Research Proposal

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1 Research Topic

Affordances of School Grounds in Malaysia for Children’s Environmental Learning

2 Research Aim

The aim of this study is to investigate the affordances of primary school grounds at varying degree of urbanization in Malaysia and its effects on children’s competence for environmental learning. The schools are situated in three different localities, which are urban, suburban and rural.

3 Research Objectives

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

i. To identify factors that influence children’s play behavior, learning mode and competence for environmental learning in the school ground,

ii. To investigate children’s perception on the perceived affordances of their school ground through their action (i.e. play behavior and activity) in the school ground, and

iii. To identify the design and planning parameters of school ground that permits children’s competence for environmental learning.

4 Assumption

Exposure to nature influences children to prefer natural elements and enriches their experiences (Samborski, 2010). The openness to experience with the biodiverse outdoor environment is the strongest predictor of perceived competence for environmental learning (Chawla & Heft, 2002). Thus, the context of the school ground can play a role in diminishing the effects of personality on students’ perceived competence for environmental learning.
5 Research Questions

The specific research questions dealt here are:

i. What are differences in the availability of affordances between the schools at varying degrees of urbanization in Malaysia?

ii. How children at different localities perceived affordances in their school ground?

iii. Are the differences in the availability of affordances in the school ground at different localities will influence children’s play and activities in the school ground?

iv. Are social background, school policy and regulation influence children’s play behaviour and mode of learning in the school ground?

v. What are the most suitable elements in the school ground that afford children’s environmental learning in primary schools in Malaysia?

6 Research Background

The design and affordances of a school ground expresses societal norms and objectives, guiding and orchestrating children’s outdoor activities at school (Gagen, 2000). School ground function as ‘moral geographies’ which embedded with codes about how and where the children ought to learn and play. The design of the school ground, including the feature, school regulation and social dynamic, plays an important role to promote particular form of physical activities and limit others. Previous studies have proved that the design of the school ground did influences children’s play behaviour, and simultaneously enhances their developments and well-being. Appropriate physical environment in the school ground as a mean toward advancing developmental and educational process (Cohen, 1990), and has potential as site which promote environmental learning among children.

Children have a unique and direct experiential way of knowing the natural world. Environmental learning among children happens through direct (observations,
sensory stimulation, movement in the space) and indirect (education, interpersonal communication, popular media) experiences of nature (Malone, 2003). Environmental learning involves three dimensions: (1) learning about the environment supports environmental knowledge and understanding, (2) learning for the environment is directed toward environmental stewardship and action, (3) learning in the environment encourages interactions and experiences in the environment (Disinger, 1990; Murdoch, 1993). Rickinson et al. (2004) defined it as “outdoor learning” which refers to learning modes or experiences that took place outside of the conventional classrooms. Outdoor learning activities could be fieldwork and outdoor visits, outdoor adventure educations, and school ground and community projects. Taylor et al. (1991) terms it as “contextual learning” which include teaching methods more familiar than textbooks and lectures, such as group workshops, fieldtrips, hands-on experience, and the participation of parents and elders in instruction. Thus, children’s environmental learning is an environment that can afford children’s motor skill activities, social interactions and cognitive activities. Children could benefit significantly from maximizing the environmental learning opportunities of the school grounds.

School ground setting that provides opportunities for movement, investigation, concentration, and social interaction, will influence the messages children derived from their interaction within the educational setting, contributing to environmental learning, like their understanding of their place within the environment (Cohen, 1990). This understanding subsequently develops their sense of place and belonging, through the appliance of shared culture of ownership and responsibility in the school ground (Lindholm, 1995; Malone, 2003; Dyment, 2007; Powell, 2007). Researchers have highlighted that the contextualization of information through outdoor environmental learning activity enhances learning, and so produces better school achievements than standard textbook and classroom instruction (Castagno and Braboy, 2008; Lipka, 1990; Taylor et al., 1991). This mode of learning improves students’ comprehension because students are taught through familiar topics and learning styles. Students also seem to be more receptive to curricular content if they know that knowledge can be put into practice (Castagno and Braboy, 2008; Lipka, 1990; Taylor et al., 1991). It enhanced
curricular knowledge acquisition because students could establish a link between theory and practice. According to Hilliard and Sizemore, environmental learning can also improve knowledge acquisition by empowering students and reinforcing their cultural identity (Reyes-García, V. et al., 2010).

