SCHOOLS BEYOND EDUCATION: REDEFINING THE IMAGE OF AN INSTITUTION

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Abstract

As developing countries move towards advancement, their metropolitan cities are faced with urbanization, a phenomenon marked by population explosion with consequences such as sprawl. Rural villages are engulfed in the process, and thus designated to be 'urban villages' – a term contradictory to its inherent characteristics. Conversely, these villages provide economic advantages such as inexpensive housing, but their infrastructure undergoes steady dilapidation. There is thus, a lack of mixed-use multifunctional facilities which can cater to a multitude of users to support this growth. It then becomes imperative to re-evaluate the premises on which communal functions are designed & built, to ensure maximum benefit is availed by all.
This paper reassesses the ways in which a school can be redesigned as a learning space in the 21st century, while strengthening its spirit as an institutional building in the context of an urban village in New Delhi, India.
This is tackled on two fronts: the first questions redundancy of design of the learning environment which was established in the industrial era 150 years ago to emulate factory life. While learning methods have adapted to changing times, learning environments have remained stagnant. The second questions redundancy of the built environment of schools during after-hours, weekends and vacations. Taking these into account, the resultant is a building that is used for 18% of the hours in a year. Thus, the school complex presents itself as a solution and opportunity to serve the larger community with its multifaceted program and strong public character, with functions catering to different sections of society. These schools would not just provide for educative spaces that enable multiple modes of teaching and learning, but serve as anchors of mixed-use community hubs.

Keywords: Schools, institutions, 21st century learning environments, education, urban villages, educative spaces, mixed-use community hubs

Introduction

Of the varied undertakings an architect may design, none can be more challenging than the school – where education and development of our kids take place (Dudek, 2000). Architecture of learning environments addresses its users in a way which no other public building can. Through design, it can either convey that education is an outdated interest lacking pertinence to the modern world; or its language can help educate, train & equip users with 21st century skills.

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The educational landscape has constantly been shifting with advancements in technology and innovations in pedagogy. To accommodate this, educators seek to future-proof learning environments for future generations of learners. However, in India, public school buildings serve only as a container for students. Little attention is paid to design and quality of spaces - the focus being meeting the area requirements. This paper challenges the design and ideology of an institutional building. It will explore the design of educational facilities as public institutions, set in a rapidly developing, resource-constrained setting in New Delhi, India. This research seeks to reevaluate grounds on which institutions are built and propose guidelines for better design of institutions as learning spaces and community hubs.

The Background

Challenges faced by Metropolitan Cities in Developing Countries

As India moves towards becoming a global superpower, its metropolitan cities are facing a distressing scenario. In developing countries, urbanization is marked by population explosion with consequences such as sprawl. As a phenomenon of urban growth, it can take two courses. First marks the population growth in cities and towns that engulfs adjoining villages and suburbs into its territory. The second is in-place population explosion that leads to transformation of rural environs to urban lands through multiplication of villages, households, and dwellings amidst fields and lands (Qadeer, 2004).

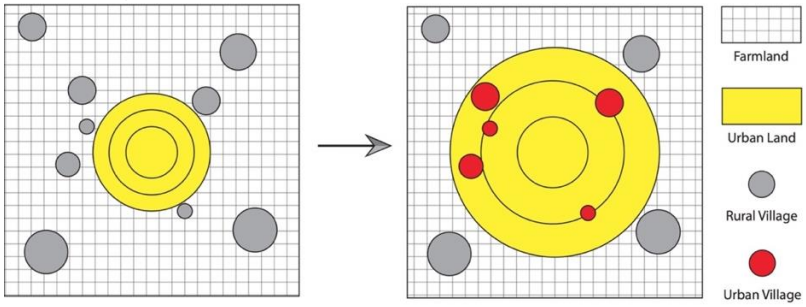


Figure 1: Formation of Urban Villages
Source: (Fanying, 2012)

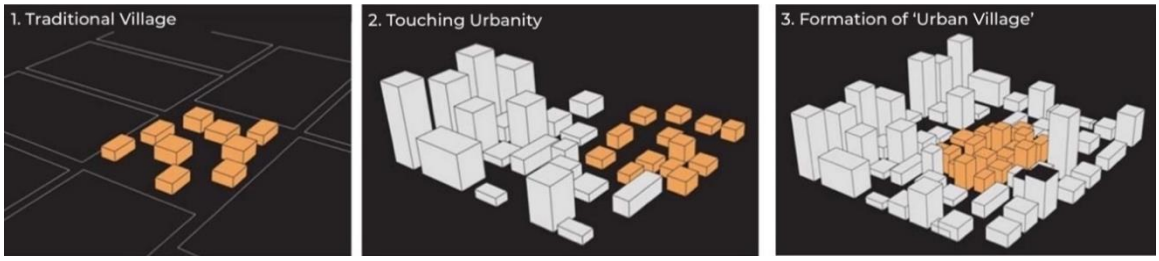


Figure 2: Formation of Urban Villages
Source: (Fanying, 2012)

New Delhi is a classic example of the former. In the wake of the 20th century, the demographic number was just over 200,000 - which rapidly transformed into a million, registering a remarkable 106.58% growth during 1941-51. Population explosion in the following decades resulted in Delhi becoming the second most populous city in India, with a demographic figure of 1,10,34,555 (Census Organisation of India, 2011).

Year	Population			Area		Density
	Number	Decennial growth rate %	Annual growth rate %	sq. km	Decennial growth rate %	Pop/ha
1911	2,37,944	–	–	43.25	–	55
1921	3,04,420	27.94	2.49	168.09	288.64	18
1931	4,47,442	46.98	3.93	169.44	0.80	26
1941	6,95,686	55.48	4.51	174.31	2.87	40
1951	14,37,134	106.58	7.52	201.36	15.52	71
1961	23,59,408	64.17	5.08	326.55	62.07	72
1971	36,47,023	54.57	4.45	446.26	36.76	82
1981	57,29,283	57.09	4.62	540.78	21.17	106
1991	84,19,084	46.94	3.92	624.28	15.44	135

Figure 3: Population, Area and Density of Delhi from 1911-91
Source: Census of India, Delhi, 1951-91

To accommodate this swelling population, the urban limits of Delhi increased. Between 1941-61, the 'official' area of Delhi almost doubled. Two decades following that witnessed a 53% increase in area to accommodate a 135% increase in demographic growth. This multi-directional expansion resulted in the urban limits of Delhi extending out till the adjoining states of Uttar Pradesh and Haryana - now a part of the National Capital Region (Hust & Mann, 2005).

As a part of urbanization, rural villages and agricultural fields are engulfed. This process, as a form of social change is recognized as the most unplanned transformation – for the population has not relocated from its rural habitat, the city has moved towards them (Hust & Mann, 2005). Thus designated as 'urban villages', the term is inherently contradictory to its characteristics and represents rural entities that are inhabited in the process of urbanization of a metropolis.

