Conducive Attributes of Physical Learning Environment at Preschool Level for Slow Learners

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Abstract

Conducive attributes of physical learning environment of schools play a dominant role in the successful delivery of lessons for slow learners. This study aims to propose a framework towards achieving conducive attributes of preschool learning environment suitable for slow learners through literature review. In summary, the physical conditions including human comfort (visual, thermal, acoustic), spatial planning, quality of furnishing and finishing and safety features are important attributes to consider for conducive learning environment. Findings are useful for designers, service providers and policy makers of special needs preschools when making decisions to provide conducive facilities for the slow learners.

1. Introduction

Being able to learn and to become a highly functioning adult is of a paramount importance for slow learners. Hence, all aspects of the slow learners' well-being and the environment should be considered. In their early childhood, conducive attributes of physical learning environment of preschools play a dominant role in the successful delivery of lessons for slow learners.

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Unfortunately, in Malaysia, there are few published work on the provision of quality preschool education and physical environment for slow learners. The government’s strategies to improve the quality of preschool education could be seen clearly in the Preschool Education Policy & National Key Result Area (NKRA) (Ministry of Communication and Multimedia, 2013). However, most policies are designed to improve teaching systems and social environments, with minimal allocation to physical environments. However, the Government's Permata Programme (with RM100 million budget for preschool education) lacks a holistic approach as no emphasis is given to highlight the physical environment aspect of preschools.

The paper aims to propose a framework, towards achieving conducive attributes of preschool learning environment, suitable for slow learners based on a review of literatures. The objectives of the study are:

- To define slow learners in terms of detection, special needs, requirement and management.
- To investigate the current trends of appropriate preschool physical environment to support special teaching programmes.
- To explore the current trends of preschool facilitated by the Malaysian government.
- To propose a framework of conducive attributes of preschool learning environment suitable for slow learners.

2. Literature review

2.1. Slow learners' identification and detection

Due to their unique characteristics of slow learners (Chauhan, 2011), their education must be altered and geared to their slower pace of learning (Borah, 2013; Lohman, 2011; Placement, 2010; Krishnakumar et al., 2006). Denying their disabilities and pretending that they are able to learn as normal students will be detrimental to their development (Idol, 2006).

It is suggested that, slow learners need help but the “type of school” is not the answer as neither group of slow learners is "successful" in school (Kaznowski, 2003). Special Education does not positively affect the academic performance of the slow learners, whilst mainstream education is not a realistic option for slow learner either (Kaznowski, 2003), where leaving them failing in the mainstream school is not an acceptable alternative (Kaznowski, 2004). These issues posed a challenge to provide the best learning environment for slow learners, and it is suggested that the way we cater to their individual needs, despite the type of school, will make the ultimate difference (Holloway, 2001).

Early detection of children with disabilities falls within the purview of both the Ministry of Health and the Ministry of Education (NECIC, 2013). More than 95% of children and their families are accessible by public health staff in the new-born period and primary school under existing programmes. It is, therefore, ideal and crucial that these ministries have in place effective, holistic and proactive mechanisms for early detection of disabilities in children. More in-depth analysis of slow learners and early detection method in Malaysia will be featured in the findings.

2.2. Physical environment's impact on preschool children development

Many studies have concluded that physical dimensions and different aspects of the physical environment influences students’ behaviour and attitudes differently (MacCaulay, 1990; Mendell & Heath, 2005). The physical environment and children’s development of cognitive and social competency are directly related (Moore 1994, Moore 2002). Studies into the design process of preschools have found that design elements are typically overlooked (MacCaulay, 1990; Mendell & Heath, 2005). The children are the experts of their environment; therefore design process of a preschool environment should adopt a holistic approach. Focus among educators seem to be low in environments with inadequate facilities Parents, children and teachers should be consulted to ensure their needs are catered properly (Şahîn & Dostoglu, 2012).

2.2.1. Preschool developmental process and the influence of the physical environment

The preschool age is important as most mental, physical and cognitive development occurs during this period - 80% occurs during the ages 4 to 6. Learning should be fun and accidental, not forced upon (Reynolds, 1970).
Aspects of physical environment, namely, human comfort, quality of furnishing and finishing, spatial planning and design, air quality and noise or pollution, have been shown to affect child’s play behaviour - influencing their learning (Abbas, Othman, & Rahman, 2012). It is concluded that formal preschool education contribute to cognitive development amongst Western children, leading to better intellectual performance and mental maturity as compared to Eastern children (Abbas, 2012). Spatial arrangement and definition also influence children development; well-defined areas promote better learning and positive behaviours among children (Abbas et al., 2012). The design and quality of materialisation correlate with positive development among preschool children. All these are technical architectural features that can be modified to better suit a child’s development.

