# Rebuilding Together

Educational and Community Renewal in Post-Conflict Kharkiv



POLITECNICO DI TORINO Departament of Architecture July, 2024

## Rebuilding Together: Educational and Community Renewal in Post-Conflict Kharkiv

## MASTER THESIS

Candidate:	Lendi Osmani
Supervisors:	Mauro Berta Edoardo Bruno

## abstract

This thesis investigates the extensive impacts of war on urban and architectural environments, focusing on a detailed case study of Kharkiv. The initial chapters examine the broad repercussions of war, including infrastructure destruction, environmental damage, and population displacement. These impacts are contextualized within Ukraine more specifically in Kharkiv to illustrate the challenges faced by cities in conflict zones.

A significant portion of the thesis explores the role of educational institutions, particularly schools, as essential community centers in post-war recovery. The research underscores the importance of community-based planning and cultural integration through participatory design, engaging community members in co-creating solutions and fostering a sense of ownership and cohesion.

Chapter two highlights an international competition organized by the Asian Institute of Low Carbon Design (AILCD), where the design proposal for reconstructing Gymnasium Nr.46 in Kharkiv won first place. This chapter presents the winning design, reimagining the gymnasium as a multifunctional space that serves both educational and community needs. The proposal showcases strategies for rebuilding and repurposing schools to enhance social cohesion and resilience. Further, the research examines the socio-cultural dimensions of reconstruction, emphasizing community involvement and cultural preservation in redevelopment efforts. It investigates strategies for fostering cross-sector collaboration, balancing economic growth with social equity, and integrating sustainable practices in architectural and urban planning. By leveraging partnerships across various sectors, the thesis aims to create holistic and sustainable educational environments, incorporating modern educational theories and technologies to develop dynamic and adaptable learning spaces.

The thesis also explores the historical context of post-war reconstruction, drawing valuable lessons from successful case studies such as the rebuilding efforts in London and Rotterdam. These examples provide insights into implementing innovative design and construction techniques while maintaining cultural and historical continuity. The study highlights the use of advanced construction methods, including prefabrication and modular systems, alongside modern materials and technologies.

Ultimately, this thesis proposes sustainable, long-term planning solutions to restore and improve educational facilities while strengthening community resilience and promoting cultural exchange. By integrating these elements, the study offers a comprehensive framework for rebuilding war-affected urban and architectural areas, supporting both immediate recovery and long-term development. This approach ensures that rebuilt educational facilities are not only structurally sound but also serve as vibrant community hubs, fostering social cohesion, cultural preservation, and economic growth. The proposed strategies highlight the central role that educational institutions can play in post-war recovery, contributing to the overall well-being and resilience of affected communities.

## INDEX

Abstract

## 1. Background and context

## 1.1 Impact of War in Ukraine

- 1.1.1 Damage to Infrastructure
- 1.1.2 Environmental Damage
- 1.1.3 Population Displacement

### 1.2 The City of Kharkiv

- 1.2.1 Impact of war in Kharkiv
- 1.3 Introduction to the Competition
- 1.3.1 The Community's Heart Before & After

### 2. Design Proposal - Gymnasium Nr.46, Kharkiv

- 2.1 Strategies
- 2.2 Project
- 2.3 Testemony

3. Community - Based Planning
3.1 Importance of Community-Based Planning
3.1.1 Benefits of Cultural Integration
3.2 Community Engagement Challenges
3.3 Partnerships and Workshops in Community - Based Planning
3.3.1 Promoting Partnerships - Workshops in Kharkiv
3.4 Stakeholders Role
3.5 Schools as Community Centres
3.5.1 Long - Term Planning
3.5.2 First step towards Sustainability

## 4. Contemporary Case Studies

- 4.1 Thoughtful Design in Learning Environment
- 4.2 Current Examples

## 5. Lessons from the past

## 5.1 The case of Post-war London School's

- 5.1.1 Prefabrication and Modular in Post-War Educational Buildings
- 5.1.2 Innovative Materials and Technologies in Post-War School
- 5.1.3 Implementations strategies Controlled, Cyclical Building Programs
- 5.1.4 Specific Implementations The CLASP system
- 5.1.5 Site Planning and Landscape Design
- 5.1.6 Hunstanton School Revisited: Innovations, Critiques, and Lessons

## 5.2 The case of Post-war Rotterdam

- 5.2.1 The Legacy of Post-war Reconstruction in Rotterdam
- 5.2.2 Post-War Reconstruction of Schools in Rotterdam

## 6. A vision for tomorrow

6.1 Future Principles to consider

Conclusions

## Bibliography

## War In Ukraine

Background and context

The full-scale invasion of Ukraine by Russia on February 24, 2022, marked a turning point in the nation's history, triggering a humanitarian crisis that has deeply affected the country's infrastructure, environment, and population.

This chapter provides analysis of the war's repercussions, focusing on the extensive damage to infrastructure, environmental degradation, and the widespread displacement of Ukrainian citizens.

The sudden and violent onset of the conflict has led to a reassessment of values among Ukrainians, with a renewed emphasis on survival, unity, and resilience. The war has inflicted severe damage on Ukraine's infrastructure, with over 50% of the housing stock in many cities either destroyed or damaged. Educational institutions have not been spared, suffering nearly \$8.9 billion in damages, which highlights the urgent need for reconstruction to ensure the continuity of education (Kyiv School of Economics, 2024). Environmental impacts have been profound, with widespread contamination of air, water, and soil resulting from the destruction of industrial facilities and oil depots (WWF & BCG, 2022). The Ministry of Environmental Protection and Natural Resources of Ukraine (2024) reports that over 3 million hectares of forests have been damaged or destroyed, leading to significant biodiversity loss (WWF & BCG, 2022). This environmental crisis poses long-term health risks and threatens local ecosystems.

The conflict has also led to massive population displacement. As of April 2024, approximately 3.7 million people remain internally displaced within Ukraine, while another 5.93 million have sought refuge in other countries (International Organization for Migration, 2024). This displacement has created a severe humanitarian crisis, with millions facing uncertainty, trauma, and the challenges of rebuilding their lives in unfamiliar environments. This chapter will explore these issues, offering a comprehensive understanding of the current situation in Ukraine. It will also emphasize the need for innovative and sustainable solutions to address the multifaceted challenges posed by the war.



## 1.1 Impact of War

On February 24, 2022, at 03:40 a.m., all citizens of Ukraine woke up in horror as a full-scale invasion by Russia began across the borders of the country. This invasion led to dire circumstances, creating a genuine crisis for both civilian and military populations, resulting in a significant humanitarian disaster. The war brought about a series of catastrophic events for Ukrainians, compelling them to reassess their lives and values. It became evident, especially in times of danger, that the paramount value is one's own life and well-being (Andrushchenko, 2022).

According to Andrushchenko (2022), "Spiritual and aesthetic values are currently undergoing a significant reevaluation. Some of them, which seemed important before the war, now receded into the background, and vice versa, we began to value some everyday things more. Helping loved ones, their smiles, supporting each other, volunteering are important, because they make us feel that each of us is not alone. Awareness of unity helps the people to withstand any difficulties. Mutual aid breeds indomitability. War is a horror. No one can argue with this axiom or argue that it does not." In other words, waking up the next day is already a great achievement; satisfying basic needs and having a cover over one's head is great luck. Many people have lost everything and are forced to survive in other, safer areas.

This crisis is undoubtedly multifaceted, covering housing, educational, social, and environmental aspects. From an architectural point of view, this now presents a major challenge, requiring the creation of pathways for the population to recapture aspects of their pre-conflict lives in the next decades. Next, the main areas that suffered and are still suffering (as of 2023) from the Russian invasion will be considered, namely the infrastructure, environment, and population of Ukraine. This will help to get acquainted with the situation in general, for the further development of methods and strategies to improve the situation in the field of educational architecture in the post-war period.

#### Impact on Ukrainian People

The full-scale invasion of Ukraine by Russia has profoundly affected the Ukrainian population. This conflict has led to significant loss of life and widespread psychological trauma, with many Ukrainians experiencing the devastation of their homes and communities, resulting in a pervasive sense of loss and uncertainty about the future.

The psychological impact is immense, with many individuals suffering from severe stress, anxiety, and depression. The collective trauma experienced by the population necessitates significant efforts towards psychological and communal healing. According to Sukhomud (2023), communal dimensions of healing are particularly important in addressing the collective trauma caused by the war. Various grassroots initiatives focus on community support and resilience, highlighting the importance of socio-political mobilization and solidarity among Ukrainians (Sukhomud, 2023).

The war has compelled Ukrainians to reassess their values, with a heightened emphasis on life and well-being. As noted by Andrushchenko (2022), there has been a significant reevaluation of spiritual and aesthetic values. Many aspects of life that were previously taken for granted have become paramount, such as the importance of helping loved ones, supporting each other, and volunteering. This sense of unity and mutual aid has been crucial in helping people cope with the difficulties brought about by the war.

## 1.1.1 Damage to Infrastructure

The infrastructure sector in Ukraine has been severely impacted by active shelling, resulting in significant damage to educational institution, housing and administrative buildings. More than 50% of the housing stock in numerous cities and towns has been destroyed or damaged, with regions such as Kharkiv, Mykolaiv, Kherson, Donetsk, Luhansk, Chernihiv, and Kyiv particularly affected, experiencing up to 90% damage to their dwelling stock (Kyiv School of Economics, 2024).

According to the Kyiv School of Economics, as of January 2024, the total amount of direct documented damages inflicted upon Ukraine's infrastructure stands at \$155 billion. This includes the explosion of the Kakhovka Hydroelectric Power Station dam caused by Russian actions in June 2023 (Kyiv School of Economics, 2024). The number of damaged and destroyed residential buildings has reached almost 250,000, including 222,000 private houses, over 27,000 apartment buildings, and 526 dormitories (Kyiv School of Economics, 2024). Direct damage to these facilities is estimated at \$58.9 billion (Kyiv School of Economics, 2024).

As of the beginning of 2024, the damage to infrastructure has reached \$36.8 billion, and the direct damages to industry and businesses have already reached \$13.1 billion (Kyiv School of Economics, 2024). According to the latest data, 78 small, medium, and large private enterprises, as well as 348 state-owned enterprises, have been destroyed or damaged. The direct damages from the destroyed infrastructure of the energy sector continue to grow, reaching up to \$9 billion. In the agro-industrial complex, damages amount to \$8.7 billion. Additionally, as of the beginning of this year, direct damages in the areas of housing and public utilities total \$4.5 billion, and healthcare has seen an increase of another \$1.4 billion, bringing the total to \$3.1 billion (Kyiv School of Economics, 2024).

#### 1.1.1 Educational institutions infrastructure

The war has significantly impacted the education sector, resulting in substantial damage and destruction to educational infrastructure. Approximately 3,800 educational institutions have been affected, leading to prolonged suspensions of educational activities in numerous regions (Kyiv School of Economics, 2024).

Consequently, the government has reallocated state budget funds from education to pressing needs like defense, disaster relief, and social protection(Kyiv School of Economics, 2024). The estimated financial damage to educational institutions is \$8.9 billion, with at least 380 facilities completely destroyed and 3,429 damaged (Kyiv School of Economics, 2024).

These affected institutions include preschools, secondary schools, colleges, technical schools, universities, academies, and specialized institutions. The most severe damages occurred in secondary, preschool, and vocational education facilities, which were often targeted due to their widespread presence and strategic use during the conflict (Kyiv School of Economics, 2024). Despite active hostilities in 11 regions, educational institutions in 21 regions have suffered damage, with the most significant impacts in Donetsk, Kharkiv, Kherson, Mykolaiv, Dnipro, and Zaporizhzhya. Among the damaged facilities, schools (1,888) and kindergartens (1,285) constitute the largest numbers (Kyiv School of Economics, 2024).



