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SOCIAL DEVELOPMENT CENTER FOR THE URBAN POOR OF KATHMANDU

BY
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Date: March 02, 2023

To,
The Chairperson and Members of the Jury,
Thesis Committee
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Subject: Approval for Final Thesis Presentation

Dear Sir/Madam,
In compliance with the requirement of the course AR 851 (V Year Architectural Design Thesis) for the degree of Bachelor's in Architecture, I hereby respectfully present my thesis for evaluation and approval.

Project Title: Social Development Center for the Urban Poor of Kathmandu
Project Location: Gusingal, Lalitpur

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CERTIFICATE

This is to certify that this thesis entitled "**Social Development Center for The Urban Poor of Kathmandu**" at Gusingal, Lalitpur submitted by Mr. Rujal Manandhar has been examined and has been declared successful for the partial fulfillment of the academic requirement for the completion of the Degree of Bachelor of Architecture.

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Asso. Prof. Dr. Sanjay Upreti
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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF CHARTS

ABSTRACT

This report was prepared as a documentation of the research and design carried out for thesis regarding the topic Social Development Center for the Urban Poor of Kathmandu. The study focuses on the issues surrounding slum formation in urban areas around the globe, particularly the expansion of squatter communities along the banks of the Bagmati River in Nepal's Kathmandu Valley. The goal of the research was to identify effective solutions for slums and squatters for their social, economic and overall development, providing a better environment for the squatters to settle in and to include them into the society. One of the research themes is also the regeneration of the public space that has been lost within the current squatter communities. The research also seeks to adopt strategies in designing locally with the perception and psychology of the squatters with active community participation.

The research was conducted using a review of the available literature, national, regional, and international case studies, site visits, study, and analysis, as well as consultation with the thesis supervisor, references from seniors and other scholars, examination of scholarly journals, websites, documents, and reports, questionnaires, surveys. The conclusion drawn from the literature review served as a fundamental underpinning for the case study selection criteria.

Slums and squatters are a rising problem, and there are a number of potential solutions, according to the study of the literature on the subject. One of them was to develop a community center for the slums and squatters on the land that they often choose to dwell. These centers would act as an agent of the social development of the residents which would uplift their economic standard through empowerment. Having forced to live in cramped environment and lack of public spaces, these centers could be an open space for the dwellers to enjoy the urban atmosphere, sports and recreation. Studies show that the center could as well be a tool for urban transformation in the community.

The literature gives an understanding of the strategies that can be adopted to make the built environment affordable with respect to the choice of materials, energy efficient techniques, planning and passive solar techniques. The research establishes what makes spaces interactive and social. The research further focuses on spaces required for training centers, waterfront development, design approaches for children to fit into the context of the site.

According to the evidence presented in this paper, slums are a significant problem in cities all over the world, and various solutions have been used to address them in the past. However, in the current situation, it appears that better solutions need to be introduced rather than adhering to previously proven tactics. The relevance of the findings is that, using this research report as a guide, they may contribute to successful transformation in the Kathmandu Valley's informal settlements and, ideally be a source of material for urban transformation project yet to be practiced in Nepal.

1 INTRODUCTION

1.1 Background

Nepal, being one of the least urbanized countries in the world, is also one of the top ten fastest urbanizing countries. In 2014, the level of urbanization was 18.2 per cent, with an urban population of 5,130,000, and a rate of urbanization of 3 per cent (UN DESA, 2014). Urban growth centers are emerging in cities like Kathmandu, Pokhara the inner Terai valley and in market and border towns on highway junctions. Kathmandu valley, as of 2015, is one of the fastest growing agglomerations in South Asia. Kathmandu Valley accounts for 24 per cent of the total urban population, with Kathmandu Metropolitan City alone accounting for 9.7 per cent. (Muzzini & Apericio, 2013; MoUD, 2015).

The poverty rate is increasing in urban areas, whilst it is declining in rural areas (ADB, 2013; UNDP, 2014). There has been a noticeable improvement in the rural Human Development Index (HDI) value between 2006 and 2011, whilst the urban HDI value has remained constant (UNDP, 2014). With this, there is gradual addition of unemployed vagrants in urban zones like Kathmandu which is less demonstrative of urban dynamism with a poverty rate of 11.5 per cent (CBS, 2012). This is a huge chunk of the urban population that need to be catered to regarding their socioeconomic upliftment.

The urban poor are generally the ones vulnerable to natural hazards due to the location of informal settlements in marginal areas and the lack of assets to assist in their recovery. Slums and squatter settlements are often located in ecologically sensitive and marginal areas such as riverbeds, lowlands, and flood-prone areas (Muzzini & Aparacio, 2013: p. 63). Unplanned growth and poor enforcement of building regulations have led to substandard housing and the loss of open space. Narrow streets and the incremental growth of informal settlements increases the vulnerability of the urban poor to hazards (Bajracharya et al., 2015; Muzzini & Aparacio, 2013). The urban poor also include street dewellers, scavenging groups, hawkers and vendors.

Since there aren't many open spaces in crowded cities, the open spaces of rural Nepal are very memorable to us city people. People from rural areas make compromises with the absence of spaces they have occupied in the past when they move to cities in pursuit of better chances. It is necessary to return these spaces to the people. Given the current circumstances, it is obvious that

the main problem is the prevalence of squatter settlements among low-income migrant populations in Kathmandu. They are compelled to squat on the banks of the Bagmati because the family doesn't have enough finances. Since they have the same right to the city as everyone else and because they currently live in the poorest conditions, these squatters cannot be driven out. One solution that can be given to the settlers to address this issue and limit further population increase is the creation of a social development center where they can engage in recreational activities and sports, learn new skills, receive education and counseling, and reform their social behavior. It is hoped that this thesis will help establish a social development center for a better built environment where squatters can live in the same respect as other city residents.

Figure 1 Squatter settlement in Nepal

Source: https://www.nepallivetoday.com/2022/07/16/squatter-settlements-in-kathmandu-in-pics/

1.2 Problem Statement

The increasing number of urban poor largely depend upon direct cash income from informal activities; cheap labor and petty trade. These people live on a hand to mouth basis. The urban poor, being engaged in insignificant economic activities, do not have an option to upgrade their lifestyle for the better. As a result of inadequate sanitation facilities and lack of access to public utilities, the poor and marginalized are the ones affected the most. And with no permanent asset on their

hands and shelters that could be evicted at any time by the Government, there is a strong sense of social exclusion among the communities. They are often treated as temporary settlers and outsiders. There is also an absence of the rule of law in slums, along with a lack of social protection mechanisms and isolation from other settlements that leads to violence and crime related activities. (GSDRC, 2015).

In a summary of how 40,000 poor people from 50 countries themselves saw poverty, Narayan et al. (2000) wrote:

> "Poor people's definitions of poverty do not only include economic well-being, but also include vulnerability, powerlessness, the shame of dependency and social isolation."

The people of the communities not only wish for economic benefits but also for their social integration and social justice.

1.3 Need Identification

As a media theorist Marshall McLuhan remarked over half a century ago said that. (1960, p. 1)

> "The sheer quantity of information conveyed by press-magazines-film-TV-radio far exceeds the quantity of information conveyed by school instruction and texts. This challenge has destroyed the monopoly of the book as a teaching aid and cracked the very walls of the classroom."

This out of all the people matters most for the urban poor. We have been following the same teaching methodologies, deemed obsolete half a century ago, to every child for it to be socially accepted in a community. So, rather than sending the child and youth only to school the better option would be a center where he could learn certain skill and be economically and socially stable.

With poor quality of housing, the urban poor are forced to live in cramped neighborhood spaces with very narrow streets and low number of open spaces (GSDRC, 2015). Their necessity of day-to-day life also doesn't encourage them to socialize with larger group of communities or form any kind of societal strata. This leads to the urban disassociation of communities. So, there is a need of a center for social revitalization so that the people can learn to be social with other communities and also amongst themselves.

1.4 Research Questions

- How can architecture contribute to affordable, better living and learning environment for the squatters and bring about positive changes to the society?
- How can placemaking be used to improve quality of space and provide opportunities of engagement on varying levels in the community
- What spaces will be suitable for the poor to socialize and learn

1.5 Objectives

- To study and establish how a social development center should work and what functions it should hold in order to cater to the stated problem
- To study how a social development center can help integrate the urban poor to community into the society.
- To provide a better living environment for squatters for them to learn and rejoice.

1.6 Methodology

Reviewing the literature is the initial stage in any research project. By reading academic articles for a literature review, we can gain a great deal of insight into the issues and potential solutions surrounding our topic. Research at various stages is what makes up a solid literature review. The first priority of the literature review should be to identify the problems that exist in the context of architecture. After the issue has been identified, it is crucial to pinpoint the key areas that the issue has affected and the best course of action for each.

1.6.1 Methodology for Literature Review

The first step is the consultation of existing problems of the slum and squatters and their solution methods in general and provisions of social and skill development centers. Field survey of a sample of a few households in slum area, graphic and photographic documentation, record of changes that took place in the case studies, and questionnaire as an efficient method were all used in this research for literature review.

1.6.1.1 Framework for Literature Review

- Study of present context of urban poor in Kathmandu
- Problems regarding slums and squatters
- General solutions to the problems
- Strategies for better built infrastructures and social development center
- Loss of public spaces
- Strategies for affordable development

1.6.2 Methodology for Case Studies

The best way to conduct case studies is to develop selection criteria based on the literature study and extracting the necessary solutions of the stated problems that one is dealing with. This can assist in ensuring that the case studies have exactly the information needed, neither more nor less and derives from the site itself. During case studies, it was taken note of the distinctive characteristics, solution methodologies employed in the successful projects, as well as praise and criticism.

Selection criteria for case studies

1. Availability of information
2. Locational attributes
3. Impact the project has on the community
4. Target group
5. Inclusivity
6. Architectural strategies for affordable construction
7. Multiplicity of use of for the available space
8. Spaces that favor learning

A questionnaire survey was done on the basis of literature review. The objective of the survey was to find out the needs at the site rather than extracting the requirements from the literature itself, what kind of spaces they were lacking and also explore the idea of an ideal space for the poor urban dwellers where they could dwell, socialize, interact and learn.

1.6.3 Methodology for Site Analysis and Study

For site analysis and study, site visits, information about the site from websites, news, and meteorological data analysis of the site were all completed. The site analysis was greatly helped by frequent site visits, documentation in the form of photos, graphics, audio, and questionnaires. Additionally, hearing the residents of the squatter settlement's stories really aided in comprehending the experiences of the locals.

Selection criteria for the site

1. Location and walking distance from the settlement
2. Approach
3. Public space
4. Land usage/ type
5. Locational attributes

1.6.4 Scope and Limitation

- **Scope**

Attempts have not been made to propose such project for the empowerment of the urban poor but projects of similar motive of helping the urban poor from an organizational level have been performed at large.

- **Limitation**

There are not any national case studies that would fulfil the criteria’s that the project would need. This limits the literature and case studies in national context. Yet case studies have been performed in parts to get insights on individual programs.

2 LITERATURE REVIEW

2.1 Urbanization and Poverty

Poverty will grow more urbanized as the world becomes more urbanized. Most urban experts explain the connection between urbanization and poverty with a simple explanation: the developing world is becoming urban, and the burden of global poverty, which has historically been carried by rural areas, is transferring to cities and towns. According to several observers, poverty is more concentrated in cities and towns as a result of the shift in global population distribution toward urban areas. (Mathur, 2014)

Urbanization supports both economic growth and the fight against poverty. Country experiences often provide credence to the idea that an increasing proportion of people living in cities helps to reduce overall poverty by opening up new opportunities for those who want to leave rural regions and escape poverty. The majority of Asian nations are simultaneously battling complex urban concerns encompassing diverse manifestations of poverty, deprivation, vulnerability, and danger. A new class of urban poor is emerging due to the decline of the state-owned sector, changes in welfare provision, and rural to urban migration, creating a class of millions of working urban poor.

2.2 Urban Poor in Global Context

One in seven people in urban areas worldwide live in poverty, mostly in overcrowded informal settlements lacking basic necessities. This leads to poor living and working conditions, inadequate diets, and health burdens, often resulting in premature deaths. Additionally, the urban poor have little power to influence policies and decisions that work against them.

Although 75% of the developing world's poor live in rural areas, the number of poor living in urban areas is increasing, especially in some countries. In Asia, for example, the percentage of the poor living in urban areas has risen from 15.7% to 21.9%, while the urban population has increased from 38% to 43% over the same period. However, poverty rates have declined more slowly in urban areas than in rural areas. Although many people have been lifted out of poverty, about 90% of them are rural poor, indicating that urbanization affects rural poverty more than urban poverty. In some Asian countries, the number of urban poor has increased, leading some urban scholars to refer to it as the "urbanization of poverty.". (Mathur, 2014)

Urban poverty is different from rural poverty and encompasses more than just a lack of income. It includes poor access to land, housing, infrastructure, services, economic opportunities, health care, education, social security, and empowerment. Urbanization in developing Asia has led to slums, inadequate housing, poor living conditions, and vulnerability to climate change and exclusionary urban forms. According to UN-HABITAT, 60% of the world's slum population resides in Asia, with many more living in slum-like conditions that are not officially recognized.

2.3 Who are the Urban Poor?

Urban poverty goes beyond income deficiency and includes vulnerability due to inadequate access to land, housing, infrastructure, services, economic opportunities, health care, education, social security, and empowerment. They often reside in ecologically sensitive areas and lack assets to recover from natural disasters. Many are rural migrants engaged in hard labor, casual jobs, or self-employment, selling goods on roadsides. This group includes slum dwellers, street dwellers, scavengers, hawkers, and vendors. Urban poverty can be categorized as absolute or relative.

2.3.1 Relative Poor

Relative poverty refers to people whose household incomes are 50% lower than the national average, making it difficult for them to afford anything beyond the bare minimum. Unlike absolute poverty, relative poverty can change based on a country's economic growth. It is also sometimes referred to as "relative deprivation" because those affected are not living in complete poverty but still lack the same standard of living as others in their society. In some cases, relative poverty can be permanent, leaving families unable to access the same standard of living as others in their community.(Humanity, 2018)

2.3.2 Absolute Poor

Absolute poor refers to those who live below a certain household income level, making it impossible for them to afford basic needs such as food, shelter, clean water, healthcare, and education. The poverty line for absolute poverty is typically based on the minimum cost needed to cover basic needs, without regard to social context or norms. The current poverty line, as of 2022, is $1.9 a day. Even if a country experiences economic growth, those living in absolute poverty are

not affected. This type of poverty is commonly found in slums and squatter settlements. (ADB, 2022).

2.4 Urbanization in Nepal

Urbanization is crucial for a nation's development, but Nepal's urban growth rate of 8% and 29% urbanization rate is not enough for a developing country. Economic problems arise in riverfront areas due to large numbers of squatters who settle there for their livelihood. Although Kathmandu has architecturally designed buildings, areas along the Bagmati river, such as Thapathali, Bansighat, and Balkhu, present an unsightly sight due to the polluted water and poorly planned houses, despite having potential for being an attraction.

2.5 Slums and Squatters

2.5.1 Slums

Slums spread across the United States and Europe from the 18th to the late 20th century as a result of the general populace's increasing urbanization. Although they are still present in affluent economies, slums are still mostly located in metropolitan areas of underdeveloped nations. Slums are highly congested urban areas marked by deteriorated and unsanitary buildings along with poverty and social disorganization. (Sharma, 2014)

Slums can form from rural-urban migration, post-disaster migration, and neglect by developers. The world's largest vertical slum grew from an abandoned 45-story building in Venezuela. Areas lacking urban amenities and with low living standards due to poverty are also known as slum areas.

The areas that lack basic urban services and where the living conditions are unsatisfactory due to income conditions and poverty of the inhabitants can also be termed as a slum area.

According to UN-HABITAT (2005), in the context of the world, slum household is a group of individuals living under the same roof in an urban area who lack one or more of the following:

- Durable housing of a permanent nature that protects against extreme climate conditions.
- Sufficient living space which means not more than three people sharing the same room.
- Easy access to safe water in sufficient amounts at an affordable price.

- Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people.
- Security of tenure that prevents forced evictions.

In Nepal, urban slums lack access to basic services such as water, sanitation, living space, sturdy housing, and security of tenure. They are mainly located along the banks of the Bagmati River.

Figure 2 Slum- Cantagalo Favela

Source: https://www.freepik.com/premium-photo/landscape-cantagalo-favela_3275628.htm

2.5.2 Squatters

Squatters are the individuals settling on public, unoccupied land, without right or title to it. slums refer to the environmental aspects of the area where a community resides while squatters refer to the legality of the land ownership and other infrastructure provisions. Squatters are less inclined to engage in the development of local infrastructure since they do not possess a land title. They may be evicted at any time because to the lack of consistent government policy for these landless people. They always live in fear of being evicted. Additionally, they lack essential amenities like public parks, community centers, and schools.

According to a census by the Central Department of Population, TU, migrants make up 40% of the population of Kathmandu. According to estimates, roughly 7% of Nepal's urban population overall resides in squatter settlements. (UN-Habitat, 2010). There are no other slum areas in Nepal that require immediate upliftment at this time due to the dominance of the squatter communities along the banks of the Bagmati River. It won't be long before the entire riverside is a slum, making it more challenging to move these individuals to different environments.

2.5.3 Squatter Settlements Along the Bagmati River

Figure 3 Squatter settlement

Source : https://www.nepallivetoday.com/2022/07/16/squatter-settlements-in-kathmandu-in-pics/

Communities of squatters are self-constructed. The makeup of these settlements teaches us a lot. The earliest of these communities was established in the 1950s. However, the most of them have emerged in the previous 20 years. The following places are some of the more well-known ones: Sankhamul, on the right bank of the Bagmati, close to Naya Baneswar; Sinamangal, near the airport; on the Bagmati; Balaju, in the north; along the Vishnumati; Khadi Pakha (KMC, no. 5); Tripureshwar (Bansighat); Tankeshwar (KMC, no. 13); Ramhity (KMC, no. 6); Permanent sukumbasi houses covered a substantial portion of Kathmandu's riparian corridor in 2008. The State, not the Municipality, has the rights to these rivers' banks. Squatters are concentrated in certain places for a variety of reasons, one of which is due to this. Each family resides in a shelter and makes up the 50 to 300 households that make up each cluster.

Around 15-20% of the population consists of temporary laborers from Northern India who work seasonally in the Valley, often building ad hoc camps on riverbeds from November to May. Almost 10% of the shelters have food stores or tea shops attached.

Maoists settled people below Bagmati Bridge in 2006 for political reasons. The settlers remain without formal land titles and are unwilling to leave despite the absence of better opportunities. This trend of rural-urban migration and settling on the banks of Bagmati River continues due to financial constraints.

Kathmandu has 29 informal communities with 2,031 households by the riverside and 73 such villages with over 1000 households along the banks of Bagmati River (reported in 2017). The

squatters lack infrastructure and sufficient housing, resulting in unwelcoming riverfront public areas and a lack of public spaces for their enjoyment

2.5.4 Present Condition of Squatter Settlements

One of the major controversies running about the squatters are their identity. No exact data has been calculated on how many of the settlers are actually in dire need of squatting. Some are known to have property in other districts. Despite this it is known that through observation of many scholarly articles and my own site visits, there are quite a large number of people who truly are absolute poor.

These settlements seem to be characterized by crime ridden activities, unsafe and mostly low-grade people when viewed though the surface. But through detailed observation, what can be noticed is that these people are no different than other normal people but have only lost their land and are economically unempowered. Squatter settlements in many cities, just like Kathmandu, were chased away from their settlements for apartments and infrastructural development who ended up squatting elsewhere and slumming the place. The solution therefore is not relocating them elsewhere but empowering them.

Strategies such as the Participatory Slum Upgrading Program of the UN-Habitat between 2000 to 2014 targeted on 9% drop in the proportion of slum to urban populations. To make this drop target even higher the intertwined aspects of social, economic and environmental layers of the settlement shall be studied thoroughly. (Abubakar, 2019)

The slums are still a critical point of concern in today's context to improve the overall wellbeing of the cities, even though they are not regarded as mainstream parts of a development nor provides any pros to the city profile. Finding out what kind of empowerment and learning opportunities would be the greatest option in the setting of Nepal is the subject of the research. Resettlement or high-rise settlement could be the solution but these do not seem possible in context of Nepal as resettlement projects have proven themselves to be inefficient and a high-rise apartment is not an option owing to the site the settlement stands and its urban context. Could it be an efficient way to deal with slums and squatter settlement if a center were to be provided where one could learn

skills, societal norms, get proper counseling, enjoy public space and socialize and interact to provide a better living environment for the urban poor of Kathmandu?

2.6 Strategies for Solution of the Squatters

Before starting a project in informal settlements, it's important to thoroughly study the factors defining the community and prioritize intervention areas. This includes a census and topographic survey to assess potential and needs. Based on this information, specific rehabilitation projects can be planned. Urban renewal proposals for poor communities typically consist of three types of projects, as explained in the study "Inclusion of Inhabitants to Full Citizenship. Urban Development and Social Inclusion Experiences in Latin America."

2.6.1 Housing Projects

Self-built houses define communities in informal settlements, but can lead to social, environmental, and physical issues. Housing substitution, improvement projects, and legal associations can improve quality of life. This includes slum relocation and affordable housing initiatives.

Slum relocation: The valuable public space that the squatters have been using can be released by relocation. The houses, societies, and works of these people are lost in the process, although it can aid in recovering state land that had been illegally held by people. Moving out of their current residence requires giving up their current jobs, commute possibilities, social group, way of life, environment, and cultural heritage.

Figure 4 Slum Relocation Kirtipur Housing Project

Source: https://pureadmin.qub.ac.uk/ws/portalfiles/portal/17386991/squatters_and_city.pdf

Housing projects do not make the individuals empowered. Rather it makes them dependent and fills them up with expectation and entitled to what they don’t own. These projects tend to be heavy on the economy if carried out considering the socio-economic aspects of the affected community which would be necessary for its success.

2.6.2 Physical-Environmental Projects

For the environment to be healthier, disease incidence to be lower, and for people to have better access to their houses, environmental and infrastructure initiatives are required. It has been shown that neighborhood culture and youth behavior can change in response to physical improvements, and that these changes can have a substantial impact on the quality of life for the locals. The projects include slum upgrading and regeneration.

Slum upgrading is an urban renewal strategy that provides a package of basic services of improvements in streets, footpaths, drainage, clean water supply, adequate sewage disposal and general infrastructures in order to improve the wellbeing of the community. Solid waste, streetlights. This practice may help uplift the living standard of the poor urban dwellers. There is constant fear of eviction. If whole community is involved in the upgrade programs and are able to sustain a quality environment suitable to be recognized as a part of the city, then there are chances they may not be evicted in the future. For this knowledge to be imparted to the community, social projects are a must.

2.6.3 Social Projects

The investments and efforts dedicated to improvement plans in poor neighborhoods are driven by the importance of promoting social transformation in the communities. Young people require constant attention, as most of them are idle and lack productive life projects, presenting a risk situation that affects the wellbeing of the community. It is therefore very important to incorporate and support them with educational and training processes. These projects include slum regeneration, slum tourism and romanticizing slums.

Slum tourism is one of the economic activities that occur in many of the slum areas around the world in the present context. Tourists are taken to visit the slums in groups. They spend the entire day examining different parts of the slums, understanding the lifestyle of the people there and seeing how they are living in what conditions. The review that the tourists give show that the people living there are happy and satisfied. This does benefit the surrounding community, city and the government to some extent and some handful individuals but this doesn't however incline to benefit the local population. (Nisbett, 2017)

Figure 5 Slum tourism

Source: https://favelissues.com/2019/09/20/what-is-all-wrong-about-slum-tourism/

Romanticizing slums is a business-oriented strategy of romanticizing the sorrow of the poor which helps inhabitants generate income by not leaving their self-built communities. This includes portraying slums as a way of living and celebrating it with artistic and cultural values.

Figure 6 Slum Romanticization Jalouzi, Haiti

Source: https://ar.pinterest.com/pin/496662665151218719/

Slum regeneration is a strategy that focuses on establishing the functions that once the community had in the past or always lacked in order to inject life into these settlements. This can include small community level projects of literacy classes, skill development or counseling as individual approaches wherever necessary. This approach focuses on making the individuals of the community self-dependent which will empower them, be it teens, adults, females, to earn and support the financial burden off of their family.

In addition to making them empowered, the projects also focus on creating environments suitable for the settlers to live in, enhance their mental state, engage in recreational activities that would help make their space livable.

Social projects have been launched since 1850s in London as a solution to slum problems. They have gone through changes from being named from university settlements to settlement movements to community centers and social development centers or urban regeneration projects.

2.7 Approach of Social Development Center

This is a social approach of solution to slum and squatter settlement which focuses on establishing a community hub that is directed towards progressive changes in social, economic and cultural structures of the community to be a part of the city and integrate its users into the urban environment. This approach of building a social development center came as an idea after going through the problems and possible solutions discussed above in the literature.

2.7.1 Understanding to Social Development

The word '**social'**, as a prefix to development, is generic, broad and all-encompassing, and wherever the word 'social' is attached to other words in a way similar to its use in social development, the meaning gets diffused and generally creates confusion among users of this word to the extent that it is often taken lightly or casually (e.g., 'social' work). The root of the word social is found in Latin, where 'socius' (noun) means 'ally, confederate', and also, by extension, 'sharer, partner and companion'. Its adjective 'socialis' means 'of or belonging to companionship, sociable, social'. Another Latin word associated with 'socius' is 'socio', which means 'to join or unite together, to associate: to do or hold in common, to share with'.

The noun '**development'** as a suffix has different meanings. Its dictionary meaning is derived from the verb 'develop', which means 'grow gradually; become or make more mature, advanced or organized' (Hornby, 1993). Develop also means 'to bring out the capabilities or possibilities of; bring to a more advanced or effective state; to cause to grow; to elaborate or expand in detail; and to bring into being or activity; generate; evolve'. Thus, development connotes an act and/or a process: an act of improving by expanding or enlarging or refining, and a process in which something passes by degrees to a different stage, especially a more advanced or mature stage.

To understand '**social development'** in a simplistic way, by combining the lexical meanings of the two words, one thing is very clear, namely, that social development does not mean development of just one individual, one family or one aspect of any entity. The 1995 World Summit on Social Development distinguishes the two and sees social development, without defining it, as a necessary complement to economic development, and so do the United Nations Development Program (UNDP) Human Development.

