

## Impact of Sport Facility Upgrade on Patron Utilisation Rate

Kim Whatt Clifford Wah(*Nanyang Technological University, Singapore*)  
· Do-Young Pyun\*(*Loughborough University, UK*)

---

### Abstract

The S\$4 million upgraded Bukit Batok Sports Hub has been serving the Bukit Batok community since its opening in December 2011. The purpose of this study is to understand the sport consumer behaviour of the Bukit Batok community towards the upgrading of the Bukit Batok Sports Hub to find out the impact of sport facility upgrade on patron utilisation rate. The System for Observing Play and Recreation in Communities direct observation instrument (McKenzie, Cohen, Sehgal, Williamson, & Golinelli, 2006) was used to find out the physical activity patterns of users of the Bukit Batok Sports Hub. A total of 1,086 people were observed. The majority of users of the Bukit Batok Sports Hub were made up of 638 users (58.75%) that were seen in the evening, 524 adult users (48.25%), and 708 male users (65.19%). The basketball court which saw 234 users (21.55%) is the most utilised facility and the street soccer court with 58 users (5.34%) is the least utilised facility. Findings indicated that the Bukit Batok Sports Hub provides various facilities which allow the community to participate in sport and understanding of the sport consumer behavior is crucial to encourage and increase patron utilisation rate of upgraded sport facilities.

*Key words: sport facility, physical activity, sport consumer behaviour*

### 1 . Introduction

Sport in Singapore is a growing sector and many sporting events and activities are being held every year such as the Standard Chartered Singapore Marathon and the Formula One Grand Prix Night Race since 2008. Not only that, citizens of Singapore have also been actively participating in physical activities and sport such as soccer, swim-

ming, jogging and basketball to name a few. The numbers are indeed increasing as shown by an island wide survey done by Sport Singapore, formerly known as Singapore Sports Council on regular sport participation rate in 2011. Singapore Sports Council (2011) reported that the incidence of regular sport participation had risen from 38% in 2001 to 42% in 2011 among the adult population aged 15 years and above in Singapore. There are

---

\* Corresponding author Email : [d.pyun@lboro.ac.uk](mailto:d.pyun@lboro.ac.uk)  
©2015 PELAB-CAU

several benefits that sport could bring. Firstly, it could allow a family to participate in sport to make time for bonding between one another. Secondly, it allows oneself to keep fit and healthy preventing illnesses such as heart diseases and obesity. Thirdly, sport participation such as playing soccer and basketball nurtures one to gain important values such as having fair play, being humble, cooperative, and showing respect to one another (Pawlowski, Downward, & Rasciute, 2011; Rasciute & Downward, 2010; Sari, 2009). The Singapore government thus needs to continue encouraging the citizens to participate in sport to ensure that they are fit and healthy to have a better quality of life and to be able to execute their activities of daily living well.

In the past few years and even currently, the government has been taking steps to build more sport facilities and upgrade the existing ones like the Woodlands Sports Centre to serve the public better and encourage them to participate in sport. The 35 hectare newly open Singapore Sports Hub which costs over S\$1.3 billion (Lin, 2014) consisting of a new stadium, a refurbished indoor stadium, an aquatic centre, a multi-purpose indoor arena, a water sport centre, a museum, a library and a retail mall, is Singapore's solution to providing a dynamic and modern sporting venue to the island nation. Hence with the government spending billions of dollars for such facilities and upgrades, they would expect to see a good return on investment. The return for the government would be to see the increase in

numbers of citizens participating and using their sport facilities.

The Housing & Development Board (HDB) in 2010 set up an initiative entitled 'The Engaging Our Heartlanders Network' with the objective of providing more opportunities for residents to bond with each other and to heighten residents' experience living in the HDB heartlands. Sport is one way that heartland residents could engage in together so that harmony, peace and a healthy relationship between one another could be formed. Through engaging in sport, heartland residents could also be physically and mentally fit so that healthy families and communities could be birth forth. Under the Jurong Town Council, the Bukit Batok community has completed the HDB's first Neighbourhood Renewal Programme project which is part of HDB's initiative to transform HDB towns into an even more vibrant and exciting place to live in. One of the highlights of the project features the new Bukit Batok Sports Hub. This Sports Hub is a unique place that caters to various sporting and leisure activities that can be enjoyed by all age groups.

This study focuses on the physical activity patterns of users of the Bukit Batok Sports Hub which has been upgraded and transformed on the seven prime facilities, including a basketball court, a street soccer court, a Sepak-takraw court, two badminton courts, a jogging track, a children's playground and multi-generation fitness corners. The S\$4 million Bukit Batok Sports Hub was officially

opened in December of 2011 and has served the community for three years and counting. There is a growing need to understand the sport consumer behaviour of the community of Bukit Batok town towards the upgrading of the Bukit Batok Sports Hub so as to find out the impact of sport facility upgrade on patron utilisation rate. To better serve the Bukit Batok community, it is crucial that the information about the physical activity patterns of users of the Bukit Batok Sports Hub be objectively identified and catalogued.

