# Methodological Approach to Assessing Child Centricity in Urban Schools of India

Smita Khan, Rajashree Kotharkar

Department of Architecture & Planning,
Visvesvaraya National Institute of Technology, Nagpur, India

smitakhan@gmail.com

## Abstract

Environt-behaviour studies have proved the power of the environmental container to impact inhabitants in a significant way. This paper is part of an on-going doctoral research on evaluating building performance of urban Indian schools using Post Occupancy Evaluation as a major tool through its primary users- the students. An appropriate methodology was evolved in response to the outcomes of a pilot survey that identified unique ground situation. It assisted in understanding the status of urban learning environs from point of view of child centricity & in conclusion enabled the research enquiry to recommend parameters for a student-friendly & inclusive school design.

Keywords: Urban Schools; Child Centricity; Inclusive Environs; POE; Appropriate Methodology

## 1.0 Introduction

The impact of the school environs on the students is prolonged & intensive, since basic education is a decade long process & engages the most impressionable years of childhood.

Schools take physical form in adherence to building regulations & the architect & owners conceive architectural expression with an eye on its marketability. School spaces support the nurture of users who are in a constant state of maturation. The psychological & emotional needs of the child in various stages of growth has been classified by Piaget on the basis of development of spatial imaging abilities into 4 major stages.(Piaget, n.d.) The impact of the surrounding built envelope on the growth of spatial cognition in the young humans needs recognition & greater acknowledgment by the designers of school environs.

Architectural experience affects people from beyond ordinary consciousness. The influence exerted by the school environs on the tender young minds is understated. Research on the impact of space on behaviour identifies intrinsic spatial tendencies in humans such as territoriality, personal & social space, defensibility, privacy, scale, hierarchy & physical comfort etc. All these are powerful environmental factors & make for emotional comfort within given spatial settings. La Gory & Pipkin (1981)

In addition, school environs need to be inclusive & child centric, since spaces designed for the growing years, are major shaping influences as children use environment to improve themselves as against adults who use themselves to improve the environments. Lillard (1972)

The study aims at evaluating performance of school buildings for their user friendliness through Post Occupancy Evaluation. 'POE findings typically describe, interpret & explain the performance of a school building' explains Sanoff (2001). pg.7. Typically POE seeks to investigate the level of satisfaction of users with respect to the facility. The expected outcome of such a process may also promote the development of children's competence, attitudes & vision for better future of space & society, say Atmodiwirjo & Yatmo (2011).

An appropriate methodology is the spine of any in-depth research work. Although literature study made for a sound understanding of the generic issues, it was imperative to get acquainted with the ground situation & address the unique concerns that were identified, for a holistic evaluation.

This paper focuses on evolution of an appropriate methodology for the stated research.

## 2.0 Literature Review

### 2.1 School education in India

The regulatory controls of basic education in India, bring it to an appreciable level. ("National Curriculum Framework 2005", n.d.)  but from point of view of environ-behaviour studies, learning environs have a larger role to play. This pertinent aspect is seemingly unexplored & understated in both sets of policies. (Refer Figure 1)
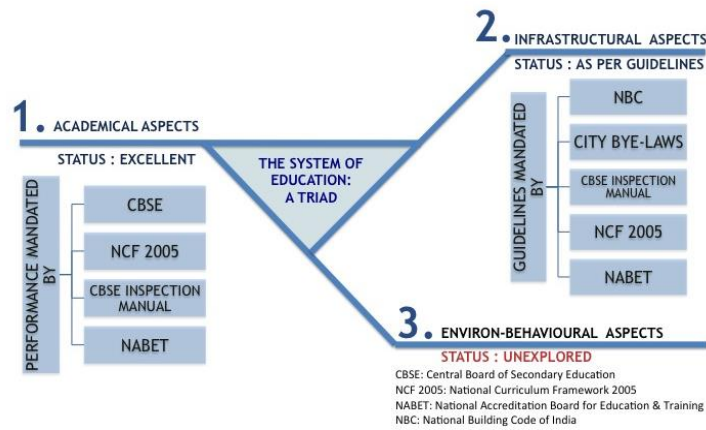
Figure 1: The system of education in India

