

AFFORDANCES OF SCHOOL GROUNDS FOR CHILDREN'S OUTDOOR  
PLAY AND ENVIRONMENTAL LEARNING

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This thesis is dedicated to my parents, husband and son.  
For their endless loves, blessings, supports and encouragements.

*“Thank you for your sacrifices along this PhD journey.  
I love you mak, abah, sayang and Haziq”.*

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## ABSTRACT

Children's outdoor play in school grounds is a fundamental component of their environmental learning because it creates meaningful, enduring environmental connections and increases children's performances. However, the extent of children's engagement in outdoor play and the way they can learn through play is strongly influenced by the physical and social contexts of school grounds. Adults and schools, have often overlooked the values of outdoor play for learning that takes place outside the classroom. Thus, many schools are designed without considering children's needs and desires. The spaces in schools are shaped with mediocre design standards and school grounds are not recognised as essential to a school's mission or curriculum. This study explores the factors that influence children's play behaviour patterns and the actualisation of affordances in school grounds, and the connection with children's conception of ideal school grounds for outdoor play and environmental learning. This study was conducted with children (n=80) and teachers (n=71) at two primary schools in the state of Johor, Malaysia. Data on the children's behavioural and perceptual responses were elicited using five methods: walkabout interview and mapping, photography, drawing, preference survey and survey questionnaire. The data were analysed using descriptive statistics, Rasch Model, and spatial and content analysis. The results revealed different play behaviour patterns and preferences among children regarding the use of school grounds during non-formal and informal learning sessions. The differences that were identified were influenced by the degree of functionality, attractiveness, aesthetic quality, comfortability, accessibility and safety of the school ground environments. The findings of the actualisation of affordances and children's conceptions of ideal school grounds suggest that children desire school ground environments that meet their physical, communal, emotional and educational needs. These findings contribute to a better understanding of children's interaction with and perceptions of their school grounds environment, and highlight the importance of such environments in promoting outdoor play and environmental learning.

## ABSTRAK

Permainan kanak-kanak di perkarangan sekolah merupakan komponen asas dalam pembelajaran persekitaran mereka kerana ia dapat mewujudkan hubungan alam sekitar yang bermakna dan berpanjangan, selain dapat meningkatkan prestasi mereka. Bagaimanapun, setakat mana kanak-kanak dapat bermain dan bagaimana mereka boleh belajar melalui bermain sangat dipengaruhi oleh konteks fizikal dan sosial di perkarangan sekolah. Orang dewasa dan pihak sekolah seringkali memandang enteng akan kepentingan bermain di luar bilik darjah. Oleh itu, banyak sekolah direkabentuk tanpa mengambil kira keperluan dan kehendak kanak-kanak. Piawaian rekabentuk ruang-ruang di sekolah dan penyediaan perkarangan sekolah kurang diberi perhatian dan dianggap tidak mempunyai kepentingan kepada misi atau kurikulum sesebuah sekolah. Kajian ini mengkaji faktor-faktor yang mempengaruhi corak tingkah laku bermain di kalangan kanak-kanak dan tahap *affordance* di perkarangan sekolah, serta kaitannya dengan konsep perkarangan sekolah yang unggul untuk permainan luar dan pembelajaran persekitaran kanak-kanak. Kajian ini dilakukan melalui penglibatan kanak-kanak (n=80) dan guru-guru (n=71) di dua buah sekolah rendah di negeri Johor, Malaysia. Data kelakuan dan persepsi kanak-kanak diperolehi dengan menggunakan lima kaedah: temuduga tinjauan dan pemetaan, fotografi, lukisan, kajian keutamaan dan soalselidik. Data dianalisis menggunakan statistik deskriptif, Model *Rasch*, dan analisis kandungan dan reruang. Kajian mendapati terdapat perbezaan dalam corak tingkah laku bermain dan kegemaran di kalangan kanak-kanak dari segi penggunaan kawasan perkarangan sekolah semasa sesi pembelajaran di luar bilik darjah dan sesi pembelajaran tidak formal. Perbezaan ini dipengaruhi oleh tahap fungsi, daya tarikan, kualiti estetik, keselesaan, kemudahsampaian dan keselamatan di kawasan perkarangan sekolah. Penemuan kajian mengenai tahap *affordance* dan konsep perkarangan sekolah yang unggul bagi kanak-kanak mencadangkan bahawa kanak-kanak mahukan kawasan perkarangan sekolah yang dapat memenuhi keperluan fizikal, sosial, emosi dan pendidikan mereka. Penemuan ini menyumbang kepada kefahaman yang lebih baik berkaitan persepsi kanak-kanak dan interaksi mereka dengan kawasan perkarangan sekolah, selain menegaskan kepentingan kawasan tersebut dalam mempromosikan permainan luar dan pembelajaran persekitaran di kalangan kanak-kanak.