7 Problem Statement

Nowadays, children spend a large proportion of their time at school, and school has been recognized as key setting to promote and to contribute to children’s physical, social and cognitive development, school ground is a potential environmental learning arena for children. Outdoor school environments associated with natural elements could become the primary places which provide a good opportunity for children to gain experience with nature (Hart, 1993) and improve their learning, cognitive, social and physical qualities (Ismail Said & Mohd Sarofil Abu Bakar, 2005). Children play in a school ground is an experiential phenomenon which is shaped or influenced by outdoor context. The context is both physical and social. Physically, the play directly influenced children’s motoric and sensual activities with landscape elements and spatial pattern of outdoor spaces, which they involved hands-on experiences. Socially, play is a social interaction involving sharing, negotiating and turn-taking. In contrast to indoor learning, which based on vicarious learning method referring to books, movies, recorded audio and visual materials, did not involved direct learning. Indoor learning did not support children’s motor skill and cognitive development in direct context. It just afforded social development.

Despite the extensive research on children’s environmental learning done in Western worlds, a few studies, if any, are conducted on how outdoor environmental learning help in children learning skills and development. Inasmuch, in many developing countries including Malaysia outdoor environmental learning activity in school compound is minimal due to present curriculum based on vicarious learning method rather than directs one, which not fully stimulates children’s scientific and thinking skills, as well as because the lack of outdoor spaces and amenities for
environmental learning. Learning process in many schools were took place in the classroom and many schools were designed with formal setting and conventional school ground. The conventional school ground limits active learning and physical activities for young children. The outdoor setting did not support children’s cognitive and physical development and the children’s need of varying interests and abilities. Typically the design of the Malaysian school ground has been proven not to be successfully in meeting children’s need and certainly provides no substitute for meaningful outdoor environmental experiences for children (Khazainun Zaini, 2007). This phenomenon may leads to a lower competence of environmental learning among children.

In order to investigate children’s competence for environmental learning, a pilot study was conducted on January 2011 at Sekolah Kebangsaan Taman Bukit Indah, Johor, using survey questionnaire with 12 questions given to 35 respondents (boy = 20, girl = 15) from standard five (aged 11 year-old). The questions comprised the three dimensions of environmental learning which are learning about, learning for and learning in the environment, in order to investigate their environmental knowledge and understanding, environmental stewardship and action, and also their interactions and experiences in the environment. Based on the result, it seems that the children’s preferences and engaged activities mostly associated with man-made play items (i.e. ball, skipping rope, bicycle) and rule-governed play (42.7%) such as badminton, football, netball, which involved a lot of physical movement for their gross motor development. Little informed the outdoor play that involved cognitive (i.e. symbolic and dramatic play) and social (i.e. associated, cooperative, solitary play) development. Thus, they reported flat surface (85.7%) and field (82.8%) as the very important elements on the school ground, while rocks (65.7%) and stumps (62.8%) as the not very important elements. When they were asked about the reasons for their chosen outdoor play, majority informed that because the play is fun, their favorite’s play and the play involved physical movement. They like to play during windy (88.5%) and dim (62.8%) day. Majority of the children reported that outdoor plays teach them about sharing (80.0%), co-operating (74.3%) and respecting others (74.3%), and they are mostly play
with their siblings (60.0%) and best friends (54.3%). When they were asked about new knowledge or understanding they gained from their play in the outdoor environment, 32 answers (88.9%) were derived from the children, and four children (11.1%) left the answers blank. However, from 32 answers given, 43.8% of the answers were based on the examples given during the pilot study, and 37.5% answers were too general which not explained their broader understanding. Only 21.9% answers given can be considered as based on the children’s understanding gained from their observation and experiences while playing in the outdoor environment. Some examples of interesting answer given were, “if we make eye contact to a dog, it will chase us because the dog thinks we are bad guys” and “the worms will come out from the ground during rainy day”. The final question in the questionnaire asked the children about their opinion on outdoor environmental learning. Majority (74.3%) of the children responded positively as they classified learning outside the classroom are fun, active and more exiting, and they have the opportunity to get engage with the natural environment. The rest who answered disliked and not sure, concerned about the comfortability in the outdoor environment and also the weather.