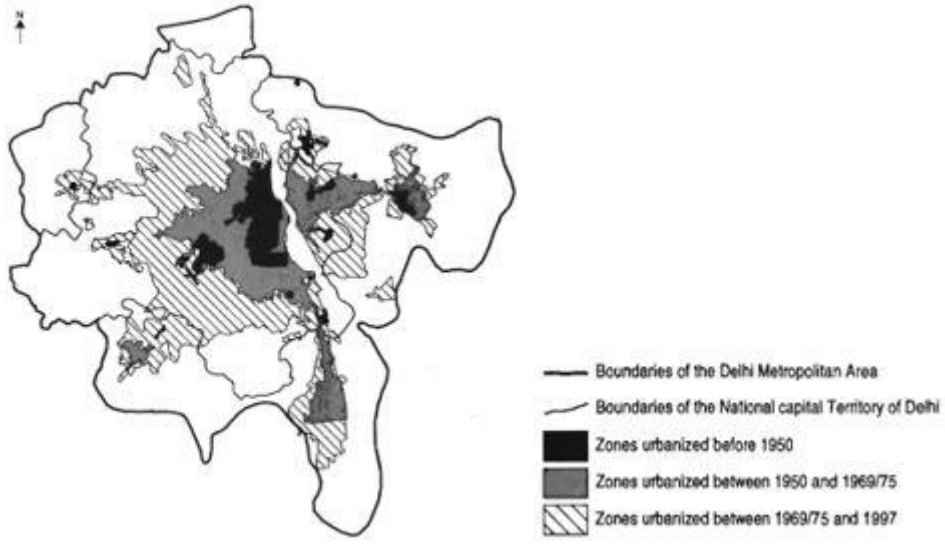


Figure 4: Expansion of Urbanized Zones in Delhi from 1950-97
Source: Survey of India, 1950-80

In its paradoxical characteristics, urban villages are classified as urban entities, whereas their traits are village-like with high density and growth rate, population explosion, unplanned buildings and depletion of resources alongside infrastructure shortage. Conversely, they provide economic advantages such as inexpensive land prices and housing but their social and physical environment undergoes steady dilapidation. These factors conjointly lead to these settlements becoming underdeveloped backyards of the city in the long run.

According to the UN, Delhi is projected to become the most populous city in the world by 2028 (Revision of the World Urbanization Prospects, 2018). 68% of the world population is projected to live in urban areas by 2050. This increase in urban population will be concentrated in a few countries – with India accounting for 35% of the growth with 418 million urban dwellers.

Thus, having posited that metropolitan cities in developing countries are rapidly advancing and fast progressing, it is imperative to comprehend the magnitude of change, alongside its repercussions. This paper acknowledges this transformation and questions the lack of mixed-use multifunctional facilities which can cater to a multitude of users to support this growth.

Significance of Education in the Indian Context

Education plays an imperative role in attaining a better future by laying the foundation for human development, and contributing to social, economic benefits in the long run. According to UNESCO Education for All Global Monitoring Report (2010), it was discovered that of 759 million adults lacking basic reading, writing and numeracy skills, over half live in just four countries: India, Bangladesh, China and Pakistan. Of this, India has the highest number of world illiterate population at 36%. The Indian Brand Equity Foundation states that as of 2015, approximately 28.1% of India's population lies in the age group of 0-14 years (Education & Training Industry in India, 2017). Of this, 29% of students would receive private education (Joshua, 2014). That leaves a staggering 71% of students who would attend government schools.

While the Government of India recognizes the pertinence of all inclusive education and allocates large budgetary outlays, there are still a lot of challenges that are faced by the country. According to the Directorate of Education, schools in Delhi should observe a minimum of 220 working days in an academic year (Government Of National Capital Territory Of Delhi, 2018). Assuming a school day is 8 hours, the resultant is an institution that is used for 18% of the hours in a year. Its implications are that the school complex is redundant with majority of the resources wasted.

Evolution of Public Schools as Institutional Buildings

In its historic significance, education was an entitlement for the rich and powerful. The lower and working class were reduced to learning skills of the trade that they were born into, or vocational training as we know it today. Our current system of education was established in an era of Industrialization, over 150 years ago (Watters, 2015). The 'Factory Model' became a prototype for structures as an economical way to meet requirements while conserving resources efficiently. These design decisions were taken with the prevalent social, economic and political context of the 19th century.

Alvin Toffler decried the "Industrial Era School" in *Future Shock,* explaining how industrialism used mass education to produce the kind of adults it needed*:*

> ". . the whole idea of assembling masses of students (workers) in a centrally located school (factory) was a stroke of industrial genius. . . Children marched from place to place and sat in assigned stations. Bells rang to announce changes of time. The inner life of the school thus became an anticipatory mirror, a perfect introduction to the industrial society.
> The most criticized features of education today – regimentation, lack of individualization, rigid systems of seating, grouping, grading and marking, the

> authoritarian role of the teacher – are precisely those that made mass public education so effective an instrument of adoption for its place and time."
>
> Toffler, 1970

While institutions organized by age stratification, regulated classes and intervals were an excellent fit for the industrial society, the same module today, is obsolete and ineffective. 150 years on, factories have responded to advancements in technology but the factory model of education continues to remain the predominant prototype for institutional design.

Figure 5: Factories in 19th century
Source: Everett Historical

Figure 6: Schools emulating factories in 19th century
Source: Rischgitz – Hulton Archive

Figure 7: Factories in 20th century
Source: Cornell University

Figure 8: Schools in 20th century
Source: The Atlantic

Figure 9: Factories in 21th century
Source: Mazak Optonics Corporation

Figure 10: Schools in 21th century
Source: Hindustan Times

Schools today, should train students to be creative, to communicate and collaborate to face the real-world challenges but instead, teach students to take on orders and follow a strictly regimented routine. There is thus, a need to reexamine the extent to which traditional teaching methods and standards for design remain fit for the digital age.

Schools as Complex Design Problems

> "Aside from sleeping, and perhaps playing, there is no other activity which occupies as much of a child's time as that involved in attending school. Apart from the bedroom. . .there is no single enclosure in which he spends a longer time than he does in the classroom."
>
> Life in the Classroom (Jackson, P.W. 1968)

Educationalist Peter Jackson (1998) asserts that classrooms are complex and demanding due to the large amount of time kids spend there during their primary years. Its clear implication is that they are complex design problems that must be designed with utmost care. Herman Hertzberger (2008) utilizes the metaphor of the school as a city to make sense of this complexity. He talks about architecture and education, and how the two affect one another and seeks to show how schools spaces can be a stimulus to learning. Schools have an ever-changing, stimulating environment where education is not restricted to reading, writing and arithmetic. The building should provide for education to be flexible enough to respond to changing demands.