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## LIST OF ABBREVIATIONS

3K Programme	-	School Safety, Health and Beautification Programme
3Rs	-	Reading, Writing and Arithmetic
DASN	-	Dasar Alam Sekitar Negara / <i>National Policy on the Environment</i>
DOE	-	Department of Environment
EE	-	Environmental education
EFU	-	Equipment and Features Used
FCA	-	Field of constrained action
FFA	-	Field of free action
FPA	-	Field of promoted action
GARS	-	Government Aided Religious School
GIS	-	Geographical Information System
KBSM	-	Kurikulum Bersepadu Sekolah Menengah / <i>Integrated Secondary School Curriculum</i>
KBSR	-	Kurikulum Bersepadu Sekolah Rendah / <i>Integrated Primary School Curriculum</i>
LESTARI	-	Institut Alam Sekitar dan Pembangunan / <i>Institute for Environment and Development</i>
LOP	-	Location of Play
MOE	-	Ministry of Education
NGO	-	Non-government organizations
NRE	-	Ministry of Natural Resources and Environment
P-E	-	Person-environment
PIBG	-	Persatuan Ibu Bapa dan Guru / <i>Parent-Teacher Association</i>
PLBD	-	Pembelajaran Luar Bilik Darjah / <i>Teaching and Learning Outside Classroom</i>



POP	-	Procedures of Play
PWD	-	Public Works Department
SD&PL	-	School Design and Planning Laboratory, University of Georgia
SJK(C)	-	Sekolah Jenis Kebangsaan (Cina) / <i>National-type schools</i>
SJK (T)	-	Sekolah jenis Kebangsaan (Tamil) / <i>National-type schools</i>
SK	-	Sekolah Kebangsaan / <i>National schools</i>
SLAAS	-	Sekolah Lestari - Anugerah Alam Sekitar / <i>Sustainable School - An Environment Award</i>
SOC	-	Social Interaction
SOPLAY	-	System for Observing Play and Leisure Activity in Youth
TOP	-	Time of Play
UK	-	United Kingdom
UPSR	-	Ujian Pencapaian Sekolah Rendah / <i>Primary School Achievement Test</i>

## LIST OF TERMINOLOGY

- AEIOU, stop!* – A rule game that requires a group of players to stop from moving when a player (called as *Tukang Jadi* or leader) said *AEIOU*, or else the players who moves will be caught by the leader.
- Astaka* – A pavilion, dais or stage
- Baby Lotion* – A game that involves two players. They clap their hands while singing the game’s song. The game starts with slow steps and rhythms, and become faster gradually.
- Batu Seremban* – It is a traditional game that involves two or more players and has seven levels. It uses objects such as marble ball, rubber seeds, small stones or other round objects. It also called as *Seven Stones* game.
- Bentes* – Sliding tackle
- Bola Beracun* – ‘Poisonous ball’ or ‘rubber ball’ game is a traditional game that involves group(s) of players. There are many ways of playing the game. The rule is they have to avoid the poisonous ball that has been thrown by other players.
- Ceper* – *Ceper* means bottle cap. *Ceper* game is a traditional game that uses five pieces of bottle cap and usually involves two players or more.
- Cop Tiang* – *Cop* means keep and *tiang* means column. *Cop Tiang* is a rule game that requires the players to keep their columns from being stolen by other player.

- Dataran* – Huge courtyard with hard, relatively smooth surface
- Datuk Harimau* – A rule game with a game's song. It requires a player as a 'tiger', a player as a 'hen' and other players as 'chicks'. The hen has to protect the chicks who queuing behind him/her from being caught by the tiger.
- Galah Panjang* – A rule game that involves two groups; defender and striker. The defender has to keep the lines (of court) from being circumvented by striker. The striker has to avoid from being touched by defender while trying to cross the lines.
- Gotong-royong* – Communal work that involves cooperation among many people to attain a shared goal.
- Ice-water – Chasing and running game that involves two groups; ice and water. A group chases another group according to their turns.
- Jungkit Kuda* – A game that requires the player to pretend that he/she is riding a horse by making the repetitive up-down movement. Normally a group of children participate and race amongst them to the finishing line.
- Jus* – A way to determine players' turn before performing any games.
- LaiLaiCi* – Thumb wrestling game that involves two players
- Laman Sinar Harapan* – A garden's name in the rural school
- Laman Titipan Budi* – A garden's name in the rural school
- Lubang Tikus* – A game that involves three players or more. Two players make obstructions by their hands (*Lubang Tikus*) while other player(s) jumping over or going through the obstructions.