2.3. Preschools in Malaysia

Poor quality facilities and building design can affect children development and teacher motivation - indirectly affecting children education (Abbas, 2010; Salleh, 2013). The preschool years should be seen as an opportunity to mould children to become better citizens in the future. Due to the increasing number of children attending preschools in Malaysia and given the government’s aim to increase enrolment, it is crucial to ensure that preschool environments are properly designed to cater to children development (Abbas, 2012).

Unlike Malaysia, most developed countries have long given emphasis to both physical and non-physical environments to ensure a balanced approach to establishing preschools (Abbas et al., 2012). Therefore, the design of public preschools in Malaysia should shift from the current approach to a more holistic and balanced approach, giving equal emphasis to the impact of the physical environment on children development.

2.4. Problem statement

The introduction and literature review sections have emphasised that early detection of children disabilities is crucial, to make ways for the implementation of learning intervention programmes at preschool level. The environmental setting plays a crucial role in ensuring successful learning for slow learners, namely the lack of published work on the provision of quality preschool education and physical environment for slow learners in Malaysia. It also showed that there is a need to explore the current trends of preschool facilitated by the Malaysian government.

- Early detection, special needs, requirement and management of slow learners are often emphasised and looked comprehensive on paper but lacks enforcement.
- Facilitating the physical environment of preschools especially for slow learners can be a challenge to support special teaching programmes.
- A framework of conducive attributes of preschool learning environment suitable for slow learners would be useful for designers and stakeholders

3. Methodology

3.1. Procedure

To achieve the aims and objectives, this paper adopts a review of secondary data (Mohit, 2014). Literatures from various disciplines concerning slow learners and physical learning environment, and other related studies are gathered and critically analysed to gauge better understanding on the the current situation under the identified sub-topics, to identify the shortcomings of the present situation and to analyse and conclude the literature review effectively.

A cross-disciplinary approach was used when reviewing the literature to gain better insight into the needs of special children, especially slow learners. This is an important element of the study as the needs of slow learners must be studied holistically. The main theoretical framework used in this paper adopts major child developmental theories as the basis of the argument. Moreover, the literatures are examined from various viewpoints, the context of the studies and topics discussed.
This paper started with the general understanding of the slow learner, covering the issues of detection, the management, and the special needs and requirements. It was followed by a general explanation of the slow learners’ appropriate type education, type of teaching techniques, type of learning environment and detail explanation of the type of physical learning environment for slow learner pre-schoolers. The current trend of existing public preschool in Malaysia was then investigated. To conclude, a framework of conducive attributes of preschool learning environment for slow learner is proposed based on the understanding from the literature review. Findings revealed that the physical learning environment at the preschool level affected the slow learner academic performance.

3.2. Limitations and delimitations

Limitations include reliance on foreign (Non-Asian) literature. This is because there is a lack of regionally published work on the impact of physical built environments for slow learners. Therefore, Western studies have to be reviewed and adapted. This may lead to inappropriate suggestions in relation to the Malaysian context and culture. Moreover, this paper explored the physical learning environment for the slow learners at preschool levels specifically. Thus, the physical learning environment in other educational settings and related to normal children have not been focused on. When there is a lack of published literature on conducive physical learning environment for slow learners, the literatures on normal and learning disabled, in general, are referred. Other limitations include the time constraint. Three months is a short period of time to conduct a research of this scale conclusively. Thus the paper only presents the initial phase of an on-going research. Hence, not all studies pertaining to the topic have been explored. The delimitation for this research is the definition of slow learners. Definitions vary regionally, but the definition outlined by the Malaysian government is used in this research.

4. Findings and discussion

This study is based on the notion that for every built environment designed for the users, care and consideration for the users needs are of utmost importance to ensure that the spaces provided are conducive to the occupants. Three major issues are:

- Slow learner - detection, special needs & requirements and management.
- Physical environment - appropriate design (design of classroom to support special teaching programmes, normal class vs. special class for slow learners) and continuity of class design between preschool and primary school classes (to contribute to school readiness).
- Preschool for slow learners in Malaysia - Government policies, NKRA, Permata Programme, and current efforts to improve slow learners' education.

A considerable amount of literature has been published on the physical environmental needs of preschools for normal children. However, there is a lack of current literature on the physical attributes of the preschool environment for slow learners in Malaysia.