## 2.2 Building performance evaluation

Post occupancy evaluation, involves a careful & systematic approach to measuring the performance of a building by involving each user group & each important design element of building under examination. Friedman et al (1972) state that individual judgments by the designer & the layperson must not be abandoned but must be augmented by more complete & rigorous techniques. For a comprehensive & all-inclusive evaluation, 3 elements of building performance are identified & treated hierarchically in their application to the POE process. (Prieser et al,1988) Refer Figure 2.
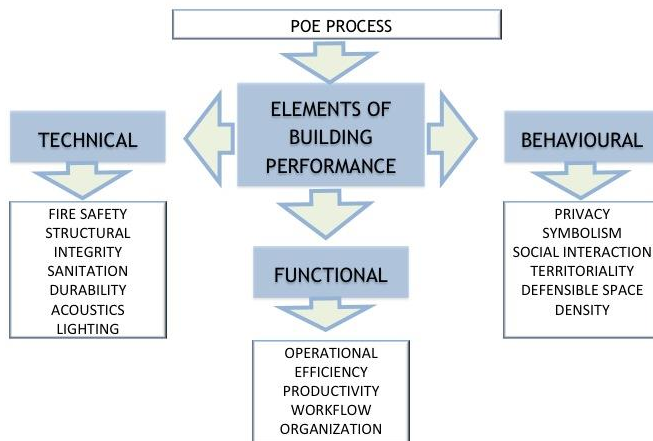


Figure 2: The elements of POE

## 2.3 Concept of child centricity

'Children's participation in research can be ensured by working with them to select methods that are appropriate to them & to the research aim' states Aziz, N & Said, I (2011) pg 76. Following identified child centric parameters oriented the POE methodology:

- **Context & location**

Proximity of school is a valid issue in planning of urban centers. Distant schools entail enduring long strenuous bus journeys.

- **Visual expression & Child scale**

Contemporary school buildings are marketed with a smart look, but tend to be large & institutionalized. Day (2007) emphasizes, 'What is an aesthetical appeal to the adult, need not be a sense- nourishing experience for the young. Sterile buildings are actively harmful'.

Scale affects the ability to relax, and hence sociability. 'Scale maladjustments in school environs can magnify competitiveness, domination and aggressive shouting. Alienation grows with increasing numbers'. (Day, 2007. pg. 44) Visual expression & child scale are complimentary factors.

- **Spatial configuration**

Most urban schools are multi-storeyed, calling for dexterity in spatial planning for appropriate visual connectivity, natural light, ventilation & noise pollution within building spaces. Flaws in the incorporation of such aspects can be detrimental to the teaching-learning process.

- **Spatial cognizability & legibility**

Cognisance of the built surroundings reduces environmental confusion & can encourage confident learning experiences. Built surroundings are a powerful yet silent teacher, so much so that it can be safely termed 'hidden curriculum'. Although direct causal links are difficult to decipher, its impact is nevertheless profound. (Marshal, 1999)

- **Hierarchy & Defensible space**

The need to actively investigate & learning by doing of early school years transforms through growing years into motivational support of the surrounds that teen years demand, necessitating spatial distribution on hierarchical lines, by Piaget's classification. Oscar Newman's (1972) definition of defensible space encompassed territoriality & natural surveillance. An intrinsic human need, it is of great advantage of the child user especially from the point of view of bullying. (Heyman, 1978)

- **Interior Ambiance & Personal space**

In discussing an environment for children, Zhang & Li (2011, pg.43) state, "An environment with high variability is full of surprises, while challenge provides children with an opportunity to feel accomplishment & complexity creates a sense of mystery".

Studies indicate that personal psychological bonding with place impacts behaviour. 'Place attachment, place identity & place dependence are concepts of a sense of place that

can be applied to wide spatial range.' (Shirotsuki, M., Otsuki. S. & Sonoda, M. 2010, pg. 16 & 22) The need to personalize is an intrinsic human trait that leads to 'rootedness'.