↑ Orikhiv, Zaporizhzhia region photo by facebook.com/MNS.GOV.UA

↓ Huliaipole, Zaporizhzhia region photo by Governor of Zaporizhzhia region





- ↑ Vovchansk city, Kharkiv region photo by facebook.com/MNS.GOV.UA
- Pokrovsk city, Donetsk region photo by facebook.com/MNS.GOV.UA
- → Borodyanka, Kyiv region photo by Vadim Ghirda
- Izum city, Kharkiv region photos by facebook.com/MNS.GOV.UA
- ↓ Kherson region photos by facebook.com/MNS.GOV.UA











## 1.1.2 Environmental Damage

In addition to the destruction of essential infrastructure, ongoing military activities have inflicted severe environmental damage that will affect Ukraine for years to come. From the shelling of chemical plants to forests set ablaze by rockets, the repercussions will impact both the ecosystems and the people of Ukraine. According to the Ministry of Environmental Protection and Natural Resources of Ukraine (2024), the war has led to widespread contamination of air, water, and soil due to the destruction of industrial facilities, oil depots, and chemical plants (WWF & BCG, 2022). Over 3 million hectares of forests have been damaged or destroyed, contributing to significant biodiversity loss (WWF & BCG, 2022).

One of the most pressing issues is the contamination of soil and water resources due to hazardous substances released from destroyed industrial facilities. This poses long-term health risks to the population and disrupts local ecosystems. Furthermore, the destruction of water infrastructure has led to water shortages in many regions, exacerbating the humanitarian crisis (Ministry of Environmental Protection and Natural Resources of Ukraine, 2024). The head of the All-Ukrainian Environmental League (2023) emphasizes that shelling and occupation increase the risk of toxic waste emissions from industrial enterprises. The regions most affected are Donetsk, Dnipropetrovsk, Zaporizhzhia, Kharkiv, and Lviv.

Russia's invasion impacts 20% of Ukraine's natural areas, including 812 protected sites and 0.9 million hectares. Approximately 160 areas in the Emerald network, covering 2.9 million hectares, are at risk. The war endangers food markets and ecosystems by shrinking territories through landmines and military actions (Vlasyuk, 2022; Sukhomud, 2023).



 Explosive objects in water bodies, Sumy region
 photo by facebook.com/MNS.GOV.UA
 Soil disturbance in the Red forest, Chernobyl zone

photo by greenpeace.org

 Explosive objects at forest areas, Mykolaiv region

photo by facebook.com/MNS.GOV.UA





- ← Consequences after Kakhovska dam explosion, Kherson region photos by facebook.com/MNS.GOV.UA
- Burned 10 hectares of wheat fields, Odesa region

photos by facebook.com/MNS.GOV.UA









← Burning of oil depot, Lviv region photo by facebook.com/MNS.GOV.UA

Burned 20 hectares of forest area, → Mykolaiv region

photo by facebook.com/MNS.GOV.UA







## 1.1.3 Population Displacement

The conflict between Russia and Ukraine has forced numerous Ukrainians to flee their homes to safeguard their families, particularly children, from the increasing threat posed by Russian forces. Since the onset of the war on February 24, 2022, modern Ukrainian families have had to confront a harsh new reality, resulting in unexpected decisions regarding their daily lives and painful separations from loved ones.

According to the International Organization for Migration (IOM), as of April 2024, around 3.7 million people remain internally displaced within Ukraine, while another 5.93 million have sought refuge in other countries (IOM, 2024). During the first month of the full-scale war, 3.6 million people left Ukraine. In the early days, kilometer-long queues formed at border checkpoints to the European Union, especially to Poland, with up to 150,000 people crossing daily (IOM, 2024).

Ukraine has also faced significant internal migration. According to the Ministry of Social Policy, nearly 4.9 million people are classified as internally displaced persons (IDPs), with 60% being women and 40% men. Reports from the United Nations (UN) indicate that as a result of the war, 9,177 people have died, and another 15,993 have been injured, including 535 children. UN observers have documented over 25,000 civilian casualties, with 61% being men and 39% women. Among children, 57.2% are boys and 42.8% are girls (UNHCR, 2023). The UN reports that the conflict has led to widespread destruction, with damage to housing and public infrastructure and a significant number of medical and educational institutions being damaged or destroyed (UN News, 2024). Civilians near the frontlines face daily hostilities and remain at risk even after fleeing, as indiscriminate airstrikes continue (UNHCR, 2024).

Furthermore, the displacement crisis has overwhelmed humanitarian services, with millions of Ukrainians dependent on aid. The UNHCR has provided protection and support to millions, including legal assistance, psychosocial support, and emergency shelter (UNHCR, 2024). Despite the significant aid efforts, the scale of need remains vast, with many displaced persons requiring ongoing support (CFR, 2024).

The prolonged conflict and displacement crisis underscore the urgent need for a peaceful resolution and sustained international support to address both immediate humanitarian needs and long-term recovery efforts (IOM, 2024; UN News, 2024).

Irpin, Ukraine. Oleg kisses his wife Yana goodbye through a train platform fence as she waits to board an evacuation train with their eleven month-old son Maksim.

Photography by: Chris McGrath/ Getty images





refugees from Ukraine recorded beyond Europe 0,364 mln

refugees from Ukraine recorded in Europe 5,967 mln

source: united nations human rights/ ohchr.org

total people affected by displacement 19,3 mln

people in need 17,6 mln

source: international organization for migration, ION/ iom.int

people with damaged housing 2.3 mln

people with completely destroyed housing 0.17 mln

source: ministry of reintegration of the temporarily occupied territories of Ukraine/ minre.gov.ua/én/

<u>casualties</u> 9 177

all population present

9,237 mln

injured people 15 993

source: united nations human rights/ ohchr.org, as 19 October 2023

returnees 3 mln

IDP 8 mln

source: united nations human rights/ ohchr.org







## INTERVIEWS

responses from 3 Ukrainian citizens who have different resident statuses after 24.02.2022.

The comments about their current lifestyle, how the situation affects them and how they see their future in different aspects



Daria, student- law 23 years old from: Kyiv current location: Turin status: refugee

#### 11

The full-scale invasion forced me to move abroad. After a journey of about one and a half weeks via the Kyiv-Lviv-Krakow-Turin route, I reached Turin, my final destination. The initial six months in Turin were emotionally challenging, as I lived closely with family I hadn't been with for a long time. Yet, amid the war and uncertainty, Turin's charm, vibrant lifestyle, diverse architecture, and efficient transportation brought me a sense of euphoria. It was the beginning of a new chapter, and I threw myself into adapting to this new environment. Looking back, I remember feeling a mix of high adrenaline and deep calmness, likely due to the stark contrasts in Turin's lifestyle, urban architecture, and colorful scenery compared to my previous experiences. The people I met and the city's blend of beauty and comfort significantly stabilized my emotional state. My cousin, who already lived in Turin, handled most household responsibilities, bearing more stress than I did.

In Kyiv, I had lived in a restricted-access modernist district, the last of its kind in the former Soviet Union. The area had large proportions, broad streets, and sprawling buildings with repetitive designs. Despite living there my whole life, some streets remained indistinguishable to me. The time-consuming planning required for trips, given the imperfect transportation system and the lack of a subway, was a constant frustration. Later, I moved to another modernist district built 20-30 years earlier in the '70s, offering a different experience with smaller buildings and ample greenery between nine-story structures, creating a garden oasis vibe. This district, surrounded by a river channel, the Dnipro River, and a lake, enhanced the peaceful atmosphere. I appreciated the trend of home improvement in Kviv, especially in my area. The district was built for economic efficiency, resulting in fast and budget-friendly construction. However, it didn't consider the city's average annual temperatures, leading to nearly 95% of balconies being individually glazed, each uniquely designed without regulatory constraints. It resembled tightly packed residential areas with superstructure balconies being a common sight.

I loved Ukraine for its local-focused life infrastructure, even though it had its drawbacks. In contrast, Turin's European culture and amenities were appealing, but the influx of tourists altered the local landscape and culture. I admired Kyiv's informal and accessible approach to real estate and rentals for young people. Personally, I felt a strong connection to Ukrainian culture and lifestyle. Another difference was that in Turin, retirees spent much time outdoors, while in Kyiv, most preferred staying at home. Living in Turin for a year and a half, I felt much safer, especially from a gender perspective. The city, especially at night, gave me a sense of security I didn't experience in Kyiv.

Regarding post-war life in Ukraine, I consider splitting my time between both countries. However, every return to Ukraine should be a chance to immerse myself in authentic Ukrainian life, language, culture, and people. The decision between returning to a familiar life or continuing as a foreigner in an unfamiliar world remains uncertain, and doubt lingers. Creating a family, finding a good job, achieving economic stability, and ensuring personal safety are my priorities. Above all, I want to feel safe and avoid occupation or similar tragic circumstances at all costs. The individual housing style in Ukraine has always fascinated me. I appreciate homes built by individuals and believe in preserving this individuality rather than homogenizing the urban landscape. I am not a fan of "perfect city" projects where everything looks the same. To achieve this, I believe a single company could organize and provide training materials for the process. However, it's crucial to cultivate a sense of responsibility among the average consumer. Therefore, a platform offering resources, knowledge, education, and technical support would help popularize this idea and facilitate its implementation in our society.

11



Dimitri, student- architecture 28 years old from: Kharkiv current location: Turin status: refugee



Alex, CRM admin 26 years old from: Crimea, Ukraine current location: Kyiv, Ukraine status: IDP (from 2014)

### 11

During the war, I have faced some of my biggest challenges. One major issue is the closed borders (since the full-scale invasion on February 24, 2022, Ukrainian law prohibits all men from leaving the country during martial law, with few exceptions). At a time when I am healthy and financially able to travel, I am eager to explore new countries, cultures, lifestyles, and cuisine. However, the lack of opportunity to do so has a profound impact on my mental well-being. Two other challenges are even more severe: the fear of rockets hitting my home and the fear of being sent to the frontline. Both of these scenarios are potentially fatal. My greatest fear is the prolonged duration of the war; I yearn to return to my peaceful past life as soon as possible.

In terms of my daily routine, not much has changed, except for the curfews and the moments during shelling when I must run to underground shelters. These situations cause anxiety, especially when I hear shelling and explosions nearby.

In the future, I hope to see a prosperous country without war, with decent and affordable housing. However, if the threat from the so-called Russian Federation continues, it would be beneficial to have newly reinforced houses with modern shelters.

11

### 11

The office where I work has switched to remote work; my daily routine is completely dependent on shelling and air raids.

It's actually very exhausting, especially this summer (2023) there was a period of shelling almost every night that ended at 5-6 am.

We didn't sleep for weeks. That is, you spend the night in the metro or in the corridor, and then in the morning you are tired out and try to work. I feel all this like a bad dream that has not end. And what is really scaring about this: I am used to it. Sometimes I spend time outside the city, in the house with my parents. I feel a little better there, because it is calmer in general and I can sleep in the basement. By the way, even before the full-scale invasion, I was always in favor of building a basement/bomb shelter in private houses.

And in general, I notice that construction sites in Kyiv and beyond its borders are continued, but much more slowly. And so it is with everything, because we are trying to somehow continue to live a normal life.

11



The war in Ukraine has precipitated a complex and multifaceted crisis that touches every aspect of Ukrainian life, from the physical destruction of infrastructure to the psychological trauma experienced by its people. This part of the chapter has examined the extensive damage inflicted upon Ukraine's infrastructure, the severe environmental degradation, and the significant displacement of the population, with a particular focus on the catastrophic impact on educational institutions.