Architecture as Pedagogy: Impact of Learning Environments on Academic Performance

> ". . .designing a room for learning is very complex. No one knows how to prevent 'learning-loss' when you design a room 'pedagogically', whereas we know lots about designing for minimum heat loss"
>
> The Impact of School Environments: A literature review, Higgins et al., 2005, p.3

Higgins, Hall, Wall, Woolner & McCaughey (2005) perceive schools as systems in whose environment various factors such as socio-cultural, curricular, motivational and socio-economic, pedagogical factors interact. Many authors propose an immediate connection between the environment and students' state of mind implied by a specific setting. Numerous scholars take note of the negative impact of poor surroundings with, for instance, Hallam (1996) arguing that disregard of school buildings 'will inevitably pervade the attitudes of staff and pupils'.

While most perceive architecture and built forms to be static environments that cannot possess characteristics to impart knowledge or teach lessons, yet these structures have proven to communicate ideas and teachings on the social and phenomenological level (Gisalson, 2007). Buildings with the way they are designed are known to influence how one should behave, interact and utilize spaces (Peponis, 2002). An example for this can be a typical house: the spaces are designed with a varying degree intimacy and publicness. The living room exuberates a semi-public characteristic, indicative of social behavior; while the bedroom nestled within the home is the most intimate and private space. Similarly, a rectangular classroom implies a teacher-centered pedagogy indicative of the dominant position of command of the instructor in both space & pedagogy.

With limited research available on the qualitative impact of a space to a student's academic performance, the evidence proves that spatial settings positively impact the learning outcomes (Terry Byers, 2018). Studies have shown that with differing classroom environments and learning pedagogies, students are likely to outperform their peers taught in the traditional settings with a variation of 7-10% in scores. Improved lighting, acoustics and air quality also accounts for 10-16% of increase in scores (Barrett, 2015).

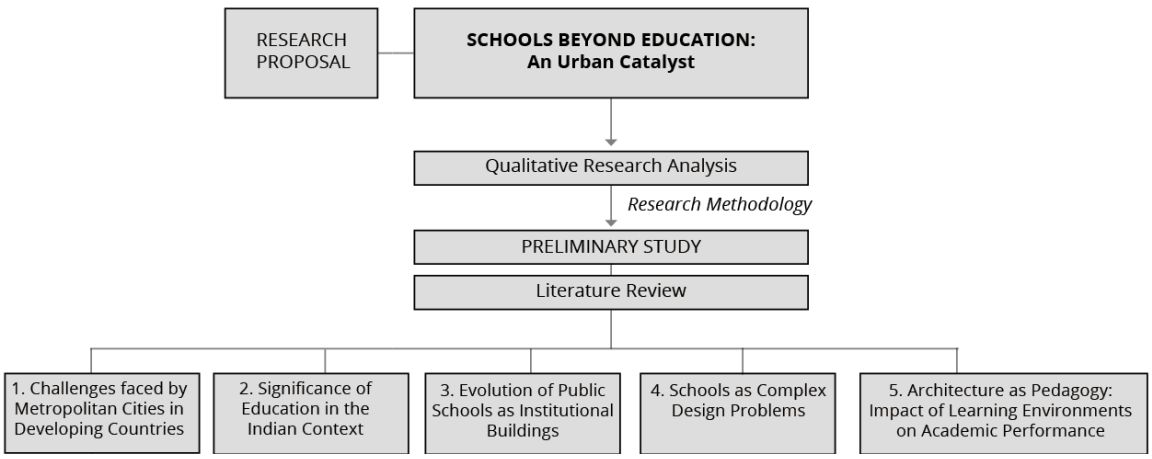
Schools Beyond Education: An Urban Catalyst

Educational facilities built to cater to economically weaker sections of the society carry the responsibility of facilitating and bringing about a social change - which is as pivotal as education of students. These schools have an untapped potential to bring together the community, which can be the first step towards their social advancement.

School buildings not only communicate necessary values to students but also to surrounding communities in terms of how we value education and our children. However, most often, these buildings exist in isolation. Having established the current challenges faced by the education system in India, coupled with primitive methods of school design that has failed to adapt to the digital age, there is a need to reevaluate educational facilities that are shaping tomorrow's leaders. The goal of this research is to explore the role and significance of design of such public schools as an urban catalyst for social and cultural activities, while exploring the design of learning environments fit for the 21st century.

Methodology

This research was developed through an in-depth analysis on preliminary areas of study & literature review that encompassed challenges faced by developing countries and the redundancy in educational pedagogy and learning environments. This is followed by a qualitative enquiry on the current system of education, with primary case studies of government schools in New Delhi and secondary case studies not only restricted to educational facilities. The primary case studies are a reflection of the typical status of government schools in India. Their implications and shortcomings are studied in order to facilitate the understanding required to design a learning facility in the 21st century. Subsequently, the secondary case study is selected to analyze and discuss its successes as an urban catalyst. The learning would consequently lead to the successful design of a multi-functional mixed-use facility that the school envisages to be.



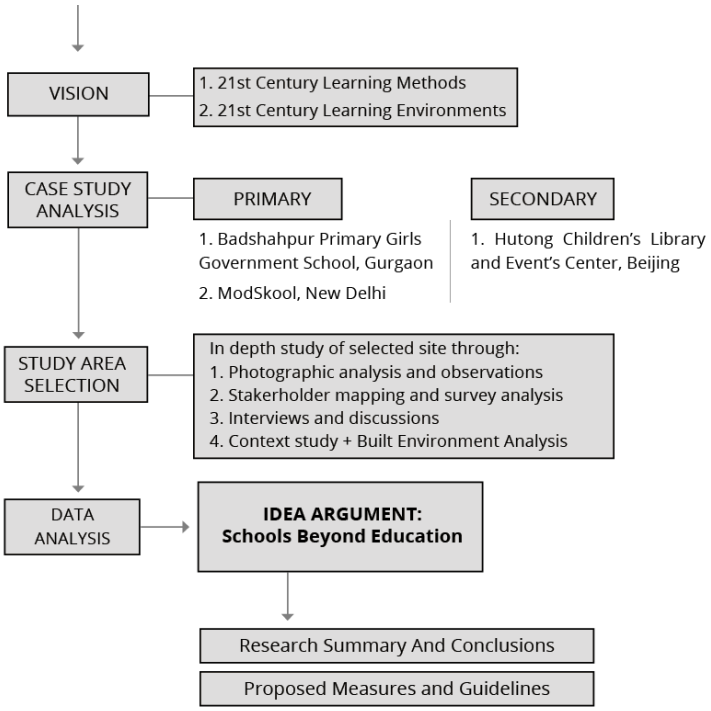


Figure 11: Research Methodology
Source: author

Limitations

This research is limited to the design of senior secondary government schools (not limited to primary schools to facilitate multiple shared communal functions). The site selected for the same must have grave development pressures - such as in urban villages, with a subsequent lack of resources and facilities. It must ideally lie on the periphery of the urban village so as to facilitate interaction with other communities and villages. The site must have a diverse user group, not limited to a singular audience, in order to facilitate the institution as a shared facility, with functions that can cater to the respective groups.