From the result of pilot study, it showed that children’s competence for environmental learning is still very low since their outdoor plays mainly just afforded physical development. This is because the design of the school ground emphasized on wide-open expanses of turf and asphalt which just favor vigorous, rule-bound and competitive play. Conventional school grounds have their limitations in promoting physical activity in large part because many children are not interested or able to play in such vigorous, rule-bound activities (Dyment, 2007). According to Harvey (1990), a high preference for natural elements is considered a measure of success of environmental learning. Drawing on concepts from ecological psychology, qualities of environments are likely to support the development of competence for environmental learning (Chawla & Heft, 2002). When talking about competence for environmental learning, the environment should be both the subject matter and milieu (Pederson, D., 1999), and most environmental learning competence is learned informally, although it can be learned formally in the classroom (Lingwood, 1971; Robinson and Wolfson,
1982; Stapp, 1971). The result also showed that the children desired for experiential learning experience outside of the common classroom.

In 2010, there was 27.2%, approximately eight million children aged below 15 years old, out of the whole populations in Malaysia (Department of Statistics Malaysia, 2011). And according to the Ministry of Education Malaysia (2011), 2,899,228 children enrolled in national primary school in Malaysia in year 2011. Its means that 36.2% was primary school children aged between 7 to 12 years old. The primary school children have been taught the syllabus related about environment especially in science subject. Since standard one, they learned about living things (i.e. themselves, animals, plants) and world around them such as using their senses, light and dark (Curriculum Development Centre Ministry of Education Malaysia, 2002). As the children went to a higher standard, the syllabus expended to a broader scope. For example, they also learned about non-living things, magnets, soils, force and energy, and the earth and the universe, materials and technology. The subject involved scientific skills such as science process skills (i.e. observing, classifying, predicting, experimenting), and thinking skills such as critical and creative thinking skills (i.e. attributing, analyzing, evaluating, making inferences, generalizations and hypotheses), (Curriculum Development Centre Ministry of Education Malaysia, 2002, 2003, 2005, 2007).

There is a large population of children in Malaysia and growing numbers of children entering schools that need to be educated using the environmental learning mode. Besides, with a greater national attention to improve education, therefore, there are needs for new criteria to be included in planning directives to insure outdoor learning environment with landscape qualities representing affordances and challenges for children at school for their environmental learning. To increase children knowledge with outdoor, we need to consider the ways in which the school ground is constructed and experienced.
8 Research Gap

Research about school grounds are various, however, less research explored on the implication of school grounds design and its surrounding landscape (context) towards children’s competence for environmental learning, and how different environmental experiences will influence person’s environmental knowledge, attitude and behavior. A study conducted by Duerden, M. D., & Witt, P. A. (2010) provide important insights regarding the role of environmental knowledge and attitude in the development of environmental behavior, and the role of indirect and direct experiences in nature which deserve further investigation.

Studies on the school ground mostly focused on the physical setting and design of the play spaces in the school grounds, and its effect on children’s physical activity and development (Nor Fadzila Aziz & Ismail Said, 2010). An evaluation were taken on the design and landscape qualities of the school ground, followed by an observation or behavioral mapping on children’s activity level and play behavior. Studies in the school ground also concern on the potential of the school ground to promote good health and development among children as well as ground for outdoor learning (Dyment, 2005, 2009; Powell, 2007; Ozdemir, 2008).

As shown in the Table 1, many studies were conducted in western countries. Thus, study on the affordances of school ground for children’s environmental learning in non-western countries should be conducted because the real issues are not known yet. Furthermore, the context is differing due to cultural and environmental factors. According to Ruchter, M., et al. (2010), the additional socio-demographic factors have strong influence of on the components of environmental learning, which in case of the children includes in particular the degree of alienation from nature. Since this alienation is expected to further aggravate in increasingly urbanized societies, thus environmental learning is important for children, especially investigating the relationship between the environmental experience and children’s competence for environmental knowledge from different contexts.
Table 1: Previous studies on environmental learning