Past research has focused on characteristics which provide minimal information about the physical activity patterns of users who utilises community sport facilities. For example, certain studies only revealed that better access to parks and sport facilities influenced greater physical activity (Alexandris & Carroll, 1997, 1999). In other studies, it was acknowledged that appropriate sport infrastructure was needed to achieve the policy goal of increasing mass participation in sport in general (e.g., Sotiriadou, 2009; Xiong, 2007). Past studies in this area have been based on individual perceptions, and thus contributing to inaccurate and poor measurement of the actual results. For example, there are studies that used only subjective approach (i.e. written surveys and questionnaires) to assess the impact of utilisation rate on available sport facilities (e.g., Chad et al., 2005; Duncan, Mummery, Steele, Caperchione, & Schofield, 2009; Limstrand & Rehrer, 2008; Sternfeld, Ainsworth, & Quesenberry, 1999). Therefore, it is warranted

to find out the physical activity patterns of users of community sport facilities such as the Bukit Batok Sports Hub and to make sure that it is done in an objective manner to reduce any inaccuracies caused by individual perceptions.

The purpose of the study was to examine the utilisation rate of users on different times (e.g., morning, noon, afternoon, and evening), the age groups they belonged to (e.g., child, teen, adult, and senior), whether male or female users utilised the Sports Hub more frequently and which of the seven facilities at the Bukit Batok Sports Hub were the most and the least utilised. All these were carried out via direct observations. This information could be beneficial to the local government by providing recommendations so that steps could be taken in order to retain and attract the Bukit Batok community to use the upgraded Bukit Batok Sports Hub and also how to best allocate resources based on the usage of the Sports Hub.

## II. Literature Review

### 1. Determinants of Sport Participation

Wicker, Hallmann and Breuer (2013) described the impact of sport infrastructure on sport participation using the Becker's model (Becker, 1965). Many previous studies on sport participation have been based on this model (e.g., Breuer, 2006; Downward, 2007;

Downward & Rasciute, 2010; Downward & Riordan, 2007; Ruseski, Humphreys, Hallmann, & Breuer, 2011; Wicker, Breuer, & Pawlowski, 2009). Wicker et al. (2009) concluded that sport infrastructure was crucial towards people participating in sport as they reported that without proper infrastructure to practice sport, people would be prevented from participating in it. However, there is no investigation on other factors which affect sport participation such as time, income level, human capital, health capital, gender, age and culture.

Humphreys and Ruseski (2010) suggested in line with Becker's (1965) theory that the decisions to participate in sport by people were dependent on budgetary and time constraints. This decision was also determined by the opportunity costs of sport participation. Opportunity costs happens when a person decides to participate in sport and thus cannot work and earn money at the same given time resulting in reduction of income (Wicker et al., 2009). Previous studies done on Becker's model suggested that a person's income is an important determinant of sport participation (e.g., Berger, O'Reilly, Parent, Seguin, & Hernandez, 2008; Downward, 2007; Downward & Rasciute, 2010; Farrell & Shields, 2002; Humphreys & Ruseski, 2007). Sports like running and jogging requires little equipment such as a pair of running shoes. However, other sports like cycling, golf and tennis needs more equipment which could be more cost intensive (Taks, Renson, & Vanreusel, 1994). In gen-

eral, it is assumed that the person with the higher income should be more likely to participate in sport. In the other hand, having high income means also having high opportunity costs when participating in sport.

Downward and Rasciute (2010) described in line with Becker's model that human capital is also a determinant for sport participation. It is brought forth that people with higher education level have learnt more different sports and thus acquired more consumption skills. Consumption skills are important to practice sport and encompass both physical abilities and mental abilities such as knowing the rules of the sport and also performing under stress. Stigler and Becker (1977) proposed that people with higher education have acquired a higher level of sport-specific consumption capital.

A person's health can also be a determinant which affects the sport participation of the individual as physical abilities and health status are expected to decline with increasing age (Grossman, 1972). Gender too plays an important determinant which affects sport participation. Many past studies have shown that men are more likely to participate in sport than in women (e.g., Berger et al., 2008; Downward & Riordan, 2007; Farrell & Shields, 2002; Haug, Torsheim, Sallis, & Samdal, 2008; Lera-Lopez & Rapun-Garate, 2005, 2007). However, there are few studies that show no significant gender effect (e.g., Hallmann, Wicker, Breuer, & Schuttoff, 2011). An individual's culture or religion might also be a determinant that affects sport participation

(Breuer & Wicker, 2008). For example, Muslim women have to cover their bodies completely during participation in sport and are not allowed to practice sport in public leading to a perceived unsuitability of the environment provided for sports (Amara & Henry, 2010; Knop, Theeboom, Wittock, & Martelaer, 1996). With the aforementioned studies on determinants of sport participation, there is a need to understand the sport consumer behavior which is lacking from the above research. Furthermore, such study has yet to be done in Singapore's context and thus it is important to find out whether there is a difference between contexts for accurate assessment. All the above determinants affects the sport consumer behavior in terms of internal factors (i.e., health and gender), external factors (i.e., income level, human capital and culture), and situational factors (i.e., available sport facilities and time). This current study through the knowledge of the determinants of sport participation will further help in understanding the physical activity patterns of users of the community sport facilities.