Vision

1. 21st Century Learning Methods: Project Based Learning

With rampant advancements in digitization and globalization, rote learning can no longer prepare students for today's world. Students require fundamental skills (reading, writing and arithmetic) but also 21st century skills (critical thinking, creativity, teamwork and collaboration, communication etc.) in order to sustain themselves.
Project Based Learning (PBL) seeks to train students to do exactly that. Instead of rote memorization or teacher-led instructions that presents facts as it is, PBL contrasts this by posing questions, problems and scenarios (Provenzano, 2018). As a student- centered approach it follows the ideology of understanding through exploration of real-world scenarios which helps bridge the gap between theoretical and practical knowledge.
PBL has been implemented in a handful of private schools in India, but is yet to be implemented in public schools – the rigid learning environments that would fail to support this teaching pedagogy being a factor.

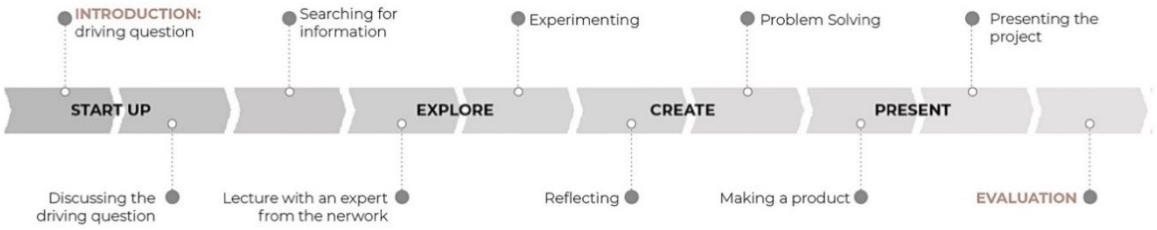


Figure 12: Process in PBL
Source: author

2. 21st Century Learning Environments: As proposed by David Thornburg

David Thornburg, an educational consultant presented four ideas in his book, *From the Campfire to the Holodeck: Creating Engaging and Powerful 21st Century Learning Environments* to prepare and adapt learning spaces for the future.

1. Campfire: Since time immemorial, storytelling as a sacred activity was used a mechanism for teaching – wisdom was passed from elders to the next generation. This often took place around the fire or under a tree which provided an ideal backdrop to the storyteller. In schools, it signifies spaces where students learn from experts.
2. Watering Hole**:** Representative of the predominant source for water in its historical significance, it was a gathering space for people in the past to meet and share knowledge with their neighbors and peers where each participant is a learner and a teacher. In schools, it is symbolic for informal learning spaces where students interact and exchange information.
3. Cave: for quiet reflection - learners occasionally feel the need to isolate themselves in order to process the information and gain insights.
4. Life: Imperative to bridge the gap between theoretical & practical knowledge, application of what is learnt is essential to the learning process, symbolized through *life*. This would reinforce the learning in order to not be forgotten.

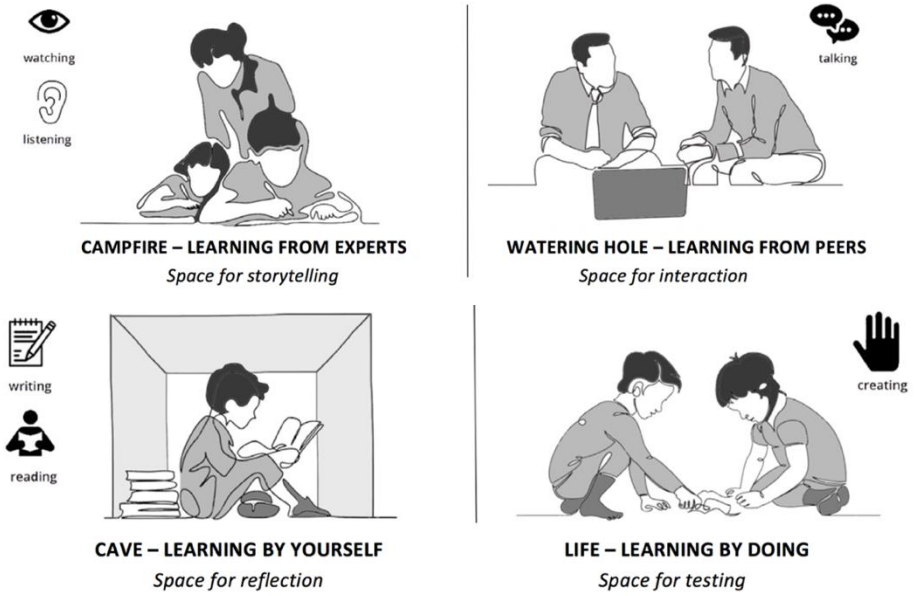


Figure 13: 21st Century Learning Environments: Cave & Life
Source: author

Findings, Analysis & Discussion

Primary Case Study 1: Government Girls Primary School

The Government Girls Primary School is located in a high-density urban village in Gurgaon and the Badshahpur Baoli (stepwell) next to the school forms the site context. Constructed in 1905, the Baoli shares its walls with the adjoining school. Due to poor state of preservation over the years, it has been cordoned off by walls and is no longer functional.

Figure 14: Aerial View of Context
Source: Google Earth

Figure 15: Context: Baoli and Govt. Girls Secondary School
Source: Google Earth

Figure 16: Immediate Context: the school is situated next to the baoli
Source: Google Earth

The Primary School was built in 2009 and caters to 384 students, with grades from 1-5. The site is extremely rich in context - however, architecture of the school fails to respond to it. The Baoli has been neglected in the design, with the school existing in isolation. The school is a two-storied structure - classrooms are planned around the sole spill-out space as the central green courtyard. Negative spaces, such on terrace of the first floor, have been disregarded which could've been optimally utilized. While classrooms on the south and west facade receive bare minimum daylight, the east facade is devoid of any windows. The school thus relies on active lighting systems when electricity is available. Other times, students are left to study in dreary and dingy classrooms.

Figure 17: Central courtyard as the sole spill-out space
Source: author

Figure 18: Classrooms on east façade - devoid of windows
Source: author

Figure 19: Unused space on the first floor terrace
Source: author

This school stands as a classic example of a public educational facility in New Delhi that exists with bare minimum necessities and learning environments limited to classrooms.
To qualitatively judge how the school performs, it is analyzed under the following parameters:

1. *Site Response*: Design neglects the site context and fails to respond to the urban fabric in terms of integrating it to the overall community.
2. *Community Participation:* Lack of community participation during design conceptualization has led to inadequate outcomes. The school fails to act as a catalyst for public inclusion and does not support vocational training courses or ancillary activities in the after-hours.
3. *Human Comfort:* Habitable rooms lack sufficient windows and adequate sized openings, with poor building orientation leading to lack of natural light and cross-ventilation. The design fails to employ passive cooling techniques.
4. *Functionality of Design*: Design is not suited to be child-friendly, as scale of spaces do not compliment the children's physical characteristics.
5. *Conducive Learning Environments:* Spaces fail to facilitate various methods of teaching and learning – alternate pedagogical methods cannot be implemented. No provision for library, workshops, etc. for hands-on learning.
6. *Basic Amenities and Administrative Functions:* No provision for a medical room or access to toilets and clean drinking water within the premises – portable toilets are present outside campus. Administrative staff rooms are not utilized due to lack of natural light and ventilation.