<table>
<thead>
<tr>
<th>Major studies of environmental learning</th>
<th>Concern and Findings</th>
<th>Setting (Context)</th>
<th>Parameter being measured</th>
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- 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. | Primary Schools, (Australia), Elementary and high schools in urban area (Canada) | ● Spatial design  
● School policies  
● Play behaviors  
● Perceptions |
- 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. | Primary schools (UK), Schools of rural and middle class community, Elementary school (US) | ● Education setting  
● Learning experiences  
● Perceptions |
| Harvey, M. (1990), Duerden, M. D. (2010), Kernan, M. (2010), | **Concern: Learning experience**  
- Direct experience with natural elements contribute positively to the development of environmentally disposition among children, provided multiple, intense opportunities for participants to apply what they had learned during the preparatory process.  
- The range of localized (field of actions) and childhood education setting influences the affordances available for children. | Schools in inner city and rural area (England), Middle and high schools (US), Early childhood education and care settings in urban area (Ireland), | ● Nature experience - direct and indirect  
● Learning outcomes - environmental knowledge and disposition, attitudes, and behavior. |
- Most schools have limited landscape qualities and lack of affordances, which influence the physical activity levels in the schoolyard.  
- Children in the good schoolyards (have access to natural areas) took part in a greater number of activities than children in the bad one. | Primary schools neighbourhood (Australia and Canada, Ankara, Sweden, England, US) | ● Spatial design  
● Physical activity levels  
● Perceptions |
9 Theoretical framework

In recent years there has been a growing discourse regarding play outdoors as both a need and right of young children, and central to their well being (Kernan, 2010). Children’s preferences to engage with active play in particular settings are influenced by their psychological affection and distinction experiences with those settings (Andel 1990; Min, 2006. The best environments for children are those which are developed on the basis of children’s natural needs, taking into account the play behavior engaged in at different developmental periods, including the physical, social and cognitive terms of play. Research on play shows that, children prefer to play in the environments with high degree of challenge, novelty and complexity (Fjortoft & Sageie, 2000). A modifiable and malleable environment offers more opportunities for exploration and learning, with corresponding behavioural consequences (Moore & Wong, 1997)

Children have a particular attraction to natural environments. The benefits of play in natural landscapes are widely recognized (Chatterjee 2005; Chawla 2007; Fjørtoft 2004; Titman 1994). The negative effects on children deprived of contact with nature during their formative middle childhood years are also well-documented (Hart 1979; Moore and Wong 1997). Some of the benefits for children in nature include more creative and elaborate symbolic or make-believe play (Kirkby 1989; Samborski 2010); stress reduction and greater ability to cope with upsetting events (Wells and Evans 2003); greater gains in agility and balance (Fjørtoft 2001); and better concentration by inner-city children and those diagnosed with attention deficits (Faber Taylor and Kuo 2008; Faber Taylor et al. 2002; 2001). Children who spend significant time in nature also show a greater commitment to protecting the natural world during their adult years (Chawla 1999; 2007; Wells and Lekies 2006). Nature study helps students acquire knowledge, values and a concern for the environment, as well as the motivation and commitment to participate in environmental stewardship (Engleson and Yockers 1994; Harvey 1990). All the benefits children gain from play in nature contribute to their environmental understanding and experience, simultaneously for their environmental
learning. School grounds that include natural diversity may help to meet the objectives of environmental learning.

A few studies in primary or elementary schools explore the relationship between the physical characteristics of the school ground and the children’s activities and perceptions (Adams, 1990; Ozdemir & Yilmaz, 2008; Ward Thompson, 1995; Young, 1990). The findings of the studies suggested that school outdoor environments offer positive and negative affordances. Usually positive affordance can be seen in the context of motoric actions. For example, an outcome from Ozdemir and Yilmaz research at Ankara primary school grounds found that school grounds provided a space for children to run, playing ball games, jump rope and etc. School grounds’ potential for active play is mostly preferred by the students who are satisfied with the yards, even though there are lacks of landscape features. In contrast for those who are not satisfied, the school grounds did not offer many positive affordances for them, where the design, materials and features provided in the school grounds usually not fulfill their needs and they can easily feel bored. A variety of elements in the school ground promoted more physical activities among children; vigorous, moderate or sedentary activity, and appeal more broadly to children of varying interests and abilities, and it also promote social interaction and cognitive development (Dyment, 2009). Research has revealed the way in which children can learn especially through play is strongly influenced by nature, the design and the policies informing the use of school grounds (Moore, 1989; Titman, 1994; Moore & Wong, 1997).