## **2. System for Observing Play and Recreation in Communities**

A study using the System for Observing Play and Recreation in Communities direct observation instrument was done on 25 community parks in the south-eastern region of United States to find out the most frequently used activity settings (Reed et al., 2008). The nine ac-

tivity settings identified were softball and baseball fields, tennis courts, volleyball courts, natural trails (e.g., natural-surface trails, etc.), basketball courts, paved trails, Frisbee golf courses, playing fields (e.g., soccer, football, etc.), and swimming pools. Each activity setting was assessed four times a day (e.g., 7:30 AM, 12:30 PM, 3:30 PM, and 6:30 PM) for seven consecutive days at each park for a total of ten weeks.

Reed et al. (2008) concluded that more males were observed at the 25 parks (1598 male versus 946 females). The most utilised activity setting in the parks were the paved trails, and the least utilised facility was the volleyball courts. Even though the study was assessed four times a day, it never noted the frequency of users who participated at each of the four different timings. In the current study, the frequency of users of the Bukit Batok Sports Hub for the different timings are being examined to allow for a holistic measure of the patterns of physical activity of users. Thus with this data and knowledge, the local government may be able to promote sports as a way of life through organising community sporting activities so that the maximum number of Bukit Batok community residents could participate in it. This will also increase the community bonding between residents and fulfilling HDB's plan in creating a vibrant and exciting place to live in.

### 3. Participant Consumption Behaviour

Funk (2008) defined sport consumer behaviour as the process through which individuals select, purchase, use, and dispose of sport-related products and services. The sport consumer behaviour is a holistic process that describes how individuals devote available resources toward sport consumption activities (Funk, 2008). This knowledge will help improve the sport experience to provide better benefits and satisfy needs through the sport-marketing exchange process. As a result, the role of decision-making of a person to participate in sport is crucial to understanding

their sport consumer behaviour. With reference to Figure 1 below to the model of participant consumption behaviour adapted from Shank and Lyberger (2015), participation in sport by an individual is affected by three factors which are similar to the previous studies using the Becker's model (1965) as shown in the previous section. The model of participant consumption behaviour encompasses three factors namely the internal factors (i.e., personality, motivation, learning, perception and attitudes), external factors (i.e., culture, social class, reference groups and family), and the situational factors (i.e., physical surroundings, social surroundings and time; Shank &

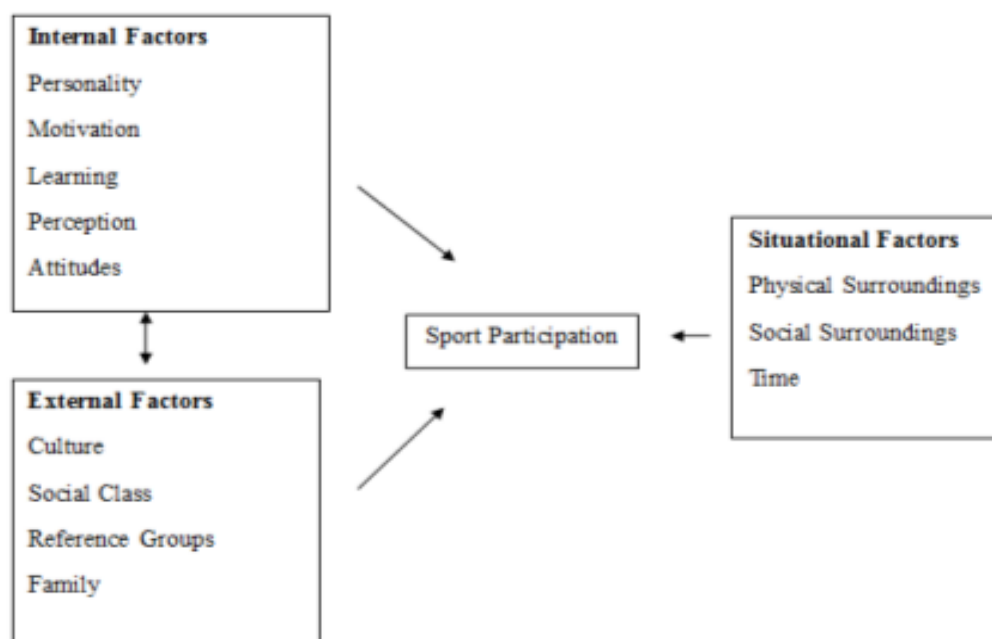


Figure 1. Model of participant consumption behaviour

Source: Adapted from Shank and Lyberger (2015)