Figure 20: Section: No windows in classrooms on east façade;
west façade shares its boundary wall with the Baoli
Source: author

Figure 21: Portable Toilets outside campus
Source: author

Figure 22: Drinking water outside campus
Source: author

Figure 23: Corridor utilized as staff room
Source: author

Primary Case Study 2: ModSkool, Delhi

Chilla Khadar, a slum nestled beside the floodplains of Yamuna river is inhabited by a community of farmers. A rural community set within the city but disconnected from the rest of it, this is unlike other urban villages which may be found in a metropolis like Delhi. It is a community of farmers living in slums sparsely spread out in open fields.

Figure 24: Aerial View of Context
Source: Google Earth

Figure 25: Clusters of built highlighted around site
Source: Google Earth

Figure 26: Immediate Site
Source: Google Earth

Since 1993, an NGO run school had been educating young children as the first step in the ladder of education. It served as a crucial bridge to formal education as the only means of access to education the children of the community had. In 2011, due to lack of formal land ownership, Delhi Development Authority decimated and razed the school under the pretense of it being “illegal” due to the permanence of the structure. Post demolition the school operated under a temporary shelter made of tarpaulin sheets, which failed to provide students with protection from extremities of the Delhi weather.

Figure 27: Temporary Setup of the school post demolition
Source: ModSkool Facebook Page

In 2015, two community architects decided to take up this project voluntarily. Thus, ModSkool emerged out of a need to provide for a community that survived out of determination and tenacity in a place they weren't allowed to. During interactions with the community, the architects realized that the community did not have a sense of belonging since ownership of land was unclear. There was insecurity and fear instilled in their minds - so one of the major obstacles for the architects was to overcome this insecurity, by building a sense of belonging with the school. They decided to build with the community, instead of for them. Due to lack of funds, it was also decided that the school would be designed to be built by the community, thus saving labor costs.

A major legal constraint for the project was to build an ‘impermanent’ structure. Combined with this, the volatile and inaccessible site - there were many challenges that the architects had to overcome. The final design conceptualized utilized indigenous materials and construction technologies that locals of the area were already familiar with. Bamboo was selected for wall partitions due to easy availability, affordability, lightness, and ease in working. This would instill a sense of belonging, and had added benefits of easy upkeep and maintenance - in case of any wear and tear, the locals would be able to fix it themselves. The structure was built in metal sections, modular in nature that would support future expansion. Partitions between classrooms were made of light wooden frames with bamboo mats as infill. Thatch weaves for walls were developed after consulting the local community.

STAGE 1

STAGE 2

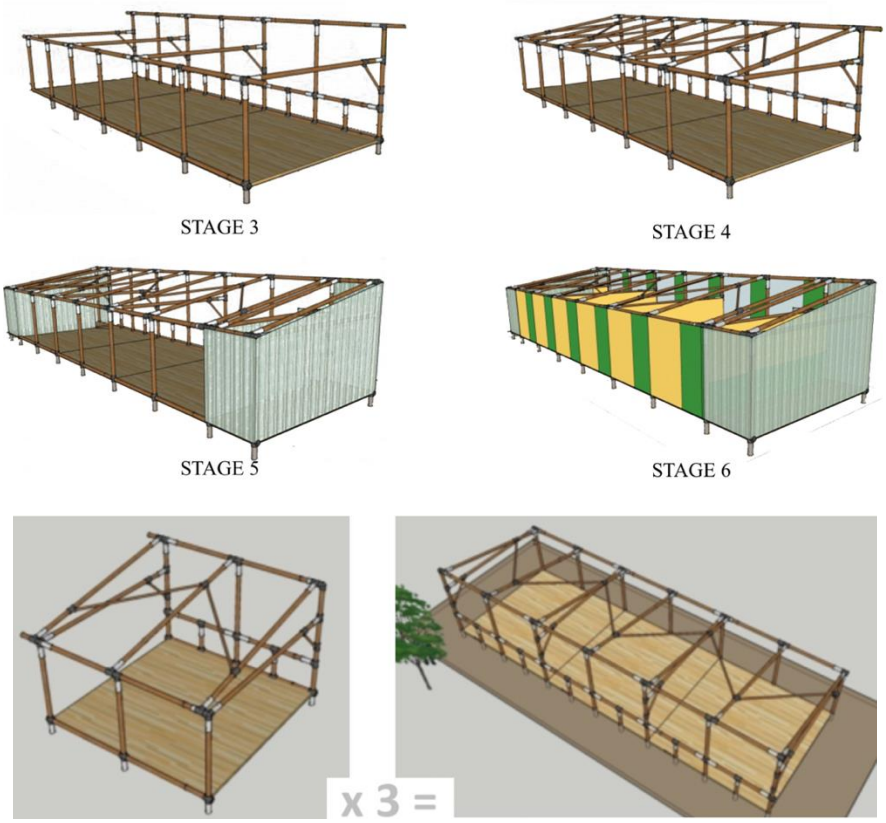


Figure 28 : Sequence of Construction and Modularity of Design
Source: ModSkool's Facebook Page

Figure 29: Classroom Block 1
Source: author

Figure 30: Classroom Block 2
Source: author

Figure 31: Windows made of thatch and bamboo
Source: author

To qualitatively judge how the school performs, it is analyzed under the following parameters:

1. *Site Response:* The design excels at responding to site conditions and context. Inferences have been drawn to inform design decisions which helped create a unifying identity of the school with the community.
2. *Community Participation:* Engaging the community early on in the design process led to better outcomes, acceptance, and ownership of the educational facility as their own.
3. *Human Comfort:* Passive design techniques are employed. Built as a climate-responsive structure, the school has sufficient openings made of thatch walls that enable cross-ventilation and natural daylight to penetrate inside. A provision for wax-coated canvas screens is proposed which would help insulate during winters. A canvas hung below the roofing creates an additional insulating pocket of airflow.

4. *Functionality of Design*: The design is not customized to the scale and anthropometry of children – it, however, provides enough flexibility for future expansion and growth.
5. *Conducive Learning Environments:* Learning environments are limited to classrooms. There is no provision for library, workshops, etc.
6. *Basic Amenities and Administrative Functions:* No provision for staff/administrative rooms, a medical room or toilets.

Secondary Case Study: Hutong Children's Library and Events Center

In Beijing, hutongs are narrow alleyways formed by traditional Chinese courtyard residences (Beijing's Hutongs, 2004). Over the past five decades, the density of the Hutong neighborhood increased manifold but with renovation practices in subsequent years, hutongs are fast disappearing. Residential courtyards with multiple spaces and compounds are now viewed as disorderly and insalubrious – their comparison almost at par with slums.