To benefit children and meet their needs for environmental understanding and exploration, a landscape must be child-friendly: it should have enough complexity to be interesting and it should capture the imagination through an element of mystery, as a path does by disappearing around a corner (Kaplan and Kaplan 1989). It should also provide small vegetative rooms or dens for symbolic play (Titman 1994; Stanley 2010). Such a landscape offers opportunities for environmental and social learning through repeated use and care. It also allows children to express themselves freely in creating and controlling their special places, and protects the secrets and activities in these places
from adult interference (Chatterjee 2005). A child-friendly landscape is likely to meet children’s developmental needs for power, freedom, fun and belonging (Glasser 1990). The diversity of a natural, child-friendly landscape provides more affordances for functional play (running, climbing rocks, sliding down slopes), constructive play (building huts and shelters, manipulating loose parts) and symbolic play (playing house, pirates, or kings and queens) (Fjørtoft 2004; Samborski 2010). The imagination needs deep absorption. Symbolic play and socio-drama, which usually take place in concealed or semi-concealed places, lift a child to the highest level of functioning (Nabhan and Trimble 1994).

10 Underpinnings

The underpinnings of this study are (1) Theory of Affordances (Gibson 1979; Kytta, 2002); (2) theories related to the development of environmental competence such as Ecological Psychology Theory (Bronfenbrenner, 1979, 1993; Gibson, 1979) and Person-Environment Fit Theory (Caplan & Harrison, 1993; Edward, Kaplan & Van Harrison, 1998) and; (3) theory related to children’s play and learning such as Piaget’s Theory of Play (Hillis, 1978; Piaget and Inhelder, 1969).

10.1 Theory of Affordances

Several studies in ecological perceptual psychology (Gibson, 1979; Kytta, 2002) suggest that children shape the environment and in turn shaped by it. The shaping of the environment depends on its affordances as perceived by the children (Heft, 1988; Kytta, 2002) as indicated in the Theory of Affordance (Gibson, 1979; Kytta, 2002). It means that children’s responses with the environments and how they perceived the environments in term of its functional properties rather than its appearances (Chawla and Heft, 2002; Fjortoft, 2004).

As such affordances refer to the functionally significant properties of the environment which are perceived through action, and the perception of individual
affordances is part of the whole activities, and it’s provide a psychologically relevant concept for analysis of the evolving child-environment relationship (Gibson, 1979). As adults, we perceived the elements in the environments from its aesthetic values, but children valued the elements, either the natural features or designed features, from its “affordances” and “playability” values, according to Heft’s Functional Taxonomy of Affordances in children’s outdoor environments (Heft, 1988). Affordances can be described in term of the “field of free action”, “field of promoted action” (Reed, 1996) and “field of constrained action” (Kytta, 2002). Reed described the affordances as “field of free action” (FFA) when it involved independent, active exploration and activity that striving for meaning, and “field of promoted action” (FPA) when the affordances are made available or emphasized for children by other people. However, Kytta found that the actualization of affordances was influenced by the social and culture factors, which she terms it as “field of constrained action” (FCA). Affordances are always unique and different for each individual and each specific group of people. It is vary in terms of the richness of information they offer in response to a person’s engagement (Chawla & Heft, 2002).

10.2 Theories related to the development of environmental competence

Competence is a quality that has emerged from the psychology research literature as being significant for adaptive, adept and emotionally satisfying human functioning (Sternberg & Kolligan, 1990). It refers to the capacity to exercise control over valued spheres of life and in so doing achieve desired outcomes. These psychological outcomes are recurring from person-environment experiences (Chawla & Heft, 2002). In ecological psychology theory, the environment is to be describes in psychologically meaningful ways, and the individual is viewed as a responsive agent who purposively engages with his or her surroundings. In this respect, individual functioning at any moment is conceptualized as being situated in a particular environmental context. Thus, this study lies in transactional psychology research, which the person-environment relationship is seen as dynamic, interactive system, the components of which cannot be taken out of context.
In Ecological Developmental Psychology Theory (Bronfenbrenner, 1979), he discusses children development in socio-ecological context. According to Bronfenbrenner (1993), a person’s development cannot be studied out of the multileveled social, material, and cultural context in which the development takes place. Developmental psychological studies should simultaneously focus on both the individual and the context, and concentrate on developmental processes (the processes that lead to the current situation); should not only focus on the results of development. According to Bronfenbrenner, (1979, 1993), there are various levels of environment, namely the level of microsystems (i.e. home, school, day-care centre), mesosystem refers to collections of more than one microsystem (i.e. a child’s daily environmental dyad consisting of a home, school and after-school activities), exosystems are systems of which individual is not necessarily a part, but which affect his or her life regardless (i.e. a child’s life is affected by happenings at the parents’ workplace), and macrosystems are the prevalent models that in each culture affect the micro, meso and exosystems (i.e. the prevalent beliefs, custom, etc. of a culture shape a child’s life).

