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## Correspondence

All correspondence should be addressed to  
The Managing Editor  
Environmental Technology & Science Journal  
SET, FUT, Minna, Nigeria  
Email: [etsj@futminna.edu.ng](mailto:etsj@futminna.edu.ng)  
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## Editorial

It is my honour as the Managing Editor on behalf of the Editorial Board to present volume 8, number 1, June 2017 edition of the Environmental Technology and Science Journal (ETSJ) to the research community with a view to expanding the discourse and provide a platform for robust academic debate. As the world's population continues to expand, implementation of resources-efficient measures in all areas of human activities is imperative. The built environment is one clear example of the impact of human activity on resources. To this end, this edition presented fifteen well-researched articles ranging from construction materials, climate change issues, car park management to real estate issues, waste management, health and safety matters and transportation.

Concrete deteriorates considerably when exposed to aggressive chemicals such as acids. Incorporation of pozzolana to concrete can ameliorate its effectiveness in these chemicals but this has to be experimentally established. Therefore, Aka *et al.* investigated the effect of pozzolana; rice husk ash (RHA), powdered burnt brick (PBB) and saw dust ash (SDA) on the compressive strength of concrete in chemically aggressive environment. The results showed that RHA and PBB concrete exhibited better strength than SDA and the control specimen in  $MgSO_4$  solution. The study concluded that RHA and PBB concrete are highly resistant to  $MgSO_4$  and can be recommended as sulphate resistant additive in concrete production.

Climate change represents a significant environmental, social and economic threat and is now firmly recognized by the majority of the world's governments and scientists as an issue of extreme concern for the planet. The public perception of

climate change on both local and global scales by residents of Minna, Niger State was interrogated by Odegbenro and Ojoye in the second paper. The findings revealed that 85.6% of the public were aware of the change in climate using change rainfall and temperature pattern as indicators. The respondents noticed that there are changes in the amount of rainfall received and increase in average daily temperature while 14.4% were completely unaware of climate change issues. The study thereby recommended among others that information and communication technology be used to sensitize people on the effects of changing climate.

Olufemi *et al.* in the third paper assessed shoreline changes, land use and land cover change, geomorphological changes of the coast. The shoreline change movement showed that between 1980 and 1990, the net shoreline movement was estimated 259 meters while the net shoreline movement between 1980 and 2010 was about 347 meters. The end-point rate also indicated the rates of erosion (424.96 meters) and accretion (277.5 meters) (loss and gain), suggesting higher increase in erosion over accretion. The study advocated continuous monitoring of shoreline changes to reinforce our understanding and establishing the processes driving erosion and accretion in the coastal areas.

Creating an outdoor learning and play environment is an initiative that would incorporate green design principles targeted at meeting children's developmental needs. Children developmental needs are cognitive, physical, social and emotional. The forth paper by Ayuba and Akpama assessed the physical outdoor spaces and natural elements in elementary schools

with a view to integrating these elements in elementary schools in Minna. The findings revealed that only 25% of the playgrounds of elementary schools in Minna have above average fixed components. The paper recommended that play-learning environment be integrated in elementary schools in Minna.

Parking management is increasingly becoming a major component of surface transport planning needs of public institutions like schools and hospitals, this is because the means of transportation cannot continually be in motion. Zaria metropolis harbors a number of such institutions which generates substantial vehicular traffic. Despite efforts by these institutions to provide parking facilities in the past ten years, persistent incidences of indiscriminate parking, non-usage of prescribed parking lots, double and road side parking is still very common. To this end, Oluwole *et al.* examined car park usage and management in five Federal Institutions (NITT, ABUTH, NCAT, FCE and NARICT) within Zaria Metropolis in the fifth paper. According to the authors, the major challenges faced by users of the car park facilities are long distance of the parking lots to the destination of the users within the institutions as well as poor medium of communication and direction to the available parking facilities. The implication of this study to the usage and management of car park in the study area lies in the provision of additional designated parking facilities to accommodate the increasing number of vehicles, strict enforcement through monitoring.