Definitions that focus on systematic planning and linking social and economic development

- The concept of social development is inclusive of economic development but differs from it in the sense that it emphasizes the development of the totality of society in its economic, political, social, and cultural aspects. (Gore, 1973)
- Midgley revised the definition as follows: a process of planned social change designed to promote the well-being of the whole population as whole within the context of a dynamic multifaceted development process. (Midgley, 2014)

Definitions that focus on structural change

- Development should be perceived as a multidimensional process involving the re-organization and reorientation of entire economic and social systems. It involves radical changes in institutional, social and administrative structures as well as in popular attitudes and even customs and beliefs. (Todaro, 1997)
- Social development is a comprehensive concept which implies major structural changes—political, economic and cultural, which are introduced as part of deliberate action to transform society. (Pathak, 1987)

Definitions that focus on realizing the human potential, needs and quality of life

- Social development has two interrelated dimensions: the first is the capacity of people to work continuously for their welfare and that of society; the second is the alteration or development of a society's institutions so that human needs are met at all levels, especially at the lowest level, through a process of improving the relationships between people and social economic institutions. (Paiva, 1982)

- Social development is directed towards the release of human potential in order to eliminate social inequities and problems. (Meinert & Kohn, 1987)

Thus, social development, in addition to common features like inclusive development, society's total development, wellbeing of the people, social transformation and improving people's quality of life, also includes equally important features such as equitable distribution of resources, elimination of inequalities, the capacity of people to work continuously for societal welfare and process structural changes. (Adam, 2019) Based on the sustainable development model, social development can be identified with four different targets which are social justice, social infrastructure, social capital and engaged governance. (Cuthil, 2010)

2.7.2 History of Social Development Center in Poor Communities

The significance of social development center stems from the scale of the potential and unaddressed needs and issues of vulnerable and impoverished populations that have existed for a long time. This development a=can be traced back to 1844 in London.

2.7.2.1 Young Men's Christian Association (YMCA)

In 1844, George Williams and 11 friends founded the Young Men's Christian Association (YMCA) to provide a refuge for young men in industrialized London. It offered a safe space to escape the dangers of street life and welcomed members regardless of social class. . (YMCA, 2022)

Figure 7 YMCA

Source: https://www.ymca.org/who-we-are/our-history

2.7.2.2 Settlement movement

Between 1890 and 1910, when more than 12 million European people immigrated to the country provided cheap factory labor. Many immigrants lived in crowded and disease-ridden tenements, worked long hours, and lived in poverty. Children often worked to help support the family. The settlement movement was a reformist social movement that began in the 1880s and peaked around the 1920s in England and the United States. Its goal was to bring the rich and the poor of society together in both physical proximity and social interconnectedness. Its main object was the establishment of "settlement houses" in poor urban areas, in which volunteer middle-class "settlement workers" would live, hoping to share knowledge and culture with, and alleviate the poverty of, their low-income neighbors.

In 1886, New Yorker Stanton Coit, Stover, and Schurz founded the nation's first "settlement house," the New York Neighborhood Guild (today the University Settlement) on Forsyth Street on the Lower East Side. Coit and others moved to the city's poorest neighborhoods to work with immigrants living in crowded, unhealthy tenement apartments. They lived as members of the community and helped local families receive health care, enroll in educational programs, join recreational clubs, and enjoy a range of social services. (ACTIVIST NEWYORK, 2022)

By 1939 there were 2,300 of these clubs, offering unemployed people the opportunity to work and organize together for the benefit of their local communities in the UK.

- **Tonybee hall**

The international settlement movement began in 1844 in Toynbee Hall, Whitechapel, under Samuel and Henrietta Barnett where a community center was formed that attracted university students who wished to live or "settle" among the underprivileged in London's economically depressed East End. They came, according to Samuel Barnett, "to learn, as much as to teach, to receive as much as to give". As at most settlement houses, its social workers—students from Oxford and Cambridge Universities, among others—resided at Toynbee Hall and sought thereby to get to know their neighbors and their needs on a more intimate, personal level. (Tonybee Hall, 2022)

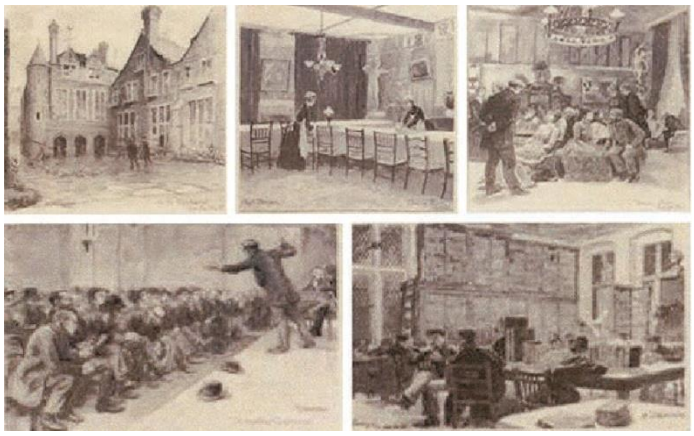


Figure 8 Tonybee Hall

Source: https://www.prints-online.com/toynbee-hall-4415872.html

The center provided services of food, shelter and basic higher education. During the few years of its establishment, it was able to bring positive changes in the poorer communities through evening classes on arithmetic, writing, drawing, citizenship, chemistry, nursing, and music; afternoon classes for girls on dressmaking, writing and composition, geography, bookkeeping, needlework, hygiene, reading and recitation, French, singing, cooking, and swimming; and evening sessions devoted to the discussion of legal principles and current social issues. Due to lack of space the users focused on multiplicity of use in the available space.

Current activities in Tonybee Hall

- Toynbee Hall provides a range of programs and activities, broadly broken down into: youth, the elderly, financial inclusion, debt, advice, free legal advice and community engagement.
- Toynbee Hall provides a pan-London free debt advice service to support 20,000 people a year with their money worries.
- Since 2007 the Toynbee Hall opened a part of the building offering dance and media studios and a theatre.

"Settlement movement adds the social function to democracy -workers had no place to congregate, to organize, to enjoy cultural or social activities, or to learn. The settlement was conceived as such a place." -Jane Adams

From the outset, there was a remarkable lack of orthodoxy in the settlement movement; the settlement idea remained a very general one, assuming different forms in response to different conditions, each settlement drawing its specific methods and aims from the needs of its community. Flexibility was the key. The basic idea, however, was constant: a settlement was to be an outpost of culture and learning, as well as a community center; a place where the men, women, and children

of slum districts could come for education, recreation, or advice, and a meeting place for local organizations. (Scheuer, 1985). The settlement houses functioned on the belief that instead of giving the poor direct relief, charities should give resources to the poor so they could break out of the circle of poverty.

2.7.2.3 Community centers

By 1916, with development of so many settlement houses, the National Community Center Association was founded and the community center was born and by 1930 there were nearly 500 centers. (Locality, 2015) A Community Centre may be defined as a building which serves a community organized in an association which is responsible for the management of the building; and provides facilities for the development of the recreational, cultural and personal welfare of members of that community; and constitutes a meeting place for voluntary organizations or other groups in the community which need accommodation. It serves as a focal point for people of all ages in the area and fosters interpersonal connections and mutual aid, fosters a sense of community cohesion and social responsibility, and gives people the tools they need to solve problems in their local area and enhance quality of life. The purpose of the community center is to encourage reciprocal responsibility, caring, and involvement in resolving identified social issues and crises by promoting and assisting the formation of community. In an urban setting, a community center can serve as a building that exemplifies the spirit of neighborhood involvement and activity.

In Nepal, there are no community centers as such, but there are initiatives for community development through organization like Rural Community Development Center, and also various Community Learning Centers aiming to enhance the quality of life of local people.

How can social development center contribute to social development?

2.8 Social Space and Interaction

Carr outlined five fundamental human needs that have an impact on how appealing a particular public area is to us. A graphic showing these requirements is provided below: Our need for food, water, shelter, or a place to rest is related to our concept of comfort. "Relaxation" refers to the need we have to calm our bodies and minds, such as by relaxing on a park bench. The terms "comfort" and "relaxation" typically refer to the environment's physical features. For instance: The quantity

of food options available in the park or the standard of the benches. Passive engagement is similar to relaxation. Passive engagement eases people by allowing them to observe what other people do, whereas relaxation can be viewed as drifting away and disengaging from the surroundings. On the other side, "active engagement" refers to our urge to experience intellectual and/or physical challenges in space.

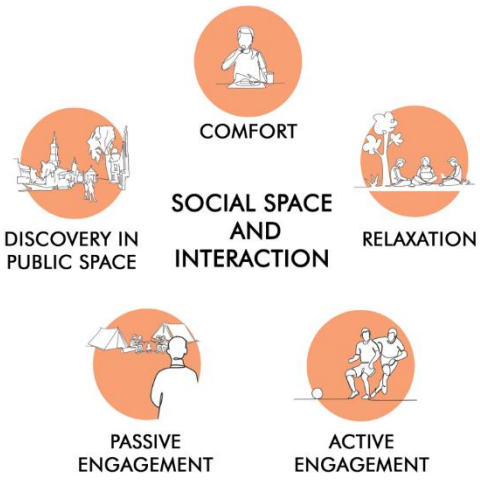


Figure 9 Social space and interaction

Source: Author

2.8.1.1 Urban Placemaking

The term "placemaking" describes a cooperative process by which we might reshape our public environment to promote shared advantage. With a focus on the physical, cultural, and social identities that define a place and its continual growth, placemaking promotes innovative patterns of use in an effort to strengthen the bond between people and the places they share. (Proctor)

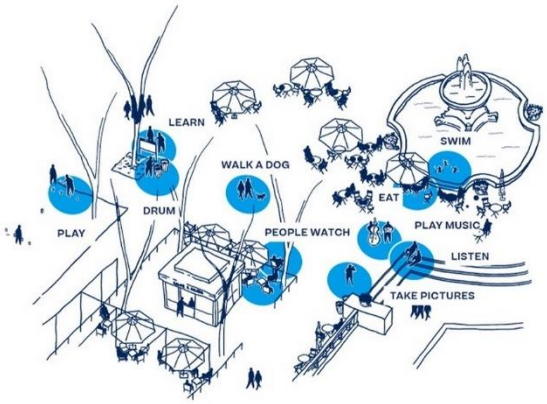


Figure 10 Urban Placemaking

Source:https://www.rethinkingthefuture.com/narratives/a6117-creative-placemaking-tells-a-story/

- **What Makes a Place Great?**

Designers frequently underestimate the instruments at our disposal for attaining this goal, despite the fact that design is a vital tool for building safe, friendly, and dynamic interaction space. These qualities help making a space into great interactive place.

Uses & Activities: Are there things to do in the space that give people a reason to come there and stay?

Comfort & Image: Do people feel comfortable and safe in the space, both physically and emotionally?

Access & Linkages: Can people access the space, physically and visually, when considering a variety of abilities and transportation modes?

Sociability: Do people interact with others in the space, in both planned and unplanned ways?

Figure 11 A great place

Source: https://www.pps.org/article/what-is-placemaking

- **Qualities of a Great Place**

  - Attractions and destinations
  - Identity and image
  - Active edge users
  - Amenities
  - Management
  - Seasonal strategies
  - Diverse user groups
  - Traffic, transit and pedestrian
  - Blending of uses and modes
  - Neighborhood preservation

- **Human Activities for Interaction**

Theoretical analysis has revealed that social, voluntary, and required activities all take place in public settings in connection to the activities that take place there.

- **Necessary Activities**

Basic tasks that are required in life, such as walking, working, conversing, and going to work, are considered necessary activities. In the short term, people are forced to engage in these activities, therefore they take place regardless of the state of the physical environment. The ability to do the required actions will be retained and strengthened over time in a healthy state.

- **Optional Activities**

Activities that people willingly engage in and participate in are referred to as optional activities. These activities occur when the surrounding environment, including the weather, supports them. The majority of these activities are leisure-related and are influenced by the physical environment and public space quality. Since places and circumstances encourage people to stop, sit, linger, and return, necessary activities will therefore occur over a longer length of time in good outdoor spaces, as well as a wide choice of optional activities. These are the things that draw people in when the weather, surroundings, and location are all usually pleasant and alluring. These activities are particularly quality-sensitive.

- **Social Activities**

When people engage, social activities occur, and these are activities that come under the first two types of activities. When people move around in the same area, they happen on their own. Social interactions include talking, playing, and observing events, among other things.

2.8.1.2 Socio-petal and Socio-fugal Spaces

In research on environment-behavior, terminology like "sociopetal" and "sociofugal" define the elements as "pushing people apart" and "bridging them together" in spaces, respectively. British psychiatrist Humphrey Osmond created these two words (1917 – 2004). They distinguish between two different sitting configurations: sociofugal seating, which encourages solitude by having the seating face outwards, and sociopetal seating, which promotes contact by having the seating face into a group. The placement of seats at bus stations or in some waiting areas, where they are arranged in rows along the walls in a military fashion, is an excellent illustration of sociofugal space. Even if they are cozy and really comfortable, people find it difficult to strike up talks in certain settings. Making eye contact is one special thing that practically compels conversation everywhere. Eye contact is necessary in sociopetal settings. On some bus seating configurations, two passengers are positioned across from another two. It has two of the most crucial components: eye contact and a close enough proximity to allow for dialogue to begin. As a result, distance has a big impact on our social interactions. According to Hall (1966), there are four main distances at which interpersonal interactions typically occur. These fall under the categories of private, social, intimate, and public.

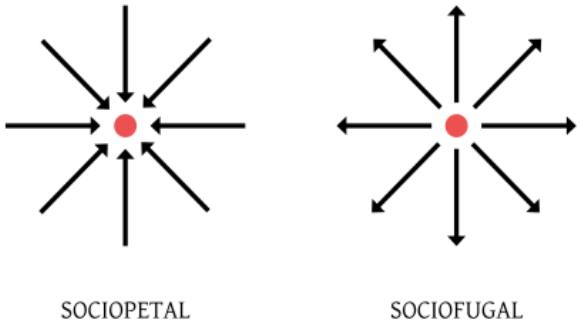


Figure 13 Sociopetal vs Sociofugal spaces

Source:https://architecturelearningblog.wordpress.com/

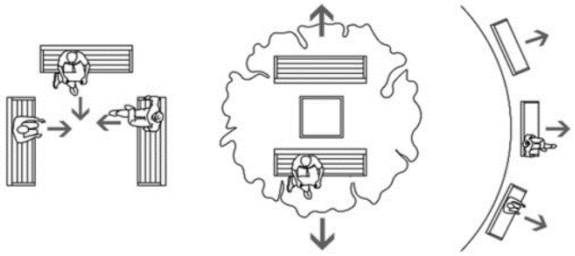


Figure 12 Sociopetal vs Sociofugal seating

Source:
https://link.springer.com/article/10.1057/s41289-020-

- **Intimate space** is the private area immediately surrounding the individual's body. It involves both physical and emotional interactions. (45 cm)
- **Personal space** is that area within which a person allows only select friends, or people with whom personal conversation is mandatory. (1.2 m)
- **Social space** is that area within which a person expects to make social contacts on temporary basis. (3.6 m)
- **Public space** is that area within which a person does not expect to have direct contact with others. (7.2 m)

It may sound like a socially inclusive idea to design more sociopetal spaces and discourage sociofugal spaces, both are actually needed to function. Human beings are complex, layered with varied experiences and applied meanings, and therefore, operate in spaces differently. One may choose to be amongst the crowd while other may need seclusion. So, it isn't the fact that all spaces are sociopetal spaces that makes it successful, but rather, that there are sociofugal spaces for people to retreat to.

2.8.1.3 Prospect Refuge Theory

Prospect and refuge theory by Jay Appleton in 1975, in his book Experience of Landscape, explains that humans seek out to satisfy an innate desire when reviewing a space to have opportunity/prospect while being safe/refuge which stems from an evolutionary survival, where the predator must be able to see their prey without being seen.

Prospect: A distant vista, an elevated view, large natural wonders

Refuge: an interior space, a bench with a wall behind, a cave

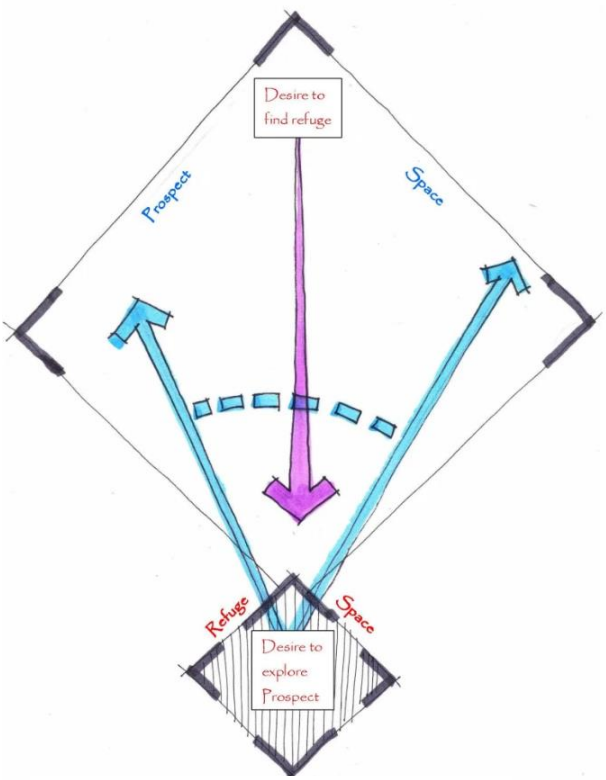


Figure 14 Prospect Refuge Theory

Source:https://landarchconcepts.wordpress.com/what-is-prospect-refuge/

People tend to gravitate to edges which allows them to maintain their prospect to survey the remaining vista. Expansive spaces discourage occupation but invite surveying of the space. So, the size of space matter to the number of occupants able to use it. Therefore, spaces of refuge are an important part to oversee that he space becomes a place.

2.8.1.4 Social Interactionist Theory

This theory explains that children observe adults communicating and then develop behavior themselves. It puts emphasis on the environment of the subject and the importance of social interaction for the subject to learn something. In the same way, students tend to be affected by the environment they are surrounded by during the process of learning a skill.

2.8.1.5 Interaction

Interaction is defined as communication or direct involvement with someone or something. There are two basic types of activities or interactions that people indulge in, in a public space:

- Passive interaction
- Active interaction

Passive interaction involves looking and observing. It is different from relaxation in that it involves engaging with the environment. People-watching is a popular passive interaction activity in many public spaces such as Kathmandu Durbar Square. Whereas active interaction represents a more direct experience with a place and the people within it. Though people-watching is very common, many people like direct interaction with others. One of the elements which provide for such interaction are activities which facilitate “triangulation”. Space should encourage different types of interaction which can be of the following types (Hester)

- Inclusive interaction is encouraged in spaces where a small number of people can form a group to interact.
- Face to face interaction is encouraged by spaces that allow two people to have a “face-to-face” dialogue.
- Exclusive interaction takes place in spaces that are left over by the above two ‘cooperative spaces’ and is usually conflictive in nature

- Parallel interaction does not encourage "co-operative face-to-face interaction". For example, people watching other people from the railing and no in direct engagement with others.
- Congruent and Incongruent interaction spaces are those, which facilitate the "observation of a role model and either the acceptance or rejection of that behavior".

2.8.2 Spaces for Vocational/ Technical Schools

Unlike regular classrooms, lessons in vocational school frequently center around equipment. Designers were therefore required to produce items not only for students but also for specialized furnishings, tools, and equipment. The flexibility and adaptability of classroom spaces to meet various functions, accommodate various sized groups, cope with pedagogical methodologies, and cope with changes in labor market demand is a crucial issue that should be taken into consideration by designers. Versatile areas that define a space or give it as little defined use as feasible are essential when designing for veterinary facilities. Flexible spaces help integrate technology into the building because of how swiftly it is developing. Traditional schools' space needs are different from those of VET schools (Cutshall, 2003)

Technical schools frequently have their instructional spaces and rooms planned around the highly specialized equipment, machines, and tools needed to train students efficiently (JISC, 2006; Cutshall, 2003). However, requests from administrators and teachers for adaptable spaces—which allow building renovations or additions to be made in a time- and money-efficient manner—as well as flexible spaces—which enable spaces to be used for multiple purposes and different sized groups—are having an increasing impact on construction and refurbishment decisions. (2008) (Christin Cave and Alastair Blyth).

Planning VET facilities calls for adaptable design that considers potential changes to pedagogical approaches and adjustments in labor market demands (Wolff, 2002). (JISC, 2006). Physical, technical, and spatial flexibility must be preserved while the space's design is coordinated with user needs and pertinent activities for the learning environment to be effective. Isler and Doerig (2008) assert that architects should design spaces with a flexible definition of function to accommodate the development or repurposing of spatial features. In fact, Jamieson (2000) notes that when considering space from the viewpoint of the teacher, the physical environment will

influence how teachers construct activities. Therefore, it may be claimed that the less explicit the role given to the location is, the more freedom teachers have to create alternate learning settings. (2008) (Christin Cave and Alastair Blyth).

VET training can take place in three different types of environments: specialized, generic, and informal (Worthington, 2007). Focused laboratories or workshops that need particular equipment to perform specific functions are examples of specialized learning spaces; lastly, informal learning spaces are non-classroom, open spaces that include a range of settings for a range of interactions. These spaces can be used for a variety of activities and do not have specific infrastructure requirements (Worthington, 2007; Wolff, 2006).

2.8.2.1 Specialized classroom

In specialized or designated spaces, students can hone necessary abilities, improve their critical thinking and problem-solving abilities, and gain practical experience with industry equipment (Worthington, 2007; Wolff, 2002). Because they create the foundation for students' admittance to higher education and/or employment, this section and the associated activities are crucial to their vocational education. Typically, this section is set aside for a specific subject or course; examples include laboratories and auto shops. The workplace that students will eventually enter after completing their studies must be reflected in practical learning environments.

Labs and workshops that mimic real-world work situations can boost student achievement, and it is this physical environment that will properly prepare students for employment (Cutshall, 2003). This configuration could be achieved by organizing the school by trades or disciplines, placing student learning rooms next to instructor offices. The optimal location for teacher offices and student learning areas is close together so that kids can connect and engage with teachers (Jamieson, 2000). The building could also be properly designed to look like an actual office or business (Paglin, 2001). The student body is directly linked to their topic of study by this approach. Several VET programs also include an apprenticeship requirement. Students are thrust into the working world with the use of this instructional component. Through the apprenticeship program, kids get access to tools and equipment that their institutions might not normally provide. (Christin Cave and Alastair Blyth, 2008).

2.8.2.2 Generic spaces

Instead of emphasizing the requirement for infrastructure and technology to enable formal instructional activities in a group setting, generic spaces place more emphasis on content (Worthington, 2007; Wolff, 2002). In contrast to specialized venues, generic facilities can be used by any department or for any course and are often used for lectures, seminars, or workshops.

The modern curriculum's aims to combine traditional coursework, such essential literacy and numeracy skills, with career-specific coursework are congruent with the availability of general classroom space. Additionally, theoretical VET courses that do not necessitate having access to tools or equipment for hands-on training can be conducted here. For this academic objective, spaces may be shared by industries like cosmetology, manufacturing, and automobile. (2008) (Alastair Blyth and Christina Cave)

2.8.2.3 Informal spaces

Users can participate socially and choose their educational activities in unstructured, potentially public, informal learning environments (Worthington, 2007; Wolff, 2002). These locations can be used for a wide range of projects, encounters, and research thanks to their versatility. Due to current technology and student needs, the use of wireless devices in these contexts is becoming increasingly vital (Lonsdale, P. and G. Vavoula, 2004).

The best design for informal learning spaces incorporates instruments for learning and promotes group, collaborative, and student-centered activities. When planning facilities, open access and informal spaces are generally ignored since they are considered to be costly and useless for improving educational outcomes (Wolff, 2002). However, because informal spaces can promote a range of relationships between students, their peers, and teachers, they are encouraged by developing pedagogical theory. They can also facilitate a variety of educational activities, including both individual and group projects (Jamieson, P., J. Dane, P. Lippman, 2005)

According to Lonsdale and Vavoula, the creative and efficient structure of open access areas will ensure that space is adequately utilized and affordable (2004). Circulation zones can also be transformed into locations for social interaction and informal education. Strategic creation of pathways that direct student mobility can further integrate learning activities in a non-disruptive

way without the need for more physical space (Wolff, 2002). The design of the hallways and corridors can extend the teachings being taught as students move from class to class, stimulating more academic discussion, enhancing learning, and offering a space for a variety of activities (Lippman, 2006). These open, unstructured places could provide another purpose for infrastructural flexibility. If the structure is left flexible and open-ended, it can adjust to satisfy shifting institutional needs (Whitaker, 2002).

2.8.2.4 General considerations for studio spaces

- **Freedom and flexibility of space**

Large ventilated rooms, high ceiling, transitional areas like courtyards, open air spaces, higher degree of porosity between indoor and outdoor environment.

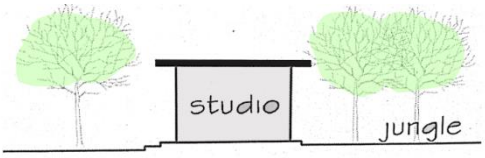


Figure 15 Freedom and Orientation

- **Visual environment**

Studios must have a lot of natural light, and high-level windows should occupy at least 25 to 30 percent of the floor area. Roof illumination is advised as well. Every window ought to have some sort of daylight control. When there isn't enough natural light, artificial light is used to highlight regions that need more attention to detail and presented images. Lighting should be designed to minimize glare, save lots of wall and ceiling space, and need little upkeep.

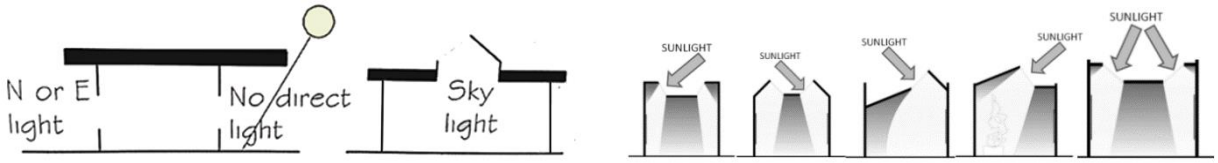


Figure 16 Visual Environment

- **Buffer zones**

It is likely that one person will be affected by a noisy workplace. So, you can create buffers by adding walls or vegetation.

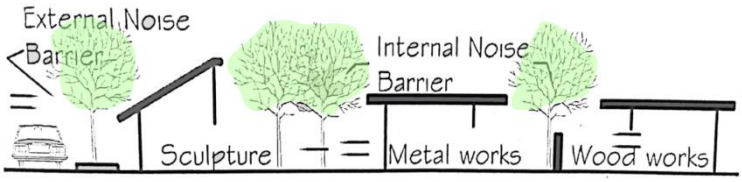


Figure 17 Buffering by green vegetation

- **Space interrelation**

The new spaces, including the studios, galleries, cafés, and outdoor spaces, should be interesting and interconnected. Long durations of isolation or alone call for interaction and a change of scenery.

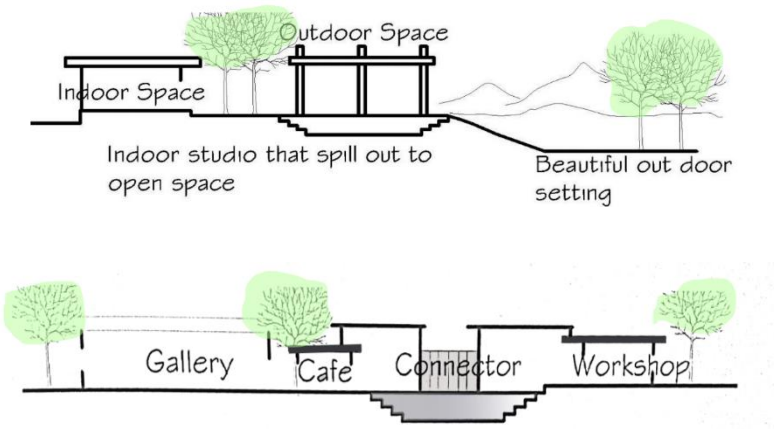


Figure 18 Interaction of work and recreational spaces

- **Locating space respective to the activities**

Spaces should be offered in accordance with functional needs. Work that necessitates large machinery or material supply should be done on the ground floor.

