



Affordances of School Grounds for Children's Outdoor Play and Environmental Learning

Nor Fadzila Aziz (PB103013)

PhD Candidate

Supervisor: Assoc. Prof. Dr Ismail Said

Faculty of Built Environment
Universiti Teknologi Malaysia
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Introduction

- The quality of life and of the environment can never be improved **without an understanding of the person-environment relationship.**
- **There is a need to understand children's perceptions about their environment** as 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).
- An understanding of children's perceptions will **lead to an understanding of their emotions, needs, preferences and interactions.**
- **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.

School Grounds

Schools grounds as potential sites for children's outdoor play and environmental learning

- School grounds provides the opportunities for children **to interact with the school environment through movement, investigation, concentration and social interaction.**
 - **Promotes children's physical, social and cognitive development and children's health** (Ozdemir and Yilmaz, 2008; Willenberg et al., 2010)
 - **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 the school grounds is **a fundamental component of informal learning**, which has been referred to as environmental learning by Tranter and Malone (2004).

Research Problems

PROBLEMS

- Adults often overlook the values of outdoor play and informal learning that lies outside the classroom

1 SG DESIGN

- Conventional school grounds
- Limited spaces and landscape features for children's play
- Children's views in planning and design are generally ignored

2 SG CULTURE

- The regulations restrict children from playing at certain times and places
- The creative, widespread use of school grounds for outdoor play were viewed as hazardous and irrelevant

Design



Courtyard (paved area)



Field



Backyard

Culture



Restrictions and the issues of accessibility

Research Gap

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.

- 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.

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**.

Research Aim

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

Research Objectives

1. To explore the affordances of the school grounds from the children's perspective
2. To identify the factors that influence the level of actualised affordances in the school grounds
3. To explore the perceptions of children and teachers on the use of school grounds for environmental learning
4. To distinguish the meaning of ideal school grounds that permit environmental learning

Research Questions

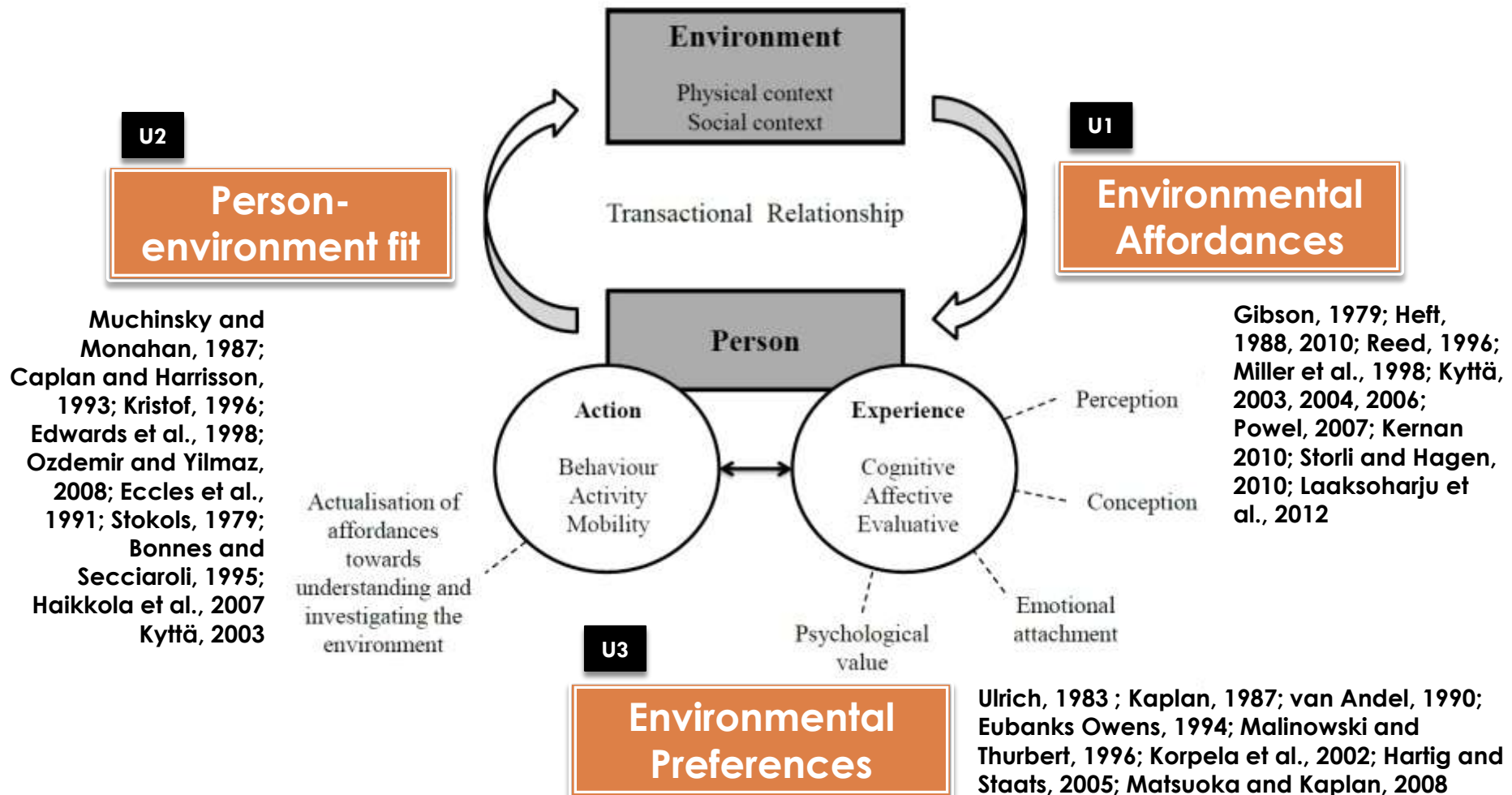
RESEARCH ASSUMPTION:

