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INTERIOR DESIGN CONSIDERATIONS TO ENHANCE STUDENT SATISFACTION IN CLASSROOMS

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Abstract

The built environment that humans live in, affects them in their cognitive, emotional and social terms. Every building has a specific purpose to serve. School buildings being the vital infrastructure to impart education, needs to be designed in ways that they provide high quality learning environment. The architectural and interior design considerations in schools may impact the learning ability, productivity and creativity of the students. To start with, the satisfaction of the students must be taken into consideration. This study comprises of exploratory research from previously done studies on similar fields, making an attempt to find out the architectural aspects necessary to be considered while designing classrooms in schools. Surveys have been conducted in schools in India to record the students' perception of satisfaction in terms of classroom design. The final result of this study deduces a set of interior design rules which may be followed in classroom design satisfying the student user group. This study can work as an inception to other advanced studies such as linking performance of students with interior design of classrooms.

Keywords

Student Satisfaction, Learning Environment, Design Guidelines, School Design, Impact of Architecture on Behavior

1. Introduction

Design of a built space has been shown to have significant impact on the behavior of the users residing in it. A successful architectural or interior design positively benefits the psychological and physiological well-being of the users. The understanding of the mutual relationship between people and their surroundings is the major concern of the behavioural sciences (Dent, 1998). Human behaviours, attitudes and values become significant in order to create enabling environments for diverse needs of people in the contemporary society (Churchman, 2002; Lang 1987; Dent 1998). As children spend the maximum amount of time in an educational setting, there is a strong impact of design of such settings on what they learn and how they move into adulthood. Childhood is an important stage in human development. Every interaction that a child makes with their environment is a learning experience; one that adults may take for granted (Kaup et al., 2013). Traditionally, designing the learning spaces are the responsibilities of architects, interior designers and usually not teacher-practitioners, but the architects and interior designers are not educational imaginary, often leading to the reproduction of the industrial model of classrooms, with notable exceptions (Jamieson et al., 2000; Abbasi, 2009). It is important to understand the perspective of the students and their needs, to carry out a successful design of a classroom for a better learning experience. Indian schools follow predominantly teacher centric approach of education. The majority of the time spent in school is the classroom. This makes classrooms the most significant spaces for learning. However, often students perceive classrooms as spaces for stressful learning. There is ample scope for improving affection of students for their classroom environment for more effective learning through design. This paper elaborates on parameters of interior design of a classroom space and their impact on the students, through exploratory study of recent researches. Further there are supporting experiments on students' perception conducted in Indian schools and conclusions drawn to establish findings through evidences.

2. Objective

The aim of the research is to find out the interior design parameters for classroom design which enhances satisfaction of the student user group as per their perception. The objective is to lay a base for further research which can be done linking student performance with classroom interior design.

3. Limitations

This study takes into account only the physical parameters of interior design of a room. This study considers students of age group 12 to 15 years only.

4. Methodology

Parameters of architectural design of a classroom are listed and narrowed down as per the scope of this research. Each parameter is elaborated and further used for questionnaire survey. Figure 1 illustrates the research methodology.