- Main Kucing* – A rule game that requires a player as a ‘*cat*’. He/she stands in the middle of circle create by other players and has to catch the ball throw by other players.
- Rempuh-rempuh* – Stampede game
- Rubber Ball* – The rules of game is similar to Poisonous Ball game.
- Sepak takraw* – Kick volleyball, is a sport native to the Southeast Asia. It uses a rattan ball and the players only can use their feet, knee, chest and head to touch the ball.
- Taman Jauhari* – A garden’s name in the rural school
- Teng-teng* – Hopscotch
- Teratak Minda* – A pavilion in the rural school
- Toyol* – A *Toyol* or *Tuyul* is a mythical spirit in the mythology of South-East Asia, especially in Indonesia, Malaysia, Thailand and Singapore.
- Vitagen* – A brand of cultured milk drink

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Introduction**

The quality of life and of the environment can never be improved without an understanding of the person-environment relationship. In the context of children's environments, there is a need to understand children's perceptions about their environment. An understanding of children's perceptions will lead to an understanding of their emotions, needs, preferences and interactions (Nor Fadzilla and Ismail, 2013). Indeed, perceptions are a good predictor of people's behaviour in some contexts (Ball et al., 2008) when the psychology behind their behaviour remains unexplained by the objective measure approach (Ward Thompson, 2013). It is an essential part of the process of creating a child-friendly environment that will offer more meaningful experiences for children through an encouraging engagement and interaction with the environment. To address this concern, the research presented in this thesis was designed to explore children's perceptions of their school grounds as a learning environment and site for their performances through outdoor play activities in the context of primary schools in Malaysia.

The school grounds is the outdoor environment at school with potential affordances to be actualised by children for their outdoor play activities. The extent of the potential and the actualisation of affordances, and the way children can learn through play, is strongly influenced by the design and culture of the school grounds (Dyment and Bell, 2007). The design and culture of the school grounds transmits messages about the school (Freeman and Tranter, 2011) that expresses the societal

norms and objectives regarding the use of the school grounds for children's outdoor play activities (Gagen, 2000; Moore and Wong, 1997; Titman, 1994; Moore, 1989). An appropriate school grounds environment contributes to children's positive development and well-being and provides the functional requirements for educational activities (Titman, 1994; Stine, 1997; Cohen and Trostle, 1990). Besides exploring the affordances of the school grounds as a learning environment and children's performances, this research seeks to probe the meaning associated with the ideal school grounds environment from children's perspectives, as they are the primary and active occupants of the environment. In essence, this research is directed at underlining the significant roles of school grounds as a site for children's performances in order to identify improvement strategies for school grounds which take into account children's action and perceptions. Previous studies that have focused on the value of improving school grounds as sites for children to play and learn have consistently demonstrated an enrichment of children's attitudes, behaviour and learning skills (Tranter and Malone, 2004; Moore and Wong, 1997; Titman, 1994; Young, 1990).

Schools were considered as potential sites to conduct the research because they provide the opportunities for children to interact with the school environment through movement, investigation, concentration and social interaction. Recent years, have seen a growing number of discourses regarding the roles of school grounds in promoting children's physical, social and cognitive development and children's health (Ozdemir and Yilmaz, 2008; Willenberg et al., 2010) and as potential sites for place-based or environmental learning and instruction (Malone and Tranter, 2003a, 2003b; Dymont, 2005; Dymont et al., 2009; Powell, 2007; Stanley 2010). Children's outdoor play in school may forge meaningful, continuing environmental and social connections and may enhance children's performances because it is an experiential phenomenon that is shaped or influenced by the outdoor context. Consistent with the nature of childhood, children learn during play. Play contributes to children's performances, physically, socially and cognitively. Physically, play directly influences children's motor and sensory activities with the landscape elements and spatial patterns of outdoor spaces that are accessed during hands-on experiences. Socially, play facilitates interaction through sharing, negotiating and turn-taking with peers. Cognitively, play helps children to understand about the

environment around them through exploration and discovery (Chawla and Heft, 2002). Therefore, children's outdoor play in the school grounds is a fundamental component of informal learning, which has been referred to as environmental learning by Tranter and Malone (2004).

The development of research that views the potential of school grounds as a site for children's play and learning has attracted increasing attention in recent years due to a range of occurrences that are hindering children's play experiences in other outdoor environments. In many countries over the last few decades, including Malaysia, there has been a dramatic change in children's lives where children have lost the freedom to actively and independently play in their neighbourhoods and cities. Children today have also lost any opportunities to have contact with nature in their daily lives. The erosion of opportunities for children's outdoor free play and interaction with the natural environment is due to rapid urbanisation in many developed and developing countries. Many cities have become negative places in which to live (Taylor et al., 1998), especially for children due to the increasing amount of street traffic (Castonguay and Jutras, 2010; Hüttenmoser, 1995), badly planned urban environments, pollution, and other hazards that have contributed to a diminished access to the outdoor environment. These developments have also contributed to the increase in concerns regarding children's safety (Blakely 1994; Prezza, 2007) and health that has led to adults' misconceptions about the risks and values of play for children, especially for those who live in big cities and have a higher socioeconomic status (Veitch et al., 2008). Adults view the outdoor environment as being negative for children and outdoor free play as being meaningless and hazardous (Thomson, 2007; Factor, 2004). Additionally, the increase in the creation of indoor play technologies, such as video games and PlayStations or X-boxes has changed the habits of children to playing inside more than actively playing in the outdoor environment (Veitch et al., 2006). As a result of these changes, it is increasingly uncommon to see groups of children playing in the outdoor environment without adult supervision. The factors that influence children's outdoor free play are interrelated and complex. Table 1.1 summarises the influential factors into individual, physical and social factors.