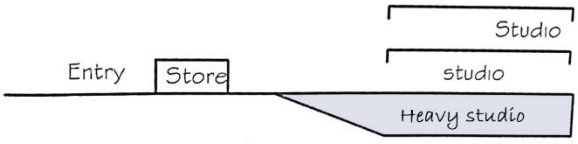


Figure 19 Function and location

2.8.2.5 Designing multifield workspace

A multifield workstation typically consists of three main areas: the workspace, which includes machine rooms and design areas; service and amenity areas like staff rooms and restrooms; and storage areas for raw materials, finished work, tools, and personal belongings. Raw materials should flow in and out seamlessly, following a carefully planned sequence from storage to the workstation to final storage. The workspace should provide comfortable working conditions, with proper lighting, thermal control, and appropriately sized furniture and fixtures. Services should be flexible and accommodating to meet the needs of all users.

2.9 Strategies for Affordable Design

2.9.1 Multiplicity and Flexibility

To keep costs down when designing for low-income communities, incorporating multipurpose spaces and lighter upper levels can help optimize space usage and reduce the need for additional structures. This also allows for greater flexibility and ease of dismantling when needed.

2.9.2 Inclusive and Participatory Design

Involving residents and users in the design and construction process can make it more affordable and sustainable by incorporating indigenous solutions and ensuring better end-user utilization.

2.9.3 Passive Sustainable Strategies

Design strategies such as solar orientation, sustainable materials, and solar energy can reduce heating and lighting costs, maintain ample lighting, and create a stable atmosphere. Using locally available materials like brick, bamboo, and wood can also make the design affordable and environmentally friendly.

2.9.4 Native Landscaping

Native landscaping can reduce irrigation needs and act as a passive energy strategy by shading the roof and windows with trees during the hottest part of the day, reducing solar heat gain inside the building.

2.9.5 Stormwater Management

Untouched sites allow rainwater to replenish the natural water table, while buildings cause rainfall to run off surfaces and into storm drains. Stormwater management strategies, like pervious pavement and retention ponds, can reduce runoff and negative environmental impact.

2.9.6 Design To Transform

The Dandora Transformation Project in Nairobi, Kenya is an example of how a simple design intervention can transform a slum community. By implementing a model street-drainage system, the area was revitalized and became economically prosperous, highlighting the importance of affordable design.

2.10 Energy Efficiency

Sustainable architecture aims to maximize energy efficiency throughout a building's life cycle, ultimately providing comfort and cost savings. Energy efficient buildings are designed to reduce the amount of energy required for heating and cooling, regardless of the equipment or energy

source used. However, structures can be made to provide thermal and visual comfort for occupants while using less energy and resources. Implementing an integrated approach to building design can have an impact on how efficiently energy resources are used in new construction. According to the document titled Energy efficiency in architecture, the main steps in this technique are:

- Incorporate solar passive approaches to building design to reduce demand on traditional systems like heating, cooling, ventilation, and lighting. Passive systems rely on natural energy transfer mechanisms and provide thermal and visual comfort, using little to no mechanical means. The design varies depending on the climate.
- Design HVAC and lighting systems that are energy-efficient (heating, ventilation, and air-conditioning) The workload placed on conventional systems (HVAC and lighting) is decreased after passive solar architectural principles have been incorporated into a design. Additionally, energy saving is made feasible by the thoughtful design of the artificial lighting and HVAC system with the use of energy-efficient tools, controls, and operational methods.
- Utilize renewable energy systems (solar water heating/photovoltaic systems) to partially power a building. By wisely using the planet's renewable resources, such as solar energy, the strain on its nonrenewable resources can be reduced. Utilizing solar energy to supply a building's electrical demands can further cut down on the use of traditional energy sources.
- Reduce the usage of high energy building materials like glass, steel, and other materials, as well as transportation energy, by using low energy building materials and construction techniques. An architect should also strive to create efficient structural designs.

In summary, an energy-efficient building balances the consumption of energy for lighting, air conditioning, and ventilation by utilizing an ideal blend of passive solar design techniques, energy-efficient machinery, and renewable energy sources. Use of low-embodied energy materials is another crucial element in the design of energy-efficient buildings.

2.11 Waterfront Development

2.11.1 Water and Waterfront

The nature of every location that water touches is profoundly shaped by this defining force. It is a characteristic that should be valued and praised rather than viewed merely as aesthetic or as a commodity. A town's waterfront is the area that is near to a body of water, like a river or the sea. It is typically the area where urban growth and water interact (Nature). Additionally, a waterfront is defined as a location that integrates land and water and has a built-in draw for tourists. It does this by linking city dwellers to the river.

2.11.2 Urban Waterfront

Urban waterfronts serve as a transitional area between the city and sea, river, and lake. The primary economic foundation of the nations is found in urban regions. They are essential to the prosperity of the nation because they provide services and jobs for the people of the nation. Urban wetland is closely related to the sustainability of urban growth and plays a vital influence in the shape and layout of cities. According to Vision 2020: Public open spaces on the waterfront can transform neighborhoods, turning inaccessible lands into vibrant community gathering areas that promote economic growth. This is according to The New York City Comprehensive Waterfront Plan, which was prepared by the Department of City Planning.

2.11.3 Elements of a Successful Waterfront

- Environmental approvals
- Function
- Authenticity
- Image and theme
- Engaging public activities
- Showcasing local identity
- Construction technology
- Financial feasibility
- Effective management

2.11.4 Principles for Successful Waterfront Development

Torre (1989) emphasized that waterfront development should cater to both human and water body needs, benefiting all stakeholders and functioning on all levels. The connection between the water and the public, as well as defining attributes that shape waterfront areas, should be considered and incorporated into the development process to maintain waterfront uses. (Bond & McDonagh, 2011)

In addition, Bertsch (2008) determined that for any use of a waterfront area, a water plan should be developed before the land plan to maintain an economically viable waterfront. Therefore, Bertsch (2008) recommended five principles that must be included while developing plans for waterfront areas and are as follows:

- **Accessibility** - waterfronts should not be isolated or separated from the development, so that the public can access the waterfront easily (convenient means for visitors to access the waterfront area).
- **Integrated** - integration of the history, culture and existing architecture is recommended for a new waterfront development.
- **Sharing benefits** - a balance between public benefit and developer profitability must be found. A public-private partnership is essential to realize the inspiration of the design.
- **Stakeholder participation** - the involvement of all of interested parties is compulsory. Government agencies, developers, community organizations, environmental groups and the public all have a stake in the development of a waterfront property and all must be involved in the process.
- **Construction phase** - breaking down a huge project into several phases and allowing all stakeholders and the general public to see this provides a vision of the future.

2.11.5 Principles for Sustainable Waterfront Development

Waterfronts are one of the most valuable resources for a country – being limited, precious and non-renewable assets. To secure long-term growth of the resource, it is important for waterfront areas to be used strategically to maintain their economic value and enhance their specific features

or image. For this reason, 10 principles are given in order to secure in achieving waterfront redevelopment projects. (Bruttomeso, 2006)

- Secure the quality of water and the environment.
- Waterfronts are part of the existing urban fabric.
- The historic identity gives character.
- Mixed-use is a priority.
- Public access is a prerequisite.
- Planning in public-private partnerships speeds the process.
- Public participation is an element of sustainability.
- Waterfronts are long term projects.
- Revitalization is an ongoing process.
- Waterfronts profit from international networking.

2.12 Activity Centers for Children

Factors contributing to betterment of activity center for children

- **A Place to Realize Opportunities**

Young people want places where they can discover talents, develop skills and display their abilities. Their centers should act as a route to further education and work, providing them with guidance and training.

- **Accessibility and Inclusivity**

It is important to clients that their activity centers are open to people of all ages, genders, ethnicities and abilities. There should be extended opening hours and wheelchair access throughout.

- **Communicating a Positive Image**

Young people are keen for the local community to know about the positive activities going on in their youth center. Design is one way to communicate this, such as creating a shop window or a ‘street’ through the building, allowing people to see what goes on inside.

- **Location and Visibility**

Young people want their activity centers to be highly visible. Youths want their activities to be the heart of the community

- **Flexible Spaces**

Children tend to love to use spaces that don't dictate them, rather spaces that they can explore

- **Dedicated Spaces**

Spaces dedicated concrete activities help in learning certain skillset

- **Outdoor Spaces**

Outdoor spaces are the playground of children where they socialize, communicative skills.

2.13 Summary of Findings

With completion on the research on social development center, basic findings of the research have been tabulated below:

Table 1 Summary of findings of literature review

Findings	Remarks
Slums are a growing problem worldwide	Squatter prevail more than slums in Kathmandu
University settlements have proven to be a viable option for slum rehabilitation	Relocation regeneration or rehabilitation are the options for the squatters and relocation has not proven to be a good solution
Regeneration projects empower the squatters and make them self sufficient	This approach helps people to be socially responsible and educated
Strategies to solve the problem includes: • Social development through activity centers • Vocational and training centers	Development of social development center is a new concept in the nation and can work as a base for such future development centers

Placemaking as a tool for urban regeneration	The urban poor are in more need of public space for interaction which can be achieved through placemaking.
Strategies for affordable design: • Open spaces design • Flexibility and multiplicity • Inclusive participatory design • Designing to transform • Energy efficiency	These strategies help create affordable long-term solutions for affordability keeping in mind the interest and dynamism in spaces
Riverfront as a n active agent to regenerate the community	The urban poor rarely get to enjoy good open spaces and this can be a chance to develop such setting

The objective of the literature review was to understand how a social development center would work, what kinds of interactive spaces would be necessary for socializing, how architecture could create better learning spaces for trainees, what spaces would be suitable for the poor, to understand context, challenges, needs, issues and strategies of a social development center. Below are the attributes that have been extracted from the learnings of literature review to understand the context and architecture:

Table 2 Architectural attributes

Architectural expression	
Visual expression	• Aesthetics • Form and space • Light • Scale
Functional expression	• Form • Perception • Flexibility • Mixed use
Symbolic expression	• Dynamic functions • Imitation • Colors • Icons

3 CASETUDIES

3.1 Study of the Balkhu, Bansighat and Thapathali squatter area

The utopian idea of designing through literature review and case studies only for the actual people was not going to produce a favorable outcome. Without understanding the problems what the people on the ground were facing and what could be the possible solution through a local approach, the design would only be limited to papers. So, the approach taken was the simultaneous study of literature review as well as the site so as to understand 'Ground Reality' of what problems actually exist on the site and research on similar problems and solutions. Following are the observations:

- **Employment**
    - Many residents work in construction especially male and female work as household worker
    - Small roadside shop cart, grocery shop and small restaurants were seen in the community
    - Tailoring workshops launched towards the idle population but ineffective output due to lack of investment.
    - Few of the household had someone working abroad either in Gulf countries
    - Mahut community who were mostly working as beggars or rag picker and the women had to adhere to certain cultural barrier and had the least economic stability.

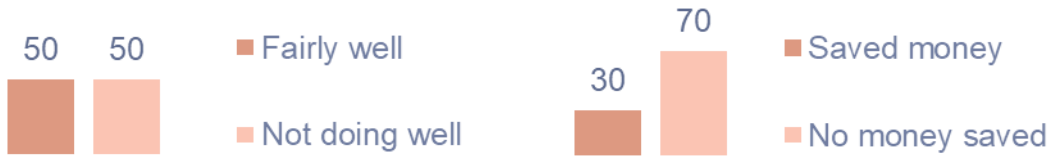


Figure 20 Graph showing economic condition of the Urban poor of Kathmandu

Source: Author observation

- **Social and Cultural Structure**
    - Display of discrimination and segregation even amongst themselves
    - Only few people with darker complexion seemed to have been a part of an informal meeting being held i.e people from the Mahut community from terai
    - Mahuts prevented females from joining social, economic and other activities
    - Females: Breadwinners of the family except for some terai families

- Males: Half of the males were the breadwinners while the other half were socially irresponsible towards the family.
- Community leaders were chosen by political parties on the basis of seniority
- Leaders were committed for the betterment of the community

- **Education**

  - Almost all kids were going to school which were being funded thorough different organizations.
  - The children of some of the Mahut families did not seem to attend the school as most of them worked as rag collector or beg in the street to earn their living.
  - Instances of studying hard and achieving good levels of education were also found.
  - Most kids were involved in after-school that were also launched by various Christian organizations or by nonprofit organizations.

3.1.1 Psychology of the Poor

From the observations made during the site study and images of cognitive mapping by Ar.Angela Subedi during her thesis, which have been attached in the annex, though their analysis some conclusions can be drawn as

- Poor people tend to live a social life with multiple social interactions between the users during morning and the evening
- They tend to form small social groups with similar intentions and characteristics mainly caste.
- The children and people become be happy when they see colors as the built form doesn't normally expose any colors in their settlements
- From the cognitive mapping it can be analyzed that the poor have a sense of belongingness to structures that are of lower height and smaller massing as none of the drawings had tall buildings.
- They are very much connected to their streets as this was where most of the kids spent their time growing up.

3.1.2 Questionnaire Survey

After an initial observation, and knowledge on what to focus on a questionnaire survey was conducted which has been attached to the annex, to understand if a social development center was necessary and what kind of functions it should have and if those functions if provided could or not cater to solve the existing problem of the urban poor. The results are tabulated in graphical form below and also to explore the idea of an ideal space for the poor urban dwellers where they could dwell, socialize, interact and learn.

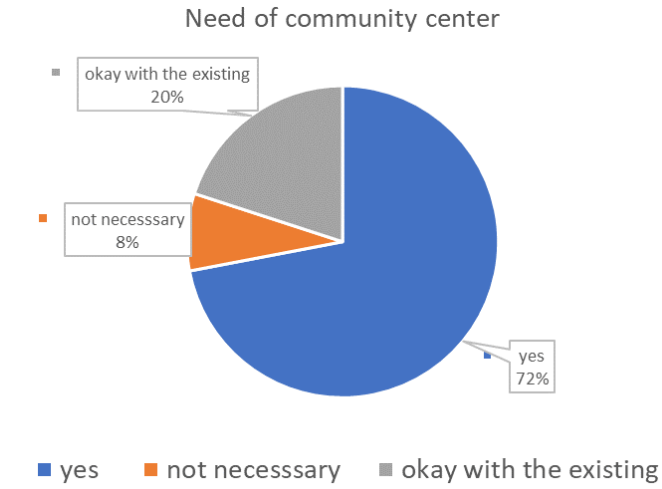


Figure 22 Necessity of a community center

Source: Questionnaire survey

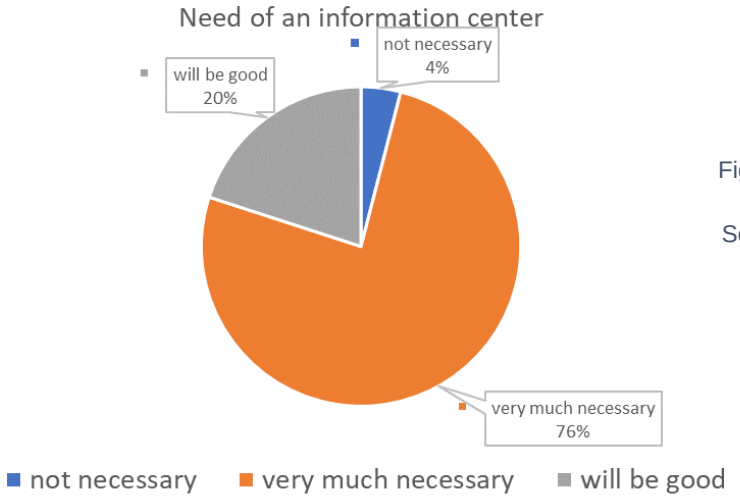


Figure 21 Necessity of an information center

Source: Questionnaire survey

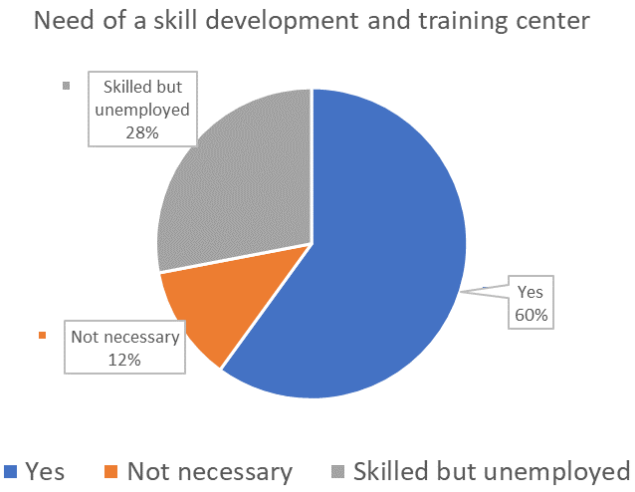


Figure 24 Necessity of skill development center

Source: Questionnaire survey

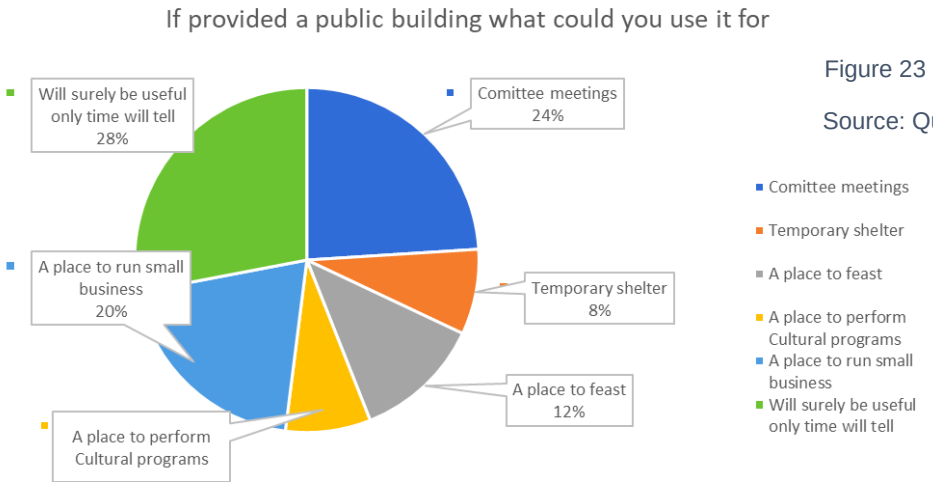


Figure 23 Public building use

Source: Questionnaire survey

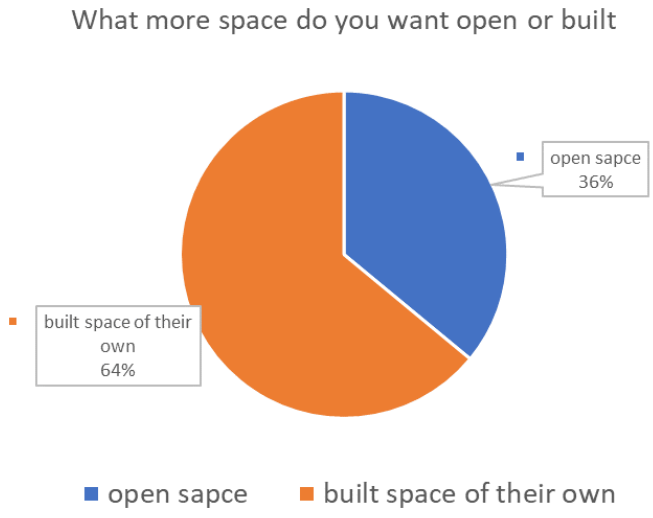


Figure 25 open space vs-built space

Source: Questionnaire survey

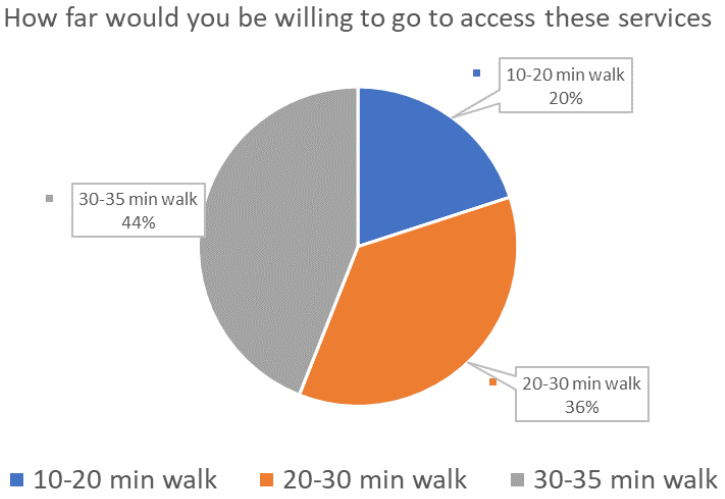


Figure 28 Walking distance analysis

Source: Questionnaire survey

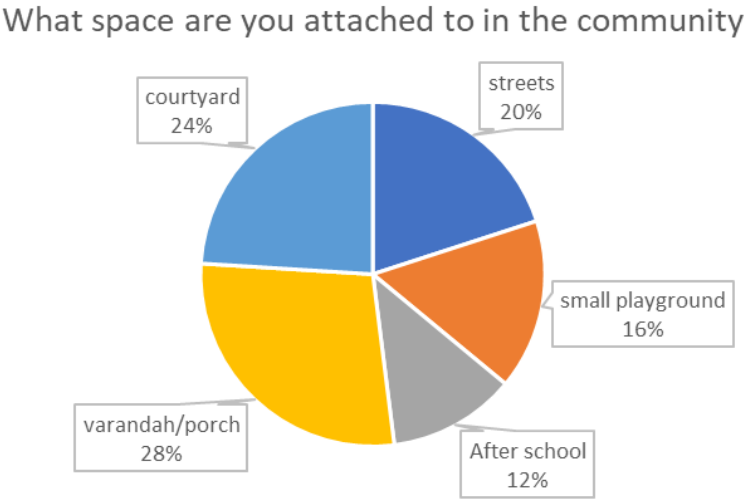


Figure 27 Space attachment to the residents

Source: Questionnaire survey

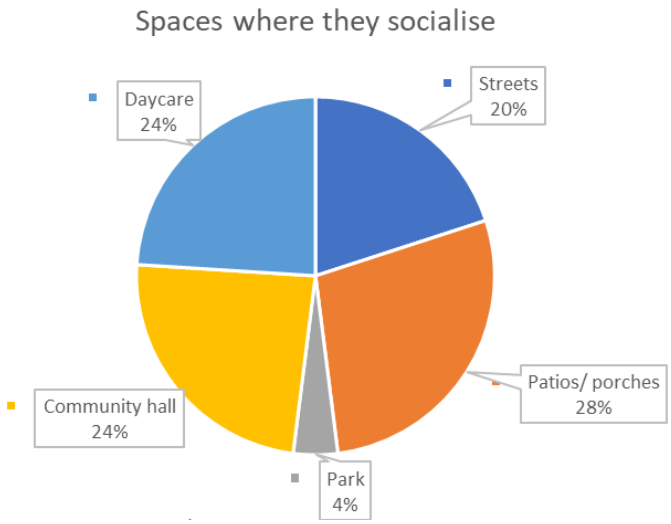


Figure 26 Socializing Space

Source: Questionnaire survey

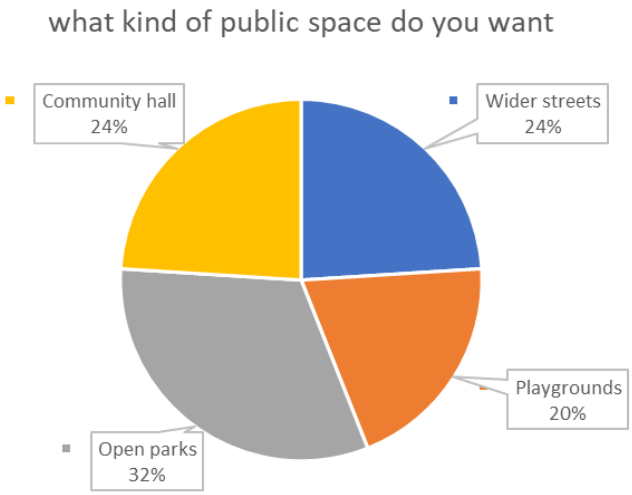


Figure 31 Type of public space people want

Source: Questionnaire survey

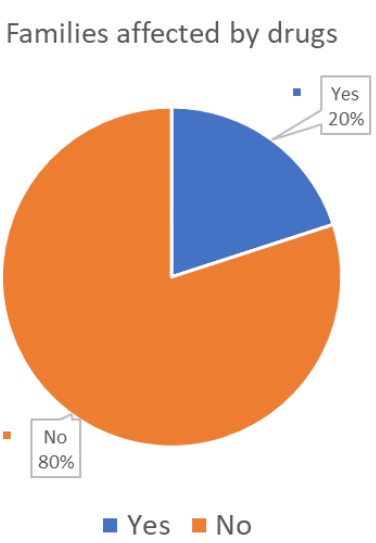


Figure 30 Drug addiction

Source: Questionnaire survey

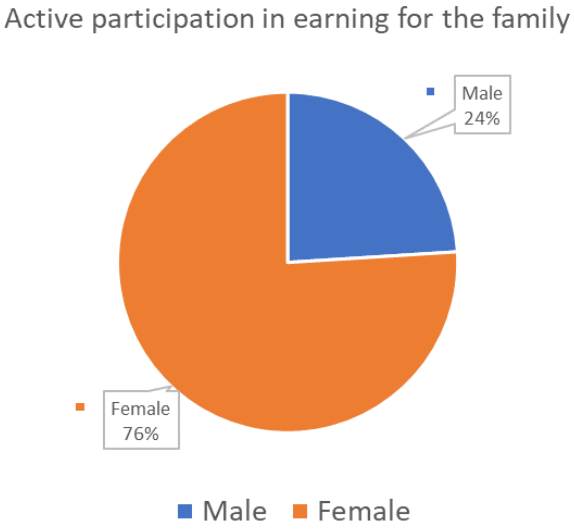


Figure 30 Earning heads of the family

Source: Questionnaire survey

Table 3 Inferences from survey

Inferences drawn	
Observed issues	• Lack of open spaces • Lack of moral education • A probable site for women empowerment • Addiction • Diminishing cultural identity • Lack of knowledge regarding services, grants, trainings and so on • Lack of capital • Housing insecurity • Unsustainable material use
Design factors	• Inclusivity • Reflection of their sense of place • Self-sustenance • Flexibility • Socializing spaces • Recreational spaces • Learning spaces • Versatile planning

Major findings of the questionnaire survey are as follows

- Need of training centers
- Women education and financial education
- Daycare and afterschool for children
- Information resource center/ counselling
- Community shelters
- Open space for socialization
- Spaces for sports and recreation

Based on these findings' studies were done of similar cases that would contribute to making a social development center.