The sixth paper by Babatunde examined the dependability of Two-Third of Market Value (TTMV) model of determining liquidation value of real estate collateral in

Niger State. The results showed that only one ESV firm identified Market Survey Model (MSM) as the appropriate model of liquidation valuation (LV); that liquidation values assessed by the ESV firms ranged between 60% and 88.20% of market value (MV) in the state. The paper recommended MSM to the valuation regulators as the basis of LV assessment where the property market is active in the state.

As cities develop and grow, urban renewal is often carried out which requires that existing structures be made to reflect changes in modern architecture and to meet new standards. This process is often done hurriedly and without necessary precautionary measures required to salvage building components that may still be valuable and reusable. Selected urban renewal and renovation sites were examined by Ayuba and Albert in the seventh paper in order to find out the techniques employed in removing whole or parts of such existing structures for effective reuse or recycling. The findings demonstrated a lack of technical know-how as well as deployment of unsuitable equipment during the construction process. The authors recommended that greater partnership between construction industry and recycling factories should be encouraged.

The shorelines are highly dynamic and ever changing. Many factors influence these changes including the type of shoreline (rocky, sandy), wave activity, tidal variations, storms and human impacts. The shoreline change study is necessary for updating the shoreline change maps and management of natural resources. Based on this, the eighth paper by Adebola *et al.* examined the shoreline changes of Akwa Ibom State for three different years 1990, 2000 and 2016; changes that occur in the

land use land cover of the area and landforms around the coast. The study concluded that the shoreline is eroding at -19.03 m/yr and accreting at 15 m/yr. Hence, the study will be very helpful for local administrative bodies for decision making in the state and coastal management in the country.

Abd'razack *et al.* assessed the risk of residing in proximity to illegal waste dumpsites in Sabon Wuse, North-Central, Nigeria in the ninth paper. The level of health risk associated with living close to dumpsites showed that a total of 878 houses are at the severe risk, while, 1,898 houses are at mild risk level. The study advocated that there should be a total clearance of the existing illegal dump site and proper monitoring of the waste management in the town to forestall illegal dumping, and adequate information to residents and awareness on the danger of consequences of indiscriminate dumping of refuse in undesignated dump sites.

In the tenth paper, the application of mass appraisal model in Nigeria was examined by Liman *et al.* The regression results revealed the contributory effect of the different housing attributes on the house price. Based on these results, a mass appraisal model for residential property valuation was developed. The study discovered that a good mass appraisal model can bring about improvement in property tax administration in the study area by reducing cost and ensuring fairness and equity, which are very crucial in any property tax assessment process.

The Urban Heat Island effect is linked to the built environment and threatens human health during extreme heat events. Duchi and Musa examined the spatial pattern of heat islands in Zaria urban area in the

eleventh paper. The results showed the correlation between the maximum temperature and the years of analysis as 0.8433 with 84.33% linear relationship. The coefficient of determination  $R^2$  is 0.7112 which reveals 71.12% change in maximum temperature caused by variation of time. The authors recommended the creation of shelter belt and stabilizing river embankment among other remedial measures.

Yakubu in the twelfth paper assessed safety and health performance of contractor's construction project in Nigeria using Safety and Health Assessment System in Construction (SHASSIC) method. The result of the assessment showed that the performance of the contractors was two (2) stars in ranking. Therefore, what the industry needs according to the author was an act that provides for the promotion, coordination, administration and enforcement of occupational safety and health.

The thirteenth paper by Olatunji established that an assessment index to guide Estate Surveyors and Valuers (ESV), willing to offer housing procurement service for house-seekers does not exist. The paper therefore sought to develop an Optimality Index, (OPTi), a simulation framework to assess Housing Choice Optimality (HcO), and test its application from two perspectives based on utility optimization of 5 key variables. The study revealed that indeed there were variations in HcO across households in the 6 neighbourhoods studied. The consistency of the results according to the author with well-known pattern in Abuja housing market is a proof that the simulation package could assess housing wellbeing objectively.