The scale of infrastructural damage is staggering, with more than 50% of the housing stock in numerous cities destroyed or damaged (Kyiv School of Economics, 2024). The educational sector has faced unprecedented challenges, with nearly \$8.9 billion in damages to schools, universities, and other educational facilities. This extensive damage has disrupted the education of millions of students, posing a significant challenge to the country's future development and recovery. The destruction of educational infrastructure underscores the urgent need for reconstruction efforts that prioritize the restoration of learning environments to ensure that children and young adults can continue their education without prolonged interruption.

Environmental damage from the conflict has also been severe. The widespread contamination of air, water, and soil due to the destruction of industrial facilities, oil depots, and chemical plants poses long-term health risks and threatens local ecosystems. Over 2 million hectares of forests have been damaged or destroyed, leading to significant biodiversity loss (Ministry of Environmental Protection and Natural Resources of Ukraine, 2024). These environmental issues will require substantial remediation efforts and long-term monitoring to mitigate their impact on human health and the environment. The displacement crisis is another critical aspect of the war's impact. As of April 2024, approximately 3.7 million people remain internally displaced within Ukraine, while another 5.93 million have fled to other countries (International Organization for Migration, 2024). This mass displacement has resulted in a severe humanitarian crisis, with millions of Ukrainians facing uncertainty, trauma, and the challenges of rebuilding their lives in new and often unfamiliar environments. The international community's response and support will be crucial in addressing the immediate needs of these displaced populations and in supporting long-term recovery and integration efforts.

The war has compelled Ukrainians to reassess their values, emphasizing unity, resilience, and mutual support. The collective trauma experienced by the population necessitates significant efforts towards psychological and communal healing. Various grassroots initiatives focusing on community support and resilience are essential in addressing the collective trauma caused by the war (Sukhomud, 2023).

Rebuilding Ukraine will require a comprehensive and coordinated approach that addresses the immediate needs of the population while laying the groundwork for sustainable long-term development. This includes the reconstruction of damaged infrastructure, particularly educational facilities, to ensure that future generations have the opportunity to rebuild their lives and contribute to the country's recovery. The restoration of educational institutions is critical not only for the immediate resumption of learning but also for the long-term social and economic recovery of the nation. Environmental remediation efforts will be necessary to address the widespread contamination and restore ecosystems affected by the conflict.

These efforts must be supported by robust policies and international cooperation to ensure effective and sustainable environmental recovery.

In conclusion, the war in Ukraine has created an intricate web of challenges that require comprehensive and multifaceted solutions. The extensive damage to infrastructure, severe environmental degradation, and significant population displacement highlight the urgent need for coordinated reconstruction and recovery efforts.

By focusing on the restoration of educational institutions and addressing the broader infrastructural and environmental challenges, Ukraine can begin to rebuild and recover from the profound impacts of the conflict. The resilience and unity of the Ukrainian people, combined with international support, will be essential in navigating the path to recovery and ensuring a sustainable and prosperous future for the nation.

A damaged playground is seen next to the Barvinok kindergarten building in Makariv, Ukraine, on April 19. Photography by: Alexey Furman/Getty Images



## 1.2 The City of Kharkiv

Kharkiv, located in northeastern Ukraine, is a city of immense historical, cultural, and educational significance. Founded in 1654 as a military fortress, Kharkiv grew rapidly into a major center of industry, trade, and education within the Russian Empire and later the Soviet Union. The city became an educational hub with the establishment of Kharkiv University in 1805, which played a crucial role in the development of higher education in Ukraine. By the turn of the 20th century, Kharkiv was home to numerous educational institutions, including technical, medical, and commercial schools, as well as cultural institutions like museums and theaters (Encyclopedia of Ukraine, 2024; Britannica, 2024).

Kharkiv's significance extends beyond its educational prowess. The city has been a major industrial center, specializing in machinery and electronics, with numerous factories and research institutions.

This industrial base, combined with its educational infrastructure, positioned Kharkiv as a key player in Ukraine's economy and innovation landscape. The city's population, estimated at 1.42 million in 2022, reflects its importance as a vibrant urban center (Wikipedia, 2024).

However, Kharkiv's proximity to the Russian border has made it a primary target in the ongoing conflict. The relentless shelling and missile attacks have caused unprecedented destruction, particularly to its educational institutions. This chapter examines the profound impacts of the war on Kharkiv, focusing specifically on the devastation of its educational infrastructure, the broader infrastructural damage, environmental degradation, and the displacement of its population. In the introduction of the competitition that took place in this city for the rebuilding Gymnasium Nr.46, we will introduce the challenges that destroyed this institution.

## Climate of Kharkiv

-total annual precipitation ranges from Kharkiv region covers 31 415 km in the 457–569 mm, peaking in Jun, dropping east of Ukraine. in Jan-Feb. Climate: -west and east winds at 4 m/s are common -the average annual temperature is 8 °C -relative humidity with a pronounced minimum in May (up to 60%) and a -the coldest month- January, with an maximum in winter (Dec-Jan up to 85%) average of -7°C, July- the hottest with an average of 20°C The region's climate varies from north to south, with the northeast being the -snow cover stabilizes from late Nov-Dec coldest and the southeast the warmest, till Feb-Mar at 7-14 cm in avarage but temperature differences are slight. average, high and low temperature wind speed 30t°C 6 m/s max max 🤈 min -10 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec -the windier part of the year: November-April -moderate continental climate with cold winters and warm summers (Dfb) average, monthly snowfall and rainfall relative humidity 140mm 100 120 100 70 60 80 50 60 4030 40 20 20 10 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec - average annual percentage of humidity: 72%; - rain falls throughout the year; the most rainy: June December - the most himid month (87%)

- snowy period: November-April (5.1 months)

30

May - the least humid month (57%)

## Passive strategies for the region



### possible building local materials: •

-timber (framing/ cladding/ interior finish)

-clay (bricks)

-limestone, sandstone (constructions)

-straw, reed (insulation)

-concrete (20th century)

### structures:

-timber frame construction -stone construction -brickwork -concrete block construction

## 1.2.1 Impact of War in Kharkiv

The war has had a catastrophic impact on educational institutions in Kharkiv. The city's educational infrastructure has faced extensive destruction, severely disrupting the education of thousands of students. According to reports, almost 800 educational facilities in Kharkiv have been completely or partially destroyed since the start of the full-scale war (Ukrinform, 2024). This includes schools, universities, kindergartens, and vocational training centers.

One notable incident involved the repeated attacks on School Number 62, a prominent institution specializing in teaching English. The school buildings suffered extensive damage from artillery fire and aerial attacks, including the use of cluster munitions (Human Rights Watch, 2024). Additionally, Kharkiv Gymnasium No. 46, named after M.V. Lomonosov, was completely destroyed by rockets in the summer of 2022 (T4P, 2024).

Higher education institutions have also been severely affected. The Beketov University of Urban Economy was damaged by a Russian missile strike in February 2023, marking one of several attacks on this institution (T4P, 2024). Furthermore, the Kharkiv Institute of Physics and Technology, housing a nuclear research facility, has been repeatedly shelled, raising significant safety concerns (T4P, 2024). Efforts to restore and improve the educational infrastructure have been slow due to ongoing hostilities. The "Education Cannot Wait" (ECW) Multi-Year Resilience Program aims to address these challenges by ensuring access to quality education and supporting non-formal education initiatives in war-affected areas like Kharkiv (Kyiv School of Economics, 2024).

#### **Broader Infrastructural Damage**

In addition to educational facilities, Kharkiv's broader infrastructure has suffered significant damage. The city has faced relentless shelling and missile attacks, destroying or heavily damaging residential buildings, administrative structures, and other critical infrastructure. The Kharkiv regional administration building and city hall were among the significant structures hit, leaving thousands of residents homeless and severely impacting the city's functionality (DW, 2023).

The total damage to Kharkiv's infrastructure is substantial, with estimates suggesting that the city alone has suffered \$30.2 billion in damages (Kyiv School of Economics, 2024). This extensive damage has created a massive challenge for reconstruction efforts and has severely affected the city's ability to provide essential services to its residents.

#### **Population Displacement**

The conflict has caused significant displacement in Kharkiv, with thousands of residents forced to flee their homes. The city has one of the highest numbers of internally displaced persons (IDPs) in Ukraine. This displacement has created severe humanitarian challenges, with displaced families facing difficulties such as lack of housing, employment, and access to basic services. Many IDPs from Kharkiv have experienced significant psychological trauma, requiring comprehensive support for mental health and community reintegration (UN News, 2024).

#### **Environmental Damage**

The environmental impact of the war in Kharkiv has been severe, with long-term consequences for the region. The destruction of industrial facilities and chemical plants has led to widespread contamination of air, water, and soil, posing serious health risks to the local population. Forest areas around Kharkiv have also been affected, with fires and deforestation resulting from military actions, leading to a loss of biodiversity and disruption of local wildlife habitats (Ministry of Environmental Protection and Natural Resources of Ukraine, 2024).



- ↑ A Ukrainian deminer examines a crater caused by missile strikes that struck the yard of a school in a residential area of Kharkiv, Ukraine, on June 27 Photo: Sergey Bobok
- A view of a school which was used as a Russian military base in the recently liberated town of Izium, Ukraine, Wednesday, Sept. 21, 2022.
   Photo: Evgeniy Maloletka





- ↑ The destroyed playground of a kindergarten in the town of Kharkivska region, May 26, 2023. Photo: Sergey Bobok
- A view shows a compound of a local school heavily damaged by a Russian military strike in the town of Avdiivka, amid Russia's attack on Ukraine, Ukraine May 5, 2023 Source: REUTERS/Stringer
- → Kharkiv School Nr.7 Photo: Maidan.org.ua
- ↘ Kharkiv Secondary School Nr.118 Photo: Olexiy Kuleba
- Kharkiv Specialized School Nr. 17
   Photo: Andriy Sadovy / Telegram











## 1.3 Introduction to the Competition

The 13th AILCD International Architecture Design Competition, organized by the NPO Asian Institute of Low Carbon Design (AILCD) and the University of Kitakyushu in Japan, in partnership with the Institute of Architecture and Design of Lviv Polytechnic National University (Ukraine), focuses on the theme of "High School Design for Kharkiv, Ukraine." This competition aims to address the challenges of post-war urban planning and the reconstruction of educational infrastructure in Kharkiv, a city significantly affected by conflict.

#### **Objective and Theme**

The competition aims to find innovative designs for rebuilding a destroyed educational building and its surrounding area in Kharkiv. The primary objective is to create a high-quality, modern lyceum that meets contemporary standards of urbanism, comfort, and accessibility within the city's historical context.

#### **Site and Context**

The competition site is Kharkiv Lyceum No. 46, located at Derzhavinska St, 4-A, Kharkiv. This comprehensive educational institution, which served 1,328 students across 49 classes and employed 129 teachers, was destroyed on July 10, 2022.

#### **Design Requirements**

Participants are tasked with designing a modern educational complex that integrates with its surroundings, provides access to adjacent streets, and aligns with the existing urban fabric. The design should include:

- A new school building
- An overall sustainable concept
- Green space design
- Proposals for renewable energy systems
- Connections with the surrounding area

#### **Conceptual Focus**

The competition encourages rethinking the transformation of old Soviet-era schools and incorporating modern trends in educational institution design. Key conceptual tasks include:

- Creating a high-quality educational institution that reflects global trends in school education
- Developing a high-quality urban composition and original design concepts
- Integrating the educational complex within the context and scale of the existing area

The competition aims to not only rebuild a crucial educational facility in Kharkiv but also to promote innovative and sustainable design solutions that can serve as models for other post-war reconstruction projects in Ukraine and beyond.