As school is being included in the 'institutional triangle' of children's daily life, it signifies the important roles of school grounds for children's outdoor play and environmental learning in outdoor environments. The physical and social contexts of school grounds may significantly influence the opportunities for children to engage in outdoor play and gain environmental learning.

KEY RESEARCH QUESTION	RESEARCH QUESTION
Why are the appropriate physical and social contexts of school grounds important in promoting outdoor play and environmental learning among children?	PART 1: Environment-behaviour responses
	1. How are the school grounds being used by the children for outdoor play during non-formal and informal learning?
	2. What are the differences in children's play behaviour patterns during the sessions? Why?
	3. What are the properties and attributes of school grounds that influence children's play behaviour patterns?
	PART 2: Perceptual responses
	4. What are the potential and barriers of school grounds for environmental learning?
	5. What are the children's and teachers' preferences and needs for ideal school grounds?

Research Underpinnings

Ecological Perceptual Psychology



U2

Person-environment fit

Muchinsky and Monahan, 1987; Caplan and Harrison, 1993; Kristof, 1996; Edwards et al., 1998; Ozdemir and Yilmaz, 2008; Eccles et al., 1991; Stokols, 1979; Bonnes and Secciaroli, 1995; Haikkola et al., 2007; Kyttä, 2003

U1

Environmental Affordances

Gibson, 1979; Heft, 1988, 2010; Reed, 1996; Miller et al., 1998; Kyttä, 2003, 2004, 2006; Powel, 2007; Kernan 2010; Storli and Hagen, 2010; Laaksoharju et al., 2012