James J. Gibson’s Ecological Perceptual Psychology refers to the person-environment relationships is immediate and based on practical activity rather than on being analytical (1979). It is based on a new description of stimulus information, which based on ecological information; accessible through human (and other organisms’) senses which forms their ecological reality. According to Gibson, perceptual reality forms an entity, the parts of which cannot be separately examined because each component defines each other (Kytta, 2003). Perception is fundamental in Ecological Perceptual Psychology; perception cannot be separated from the intentional activity with which it is connected. The framework of Ecological Perceptual Psychology thus approaches the framework activity theory, in which activity is seen as the basis for all mental phenomena, and the study of activity is seen as an essential unit of psychological analysis (Leontjev, 1978). In addition, perception is oriented towards finding the affordances of an environment. When perception and action mix; action reveals new affordances, and the perception of new affordances creates new action (Kytta, 2003).
According to Person-Environment Fit Theory, individual’s behavior, motivation and mental health are influenced by their environments and the characteristics of these environments (Kaplan & Harrison, 1993; Edward, Kaplan & Van Harrison, 1998). Children are not likely to be very motivated and satisfied if they are in environments that do not fit their psychological needs.

10.3 Theory related to children’s play and learning

An understanding of children’s play is important for adults to learn about the nature of childhood and ways of working with children to optimize their development. The value of play as a learning medium can be explained in terms of all aspects of children development, namely physical, cognitive, emotional and social (Khazainun Zaini, 2007). In contemporary theories of play such as Freud’s theory of play, Eriksen’s theory of play and Piaget’s theory of play, play is treated as one aspect of behavior within a more wide-ranging focus of explaining development trends in behavior and causal relationships between behavior and environment. Piaget’s Theory of Play examines play from the perspective of its contribution to intellectual development which is cognitive development (Hillis, 1978; Piaget and Inhelder, 1969). He viewed play as a “biological model of interaction between children and environment (Heseltine, 1987), meaning that play represents a way of manipulating the outside world so the environment (play objects) fits the child’s existing way of structuring and viewing the world (Hillis, 1978; McDevitt & Ormrod, 2002).

11 Scope of Study and Variables

The study lies in transactional psychology research which looking at person-environment relationship; the school ground elements, designs and policies are the environmental (contextual) factors that may influences children’s physical, social and cognitive development. In order to accomplish the objectives, the study will investigates the children’s competence for environmental learning based on their perception on
perceived affordances, their play behaviours, activities and experiences in the school grounds (Refer Appendix A).

The unit of analysis is the middle childhood children, aged 7-12 year old. The reason for selecting children at these ages is because they are at the concrete-operational stage for children’s cognitive development, according to Piaget’s theory of cognitive development (McDevitt & Ormrod, 2002). This is a phase where children learn to move beyond a conception of the universe as a collection of objects to a system of operations (Piaget and Inhelder, 1969). The emergence of logical (cause-effect) thinking, including reversibility and ability to sequence and serialize started to occur in their thinking. They are able to take their point of view, and understand a part or the whole relationship and classification. They have the ability to interpret their experiences, preferences and feelings as they use the outdoor environment extensively (Chawla, 1992; Kellert, 2002), because they benefit from increasing freedom to play outdoors without adults’ supervision. In addition, middle childhood children are typically becoming less egocentric and more socio-eccentric at this age, as they have a greater understanding of his or her relationship with others (Black et al., 1992). Furthermore, the increasing endurance and coordination enable them to enjoy many gross motor activities and games (Billman, 1996). They perceived play in the outdoor environments which offer various exciting and challenging play elements, provide them the opportunity to choose, make decision, experiment, imagine and create new things.