3.2 UVA, EL Paraiso

Overview

Location: San Antonio De Prado, Colombia

Area: 4000 Sq. m.

Figure 32 UVA aerial view

Source: https://www.archdaily.com/782851/uva-el-paraiso-edu-empresa-de-desarrollo-urbano-de-medellin

Selection criteria: An urban transformation project in poor urban part of San Antonio changed the neighborhood of the Medelin which is intended for public meetings, culture and community participation, recreation and sports by recycling existing and unused spaces and creating spaces for all senses to enjoy.

3.2.1 Introduction

The UVA (articulated life unit) "The Paradise" is a sports complex with recreational and cultural amenities. It was designed as a neighborhood club and is located in one of Medellin's most developed neighborhoods. This location was chosen in response to the consolidation of a strategic project involving urban centralities that was connected by. The San Antonio de Prado Park-library and La Cabuyala Creek serve as environmental axes and as existing cultural institutions, respectively. A rural town that is expanding its housing stock has a strong need for cultural events, music, and sports.

The idea for this project originated from community participatory design, which involves the creation of ideas and imaginaries by a group of people with the citizen as the main character. These methodologies enriched the design with proposals for spaces for extreme sports and cultural activities like music disclosure and dancing, creating a sense of community, ownership, and sustainability.

The architectural program for this building is divided into four volumes that revolve around a converted soccer field that serves as the central hub connecting all of the programs. This precise distribution is done out of respect for the preservation of several trees of significant natural value and two creeks that run through the lot. An expansive public terrace that incorporates the soccer field as the main stage stretches from the existing urbanization platform.

Figure 33 Masterplan

Source: https://www.archdaily.com/782851/uva-el-paraiso-edu-empresa-de-desarrollo-urbano-de-medellin

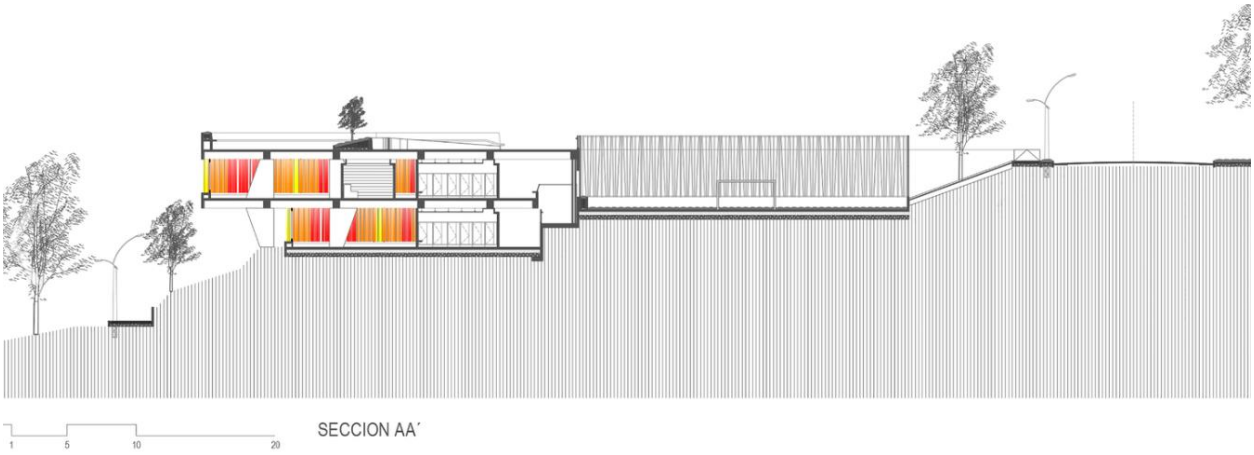


Figure 34 Section

Source: https://www.archdaily.com/782851/uva-el-paraiso-edu-empresa-de-desarrollo-urbano-de-medellin

Due to the lack of available land for the new generation of public spaces and facilities in Medellin, we were forced to create buildings that double as parks, maximizing the opportunity for citizen interaction. Because of our location, these covers make ideal city balconies, and in UVA's case, they host the community's expressed desires for a variety of activities that enliven urban life and its surroundings, including an outdoor gym, skate park, playground, community events square, and an interactive water feature that is a 100% effective and accessible public space.

The community is offered services for a variety of recreational pursuits and training, music

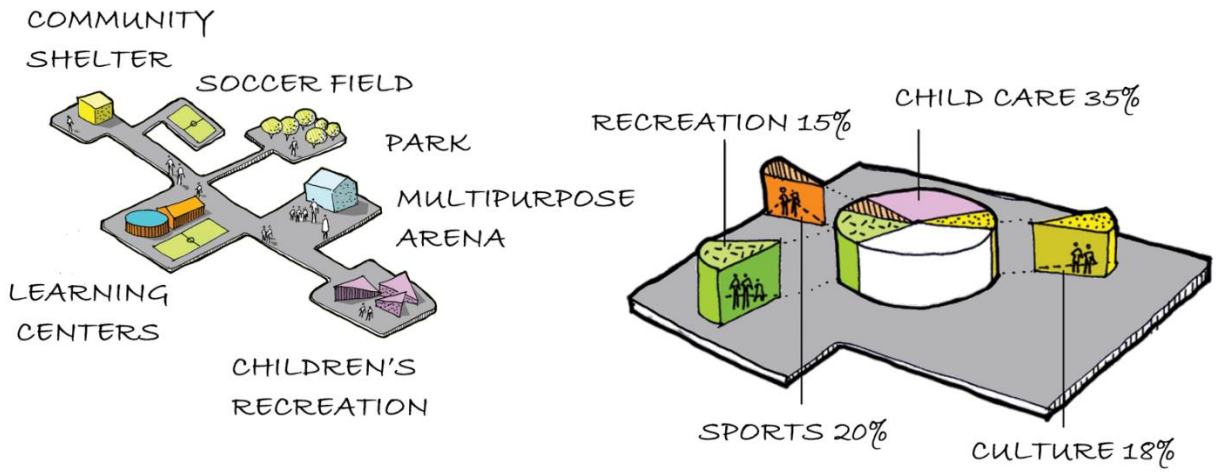


Figure 35 Function distribution

Source: https://www.archdaily.com/782851/uva-el-paraiso-edu-empresa-de-desarrollo-urbano-de-medellin

rehearsal spaces, recording studios, sports centers, gyms, auditoriums, dance studios, and synthetic turf soccer fields that serve as event backdrops. It is in a concrete structure that is in plain sight. The facade is made up of a number of vertical brises in warm hues that the community chose, and these brises themselves are a part of the structure's bioclimatic sun protection approach.

3.2.2 Analysis

Table 4 UVA- analysis

Physical accessibility	• Region for public interaction, entertainment and recreation • Set in an urban area
Visual accessibility	• Open without boundary walls • Located as a landmark
Inclusivity	• Inclusive to all age groups and members of the society

	• Universally accessible
Flexibility	• Spatial layering and fluidity throughout built form • Dynamic and participatory place
Interaction	• Linear routes with programs on each sides allowing visual interaction at all times • Interactive built form • Spaces for both active and passive interaction • Clustered spaces at every level
Visual expression	• Multiple volumes that merge with the landscape • Architecture resembling cheerfulness • Use of colorful exterior and interiors
Symbolic expression	• Stands as a symbol of regeneration of Medelin community • Central void space expresses cohesion

3.2.3 Inferences Drawn

The context and intent of the social development center are in sync with the UVA Project so the architectural responses and expression are of special interest like the spatial organization, open public terraces.

3.3 Gennevilliers Training Center

Overview

Location: Gennevilliers, France

Area: 7800 Sq. m.

Project type: Recreation and training

Selection criteria: To study the spaces that favor learning and training and to understand spatial and organization of functions in training centers.

Figure 36 Architectural expression

Source:https://www.archdaily.com/384968/gennevilliers-training-center-atelier-d-architecture-brenac-

3.3.1 Introduction

Like any training facility, this one offer both more general education and vocational instruction focusing on carpentry, woodworking, and elevator maintenance. Because this is also the institution's metaphorical foundation, vocational training is located at the base of the structure. In order to build comfortable, well-lit, useful, and welcoming work spaces, we sought to keep in mind the wellness of its users—administrative staff, instructors, and students. We may present a positive image of the institution and of vocational training as a whole by using the spacious lobby as an official reception and exhibition area.

Through a sizable pane of glass, this foyer is visible from the exterior concourse and offers a view of its vibrant double-height interior. The eastern block has been carved out to create a porch that directs guests to the entrance and caretaker's office. Students moving up or down from the cloakrooms, classrooms, and workshops are orchestrated by the enormous grandeur of the foyer and the large central staircase.

The cloakrooms, which open onto a mezzanine with a view of the double-height workshops, are located on an intermediate level that is reached by a first flight of stairs. The resource center and library are also accessible from this landing, which is situated at a key intersection. The administrative offices, the recreation area, the sports hall, and several regular rooms are all accessible from the second landing. The institution's symbolic center, the workshop where elevator repair is taught, is situated at the "western block's" northernmost point.

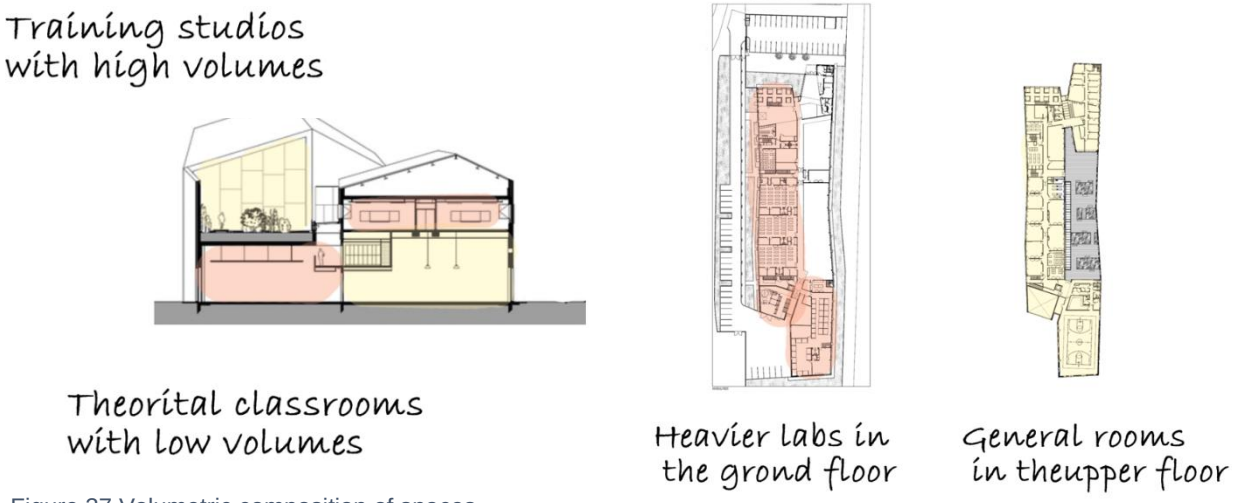
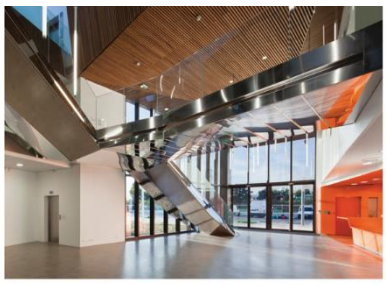


Figure 37 Volumetric composition of spaces

Source:https://www.archdaily.com/384968/gennevilliers-training-center-atelier-d-architecture-brenac-gonzalez



Foyer used as exhibition area

Spillout areas for training spaces

Open lobbies that favour interactions

Figure 38 volume and function relation

Source:https://www.archdaily.com/384968/gennevilliers-training-center-atelier-d-architecture-brenac-gonzalez

The glass building allows visitors to observe students and moving elevators. The first-floor entrance and central gangway lead to the recreation area. A soundproof wall along the railroad lines shields the center from outside sounds. Expansion is possible using unoccupied space.

3.3.2 Analysis

Table 5 GTC- analysis

Physical accessibility	• Accessible to the users • Set in an urban area
Visual accessibility	• Prominent visual accessibility • Stands out in the surrounding
Inclusivity	• Universally accessible
Flexibility	• Interconnectedness in spaces makes the space flexible • Large bulky spaces allow flexibility
Interaction	• Connected routes allowing visual interaction at all times • Interactive built form • Spaces for both active and passive interaction
Visual expression	• Volume cutouts create visually pleasing space • Architecture resembling the native architecture of sloped roof and brick facade • Use of vibrant color of brick in exterior and subtle calming colors in the interior.

3.3.3 Inferences

Spatial planning

- A large foyer that makes the environment well-lit and makes the space welcoming
- Volumetric removal of a portion of block to emphasize the entrance
- Ground level- workshops
- Upper levels research centers, library administration and sports
- Insulated walls to insulate sound from one workspace to another

3.4 Grotao Community Center

Overview

Location: Sao Paulo

Area: 4400 Sq. m.

Project type: Civic hub

Figure 39 GCC in an urban context

Source:https://uttdesign.com/archive/buildings/fabrica-de-cultura-grotao

Selection criteria: Combining top down and bottom-up approach, the project was aimed to equip neighborhood with physical infrastructure, social infrastructure like safety, culture, public space, sports and translate society's need for access to housing, employment services and resources into spatial solutions.

3.4.1 Introduction

The challenging topography and informal settlements of Grotao, Sao Paulo is transformed into a productive zone and dynamic public space through social design – a process of analyzing the local effects of rapid growth and improving marginalized settlements through social structures that manifested into a multifunctional public building. The music factory which stacks various projects to optimize the site's potential, is located in the bottom zone. Public transportation, athletic facilities, and the music school, which offers practice and rehearsal areas, studios, a performance hall, and auxiliary classes, are some of these. This serves as a significant catalyst in the community, bringing music and cultural programs into the favela and creating a new network that caters to

young people from all walks of life. For those relocated from the high-risk locations, new replacement dwellings will be located on the upper level. On the first level, commercial spaces are added as a means of generating income, enlivening the neighborhood's streets and boosting the urban farm's local microeconomy.

Prominent features of the project

- The new terrace system combines necessary physical infrastructure with social infrastructure, providing space for flexible and adaptable programs
- The ramp system moves through the site creating public accessibility from the top to bottom and throughout the space and building.
- The wetland system provides a passive filtration system for water re-use on-site
- The fábrica de música serves as a music and performing arts school.
- The school and landscape work as one building

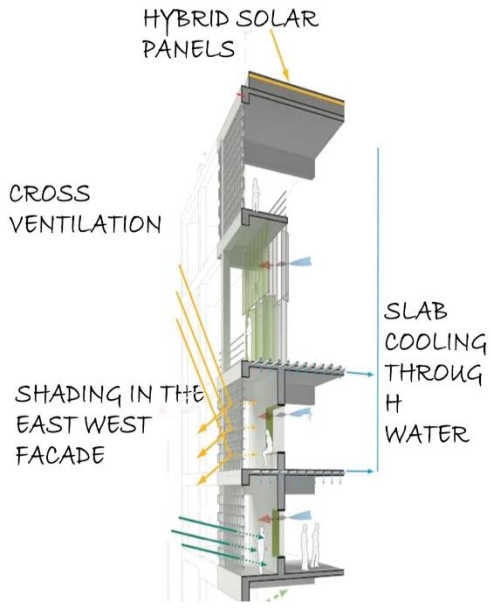


Figure 41 Passice solar techniques

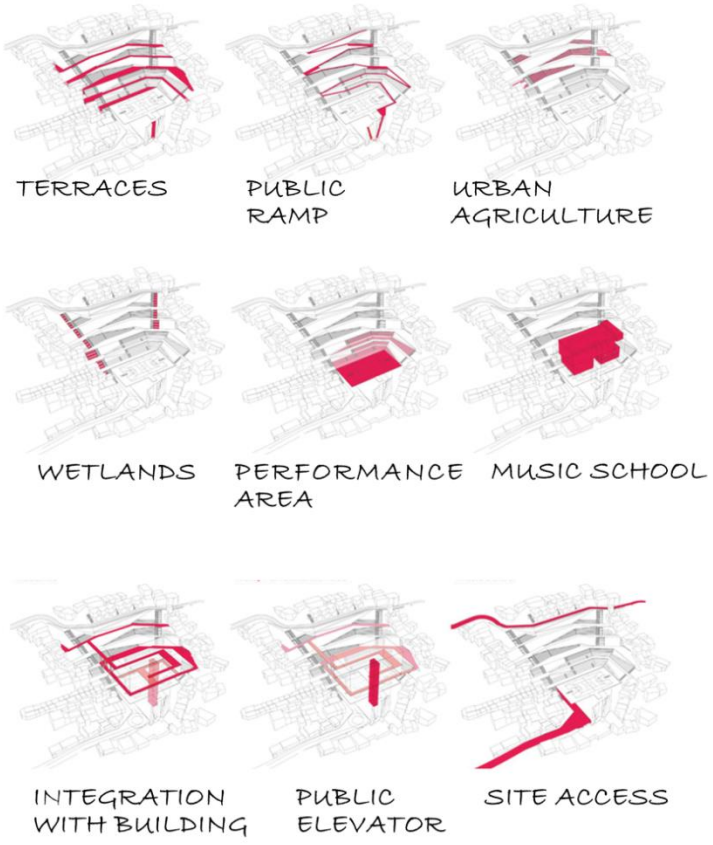
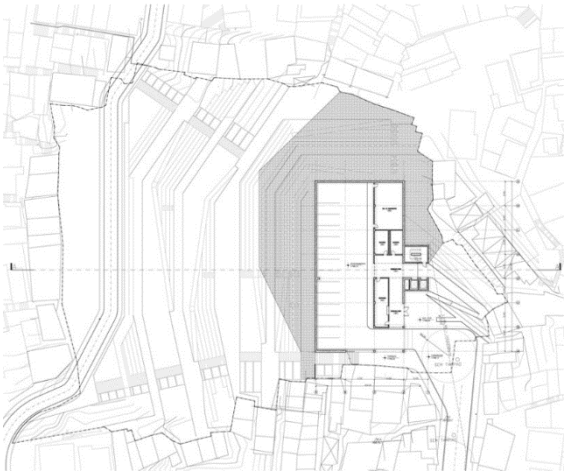


Figure 41 Layers of activities

Source:https://uttdesign.com/archive/buildings/fabrica-de-cultura-grotao



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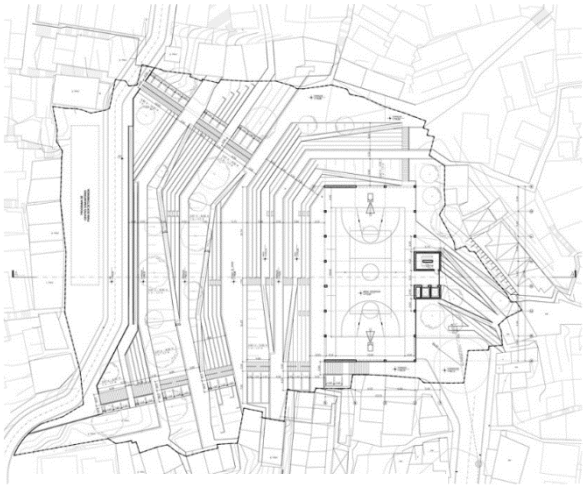

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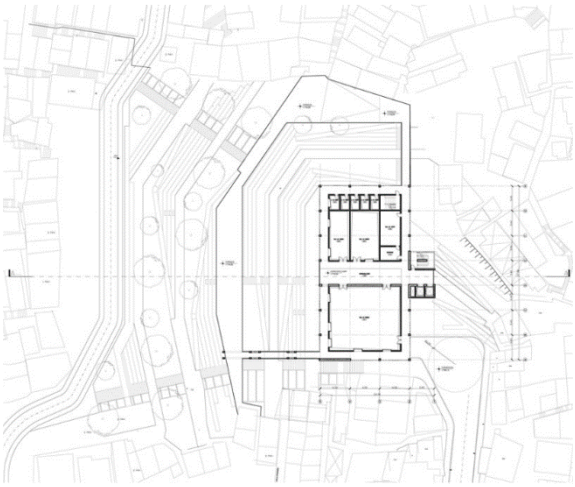
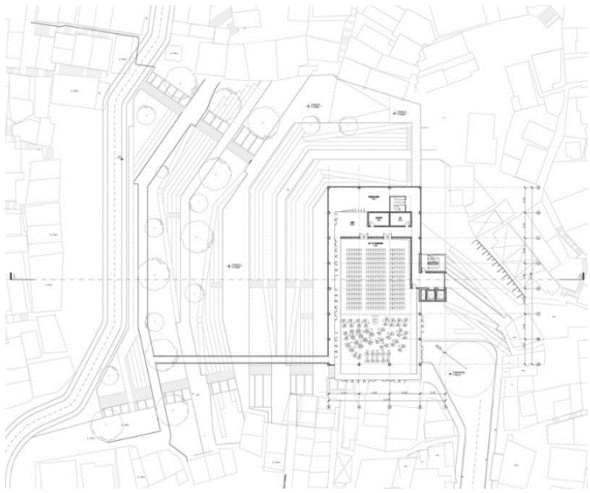


LVL 2



LVL 3

3.4.2 Analysis

Physical accessibility	• Region for public interaction, entertainment and recreation • Set in an favella, the project arose for physical accessibility to the zone
Visual accessibility	• Open without boundary walls • stands as a landmark
Inclusivity	• Inclusive to all age groups and members of the society • Universally accessible using contours to the advantage

Flexibility	• The exterior structure is rigid but the interior is filled with ample large space that allows flexibility • Dynamic and participatory place
Interaction	• Routes connect the exterior contours to various levels of the building fostering interactive spaces throughout the built form • The landscape once unused is turned into a space for multifunctionality • Spaces for both active and passive interaction
Visual expression	• A building that stands out from the urban scape in terms of material, scale and visual representation • Architecture resembling cohesiveness
Symbolic expression	• Stands as a symbol of regeneration for the Grotao Community

3.4.3 Inferences

- Integrate the available public spaces as a part of the building to enliven the community and social interaction
- considerations regarding sustainability in buildings
- respond to topography and landform
- Use both top down and bottom-up approach to design for the community

3.5 Hamilton Grange Teen Center

Overview

Location: New York, USA

Area: 410 Sq. m.

Project type: Children's center

Selection criteria: To study what spaces favor in learning spaces for children and what spaces children love to grow.

3.5.1 Introduction

This space provided by the Hamilton grange teen center challenges library norms to provide a more open, socially-instigating environment that attracts and engages neighborhood youth. The different types of spaces that have been experimented in this center are

- interactive gaming program and spaces around it
- reading lounge, study niche, chat niches
- common lounge, book stacks
- bamboo bleacher providing access to the exterior
- group seating area

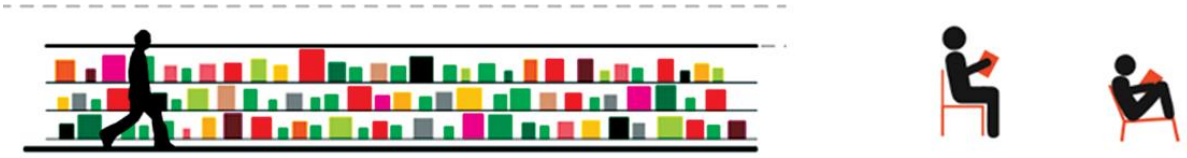


Figure 42 Creating interactive atmosphere for kids

Source:https://www.archdaily.com/233607/hamilton-grange-teen-center-ricelipka-architects

Figure 43 Plan showing multiple spaces

Source:https://www.archdaily.com/233607/hamilton-grange-teen-center-ricelipka-architects

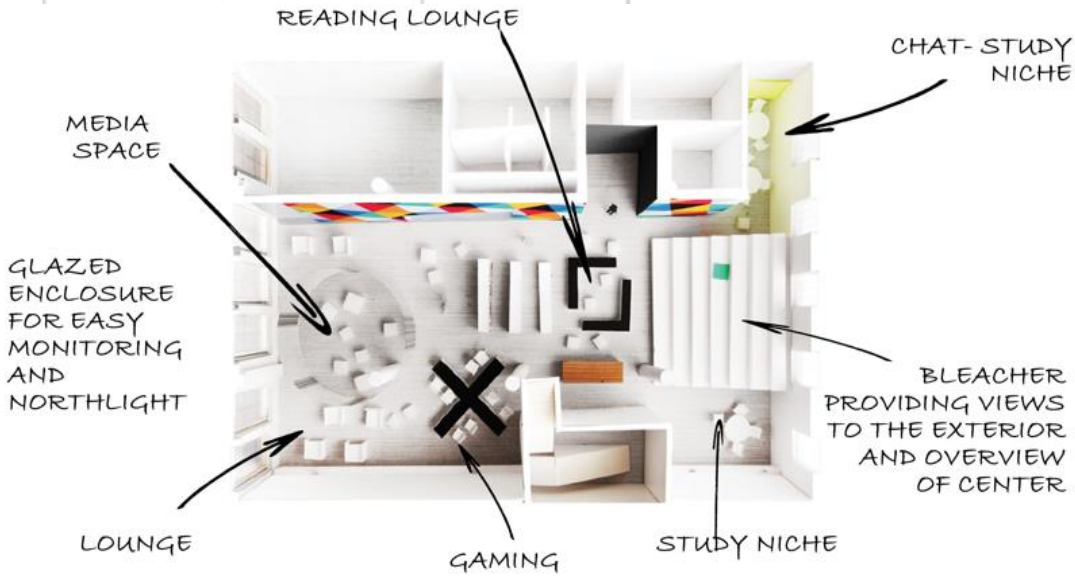


Figure 44 Naturally lit multiple interactive zone that nurtures small groups of socialization

Source:https://www.archdaily.com/233607/hamilton-grange-teen-center-ricelipka-

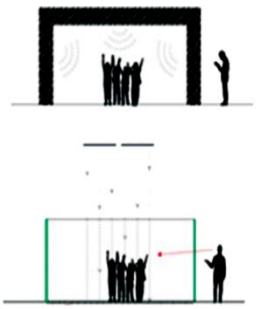
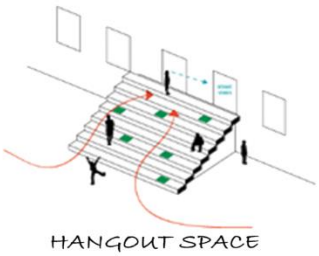


Figure 45 Transparency and interactivity



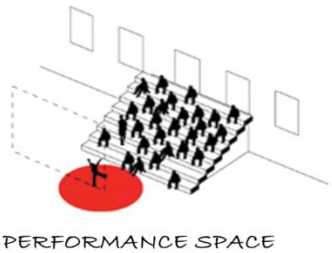


Figure 46 Multiplicity

Source:https://www.archdaily.com/233607/hamilton-grange-

3.6 Mandala Street

Overview

Location: Thamel, Kathmandu

Project type: commercial street

Selection criteria: To study what kind of spaces favors market areas and enlivens streets

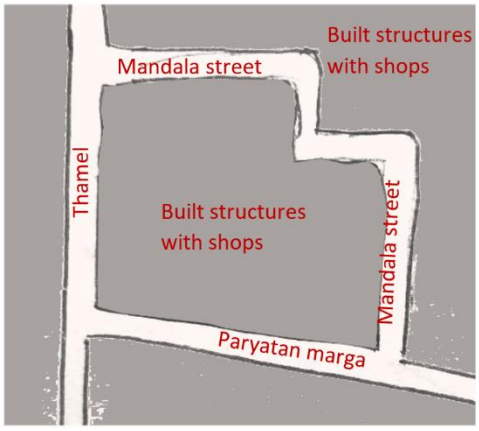


Figure 47 Mandala street

3.6.1 Introduction

Thamel is one of those areas that you would not like if you were to live there daily. The tourist area is congested and filled with expensive giftshops and trekking supplies and a nightmare of traffic. Mandala street is a side street in Thamel linking two of the main roads that form Thamel. Fifteen years ago, mandala street was the same; crowded streets, rampant motorbikes, cars and cows. The red stone building was falling apart. But about a decade ago, the street was completely restored and built by private investors. Unlike how other streets were being built back then, this street was built contemporary fashion respecting the traditional architecture of the vicinity.