U3

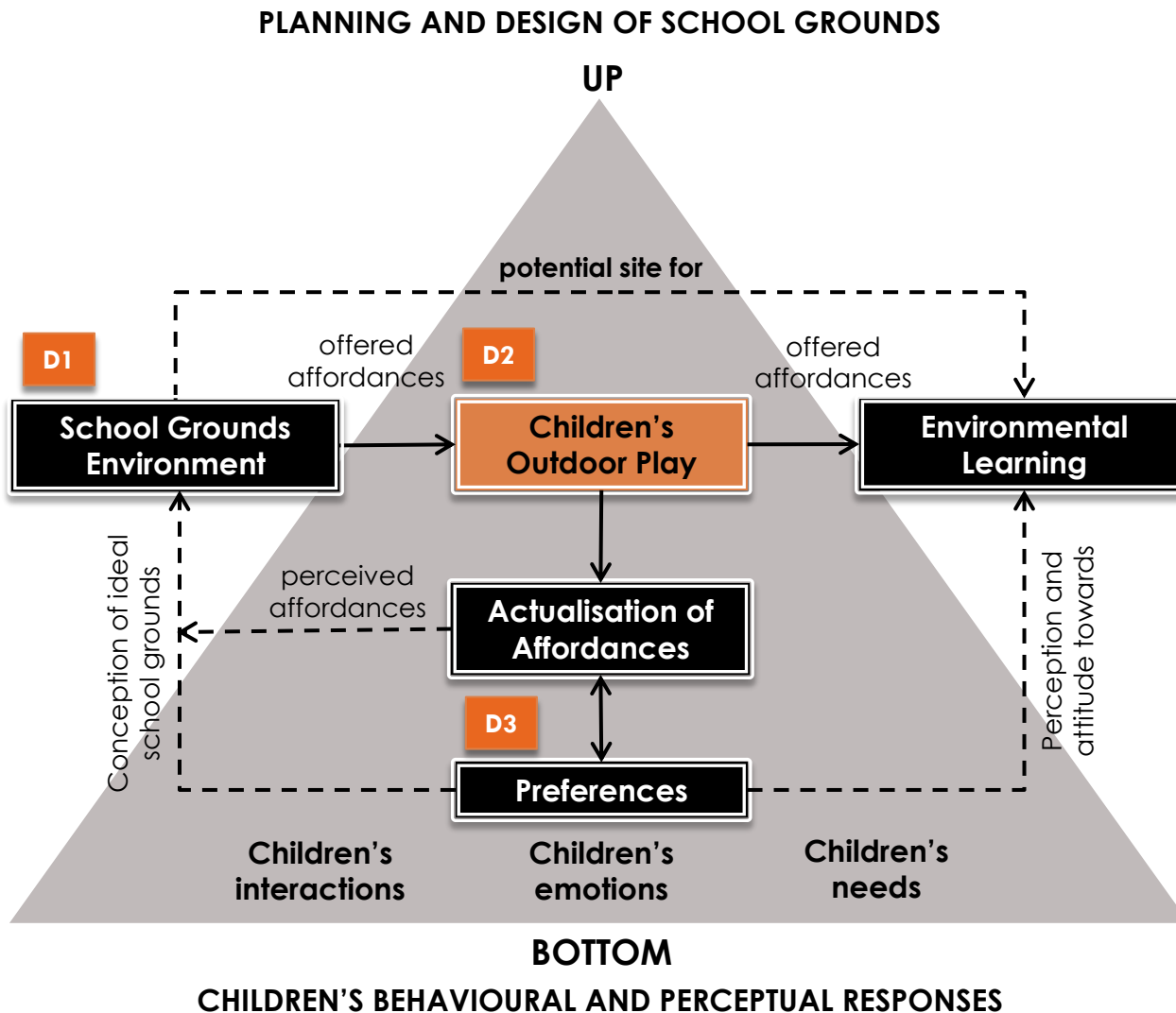
Environmental Preferences

Ulrich, 1983; Kaplan, 1987; van Andel, 1990; Eubanks Owens, 1994; Malinowski and Thurbert, 1996; Korpela et al., 2002; Hartig and Staats, 2005; Matsuoka and Kaplan, 2008

Variables of the Study

DIMENSION	VARIABLES	ITEMS
1. Properties and attributes of school grounds (ENVIRONMENT)	a) Physical environmental properties b) Physical environmental attributes c) Social/cultural properties and attributes d) Accessibility	<ul style="list-style-type: none"> • Features – natural and man-made features • Design – spaces, size, space connectivity • Availability, functionality, adequacy, aesthetic quality, safety • Policies, regulations, social dynamics • Physical – location, easily access • Socially – permitted/restricted
2. Behavioural responses (ACTION)	e) Opportunities for outdoor play f) Actualisation of affordances	<ul style="list-style-type: none"> • Use, activities, types of play, play behaviour pattern, social interaction, performance • Place affordances, level and taxonomy of affordances, fields of free, promoted and constrained action
3. Perceptual responses (EXPERIENCE)	g) Place preferences h) Perception of environmental learning i) Conception of ideal school grounds j) Emotional effects	<ul style="list-style-type: none"> • Favourite and disliked places in school grounds • Potentials and barriers of environmental learning in school grounds • Needs – Communal, physical, emotional and educational needs • Preferences – Features and design patterns • Positive and negative feelings from interaction with school grounds environment








Interrelationship between Variables



The Study Sites

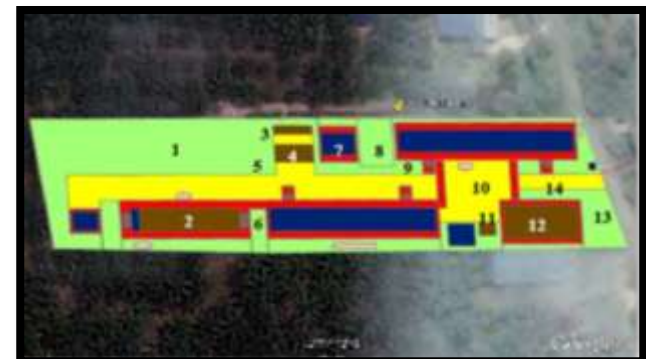
SELECTION CRITERIA:

- ❑ The school is a national school of the MOE;
- ❑ The school has been recognised as a Sustainable School – An Environment Award through participation in the programme for the session 2009/2010;
- ❑ The selected schools should represent different localities of school – an urban school and a rural school; and
- ❑ The area of each school is between 2.5 to 5 acres (approximately 10,000-21,000 square meters).