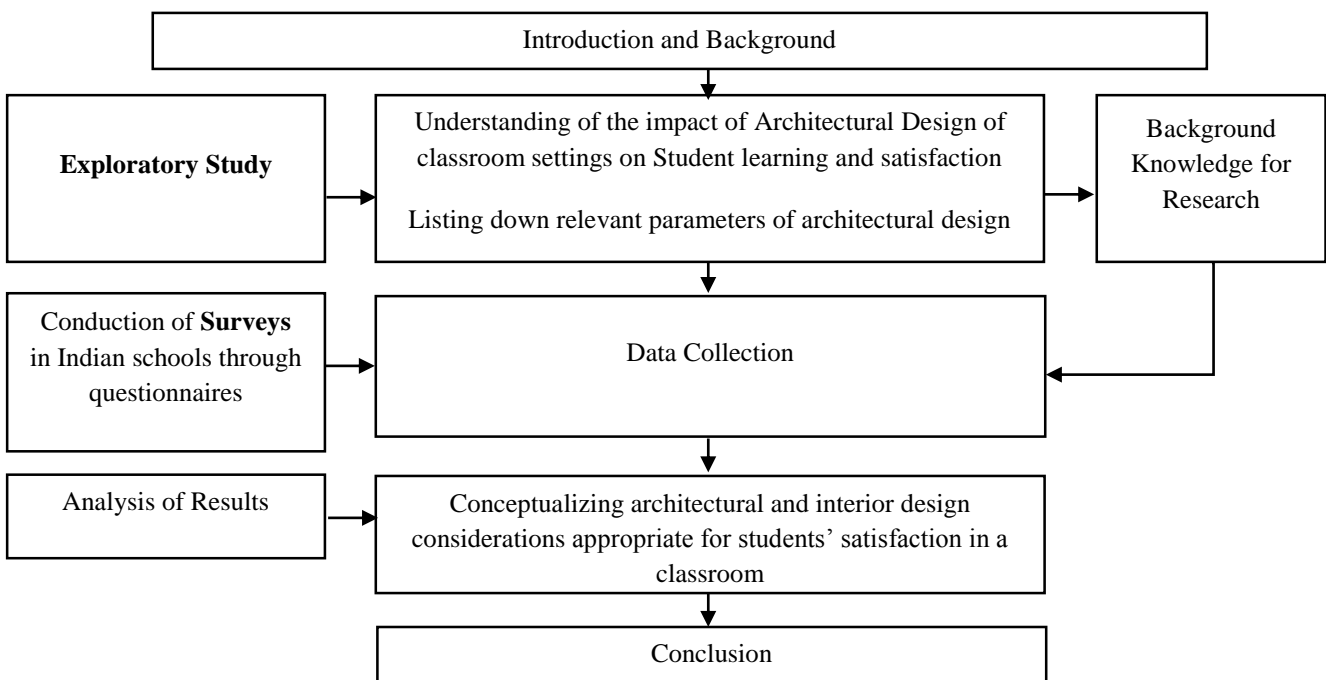


Figure 1: Methodology

5. Design Parameters

As designs are always context specific and there is a large range of design parameters to be considered, it is difficult to find out the perfect design guidelines which can be used universally. Therefore, there does not exist any universal set of rules to design perfect classroom settings. Architectural and interior design parameters range from physical aspects like aesthetics to technical aspects like sustainability. To narrow down the focus of the study, this research takes into consideration

only the physical aspects of architectural design. Figure 2 lists down the design parameters and narrows down the scope of this research.