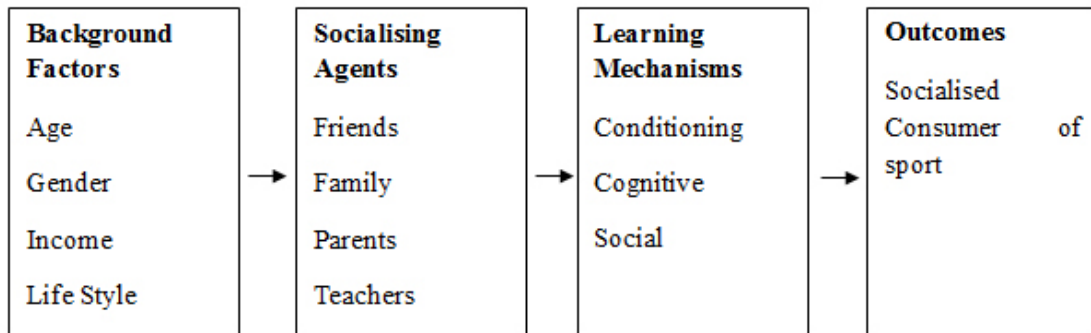


Figure 2. Model of consumer socialisation

Source: Adapted from Mowen (1993)

Lyberger, 2015). These three factors then have an impact on the person's actual participation in sport. Shank and Lyberger (2015) suggested that culture (under external factors) is the set of learned values, beliefs, language, traditions, and symbols shared by a people and passed down from generation to generation. One of the most important aspects of this definition of culture includes the learning component. Socialisation into sports occurs when there is a learning about the skills, knowledge, and attitude necessary for participating in sports (Shank and Lyberger, 2015). A model of sport socialisation in Figure 2 shows a framework for understanding how people socialise into sport. In this study, the participation in sport on the basis of age and gender of users of the Bukit Batok Sports Hub will be investigated.

Based on the aforementioned discussions, the current study will focus on and examine the situational factors (which of the seven facilities at the Bukit Batok Sports Hub are the most and the least utilised and the numbers of

users on different times(e.g., morning, noon, afternoon, and evening). The study will also examine the external factors to find out whether male or female users and the age group they belonged to (e.g., child, teen, adult, and senior) utilises the Sports Hub more frequently. To better serve the Bukit Batok community, it is crucial that the information from this study will greatly help the local government understand the sport consumer behaviour of users so as to retain and attract the community to use the Bukit Batok Sports Hub.

### III. Method

This study is focused on the population of users of the Bukit Batok Sports Hub. The physical activity patterns of users of the Bukit Batok Sports Hub were used to understand the sport consumer behaviour of the community towards the upgrading of the Sports Hub and thus find out the impact of sport facility up-

grade on patron utilisation rate.

### 1. Observation Schedule and Protocol

The seven facilities at the Bukit Batok Sports Hub were assessed four times a day (i.e., 7:30 AM, 12:30 PM, 3:30 PM, and 6:30 PM) during seven days in one week (total = seven observation days from 9 February 2015 until 15 February 2015). Observations were made during each day of the week (i.e., Monday through Sunday). The seven facilities were visited in each time period and each facility was scheduled for observation a total of 28 times. During each assessment, the observer went to each of the seven facilities at the Sports Hub and completed a coding form adapted from McKenzie et al., 2006 (see Figure 3 below). The observer first circle the period of observation at the facility. Following

that, the observer make independent visual sweeps from left to right to categorise the genders of the users. Females were observed first and then males for a maximum of six visual sweeps each. The observer noted down onto the coding form the number of females engaged in the activities of the facility based on their age group (e.g., child, teen, adult, and senior). The age groups were determined to the following criteria: Child is for children from infancy to 12 years of age, Teen is for adolescents from 13 to 20 years of age, Adult is for people from 21 to 59 years of age, and Senior is for people 60 years of age and older. After which, the same procedure was done for the male users that were present there. The observer then moved to the next facility at the Bukit Batok Sports Hub to complete the same observations until all seven facilities have been observed completely.

Date _____		Period: 7:30 AM / 12:30 PM / 3:30 PM / 6:30 PM			
Facilities	Gender	Age Group			
		Child	Teen	Adult	Senior
Basketball Court	Male				
	Female				
Street Soccer Court	Male				
	Female				
Sepak-takraw Court	Male				
	Female				
Badminton Court	Male				
	Female				
Jogging Track	Male				
	Female				
Children's Playground	Male				
	Female				
Multi-generation Fitness Corner	Male				
	Female				

Figure 3. Coding form Source: Adapted from McKenzie et al. (2006)

## 2. Instrument Development

The System for Observing Play and Recreation in Communities direct observation instrument was adapted for the collection of data for this study. The System for Observing Play and Recreation in Communities direct observation instrument has been shown to be a valid and reliable method for assessing physical activity and the context in which it occurs (McKenzie, 2002). It was created to better understand physical activity in community and recreational settings (McKenzie et al., 2006). This instrument have been used in previous observation systems: BEACHES (Behaviors of Eating and Activity for Children's Health: Evaluation Systems) (McKenzie et al., 1991), SOFIT (System for Observing Fitness Instruction Time) (Scruggs et al., 2003), and in SOPLAY (System for Observing Play and Leisure Activities) (McKenzie et al., 2000). There is evidence indicating momentary time sampling techniques yield valid behavioral samples (McKenzie et al., 2002). The rights of all human subjects were not compromised as the researcher recorded behaviours in open environments with no invasive methodologies to collect data (Reed et al., 2008). The coding form (see Figure 3) as the instrument allows analysis for the objectives of the study. The study analysis including the seven facilities at the Bukit Batok Sports Hub, timing of the observation, gender and age group of users were all tabulated based on the coding form.