**Table 1.1:** The factors that influence children's free play in outdoor environment

Category	Factors	Authors (year)	Descriptions
Individual factors	Demographic factors	Prezza (2007), Blakely (1994)	Factors relating to age, gender and ethnicity. Younger children and girls normally have less autonomous mobility.
	Socioeconomic status	Veitch et al. (2008), Valentine and McKendrick, 1997)	The status of family income, that is, low, medium or high income family.
	Place's experiences	van Andel (1990), Castonguay and Jutras (2009)	Children's familiarity with places and specific experiences with the place and its features.
	Attitude to active play	Veitch et al. (2006)	Individual preferences, positive or negative attitudes towards active play.
Physical factors	Design and quality of environment	Heusser et al. (1986), Veitch et al. (2006, 2008), Dymont et al. (2009)	Provision of facilities including playgrounds, parks and accessibility for play.
	Urban design and safety	Hüttenmoser (1995)	Elements of urban design and street design which influence choices of place for active play.
	Environmental affordance	Castonguay and Jutras (2010), Holt et al. (2008)	The availability of functional properties of the outdoor environment.
Social factors	Parental restriction and level of children's independence	Prezza (2007), Kytä (2004), Veitch et al. (2008)	Parental fears regarding the children's safety increase the restrictions on playing outside, as well as decreasing children's autonomous mobility.
	Bad people and culture	Castonguay and Jutras (2010)	Exposure to strangers, teenagers, elements related to drug culture (syringes) and negative cultures.
	Social aspects	Wilkinson (1985), van Andel (1990)	Impact of friends, peers, neighbours in children's play.
	Impact of friends, peers, and neighbours in children's play.	Valentine and McKendrick, 1997)	Social interaction between parents in establishing the local 'norm'.

Source: Derived and modified from Nor Fadzila and Ismail, 2012b

Such changes that hinder children's outdoor free play and contact with nature certainly have profound repercussions on their psycho-physical development (Castonguay and Jutras, 2010) and contribute to the rise in psychopathology among children (Gray, 2011). Previous studies have suggested that a lack of engagement with the outdoor natural environment may contribute to lower performances among children in three aspects: physical, social and cognitive (Bartlett 1997; Hüttenmoser 1995).

Thus, children's freedom to play and their access to an outdoor natural environment has declined significantly in recent years. However, for many children,

the school grounds is one of the few remaining outdoor environments that allow them to actively play with their peers and engage with nature. School grounds are being considered as a place safe from traffic and strangers. Furthermore, children spend a large proportion of their time at school along with in their homes and at other recreational facilities. The school grounds environment also has been recognized as a key setting to promote and contribute to children's physical, social and cognitive development. Therefore, the school grounds as an environment that is associated with natural elements could become the primary place which provides good opportunities for children to gain an experience of nature (Hart,1993).

## **1.2 Statement of Problem**

Schools have become one of the important 'places for children' (Rasmussen, 2004) as children engage with this institutional location in their everyday lives. Schools are included in the 'institutional triangle' that circumscribes children's daily lives (Zeicher, 2003), including home arenas and recreational facilities. In recent years, schools have become increasingly seen as places that should provide the best development opportunities for children where formal, standard-based instruction has increased (Pellegrini, 2005). However, teachers and parents tend to focus more on what happen in the conventional classrooms where the serious matter of learning normally happens at schools. Academic excellence is seen as the main indicator in children's success as adults often overlook the values of outdoor play and informal learning that lies outside the classroom. This is due to their perception that the creative, widespread use of school grounds for play is hazardous and irrelevant (Factor 2004; Thomson 2007; Stanley 2010). This perception is associated with adults' misconception of risk (Rudner, 2012) that leads them to view the environment as negative and children as potential victims. The overriding concern about risk makes adults often disregard the connection of outdoor play in the school grounds to children's environmental learning. Therefore, school grounds are often the least considered area, or are perceived only as places of secondary importance and are not recognised as being essential to a schools' mission or curriculum (Tranter and Malone, 2004).