Besides primary school children, the study also will involves the headmasters and teachers of each school as respondents, in order to get their opinion about the function of school grounds, environmental learning and issues related to it (i.e. policies and school regulations). The information gain from the headmasters and teachers will lead to a better understanding on the potentials and challenges towards the implementation of environmental learning on the school grounds in Malaysia.

The study will be conducted in three primary schools in Johor representing three different localities which are urban, suburban and rural area. The reason for selecting
Johor is because it is a second state in Malaysia with the highest population of children aged 5-14 year old, after Selangor. According to population projections based on the 2000 population census, in 2010, there were 695,608 children aged 5-14 year old in Johor, approximately represented 7.79% from the overall population of children of these ages in Malaysia (Department of Statistics Malaysia, 2010). The study will be conducted at different localities as a reason to investigate the influence of the surrounding landscape context of the school ground towards children’s perception on perceived affordances at their school ground. The results will indicate other factors that may influence the development of children’s competence for environmental learning. Thus, the surrounding landscape of the school ground (in range of 0.5 miles or 0.8 kilometers from school boundary) will be included in the scope of study site for mapping purposes. The distance is selected based on the General Neighbourhood Concept and the formation criteria for educational facilities set in the Community Facilities Planning Standards, Department of Town and Country Planning of Peninsular Malaysia, JPBD Bil. 19/97, 1997 (Jabatan Perancangan Bandar Dan Desa Negeri Selangor, 2008), which is within the radius of about 0.5 miles or 0.8 kilometers from the neighbourhood centre. For this study, only National School; either ‘Sekolah Kebangsaan’ (SK) or ‘Sekolah Rendah Kebangsaan’ (SRK) type under the Ministry of Education Malaysia will be selected for this study. This is to establish a more accurate result to reflect Malaysian’s multi-racial and multi-ethnicity country.

12 Significance of Study

The study is significant in order to response to the problem statement and research gap that have been mentioned earlier in the research proposal:

i. The study will add to the body of knowledge that the elements, designs and policies of a school ground play an important roles in children’s functioning; physically, socially and cognitively, and contribute to the development of children’s competence for environmental learning,

ii. The study will accentuate the importance of the development of competence for environmental learning among primary school children in
Malaysia, as it is function as a critical component in subsequent efforts toward constructive community change.

iii. In the aspect of planning and design, it would reveal the properties, attributes and key dimensions that support children’s environmental learning in the school grounds from the perspective of children, as it will be put in the model of school ground design.

iv. From the children’s responses on the perceived affordances of the school ground, a model of analysis which emphasizes the importance of landscape qualities representing affordances and challenges for children at school ground for their environmental learning could be formulated. The model could be proposed to the Ministry of Education Malaysia to develop school ground as an effective environmental learning platform.

13 Research Design

As the study aims to investigate the affordances of school grounds at varying degree of urbanization in Malaysia and its effects on the development of children’s competence for environmental learning, therefore, it will investigate the impacts of physical settings (i.e. elements, designs) and policies of the school ground (independent variables) on children’s action (i.e. play behavior and activity), and their perception on the level of affordances in their school ground (dependent variables). An assessment or the affordances available to children can provide researcher with one source of information about the opportunities a community provides for the development of competence across a wide range of domains. The concept of affordances can sharpen the observations of children in the environments in order to identify exactly what actions different features of the environments facilitate, depending on children’s capacities (Chawla & Heft, 2002). Apart from the specific affordance properties of objects, the accessibility of those affordances to children also becomes an important consideration in this study.
The physical settings of the school ground which are the elements (natural and man-made) and designs (i.e. size, feature, form, space) of the school ground will be obtained through assessment. The data then will be analyzed by using ArcGIS for spatial analysis. While the information related to school policies on environmental learning will be obtained through interview with the headmasters and school teachers.

For children’s actions, two sets of data will be gathered: overt and covert actions. Behavioral mapping using ArcGIS will be used in order to record the overt actions, namely the children’s movements, spatial patterns and social interactions in the site plan of each school. Data of the covert actions, which are the children’s perceptual responses on the environmental elements and climatic factors that they encountered will be elicited using survey questionnaire and open-ended interview. Furthermore, participatory method which involves children’s expression into drawings and photo-taking of children’s like and least liked spaces in the school ground will be conducted in order to gain a deeper understanding on children’s perceptual responses.