## 3. Data Analysis

Counts were tallied for all variables of users of the Bukit Batok Sports Hub which include gender, age groups, and numbers of users at the four different timings across the seven different facilities of the Sports Hub. To compute these variables, daily means of counts based on the four timings (i.e., 7:30 AM, 12:30 PM, 3:30 PM, and 6:30 PM) during the seven days in one week were computed. Using these scores, the total were computed by aggregating counts across the seven facilities of the Bukit Batok Sports Hub by gender, age group (i.e., Child is for children from infancy to 12 years of age, Teen is for adolescents from 13 to 20 years of age, Adult is for people from 21 to 59 years of age, and Senior is for people 60 years of age and older), and the numbers of users at the four timings.

## IV. Results

### 1. Park User Characteristics

The physical activity patterns of users of the Bukit Batok Sports Hub were used to understand the sport consumer behaviour of the community towards the upgrading of the Sports Hub and thus find out the impact of sport facility upgrade on patron utilisation rate.

A total of 1,086 people were observed four times a day (i.e., 7:30 AM, 12:30 PM, 3:30 PM, and 6:30 PM) for the seven days from 9 February

2015 until 15 February 2015 at the Bukit Batok Sports Hub. According to Figure 4, the Bukit Batok Sports Hub's users were seen more in the evening( $n= 638, 58.75\%$ ), followed by afternoon( $n= 293, 26.98\%$ ), noon( $n= 117, 10.77\%$ ), and morning( $n= 38, 3.5\%$ ) time periods. Figure 5 shows that there were 524 adults( $48.25\%$ ), 243 children( $22.38\%$ ), 226 teens( $20.81\%$ ), and 93 seniors( $8.56\%$ ) in the Sports Hub. 708 males were observed using the Sports Hub as compared to 378 females ( $65.19\%$  vs.  $34.81\%$ ).

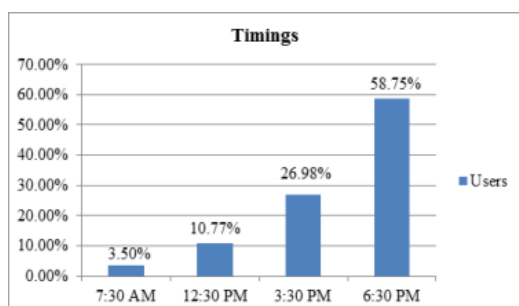


Figure 4. Proportion of Bukit Batok Sports Hub's users by timings. (N = 1,086 people)

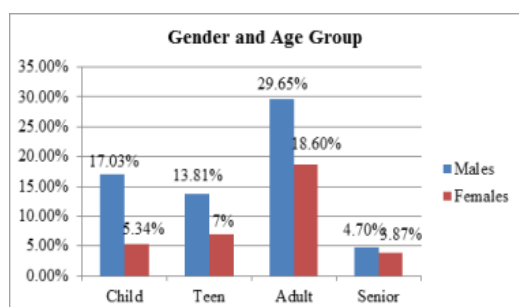


Figure 5. Proportion of Bukit Batok Sports Hub's users by gender and age groupings. (N = 1,086 people)

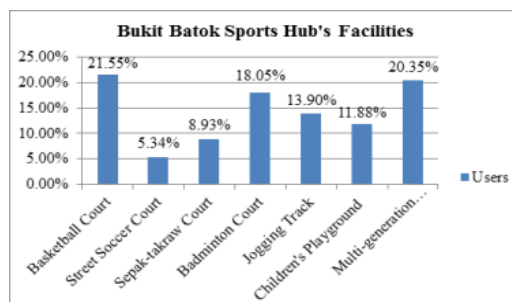


Figure 6. Proportion of Bukit Batok Sports Hub's users by the seven facilities. (N = 1,086 people)

Figure 6 shows the most frequently used facility at the Sports Hub which was the basketball court 234 users (21.55%), followed by multi-generation fitness corner 221 users (20.35%), badminton court 196 users (18.05%), jogging track 151 users (13.9%), children's playground 129 users (11.88%), Sepak-takraw court 97 users (8.93%), and street soccer court 58 users (5.34%). The observations found out firstly that most users utilised the Bukit Batok Sports Hub at 6:30 PM, secondly adult's usage were the highest, thirdly male users dominated the usage of the Sports Hub, and fourthly the basketball court was the most utilised facility and the street soccer court was the least utilised facility.