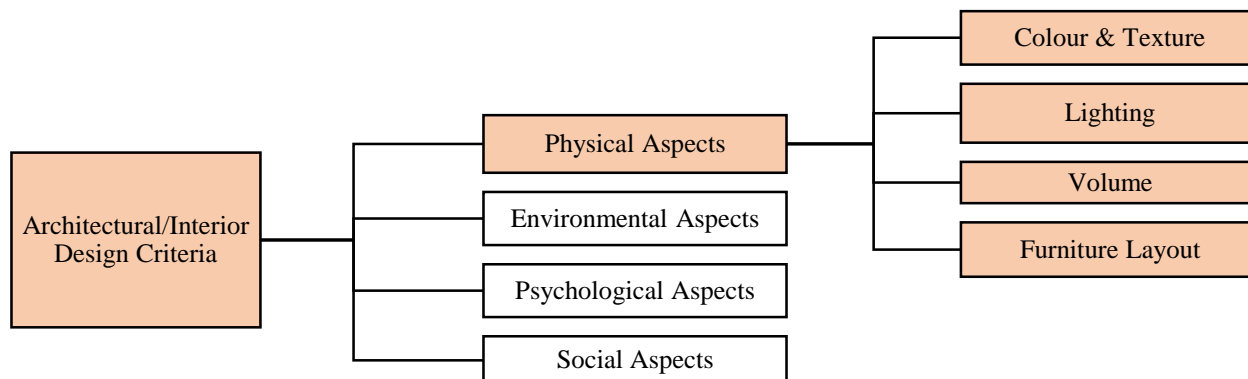


Figure 1: *Architectural Design Parameters*

5.1 Colour & Texture

We all harbor the desire for color harmony in our environment, and many studies show that such environments can increase well-being and performance (Walden 2015). Colour, pattern and texture are major design elements for interior design/architecture that effects the behavior of the users. The architecture of a space should work with the specified colour. Selection of colours for classroom environment depends highly on subjectivity. One colour might appeal a particular student while might be intimidating for another. Colours can be correlated to age as per studies and with growing age colour preference differs. Colour combination can create pleasant atmospheres and have emotional impact of the users. Spaces perceived as unpleasant and ugly with respect to their color design will have a negative effect on the motivation and desire to learn and perform as well as on well-being (Walden 2015). Use of multiple colours should be carefully implemented. A high contrast between a surface of teaching presentation mode such as a display board and the background wall may not appropriate for students' visual attention. As a child matures, preferences change from tints and pastels (elementary school) to bright medium-cool colors such as greens, blues, and green-blues (middle school) to darker colors (high school) such as burgundy, gray, navy, dark green, deep turquoise, and violet (Gale 1933). As children enter adolescence, less preference is given for primary colours as they are associated to immaturity. Colors in classroom should be selected in ways that they reduce stress and increase attention span of students. Use of monotonous colour can lead to boredom while use of too many colours causes disturbance and strains the brain. In architecture colour serves an important role in ways a user perceives the space. Warm colours on wall surfaces, visually reducing the size of the room encouraging confinement, can be used for elementary school classrooms. Cool colours on the other hand, enlarging the

size and scale of the room visually making them less intimate, are more appropriate for high schools. Use of textures on interior surfaces of a classroom can be visually treated as patterns. Textures with too much contrast can strain the eyes and cause distraction. However, textures with which students are more acquainted to and has a certain level of naturalness in it can be used to clad the classroom walls.

5.2 Lighting

Lighting conditions in a room can vary from natural light to artificial light. The most easily available natural light is sunlight. Natural daylight has many positive impacts on human moods and efficiency. It helps create physiological and psychological comfort and is not just a tool for visibility. Performance improves in the presence of daylight, and its positive effect is manifested in better social behavior (Walden 2015). However, too bright light can cause disturbance and have negative impacts. Artificial florescent lights are available in many different spectrums ranging from daylight florescent light to white florescent light which are cooler. Different warmth of florescent light have different effects on human psychology in complicated ways. If the light is too cold it might be perceived as unhealthy or unwelcoming. Cold light also influences users based on gender in different ways. Too bright florescent light steals the naturalness from the classroom. This suggests the use of direct and diffused daylight as the main source of lighting in classrooms with a combination of artificial lighting. In schoolrooms, differentiated and variable lighting systems should be used that support the instruction offered at any given time (Engel & Dahlmann, 2001).

For efficient use of day lighting the orientation of the building is a key deciding factor. It is suggested to have the classrooms oriented towards the east-west axis as this direction has direct sunlight. North façade can be used for other spaces like library where a uniform diffused lighting is desired. Windows should be optimally sized and located in a well distributed manner on the face of the wall so that there is ample play of light in the room. There should be windows with standard sill level along with windows placed higher to bring more light in the room in a diffused manner. Shading devices should be flexibly designed so that they can be controlled to avoid glare. In times of very low or no sunlight artificial lights in the room can suffice the lighting need. Placement of artificial light should be done as per function such as presentation area or some special activity area and the furniture arrangement of the room. It will be the best practice to use lights with sensors to provide only required light and also save energy.

5.3 Volume and Furniture Layout

Size of a classroom depends on the number of students in it. Classrooms with optimum area incites more intimacy in the students than classrooms which are too big in area. Rooms with higher areas however encourages flexibility of use. The areas which are not being utilized for formal instruction can become areas for other student activities. The height of the ceiling has an effect on the creativity and way of thinking of the users. The effects produced by high or low ceilings actually occur because such ceiling heights increase or decrease vertical room volume, which in turn stimulates alternative concepts and types of processing (J. Meyers-Levy, R. Zhu, 2007). Students of classroom with a lower ceiling height will tend to focus more on the instruction than that of a higher ceiling height. Classrooms with high ceiling heights impact the students to think freely and more creatively.