Drab uninspiring & uninvolved spaces instil lack of a sense of belonging & is associated with an increased risk of anti-social conduct states Piaget.

## 2.4 Ground Investigation

Wide spread research on learning environs is available, but most studies are non-Indian. They definitely impart a vision, but stop short of any practical contribution given the diverse climatic & cultural settings of the land & its people. Pilot survey bridged the gap by identifying unique & pertinent ground issues & concerns.

# 3.0 Methodology

## 3.1 The pilot survey

It involved 250 students, aged 13 to 17 years, of a well-established school in Nagpur city. A creative task, guided by a set of wide ranging informal queries on their use of 'school spaces' & their 'school experience' constituted the survey. The learning is summarized in Table 1.

Table: 1: Relationship between characteristics of a school & qualities they nurture

| # | TYPICAL CHARACTERISTICS OF AN URBAN INDIAN SCHOOL | QUALITIES THEY NURTURE IN THE STUDENTS |
|---|---|---|
| **1 Uniformity** | | |
| | This is brought about by the mandatory dress code, common prayers & by encouraging boys & girls by an at par participation in all activities | i) a sense of identity<br>ii) respect across genders<br>iii) multi-cultural tolerance<br>iv) discipline |
| **2 Size of schools** | | |
| | Due to large intake & restricted space, occupancy levels are high in density | i) students strive for individuality<br>ii) stiff competition in every sphere of acticity<br>iii) lack of personal space<br>iv) need for defensible spaces<br>v) lack of sense of belonging towards the school amongst many students |
| **3 General lack of maintainance** | | |
| | Schools displayed a general apathy towards maintainance of infrastructure. Toilets & classroom furniture were in a dilapidated condition | i) causes physical discomfort<br>ii) ingrains an ability to adjust & carry on one's work, albeit needs discouragement in some elemants such as the habit of non-use of toilets for prolonged durations<br>iii) a deep seated sense of dis-satisfaction<br>iv) lack of perception of the need of environmnetal aesthetics |
| **4 Extreme emphasis on academic performance (exam oriented)** | | |
| | It is usually assumed in India, that excellence in academics is independent of need of a physically, emotionally & psychologically supportive learning environ. Acknowledgement of the need for environs to be a soothing & benign setting for the young is under estimated | i) on a positive note, this inculcates the ability to think on one's feet without any external supports, even environmental<br>ii) but leads to a superfluous attitude rather than a dedicated outlook towards ones living & built environs<br>iii) tendency towards a tensed disposition<br>iv) bane for slow learners & dreamy students<br>v) possibility of developing a psychological complex, leading to a negative self esteem<br>vi) due to lack of importance given to 'softer' aspects of life, undermining the importance of such aspects |

In addition to the issues stated above, the student's evaluation revealed absence of many child centric aspects that make environs inclusive, comfortable & nurture a sense of belonging towards the school. The users reiterated having to negotiate with their environs while resolving their needs.

The study brought forth lack of communication on this vital issue. The evaluation of spaces by the major users, the students, is never a matter of consideration at all levels: from policy planning to actual design. The total absence of design guidelines leaves the creation of this facility at the whims of the designer & the clients.

Given the existing physical & spatial circumstances of the facility, the humanization of the school seemed an urgent need essential to the happiness & contentment of the young who are nurtured within its spaces. Pilot survey helped identification of variables that required investigation in the POE.

### 3.2 Evolving an appropriate methodology

Pilot survey paved direction to designing an appropriate research methodology. In response to its outcomes, following stages made for a relevant POE exercise:

- **Contextualizing the location for groundwork in India**

This study is based in Nagpur city, as it exemplifies the typical Indian grade II metropolitan city. It marks the geographic centre of India & consists of an old city core & a rapidly spreading extension, supporting a population in excess of 4 million. It is home to a moderate industrial base, government offices, educational institutions & agrarian trade.