4.1. Slow learners - detection, characteristics, special needs and requirement

4.1.1. Early detection of slow learners

Recently, the Family Health Development Division of the Ministry of Health has begun to establish early detection initiatives to improve and accelerate the detection of children with disabilities (NECIC, 2013). In 2008, the Ministry of Health ran a pilot programme in 5 areas in Malaysia that included specific development health screening at 5 months, 12 months, 18 months and 4 years (NECIC, 2013). The programme strongly encouraged health professionals to take note of parental concerns of developmental delay, and incorporated a child developmental checklist to assess parental concerns, M-CHAT (Modified Checklist for Autism in Toddlers) at 18 months, and ADHD or Learning Disorders screening at 4 years (NECIC, 2013).

These programmes engage both parents and healthcare providers to look out for and act on the early signs of potential disabilities.
4.1.2. Difference of slow learner and others

Kovacs (1989) proposed eight categories of children with learning disability namely, slow learner, dyslexia, hyperactive, ADHD, autism, cerebral palsy, syndrome down and the mentally retarded. Slow learners are often confused with dyslexia (Kovacs, 1989). Although slow learner and Dyslexia is categorised under high functional learning disabled, there are differences between both:

- **Dyslexia** – Their attainment level specifically in reading and spelling is lower than their actual intellectual ability (normal IQ). They may be good at other subjects that not involve reading and spelling such as mathematics and history.

- **Slow learners** – their attainment level in all academic subjects is equal to their actual intellectual ability (low IQ) (Krishnakumar et al., 2006). In other words, their attainment level in all academic subjects is as low as their IQ level. Because of their below average IQ, they are often being called as intellectually disabled. They may be good at other activities that not involve academic learning such as sports (Krishnakumar et al., 2006).

4.1.3. Slow learners and the learning disabled

In developed countries, slow learners are not considered to suffer from learning disabilities. The fact that they are working to the best of their ability does not qualify them for help. On the other hand, in Malaysia, the learning disabled are considered as suffering from learning disabilities. Their ability levels are not parallel with their normal IQ levels. Due to this, they qualify for help and special education.

4.1.4. Slow learners special needs and requirements

As compared to normal children, slow learners require integrated education with special classes in regular schools. They need special classes to ensure their education where they can get more help and attention in acquiring the predetermined skills than average children. However, they should not be isolated from other children to the extent of special schools (Krishnakumar et al., 2006). They must be part of the mainstream education system in regular schools, mixing with other children and living life like other average children. The children who registered for integrated preschool programme get to share and play together in the outdoor play area (Boon, 2010), thus enhance their social interaction that benefits them cognitively.

Integrated education approach seems to be more balanced and appropriate for the slow learner. While they get to socialise normally with normal population of the school, they could also have benefits of separation during formal academic lessons. Although social interaction with normal population especially with the same-age peers is important for their cognitive development, this should be avoided during formal academic lessons in classrooms, so as to avoid any academic competitiveness that leads to negative emotions among slow learners. This is different from the needs of normal children who do not require special classes with special programmes.

4.2. Conducive physical learning environment for slow learners

The success of slow learners is greatly influenced by their learning environment (Mauro, 2009). There are two aspects of a conducive classroom environment - good classroom organisation and management and an appealing physical environment to promote effective learning (Sivalingam, 2009; Chitravelu, Sithamparam & Teh, 2005).

The following attributes namely human comfort (visual, thermal, acoustic), spatial planning, quality of furnishing and furnishing (including storage), and safety features for a well-designed layout are agreed upon.

4.2.1. Human comfort

Physical discomfort and health problems such as fatigue condition or sick building syndrome that occur among building with poor indoor environmental quality have been reported. As children spent most of their learning time indoors (Juster, Ono & Stafford, 2004), a comfortable and tailored indoor environment will undoubtedly help to enhance their learning process.

4.2.1.1. Visual

As compared to normal students, slow learners tend to understand visual stimuli better than audio stimuli. Therefore, for slow learners, visual support is a better strategy to facilitate the teaching and enhance children’s
learning. Physical environments must be designed to enhance visual stimuli. This includes body movements, environmental cues, objects, and written language (Sells, 2013). Visual cues such as photographs, drawings, graphics, or computer-generated icons actually benefit all students – normal and learning disabled (Tissot & Evans, 2003) whereas web-based learning or e-learning is the latest trend in educational technology (Pirani & Sasikumar, 2013) significantly affecting the learning of students especially for students with learning difficulties (Rhodes & Milby, 2007).