3.6.2 Surroundings

The site is located in the busiest and most touristic place of Kathmandu; Thamel. As during the hippie era most tourists would spend most of their days here, the surrounding area can be regarded as the hotspot for tourism inside Kathmandu valley. The streets of Thamel is characterized by narrow crowded alleys with various shops and vendors. Commonly sold good s include food, trekking gear, handicrafts, souvenirs. Travel agencies, small groceries, budget hotels, restaurants, pubs and clubs can be observed around the area.

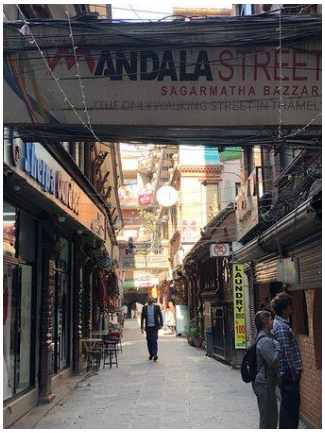


Figure 48 Entry to mandala street

3.6.3 Description

Mandala Street is a constrained street in Thamel that has been restricted to pedestrian traffic. The roadway runs in a zigzag pattern, is just about 12 feet wide, and turns right at each intersection.

The width of the street changes with the twists, but it resembles a small neighborhood market like those in Ashan. Everyone has physical and visual access to the road. It is used to connect with the stores that are located adjacent to the road and to access buildings. A wide range of businesses on the ground floor welcome guests inside their spaces for interaction. These included stores that offered handcrafted goods, pashminas, beverages, cafés, clothing, bags, and atm booths, as well as hotels and bakeries.

The roadway has warm, welcoming stone paving that evokes the impression of traditional squares. The street is made livelier by the café and the stores together with the seating areas. The street provides food and drink options, as well as a variety of pedestrian activities like sitting, buying, selling, and walking.

The structures adjacent to the street are made of reinforced concrete and have traditional facade elements like brick, brick cornices, wooden struts, etc. Their ground floors are exposed to the street and are permeable. The chamfered walls at the street corner serve as a good reaction to space making in the street and bridge connections between buildings assisted in connecting the upper levels of the structures. Additionally, they produced a pleasant atmosphere in the roadway and offered shade from the sun throughout the summer. This street was made more attractive and vibrant by the addition of greenery, vibrant colors, and ambient lighting, catching the attention of passersby.

3.6.4 Visual Analysis

Figure 53 Pedestrian friendly streets

Figure 52 Street being used as gathering space

Figure 50 Chamfered corner at the turning making the street more spacious and walkable

Figure 51 Natural greenery adding to vibrancy of the street

Figure 54 Night view of the vibrant street

Figure 49 Bridge joining upper levels making space more public, interesting and vibrant

Figure 55 Street respecting the traditional streetscape which in turn makes it more inviting to the visitors

Figure 56 Extension of shops into the streets making the street porous

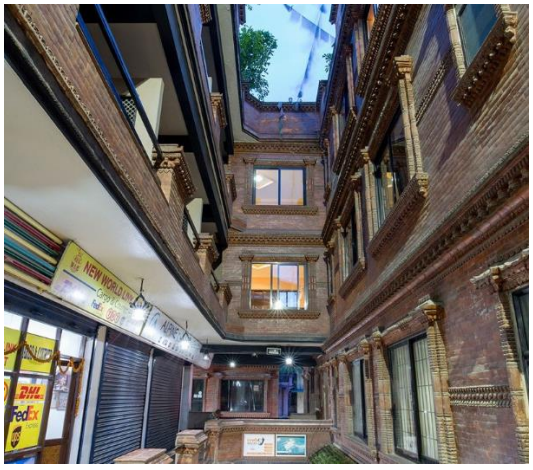


Figure 58 Narrow alleyways built in proportion to the tradition streets

Figure 57 Variety of shops Creating a unique experience

3.6.5 Inferences

- Visual accessibility is an essence in public space
- Multiplicity increases vibrancy
- permeability increases chance of interaction
- variation in functions makes the space more public
- a sense of place can be created through reflection of architectural elements

3.7 Manav Sadhna

Overview

Location: Ahmedabad, India

Area: 1100 Sq. m.

Project type: Children's center

Selection criteria: A regional contextual case study of an activity center that serves as school, vocational training center and healthcare for urban poor Ramdev Pir Tekra settlement, which is the largest slum in Ahmedabad with secluded castes from Gujrat and potter families of Rajasthan. the area confronts issues of health, illiteracy, poverty, crime.

3.7.1 Introduction

In 1990 a team of young volunteers inspired by Gandhian values began gathering under the branches of a tree in Gandhi ashram every Saturday to play with three children they provided children with a nutritional Neil and taught them about basic hygiene by cutting their nails and bathing them. The center is amongst the best examples of architecture mixing with functionality in such an under-size piece of land. The center was established to serve the underprivileged by seeing the God in every individual where services transferred to worship. The center targeted mainly the slum children. The project was based on three main concepts:

- Nonpolluting environment
- Economic empowerment
- Affordable built forms

The activity center sustained through multiplicity of use. Informal schools were launched in the morning, vocational skills and training centers in the afternoon, community center with sports, leisure, gymnastics and social gatherings in the evening.

Some services that the center provided are

- Dormitory for the school children
- meditation unit

- creche for looking after children
- multipurpose halls for dancing, painting, art
- medical consultations
- computer literacy value-based learnings
- adolescents' program
- elderly care
- health, hygiene awareness and health camps

3.7.2 Design Strategies Used in the Project

Figure 60 Central court shaded throughout the day is used for sports activities and other interactions

Source:https://www.re-thinkingthefuture.com/architecture/housing/manav-sadhna-by-vatin-pandya/

Figure 59 Semicovered extended plinths act as spaces to carry out nonformal activities. these spaces act as spillout spaces that gives opportunity to extend the function and make space more open.

Source:https://www.re-thinkingthefuture.com/architecture/housing/manav-sadhna-by-vatin-pandya/

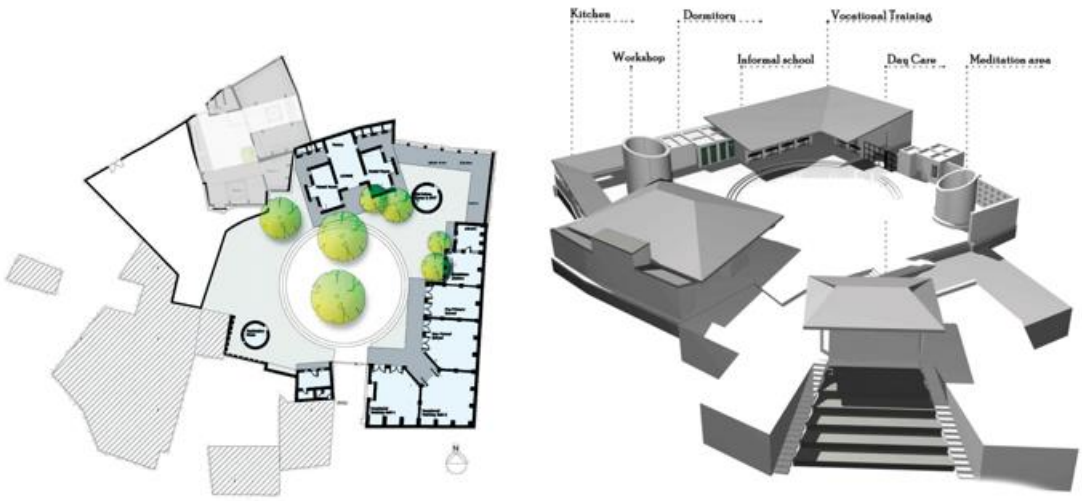


Figure 62 Spatial organization and volumetric organization
Source:https://www.re-thinkingthefuture.com/architecture/housing/manav-sadhna-by-vatin-pandya/

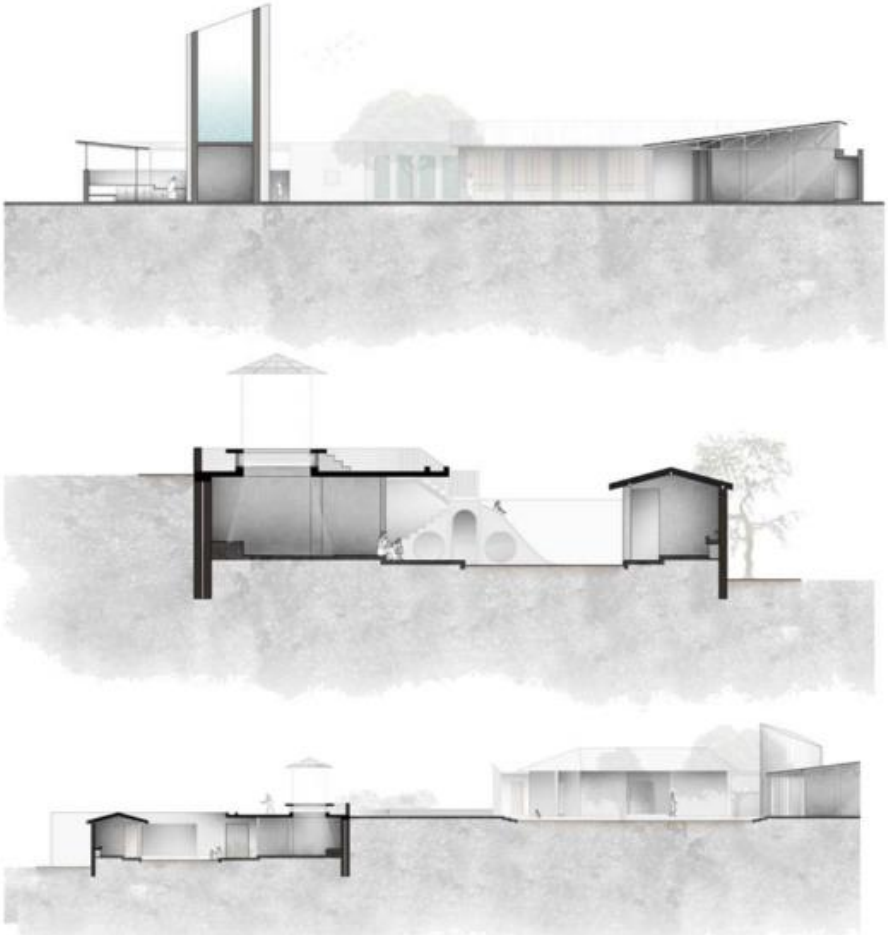


Figure 61 Sections

Source:https://www.re-thinkingthefuture.com/architecture/housing/manav-sadhna-by-vatin-pandya/

3.7.3 Strategies Used for Affordability

The center was constructed as a live demonstration of the use of recycled waste as affordable, aesthetic-looking, and efficient building components. The products are prepared using basic hand tools and produced together with the assistance of end users which are displayed in walls roof slabs, doors, and windows.

- **Affordable Wall Techniques**
    - Cement bonded flash bricks
    - Mold compressed bricks
    - Stabilized soil bricks
    - Rammed earth
    - Recycled glass/ plastic bottles
    - Vegetable crate wooden paneling.
- **Affordable floor and roof slabs**
    - Filler slabs with glass bottles
    - With plastic bottles and brick
    - Stone slab
    - Pipe truss with GI sheet
    - Particle board with clay tile cover
- **Door paneling**
    - Shredded packaging wrapper
    - Coated paper waste management

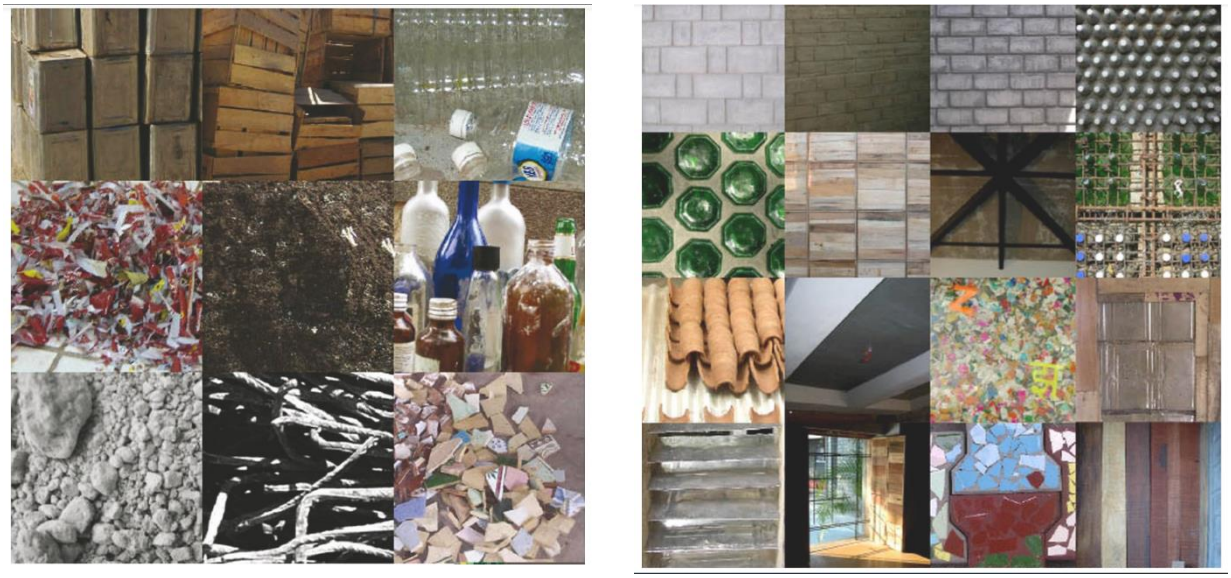


Figure 63 From household waste to architectural Elements
Source:https://www.re-thinkingthefuture.com/architecture/housing/manav-sadhna-by-vatin-pandya/

3.7.4 Inferences

- Use of locally available material to create architecture that the users can relate to
- The project came to fruition as a participatory approach and has had positive review from its users. this shows how important it is to work from the ground up
- Proves how a simple design can improve quality of space and life of people

3.8 Sanothimi Training Institute

Overview

Location: Sanothimi, Bhaktapur

Project type: Training Center

Selection criteria: A contextual case study to understand the present context of training institutes in Nepal.

Figure 64 STTI
Source:https://www.facebook.com/profile.php?id=1000576491

3.8.1 Introduction

An independent subsidiary organization of UCEP Nepal, Sano Thimi Technical School (STTS) was founded in 1983 and is the first technical school of its sort in Nepal. In ten various trades, it has been offering short- and long-term courses that are specifically tailored to the market. It is closely related to the corresponding industries and workshops. In each program, the school has been emphasizing a competency-based curriculum that is more than 80% practical. Activities that boost confidence include life skill and soft skill sessions, motivational workshops, exposure trips, basic computer literacy classes, sports, and training-related activities. More than 500 young people leave the institution with diplomas each year. In Nepal's technical education and vocational training sector, it is growing in importance.

The unemployed youths of the nation are the school's target demographic; by giving them good practical skill training, they will have a higher chance of finding jobs. The ordinary youth are the sano thimi technical school's fee-paying students. However, it also arranges training programs for the underprivileged residents of various communities in collaboration with various NGOs.

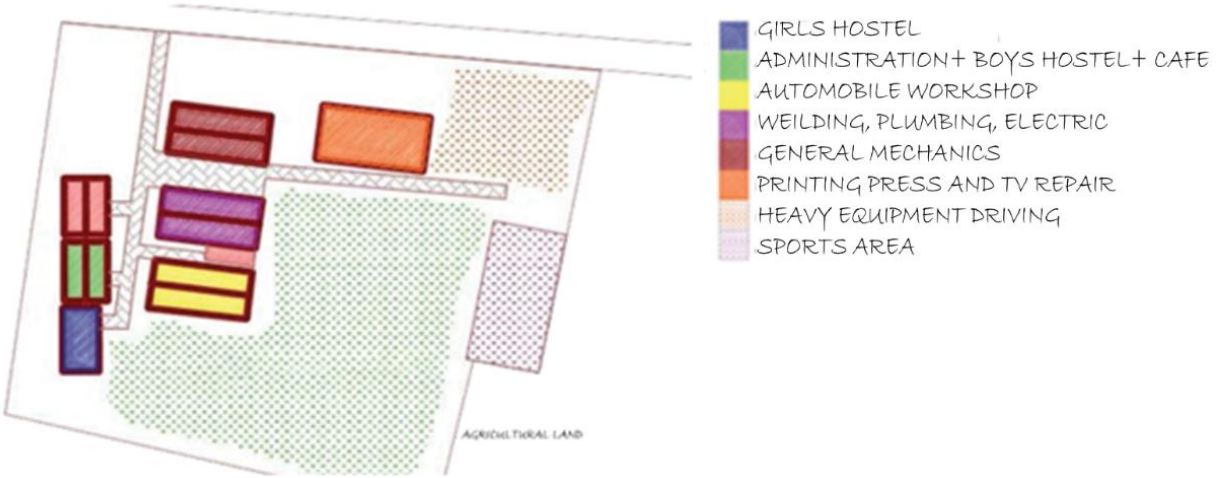


Figure 65 Masterplan of STTS
Source: Thesis-Civic Empowerment Center-Prabin Basnet

3.8.2 Space Allocation

Table 6 Space Allocation

Block	Spaces	Size
A	Admin/boys hostel/ café	95'*55'
B	Mechanical/ heavy equipment	115'*55'
C	Electronics/ printing press	60'*140'
D	Welding/ plumbing/ hose wiring-A BLOCK	115*55'
E	Automobile/ motorcycle trade	115'*75'
F	Girls hostel/ tailoring	45'*75'

Plumbing and sanitation trade		
Components 40 trainees at once	Area m2	Occupancy
Storage	30	
Working desk	55	16
Pipe walls	27	4
Office	32	2
Theory class	45	18

Table 7 Plumbing workshop space allocation

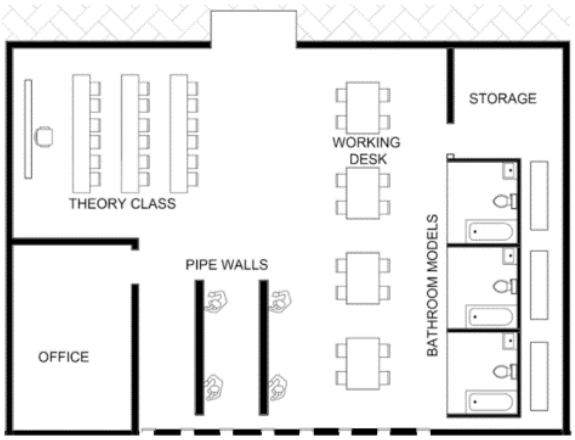


Figure 66 Plumbing workshop

Table 8 Electrical workshop Space Allocation

Electrical		
Components 40 trainees at once	Area m2	Occupancy
Storage	40	
Working desk	110	36
Instructors' office	20	4
Wall display and boards		

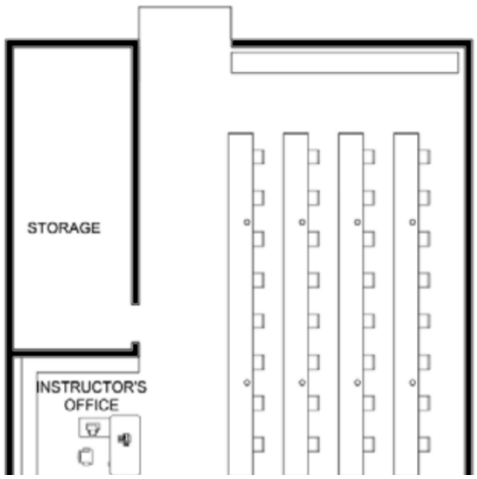


Figure 67 Electrical workshop

Table 9 Automobile Workshop space allocation

Components 45 trainees at once	Area m2	Occupancy
Instructors' office	27	2
Theory class	29	15
Storage	50	0
Machinery parts fixing area	100	14
Working desk	30	16
Vehicle mounting area	30	2 four wheelers
Garage	95	6 four wheelers
Wall display		
Safety partition		

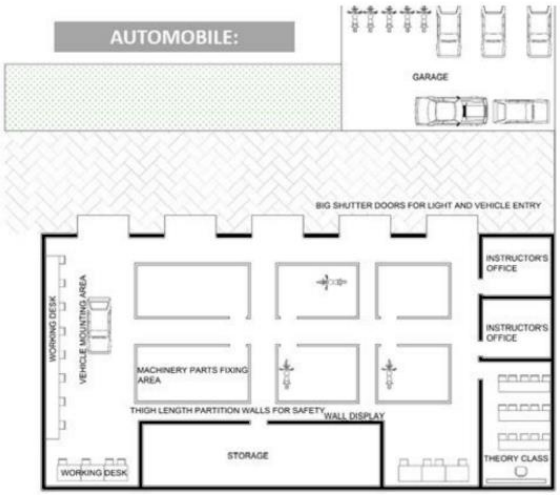


Figure 68 Automobile Workshop

Table 10 tailoring workshop space allocation

Tailoring		
Components 22 trainees at once	Area m2	Occupancy
10 screened welding area	44	10
Metal work desks	56	12
Special fume exhaust	6	
Screened cubicles		
Exhaust pipes		
Intake pipes		

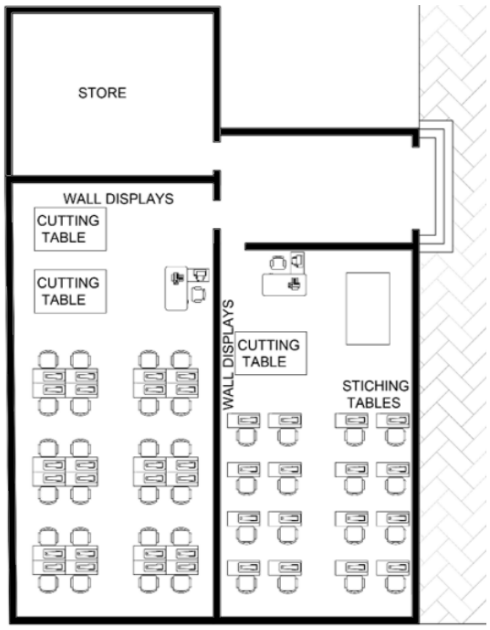


Figure 69 Tailoring Workshop

3.8.3 Visual Analysis

Figure 70 Visual analysis

Source:https://www.facebook.com/profile.php?id=100057649111789

Table 11 STTI analysis

Analysis	
Accessibility	• Large open windows allow visual accessibility which fosters learning environment
Flexibility	• Limited flexibility in spaces as the equipment's are fixed • Multiple activities are still carried out in certain spaces
Interaction	• Linear planning of buildings allows interaction amongst users through the path that connects them • Patches of open space are where the students prefer to interact and socialize
Architectural expression	• Uses brick as the main element that keeps the building contextual • Sloped roof sets the building as a part of the landscape • Higher ceiling accentuates the building's grandeur though it is relatively small building

4 PROGRAM FORMULATION

The program formulation was a process that originated from the site itself. The problems in the site, where the urban poor of Kathmandu settle the most; Balkhu squatter settlement, Thapathali squatter settlement, Bansighat squatter settlement, were first studied through literature and surveys on the site. The top down approach of searching for solutions through research papers and literature and the bottom up approach of finding solutions from the community participation program gave an idea of what cases should be looked at in order to solve the problem. Inferences from case studies and community participation is what led to the formulation for the program below.

Figure 71 Programmatic Components

Table 12 Urban resource center

SN	DESCRIPTION OF SPACES	STANDARDS(PER SQ M)	CAPACITY	ALLOCATED AREA
1	URBAN RESOURCE CENTER			
	ADMINISTRATION	4	20	200
	VISITORS CENTER		15 -20	200
	COUNCELLING SECTION		5	65
	NGO/ FINANCIAL RESOURCE			65
	DWELLING UNITS	15	6*3	270
	W/C			10
			SUB TOTAL	810

Table 13 Day clinic

2	DAY CLINIC			
	OFFICE	4	2	20
	OVERNIGHT BEDS	4	6	50
	EXAMINATION ROOMS	3	8	50
	CONFERENCE	4	25	100
	W/C			10
			SUB TOTAL	230

Table 14 Community center

3	COMMUNIY CENTER			
	MULTIPURPOSE HALL	1.4	250	350
	KITCHEN AND CAFETERIA	2.5	150	375
	DANCE / ART THERAPY			100
	ADULT LITERARY CLASSES			100
	LIBRARY	4	50	200
	OFFICE	3	3	10
	JANITORS ROOM			30
	W/C	1/20PEOPLE	200	25
			SUB TOTAL	1190

Table 15 Daycare center

5	DAYCARE			
	CRECHE	3.5	50	200
	AFTERSCHOOL	3.5	50	200
	SATELLITE KITCHEN	0.56	100	56
	W/C		100	12.5
			SUBTOTAL	468.5

Table 16 Training center

4	TRAINING CENTER	TH/ PR/STO/REC		
	LARGE STUDIOS			
	ELECTRICAL	2.5/7.5/15%/25%	30	390
	PLUMBING	2.5/7.5	30	390
	MECHANICAL	2.5/7.5	30	390
	HANDICRAFT/ WOODCRAFT	2.5/7.5	30	390
	SMALL STUDIOS			
	WEAVING/ HOSIERY	2.5/4	25	180
	JWELLERY / EMBROIDERY	2.5/5	25	180
	SELLING AREA	5*7 SQ M	8	280
	ADMINISTRATION			256
			SUB TOTAL	2456

		TOTAL CARPET AREA		5154.5
		CIRCULATION 35%		1804.075
		TOTAL BUILTUP AREA		6958.575

Total built-up space: 6958.575 sq. m.