## 1.3.1 The Community's Heart -Before & After

The international competition organized by the Asian Institute of Low Carbon Design aimed at fostering "a better and peaceful future."

Our project as you will see in Chapter 2 intricately blends the memory of the bombed sites with the redefinition of spaces for the Kharkiv community. This educational landscape transforms into a social incubator, dedicated to mending the fragilities of a system strained by persistent conflict.

This school, historically a cornerstone of education in the region, has been left in ruins by the recent Ukrainian conflict. Its restoration is not merely a construction endeavor but a beacon of hope for the community's future.

We have focused on prioritizing the community's needs and honoring their collective memories. Central to our approach is recognizing the school as the neighborhood's heart, with the potential to strengthen communal bonds.

We aim to foster stronger community ties by transforming the school into more than just an educational institution, but also a hub for social interaction and engagement. Our design introduces the concept of 'Schools as community centers,' a novel idea particularly relevant in the post-Soviet context, where institutions often serve as focal points for local life.

Our design seamlessly integrates the preservation of the school's courtyard, serving as a testament to shared experiences and memories while introducing modern spaces conducive to learning and community participation.

Community was integral throughout the design process, ensuring the project truly reflects the residents' needs and desires.

We extend our heartfelt gratitude to the Asian Institute of Low Carbon Design for their invaluable support in bringing our vision to fruition. Together, let's embark on a journey to rebuild hope and pave the way for a brighter future for Kharkiv and its inhabitants. This project is not just about reconstructing a building; it's about rebuilding lives, nurturing dreams, and fostering a resilient, united community.













Low infrastructure on parks and problems with the flooding.

Before July 10, the Kharkiv School Nr. 46

No pedestrian infrastructure for the community, and barriers on public spaces.

High levels of residental building marking the neiborhood.

## After July 10, 2022 Kharkiv School Nr.46



Spurce :Dmytro Malyshev

11





"we will
rebuild
what was
destroyed "

# 2

## **Design Proposal**

Gymnasium Nr.46, Kharkiv

The international competition organized by the Asian Institute of Low Carbon Design (AILCD) aimed to promote "a better and peaceful future" through the reconstruction of Gymnasium No. 46 in Kharkiv. This initiative was not just about rebuilding a school; it was about healing a community and providing a beacon of hope amidst the ruins. Our project intricately combines the memory of the bombed sites with the redefinition of spaces for the Kharkiv community, transforming this educational landscape into a social incubator dedicated to repairing the fragilities of a system disrupted by the ongoing conflict.

We are thrilled to announce that this project has secured the 1st prize in this competition. Historically, Gymnasium No. 46 has been a cornerstone of education in the region, now reduced to ruins by the recent Ukrainian conflict. Its restoration is not merely a construction endeavor but a symbol of resilience and a beacon of hope for the community's future. Our winning design marks a pivotal moment in envisioning a brighter tomorrow for the region's residents.

Guided by the principle "We will rebuild what was destroyed," we focused on prioritizing the community's needs and honoring their collective memories. At the center of our approach is the recognition of the school as the heart of the neighborhood, with the potential to strengthen community bonds. By transforming the school into more than just an educational institution, we aim to foster stronger community ties, creating a hub for social interaction and engagement. Our design introduces the concept of 'Schools as community centers,' a novel idea particularly relevant in the post-Soviet context, where institutions often serve as focal points for local life. At the core of our design philosophy is the idea of providing the school with a distinct identity within a neighborhood devastated by war. Represented in layers that resonate with the community's history and aspirations, we creatively utilize architectural elements such as the roof to craft a symbol of resilience and renewal, akin to a precious jewel amidst adversity.

The large roof becomes a multifunctional device, collecting and accommodating a multitude of functions, both educational and socially innovative. It serves as a visual and functional centerpiece, designed to gather rainwater, host solar panels, and provide shaded areas for outdoor activities. The internal square-shaped courtyard echoes the same footprint of the school now reduced to rubble, restoring on those same grounds the will to recreate spaces for the sharing of a community that, torn apart, looks to the public building as a future point of reference.

Sustainability is a key aspect of our design, incorporating eco-friendly materials and energy-efficient systems to ensure the school's longevity and minimal environmental impact. The building's sustainability elements address both the reduction of energy consumption and the creation of a completely off-grid building. We also envision the construction of laboratories open to social and entrepreneurial innovation for students and residents, encouraging a culture of creativity and collaboration. Our design seamlessly integrates the preservation of the school's courtyard, serving as a testament to shared experiences and memories while introducing modern spaces conducive to learning and community participation. Community involvement was integral throughout the design process, ensuring the project truly reflects the residents' needs and desires.

We envision post-Soviet schools not merely as places of academic instruction but as dynamic social incubators, where a diverse array of stakeholders can converge to exchange ideas and engage in innovative programs. These spaces will provide educational opportunities and serve as cultural and social hubs, fostering a sense of community and shared purpose. We see this school evolving into a vital community hub that will continue to serve and inspire future generations.









- 1 Classroom
- 2 Workshop
- 3 Laboratory 4- Library / Media
- 5- Caffiteria
- 6 Playground,theater 7 Toilet
- 8 Auditorium
- 9- Conference / Lecture
- 10 Nurse
- 1 1- Sport hall 12 Open door cluster
- 12 Open deor closer
  13 Teachers space
  14 Rooftop green house
  15 Community caffe
  16 Amfitheater

Ground Floor



First floor

а



### Hybrid and multifunctional spaces

A space that can be used as an extension and connection between the corridor and the greenhouse. It is a semi-external classroom, which diversifies and varies according to the specific activities, thus increasing the possibilities of exploiting the students' learning and playing spaces.

## The classrooms

The movable walls between two classrooms allow the extension of the spaces and thanks to the opening windows it is possible to use the greenhouse as an extension of the classrooms themselves. The walls towards the internal corridor are designed as containers for students, with easily accessible lockers and wardrobes.











### The laboratories

Flexible and combinable, they allow activities to be carried out in small or medium groups. They are equipped with equipped walls that perform the function of storage for teaching equipment, while at the same time guaranteeing, with large windows, visual communication between the classrooms and the connective space.









Section A-A 1: 250



Section B-B 1: 250





Schools as Community Centers - Kharkiv School Nr.46



In Kharkiv, Ukraine, the ongoing conflict with Russia has profoundly impacted the social, economic, and infrastructural landscape of the city. Gymnasium Nr.46 has not been immune to these effects, facing challenges such as damaged or destroyed school buildings, displacement of students and teachers, disruptions to the curriculum, and psychological trauma among students and educators.

Our design approach in Kharkiv recognizes the dynamic and evolving nature of the conflict and its impact on the educational ecosystem. Unlike traditional design approaches, which may prioritize aesthetics or functionality, responsive design in Kharkiv places a strong emphasis on adaptability, resilience, and empathy. It seeks to address the immediate needs of students and educators while also anticipating and mitigating future challenges posed by the conflict. This approach entails designing educational environments that can quickly adapt to changing circumstances, such as providing temporary learning spaces in the aftermath of building destruction or facilitating distance learning for displaced students.

Moreover, responsive design actively involves the broader community, including parents, local leaders, NGOs, and other stakeholders, in the design process. By fostering a sense of ownership and collaboration, designers ensure that solutions are culturally relevant, sustainable, and inclusive.



## PASSIVE ENERGY SYSTEMS





Rain garden for the floding A strategy for the infrastructure of the neighborhood








South - West1:250

![](_page_37_Picture_0.jpeg)

![](_page_38_Picture_0.jpeg)

![](_page_39_Picture_0.jpeg)

via Lugaro, 15 - 10126 - Tel. 011/5369611 Email: torinedorepubblica it Whatspap per i lettori: 3468964519 Fax 011/533327 - Pubblicità: A. Manzoni& C. Via F. Aporti 8 - Milano - tel 02/574941.

# In Repubblica

# L'ira di Cirio per il video pro 5S telefonata di fuoco a Salvini

Il leader leghista in imbarazzo: "Da noi pieno sostegno". Per Allasia addio posto nella futura giunta

![](_page_39_Picture_5.jpeg)

▲ L'appello Per Ouhab Disperso da giovedì

# A 14 anni va al parco e svanisce nel nulla

Ouhab è scomparso, non lo trovano più. L'adolescente giovedì scorso è uscito da scuola alle 14, ha pranzato a casa, nella zona di via Borgaro, a Torino Nord, tra Borgo Vittoria e Lucento, poi è andato a giocare con gli amici ai giardinetti in via Stradella, a due passi da casa, e da allora la famiglia non ha più sue notizie.

«È alto circa un metro e sessanta, ha capelli ricci scuri, gli occhi scuri – dice la madre Nabila – al momento della scomparsa indossava dei vestiti neri e delle scarpe da ginnastica bianche. Lo stiamo cercando ovunque».

di Luca Monaco @ a pagina 7

L'ira del presidente Alberto Cirio si è sentita fino a Roma. Ed è arrivata direttamente alle orecchie del leader della Lega, Matteo Salvini, che ha disconosciuto il video sul voto disgiunto fatto dai candidati Stefano Allasia a Sara Zambaia. «Fatto a titolo personale, la Lega sostiene Cirio». Nel video-tutorial la candidata leghista Sara Zambaia spiega come fare il voto disgiunto a favore suo e del collega di partito Stefano Allasia, mettendo però una croce sulla candidata presidente 5S.

di Diego Longhin • a pagina 3 All'incontro elettorale del grande chirurgo

![](_page_39_Picture_14.jpeg)

Il Pd si aggrappa a Salizzoni per un trapianto di voti "Stavolta è dura"

di Maurizio Crosetti 
a pagina 3

Progettata da tre architetti torinesi

![](_page_39_Picture_18.jpeg)

Dopo le bombe Lo studio 2Mix ha vinto il concorso per rifare le superiori devastate dalle bombe

Una scuola per la devastata Kharkiv

di Cristina Palazzo • a pagina 2

![](_page_39_Picture_22.jpeg)

Piemonte Economia

Sant'Anna

![](_page_39_Picture_23.jpeg)

Compagnia Alberto Anfossi

Francesco Alberto Anfossi, torine se, classe 1978, è Segretario gene rale della Fondazione Compa gnia di San Paolo dal luglio 2018 È stato riconfermato nell'incari co il 23 aprile scorso dal nuovo Co mitato di gestione. Laurea in Fisi ca all'Università di Torino, dotto rato al Politecnico, sa bene che co sa significhi parlare di transizio ne energetica. Per questo sfoglia con soddisfazione la seconda edi zione del bando «Sinergie, svilup po di comunità energetiche rin novabili (Cer) a impatto sociale» di Francesco Antonioli a pagina 8

La storia

Rendere i robot più democratici la nuova sfida di Comau

The cover of la Repubblica on 27 May,2024. Artcile by Cristina Palazzo

# 2.3 Testemony given for la Repubblica

I was born in 1998, during the peak of the Kosovo war. Growing up, I was surrounded by stories of the conflict, shared by my family and relatives. These narratives profoundly shaped my understanding of the impact of war on communities and instilled in me a deep sense of the importance of rebuilding and recovery.

Recently, we achieved a significant result in our careers as young architects by winning the 1st prize in an international architecture competition organized by the Asian Institute of Low Carbon Design. This competition focused on reconstructing Gymnasium No. 46 in Kharkiv, Ukraine—a region currently enduring the demolish of conflict. For me, this victory is much more than a professional achievement; it holds personal and symbolic meaning, representing my solidarity with the people of Kharkiv.