Despite the importance of schools in children's lives, children are generally ignored as information sources in the planning and design of schools (Hart, 2002). Many schools are designed without considering the children's needs and desires, and spaces at schools are often shaped with mediocre design and building standards (Tanner, 2000). The design, policy and management of schools are strongly influenced by the values of adults (Malone and Tranter, 2003b), who often emphasise neatness, simplicity of maintenance, litigation concerns, and the behaviour management of children. Therefore, many schools are designed with conventional school grounds that primarily consist of open expanses of turf and asphalt (Dyment et al., 2007), with a low quality of landscape and a minimal amount of utilized and shaped affordances (Ozdemir and Yilmaz, 2008; Kyttä, 2003). Therefore, in many developing countries, including Malaysia, outdoor environmental learning in school grounds is minimal due to the lack of outdoor spaces and amenities for environmental learning. The conventional design of school grounds limits the active learning and physical activities for children because the outdoor setting does not provide opportunities for children to explore or learn from the natural landscape, either in formal or informal ways (Rivkin, 1995). Typically the landscape design of school grounds in Malaysia has been proven to be unsuccessful in meeting children's needs and certainly provides no substitute for meaningful outdoor environmental experiences for children (Nik Roh Hayati, 2008; Khazainun, 2007). Conventional school grounds also have their limitations in promoting physical activity mainly because many children are not interested or able to play in such vigorous, rule-bound activities. In other words, they do not support children's cognitive and physical development or the children's need for a variety of interests and abilities (Lindholm, 1995; Dyment et al., 2007).

In 2012, out of the whole population in Malaysia 10.1% (approximately three million) were children aged between 6-11 years old (Ministry of Education Malaysia, 2013a). In that year, approximately 2.8 million children enrolled at primary schools in Malaysia, giving an enrolment rate of 94.5% (Ministry of Education Malaysia, 2013a). Thus, there is a large population of children in Malaysia and an increasing number of children entering schools. Therefore, there is a need to address the issues related to designs and policies of school grounds due to concerns on the importance for children's healthy development through outdoor play

and environmental learning. Increasingly, national attention is focused on the need to improve the learning environment in Malaysia with the implementation of initiatives, such as the 3K programme and the Sustainable School - an Environment Award programme, that highlight the importance of safety, hygiene and school improvement in enhancing children's performances and promoting the culture of environmental learning. Therefore, there is a need for new criteria to be included in planning directives to ensure an outdoor learning environment with landscape qualities representing affordances and challenges for children at school regarding their outdoor play and environmental learning. In order to improve children's interaction with the outdoor environment at school, it is important to consider the ways in which the school grounds are designed and experienced.

### **1.3 Research Gap**

Recently, there has been a variety of research about school grounds, but most studies have focused either on the impacts of the physical environment on children's behaviour and levels of physical activity or on children's perception of their school grounds environment. For example, Willenberg et al. (2010), Jones et al. (2010), and Haug et al. (2008, 2010) suggested that the provision of more sports equipment and outdoor facilities stimulated more physical activity. Likewise, studies on school grounds greening (Jansson and Mårtensson, 2012; Samborski, 2010; Dymont et al., 2009) have found that a diverse school ground environment offered children access to nature, and they had greater opportunities to engage in a range of activities. Wolsey and Uline (2010) and Singal and Swann (2011) studied the children's perceptions regarding places that support their learning inside and outside school while research conducted by Malone and Tranter (2003b), Dymont (2005) and Dymont and Bell (2007) studied the physical and social factors that influence children's environmental learning in the context of school grounds. Khazainun's (2007) study focused on children's conception of the ideal school grounds without studying children's behavioural responses within the environment. The research concerns of previous studies on school grounds are summarized in Table 1.2.

**Table 1.2:** Summary of studies on school grounds environment

<b>Authors (years)</b>	<b>Research concern</b>	<b>Findings</b>
Willenberg et al. (2010), Jones et al. (2010), Haug et al. (2008, 2010)	The relationship between school playground characteristics and children's activity level.	The provision of more sports equipment and outdoor facilities stimulated more physical activities.
Jansson and Mårtensson (2012), Samborski (2010), Dymont et al. (2009), Ozdemir and Yilmaz (2008), Lindholm (1995)	The impact of school-grounds greening on children's play and activities	Children in good schoolyards (with access to natural areas) took part in a greater number of activities than children in poor ones.
Wolsey and Uline (2010), Singal and Swann (2011), Powell (2007)	Children's perception of their learning environment	Outside school learning experiences, both structured and less formalized, were perceived by children as being more active, collaborative and challenging, contributing to their understanding of their place within the environment.
Malone and Tranter (2003b), Dymont (2005), Dymont and Bell (2007)	The influential factors on children's environmental learning	The variations in the types of play and environmental learning are related to variations in the physical qualities of the school grounds, and the school philosophies concerning the use and management of the outdoor school environments.
Khazainun (2007)	Children's conception of ideal school ground	Children desired a more diverse, rich natural environment that affords them opportunities to play, learn and socialize with peers.