## 2. Discussion

The primary purpose of this study was to understand the sport consumer behaviour of the community of Bukit Batok town towards the upgrading of the Bukit Batok Sports Hub so as to find out the impact of sport facility upgrade on patron utilisation rate. Majority of

users utilises the Bukit Batok Sports Hub at 6:30 PM which is in line with Humphreys and Ruseski (2010) theory that the decisions to participate in sport by people were dependent on time constraints. There may be factors such as school, work, or taking care of family that may have resulted in majority of users of the Sports Hub participating in sport at 6:30 PM as compared to the other three timings. The 1,086 users utilised the seven facilities of the Sports Hub during the seven days of observation. According to the census of the Bukit Batok Central population (Singapore Department of Statistics, 2010), 1,086 people represent 4.09% of the community participating in physical activity and sport in seven days of one week. It is clear that with the providence of sport infrastructure as noted by Wicker et al. (2009), people would participate in physical activity and sport.

Adults were also seen to be the majority of users as compared to children, teens, or seniors and in line with the model of participant consumption behaviour (Shank and Lyberger, 2015), it may be the result of constant knowledge from sources be it television, newspapers, their company's work beliefs, their social circle, and their surroundings that moulded them towards having regular sport participation. The other age groups may not have the freedom of access to such sources, lack the appropriate knowledge of the advantages of sport participation, and may not have the finances to get the proper attire or equipment for sport participation. According to Grossman (1972),

there is a reduction of an individual's physical abilities with increasing age and this explains the seniors having the least sport participation. Children and teenagers are still developing their motor competency for sport and physical activity and so participation in sport may not be as high. The physical abilities and health status of adults are the most optimum for sport participation and thus the majority of users at the Sports Hub. Adults have fully developed their physical stature and also are at the age when they are the most active and healthy to participate in sport.

As with the findings of the aforementioned studies (e.g., Berger et al., 2008; Downward & Riordan, 2007; Farrell & Shields, 2002; Haug et al., 2008; Lera-Lopez & Rapun-Garate, 2005, 2007), male users utilised the facilities of the Sports Hub more often than the females. Cohen et al. (2007) examined how parks contributed to physical activity in urban areas using the System for Observing Play and Recreation in Communities direct observation instrument reported a similar finding. In the study, males used the parks more frequently than the females.

The most utilised facility is the basketball court and the least utilised facility is the street soccer court at the Bukit Batok Sports Hub. Therefore, a greater emphasis needs to be placed on finding ways to build more basketball courts when the local government are planning new or upgrading sporting facilities in neighbourhood communities. Furthermore, the local government can also research on the

viability or popularity of a street soccer court in their planning process. The most important issue is that more residents of the local communities are increasing their usage or are encouraged to use the sporting facilities after it have been constructed or upgraded.

The local government also need to strategies ways to encourage more females, child, teen, and seniors to participate in physical activity and sport. Moreover, coming up with ways on maintaining the usage of the Bukit Batok Sports Hub by the male and adult users. Taking part in regular physical activity will aid in the overall well-being of a person and this will enable the community to have a better quality of life so as to carry out their activities of daily living without any hindrances. Furthermore, the aim of HDB in transforming HDB towns into an even more vibrant and exciting place to live in will also be realised.

### 3. Conclusion

The S\$4 million Bukit Batok Sports Hub has enabled the Bukit Batok community to participate and engage in regular physical activity and sport. The Sports Hub provides various facilities which allow people of different demographics such as the different age groups and gender to sweat and exercise in its grounds. This study seeks to understand the physical activity patterns of users of the Sports Hub. Such knowledge of the sport consumer behavior of users of the Sports Hub is of importance as the results could allow the local

government to devise plans and strategies to further enhance the facilities or when planning a new facility in community neighbourhoods. Furthermore, the local government could also take steps to increase the usage or encourage the different demographics which are lacking in participation in physical activity and sport to get engage in them.

The primary limitation associated with the current study was that the usage of the Bukit Batok Sports Hub was observed for seven days only. It is essential to examine the Sports Hub's users for longer periods to better understand the physical activity patterns of users and accurately examine their sport consumption behavior of the upgraded sport facilities. Using the System for Observing Play and Recreation in Communities direct observation instrument (McKenzie et al., 2006) had made it possible to gather information about the physical activity patterns of users of the Bukit Batok Sports Hub objectively. However, having the addition of a survey method can further provide support in understanding the sport consumption behavior of users of the Sports Hub as data collected could be cross-referenced with the data from the observation method. This holistic approach allows for better accuracy of data to support the findings and objectives of the study. The System for Observing Play and Recreation in Communities direct observation instrument is also labour intensive, and if a study is conducted for a longer period of time, there should be more manpower in the research

process of the study.