In 2012, Zhang Ke sought after an attempt to redesign and reclaim the hutongs - recognizing them as an important historical layer to Beijing's urban fabric. He aimed to explore its potential as catalysts of social interaction and place-making. By positioning the design around a central pavilion under a Chinese scholar tree, functions such as art rooms, children's library, an exhibition space, a multifunctional hall, etc. were provided. On the outside, an external staircase along the tree was planned for. Appropriately used as a viewing deck, it would provide the locals of the hutong: children and adults alike a respite from the otherwise dense built fabric.

Figure 32: Before and after revival of the Hutong
Source: AKTC, ZAO/Standardarchitecture

Figure 33: Site Context and Site Plan of Intervention
Source: AKTC, ZAO/Standardarchitecture

To qualitatively judge the intervention, it is analyzed under the following parameters:

1. *Site Response*: As an imperative part of the reviving the hutongs, design decisions of massing and heights were taken following a study on site conditions. Grey bricks were selected as primary building materials, blending the urban insert with the existing fabric.
2. *Human Comfort:* All habitable spaces have sufficient openings with plenty of daylight.
3. *Functionality of Design:* The interiors are suited to the child's scale - with reading nooks to adaptable furniture and seating that can become an ad-hoc table - the design is indicative of the spontaneity of childhood.
4. *Basic Amenities and Administrative Functions*: Provisions are made with a guard room at the entrance, and amenities like a kitchen, meeting space and toilets.

Fig. 34: Interior spaces
Source: AKTC, ZAO/Standardarchitecture

Site Selection and Analysis

Lado Sarai, an urban village in New Delhi dates back to 18th century and is situated in a historically significant part of the city, containing traces of three imperial cities (DUAC, 2015). Lying in the southern part of Delhi, it has a heterogeneous character, where planned and unplanned areas coexist with residential arrangements and designer boutiques, restaurants and art galleries. With a mix of indigenous people and user groups – from land owners, tenants and migrants to the recent influx of artists and designers, it is a unique urban village with a cosmopolitan character, and is often referred to as the 'artist's' village'.

Figure 35: City level location map of Lado Sarai
Source: author

Its favorable location with respect to its intra-city connectivity has attracted additional population and intensification in recent years, but without provision for adequate infrastructure to support the same. According to the 1962 Delhi Master Plan, Lado Sarai had been marked as complete residential but has since transformed as a major mixed-use development. It however is deficit of the required public utilities and social infrastructure, as it was never planned for. This was thus selected as the site for intervention for this research.

Figure 36 : Aerial View of Lado Sarai
Source: Google Earth

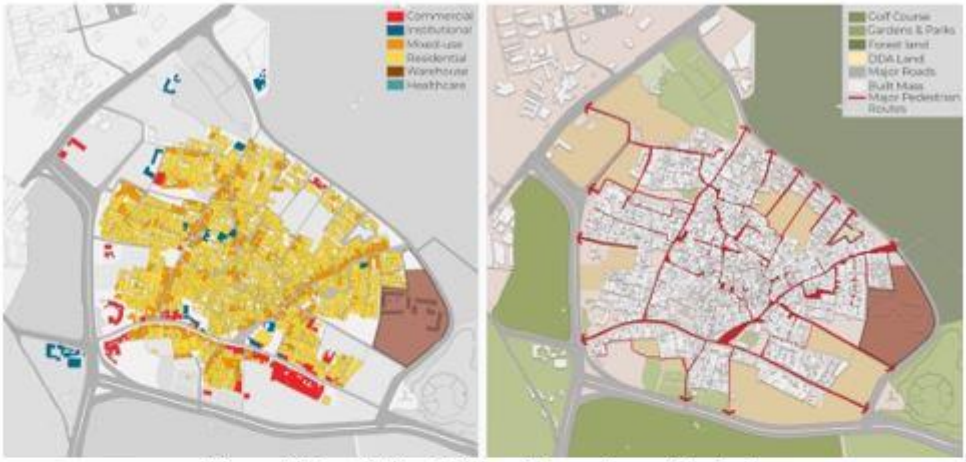


Figure 37: Land Use; Built and Open Space Analysis
Source: DUAC, 2015

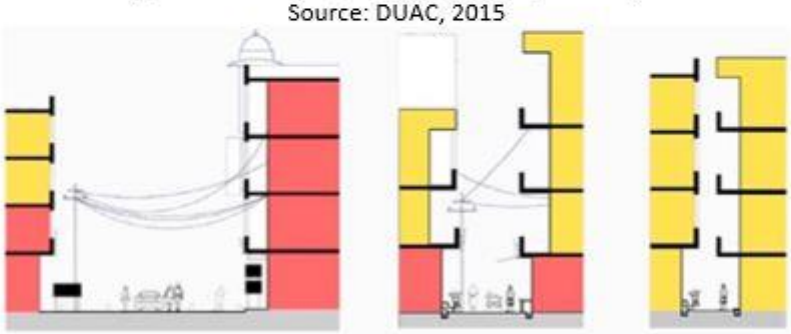


Figure 38: Old MB Road, Main Street and Inner street sections
Source: DUAC, 2015

Post the proposal of arterial roads to provide city level connectivity, Lado Sarai became an enclosed urban island. This resulted in peripheral negative open spaces of the built fabric - the selected lies on this periphery and is irregularly shaped. Bound by roads on four of its sides, it is 5.4 acres in area. Lado Sarai road is a major peripheral road around the site. Other sides are bound by tertiary roads which were born as a part of the organic development of the village. The chosen site is currently utilized as a Boys Government Primary School.

Figure 39: Boys Government Primary School
Source: Author

Prior to fabrication of the school program, it was imperative to study the varied demographic conditions. The major communities, as observed in figure 40 form a disparate mix. With a total of 8385 households (Census of India, 2011) and economic disparity that forms a variable between high commercial rates upto Rs.200/sq.ft ($3/sq.ft) to lower residential rates upto Rs.25/sq.ft ($0.36/sq.ft) – it was necessary to analyze various stakeholders. The *Artist's Village* envelopes multiple architecture studios, art galleries, graphic and fashion designers. Thus, the school would serve the indigenous resident community, and also the varied working class.