The usage of effective visual cues such as signages in classrooms are able to sustain children’s attention - helping them grasp abstract concepts more easily, reduce anxiety of academic learning situations and help them express their thoughts coherently (Broun, 2004; Li, 2004; Rao & Gage, 2006)

Sufficient daylight in classrooms is important because it has been shown to improve study and health, awareness and feelings of well-being in classrooms. The lack of natural daylight reduces visual comfort contributes to sick building syndrome and absenteees and in turn affect academic performance (Smith & Bradley, 1994).

4.2.1.2. Thermal

This is comparable to normal children as thermal comfort is also (Li & Yao, 2012) helps both children and teachers to work more efficiently thus contribute to academic success. Poor thermal comfort in classrooms could distract children from learning, influence mood, health, attendance rate and academic performance (Mendell & Heath, 2005). This condition is made worst by learning disabled children such as slow learners. Therefore, it is a more crucial aspect in the design process of preschool for slow learners as compared to normal children.

Living in a hot-humid region such as Malaysia, perspiration is more prevalent, leading to thermal discomfort. Due to this, people require air-conditioning or mechanical ventilation systems to achieve thermal comfort. This condition, on the other hand, would be different in cold regions where the use of mechanical heating is much more needed.

Window shading devices, blinds or curtains should be used to prevent direct solar radiation (Fadeyi, Alkhaja, Sulayem & Abu-Hiljeh, 2014). Body heat and moisture from the users could raise classroom temperatures thus influencing thermal comfort. High quantity of furniture used would also affect the airflow in the classrooms.

4.2.1.3. Acoustic

Concentration and distractibility are common issues among slow learners (Bateman, 1991). Classrooms must, therefore, be fitted with sound insulators to reduce noise pollution to help slow learners participate and concentrate better in class as it affects recognition of sound patterns - interfering directly with concentration during classroom learning (Baddeley, 1998).

Acoustic design must also be tailored to reduce anxiety and distress because audio stressors can cause literacy problems (Tallal, 2003, Krishnakumar et al., 2006). Proximity to acoustic hazards such as generators, public areas such as cafeteria or factories and sources of vehicle noise, for example, main roads and heavy traffic should be minimised. Additionally, leakages that transmit external noise indoors must be reduced. However, sound generated by air-conditioning systems, mechanical fans, and teachers’ and students’ activities are unavoidable (Fadeyi, Alkhaja, Sulayem & Abu-Hiljeh, 2014).

Slow learners are also more susceptible to psychological stress due to their condition – they may feel shy, inferior or depressed. Therefore, an environment that exposes them to discomfort (both visual and audio) will be detrimental to their psychological state (Bateman, 1991). By properly designing acoustics, a healthy physical setting will promote positive social behaviours and boost a child’s interest to attend preschool consistently (Fadeyi et al., 2014).

4.2.2. Physical spatial planning needs

- Clearly defined spaces within the learning space used for different purposes, and that ensure students know how to behave in each of these areas (Quinn, Osher, Warger, Hanley, Bader, & Hoffman, 2000; Stewart & Evans, 1997; Walker, Colvin, & Ramsey, 1995). For example, a learning environment for students with learning problems may have separate quiet spaces where a student can cool down or work independently (Quinn et al., 2000; Walker et al., 1995), personal spaces for each preschooler and flexible areas for large and small group activities for various interactions between students and teacher (Rinehart, 1991; Walker et al., 1995). This again
is different from normal children. All preschoolers should have clear visual access to the teacher and vice versa, at all times (Quinn et al., 2000; Rinehart, 1991; Stewart & Evans, 1997; Walker et al., 1995).

- Preschoolers with special needs should be in proximity to the teacher (Bettenhausen, 1998; Wolfgang, 1996) so teachers can closely monitor and give compliments and encouragements when necessary. Although normal children require close contact with teachers too, it is more apparent among slow learners as they due to their distractibility and need for more assistance.

- Comparable to normal children, classrooms for slow learners are ideally small in size where the student-to-teacher ratio is much smaller (Lohman, 2011). This will promote intense contact between teachers and students.

  Teachers will interact better with their students and also can appraise the students’ social and emotional needs and academic ability levels. These unique students require one-to-one contacts to progress in their academic learning (Welsh, 2010).

- To promote attentiveness among slow learners, seating arrangement in their classroom should be properly organised (Borah, 2013; Bettenhausen, 1998; Stewart & Evans, 1997). Layout of tables and chairs in rows would facilitate task behaviour and academic learning; whereas more open arrangements, such as clusters and u-shaped would encourage social interactions and eye contacts among students (MacAulay, 1990; Walker & Walker, 1991) as shown in Fig. 1. Teachers should sit at the rear of the classroom to observe everyone better (Gujjar, 2010).