Winning this competition means more to me than words can express. Having grown up with the narratives of war in Kosovo, I feel a deep connection to the people of Ukraine. The devastation and suffering they are experiencing resonate deeply with me. Rebuilding the school in Kharkiv is not just about construction; it's about restoring hope, dignity, and a sense of normalcy for the people affected by the conflict.

Our design reflects our deep commitment to community-centric architecture. Guided by the principle "We will rebuild what was destroyed," we focused on creating a space that honors the collective memories of the community while addressing their present and future needs. I reimagined the school not just as an educational institution but as a social hub that strengthens community ties and fosters social interaction. The concept of 'Schools as community centers,' particularly relevant in the post-Soviet context, underpins my design philosophy. By integrating sustainable and eco-friendly materials, I aim to ensure that the rebuilt school stands as a beacon of resilience and renewal, symbolizing a brighter future for Kharkiv.

This project is my way of contributing to the people of Kharkiv, showing them that they are not alone. It's a message of solidarity and hope, from one war-torn country to another. Architecture has the power to heal and bring people together, and that's what we aspire to achieve with this project.

I am proud to be part of a collaboration with 2mix Architetti, a studio located in Turin, Italy. Our emerging team of young architects has worked enthusiastically to bring this vision to life. My journey from the war-torn landscapes of Kosovo to becoming beacons of hope for Kharkiv exemplifies the transformative power of resilience and solidarity. This story is not just about architecture; it's about using our skills and experiences to make a meaningful impact on communities affected by conflict.

With the support of others, we are determined to continue our mission of rebuilding and restoring hope. Our work in Kharkiv is just the beginning of a promising career dedicated to humanitarian and community-focused architecture.

Lendi Osmani

# La storia

# La scuola di Kharkivideata da tre giovani torinesi "È un aiuto a chi soffre"

# di Cristina Palazzo

Ricucire una comunità lacerata dal conflitto russo-ucraino attorno a una scuola, il #46 Gymnasium di Kharkiv. Una scuola che ha rappresentato uno spazio chiave per l'i-

struzione della regione, devastata dalla guerra in corso. Così l'idea del giovane team torinese di architetti 2Mix è ricreare questo simbolo, unendo la memoria dei luoghi bombardati con la ridefinizione degli spazi e aprendoli alla comunità circostanze così «il paesaggio educativo si trasforma in un incubatore sociale, dedicato a riparare le fragilità di un sistema messo in crisi dal conflitto persistente».

L'idea del team. composto da

Arianna Baldoncini, Federica Carrero, Lendi Osmani, team iniziativa di 2Mix Architetti per supportare i giovani professionisti, ha vinto il primo premio per la categoria "young's architetti" del concorso Internazionale di Progettazione di Architettura per un mondo migliore e più pacifico. L'obiettivo del concorso promosso da Ailcd (Istituto asiatico di progettazione a basse emissioni di carbonio) era proprio progettare le al culmine della guerra in Kosovo,

scuole superiori di Kharkiv.

«Questa vittoria è molto più di un traguardo professionale, ha un significato personale e simbolico perché rappresenta la mia solidarietà con il popolo di Kharkiv. Ricostruire la scuola non riguarda solo la costruzione; si tratta di restituire speranza, dignità e un senso di normalità alle persone colpite dal conflitto», commenta Osmani. Nato nel 1998,

Simbolico L'idea del team di architetti è ricreare la scuola tra memoria dei luoghi bombardati e ridefinizione degli spazi

Lo studio 2Mix ha vinto conosce bene le conseguenze di un ma della devastazione così da richiaconflitto. «Ero circondato dai racmare un passato esistente e all'interil concorso per rifare conti della mia famiglia, hanno prono dei laboratori aperti all'innovale superiori devastate fondamente influenzato la mia comzione sociale e imprenditoriale deprensione dell'impatto della guerra gli studenti ma anche degli abitanti dalle bombe sulle comunità e mi hanno instillato del quartiere, il tutto con particolaun profondo senso dell'importanza re attenzione alla sostenibilità, quindi ai consumi energetici. «L'architetdella ricostruzione e del recupero. tura - conclude Lendi Osmani - ha il Vincere questo concorso significa per me più di quanto le parole possapotere di guarire e unire le persone, no esprimere perché la sofferenza ed è ciò che aspiriamo a realizzare che stanno vivendo il popolo ucrai- | con questo progetto». ORIPRODUZIONE RISERVATA

no risuona in me».

Il progetto racconta una storia, sottolinea, che «non riguarda solo l'architettura; riguarda l'uso delle nostre competenze ed esperienze per avere un impatto significativo sulle comunità colpite dal conflitto». Così sul principio di ricostruire

![](_page_40_Picture_13.jpeg)

quanto distrutto e seguendo il concetto di scuole come centri comu nità, hanno idea to uno spazio che accolga le esigen ze della scuola e della comunità che la circonda.

La scuola, infat ti, è stata pensata come un polo multifunzionale con una propria identità visiva nel guartiere devastato: il tetto diventa una grande strut tura che accoglie persone e funzioni, resta la corte interna a forma quadrata, che ricorda il luogo pri3

# **Community-Based Planning**

# Schools as Community centers

This chapter sets the stage for exploring the symbiotic relationship between community engagement and educational architecture. Schools should be framed not just as physical structures but as dynamic community hubs that have the power to mobilize social change and community development.

They are more than just places of learning, contextualized within the broader social and cultural landscape. Embedded within communities, shaping and being shaped by the social, cultural and economic dynamic of their surroundings they emphasize transformative potential as agents of change within communities.

Since the late 1800s, with the emergence of mass education, schools have assumed significant roles within their local environments. By their very nature, they have played an important role over the lives of young individuals, families, and community members, both physically and socially. While schools are now commonplace fixtures in urban, regional, and rural areas, the dynamics between schools and their surrounding communities have been subject to debate, exploration, and enhancement for over a century. The notion of schools functioning as community centers is not new.

In 1899, John Dewey promoted the concept of schools as genuine hubs of community life in the first edition of his book "The School and Society," proposing that schools should embody "a genuine form of active community life, rather than merely a place segregated for learning" (Dewey, 1915, p. 13). With the introduction of the single schoolhouse followed by more advanced educational models and infrastructure (Tanner & Lackney, 2006), schools have served as gathering places, nurturing social interaction and unity within communities.

However, schools that actively prioritize the education, health, and overall well-being of not only students but also educators, parents, caregivers, and broader community members have been rare, and such approaches have rarely been widely implemented. Historical evidence suggests that establishing and maintaining operations that transcend traditional schooling can be complex and demanding.

At the heart of this discussion lies the fundamental belief that space profoundly shapes the dynamics between schools and communities, either fostering cohesion or creating barriers to engagement. Throughout the chapter, various factors influencing the relationship between schools and their surrounding communities are explored. These encompass a wide spectrum of considerations, from spatial design to social dynamics. By examining these factors collectively, a nuanced understanding emerges of how to cultivate robust connections and collaborative initiatives that give mutual advantages for schools, government bodies, industries, community organizations, and individuals alike. This holistic approach underscores the importance of fostering both formal and informal networks that enhance the collective well-being and prosperity of all stakeholders involved.

![](_page_42_Picture_0.jpeg)

# 3.1 Importance of Community-Based Planning

The importance of community members engaging in the design, planning and programming process, is very relevant in pushing this transformation beyond physical design to encompass a deeper integration within the ethos and values of the community, evolving into vibrant centers for social interaction, cultural exchange and community empowerment.

By involving community members in decision-making processes, schools can reflect the diverse perspective, traditions, and aspirations of the local inhabitants, ultimately leading to more responsive and culturally relevant educational environments.

Community-based planning prioritizes collaboration, inclusivity, and sustainability, ensuring that schools serve as vibrant hubs for social, cultural, and educational activities. By actively engaging community members in decision-making processes, architects and educators can create spaces that reflect the cultural identity, social dynamics, and educational priorities of the local inhabitants.

This **concept of co-authorship**, where communities actively participate in the design process, contributing with their perspective, values, aspirations, tend to create spaces that reflect the identity and the needs of the local community acknowledging that educational spaces are not just physical structures but dynamic environments. These engagement usually comes with methodologies, such as participatory design workshops, focus groups, and community forums. **Beyond Stakeholder Roles:** Community involvement in educational architecture transcends traditional stakeholder roles. It goes beyond the involvement of parents, teachers, and administrators to embrace a broader audience of community members, including local residents, cultural leaders, business owners, and other relevant stakeholders. This approach recognizes that communities are diverse, and each member of the community brings their experience, perspectives and expertise to the table.

**Cultural Relevance and Sensitivity:** Community involvement ensures that educational spaces are culturally relevant and sensitive to the needs and preferences of the community. This cultural sensitivity is required for creating inclusive and equitable educational environments. For architects this sensitivity is important where they can gain insights for the design process, from cultural traditions, aesthetic preferences, and spatial practices , shaping this cultural center and getting acceptance from the community itself.

**Enhanced Educational Outcomes:** Research has shown that community involvement in educational architecture is associated with improved educational outcomes for students. When community members feel a sense of ownership and investment in their local schools, they are more likely to support educational initiatives, participate in school activities, and advocate for resources and support. This increased community engagement contributes to a positive school climate, enhanced student achievement, and overall academic success.

# 3.1.1 Benifits of Cultural Integration

In the wake of a conflict with Russia, the significance of community in Kharkiv can not be overstated, particularly when it comes to the design and function of schools. Community serves as the backbone of resilience, restoration, and progress in such challenging times. Here's why emphasizing community in the design of schools is crucial:

Unity and Solidarity: A strong sense of community fosters unity and solidarity among the residents of Kharkiv. Designing schools that reflect this unity can help in creating a safe and supportive environment for students, teachers, and families alike. Spaces within the school can be utilized for community gatherings, events, and discussions, promoting a sense of belonging and shared purpose.

Healing and Support: After the trauma of conflict, communities need spaces where healing and support are prioritized. Schools can serve as more than just educational institutions; they can become centers for counseling, therapy, and rehabilitation. By integrating facilities for mental health services and support groups within school designs, the community can access essential resources for healing and recovery.

Education and Empowerment: Education is a powerful tool for empowerment and rebuilding communities. By involving the community in the design process of schools, their needs, preferences, and aspirations can be taken into account. This ensures that the educational environment is tailored to the specific requirements of the community, leading to more effective learning outcomes and increased opportunities for personal and collective growth.

Cultural Preservation and Celebration: Kharkiv boasts a rich cultural heritage that deserves to be preserved and celebrated, especially in the aftermath of conflict. Schools can play a vital role in this by incorporating elements of local culture, history, and traditions into their design. By creating spaces that honor and showcase the community's cultural identity, schools can become symbols of resilience and pride for future generations.

Social Cohesion and Integration: In times of crisis, maintaining social cohesion and promoting integration are essential for rebuilding communities. Schools can serve as hubs for social interaction and integration, bringing together people from diverse backgrounds and fostering understanding and tolerance. By designing inclusive and accessible spaces, schools can break down barriers and promote social cohesion among residents of Kharkiv.

In summary, community involvement is essential for creating educational spaces that are culturally relevant, socially inclusive, and educationally effective. By embracing the diverse perspectives and experiences of the community, architects and educators can co-create dynamic learning environments that reflect the identity, values, and aspirations of the local inhabitants. By involving community members in the design and planning process, architects and educators can foster a sense of ownership, pride, and investment in the final outcome. This sense of ownership not only enhances community satisfaction and engagement but also promotes long-term stewardship and maintenance of educational facilities.