Ultimately the Bukit Batok Sports Hub is constructed and upgraded in order for the community to have a place to take part in regular physical activity, sport, and to have a place to socialise so that the Bukit Batok community will be one of vibrancy and conviviality. Besides the Sports Hub enabling people to have fun, socialise, and enjoying a healthy lifestyle, sport also helps to develop positive mental qualities such as passion, creativity, a risk-taking attitude, resilience, determination, team work, fair play, and an ability to handle adversity (Pawlowski et al., 2011; Rasciute & Downward, 2010; Sari, 2009). Sport enhances one's sense of well-being and inculcates positive values necessary for success in life. With so much benefits sport could bring, understanding the sport consumer behaviour and upgrading sport facilities to meet the needs of communities have definitely birth a new sporting culture in Singapore.

## References

- Alexandris, K., & Carroll, B. (1997). Demographic differences in the perception of constraints on recreational sport participation: Results from a study in Greece. *Leisure Studies, 16*(2), 107-125.
- Alexandris, K., & Carroll, B. (1999). Constraints on recreational sport participation in adults in Greece: Implications for providing and managing sport services. *Journal of Sport Management, 13*(4), 317-332.
- Amara, M., & Henry, I. P. (2010). Sport, Muslim identities and cultures in the UK, an emerging policy issue: Case studies of Leicester and Birmingham. *European Sport Management Quarterly, 10*(4), 419-443.
- Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal, 75*(3), 493-517.
- Berger, I. E., O'Reilly, N., Parent, M. M., Seguin, B., & Hernandez, T. (2008). Determinants of sport participation among Canadian adolescents. *Sport Management Review, 11*(3), 277-307.
- Board, H. &. Development (2014, December 09). *Engaging our heartlanders*. Retrieved from <http://www.hdb.gov.sg/fi10/fi10333p.nsf/w/EOHOverview?OpenDocument>
- Breuer, C. (2006). Sport participation in Deutschland: Institute of Sport Economics and Sport Management. *German Sport University, 36*(3), 292-305.
- Breuer, C., & Wicker, P. (2008). Demographic and economic factors concerning the inclusion in the German sport system: A micro-analysis of the years 1985 to 2005. *European Journal for Sport and Society, 5*(1), 33-42.
- Chad, K. E., Reeder, B. A., Harrison, E. L., Ashworth, N. L., Shephard, S. M., Schultz, S. A., et al. (2005). Profile of physical activity levels in community-dwelling older adults. *Medicine and Science in Sports and Exercise, 37*(10), 1774-1784.
- Cohen, D. A., McKenzie, T. L., Sehgal, A., Williamson, S., Golinelli, D., Lurie, N.

- (2007). Contributions of public parks to physical activity. *American Journal of Public Health*, 97(3), 509-514.
- Department of Statistics, S. (2010, June 30). *Census of population 2010 statistical release 3: Geographic distribution and transport*. Retrieved from [http://www.singstat.gov.sg/publications-publications-and-papers/cop2010/census10\\_stat\\_release3](http://www.singstat.gov.sg/publications-publications-and-papers/cop2010/census10_stat_release3)
- Downward, P. (2007). Exploring the economic choice to participate in sport: Results from the 2002 General Household Survey. *International Review of Applied Economics*, 21(5), 633-653.
- Downward, P., & Rasciute, S. (2010). The relative demands for sports and leisure in England. *European Sport Management Quarterly*, 10(2), 189-214.
- Duncan, M. J., Mummery, W. K., Steele, R. M., Caperchione, C., & Schofield, G. (2009). Geographic location, physical activity and perceptions of the environment in Queensland adults. *Health & Place*, 15(1), 204-209.
- Farrell, L., & Shields, M. A. (2002). Investigating the economic and demographic determinants of sporting participation in England. *Journal of the Royal Statistical Society*, 165(2), 335-348.
- Funk, D. C. (2008). *Consumer behaviour for sport & events: Marketing action*, Oxford, England: Elsevier.
- Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*, 80(1), 223-255.
- Hallmann, K., Wicker, P., Breuer, C., & Schuttoff, U. (2011). Interdependency of sport supply and sport demand in German metropolitan and medium-sized municipalities: Findings from multi-level analyses. *European Journal for Sport and Society*, 8(1/2), 65-84.
- Haug, E., Torsheim, T., Sallis, J. F., & Samdal, O. (2008). The characteristics of the outdoor school environment associated with physical activity. *Health Education Research*, 25(2), 248-256.
- Humphreys, B. R., & Ruseski, J. E. (2010). The economic choice of participation and time spent in physical activity and sport in Canada. *Edmonton: University of Alberta, Department of Economics, Institute for Public Economics*.
- Humphreys, B. R., & Ruseski, J. E. (2007). Participation in physical activity and government spending on parks and recreation. *Contemporary Economic Policy*, 25(4), 538-552.
- Knop, P. D., Theeboom, M., Wittcock, H., & Martelaer, K. D. (1996). Implications of Islam on Muslim girls' sport participation in Western Europe: Literature review and policy recommendations for sport promotion. *Sport, Education and Society*, 1(2), 147-164.
- Lera-Lopez, F., & Rapun-Garate, M. (2005). Sports participation versus consumer expenditure on sport: Different determinants and strategies in sports management. *European Sport Management Quarterly*, 5(2), 167-186.
- Lera-Lopez, F., & Rapun-Garate, M. (2007). The demand for sport: Sport consumption and par-