The physical arrangement of the classroom has the potential to encourage desirable behaviour or contribute to students' misbehaviour (Daniels, 1998). The seating arrangement can vary largely from a formal row and column system to an informal semicircular arrangement. It depends largely on the instructor and the intent of the instruction to decide on best seating arrangements. In a collaborative form of learning it is best to have an arrangement where all students sit equidistant to the instructor. Formal seating arrangement of rows and columns tend to have the students seating at the back distracted by interacting with each other leading to break of attention. A flexible seating arrangement can also be practiced. In case of instruction which involves more teacher centric approach where students write and ask questions directly to the instructor, rows arrangement seems to be a good option. When an activity or group discussion where interaction among students is required, the seating arrangement can be changed desirably to clusters or semicircular arrangements.

6. Survey

A pilot study was conducted as a survey of a sample size of 100 Indian high-school students of Mar Baselios Public School, Pallikoodam School, The Choice School and Marian School (All located in Kerala, India). Age of students in the study ranges from 12 to 15 and a 60:40 male to female ratio was maintained. Photo realistic 3D views simulating classrooms were created by using Google SketchUp and Lumion software, considering design parameters colour and texture, lighting, volume and seating arrangement. These views with different cases considering each parameter were projected to the students using Virtual Reality glasses and were asked for their preference. Figure 3 to Figure 6 illustrate these cases. For lighting as shown in Figure 3, Case – 1 is a room with full glazed back wall with artificial

lighting as well. Case – 2 depicts a room with similar conditions as case one with skylights implemented. Case – 3 shows a room with high use of artificial light and nominal fenestration on the walls. It was conveyed to the students that there will be blocking devices light blinds to be used as and when required. For colour and texture as shown in Figure 4, Case – 1 uses exposed masonry on walls, Case – 2 uses bright blue colour on wall, Case – 3 uses exposed concrete on walls and Case – 4 uses dull coloured paint on wall. For seating arrangements as shown in Figure 5, Case – 1 has a formal arrangement of seating with rows columns, Case – 2 has intermediate space for instructor to stand and deliver instructions and Case – 3 has a mixture of arrangement where there is provision for interactive group works apart from text book learning. For volume of room as shown in Figure 5, Case – 1 has extra space kept for other activity and Case two shows lower ceiling height with lesser area compared to Case – 1 with no extra space for other activities.



Lighting, Case – 1



Lighting, Case – 2



Lighting, Case – 3

Figure 3: Simulation views for Cases of Lighting



Colour & Texture, Case – 1



Colour & Texture, Case – 2



Colour & Texture, Case – 3



Colour & Texture, Case – 4

Figure 4: Simulations for the Cases of Colours and Textures



Seating Arrangement, Case – 1



Seating Arrangement, Case – 2



Seating Arrangement, Case – 3

Figure 5: Simulations for the Cases of Seating Arrangements



Room Volume, Case – 1



Room Volume, Case – 2

Figure 6: Simulations for the Cases of Room Volume

7. Results and Analysis

7.1 Lighting

As shown in Figure 7 it was observed that maximum number of students preferred the use of combination of natural and artificial light. A very few numbers preferred the use of only artificial light. The images shown as simulations with full glazed back wall may have appealed the students because of provision of an outdoor view which led to such results. Nevertheless, it is evident from the results that artificial lighting is generally not preferred.

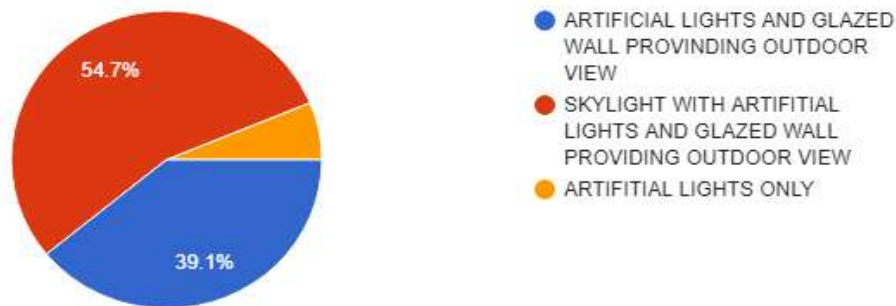


Figure 7: Survey Results for Lighting

7.2 Colour and Texture

As shown in Figure 8, maximum number of students preferred exposed masonry on walls followed by bright colours. Numbers in all cases do not have much difference and thus it increases the subjectivity of choice of this parameter.