- **Determining the focus of study**

The study focuses on urban schools of Nagpur city, affiliated to the Central Board of Secondary Education (CBSE), which adheres to well regulated norms & encompasses schools across the nation. CBSE mandates for academic as well as infrastructural requirements are comprehensive & stringent making a level operational ground for ease of comparison.

- **Defining the participants**

From approximately 40 CBSE schools, 14 well-established & architect designed schools, were identified for POE. The sample size for evaluation response was fixed at approximately 135 students per school. Thus a total of 1890 students belonging to IX/X grades (14-17 years) constituted the response group. As senior students their ability to grasp & respond to the complex issues of evaluation study, which are never a part of school studies at any stage, was depended upon.

- **Customizing the POE**

The 3 pronged classification suggested by Preiser was tailored specifically for evaluation of Indian school environs. Supported by Sanoff's definition, aspects were re-organized &

summarized as 5 constituent groups to encompass an umbrella of issues that require to be examined for a comprehensive POE. (Refer figure 3)
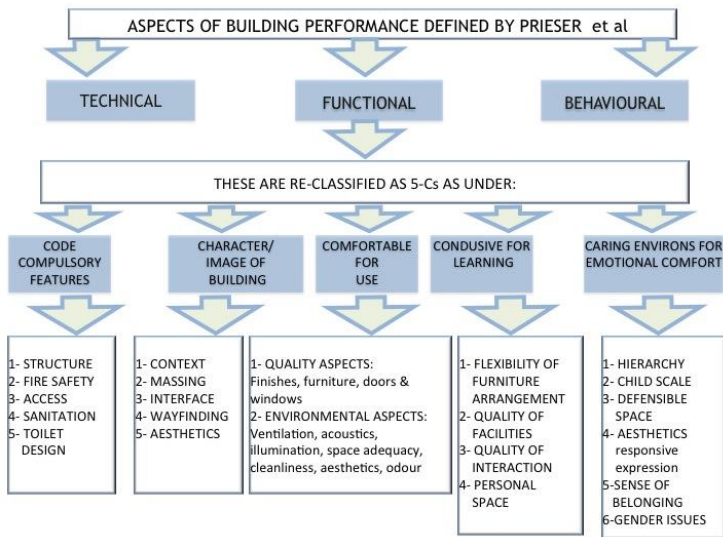


Figure 3: Defining the 5-Cs for POE

- **Identification of tools for POE**

To assess the wide spectrum of concerns stated above, the evaluation methodology is multipronged & operates through many tools. Contributions of the 10 tools identified through literature review & the pilot survey are stated below.

i- Occupancy data for each sample school made grounds for basic comparisons in terms of total occupancy, ratio of boys to girls, travelling distance to school, fees for an academic year & age of the building etc.

ii- Direct observation of school activities helped identify manner in which students of different age group & gender use school spaces & issues regarding the spatial environs. It assisted in understanding school environs with respect to its major users: the students.

iii- Walk through evaluation aided in a personal experience of issues of spatial setting of schools, such as quality of construction, level of maintenance, attitudes towards built environs, etc. & facilitated a scale for verifying user's evaluation.

iv- Analysis of spatial design through architect's drawings aided in identifying essential spaces of learning environs & their critical attributes to base evaluation study on. (Refer Table 2)

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Table: 2 : Identification of school spaces for study & their attributes

| # | SPATIAL CLASSIFICATION | ACTIVITY AREAS UNDER STUDY | IDENTIFIED CRITICAL ATTRIBUTES OF SPATIAL PATTERN |
|---|---|---|---|
| 1 | Outdoor spaces | 1.1 Playground | i) Way finding |
| | | 1.2 Canteen | ii) Legibility |
| | | | iii) Degree of enclosure/ openness |
| 2 | Enclosed open | 2.1 Assembly | iv) visual connectivity |
| | | | v) child scale |
| 3 | Transitional | 3.1 Entrance Foyer | vi) defensible space |
| | | 3.2 Corridors | vii) hierarchy |
| | | 3.3 Staircases | viii) visual expression |
| | | | ix) flexibility |
| 4 | Indoor spaces | 4.1 Classrooms | x) personal space |
| | | 4.2 Library | |
| | | 4.3 Activity rooms | |
| | | 4.4 Toilets | |
| | | 4.5 Laboratories | |
| | | 4.6 Computer room | |
| | | 4.7 Audio-visual room | |

v- Photo documentation of use of school spaces by students aided comparative analysis across schools.