The effects of road quality on commercial land use pattern in Makurdi Urban, Benue State by Umoren and Mchi in the fourteenth paper indicated that interaction effects between neighbourhood and road quality was not statistically significant. The paper recommended that mix use development be encouraged and more roads to link the neighbourhoods in Makurdi urban should be developed.

Resident's wellbeing is a key factor in the quest to provide residence and neighbourhoods that are people-responsively designed, produced and situated in a conducive physical environment to bring about satisfaction, quality of life and health. The focus of the fifteenth by Johnson *et al.* attempted to find out how the physical attributes of residential units and the immediate neighbourhood impact on the wellbeing of residents. The results indicated that the

neighbourhood amenities beneficial to resident's wellbeing proposed at design stage were either grossly inadequate and now completely absent. The authors recommended that firmer proactive development control policy actions and best professional practices are necessary to protect occupants, maintain current residential capacity and hence make the residential developments sustainable in terms of well-being.

It is my hope that the issues interrogated in this edition will spur us towards making our environment a better place. Happy reading!

R. A. Jimoh, PhD  
Managing Editor

# Evaluation of Key Design Elements for Play-Learning Environment in Elementary Schools in Minna, Nigeria

**Ayuba, P. & Akpama, D. S.**

*Department of Architecture, Federal University of Technology, Minna, Niger State, Nigeria.  
Corresponding E-mail: [arcayubaxx2@futminna.edu.ng](mailto:arcayubaxx2@futminna.edu.ng)*

## **Abstract**

In an era of climate change and a time when pupils especially those in elementary schools spend most of their time indoors, attempt to entice and encourage children and their teachers to spend more time in well-structured, child-centred green designed school grounds is timely and cannot be overemphasized. Creating an outdoor learning and play environment is an initiative that would incorporate green design principles targeted at meeting children's developmental needs. Children developmental needs are cognitive, physical, social and emotional. This paper assessed the physical outdoor spaces and natural elements in elementary schools with a view to integrating these elements in elementary schools in Minna, Niger State. The research was carried out by the use of a structured observation schedule and questionnaires. Data collected were analyzed using descriptive statistical tools such as mean, percentages and averages. The findings revealed that only 25% of the playgrounds of elementary schools in Minna have above average fixed components. It also showed that no provisions were made for experimental, individual, gathering and ecological spaces. The results generated were shown in tables. The paper recommended that play-learning environment be integrated in elementary schools in Minna.

**Keywords:** Developmental needs, elementary schools, green designed, space, play-learning.

## **Introduction**

In the world over, every child plays. The drive to play in children is so profound that children will make effort to do so in the midst of any circumstance. Young children consider pretending, running and building as fun (Whitebread, 2012). It is a well-known fact to researchers and educators that these playful activities are of immense benefit to the development of the whole child across social, cognitive, physical and emotional domains. Play is indeed very instrumental to a healthy child's development; it is no wonder that the American Academy of Pediatrics issued a white paper on the topic (Ginsburg, 2007). The National Association for the Education of Young

Children (2009) named play as a central component in developmentally appropriate educational practices, and the United Nations High Commission on Human Rights (1989) recognized play as fundamental right for every child.

Play has a wide range of definitions ranging from discrete descriptions of various types of play such as physical, construction play, language play, or symbolic play (Miller and Almon, 2009), to a list of broad criteria, based on observations and attitudes that are meant to capture the essence of all play behaviours (Rubin *et al.*, 1983).

Contemporary definitions of play focus on a number of key criteria. The founder of the National Institute for Play, Stuart Brown in his words defines play as anything that spontaneously is done for its own sake. Similarly, Kasser and Pepler (1980) and Rubin *et al.* (1983) defined play along a continuum as more or less playful using a set of behavioural and dispositional criteria. Play includes activities that are freely chosen and directed by children and arise from intrinsic motivation (Miller and Almon, 2009). Today under the pressure of rising academic standards in our elementary schools, play has been given trivial consideration. In our society today, a pseudo dichotomy has been created between play and learning.