In particular, the community plays an important role in the functioning of lyceum in Kharkiv, especially in the aftermath of a war conflict. By prioritizing unity, healing, education, cultural preservation, and social cohesion, schools can become catalysts for rebuilding and revitalizing the community. Through collaborative efforts and a shared commitment to progress, Kharkiv can emerge stronger and more resilient than ever before.

![](_page_43_Figure_9.jpeg)

![](_page_43_Figure_10.jpeg)

Source: FastCapital for Communities

![](_page_43_Figure_14.jpeg)

![](_page_43_Picture_15.jpeg)

# Your Why

 Identify Your Purpose: Understand why you're making this plan. Know your core values and vision. This will help you respect your partners' time, ask meaningful questions, and take actionable steps with them.

Learn

Do Your Research: Before engaging with your community, especially those affected by systemic oppression and bias, educate yourself. Don't rely on them to teach you. Learn about the community and the broader social and environmental context. Utilize tools and databases like Infobase for your research.

Listen

Engage Directly: Talk to people in your community. This is crucial for creating a shared future. Whether through formal interviews, focus groups, or casual conversations, focus on learning about their goals, dreams, passions, and the challenges they face. Avoid discussing your library in the first conversation; make it about them.

Share

Reflect Back: After speaking with various people, identify common themes between their motivations and yours. Go back to them and share what you've learned. This step is essential for building trust. Co-create

Collaborate: Invite people to help co-design solutions. Turn big ideas into practical programs, spaces, and strategic plans. Use design thinking and participatory design techniques. (IDEO's toolkit is a great resource.)

Developing, implementing, and sustaining schools as community centers isn't a very straightforward, easy task. If it were, wouldn't it be a widespread practice? Nevertheless, the benefits for students, parents, and the broader community can be substantial.

To grasp the opportunities and challenges associated with this endeavor, cooperation among researchers from various disciplines and collaboration with diverse participants and stakeholders from both Ukraine and internationally are vitally important.

Determining a definition of success and articulating the key factors that influence it is the essence of evaluation. It necessitates evaluative thinking and aids in interpreting evidence for actionable steps. However, stakeholders such as policymakers, researchers, educators, practitioners, urban designers, and planners may have divergent views on success, necessitating different answers and sometimes distinct data. Acknowledging these varied notions of success is crucial for the thriving of schools as community centers.

Transparency regarding the evaluation's purpose and identifying its target audience are paramount in the initial phase. Moreover, recognizing primary and secondary intended users is essential. For place-based initiatives like schools as community hubs, conducting a stakeholder analysis within the education ecosystem is indispensable. This analysis aids in understanding school and community needs, leveraging community, physical, and infrastructure strengths, and ensuring ongoing engagement.

Early identification of various audiences and stakeholders in schools as community hubs is critical. Understanding their needs, perspectives on success, and information requirements is essential for sustained engagement and success. The integration of school infrastructure with other social amenities could become increasingly vital in meeting the needs of thriving communities. Throughout Ukraine, there's a rising demand for well-distributed facilities catering to early years and adult education, sports, recreation, library and information services, visual and performing arts, as well as health and wellbeing services (Cleveland, 2023). Transforming existing school facilities and designing new ones to serve as anchor organizations in mixed-use social infrastructure precincts could significantly enhance local community infrastructure, particularly in rapidly growing inner urban, peri-urban, and regional city areas (Cleveland, 2023).

The concept of strengthening the connection between schools and their communities has been advocated by governments, educators, health service providers, and community developers across Europe, North America, and Australia in recent decades (Cummings et al., 2011;Dryfoos, 1994; Dryfoos & Maguire, 2002; Hands, 2010; Pelletier & Corter, 2005; Salagaras, 2009; Sanjeevan et al., 2012).

Despite intermittent interest in schools as community hubs, existing literature on school facilities has predominantly focused on their design for teaching and learning, neglecting their potential role in supporting the broader community's education, health, and wellbeing (McShane & Wilson, 2017). The growing population, urban densification, and increasing demand for high-quality venues for various activities and services underscore the need for school infrastructure to contribute more to social infrastructure networks. This would ensure broader demographic access to the facilities and services essential for community well-being. In both educational architecture and the context of conflict, community engagement encounters significant challenges. From communications barriers to trauma, from power dynamics to safety concerns, addressing these problems is essential for fostering inclusivity and resilience.

**Communication Challenges**: In community engagement sometimes we come to face different backgrounds and cultural walls that may affect collaboration. Diverse communities might speak different languages, or various cultural backgrounds, that's why sometimes it's essential to provide multilingual resources, interpretation services and culturally sensitive communication strategies.

Another challenge is limited awareness and engagement among community members, due to socioeconomic factors, geographic isolation, or historical oppression.

Addressing these challenges with proactive outreach efforts, mobilization strategies, campaigns to raise awareness, build trust, and encouraging participation gives these groups the opportunity for contribution, including them in the decision making process.

In the case of Kharkiv conflict context, these barriers are compounded by destroying infrastructure and intensification of security measures, further isolating community members where they can not access information, participating in engagement efforts, and voicing their concerns. The breakdown of infrastructure, displacement of populations make it very challenging in reaching all the members of the community effectively.

### Power Dynamics, Trauma and Psychological Impact :

Community engagement may challenge power dynamics and representation, particularly in communities where certain groups hold more influence or authority than others. This variety of power can exclude groups and limit their voice of concern, preserving inequities in the decision making process.

When we discuss the context of Kharkiv we can not neglect the trauma and psychological impact that the conflict will leave on communities, manifested as grief, anxiety and mistrust. Residents may struggle with loss, displacement and violence, which intensify emotional distress doubting their capability for meaningful engagement. These are patterns you find in cases where conflict has happened, extracted from cases like the war in Kosovo in 1998.

One of the strategies that we took into consideration when we designed Gymnasium Nr.46, was that in the facility we provided psychosocial support and traumainformed care, spaces also where community members can share and feel safe.

Resource Constraints: Schools, with their limited resources, cannot operate in isolation (Cleveland, 2023). Establishing and maintaining a school as a community center necessitates partnerships with like-minded community members, organizations, and service providers (Cleveland, 2023). Building communication, nurturing relationships, and fostering robust partnerships demand significant time and resource investment but greatly enhance the capacity for enduring impacts. However, educational institutions like Gymnasium Nr.46 often face challenges due to limited funding, staff capacity, and technical expertise, making it difficult to imple-ment comprehensive community engagement strategies.

Securing reliable, long-term funding and effective financial management are essential for sustaining hub operations. Often, combining funding from various sources, each tied to measurable outcomes, is necessary. Additionally, constructing and managing facilities typically involve contractual agreements among partners. Clear agreements upfront regarding financial responsibilities help prevent disputes.

We discussed this before and it's important to point out the partnerships with community based organization, non governmental organization (NGO), academic institutions, municipality, national and international government agencies to access, share knowledge and build capacity for the vision to come to life. So, by attracting resources and expertise, schools can enhance their ability to engage with diverse stakeholders, address challenges that community benefit and to set an example for the reconstruction of educational institutions in Kharkiv, but not just in the case of Kharkiv, but also around Ukraine.

Safety and Security Concerns: Ensuring safety without isolating the school from the community is very important. It's crucial to strike a balance between security measures and creating an environment that welcomes community involvement. Safety considerations become especially critical when students interact with adults from outside the school community. Discussing security options early in the design phase allows for exploration of both 'hard' and 'soft' security measures. Collaboration among stakeholders is essential for find-ing effective solutions to security challenges. Establishing clear access protocols for different user groups, both during school hours and outside, is key to guiding security measures.

In conflict-affected areas like Kharkiv, safety is a top concern. Fear of reprisals or violence may deter community members from participating in public activities. Schools must implement robust security measures and conduct thorough risk assessments to ensure the safety and well-being of all participants. Later, we'll delve into these measures in more detail.

Integrating with the community raises security concerns. If students and teachers don't feel safe, the learning environment suffers. Therefore, ensuring safety in educational facilities is a crucial aspect of their design. As the focus shifts towards lifelong learning and integrated services, security must be considered within the broader context of compulsory and post-compulsory education. This includes all shared facilities and activities with other partners, taking into account architectural, socio-cultural, leadership, and management aspects of the school. Incidents of violence within school premises and communities have kept school safety a priority. For instance, in 2002, the PEB co-organized an expert meeting with the US Department of Education on preparing schools for and responding to terrorist attacks. However, safety considerations extend beyond human conduct and structural integrity, encompassing protection from natural disasters like earthquakes. In 2004, an ad hoc expert meeting led to the OECD Recommendation Concerning Guidelines on Earthquake Safety in Schools (2005).

**Displacement and Fragmentation:** Conflict disrupts social networks and displaced populations, fragmenting communities and eroding trust. Residents may be forced to flee their homes or seek refuge in temporary shelters, disrupting established patterns of community life and engagement. Our design proposal for Gymnasium Nr.46, is trying to adapt engagement strategies to reach displaced populations, promoting technology and community networks to bridge geographical boundaries and maintain connections with community members.

Building Trust and Resilience: Building trust and relationships with community members is essential for successful community engagement. However, trust may be fragile, particularly in communities that have experienced historical trauma, social inequality, or institutional mistrust. Which is the case of Kharkiv, that's why Schools must invest time and effort in relationship-building activities, transparency, and accountability mechanisms to earn the trust of community members and establish meaningful partnerships. By demonstrating integrity, empathy, and responsiveness in our interactions with the community, schools can foster trust, mutual respect, and collaboration.

In conclusion, the endeavor to develop schools as vibrant community centers presents a multitude of challenges, ranging from communication barriers and resource constraints to power dynamics, trauma, safety concerns, displacement, and fragmentation, particularly in conflict-affected areas like Kharkiv. Overcoming these challenges requires a multifaceted approach that emphasizes interdisciplinary collaboration, stakeholder engagement and evaluation, partnerships and resource mobilization, safety and security measures, and building trust and resilience.

Despite the complexities involved, the potential benefits for students, parents, and the broader community are substantial. By addressing these challenges head-on and implementing effective strategies, schools can truly become agents of positive change within their communities, fostering inclusivity, resilience, and mutual support. Moving forward, it is imperative that stakeholders continue to work together, guided by principles of inclusivity, transparency, and empathy. By investing in these efforts, we can create stronger, more vibrant communities where schools serve as not just centers of learning, but also as pillars of community engagement and support. Through dedication, collaboration, and a shared vision for the future, we can overcome these challenges and create a brighter, more inclusive future for all.

![](_page_45_Figure_5.jpeg)

# Managing Cultural Integration

![](_page_45_Figure_8.jpeg)

# Strategies for Successful Cultural Integration

![](_page_45_Figure_10.jpeg)

source: Cleveland, 2023

# 3.3 Partnerships and Workshops in Community - Based Planning

Collaborative partnerships are widely regarded as vital for the successful establishment of schools as community hubs (Calfee et al., 1998; Dryfoos, 2002; Hands, 2010; Walsh & Backe, 2013). Establishing a unified vision alongside stakeholders is crucial for achieving success in both the short and long term. Embracing and actively pursuing this vision will draw in compatible partners and collaborators, inform decision-making, and streamline the implementation of plans.

Workshops serve as dynamic platforms for collaboration and creative exchange among diverse stakeholders involved in the design and planning process. By bringing together architects, educators, parents, students, community leaders, and other relevant stakeholders, workshops create opportunities for collective decision-making and idea generation.