4.1 Calculation of Number of Users

850 families (400 fromBbalkhu+ 250 from Bansighat + 200 from Thapathali)

850 families	Approximate Family structure		attendance		
Children	One out of 3 families	280	For Banisghat only	100	
Youths	One per family	850	50%	400	
Adult males	One per family	850	25%	200	
Adult females	One per family	850	25%	200	For 800 people at a time

30 students in a studio

Number of studios at a time -5

Teacher to student ratio for vocational training 1:10-1:15

So, number of teachers present- 3 * 5 = 15

Additional faculty members present -5

Total number of people present at a time in the training studios = 30*5+20= 170

Considering studios to be held at 4-4-4-hour shift

total number of people catered 170*3= 510

URC- 10+5+15 =30

Day clinic –2+15= 17

Community hall/ cafeteria- 200

Library+ visitors center- 50

Daycare- 100

Subtotal- 30+17+200+50+100=400

Total people served throughout the day = 400+500=900

5 THE SITE

Overview

Site: Gusingal, Lalitpur

Government owned land located at the northernmost part of Lalitpur.

Location: 27°41'33.5"N, 85°18'25.4"E

Figure 72 Site location

Area: 18813 sq. m.

Topography: Almost flat

Selection criteria: Selected based on the location where the urban poor choose to dwell and is in proximity to three of the urban poor settlers

Criteria	
Distance and location	Within the Kathmandu Valley
Approach	close to ring road and easily accessible
Locational Attributes	Center of the city
Character	Strong cluster and area with the greatest number of squatter settlements
Public Space	Fully encroached and needs attention

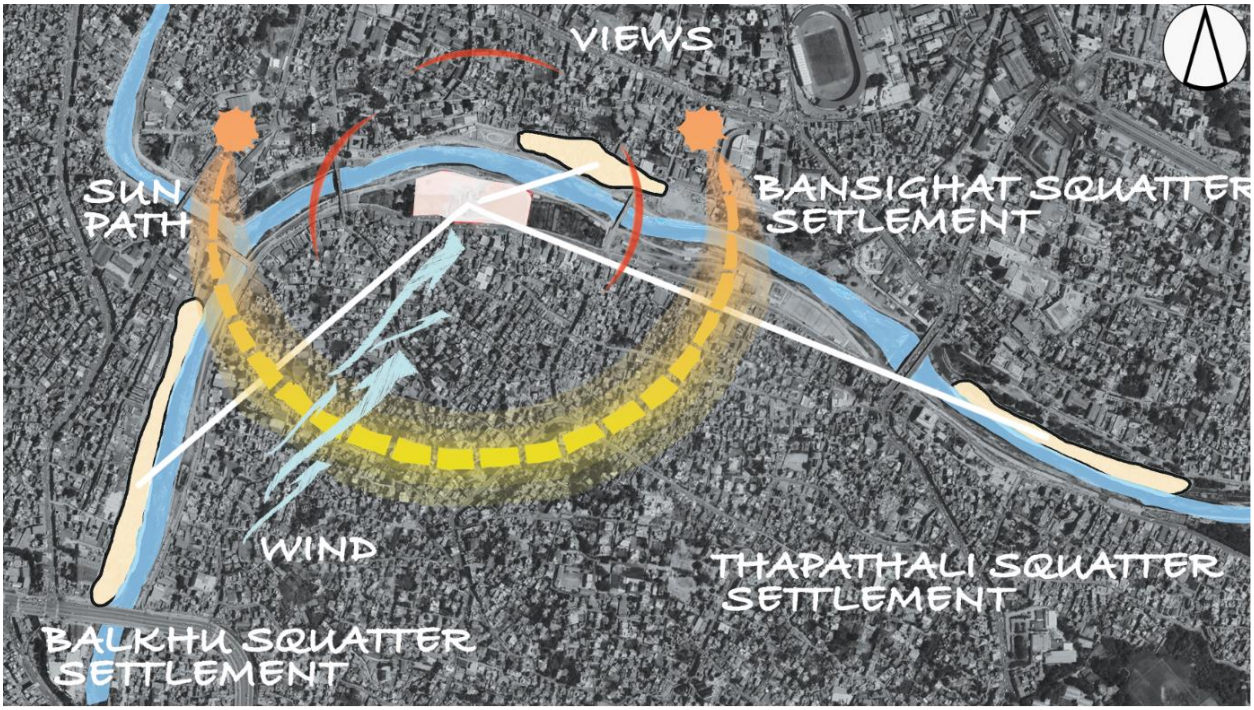


Figure 73 Proximity of the site to squatter settlements

5.1.1 Immediate Surrounding

The site is located in Gusingal, midway through three squatter settlements; Bansighat squatter settlement, Balkhu squatter settlement and Thapathali squatter settlement. It is the northernmost part of Lalitpur district. To the north is the Bagmati river and beyond that is a temple complex of Teen Dewal Mandir. To the east is a chautari and a small temple and accessible public space for the general public. To the west is a stretch of land being used for agricultural purpose. To the south the residential area that is commercializing.

Figure 74 Immediate surrounding

Figure 75 Panoramic site elevation

SOCIAL ASPECTS

• At the west-most part of the site is a play space for kids later converted to a fitness park.

• Beside the park is a small Ganesh temple.

Figure 77 Outdoor fitness park

Figure 76 Ganesh mandir

PHYSICAL ASPECTS

• Small area remains as ghat while most of the ghat structures are at the other side of the river

• Once proposed to be used as Pati for ghat nearby, now with no usage

• Most space is open with unchecked growing bushes

Figure 78 Unused pati and ghat

ECONOMIC ASPECTS

• A part of land is being used illegally by waste recyclers for recycling plastic materials.

• Across the road are rows of shops that provide mechanical services to vehicles

5.1.2 Access

The squatter settlements along the banks of Bagmati River have created an uninviting riverfront. And the site opposite to the settlement is not also managed. Via Ring Road, the squatter settlement can be accessed through a road north to the Balkhu bridge. Although the main road is 10m (30ft) wide, the alleys that are made to enter homes in the inner settlement are around 1-1.2m (3-4ft)

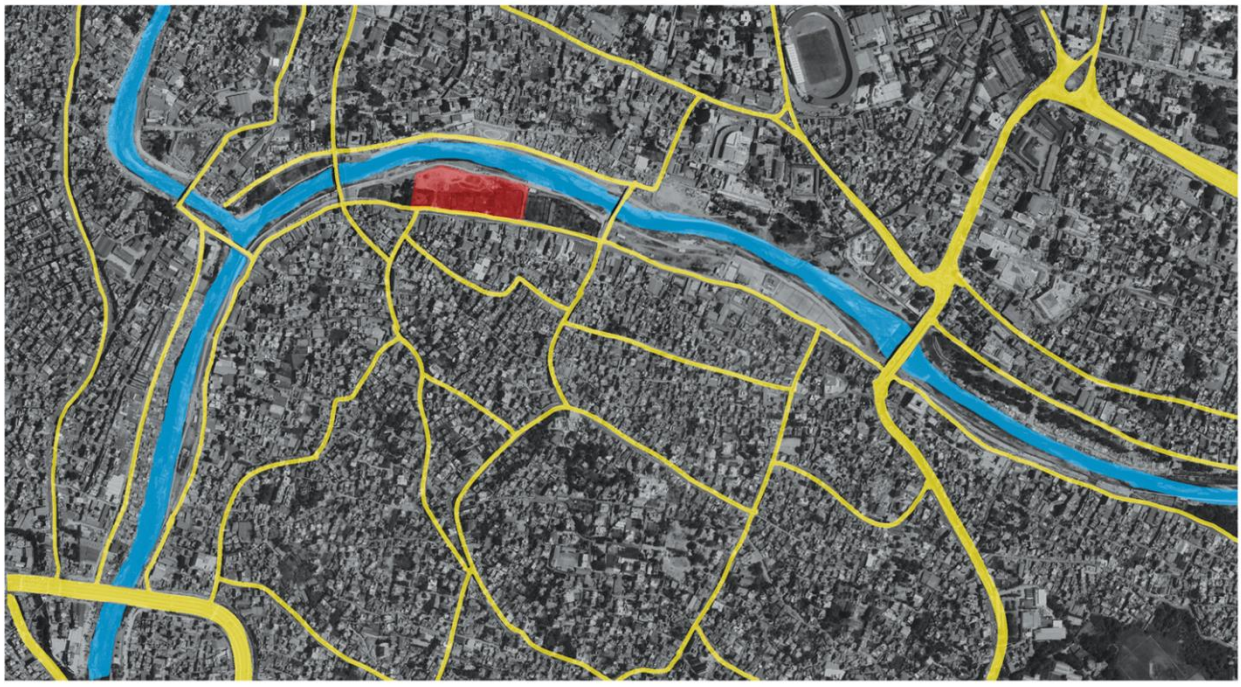


Figure 79 Access to the site

wide; some even lesser than 0.6m wide in balkhu settlement whereas in thapathali and bansighat it is comparatively wider from 2 to 4 m wide. The width of road is not enough for two people to pass freely. The scooters and motorbikes of some of the squatters don't fit easily into the narrow alleys so they have to push the vehicles in angles to take them inside their homes where they park them overnight due to security reasons. Some people park the vehicles outside, day or night.

5.1.3 Architecture Within the Settlement

The houses are one to two storey high. The sunlight surprisingly enters in some parts of the narrow alleys during summer, which allows for some people to dry their clothes along the walls of their homes on the southern side. There isn't any open space for drying clothes or having social interaction in case of balkhu and bansighat settlement. Everything happens on the street. The

narrow roads feel very dark and scary. Whereas in case of Thapathali settlement area theu get ample light and space to dry clothes sone of them with courtyards within the community.

The structures resemble rural Nepalese dwellings very much. Some homes are constructed using inexpensive hollow concrete blocks, while others utilize bricks and cement mortar to create exposed walls without the use of plaster. While some of the homes lack paint, others have cement plaster. Some also contain paints. Despite having solid walls, the majority of the roof is built of CGI roofing. Other homes are constructed with bamboo, wood, thin metal, or CGI sheets, with metal poles serving as the frame. You can also find houses using CGI sheets used for the walls, roof, partition walls, doors, and windows. Therefore, the settlement's architecture reflects how the residents from various regions of the nation have adapted it. The dwellings are constructed using whatever materials were available. The buildings' walls have tiny apertures called fenestrations that let in little to no light.

5.1.4 Climatic Data

- **Sun path diagram and wind rose diagram**

Through the analysis of sun path, we can gain passive heating and cooling in the building design. The latitude of Kathmandu is 27º40’38” N, which gives the highest solar altitude angle of 86º in Summer and lowest solar altitude angle of 40º in winter.

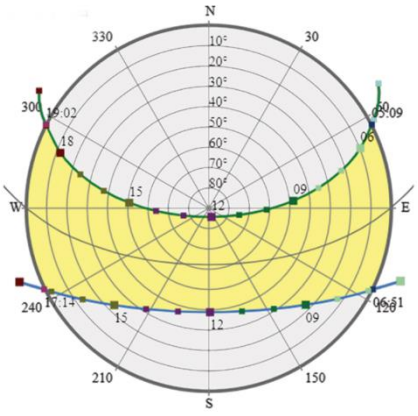


Chart 1 Sunpath diagram
Source: Gaisma.com

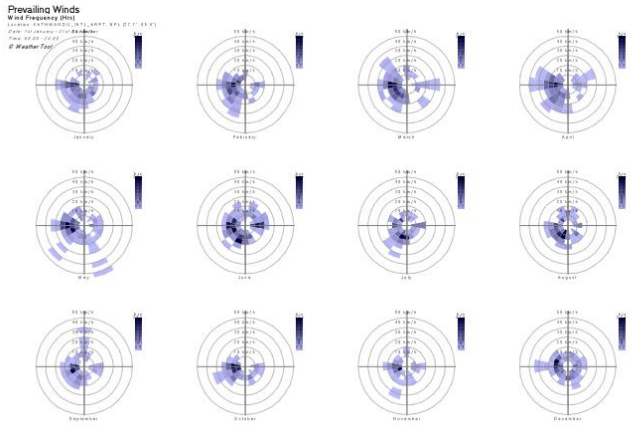


Chart 2 Windrose Diagram
source: meteoblue

- **Average temperature and precipitation**

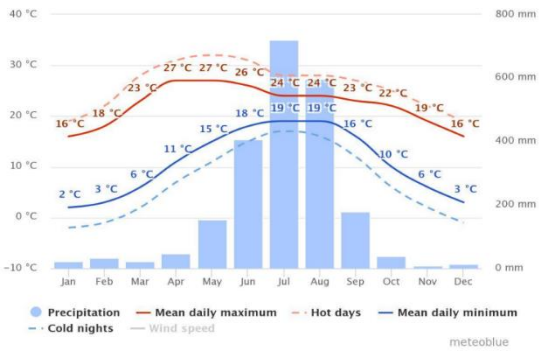


Chart 4 Average Temperature and precipitation
Source: meteoblue.com

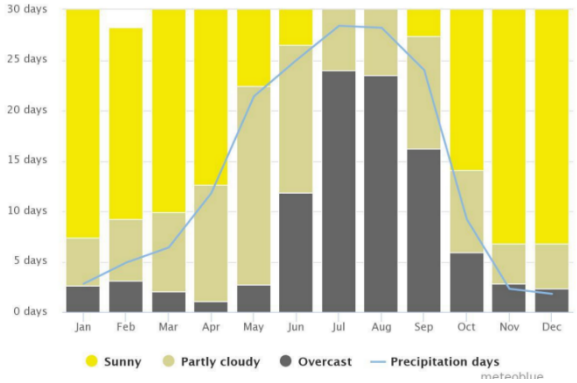


Chart 4 Sunny cloudy and precipitation days
Source: meteoblue

- **Maximum temperature and Precipitation data**

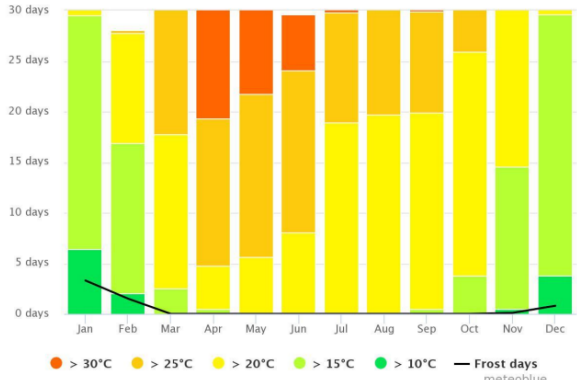


Chart 6 Temperature data
source: meteoblue

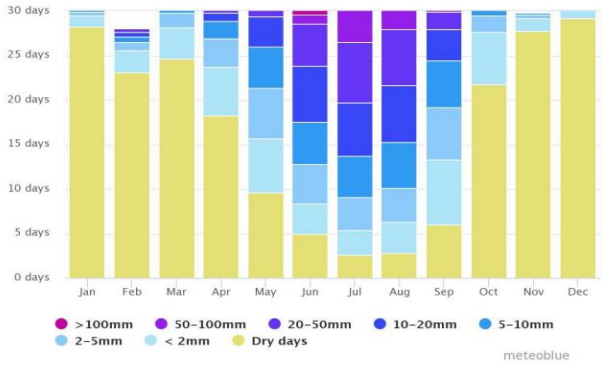


Chart 6 Precipitation data
source: meteoblue

5.1.5 Land Use

Most of the site is used as inactive agricultural zone. Some parts of the site is being used for recyclable waste collection and transfer sites.

5.1.6 Changes in Site Throughout Time

Figure 80 Changes in the landscape throughout time
Source: google earth

6 THE DESIGN

The proposed social development center is envisaged to be a lively learning and socializing space that stands amidst the need of the urban poor. It is a place where one can grow socially, psychologically, financially and physically. The concept takes inferences from the character of site, surroundings and its users.

6.1 Zoning

The site was first subdivided into regular grids, which served as the basis for the subsequent zoning process. Each function was then individually zoned, taking into account a range of factors such as road access, site constraints, visibility, noise levels, volume, and access to the riverfront.

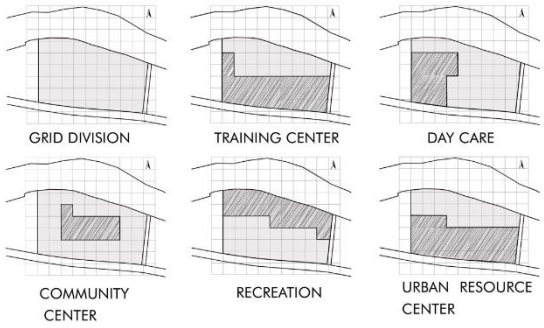


Figure 82 Individual Zoning

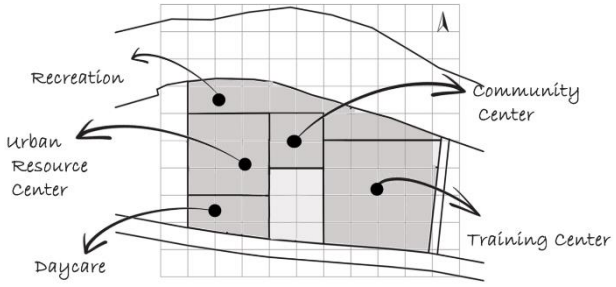


Figure 81 Final Zoning

The resulting individual zones were then integrated and evaluated in order to determine the most optimal outcome, resulting in a final zoning plan that successfully addressed all relevant constraints.

6.2 Orientation

The initial idea was to plan the center in a modular pattern in order to give a sense of formality while trying to mimic the informality of the settlement. So, the blocks were placed along the central line that represented the street. Rather than placing the blocks in the north south alignment, the blocks are placed at 32 degrees to the north so as to let optimum amount of light into most of the blocks. This is also the angle at which the nearest squatter settlement is located. Hence when the settlement gets relocated in the future the center will remain as a landmark that reminiscing the history.

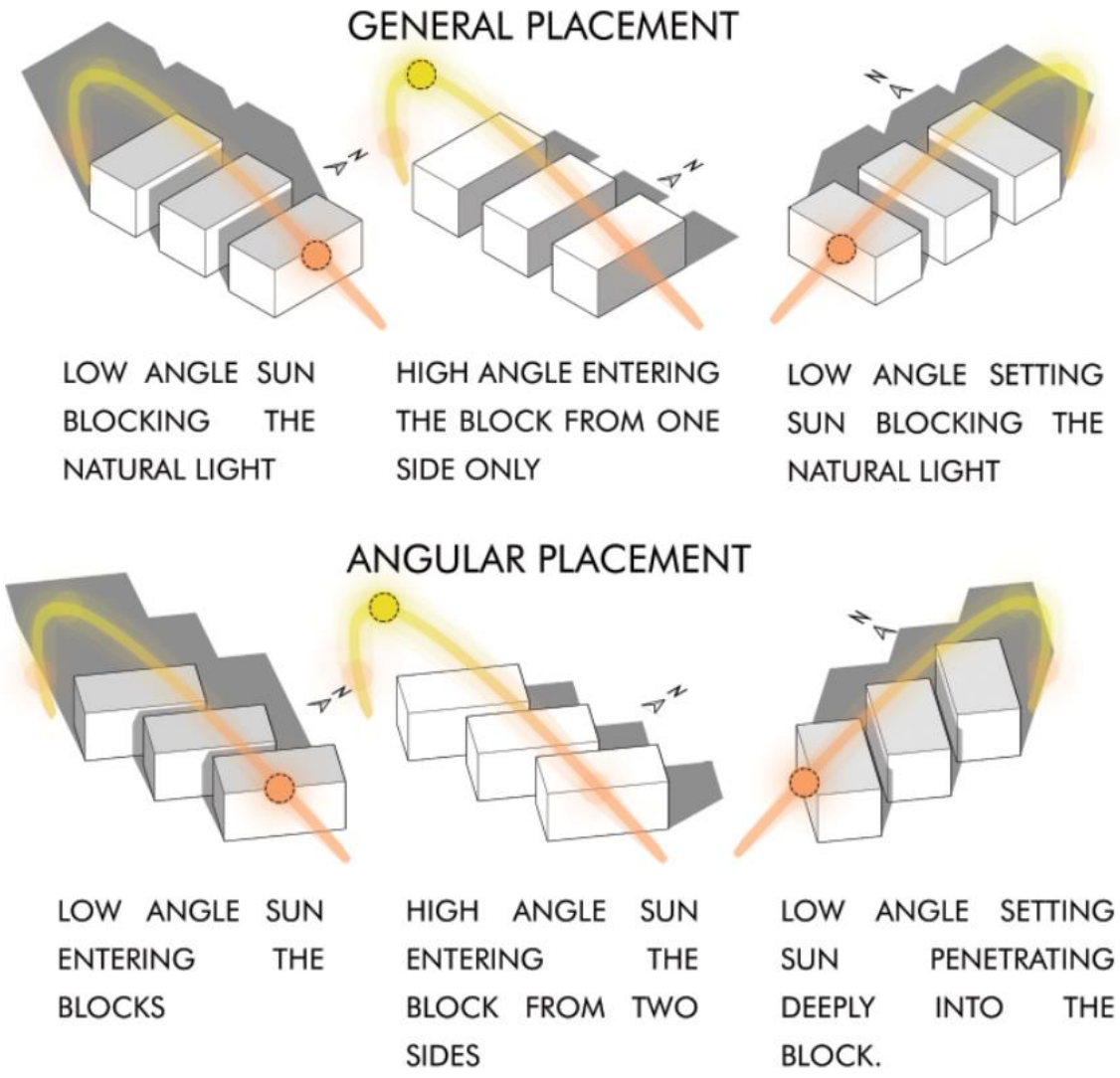


Figure84 Building Orientation

6.3 Concept

The Street

The street, for the urban poor, is a significant open space. Here the people engage in community activities, the old socialize, children play and youths gather.

Figure83 The street

Figure85 The settlement

The settlement

The organic placement of dwellings of the urban poor as need arises, allows interconnected pathways to be woven. This characteristic feature of **the settlement** is embedded onto the memories of the dwellers.

The river

All these interconnected streets eventually open up to the river which is a pivotal part of people's lives. **The river** changing its course is synonymous to lives of people living at the edge.

Figure86 The river

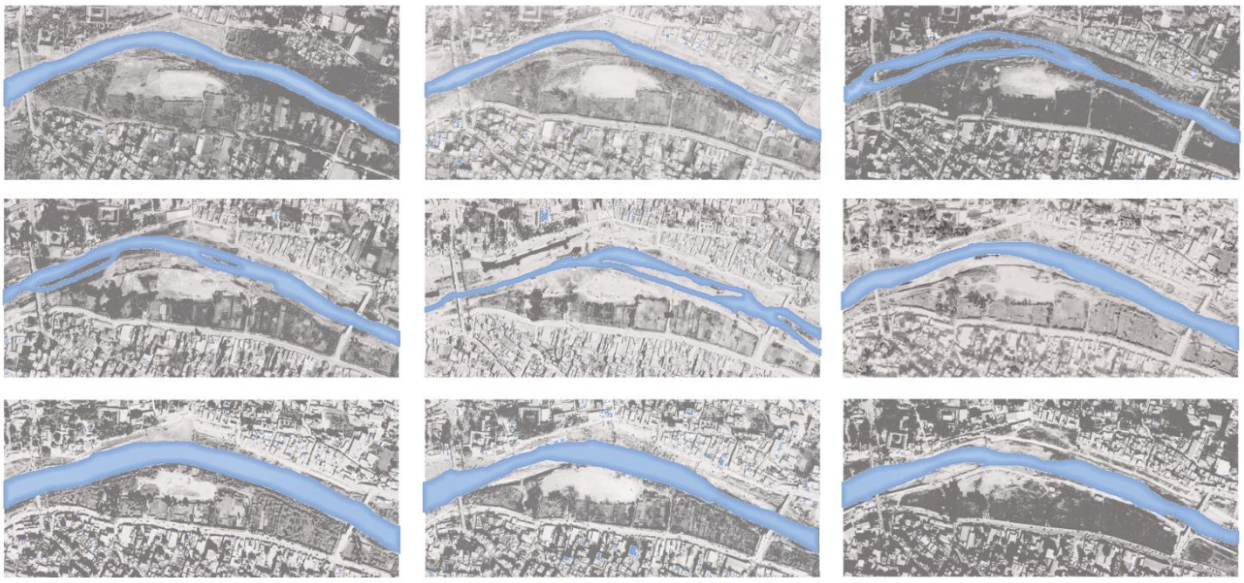


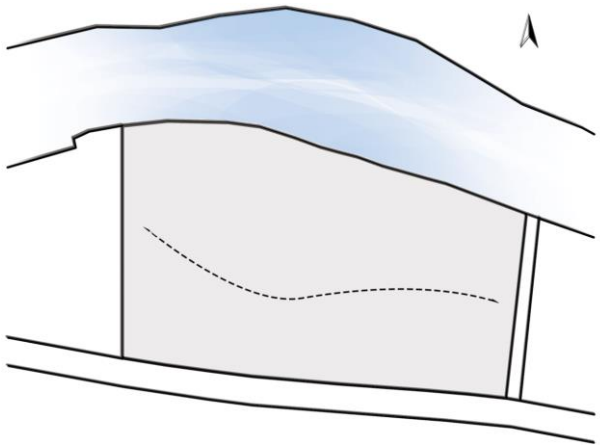
Figure 87 Changing course of the river

Taking all this into consideration, the goal became to create an environment for the poor where they feel that they belong.

6.4 Design Development

The design concept was centered around creating a sense of belonging for users, achieved through the adoption of a simple curve that reflects the character of the river and the lives of those it connects. Open spaces were thoughtfully integrated along the curve of the street to foster communal gatherings and interactions.

At a smaller scale, a network of open spaces was dispersed throughout the site, creating a sense of fluidity and continuity that mirrors the surrounding settlement. These smaller open spaces were thoughtfully connected through a network of streets, further enhancing the sense of community and facilitating ease of movement and circulation. Overall, this design approach fosters a strong sense of place and community, effectively integrating the site into its context while also serving the needs of its users.



Taking a simple curve to reflect character of river and lives of people it binds as a street.

Figure88 The street/ river

Creating communal spaces throughout the street to produce engagement.

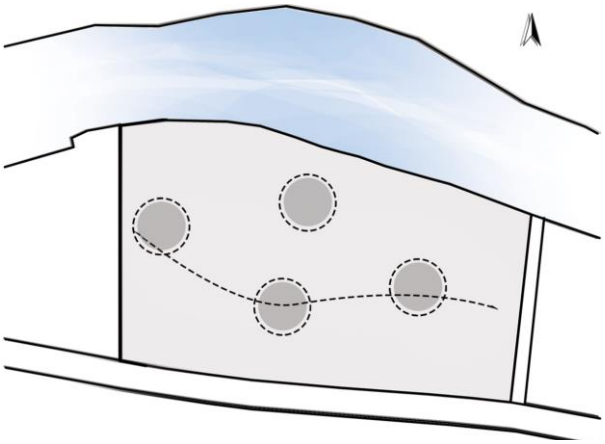


Figure89 The open spaces

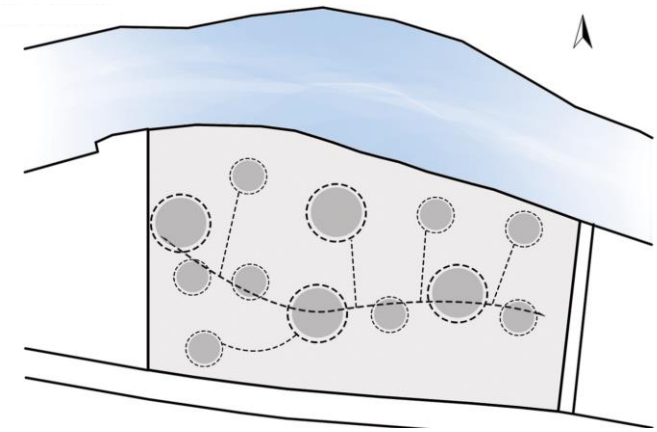


Figure90 The pockets

Adding pocket of open spaces throughout the site to create fluidity in space and connecting them through streets to represent the character of settlement.