This paper therefore, seeks to discourage the strict relegation of learning to the four walls of the classroom by assessing the physical outdoor spaces and natural elements in elementary schools with a view to integrating these elements in elementary schools in Minna, Niger state. This research will encourage outdoor learning through play thereby reducing the time spent by pupils in the classrooms.

### The Importance of Play

Play builds the foundation for a lifetime of learning. Play is pleasurable, intrinsically motivated, freely chosen and is process oriented. Play is also non-verbal and is actively engaged. According to American Academy of Pediatrics (2016), children playful behaviours can range from 0-100% playful. It is through play that children at a very early age engage and interact

in the world around them. The American Academy of Pediatrics titled "The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds" elucidates on the importance of play to the healthy development of children. Among other things, the report says the "play allows children to use their imagination, dexterity, and physical, cognitive and emotional strength" (p.151). Play is important to the development of healthy brain. Children stand the chance to learn how to work in groups, to negotiate, to share and to resolve differences, and to learn self-advocacy skill (Heidi, 2013). These aforementioned benefits of play would be impossible without a well-structured and conducive environment that can foster and instigate children and their teachers to spend appreciable outdoor time to play and learn.

It is alarming that as experts are arguing and yet to come to terms with the importance of play in the lives of children, the actual time children spend daily in playing continues to decrease. Today, children play eight hours less each week than their counterparts did two decades ago (Elkind, 2008).

### Play as a Pedagogy

Moyles *et al.* (2002) examined that although adults endorsed the educational benefits of play, they were uncertain of their role in play and how to assess the prospects of play. Professional knowledge and expertise is critical in planning and engaging in playing, learning and teaching. Siraj-Blatchford *et al.* (2002) studied effective pedagogy and distinguished

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between pedagogical framing (planning for play, providing resources and a routine) on behalf of adults and pedagogical interactions (specific behaviors in face to face encounters), and established that both are required. In conclusion they emphasized that the most effective settings had a balance between adult-initiated and child-initiated activities.

Play is a natural medium through which learning and development is holistically enhanced. As suggested by Hayes (2003), "Play is a pedagogical tool for the teacher as well as a pathway for learning for a child" (p.122). It is obvious that young children learn through play in a composite system.

#### **Components of a Supportive Environment**

Outdoor and indoor learning environments should be motivating and inviting to all children, so that they are encouraged and helped to explore and to use all the possibilities offered for fun, adventure, challenge and creativity as stated by National Council for Curriculum and Assessment (NCCA, 2004). The physical environment, both indoors and outdoors, encourages positive growth and development for children through opportunities to explore and learn. Safe, clean, spacious, bright, welcoming, warm, and accessible environments for children and adults, including those with additional needs, should afford opportunities to rest and play. Babies, toddlers and young children need fresh air and outdoor play space is essential if children are to have a balanced, healthy day. Learning is constrained and may

be damaged if young children are required to sit still indoors, where adults do most of the talking and require children to follow their lead (Bruce, 2004). The environment should offer children opportunities to: actively explore, make decisions and follow through with their ideas; engage in co-operative, symbolic, dramatic or pretend play; move, dance and increase control over their bodies (Hohmann and Weikart, 1995).

Socio-cultural theory is concerned with children's learning in context. Children respond to the reality they see around them and what they learn reflects that reality (Penn, 2005). Environments can reflect the lives and activities of the children/families in the service to establish positive identities. In addition, environments can have resources to counteract stereotypical and discriminatory attitudes (French, 2003).

The same principles apply whether organizing indoor or outdoor areas. In fact many of the activities babies, toddlers and young children enjoy indoors can be achieved outdoors and with greater freedom. If in group care careful consideration of the organizing of rooms for different age groups is necessary. Babies and toddlers need a room or home base where they can relate for part of the day with a small group of children and adults, where they can feel secure and build relationships. Older children need more space (French, 2003).