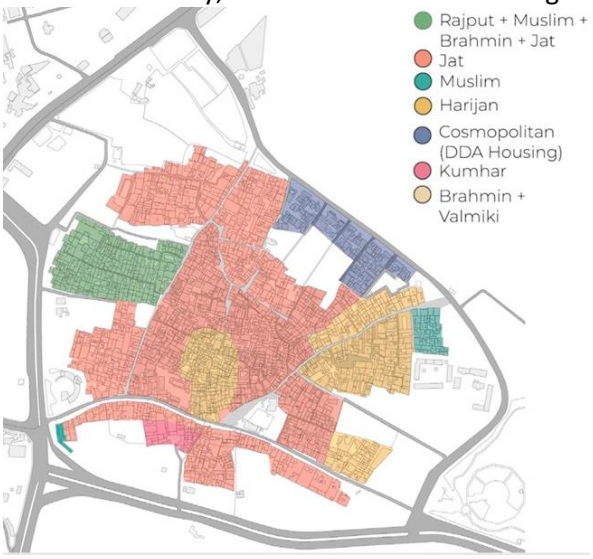


Figure 40: Communities in Lado Sarai
Source: DUAC, 2015

To enable better understanding of user-groups, stakeholders were identified and a survey was conducted. The stakeholders identified were residents living in Lado Sarai (both adults and senior citizens), employees at the Artist's Village and school teachers. A sample size of 100 people was surveyed, following which the school program was devised. The survey covered questions regarding requirements for the following:

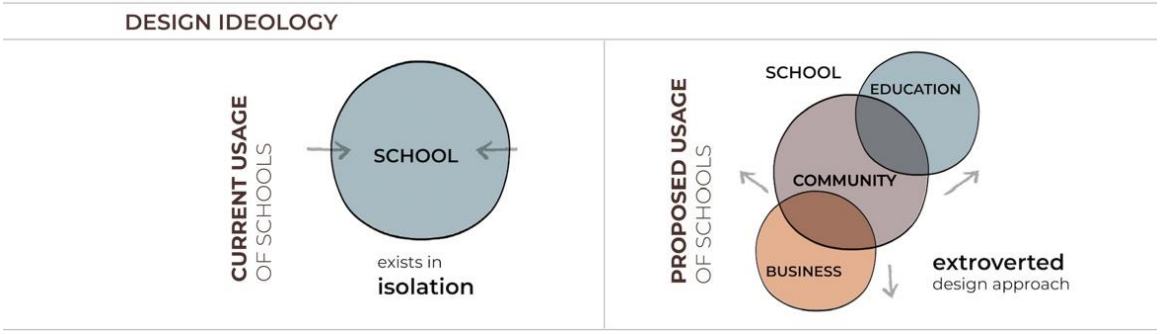
a. Vocational training center
b. Workshop & model making facilities
c. Library
d. Healthcare and medical facilities
e. Day care & crèche
f. Senior citizen's center
g. Multifunctional spaces
h. Sports facilities
i. Cafeteria/Canteen

Conclusion

The exploration of the transformation of physical environment of schools is one that requires a thorough understanding of the underlying complexity of the interaction of the pedagogical, social-cultural and socio-economical factors. It must also facilitate the current necessity for change, which is explored in this paper through the primary case studies.

The analysis of the Girls Government School is indicative of the apathy towards design of learning environments. Its hasty design and construction seeks to serve as a container for students and a quick solution for the population explosion. Similarly, Modskool fails to adequately meet the parameters that constitute a satisfactory 21st-century learning environment, but the project is an attempt to tackle local problems that the community is faced with. It stands as a successful representative of a step in the right direction - a solution formulated keeping in mind requirements of the immediate context and community. The Hutong Children's Library and Events Center is a small scale intervention that manages to have a much larger impact. It stands as an example for a successful multi-functional intervention that goes beyond its programmatic functions. it fulfills the social needs of the local community and strengthens the bonds between locals towards enriched contemporary Hutong life. Its implications in the research prove that a mixed-use, multifunctional facility does not need to be confined within the exploration of an institution. It can be investigated under different programs, based on the necessity of the community.

Thus having explored the growing pressures upon developing countries like India, an attempt must be made to ensure the livability of cities is not compromised. Planning *'Schools beyond Education'* would enable multiple modes of teaching & learning while also serving as an anchor for a mixed-use community hub that serves the larger community. Its multifaceted program and strong public character with functions catering to different sections of society would transform the way we perceive schools and institutions, redefining the image it holds for our cities. The school complex presents itself as an opportunity and solution - blurring boundaries between the formal and informal sector. It can be seen as a vital public space in our cities and villages to be inhabited.



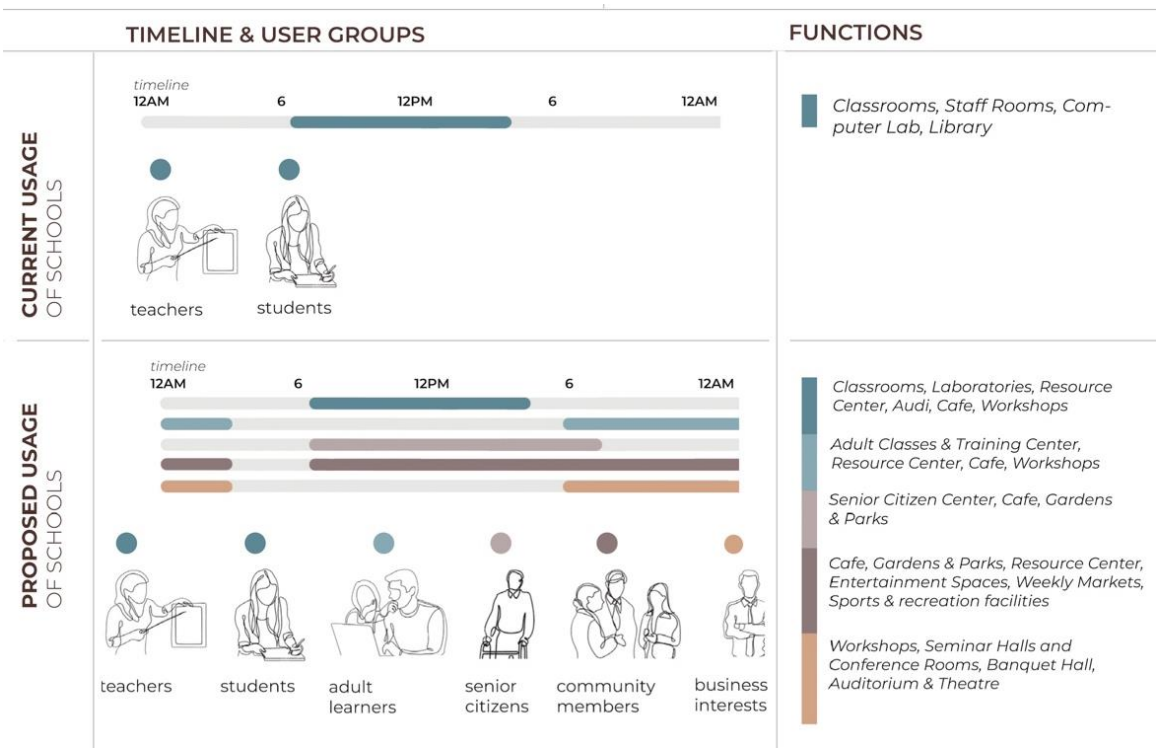


Figure 41: Current Usage Vs Proposed Usage of Schools
Source: author

Proposed Measures and Guidelines

As every design problem is unique, a 'one size fits all' approach would fail and a customized solution has to be devised. Based on the evidence gathered, these are the potential solutions available to designers to implement the proposed solution:

1. Program and Function Analysis:
   Selection of program following a study on site conditions and analysis of varied user groups.

2. Setbacks and Site Boundaries:
   An important aspect is utilization of the site setbacks as spill-out spaces for the public functions. Boundary walls are to be strategically utilized for this purpose: only the primary learning center should be cordoned off. To activate the public realm, rest of the site should not be bounded at the site's peripheral limits.