Any changes in classroom organisation and physical layout could affect student's behaviour (Darch & Kae'enui, 2001).

<table>
<thead>
<tr>
<th>Traditional Classroom layout</th>
<th>U-Shaped layout for whole group discussion</th>
<th>Fish-bowl layout for bigger group discussion</th>
<th>Small working groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher has eye contact with all the students for &quot;teacher centred” learning</td>
<td>Students can have eye contact with their classmates</td>
<td>There are outer and inner circles and work best without the tables.</td>
<td>Smaller groups can work together but also have eye contact with the other groups</td>
</tr>
</tbody>
</table>

Fig. 1. Physical learning environment seating layout to facilitate teaching and learning.

Source: Atherton, (2013)

4.2.3. Quality of furnishing and finishing

Furniture such as bookshelves should not obstruct the view towards the teacher (Sivalingam, 2008). There may also be spaces to store items, computers, or audio-visual equipment.

Kalyani and Radhakrishna (2002) measured the impact of a classroom environment on the intelligence of Ashram school children. The results indicated that, some of the components of a classroom environment namely, physical facility, methods of teaching, teacher’s characteristics significantly affects intelligence.

Two methods, namely an analysis of the spatial needs and the use of appropriate rating tool for children physical environment, could be adapted to analyse the conduciveness of the physical learning environment for slow learners. Slow learners will require different concepts of finishing and furnishing due to their condition and learning ability.

4.2.4. Safety features

Similar to other children, dangerous elements should be avoided to maintain health and safety. Uncovered wiring on the floor, worn-out building material, stained classroom surfaces, patched flooring and crack walls as well as
potentials for causing fire outbreaks such as rubber, papers, furniture and wirings could harm preschool users especially the vulnerable ones – the children (Fadeyi, Alkhaja, Sulayem & Abu-Hiljeh, 2014). Figure 1 shows the safety features as part of the framework for conducive learning environment for slow learners in preschool setting.

4.2.5. Rating tool for children’s physical environment

The Children Physical Environment Rating Scale (CPERS) was developed (Moore & Sugiyama 2007; Moore, 2008) to evaluate the quality of preschool physical environments. It is the first of its kind and was designed based on an interactional – constructivist theory of children development and the influence of the child’s surrounding environment (Moore, 1976, 2002, 2008; Moore & Sugiyama, 2007). As discussed in Moore (2008), major development theories such as those by Piaget (1963) and Werner (1949), have been used as guidelines to construct this scale (Moore & Sugiyama 2007). With high test-retest consistency in all, assessments the scale is recommended for assessment of preschool physical environment quality (Moore & Sugiyama 2007; Moore, 2008). The scale is applicable in various settings such as other countries, rural areas and for other personnel such as teachers and parents (Moore, 2008). In fact, (Abbas, 2012) adopted the CPERS scale in his assessment of Malaysian preschools. This tool can be adapted to slow learners and their needs to assess preschools that cater for them.

4.3. Proposed framework of conducive attributes of preschool learning environment for slow learners

Besides CPERS, a framework of conducive attributes of preschool learning environment suitable for slow learners would be useful for designers and stakeholders. Figure 2 reflects the conducive attributes of physical learning environment for slow learners.

5. Conclusion

In conclusion, the provision of a conducive preschool physical environment for slow learners must adhere to special criteria, in line with their specific characteristics and requirements. It must be appropriate, comfortable, well-defined and safe in order to maximise their learning. Hence, the comfort conditions, spatial planning, quality of furnishing and finishing and safety features are important physical attributes to consider for conducive learning environment. A comprehensive understanding of their uniqueness in terms of the slow learners' mental, social and behavioural states and how they differ from and interact with other children is therefore crucial as it allows us to tailor our design better to cater their needs fully.

Priority must also be given to ensure early detection of slow learners in society to avoid disintegration and isolation in the future. It is important to know that slow learners are normal human beings with special needs, thus any assistance at early stage will go a long way; ensuring they live a normal if not fulfilling life in the future.

This paper is the outcome of the first stage of a study into the physical environmental needs of preschool slow learners. An empirical and more comprehensive study of the actual physical environment of preschoolers with emphasis on special needs children including slow learners will be embarked next. It is hoped that this research is able to stimulate more interest in the area, encourage more serious consideration regarding mental and physical needs of slow learners and contribute significantly to the design of their preschools in the future.
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