A supportive environment is one structured to meet the developmental needs of children. The developmental

Needs include emotional development, physical development, social development and cognitive development needs. It is paramount to note that any distinct space on the playground is likely to have both fixed and movable components and serving a range of developmental needs (Heidi, 2013). Fixed landscape components are the anchor points of a landscape, for example, trails, groves of trees, hills, and rock circles. These components must be thoughtfully arranged, to prioritize connectivity, maintain flexibility and create a kind of "loose fit" that allows educators and children to play an active part in adding moveable components to customize their play-learning environment (Heidi, 2013).

A menu for moveable components was suggested by Heidi (2013), to serve as objects that enhances play and can be incorporated into the play space as seen in figure 1. They include but not limited

1. Containers: milk crates, buckets
2. Gardening equipment: wheelbarrows, gloves, watering cans
3. Chalk boxes and tubes
4. Dirt, mud, cob, sand and water.

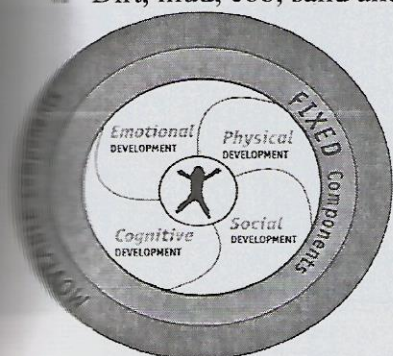


Fig. 1. Fixed and moveable components serving developmental needs. Source: Heidi (2013)

### Creating a Supportive Environment

Smith *et al.* (2005) advocated that the learning environment should be carefully planned to meet children needs by providing them with the optimum opportunities to work independently, to make choices, decisions and solve problems, to engage in real experiences, and to experience success. The High and Scope Educational Research Foundation (2001) suggested that the space should be inviting for children and organize into well-defined areas of interest to encourage distinctive types of play. Hohmann and Weikart (1995) noted that the interest areas are arranged to promote visibility and easy movement between areas and are flexible to accommodate children changing interests. Curtis and O'Hagan (2004) promoted a variety of easily accessible, open-ended, natural, found, real life materials which can be used in creative and purposeful ways and reflect children's family lives. Materials are stored so that children can find, use and return materials they need. The most effective learning comes from simple but versatile materials and environments which extend the child's imagination and can be adapted by children to suit their learning needs and level of understanding. Dowling (2000) referred to this as an informational environment which supports children ability to make and learn from mistakes, discover the best way of doing things and learn how to make decisions.

## Integrating Key Spaces into Play-Learning Environments

Developing a conceptual design for a play-learning environment will require the bringing together entire piece together- the fixed and moveable landscape components, children developmental needs and the desired spatial qualities of the site. It was advocated that priority be placed on five key spaces that should work in concert to create a diversity of play and learning opportunities (Heidi, 2013). The key spaces as described by Heidi (2013) are active spaces, experimental spaces, individual spaces, gathering spaces and ecological spaces as indicated in figure II.

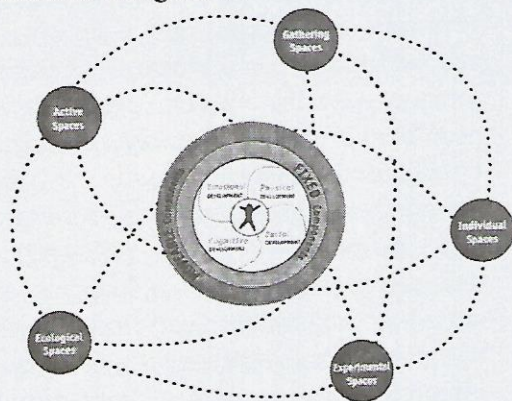


Fig. II. Key spaces in play-learning environments  
Source: Heidi (2013)

### Active Spaces

Spaces that encourage active play vary in topography, incorporate changes in height, challenge the mind to assess competencies and go beyond perceived limits. Plate I explains how these spaces feel energetic as they promote fitness and health.