Zoning	1. Urban school		2. Rural school	
	Area (m ²)	%	Area (m ²)	%
 Enclosed space	1578	9	1229	12
 Semi-enclosed space	859	5	755	7
 Green area	10606	58	4878	47
 Asphalt area	1895	10	1909	18
 Paved area	1453	8	0	0
 Walkway/corridor	1426	8	1347	13
 Drain/others	548	3	245	2
TOTAL AREA	18365	100	10364	100



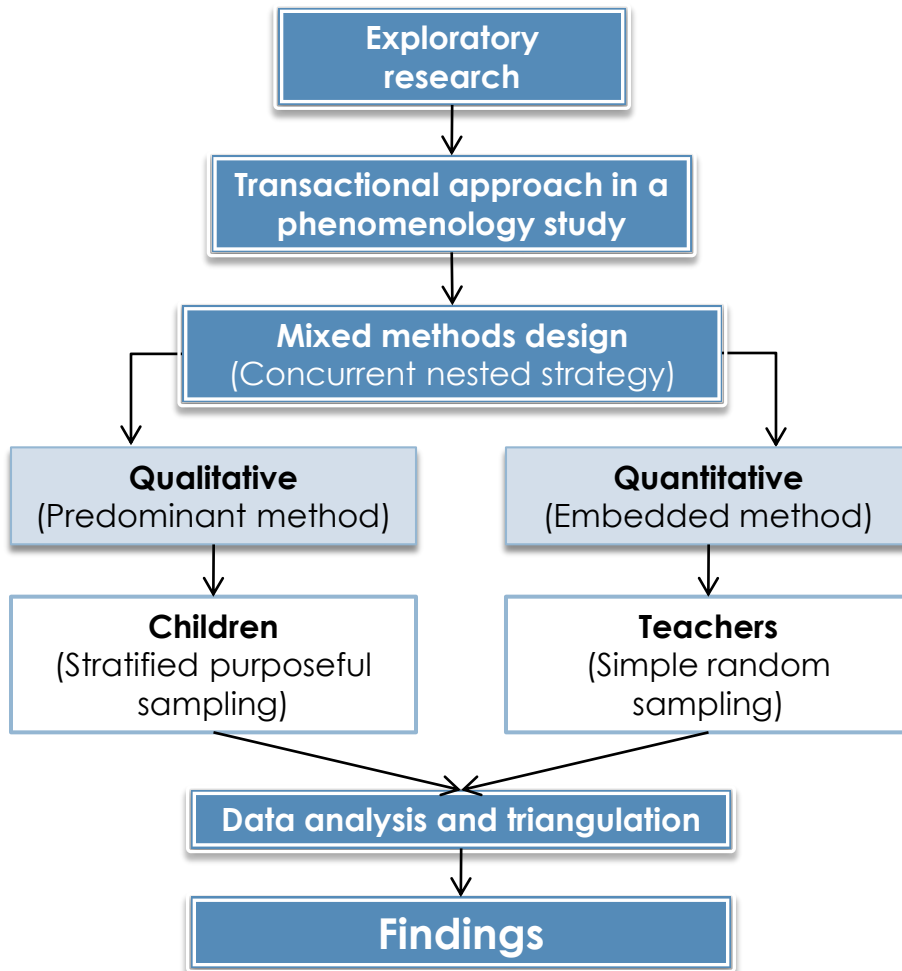
1. SK Taman Molek, Johor Bahru (urban school)



2. SK Sungai Bunyi, Pontian (rural school)

Research Methodology

Research Design



Measurement Strategies

	STRATEGY	RESPONDENT	OBJECTIVE
a)	Walkabout interview and mapping	Children (n=80)	RO#1
b)	Photography and discussion		RO#2
c)	Drawing		RO#4
d)	Preference survey		RO#3
e)	Survey questionnaire	Teachers (n=71)	RO#3 RO#4

Research Objectives

RO #1
Affordances of school grounds

Outdoor play activities

The use of school grounds environment
Play behaviour patterns & children's performances

Children's walkabout interview & mapping (n=80)

Descriptive statistics (Univariate)
Spatial analysis (Hotspots)
Content analysis (Interpretative)