Many iterations of the placement of the blocks were done keeping in mind the figure and ground. The composed one out of all that fit the concept of interconnected open spaces was chosen to proceed.

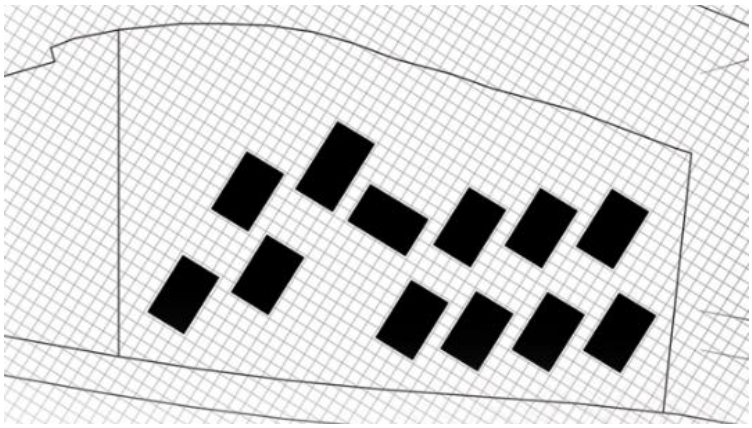


Figure 91 open spaces and blocks

The blocks were aligned at the specific angle of 32 degrees to the north to take optimal usage of sunlight. Adding to this, it also points at the direction of the existing squatter settlement. What this can state is, if in the future the squatters gets uplifted from the present settlement, this social development center can be a mark t in history that helped in uplifting the squatters.

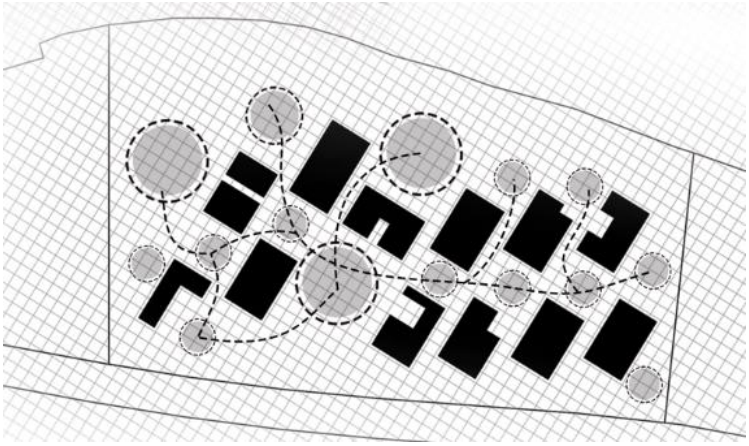


Figure 92 Figure and ground

6.5 Layers of Interaction Space

6.5.1 Connected Courtyards

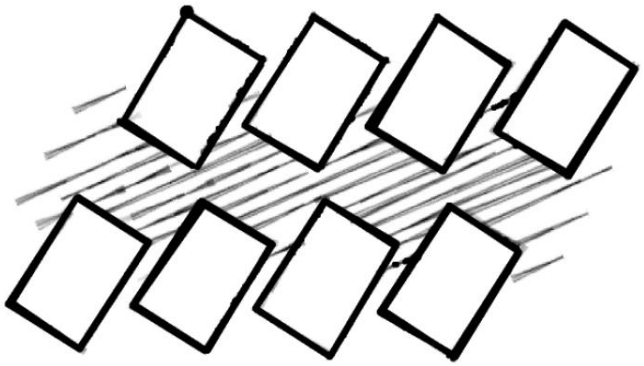


Figure 93 Interconnected courtyards create distinct human scale spaces for varying experience.

Aldo van Eyck believed that in order to create a truly human-centered architecture, it was important to design spaces that were interconnected yet distinct. By creating open spaces that were interconnected, each space could have its own unique identity and experience, depending on the functions that it surrounded. This allowed for a greater degree of flexibility and adaptability in the use of space, while also fostering a sense of community and social interaction. In essence, by designing spaces that were both interconnected and distinct, it was possible to create an architecture that was both functional and humane, one that responded to the needs and experiences of its users and fostered a sense of connection and continuity between people and their built environment.

6.5.2 Contextual Elements

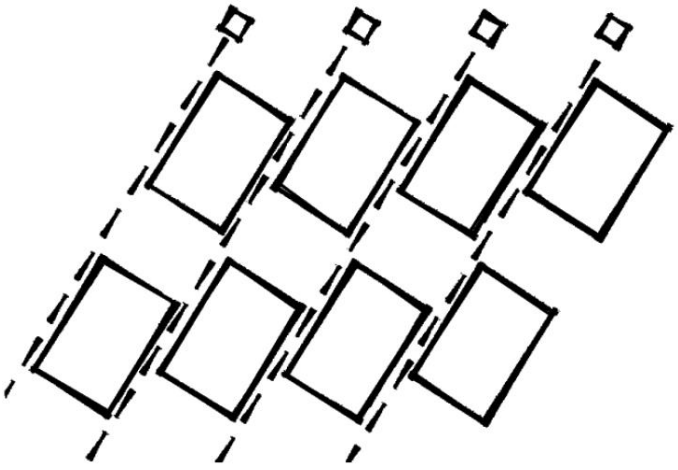


Figure 94 the arrangement of the blocks done so as to create sense of surprise through alleys leading to the riverfront

The blocks have been artfully arranged to create a sense of surprise and delight reminiscent of the vernacular architecture found in the valley and surrounding impoverished settlements. The central circulation system deftly branches out towards the riverfront, further emphasizing the element of surprise. Moving through these streets, one is greeted with a series of

alleys that converge at a central point. At the end of each alley is a captivating sculpture, strategically placed to create multiple vantage points for the viewer to appreciate the artistry of the piece. This intersection of alleys and sculptures creates a unique spatial experience, inviting visitors to explore and discover the intricacies of the design. Overall, the arrangement of these architectural elements creates a harmonious and intriguing environment, melding the beauty of the natural landscape with the creativity of human design.

6.5.3 Form

The focus of the built form has been directed towards creating a design that the users feel a sense of belongingness. The bulky volume is broken down so as to create walkable space for the pedestrians and also to encourage the view of open space from the upper level.

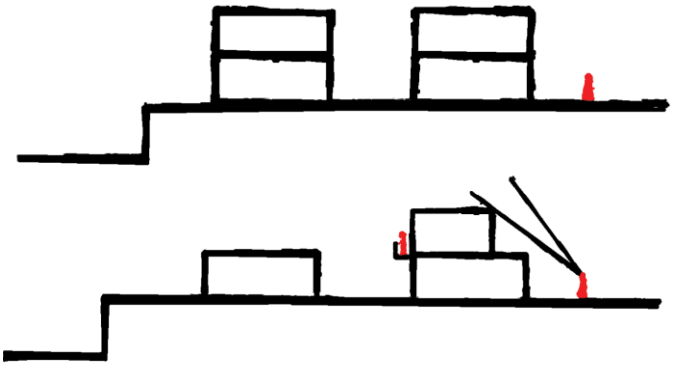


Figure 95 Decomposing the bulk volume for the pedestrians to make the space walkable and to open up the block to the riverfront

The roof form for the overall built structure is a pyramidal roof that blends with the architecture of the valley.

6.5.4 Plinths

Plinths which are an extension of the studio, have been designed with flexibility in mind. This design strategy enables the semi-covered plinths to serve as spaces for interaction, while simultaneously blurring the boundary between the interior and exterior environments. This

boundary ambiguity creates a spatial experience that is more dynamic and interactive, facilitating generative learning and promoting engagement with the built environment. The semi-covered plinths function as adaptable platforms for diverse activities, thereby serving as transitional spaces that connect the interior and exterior, allowing for a more seamless flow between the two. Overall, this approach to design maximizes the potential for spatial integration and interaction, providing an immersive learning environment that supports a range of diverse activities and experiences.

Figure 96 Extended semi covered plinths acting spill out spaces and to carry out nonformal activities

6.5.5 Riverfront

The riverfront has been transformed into a dynamic and engaging public space that promotes social interaction and community engagement. By dividing the riverfront into various levels, the design creates a range of distinct spatial experiences that offer varying degrees of interaction and immersion. This spatial differentiation, with its varied topography, fosters a sense of discovery and exploration that enhances the user experience.

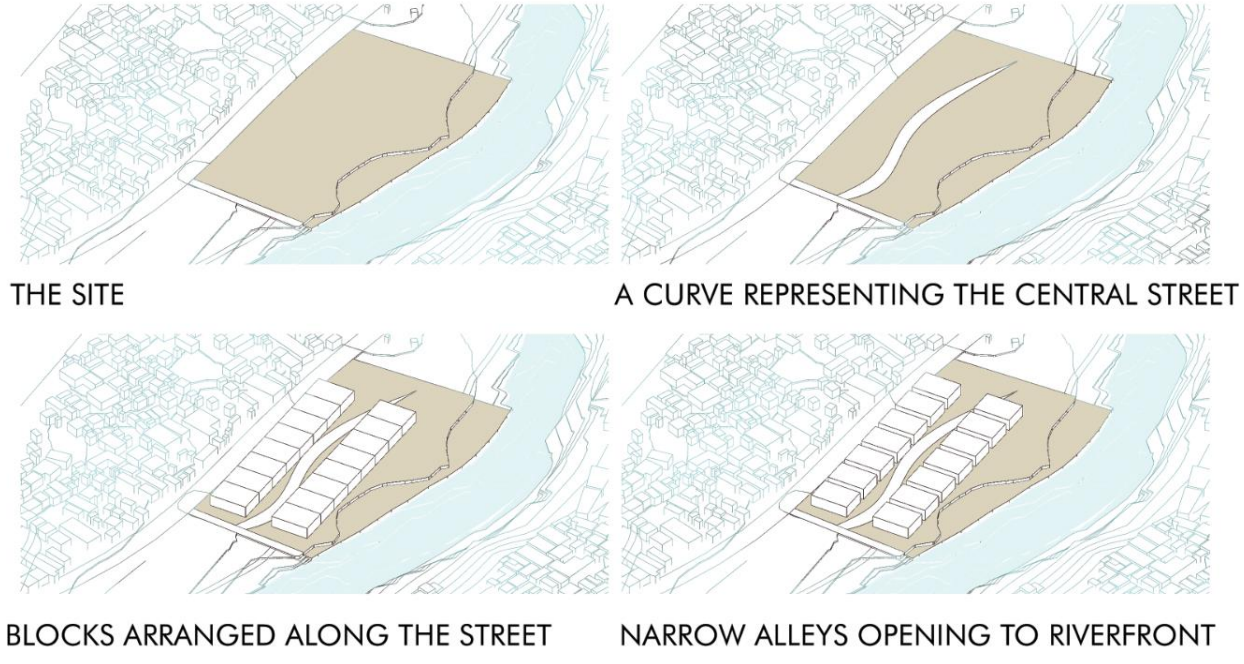
Furthermore, the design integrates open areas for recreational activities, including a futsal pitch and a small patch of land that encourages public participation. This strategic placement of recreational spaces creates opportunities for social interaction and community building, while also promoting physical activity and a sense of playfulness within the urban context.

Figure 97 Turning the riverfront into interactive public space through varying levels

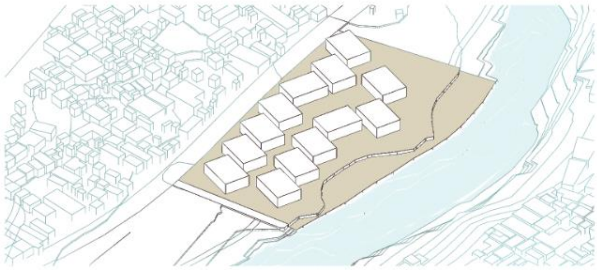
Figure 98 The view of the riverfront

Overall, the design prioritizes the activation of the riverfront as a vital public space, one that fosters a sense of place and community within the city. The integration of recreational spaces, varied topography, and opportunities for social engagement creates a vibrant and dynamic public realm that serves the diverse needs and interests of the general public.

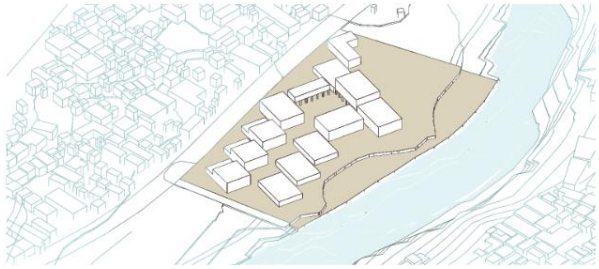
6.6 Overall Form Development



BLOCKS ALIGNED TO GAIN OPTIMAL LIGHT



COURTYARDS CREATED AS PER FUNCTIONS



VOLUME DECOMPOSITION TO FIT THE SITE

ROOF FORM THAT SPEAKS THE CONTEXT

RIVERFRONT DESIGNED MAKE THE SPACE POROUS

FACADES DESIGNED TAKING BATTENS AS ELEMENTS AND BRICK ARCHITECTURE

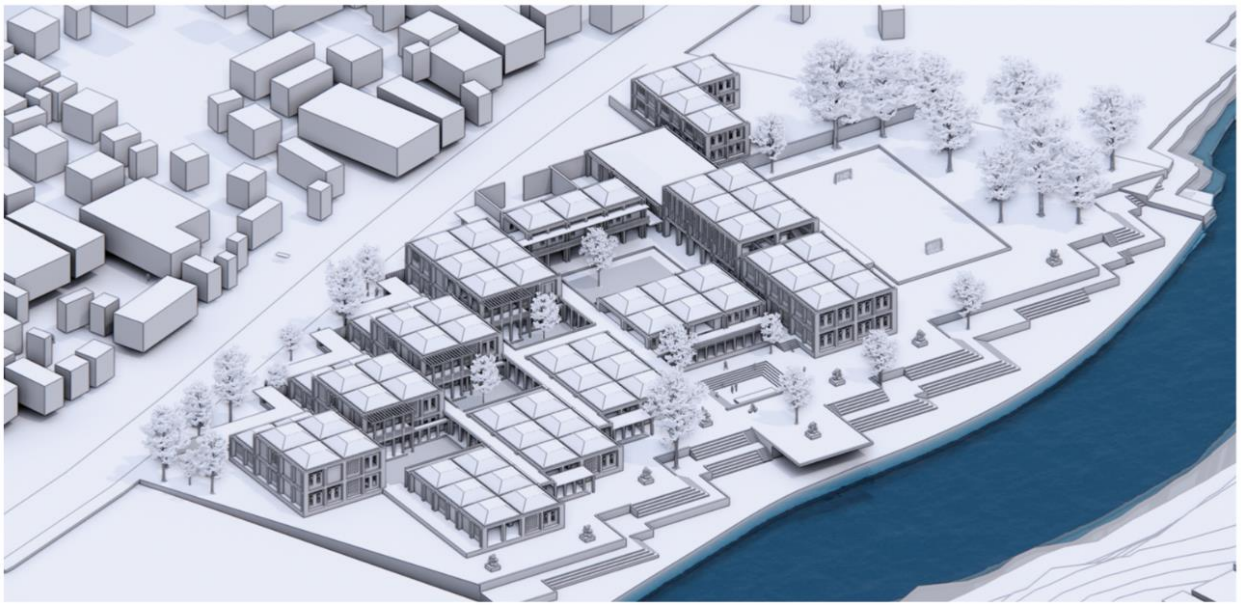
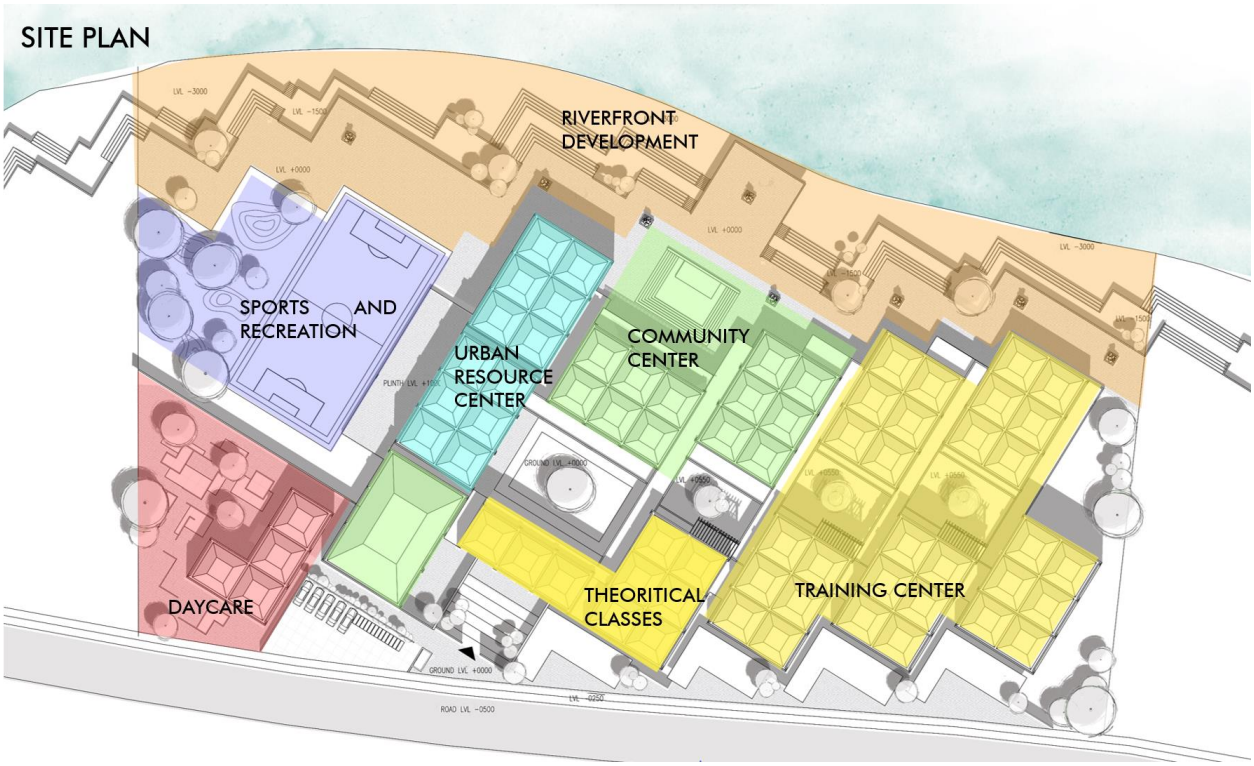


Figure 99 The final form



6.7 Materials and Construction

Glancing the site from an urban context the location of the site is amidst the brick architecture of the valley. So, to make the built form contextual brick architecture has been chosen. Comparatively longer spans can be achieved using reinforced brick masonry construction tied through concrete beams. The roof slabs can also be casted through lime and brick mortar in vaults a finished to look as pyramid roofs from the exterior.

6.7.1 Reinforced Brick Construction

9 rebars of dia 15mm are placed at 150mmc/c that connects to the foundation and the beam above. At each 4 courses of brick a 5 mm thick metal plate 400mm * 400mm is placed to act as stirrups

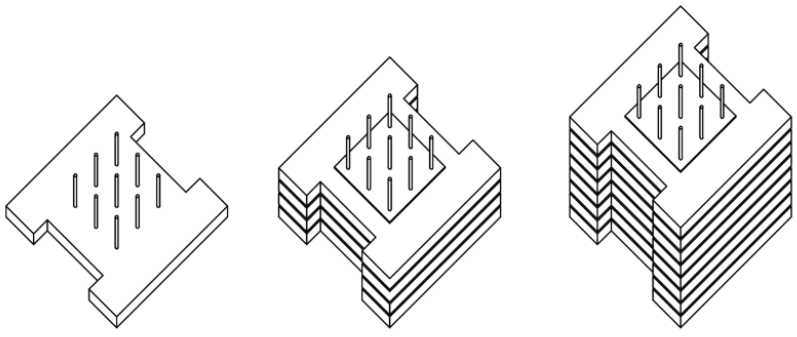


Figure 100 Reinforced brick columns

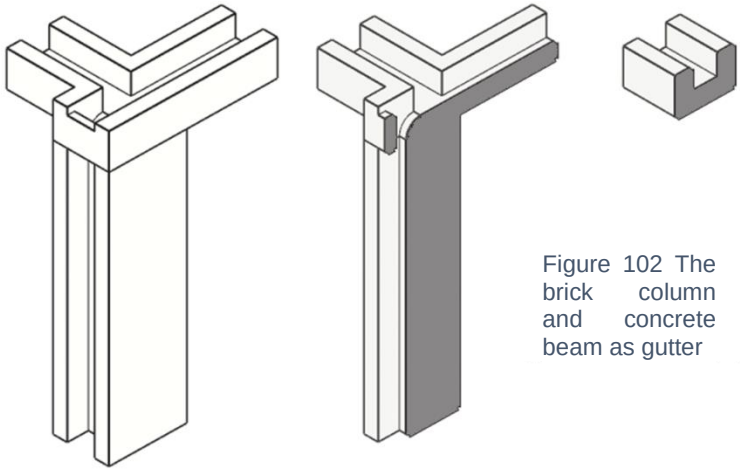


Figure 102 The brick column and concrete beam as gutter

Concrete gutter composite of beam and fascia as an architectural element that runs throughout the building complex to unify the built structure. The load bearing unit of the column is 800mm*800mm. pilasters of width 200mm protrude 300mm from the face on either end creating a vertical gutter in the middle. The beams also protrude 300mm at the ends flushing with the brick pilasters and creating a distinctive element. The concrete beam emphasizes the horizontality in the overall built form that helps the users feel the grounded character of the building and eliminate alienness.

Figure 101 Elevation showing wise use of brick, concrete and pyramid roofs

6.7.2 Wood Battens

The characterstic battened feature of the squatter settlement was noted from the observations. The use of battened wood was abundantly seen in the settlement owing to its quick availability and ease of constructability. The facades have been designed in such a way that they reflect this characteristic feature that would evoke feeling of belongingness to the users.

Figure 104 Wooden batten characteristic feature in the settlement

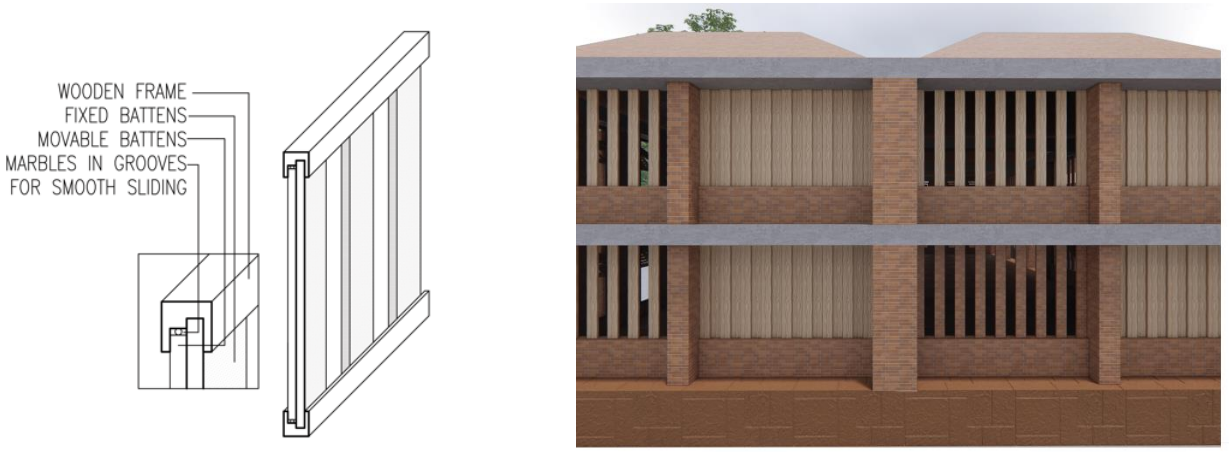
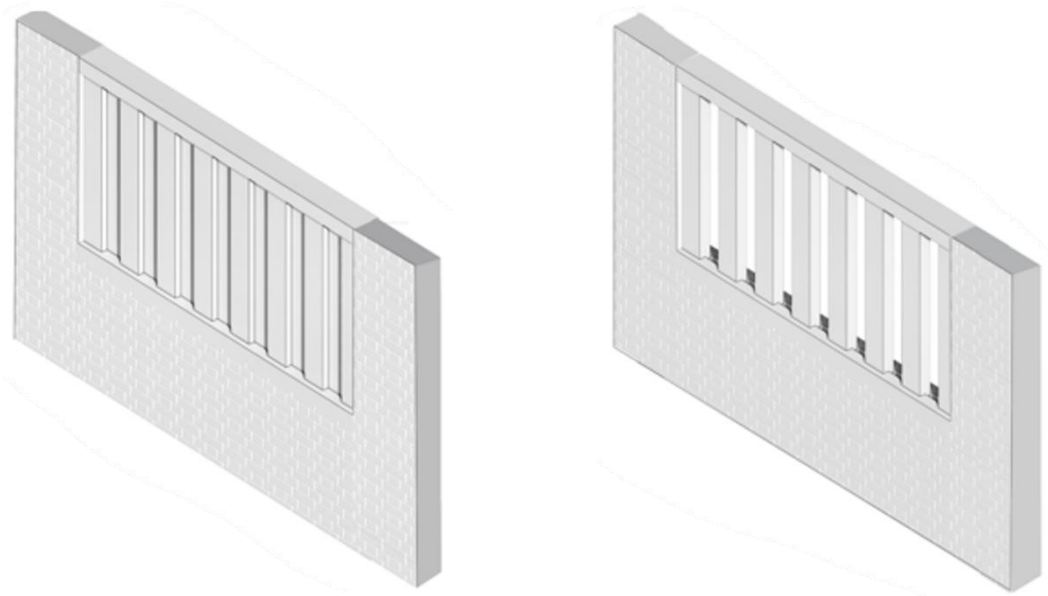


Figure 103 Detail of battens converted to sliding window and rendered view



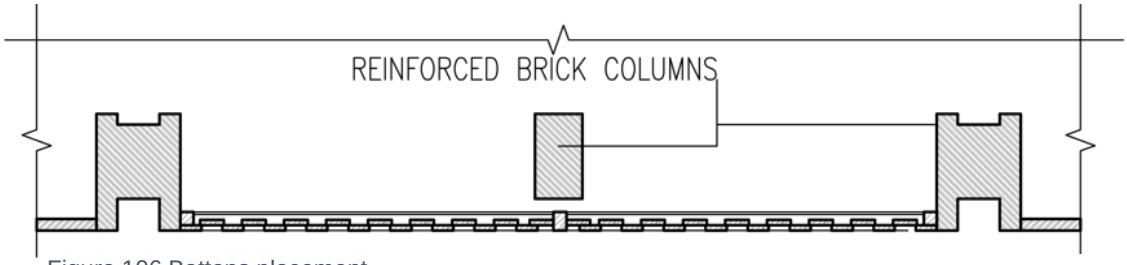


Figure 106 Battens placement

Figure 105 Battens as a prominent feature in the entry

These vertical battens are placed such that it breaks the monotony of horizontality of the overall complex. And also the pivot window on either sides and the gutters also add to vertical nature complimenting the linearity of the building.