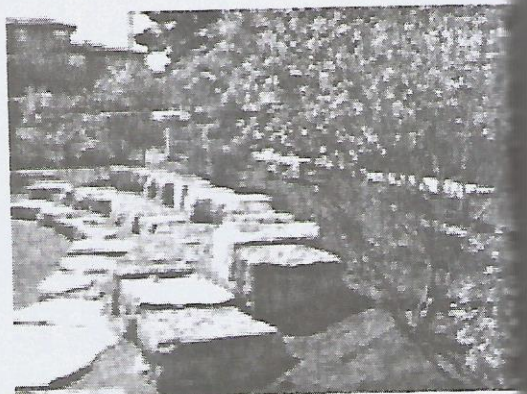


Plate I. Active Space Source: Heidi (2013)

### Experimental Spaces

These are spaces for discovery, exploration, hypothesizing. They are temporary in nature. They are also flexible, alive, messy and emergent. They should feel more like a lab, a space that supports creativity, constructing, building, testing and idea generating. Plate II identifies spaces that are often very social, offering opportunities for the development of communication/language skills. They are filled with materials, and have child sized furnishings and storage. Mud, sand, water, wood, buckets, tools and other types of loose parts are essential. Educational materials such as hand lenses, clipboards, pencils and cameras should be used (Heidi, 2013).



Plate IV. Experimental Space  
Source: Heidi (2013)

### Individual Spaces

Individual spaces support quiet reflective moments, observation and listening as shown in plate III. They feature small enclaves that are protected, cozy and enclosed. This type of space would accommodate one or two children and could be on the edge of another play zone, most likely away from an active play area. This is a space for private time. Some children are sensitive to noise and have need for a quiet space in the playground (Heidi, 2013).

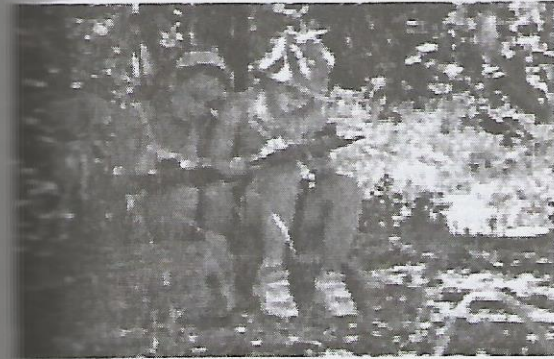


Plate III. Individual Space  
Source: Heidi (2013)

### Gathering Spaces

Gathering spaces can be for a large or small group. Plate IV describes a typical welcoming, fostering of social interaction, and focused on communication, negotiation, and sharing. They offer seating, shade, and should have a balance of soft and hard features (Heidi, 2013). They should be flexible and accommodate multiple use and users (staff, children, parents).



Plate IV. Gathering Space Source: Heidi (2013)

### Ecological Spaces

Trees, shrubs, and vegetation are strong elements of these spaces. They are alive, containing ecosystems that attract birds, butterflies, insects, and worms. They offer children access to water, soil, and plants (plate V). They create habitat on different scales and will attract a diversity of plant and insect species. They evoke an emotional response, nurture a sense of responsibility, and offer moments for reflection (Heidi, 2013).