RO #2
Factors that influence level of affordances

Place preferences

Children's affection & evaluation towards the environment
Properties & attributes of school grounds

Children's photography & discussion (n=80)

RO #3
Environmental learning in school grounds

Perceptions & attitudes

The potentials & barriers of school grounds for environmental learning
Beliefs, preferences & needs

Children's preference survey (n=80)

Descriptive statistics

RO #4
Ideal school grounds for environmental learning

Needs & preferences

Meaning and understanding on the potential affordances of school grounds
Features, design patterns & aspects considered

Teacher's survey questionnaire (n=71)

Descriptive statistics
RASCH Model

Children's drawing (n=80)

Descriptive statistics
Content analysis

TRIANGULATION

Person-environment relationship ("ACTUAL" environment)

Physical & social factors

Perceptual & conception ("IDEAL" environment)

Theoretical & design implication in enhancing school grounds' potentials

Research Findings

OBJECTIVE	VARIABLES/ ITEMS	RESULTS AND FINDINGS
RO #1	1. Opportunities for outdoor play	The SG offered more play opportunities for the children during the Informal Learning (IL) than the Non-formal Learning (NL) sessions.
	2. Play behaviour patterns	Different play behaviour patterns during NL (prescribed play and organized play) and IL (unstructured activities, imaginative, creative and active-free play).
	3. Actualisation of affordances	<p>Place affordances: The opposing trends during NL (school field) and IL (semi-enclosed space) at both schools.</p> <p>Taxonomy of affordances: The school grounds offered more MM features for children to engage with, suggests that the SG have barren landscapes.</p> <ul style="list-style-type: none"> • Categories for NA features: Graspable objects, Flat surfaces, Sociality. • Categories for MM features: Graspable objects, Attached objects, Flat surfaces. <p>Level of affordances: The MM features offered more affordances for children to utilise and shape the features.</p>
RO #2	1. Spatial patterns of place preferences	Different hotspots areas for favourite and disliked places & similar trends at both schools: <ul style="list-style-type: none"> • Favourite places: Concentrated at certain places (Green areas). • Disliked places: Scattered among many places (Green areas, Paved areas, Semi-enclosed spaces).
	2. Factors that influence children's place preferences	Children's responses were categorised into 19 categories, then sorted into 6 main themes (environmental characteristics) : <ul style="list-style-type: none"> • Functionality, Accessibility, Attractiveness, Aesthetic quality, Comfortability and Safety Different environmental characteristics for different place preferences: <ul style="list-style-type: none"> • Favourite places: Functionality, Attractiveness, Aesthetic quality, Comfortability • Disliked places: Safety, Aesthetic quality, Comfortability, Accessibility

Research Findings

OBJECTIVE	VARIABLES/ ITEMS	RESULTS AND FINDINGS
RO #3	1. Children's perception on learning in SG	Majority of the children preferred to learn in SG <ul style="list-style-type: none"> • Positive perception: Contact with nature, affection, comfortable, play, change learning routine, see others, better concentration and understanding. • Negative perception: Microclimate, boring, noisy, safety, inadequate facilities, less concentration.
	2. Teachers' perception on the use of SG for PLBD	Majority of the teachers gave positive responses <ul style="list-style-type: none"> • Potentials: Afford EE, diversify and enhance P&P activities, long-life leisure, develop skills and attitude, hands-on experiences. • Barriers: Safety, limited spaces, resources, budgets and time, weather and environmental conditions.
RO #4	1. Children's perception on ideal SG	<p>12 categories of Environmental features were categories into 4 main categories:</p> <ul style="list-style-type: none"> • MM (Attached and graspable objects, facilities, vehicles); NA (Animals, vegetation, topography, water features, surface features); SO (People, activity); CL (climate). <p>19 relevant Design patterns were identified from children's drawings:</p> <ul style="list-style-type: none"> • The most drawn: Green area, reference, animal life, quite area, play area, field, orchard, context of SG, private space. • The least drawn: Learning zone, canteen, sporting court, pathway, campus plan, promenade, technology, grassy area, hard surface area, entrance area.
	2. Teachers' perception on ideal SG	<p>6 relevant Design Patterns:</p> <ul style="list-style-type: none"> • Learning zone, green area, display space, play area, animal life, quiet area. <p>Aspects considered for SG environment:</p> <ul style="list-style-type: none"> • Environmental aspects: Attractiveness, Comfortability, Aesthetic quality, Safety. • Other aspects: Maintenance work, support from school, PLBD in curriculum, training for teachers, budget, resources for teaching, time management.