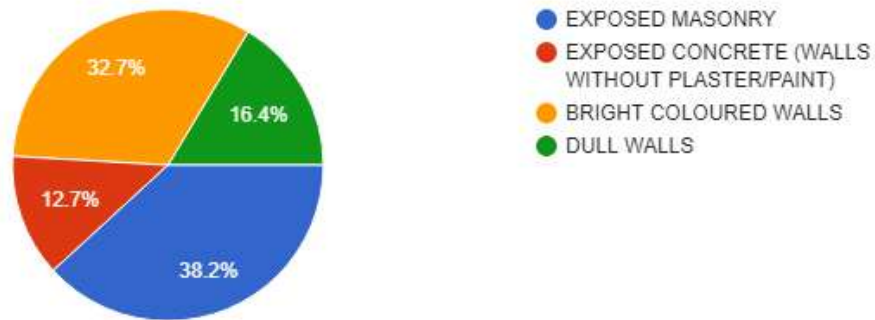


Figure 8: Survey Results for Colour and Texture

7.3 Seating Arrangements

As shown in Figure 9, the most preferred arrangement was a mixture of formal seating and for group activity seating and the surrounded seating. This shows that students are eager to break monotony of classroom learning and have activity spaces to ensure the provision of such activities taking place. The results of all three cases does not show a vast difference which depicts the subjectivity of choice of seating arrangement. There is a significant number of students who perceive formal seating arrangements to work best for them. However, majority of students have selected the either of the two other options.

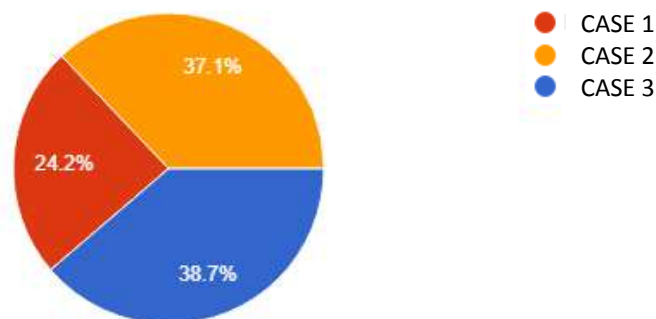


Figure 9: Survey Results for Seating Arrangement

7.4 Room Volume

As shown in Figure 10, students preferred a room with additional space in their classrooms in major numbers. It can be concluded that they desire more activities apart from formal teaching and the requirement of a space for that can fulfill this cause.

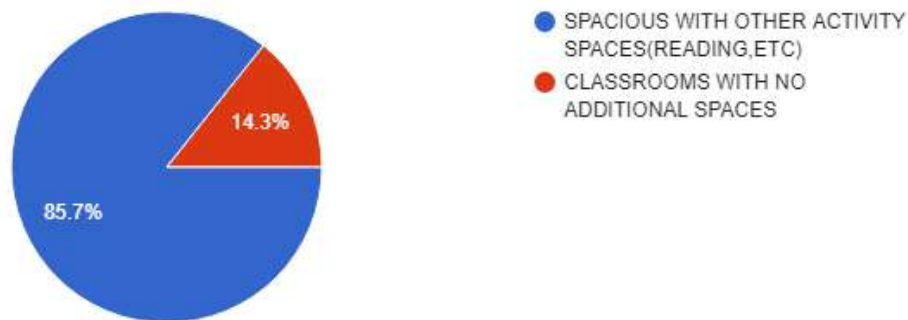


Figure 10: Survey Results for Room Volume

8. Conclusion

Effect of architecture on behavior of students and humans as a whole is a very vast and complicated field, as there are several other factors that work along with the factors being considered here. From the students' upbringing and their present mental conditions to their cultural background and economic conditions, these factors are difficult to capture in questionnaires. However, in this study an opinion has still been achieved in a broad manner. Few cases the results did not show any vast differences while others had clear answers of choice. Indian school conditions are evolving and the government should take initiatives to standardize the school design guidelines to deliver the students a better and satisfactory environment to learn.

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