However, the studies overlooked the connection between the physical environment and the social context of school grounds regarding the actualisation of affordances and the formation of children's preferences. Research focusing on children's values of outdoor play for environmental learning in relation to the physical and social contexts of school grounds is less studied, and this is the research gap this study aims to fill. Therefore, more comprehensive research is required to explore the connection between children's experiences within the designed school grounds environment with their perceptions of the ideal school grounds for environmental learning. As argued by Kytä (2003), individuals apply the knowledge gained from past experience to realise the future potential of their environment; the process is both retrospective and prospective (Heft, 2001). The level of actualised affordances seems to have influenced the perception of prospective affordances of the environment. In an effort to create better school grounds environments for children's outdoor play and environmental learning, there is a need to understand both the behavioural and perceptual responses of children. Therefore, the actual

phenomenon of the person-environment relationship should be understood, in order to fit in with the conception of ideal school grounds that reflects children's needs and preferences. This thesis, therefore, attempts to focus on investigating the factors that influence the actualisation of affordances on school grounds and their connection with children's conception of the ideal school grounds for outdoor play and environmental learning.

#### **1.4 Research Aim**

The aim of this study is to identify the influential factors affecting the actualisation of affordances and children's preferences regarding the use of school grounds for outdoor play and environmental learning. The factors include both the encouraging and restricting ones. Therefore, the study will reveal the properties and attributes of the environment that support children's outdoor play and environmental learning.

#### **1.5 Research Objectives**

To achieve the research aim, the following objectives are formulated:

- (i) to explore the affordances of the school grounds from the children's perspective;
- (ii) to identify the factors that influence the level of actualised affordances in the school grounds;
- (iii) to explore the perceptions of children and teachers on the use of school grounds for environmental learning; and
- (iv) to distinguish the meaning of ideal school grounds that permit environmental learning.

## **1.6 Scope and Limitation**

The study is based in transactional psychology research which investigates the person-environment relationship. It explores the behavioural and perception responses of primary school children, aged 8-11 years old, to the use of school grounds for outdoor play and learning. The study was conducted in two primary schools in Johor, Malaysia, which represented the urban and rural schools as the context of the study. The children's outdoor play and learning in the school grounds is a phenomenological context that explains their relationship within the context based on what has been offered, promoted and limited to them (fields of action on potential affordances). The physical and social factors of the school grounds (independent variables) are expected to influence children's play behaviour patterns and performances physically, socially and cognitively (dependent variables). In addition, it is expected that their experiences in the school grounds will influence their perception of their school grounds, so that they consider them as either positive or negative. This study also discusses children's conception of the ideal school grounds for outdoor play and environmental learning, which represents their needs and preferences.

However, it is beyond the scope of this study to examine the behavioural and perception responses due to different gender, ethnic, socio-economic and cultural factors. This is because the childhood education sector provides equal facilities to all children regardless of their gender, ethnic, socio-economic and cultural background.

## **1.7 Significance of Study**

The study is significant in order to respond to the problem statement and research gap:

- (i) The study adds to the body of knowledge that the physical environment and culture of a school's grounds play an important role

in children's performances physically, socially and cognitively, which contributes to their environmental learning;

- (ii) A model of analysis which emphasizes the importance of environmental qualities, representing both affordances and constraints, for children's outdoor play and environmental learning is formulated. The formulation of the model is based on children's behavioural and perception responses to the actualisation of affordances of the school grounds.
- (iii) From the aspect of planning and design, the study reveals the properties, attributes and key dimensions that support children's outdoor play and environmental learning in the school grounds, taking into account the children's preferences and needs, as will be demonstrated in the model of school grounds design.

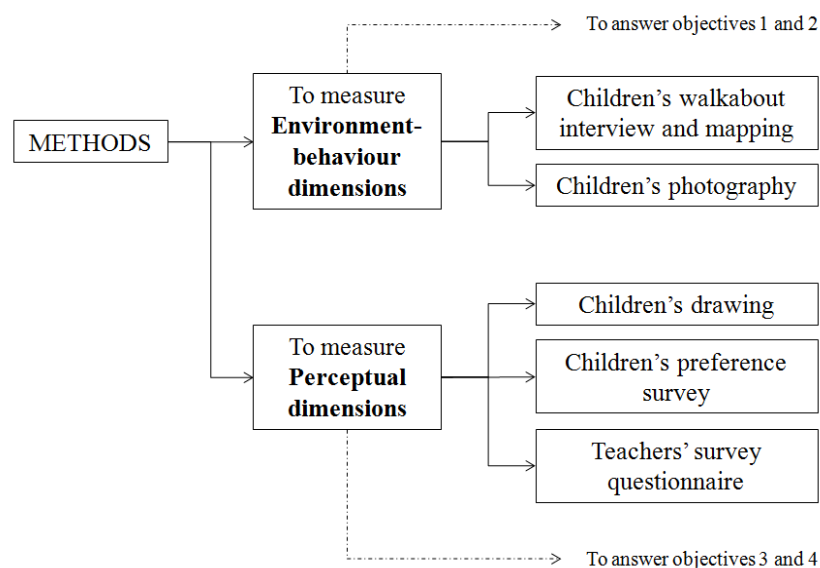
## **1.8 Outline of Research Methodology**