The overt and covert data, therefore, are the affordances of the school ground perceived by the children through their physical actions. The affordances (perceived, utilized, shaped) of primary school ground is then mapped and overlapped resulting to three maps of school ground for children’s environmental learning. The three maps of the school grounds will be compared in order to analyze the level of children’s competence for environmental learning at different localities. The questionnaire will be analyzed using SPSS for inferential statistic analysis, while the interview, drawings and photos will be analyzed using nVivo for content analysis.

To achieve the objectives, the study will be conducted in several stages as follows (Refer Appendix B):

i. Define the background, theories and concepts of affordances, ecological psychology, development of competence and environmental learning.

ii. Define the criteria for quality school ground for children’s environmental learning.
iii. Field survey and data collection.

iv. Analyzing the physical setting and children’s behavior and activity (spatial patterns) using layering series of maps to clarify the affordances of the school ground.

v. Analyzing the perceptual responses (of children, headmasters and school teachers) on the elements and environmental learning in the school ground through descriptive and statistical analysis.

vi. Synthesizing the criteria for the quality school ground for children’s functioning which contribute to their competence for environmental learning.

vii. Documentation of findings on the affordances of school grounds and the development of children’s competence for environmental learning, conclusion and implication of study.

14 Anticipated Findings

The study will reveal the factors that influence the development of children’s competence for environmental learning. Thus, the study anticipates getting three findings:

i. Direct contacts with environmental elements enhance children’s learning skills including exploration and manipulation, and simultaneously develop their competence for environmental learning.

ii. The school ground design and setting more or less are similar; however the level of affordances perceived by the children from different schools are differ due to the context of the schools from different localities. Children from rural school perceived more diverse and variety of affordances to engage in sensorial and gross-motor activities than children from urban school.

iii. Besides children’s experience with nature, the differences and similarities of affordances between the schools are also due to socio-cultural background, and school policy and regulation.
At the end of this research, the expected result of this study will be a model of school ground design for children’s environmental learning and could be use for future reference and further studies. It is significant in order to identify if there are certain factors that influence the development of children’s competence for environmental learning, especially in the school grounds. This study seeks to determine the quality of the school ground environment and its surrounding landscape, which is likely to support the development of competence. These findings will help us to understand the importance of the environments as both subject matter and context for children’s environmental learning from a more holistic perspective.

15 Research Schedule

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Other References


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APPENDIX A
Research framework

ELEMENT / NATURE
- Availability
- Diversity
- Dynamic
- Complexity
- Stimulating
- Accessibility

DESIGN
- Size
- Form
- Space
- Feature
- Connectivity
- Context

POLICY
- Rule and regulation
- Management
- Maintenance
- Culture

DIMENSIONS OF COMPETENCE:
- Conscientious
- Outdoor skills
- Way finding
- Knowledge
- Practical skills
- Resources conservation

CHILDREN’S COMPETENCE FOR ENVIRONMENTAL LEARNING

ACTION
- Activity
- Movement
- Spatial pattern
- Social interaction
- Behaviour

PERCEPTION ON THE LEVEL OF AFFORDANCES
- Perceived
- Utilized
- Shaped

DIMENSIONS OF ENVIRONMENTAL LEARNING
- Environmental knowledge and understanding
- Environmental action and stewardship
- Interaction and experience
APPENDIX B
Flowchart of research design

LITERATURE REVIEW

Affordances of children’s outdoor environment
School ground design and children’s development
School ground as site for environmental learning

Quality of school ground for children’s functioning (physical, social and cognitive) and competence for environmental learning

DATA COLLECTION

Physical setting
Assessment of the school ground element and design

Overt action
Behavioural mapping (activity, movement, spatial pattern, etc.) using ArcGIS

Covert action
Perception on perceived affordances and environmental learning using survey questionnaire, interview, drawing and photo-taking

DATA ANALYSIS

Overlapping spatial and behavioural maps using ArcGIS

DATA ANALYSIS

Inferential statistical analysis (SPSS)
Content analysis (nVivo)

FINDING AND DISCUSSION

Affordances of school ground and children’s competence for environmental learning

Model of school ground design for children’s environmental learning at primary school in Malaysia