Plate V Ecological Space Source: Heidi (2013)

### Research Method

The research method employed to carry out this study was the use of post-occupancy survey research. An observation schedule was structured to



evaluate the physical outdoor spaces and natural elements available in primary school play grounds. The assessment was conducted in Minna, Niger state, Nigeria. Two local governments which lie within Minna are Bosso and Chanchaga Local governments. Ten public primary schools were selected at random from each of these local government areas by simple random technique of probability sampling method. The selection of public schools was based on the fact that large populations of pupils in Niger State attend public schools and has a wide variety of spread across the wards in the area. The data was collected and analyzed using descriptive statistical tools such as mean, percentages and averages in a tabular format. Ten public schools selected from each the two local government local areas are tabulated below:

**Table 1.0: Schools selected in Bosso local government area**

S/No	Name of Primary School
1	Baban Dabo Primary School
2	Dr. Yahaya Bawa Bosso Pry Sch.
3	Gusase Primary School
4	Gurusu Primary School
5	Jikuchi Ube Primary School
6	Kadna Primary School
7	Maitumbi Primary School
8	Shango Primary School
9	Tudun-Fulani Model School
10	Kwarkwota Primary School

**Table 2.0: Schools selected in Chanchaga local government area**

S/No	Name of Primary School
1	Shango Primary School
2	Aliyu Mu'azu Sarkin Yakin Mem. Sch.
3	Anguwan Zakka Primary School
4	Dr. Umar Farouk Primary School
5	Ibb Primary School
6	Kuyanbana Primary School
7	Usman Nagogo Primary School
8	Limawa Model Primary School
9	Tunga North Primary School
10	Umar Audi Memorial Primary Sch

## Findings and Discussion of Results

The results obtained through observation schedules were recorded using following representations.

- 0 -not available
- 1 - available

The result in Table 3.0 shows that all the playgrounds of the schools had both hard and soft surfaces required for physical development. It also shows that 85% of groves of trees will enhance the emotional development of children. It further shows that only 10% of the playgrounds have hills which support cognitive learning, 20% of rock circles which support social development but none had trails or pathways in the playgrounds.

Table 4.0 shows that all the playgrounds had either sand or mud or both and chalk boxes which support emotional and cognitive developments in children during play. No playground had a play table which supports both cognitive and social development and only 25% had garden equipment which also supports cognitive developments in children.

Table 5.0 shows that the only type of play space available in the playgrounds of the selected primary schools is the active space. The ecological space, individual space, experimental and gathering space which support play-

learning environments are not available. The environment should offer children opportunities to: actively explore, make decisions and follow through with their ideas; engage in co-operative, symbolic, dramatic or pretend play; move, dance and increase control over their bodies.

**Table 3.0: Fixed components in playgrounds**

No.	List of Schools	Hard/Soft Sur.	Hills	Rock Circles	Groves Of Trees	Trails	Total
01	Baban Dabo Primary School	1	0	0	1	0	40%
02	Chanchaga Primary School	1	0	0	1	0	40%
03	Dr. Yahaya Bawa Bosso Pry Sch.	1	0	1	1	0	60%
04	Gusase Primary School	1	0	0	0	0	20%
05	Gurusu Primary School	1	0	0	1	0	40%
06	Jikuchi Ube Primary School	1	0	0	1	0	40%
07	Kadna Primary School	1	0	1	1	0	60%
08	Maitumbi Primary School	1	1	0	1	0	60%
09	Shango Primary School	1	0	0	1	0	40%
10	Tudun-Fulani Model School	1	0	0	1	0	40%
11	Aliyu Mu'azu Sarkin Yakin Mem. Sch.	1	1	0	1	0	60%
12	Anguwan Zakka Primary School	1	0	0	1	0	40%
13	Dr. Umar Farouk Primary School	1	0	0	1	0	40%
14	Ibb Primary School	1	0	0	1	0	40%
15	Kuyanbana Primary School	1	0	1	1	0	60%
16	Kwarkwota Primary School	1	0	0	0	0	20%
17	Limawa Model Primary School	1	0	0	1	0	40%
18	Tunga North Primary School	1	0	1	0	0	40%
19	Umar Audi Memorial Primary Sch	1	0	0	1	0	40%
20	Usman Nagogo Primary School	1	0	0	1	0	40%
	<b>Total</b>	<b>100%</b>	<b>10%</b>	<b>20%</b>	<b>85%</b>	<b>0%</b>	