The study explores the properties and attributes that influence children's behavioural and perception responses regarding their outdoor play and environmental learning in school grounds. Therefore, the study focuses on middle childhood children (aged 8-11 years) as its main respondents. The reason for choosing middle childhood children is because it is the most important stage of children's development, whereby through their social, cognitive, emotional and motor development they gain a logical and positive perception of becoming adolescents and adults (Moore, 1978; Matthews, 1987). They have the ability to interpret their experiences, preferences and feelings as they use the outdoor environment extensively (Chawla, 1992; Kellert, 2002). They perceive that play in outdoor environments offers them various exciting and challenging play elements and provides them with the opportunity to choose, make decisions, experiment, and imagine and create new things (Cobb, 1977). In order to obtain a deeper understanding of the phenomenological inquiry into the relationship between children and their school grounds environment, the study engaged the children in research. The study utilised walkabout interviews and mapping, photography,



drawing, and a preference survey with the children to elicit data on their outdoor play activities, preferences and needs regarding a school grounds environment.

As well as having middle childhood children as the main respondents, the study also involved the teachers in order to elicit data regarding their beliefs, practices and barriers on the use of the school grounds as a learning environment (Ernst, 2013). It is anticipated that the data gained from the teachers will lead to a better understanding of the children's interaction with the school grounds environment, as well as giving information about the potentials of and barriers to the use of school grounds as a site for outdoor play and environmental learning. Subsequently, teachers play a significant role in encouraging or limiting children's outdoor play and environmental learning in the school grounds. Survey questionnaires consisting of closed and open-ended questions were used to collect the data from the teachers. In sum, the study used five methods to measure the environment-behaviour dimensions and perceptual dimensions. The methods for the environment-behaviour dimensions include children's walkabout interviews and mapping, and photography by children in the school grounds. Meanwhile, the methods for the perceptual dimensions include children's drawings, a children's preference survey and a teachers' survey questionnaire. Figure 1.1 indicates the methods used in the study.



**Figure 1.1:** Methods of eliciting data on environment-behaviour dimensions and perceptual dimensions

All data gathered from the qualitative approaches were analysed using descriptive and content analysis, except for the survey with teachers (as quantitative approach), which were analysed using inferential statistics. Firstly, the data on children's outdoor play, gathered from the walkabout interviews, were analysed descriptively to identify the play behaviour patterns in the school grounds. The mapping of children's outdoor play was analysed using ArcGIS to identify the hotspots of children's play spaces (places' affordances) in the school grounds. Then, the children's performances in the school grounds were further analysed from the perspective of affordances including the taxonomy of affordances and the level of affordances. Secondly, the data from children's photographs and drawings were analysed using descriptive and content analysis to identify the properties and attributes that influence children's play behaviour patterns, performances, preferences and needs. The data from survey with teachers was analysed inferentially using the Rasch Model measurement in order to support the results obtained from the qualitative research methods.

The focus of this exploratory research is to understand the children's experiences and preferences as the central phenomenon of their interaction with the school grounds' properties and attributes. To achieve the aim and objectives, the study was conducted in five operational stages:

- (i) definition, background, theories and concepts of children's behaviour in an outdoor environment; affordances; perceptual ecological psychology; children's play; greening of school grounds; and impacts on children's performances;
- (ii) synthesis on criteria of ideal school ground for children's outdoor play and environmental learning;
- (iii) field survey and data collection;
- (iv) descriptive and content analysis for qualitative data and inferential analysis for quantitative data; and
- (v) documentation of findings on the affordances of school grounds and the influential factors on actualised affordances for children's outdoor play and environmental learning, conclusion, and implications of study.

### **1.8.1 Stage 1: Literature Review**

The literature review focuses on the history and theories of person-environment relationships, children's preferences and play behaviour towards learning and developmental needs, their behaviour and learning modes in an educational context, methods of behavioural and perception evaluation, school grounds as a site for children's play and learning, and the Malaysian education policy and initiative for outdoor learning environments. This preliminary stage involved gathering literature from several fields including environmental psychology, children's geographies, child development, childhood education, place and health, preventive medicine, environmental education, outdoor education, architecture and landscape architecture.

### **1.8.2 Stage 2: Synthesis Theories and Concepts of Children Experiencing School Grounds Environment**

The literature gathered in stage 1 gives an insight on the criteria of ideal school ground for children's outdoor play and environmental learning. The criteria are tabulated in a table which indicates a set of domains that will be considered in the research to evaluate the properties and attributes of a school grounds environment that promotes or restricts play and learning among children, based on children's experiences and preferences.