Workshops enable participants to co-create a shared vision for educational spaces through interactive exercises, brainstorming sessions, and intense periods of design, participants contribute their insights, preferences, concerns, that shape the direction and outcomes of the design process, particularly in challenging contexts such as Kharkiv

The changes in the educational landscape, especially the introduction of 'semi-autonomous schools', require that planners and educators interact in a different way in the future. . A look at the schema on the left will show that architecture and educational theory have thus far only worked together to a limited extent and that teachers above all are still not asked what they think and included enough.

With the introduction of directed schools, new discussion partners are making their appearance, and they must be included in the dialogue between architecture and educational theory.

Together with their team, the headmasters of the semi-autonomous schools must enter the planning process and signal their needs. In other words, there will be more people with a background in education who will have to participate in the architectural discussion.

At the same time, these new conditions challenge the architect to take a greater interest in educational concerns.

**Partnerships Beyond Stakeholder Roles:** Partnerships may involve interagency agreements, collaborations, or co-locations, and are commonly developed between stakeholders that may include education authorities, private education providers, service providers (such as health organizations), sporting clubs, universities, private industry, charities, and various agencies from all tiers of government (Cleveland et al., 2023, p. 6). A recurrent theme is that strong partnerships take time to develop and require trust and reciprocity between organizations that may be unaccustomed to working together (Cleveland et al., 2023, p. 6). Workshops foster trust and relationships among diverse stakeholders involved in the design and planning process. By creating spaces for open dialogue, mutual respect, and shared decision-making, workshops facilitate the building of relationships based on trust, collaboration, and cooperation. By demonstrating a willingness to listen and respond to community input, architects can establish themselves as trusted partners in the design process, leading to smoother project implementation and greater overall satisfaction with the final outcome.

When community members actively participate in the design workshops, they develop a sense of ownership and pride in the project. This can lead to greater support for the school both during the design phase and after its completion. Additionally, involving students in the workshops empowers them to voice their opinions and fosters a sense of responsibility towards their learning environment.

**Workshops on addressing Specific Challenges:** Workshops provide an opportunity to identify and address specific challenges or concerns that the community may have regarding the school design. Whether it's issues related to accessibility, safety, sustainability, or cultural sensitivity, workshops enable architects to gather feedback and incorporate appropriate design strategies to overcome these challenges.

![](_page_46_Figure_14.jpeg)

![](_page_46_Figure_15.jpeg)

![](_page_46_Figure_16.jpeg)

Source: School Buildings The State of Affairs

Considering our context of work in Kharkiv, the approach to designing schools and engaging with the community would need to be adapted to the challenging circumstances.

Designing schools in a conflict zone like Kharkiv requires a holistic approach that prioritizes safety, emergency preparedness, trauma-informed design, community resilience, resourcefulness, and international solidarity. Workshops serve as crucial forums for engaging with the community and addressing their specific needs and challenges in the context of war and conflict.

These methodologies would be appropriate if the project would take place in the ongoing climate of war but taking into consideration that our project is conceptualized into a Post-War hypothesis, this part serves as a research point to see the collision between these two situations, War and Post-War context.

**Safety and security:** Given the ongoing conflict and security threats, safety considerations would be paramount in the design of schools. Workshops would focus heavily on discussing and implementing measures to ensure the safety of students, teachers, and staff, including provisions for bomb shelters, reinforced structures, and evacuation plans.

**Emergency Preparedness:** Workshops would also address emergency preparedness and response strategies, such as first aid training, communication protocols, and coordination with local authorities and emergency services. Architects would work closely with community members to design schools that can serve as safe havens during times of crisis. **Trauma-Informed Design:** Recognizing the psychological impact of living in a conflict zone, architects would incorporate trauma-informed design principles into the school environment. This could include creating calming spaces, incorporating natural elements, and providing access to counseling and support services for students and staff affected by the conflict.

**Community Resilience:** Workshops would serve as a platform for fostering community resilience and solidarity in the face of adversity. Architects would collaborate with local residents to design schools that not only meet their educational needs but also serve as hubs for community activities, social support, and collective action in response to the crisis.

**Resource Constraints:** Given the strain on resources caused by the conflict, work-shops would need to prioritize practical and cost-effective design solutions. Architects would work with the community to identify priorities and make informed decisions about the allocation of limited resources to ensure that school projects can be implemented effectively despite the challenging circumstances.

International Support and Solidarity: Workshops could also provide an opportunity to mobilize international support and solidarity for the affected community. Architects, along with local leaders and organizations, could use these platforms to advocate for humanitarian assistance, funding, and expertise to support the reconstruction and rehabilitation of schools in Kharkiv and other conflict-affected areas.

In summary, designing schools in a conflict zone like Kharkiv requires a holistic approach that prioritizes safety, emergency preparedness, trauma-informed design, community resilience, resourcefulness, and international solidarity. Workshops serve as crucial forums for engaging with the community and addressing their specific needs and challenges in the context of war and conflict. These workshops play a vital role in community-based planning for educational architecture by facilitating collaboration, co-creation of vision, empowerment of communities, building trust and relationships, and ensuring relevance and responsiveness to community needs. By embracing a participatory approach to design and planning, workshops empower communities to actively shape their educational spaces, fostering a sense of ownership, pride, and investment in the built environment, especially in situations of adversity and conflict.

![](_page_47_Figure_12.jpeg)

Collaborative or Stakeholder-Led Planning: Best When Solutions Aren't Clear

The process focuses on engaging stakeholders to increase the likelihood of them "owning\* the process and responsibility for implementation.

# 3.4 Stakeholder role

The development of school facilities that are both functional and aesthetically pleasing requires a collaborative effort among architects, engineers, and educational stakeholders (Lippman, 2010). This collaboration is crucial for ensuring that school buildings not only meet structural and safety requirements but also support innovative teaching methods and adhere to sustainability principles (Lippman, 2010).

The rationale behind this collaborative approach is that combining the expertise and perspectives of various stakeholders leads to more effective and holistic design solutions. Architects bring creativity and an eye for design, engineers provide technical and safety expertise, and educators offer insights into the practical needs of students and teachers. This multidisciplinary teamwork ensures that the final design addresses all aspects of school functionality, safety, and aesthetic appeal (Nair & Fielding, 2005).

The method involves a structured process where design and engineering teams work closely with educational stakeholders from the outset. This begins with understanding the specific needs and goals of the school community. Architects and engineers collaborate to develop designs that are not only visually appealing but also practical and sustainable. They ensure that the buildings comply with all safety and building code requirements, integrating features that promote a safe learning environment (Earthman, 2004). Research supports this integrated design approach, showing that collaboration among stakeholders results in more functional and well-rounded school facilities (21st Century Schools) (Lippman,2010). By involving educators in the design process, the team can create spaces that enhance learning experiences and support innovative teaching methods. Engineering solutions are applied to ensure that the structures are sound and meet all necessary safety standards (National Clearinghouse for Educational Facilities).

In the implementation phase, detailed designs and engineering plans are created, incorporating continuous feedback from educators and other stakeholders. This ensures that the facilities meet the evolving needs of their users. For example, flexible classroom designs can be developed to accommodate various teaching styles and learning activities, fostering a more dynamic and engaging educational environment (McGregor, 2004).

The outcome of this collaborative design process is the creation of schools that are built to high standards, providing safe, functional, and attractive learning environments (Baker, 2012). A practical example of this approach is a school where architects and engineers work with educators to design spaces that not only comply with safety standards but also support innovative teaching practices.

These might include open-plan layouts that encourage collaboration, environmentally sustainable features that reduce the building's carbon footprint, and technologically advanced classrooms that enhance learning (Woolner et al., 2007). The collaboration between architects, engineers, and educational stakeholders is fundamental to developing school facilities that are both functional and aesthetically pleasing. By integrating diverse expertise and continuously involving all stakeholders in the design process, the resulting school buildings are able to meet the highest standards of safety, functionality, and design, ultimately providing an optimal environment for education (Lippman, 2010).

S T A K E H O L D E R S

![](_page_48_Figure_10.jpeg)

This stakeholder chart lists the different professionals involved in the design of an educational facility. A key difference in this chart that relates to the desion team is the positioning of the educational planner and the researcher who works with the architect and the designer guiding the conception, programming, planning, and design of the project. Educational Resource Planner: Peter Lippman. Marius Calin

Traditionally, schools or educational institutions have been seen only as entities focused only on academic learning. However, the new and innovative concept of these institutions as community centers enrich a broader range of functions and activities, by expanding the role of schools. This comprehensive integration creates potential for schools to become dynamic hubs that serve the different needs and positive interests of the entire community. This shift recognizes that schools are not isolated entities but integral parts of the social fabric, with the potential to adapt positive change and foster community development.

In the post-Soviet country a vision to transform schools into community centers has not yet been applied , that's why such a vision for our project can be seen as Innovative in the context of Kharkiv.

Integration of Cultural and Social Activities: By providing a platform for artistic expression and cultural exchange with activities like community festivals, art exhibitions, musical performances, theater productions and cultural celebrations, these community centers attract the curiosity of the public and serve the cultural, social needs of the members of the community.

**Promoting Intergenerational Interaction:** Community - centered schools open the door for interaction and education to the people of all ages. Through programs such as mentorship initiatives, workshops, and community service projects, schools create opportunities for meaningful connections and mutual learning between different age groups. These situations foster empathy, understanding, and respect across generations, contributing to the development of a more cohesive and inclusive community. Especially in our case in Kharkiv such a strategy can be quite innovative for the reason that the programing of schools in post-soviet countries integrate elementary, middle and high schools into one institution hosting childrens of all ages under one umbrella.

**Community Well-Being:** Schools as community centers play a vital role in promoting the overall well-being of the community. They provide access to a wide range of resources, services, and facilities that support physical, mental and emotional health. Such strategy was used in programing and transforming into design part of Gymnasium Nr.46, where we include clinics, counseling services, recreational facilities, fitness programs, and nutrition initiatives. Creating an infrastructure that promotes bike riding, parks, urban agriculture all these principles intended to contribute to a healthier and more resilient community.

There are numerous challenges to understanding the implementation and impact of SaCH. For example, these challenges include the duration of initiatives, levels of collaboration, varying levels of implementation across different contexts and initiatives, and the collection of information about implementation. Similarly, in the evaluation realm, understanding the indicators of success to determine attribution or contribution pragmatically is challenging given the variable stakeholders in the school context. It is vital to evaluate success across these various perspectives of the complex education ecosystem in which Schools as Comunity Hubs are located.

![](_page_49_Figure_8.jpeg)

The education ecosystem source: Clinton, 2023

![](_page_49_Figure_11.jpeg)

**Nourish Social Networks:** Social networks formed within school communities foster a sense of belonging, support and solidarity creating a strong foundation for community engagement and collaboration. They provide opportunities for residents to come together, share experiences and build relationships based on common interests and goals. Such a feeling needs to be quite strong and crucial in a post-war country, to secure the progress of well-being.

As infrastructure networks lack precise definition in existing literature, it's necessary to first clarify what constitutes a 'network' and then explore the concept of an 'infrastructure network' ' (Miles, Cleveland, & Chandler, 2023, p. 100). Rogers et al. (2013) define a network as "a set of nodes and the paths linking them together," while Mayhew (2015) identifies it as "a system of interconnecting routes allowing movement from one center to others." In his book Community, Delanty (2018) defines networks as "heterogeneous sets of relationships between nodes," emphasizing their role in facilitating communication and social change (Miles, Cleveland, & Chandler, 2023, p. 100)

The network diagrams depicted in Fig. 2, adapted from Baran (1962), illustrate various operational modes of networks. Originally designed to elucidate communication networks, these representations also shed light on the diverse nature of networks in general. One such model is the 'centralized' network, characterized by a single central node connecting to each end node. Baran highlights the vulnerability of this type, contrasting it with the 'distributed' model, which allows continued network operation even if one node fails.