vi- Interviews with school principals helped acquaintance with the unique micro-culture of each school. This interaction is a vital support to the evaluation process.

vii- Interview with architect of the school imparted an understanding of the underlying thought process in the design.

viii- Questionnaire for students yielded categorical data for qualitative analysis. Vital issues in the design of the questionnaire for learning environs are discussed:

a- Questions are pin pointed and address specific issues. All-important identified issues are incorporated. Most part of the questionnaire is bounded & specific. Since this is suited best for a statistical analysis. The questions are numerically evaluated on a four-point scale; poor, fair, good, excellent. An option of 'don't know' is also made available. Abstract questions were answered as YES/NO.

b- Sequence of queries proceeds from ordered & very specific to thought provoking & at conclusion encourages wishful thinking & dreaming about their ideal school at conclusion. This order is as listed in figure 3.

The questionnaire initiates with performance evaluation of selected spaces of the school for their overall quality as regards quality of finishes, ventilation, lighting level, adequacy of space, aesthetics etc. Level of complexity is stepped up with next query on aspects of form & spatial organization of the school building. These include: context, massing, way finding etc.

The journey now makes respondents enter the main learning space, the classroom. The series of queries include flexibility, nature & quality of learning spaces & interaction in classroom. The last part is designed as a rapid fire round with interrogation on abstract qualities or behavioural traits such as hierarchy, child scale & defensible space.

At conclusion, the students have a good idea of the process & are in a position to appreciate the exercise. So more thoughtful questions, which involve a humane yet critical judgment of the relationship of built environment & its affect on its occupants, are put forth. A wish list helps bring out in full force all the aspirations they nurture within themselves for their learning environs.

c-The questionnaire is conducted as a time–bound guided activity to concede to the concentration span & fit into timetable slot. It demands a flawless conduct, in a spirited atmosphere, so that students understand its significance & respond in an involved & thoughtful manner.

d- Since it is part of architectural research, the design & layout of the questionnaire must be visually appealing. These sessions are conducted without prior intimation to the students. The feeling of intimidation at this unexpected activity is smoothened to see a well-designed sheet & an absorbing introduction. The performing art element in the actual conduct of this activity cannot be under estimated!

e- Creative exercise urged students to respond in a free manner to 27 pertinent aspects of school environs through sketches, drawings, poems or notes. The liberal nature of this exercise resulted in a frank unbound assessment by respondents. Although of no statistical worth, it value-adds the ordered & restricted sequence of the questionnaire & gives a deeper insight of the assessment.

- **Statistical analysis**

It brought questionnaire data on each parameter on a level ground. It applied the method of pooled average as an indicator of performance level of a school on each parameter under study. Using this method at different levels, it became possible to correlate researcher's opinion (qualitative) to the evaluator's perception (categorical) of their learning environs. Dovetailing the two data inputs made evaluation complete.

## 4.0 Discussion
### Contributions of the methodology
The characteristics of environs of a typical Indian urban school impact the qualities nurtured in the students as enlisted in table 1. The pilot survey identified the ground challenges & paved way for a context based research by facilitating the design of a suitable methodology.

Conjoined with literature study, this lead to identification of the 5-constituents of school environs that are a need based selection from a wider spectrum of child centric parameters.

This study identified methods by which students would respond on school experience. The methodology encompassed several tools for a holistic study, thus covering several important aspects in more than one way. This aided in crosschecking & affirming points under study.