### **1.8.3 Stage 3: Data Collection**

To elicit data on the environment-behaviour responses and perceptual responses of children on their school grounds environment, the study engaged the children in research. Five measurement strategies were conducted including (i) walkabout interview and mapping of children's outdoor play activities on school grounds, (ii) photography of children's preferred places in the school grounds, (iii) children's drawings of their ideal school grounds environment, (iv) children's preference survey on the use of school grounds for environmental learning, and (v) a

survey questionnaire with teachers regarding their beliefs, practices and barriers on the use school grounds as a learning environment.

#### **1.8.4 Stage 4: Data Analysis**

The focus of the analysis is to understand the phenomenological inquiry of the relationship between children and their school grounds environment and to identify the factors that influence the relationship through children's behavioural and perceptual responses. The data on behavioural responses, that is, the children's play behaviour patterns and types of play including physical, social and cognitive activities, were descriptively analysed. The statistics include frequency and percentage distributions. The data on perceptual responses, that is, the children's discussions of their photographs and drawings, were analysed by content and descriptive analysis. In content analysis, the processes include segmenting significant statements or images into categories, developing codes and themes, and interpreting a meaning from the data (Creswell, 2003, 2009). The processes of analysis make possible the identification of patterns in the responses (Patton, 2002) to the factors influencing children's play behaviour and preferences on school grounds. Descriptively, the codes and themes derived from content analysis were quantified so they could be compared with the quantitative data (Creswell, 2003) from the surveys. The quantitative data from the survey with the teachers were analysed using the Rasch Model measurement.

#### **1.8.5 Stage 5: Documentation of Findings**

The influential factors in the actualisation of affordances and children's preferences in the use of school grounds for outdoor play and environmental learning are presented in the following format:

- (i) play behaviour patterns in school grounds during non-formal and informal learning sessions;
- (ii) affordances of school grounds for children's performances;

- (iii) properties and attributes of school grounds that promote the actualisation of affordances;
- (iv) properties and attributes of school grounds that limit the actualisation of affordances;
- (v) teachers' and children's preferences regarding learning in school grounds;
- (vi) teachers' and children's conception of ideal school grounds; and
- (vii) theoretical and design implications of school grounds for children's outdoor play and environmental learning.

## 1.9 Thesis Structure

The thesis is divided into six chapters as follows:

**Chapter 1** introduces the research background and problems. The chapters also include the research aim and objectives in response to identifying the research gap, that is, the need to understand both the behavioural and perception responses of children, and their relations towards the actualisation of affordances on school grounds. The scope and limitation of the study, the significance of the study, the research design and the overall thesis structure are also presented in the chapter.

**Chapter 2** reviews the theories related to person-environment relationships and the affordances of children's outdoor environments. It defines the environment as a phenomenological landscape for children's play and learning. It also reviews the factors that influence environmental preferences and the actualisation of affordances. The chapter also comprehensively discusses the roles of school grounds from a review of four disciplines including children's geographies and environmental psychology, architecture and landscape architecture, health and preventive medicine, and childhood education. Then, it discusses the types of school grounds and their impact on children's play behaviour. Finally, the chapter reviews the modes of learning promoted in school grounds and the connection between children's outdoor play and environmental learning.

**Chapter 3** contextually reviews the education system in Malaysia and the ministry's concerns regarding the policies, initiatives and programmes that are related to the provision of school landscapes for children's outdoor learning and environmental learning. The chapter also reviews the planning and design guidelines of schools in Malaysia as well as the landscape design guidelines that focus on the provision of outdoor spaces and school landscapes.

**Chapter 4** presents the research methodological approach taken in the study with the children. It also explains the measurement strategies which are designed to address the four research objectives, including walkabout interview and mapping with the children, the children's photography, the children's drawing, the children's preference survey and the teachers' survey questionnaire. This is followed by the types of analysis used in this study for qualitative and quantitative data. The analysis includes descriptive analysis, content analysis, hotspots analysis (ArcGIS) and inferential analysis (Rasch Model measurement).

**Chapter 5** presents the results and findings of the study together with a discussion. The findings are divided into the behavioural responses and the perceptual responses of the children on school grounds. The findings on the children's behavioural responses indicate their play behaviour patterns and the affordances of school grounds whilst the findings on the children's perceptual responses will justify the findings on behavioural responses, indicating the factors that influence their play behaviour patterns and the actualisation of affordances on school grounds. Finally, the chapter discusses how the children's experiences of school grounds through their behavioural and perceptual responses are related to their preferences and conceptions of ideal school grounds for outdoor play and environmental learning.

**Chapter 6** concludes the thesis with a discussion of the overall findings including the theoretical and design implications of the body of work. It discusses the factors that affect the actualisation of affordances for play and learning. It also explains the model of person-environment transactions as children's environmental learning and types of children's environments. Further, the chapter discusses the recommendations on ideal school grounds for children's outdoor play and

environmental learning. Finally, the chapter suggests future works on the study of school grounds as a children's outdoor environment.

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