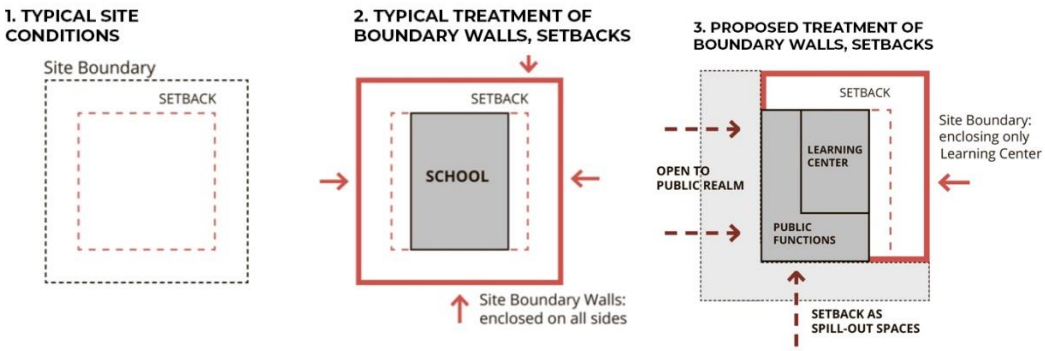


Figure 42: Setbacks and Site Boundaries
Source: author

3. Categorization of functions & zoning according to site conditions:

   a. *Public oriented outward facing functions*
   Functions possessing a very strong public character that not only cater to the resident community, but also the working community in the urban village (as in the case of the Artist's Village in Lado Sarai). For example: library, cafeteria and canteen, workshops.
   b. *Resident community oriented inward facing functions.*
   These functions have a public character - however they are specifically designed to cater to needs of the resident community (but not limited to) since they will be utilizing these the most. For example: an intergenerational center (crèche facility and day care center, kindergarten, senior citizens center), healthcare & dispensary.
   c. *Learning Center for students – children & adult learners*
   Functions predominantly in the form of primary learning spaces for students & learners which may not be utilized for functions beyond that. For example: classrooms and science laboratories.
   d. *Multipurpose Hall*
   Segregating the multipurpose hall and its spill-out area from the rest of the school so that it can be utilized by the community when not operational during school-hours.

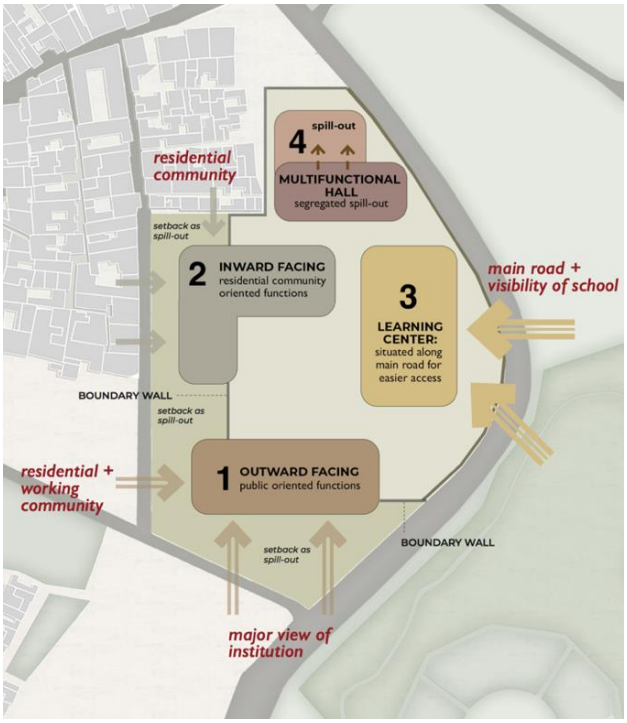


Figure 43: Functional Zoning on Site
Source: author

4. Classrooms as Learning Environments

Classrooms must reflect the students' cognitive stages and thus be designed accordingly. Following David Thornburg's proposed learning spaces, they must provide the required flexibility and adaptability. Their treatment must differ as follows:

a. *Primary School (grade 1-5) –*
   Social integration between different sections of the same grade must be emphasized to enable social inclusion of students in a domestic scale. The design must not restrict movement – complimenting the natural state of children. Multiple learning and play spaces should be provided with access to outdoor play areas.
b. *Middle School (grade 6-10) –*
   Social integration between different grades should be accentuated to enable social inclusion at a greater scale. It must also focus on imposition of discipline through a more rigid form.
c. *Secondary School (grade 11-12) –*
   To enable students selecting different electives, the space must be dividable – a collapsible wall that could provide the flexibility to use the same space for different lectures.

5. Building Heights:
   Following a site study and analysis, the intervention must relate to the immediate context with its height derived from the same, thus ensuring that the institution does not feel alien to the community.

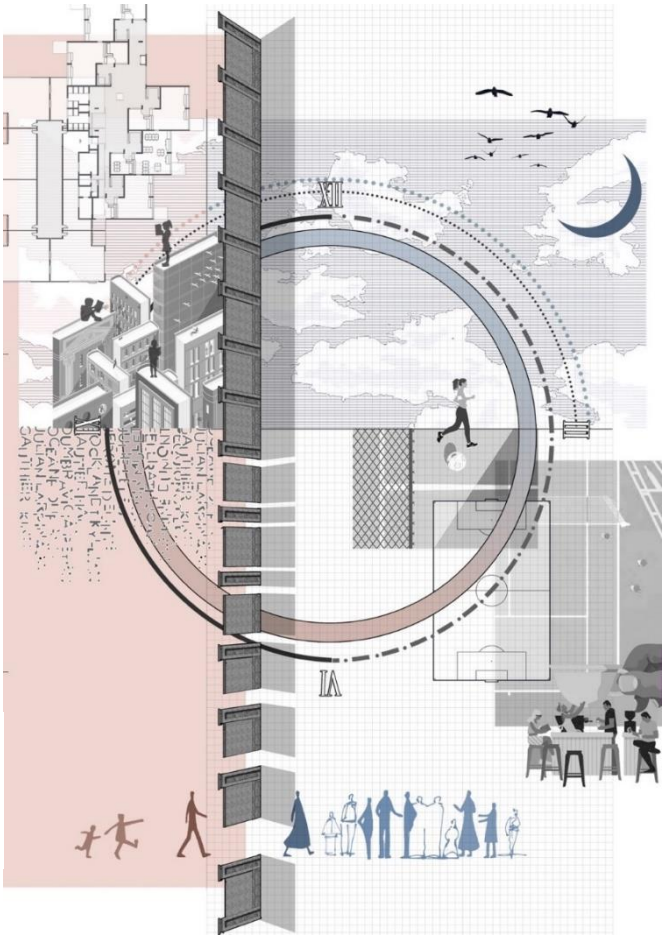


Figure 44: Abstraction of Proposed Idea: Redefining Schools as Public Institutions
Source: author

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