The questionnaire & the creative task were the most user responsive tools. Scale was identified as a major issue, necessitating care in the design of these tools of direct response. The questionnaire helped organize issues in a concise & crisp manner so that the time for conduct was friendly to a school timetable slot & respected the attention span of the respondents. Most importantly, it helped all the above evaluation data to be collected in a manner conducive to statistical analysis. The creative task needs special mention because of the involved nature of responses it evoked. Qualitative evaluation supported by categorical analysis completed the assessment holistically. These can be looked at as positive contributions of this methodology.

### Limitations & Further Applications of Methodology
In India environ-behaviour studies are in a nascent stage. The methodology of this study thus places more emphasis on the physical & spatial attributes through actual ground survey, as due to lack of indigenous studies, its environmental significance is derived from literature reviews.

Thus one of the limitations of this research is its overt emphasis on physical-spatial attributes rather than perceptional responses, which are socio-economic, culture & lifestyle driven & shall be tested in the course of this enquiry. This endeavour shall contribute positively to the environ- behaviour studies in the Asian context.

Intrusive techniques such as access to drawings & photography during school hours, required special permissions from school managements & was rejected in some cases. The creative task is limiting in many cases due to lack of ability of expression through the medium of drawing & sketching.

On a positive note, with requisite modifications, the tools themselves are applicable to other typologies in similar conditions. POE is an emerging concept in India. This study can contribute positively in the development of a well-organized methodology for furthering built environment assessment research in the Indian context.

## 5.0 Conclusion
This paper contributes:
1- in evolving methodology to study child centricity
2- in identifying variables in Indian context

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3-    in developing requisite tools for POE

Research in the field of environ-behaviour studies is in a nascent stage in India. The reliance on foreign studies definitely imparts a vision, but stops short of any practical contribution given the diverse climatic, cultural & economic settings of the land & its people. There is felt need for intensive & relevant ground study given the existing physical & spatial circumstances of a majority of Indian schools. In such a context, the pilot study aided in identification of the unique issues & defined the research direction. It highlighted child friendliness as a neglected aspect of Indian schools requiring focused attention. It assisted in customizing the design of an appropriate research methodology.

The process of evaluation by the major users of the school is essentially influenced by their cultural background & level of environmental awareness of their built surroundings. The study also brought forth the level of cognizance towards issues of environmental awareness in the school students in particular & the Indian society in general. In conclusion, this research emphasizes the need to look afresh at the design & development of learning environs especially from point of view of child friendliness.

## Acknowledgement

## References

Day, C. (2007). *Environment & Children: Passive lessons from the everyday environment.*  UK: Elsevier Architectural Press.

Friedman, A., Zimring, C & Zube, E. (1978). *Environmental Design Evaluation*. New York: Plenum Press.
Heyman, M. (1978). *Places & Spaces: environmental psychology in education*. Bloomington, USA: Phi Delta Kappa Educational Foundation.

Lagory, M. & Pipkin, J. (1981). Urban Social Space. USA: Wadsworth Publishing Company.

Lillard, P. (1972). Montessori- A modern approach. New York: Schocken Books,

Marshall, A. (1999). Greener school grounds: Learning through landscape, quoted in Day, C. 2007

National    Curriculum    Framework    2005,    (n.d.)    accessed    at http://www.ncert.nic.in/rightside/links/pdf/framework/english/nf2005.pdf on 15/3/2012

Oscar, N. (1972) *Defensible Space Theory*, accessed at        http://en.wikipedia.org/wiki/Defensible_space_theory on 27/11/2011

Piaget.    (n.d.).    *Piaget's    theory    of    cognitive    development.*    accessed    at http://en.wikipedia.org/wiki/piaget%27s_theory_of_cognitive_development  on 29/06/2011

Prieser, WFE., Rabinowitz, Z., White,T. (1988). *Post Occupancy Evaluation*. New York: Van Nostrand Reinhold.

Sanoff, H. (2001). School Buildings Assessment methods, USA: National Clearinghouse for Educational Facilities.