- participation models. *Journal of Sport Management*, 21(1), 103-122.
- Limstrand, T., & Rehrer, N. J. (2008). Young people's use of sports facilities: A Norwegian study on physical activity. *Scandinavian Journal of Public Health*, 36(5), 452-459.
- Lin, M. (2014, June 27). *Singaporeans get first close-up glimpse of the sports hub and its facilities*. Retrieved from <http://www.straitstimes.com/the-big-story/sports-hub/story/singaporeans-get-first-close-glimpse-the-sports-hub-and-its-facilities>
- McKenzie, T. L. (2002). Use of direct observation to assess physical activity. In *Physical Activity Assessments for Health-Related Research* (pp. 179-195). Champaign, IL: Human Kinetics.
- McKenzie, T. L., Cohen, D. A., Sehgal, A., Williamson, S., & Golinelli, D. (2006). System for observing play and leisure activity in communities (SOPARC): Reliability and feasibility measures. *Journal of Physical Activity and Health*, 3(1), 208-222.
- McKenzie, T. L., Marshall, S. J., Sallis, J. F., Conway, T. L. (2000). Leisure-time physical activity in school environments: an observational study using SOPLAY. *American Journal of Preventive Medicine*, 30(1), 70-77.
- McKenzie, T. L., Sallis, J. F., Patterson, T. L., Elder, J. P., Berry, C. C., Rupp, J. W., et al. (1991). BEACHES: An observational system for assessing children's eating and physical activity behaviors and associated events. *Journal of Applied Behavior Analysis*, 24(1), 141-151.
- Mowen, J. (1993). Model of consumer socialisation. In *Consumer Behavior* (3rd ed.). New York: Macmillan
- One, A. (2011, December 04). *Jurong gets its own sports hub*. Retrieved from <http://news.asiaone.com/News/AsiaOne+News/Singapore/Story/A1Story20111204-314323.html>
- Pawlowski, T., Downward, P., & Rasciute, S. (2011). Subjective well-being in European countries—On the age-specific impact of physical activity. *European Review for Ageing and Physical Activity*, 8(2), 93-102.
- Rasciute, S., & Downward, P. (2010). Health or happiness? What is the impact of physical activity on the individual?. *Kyklos*, 63(2), 256-270.
- Reed, J. A., Arant, C., Wells, P., Stevens, K., Hagen, S. & Harry, H. (2008). A descriptive examination of the most frequently used activity settings in 25 community parks using direct observation. *Journal of Physical Activity & Health*, 5(1), 183-195.
- Ruseski, J. E., Humphreys, B. R., Hallmann, K., & Breuer, C. (2011). Family structure, time constraints, and sport participation. *European Review for Ageing and Physical Activity*, 8(2), 57-66.
- Sari, N. (2009). Physical inactivity and its impact on healthcare utilization. *Health Economics*, 18(8), 885-901.
- Scruggs, P., Beveridge, S., Eisenman, P., Watson, D., Schultz, B., Ransdell, L. (2003). Quantifying physical activity via pedometry

- in elementary physical education. *Medicine & Science in Sports & Exercise*, 35(6), 1065-1071.
- Shank, M. D., & Lyberger, M. R. (2015). *Sports marketing a strategic perspective* (5th ed.). New York: Routledge.
- Sports Council, Singapore (2011). *National sports participation survey 2011*. Singapore: Singapore Sports Council.
- Sotiriadou, K. (2009). The Australian sport system and its stakeholders: Development of cooperative relationships. *Sport in Society*, 12(7), 842-860.
- Sternfeld, B., Ainsworth, B. E., & Quesenberry, C. P. (1999). Physical activity in a diverse population of women. *Preventive Medicine*, 28(3), 313-323.
- Taks, M., Renson, R., & Vanreusel, B. (1994). Of sport, time and money: An economic approach to sport participation. *International Review for the Sociology of Sport*, 29(4), 381-395.
- Wicker, P., Breuer, C., & Pawlowski, T. (2009). Promoting sport for all to age-specific target groups: The impact of sport infrastructure. *European Sport Management Quarterly*, 9(2), 103-118.
- Wicker, P., Hallmann, K., & Breuer, C. (2013). Analyzing the impact of sport infrastructure on sport participation using geo-coded data: Evidence from multi-level models. *Sport Management Review*, 16(1), 54-67.
- Xiong, H. (2007). The evolution of urban society and social changes in sports participation at the grassroots in China. *International Review for the Sociology of Sport*, 42(4), 441-471.

Received: 04 December 2015

Revised: 14 December 2015

Accepted: 23 December 2015