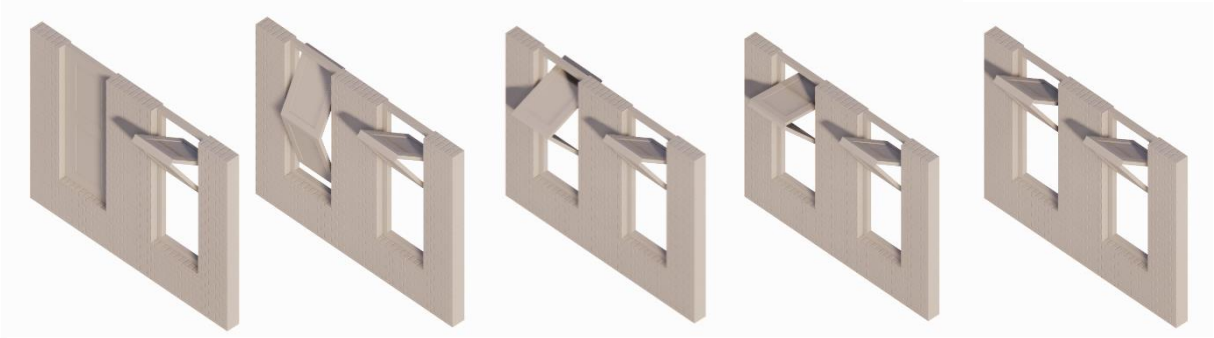


Figure 107 Working mechanism of a pivot window

6.7.3 Module and grids

Primary grid of two 8m x 8m along the width and three 8m x 8m along the length has been chosen. Secondary grids of 4mx8m are placed for additional support. The walls have been constructed through brick masonry and flexible wooden planks. These planks being easily available and in cheap cost are characteristic feature of the settlement of the urban poor. So, the wooden planks can be used on the facades of the center. A simple mechanism of sliding can be used to mimic the planks into windows that would allow ample light into the interior.

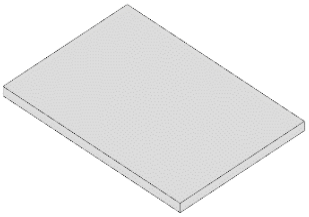


Figure 113 Plinth

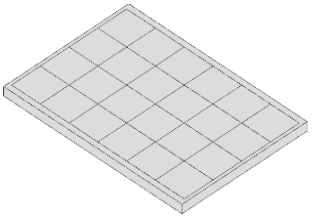


Figure 113 grids of 4m x4m

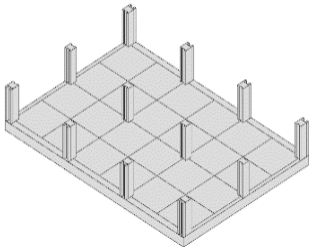


Figure 113 8m x8m RB column grid

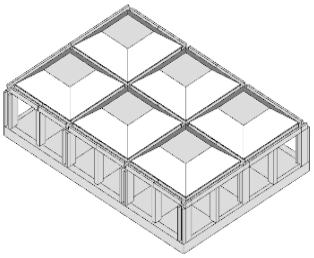


Figure 113 Pyramid roof structure

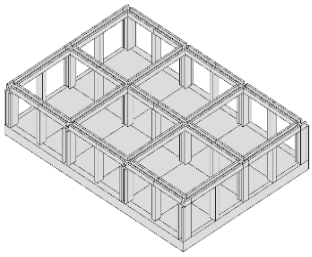


Figure 113 Concrete beams

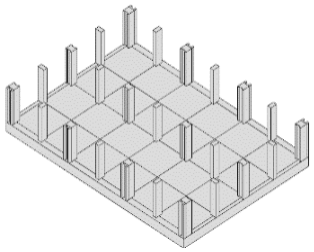


Figure 113 Secondary columns

6.7.4 Construction of Rhotak Dome

The roof form is a characteristic element of the design that describes the overall style of building. The roof form chosen is pyramidal roof form in order to contextualize the built form. A pyramid roof in itself would need certain shuttering and casting it in concrete would not be an appropriate approach. To address this challenge, the design incorporates a unique construction method known as the Rhotak Dome. This dome is made entirely of locally sourced brick and lime mortar, and does not require the use of any shuttering or complex machinery. Instead, it relies on the adhesion of the mortar and brick, as well as the principles of geometry and gravity.

This method of construction is mainly found in Rhotak, a village in India that uses the local materials available to construct the roof without the need of complex machinery and technology. The construction is done with local handy equipment's and native knowledge passed down from generations.

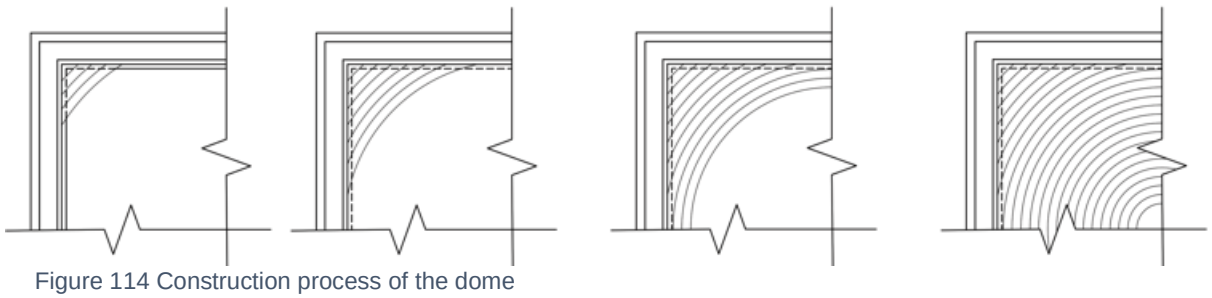


Figure 114 Construction process of the dome

The construction process begins by establishing a horizontal load-transferring element, typically a set of beams that are tied together in either a rectangular or square base. A section of each beam is cut to form a base for the brick to be laid. The center of the beam plan is marked, and specific angles are identified for placing the bricks.

Figure 115 Rhotak dome from the inside

Then the brick is laid starting from the corners and gradually increasing in height upon addition of another course of the brick. Slowly then an arch like structure is formed at the corner. This is repeated at each corner until the courses of brick meet making a circle. Once the circle is completed, the it is only the matter of laying the bricks and mortar one step at a time. As completion of one brick course would make it act like a flat arch with nothing holding the structure except its own weight. The dome is completed slowly adding the courses of brick and increasing the pitch gradually.

Once the dome is constructed and after the mortar sets, a layer of lime / surkhi mortar can be applied on the top with circular and radial bamboo reinforcements tied to each other. Then a layer of lime screeding is laid on the top. Now, circular bases for the pyramid roof can be constructed on the dome and then with the help of bricks the shape of pyramid roof can be provided and then finished with tiles.

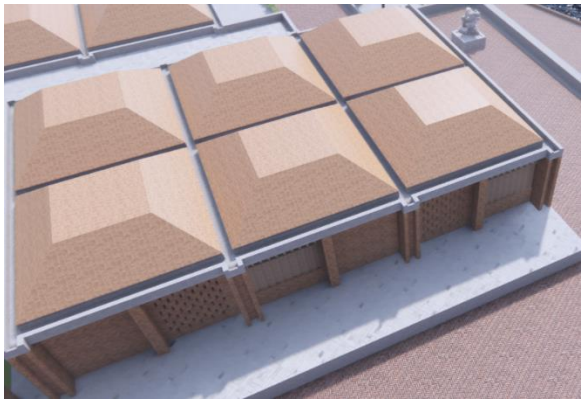


Figure 116 Rhotak dome finished with pyramidal roof

6.7.5 Construction of Madaras Terrace Floor

Madaras floor is also another sustainable and local technology that belongs to the southern part of India. The construction uses local materials like brick, lime, wood and mortar. First wooden joists are placed at 450mm distance to each other which is laid on the beam. Then thin brick battens are placed vertically and 45 degrees to the wooden joists, starting from the corner. The bricks stick together with the help of mortar. So gradually bricks are laid in similar manner. Once all of the

floor is covered with the brick, then a layer of lime mortar is spread and now the bricks are laid flat on the floor but at 90 degrees to the brick battens below. This allows proper adhesion. In similar manner the construction starts from the corner and ends at the opposite corner. An additional layer of mortar is added on the top of which tiles or finishing elements is laid to give the desired result.

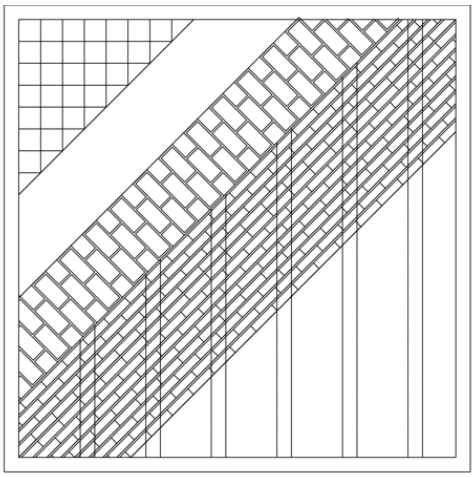


Figure 117 Madaras floor construction plan

6.8 Incremental Approach

The blocks have been arranged in such a manner that an addition of two blocks following the pattern creates a new courtyard-like space with its own character that the users can create depending upon the type of function the block holds. So, in the future if project were to be successful and additional studios are demanded, then simply arranging the blocks to the east gives the best solution. A block on at the site can be removed to open up the space for connecting the open riverfront to the internal courtyard.

6.9 Some 3D views

Figure 118 The entrance to the center

Figure 119 The framed view of the main courtyard

Figure 120 The semi covered pathway that also acts as extended plinths

Figure 121 The main courtyard

Figure 122 The pocket courtyards and extended plinths

Figure 123 The sunken courtyard and the communal space

Figure 124 The view of the playground with the social development center in the background

Figure 125 The entry to the visitors' center

Figure 126 The rhotak dome ceiling view from the visitor's center

Figure 127 Model 01

Figure 128 Model 02

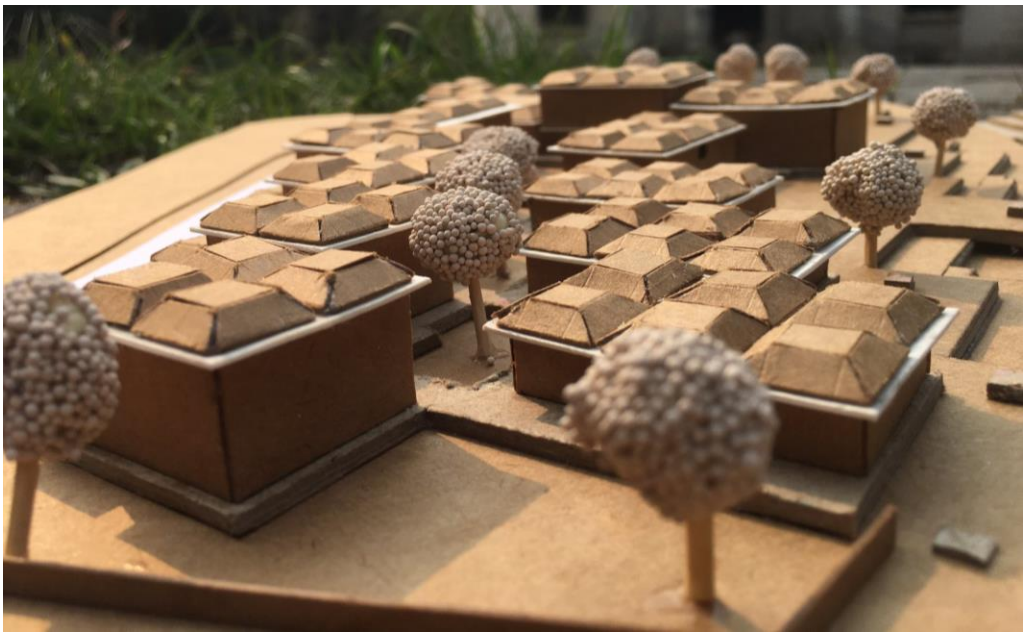


Figure 129 Model 03

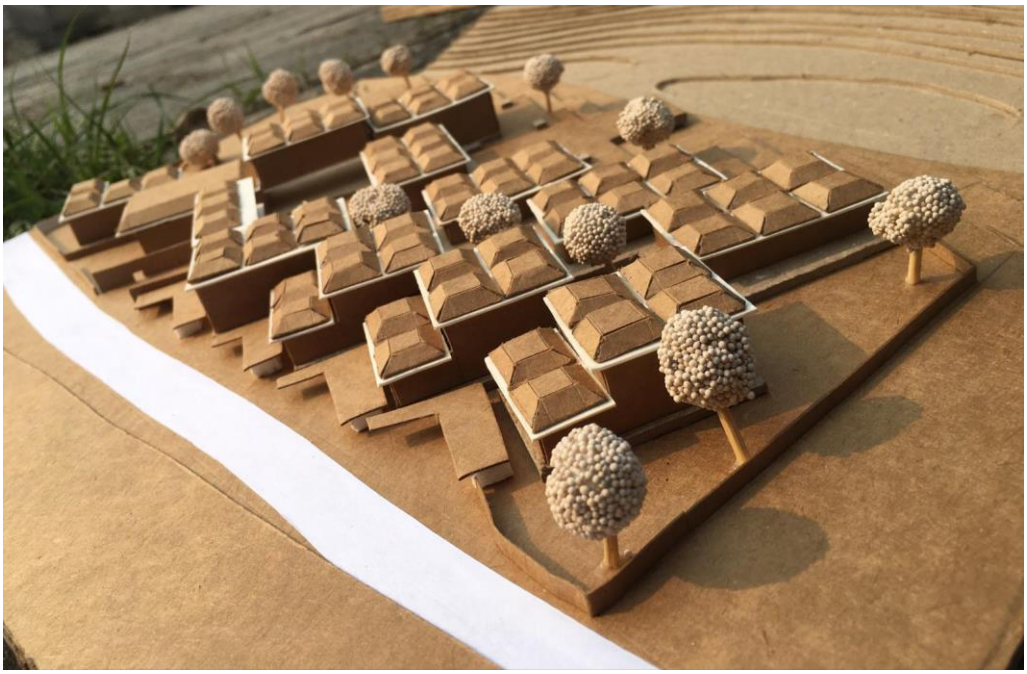


Figure 130 Model 04

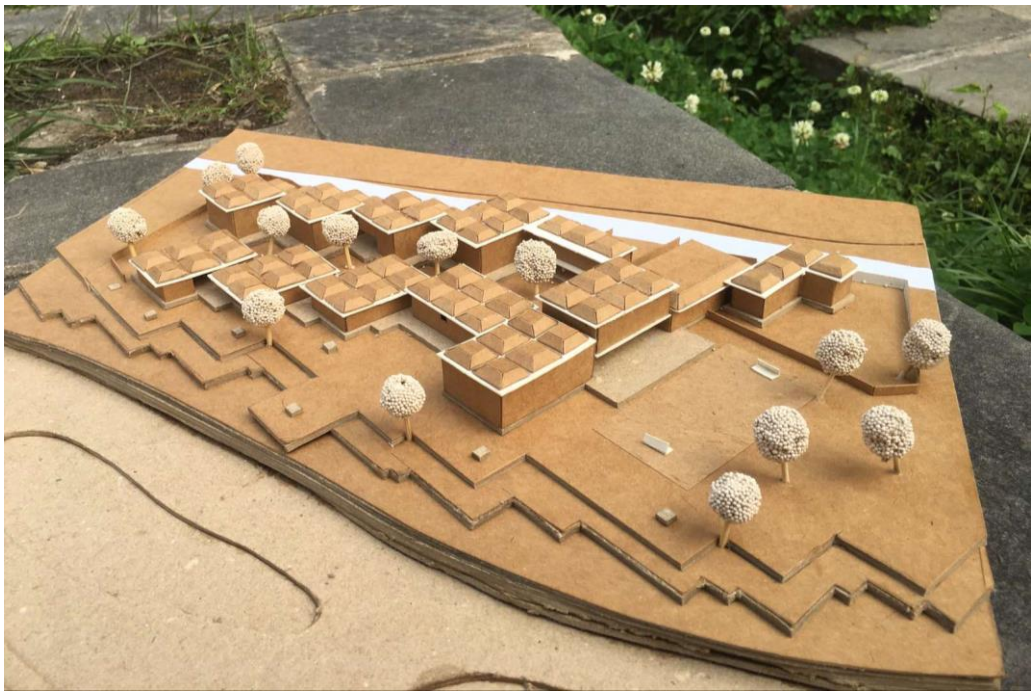


Figure 131 Model 05

Figure 132 Model 06

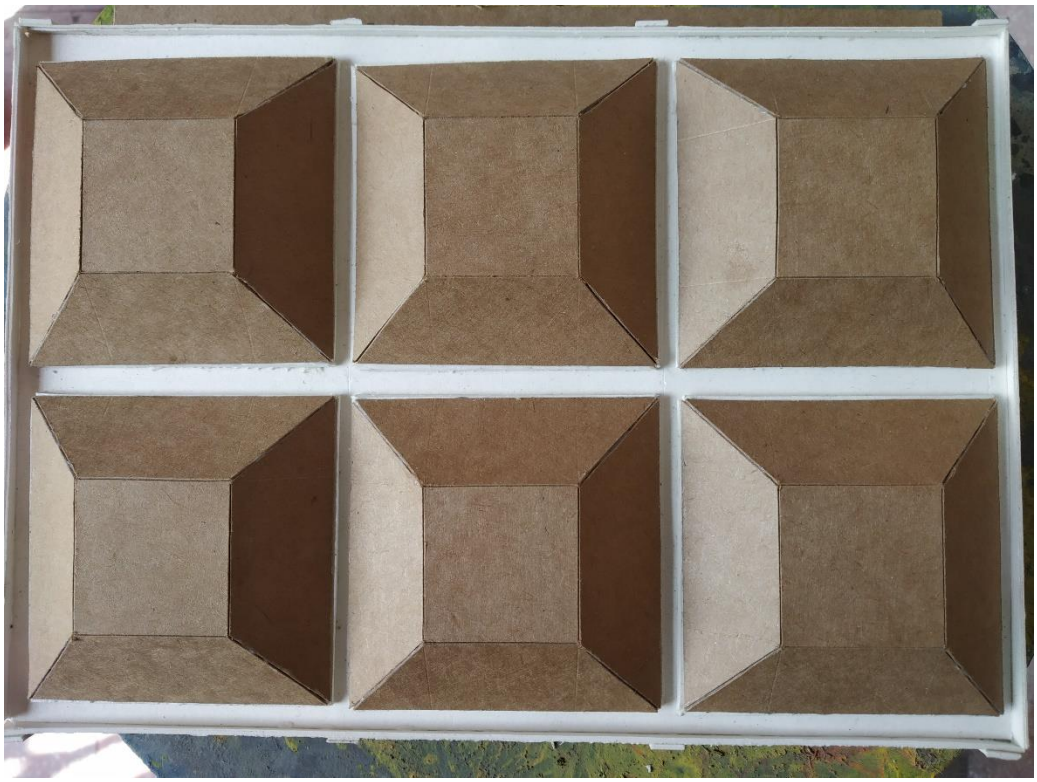


Figure 133 Model 07

Figure 134 Model 08

7 DESIGN DRAWINGS

Refer to appendix for the drawings

8 SERVICES

8.1 Water services

Nepal water supply corporation is the main source of drinking water for the whole project. Apart from this, rainwater harvesting has also been done that can supply water to the center's need.

8.1.1 Location

The overhead water tank is located at highest elevation of the complex, the second floor of the URC block that is distributed using gravity flow. The water is pumped from the underground tank to the overhead tank thrice a day in order to meet the maximum water supply charge.

8.1.2 Calculation of Water Quantity

Calculation of the water tank capacity is done based on water requirement as guided by NBC-208

Table 17 Calculation of water quantity

Particulars	No of users	Lpcd	Total (liters)
Urban resource center	35	45	1575
Multipurpose	200	15	3000
Cafeteria	160	70	11200
Day clinic	20	45	900
Training center	510	20	10200
Dormitory	20	45	900
Library/ visitors center	50	20	1000
Daycare	100	45	4500
Total			33,275

Total amount of water required per day = 33275 liters

= 33.275m3

=33.275 m3 *3 (safety factor)

=99.285 m3

Fire demand = 50000 liters (NBC)= 50 m3

total underground water tank = 149 m3 = 7m x 7m x 3m

calculation of overhead tank = 35% of underground tank (assuming is pumped thrice a day)

= 0.35*33.275

= 11.65 m3

=12000 liters

So, 4 water tanks of capacity 3000 liters (1.5m*1m*2m) can be used.

8.1.3 Rainwater Harvesting Collection

Implementing low-cost rainwater harvesting techniques can effectively address water scarcity during dry seasons. By collecting rainwater from catchments, not only can the water be used for daily needs, but it can also be utilized for irrigation and as a sustainable source for landscaping. Such measures can significantly reduce the dependence on scarce water resources, thereby promoting water conservation and sustainable use.

Catchment area = 4680 sq.m. (Total roof area)

Annual rainfall= 1.54 m

Runoff coefficient= 0.8

Annual rainwater harvesting potential = 4680*1.54*0.8= 5677 cu.m.

The BS 8515 2009 states that the capacity of the rainwater harvesting storage tank must be the least of 5% of the annual rainwater yield.

Thus, the tank capacity of rainwater = 10% of 5677cu.m.

= 566 cu.m.

= 8m*7m*5m x 2

8.2 Sanitation

Septic tank is used for proper management of sewerage. One septic tank is placed within the site, which collects the sewerage from different blocks through manholes and the wastewater after travelling through septic tank is spread into the underground through soak pits.

Table 18 Calculation of number of users of sanitation

No of users			
Primary users		Secondary users	
URC	35	Cafeteria	160
Training studios	(Taking 75% of users) 375	Multipurpose	200
Daycare	100children= 50adults	Library/ visitors center	50
Library	5	Dormitory	20
Cafeteria	10	Day clinic	20
Day clinic	5		450
Total	480	Taking 20% of total	90
Total number of users			570

Septic tank calculation = no of users x 3 cu.ft.

= 570*3 cu.ft.

= 1711 cu.ft.

= 48.42 cu.m.

Assuming height of septic tank 3m

L X B X H = 48.42

3B X B X 3 = 48.42

B = 2.3m L = 6.9m H= 3m

Septic tank size = 6.9m x 2.3m x 3m

Size of soak pit= 4* SP-6 (where SP6 is soak pit with 5m diameter and height of 2.75m) from NBC

9 CONCLUSION

This research tends to respond to the contemporary issues to prevent possible future problems of slum regeneration and encourage empowerment to the squatters and slum dwellers. Urbanization is inevitable and its repercussions are un avoidable and the problem of squatters is constantly growing in the valley. Research suggests that there exist several ways to approach the solution such as slum relocation, upgrading, regeneration and rehabilitation. The social approach of solving the slum and squatter problem through urban transformation projects is one of the applicable ways to transform slums and squatter settlements by uplifting the dwellers and empowering them. Various strategies to create this kind of social development center projects have been studied and in affordable ways. These social development centers can act as a core to allow open space for them to be enjoyed, learn skills and socialize with the rest of the urban communities. This can also be an opportunity to develop the riverfront which doesn't have a pleasing vista.

The major takeaway of the research is to design to create an impact and uplift the poor through skill development, counselling, informal education, sports and recreation with affordability, sustainability and energy efficiency applied in building design.

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11 ANNEX

Questionnaires prepared for the survey

For the community members

- **Information Resource center**
  - How easily can you access government services?
  - Do you get any information on any training activities that are held in the community?
  - How often are these activities held?
  - Do you know what kind of services are being provided by the government to the poor?
  - Would you visit this type of center if it were available?
  - How far will you be willing to walk to access these services?
- **Training Center**
  - If skill development programs are to be launched, what kind of programs would you prefer to attend?
  - Will you attend skill development programs if the government launches them?
  - How much does your family earn in a month or a daily basis?
  - What is the number of family members and earning members of the family?
  - From a scale of 1 to 10 how much do you feel a training center would be necessary for the people in the community?
- **Community Shelter**
  - Is there any sort of committee of the community?
  - Where are the meetings of the community held?
  - Are you aware of these community meetings?
  - Do you take part in these activities?
  - How often are these meetings held?
  - Do you feel the need of a community shelter building?
  - What activities will you as a community member perform if you had access to the shelter?

- Is there any dedicated space in the community where a family can stay if their house is affected by any sort of disaster like fire or flood?

- **Open Spaces**

  - Do you feel the open spaces are ample for your living?
  - If more open space were available, what purpose would you use it for as a community member?
  - What kind of socializing and interaction space do you need?

For the organizations

- What is the most necessary need of the urban poor besides proper housing?
- How can information resource center be beneficial for the community?
- Do you feel the need of a built structure in the poor community where you can provide services, launch programs, meetings and other activities?
- Is training program necessary for the urban poor of Kathmandu?
- How do you feel that the urban poor can be socially integrated I to the urban community?
- Is there a need of community shelter for the urban poor?
- What activities will help uplift the living standard of the poor?
- Can community shelter uplift the social interaction amongst the people?

Extracts of cognitive mappings done by Ar. Angela Subed during her thesis on slum rehabilitation

Drawing 1: Cognitive Mapping - C1

Drawing 3: Cognitive Mapping - C26

Drawing 9: Cognitive Mapping – C41

Drawing 2: Cognitive Mapping - C2

Drawing 4: Cognitive Mapping - C27

Drawing 10: Cognitive Mapping – T3

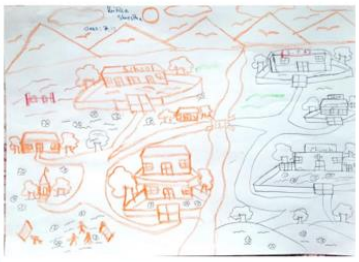
Drawing 5: Cognitive Mapping - C28

Drawing 7: Cognitive Mapping - C30

Drawing 11: Cognitive Mapping – T4

Drawing 6: Cognitive Mapping - C29

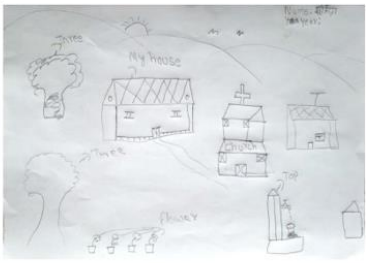
Drawing 8: Cognitive Mapping - C34



Drawing 12: Cognitive Mapping – T5

Drawing 24: Cognitive Mapping – F22

Drawing 22: Cognitive Mapping – F19



Drawing 23: Cognitive Mapping – F20