**Table 4.0: Moveable components in playgrounds**

No.	List Of Schools	Containers	Garden Equip.	Chalk Boxes	Sand/Mud	Play Tables	Total
01	Baban Dabo Primary School	0	0	1	1	0	40%
02	Chanchaga Primary School	1	1	1	1	0	80%
03	Dr. Yahaya Bawa Bosso Pry Sch.	1	0	1	1	0	60%
04	Gusase Primary School	0	0	1	1	0	40%
05	Gurusu Primary School	1	0	1	1	0	60%
06	Jikuchi Ube Primary School	0	0	1	1	0	40%
07	Kadna Primary School	1	0	1	1	0	60%
08	Maitumbi Primary School	1	0	1	1	0	60%
09	Shango Primary School	1	1	1	1	0	80%
10	Tudun-Fulani Model School	0	0	1	1	0	40%

11	Aliyu Mu'azu Sarkin Yakin Mem. Sch.	1	0	1	1	0	60%
12	Anguwan Zakka Primary School	0	0	1	1	0	40%
13	Dr.Umar Farouk Primary School	0	0	1	1	0	40%
14	Ibb Primary School	1	0	1	1	0	60%
15	Kuyanbana Primary School	1	1	1	1	0	80%
16	Kwarkwota Primary School	0	0	1	1	0	40%
17	Limawa Model Primary School	1	1	1	1	0	80%
18	Tunga North Primary School	0	0	1	1	0	40%
19	Umar Audi Memorial Primary Sch	1	1	1	1	0	80%
20	Usman Nagogo Primary School	0	0	1	1	0	40%
	<b>Total</b>	<b>55%</b>	<b>25%</b>	<b>100%</b>	<b>100%</b>	<b>0%</b>	

**Table 5.0: Types of spaces required for a play-learning environment.**

S/No	List of Schools	Active	Experi-Mental	Indivi-Dual	Gather-Ing	Ecolo-Gical	Total
01	Baban Dabo Primary School	1	0	0	0	0	20%
02	Chanchaga Primary School	1	0	0	0	0	20%
03	Dr. Yahaya Bawa Bosso Pry Sch.	1	0	0	0	0	20%
04	Gusase Primary School	1	0	0	0	0	20%
05	Gurusu Primary School	1	0	0	0	0	20%
06	Jikuchi Ube Primary School	1	0	0	0	0	20%
07	Kadna Primary School	1	0	0	0	0	20%
08	Maitumbi Primary School	1	0	0	0	0	20%
09	Shango Primary School	1	0	0	0	0	20%
10	Tudun-Fulani Model School	1	0	0	0	0	20%
11	Aliyu Mu'azu Sarkin Yakin Mem. Sch.	1	0	0	0	0	20%
12	Anguwan Zakka Primary School	1	0	0	0	0	20%
13	Dr.Umar Farouk Primary School	1	0	0	0	0	20%
14	Ibb Primary School	1	0	0	0	0	20%
15	Kuyanbana Primary School	1	0	0	0	0	20%
16	Kwarkwota Primary School	1	0	0	0	0	20%
17	Limawa Model Primary School	1	0	0	0	0	20%
18	Tunga North Primary School	1	0	0	0	0	20%
19	Umar Audi Memorial Primary Sch	1	0	0	0	0	20%
20	Usman Nagogo Primary School	1	0	0	0	0	20%
	<b>Total</b>	<b>100%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	

## Conclusion

The study has revealed that a play-learning playground has not been given any considerable attention. It was observed that only 25% of the playgrounds of primary schools had above average fixed components and 25% had moveable components. It is alarming that no provisions were made for experimental, individual, gathering and ecological play-learning spaces. These would limit or deprive the children certain developmental needs which these spaces would have offered if they were present.

## Recommendation

State holders, developers and professionals involved in the development of primary schools, should pay adequate attention to these key design considerations which support play-learning playgrounds thereby creating an enabling environment where children developmental needs would thrive.

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