In practical terms, most networks exhibit a combination of centralized (star) and distributed (mesh) elements (Baran, 1962; Miles, Cleveland, & Chandler, 2023, p.102). Insights from studies on social networks offer valuable avenues for understanding infrastructure networks, including mapping techniques and methods for delineating links between nodes. For instance, network diagrams related to social networks, often referred to as 'sociograms', visualize individuals or organizations as nodes interconnected by relationships.

![](_page_50_Figure_4.jpeg)

Moreover, Social Network Analysis (SNA) provides methodologies for analyzing social relationships (Borgatti et al., 2009; Marin & Wellman, 2014; Scott, 1988), offering potential insights into the relationships among infrastructure assets.

Exploring the 'links' in infrastructure networks warrants deeper consideration. While individual facilities may serve as nodes, the nature of links or edges in these networks is multifaceted. They may encompass the physical movement of people between assets, operational connections, indirect associations through broader social networks, and the exchange of data via digital networks. Thus, understanding the intricate interplay of these linkages is essential for comprehending the dynamics of infrastructure networks.

In the mapping of Community Infrastructure Networks, including schools, it becomes apparent from previous literature that there exists a gap in understanding school planning within urban contexts (e.g., McShane & Wilson, 2017; Morphet, 2016), particularly regarding schools' involvement in and benefits from local community infrastructure. Furthermore, there is a need for additional research into the functioning and appearance of social infrastructure networks. While the importance of social infrastructure networks is acknowledged (Infrastructure Australia, 2019), further exploration is required to grasp their mechanisms.

The Greater London Authority lays the groundwork for mapping connections, suggesting that engagement processes should commence with observational research and mapping of both quantitative and qualitative aspects of environments, encompassing barriers to independent mobility and broader connectivity networks (Greater London Authority, 2020b, p.58; Miles, Cleveland & Chandler, 2023).

Network types, adapted from Baran(1962)

Drawing on the network models proposed by Baran (1962) as a starting point, one can speculate on the emergence of a community infrastructure network. By documenting the connections between existing and potential facility nodes, insights into how a network model could function are gained (Miles, Cleveland, & Chandler, 2023). A speculative community infrastructure network map, illustrated in Figure 3, presents a fusion of Baran's 'decentralized' and 'distributed' network models, envisioning a neighborhood network linking various entities such as schools, recreational facilities, cultural institutions, and public amenities (Miles, Cleveland, & Chandler, 2023).

Contemplating the connection of entities like schools, aged care centers, and early learning facilities to a performing arts hub, with walkable connections, prompts consideration of the benefits that could be bestowed upon local neighborhoods. Delving into how the network of community infrastructure could be integrated, a new social infrastructure landscape may be uncovered (Miles, Cleveland, & Chandler, 2023).

![](_page_50_Figure_13.jpeg)

![](_page_50_Figure_14.jpeg)

# 3.5.1 Long-Term Planning

Strategic long-term planning is essential to anticipate future educational needs and demographic changes, ensuring the creation of sustainable and adaptable school infrastructure. This comprehensive approach involves a multifaceted process that includes analyzing demographic trends, aligning with educational policies, and incorporating community input. Understanding these factors allows planners to develop robust strategies that inform the design and construction of school facilities to meet both current and future demands.

**Demographic Analysis:** One of the critical components of strategic long-term planning is demographic analysis. By examining population trends, birth rates, migration patterns, and other demographic factors, planners can forecast future student enrollment. This information is vital in determining the number and size of schools needed, as well as their locations. Accurate demographic analysis ensures that educational facilities are neither overbuilt nor underutilized, optimizing resource allocation and preventing future overcrowding or under-enrollment issues (Lippman, 2010).

**Educational Policy Alignment:** Another key aspect is aligning long-term plans with educational policies. This alignment ensures that the planned facilities meet future educational standards and requirements. Educational policies often evolve to incorporate new teaching methods, technological advancements, and curriculum changes. By staying aligned with these policies, planners can design schools that support modern educational practices and anticipate future shifts in educational paradigms (Lippman, 2010).

**Community Input:** Incorporating input from the community is also crucial in strategic long-term planning. Engaging with parents,

teachers, students, and other stakeholders helps planners understand the unique needs and preferences of the community. This collaborative approach ensures that the resulting school facilities are well-received and effectively serve the community's educational goals. Community input can also highlight local factors that may not be apparent through demographic and policy analysis alone" (Miles, Thompson, & Cleveland, 2023, p. 104).

**Implementation:** The implementation phase involves projecting future needs and integrating them into the design and construction phases of school facilities. This process includes developing flexible designs that can adapt to changing educational practices and fluctuating student populations. For instance, modular classrooms that can be expanded or reconfigured as needed offer a practical solution to accommodate growth and change. Incorporating advanced technologies and sustainable building practices also ensures that schools remain relevant and efficient over time (Lippman, 2010; Maclure, 1984, p. 107).

Outcome: The outcome of effective long-term planning is the creation of school facilities that can accommodate future growth and adapt to changing educational requirements. These schools provide sustainable solutions that align with community needs and educational standards. For example, a well-executed long-term plan might involve projecting an increase in student enrollment and designing schools with the capacity to expand as needed. This foresight helps create educational environments that are flexible, enduring, and capable of supporting evolving educational practices (Lippman, 2010; Maclure, 1984). Strategic long-term planning for educational facilities is a dynamic and ongoing process that requires careful analysis, align-ment with policies, community engagement, and forward-thinking implementation. By anticipating future needs and designing adaptable and sustainable schools, planners can ensure that educational infrastructure supports both current and future generations of students.

**Budgeting and Financing:** Securing adequate funding and managing financial resources are paramount for the successful execution of school construction projects. The process begins with careful planning and allocation of budgets, which are often secured through various financing mechanisms such as government budgets, grants, bonds, or other sources. These financial resources must be meticulously managed to ensure that projects remain within budget and that funds are utilized efficiently to achieve the desired outcomes (Lippman, 2010).

The theoretical context emphasizes that the effective allocation and management of financial resources are critical. Research insights further support this by highlighting the importance of prioritizing project needs when allocating funds. This approach ensures that the most critical aspects of the project receive the necessary financial support, thereby maximizing the impact of the available resources .

Securing funding through diverse mechanisms such as government budgets, grants, and other financing options is vital for the smooth implementation of school construction projects. These mechanisms provide the necessary financial backing to initiate and sustain the projects from inception to completion. For instance, a well-planned budgeting process might involve securing government grants and strategically managing project funds to ensure not only the timely completion of the project but also its financial sustainability in the long run (Boice, 1970, p. 456). Effective budgeting and financing practices play a crucial role in guaranteeing that school construction projects are not only adequately funded but also financially viable. By carefully managing financial resources and ensuring that all expenditures are justified and aligned with project goals, schools can avoid cost overruns and ensure that the projects are completed efficiently.

The success of school construction projects hinges on securing sufficient funding, effectively allocating resources based on project priorities, and meticulously managing financial resources. This comprehensive approach ensures that projects are completed on time, within budget, and to the desired quality standards, ultimately contributing to the creation of effective and sustainable educational environments (Bakkah, 2024).

![](_page_51_Picture_16.jpeg)

A cost cycle diagram that considers the interrelationship among the cost of the project, the schedule for designing and constructing the project, and the total square footage of the project. Educational Resource Planner: Peter Lippman. Marius Calin **Procurement and Contracting:** Efficient procurement and contracting are crucial for selecting skilled contractors and ensuring good pricing. A well-organized procurement process not only gets the best value for money but also promotes innovation and high-quality construction. The goal is to create a competitive environment that motivates contractors to deliver their best work at fair costs (Cox & Thompson, 1997).

A transparent and structured procurement process is essential. Efficient procurement and contracting help in choosing only qualified contractors, which is vital for maintaining high quality and cost-effectiveness (Luu, Ng, & Chen, 2003). A well-managed procurement process reduces risks and increases the chances of project success (Cox & Thompson, 1997).

This involves competitive bidding to get offers from construction firms. Different procurement methods like traditional contracting, design and build, and management contracting have their benefits and are selected based on the project's needs (UK Government, Cabinet Office, 2016). Contracts are awarded through competitive bids, ensuring that projects are done by qualified firms at reasonable costs (Paul & Peter, 2005). Detailed contract documents that define the scope of work, timelines, and performance standards are crucial. Good contract management includes regular monitoring and evaluation to ensure compliance (World Bank, 2011).

Research shows that getting bids from construction firms through competitive processes ensures quality and cost-effectiveness (Smith & Noble, 2013). Competitive bidding makes contractors more innovative and efficient (Paul & Peter, 2005). Effective contract management ensures that projects are completed as agreed, including regular progress reviews, quality checks, and quick resolution of disputes (Case studies from the \*Journal of Construction Engineering and Management\*).

The procurement process may involve issuing a request for proposals (RFP), evaluating bids, and selecting a contractor based on qualifications and pricing. Case studies show that successful procurement processes lead to timely and within-budget project completions (Smith & Noble, 2013).

Efficient procurement and contracting ensure that school construction projects are done by capable contractors, maintaining quality and cost-effectiveness. These processes, when well-implemented, contribute to the overall success and sustainability of construction projects (Luu, Ng, & Chen, 2003).

Transparency and accountability throughout the procurement process build trust among stakeholders and ensure efficient use of public resources (Cox & Thompson, 1997). Identifying and mitigating risks is crucial, with strategies like thorough vetting of contractors and detailed project planning (World Bank, 2011). Encouraging innovation through procurement can lead to better project outcomes, with examples where innovative procurement strategies led to improved construction techniques and materials (Smith & Noble, 2013).

# 3.5.2 First Step Towards Sustainability

Schools as community centers should embrace the principles of environmental operation and social value through community-based ownership of sustainability initiatives. By involving the community in the design, implementation, and maintenance of sustainable practices, schools become engines for collective action and environmental responsibility. Sustainable principles need to be culturally relevant and inclusive, reflecting the community's identity. Special care should be taken when incorporating building materials and construction techniques, potentially incorporating vernacular architecture elements that resonate with the local cultural identity and heritage (Cleveland et al., 2023).

Woolner (2016) discusses "the potential for the school in the city to be part of the solution to environmental, and perhaps social, injustice: efforts rooted in improving the school space begin to create a center for sustainable living and an environmental resource for the wider community" (p. 49). This potential can be realized through school planning that considers the environmental costs of energy usage and travel; constructing school buildings that serve as models of good practice, such as incorporating green roofs, growing spaces, and nature reserves on site; integrating Education for Sustainable Development (ESD) into both children's and adult learning; and supporting community initiatives like providing space for local farmers' markets and shared community meal preparation and dining (Hron, 2023).

Schools as community centers ensure that members of the community have access to environmental resources and advantages, regardless of socioeconomic status or background. This includes providing green spaces, parks, and outdoor sport and recreational facilities that enhance quality of life and promote physical and mental health. This approach aligns with the design principles of Schools as Community Centers, which includes urban agriculture, greenhouses, solar panels, wind trees, and noise barriers for the community, adding more value to the site through sustainability strategies and environmental principles (Hron, 2023).

Incorporating features such as green roofs not only provides insulation but also supports biodiversity by creating habitats for various species (Cleveland et al., 2023). Growing spaces within school grounds can serve dual purposes: educational tools for teaching students about agriculture and sources of fresh produce for the community. Nature reserves on school sites offer spaces for environmental education and act as carbon sinks, improving air quality and offering aesthetic and recreational benefits.

Schools can provide environmental education and sustainability training, serving as platforms where students, parents, and community members can learn about environmental issues, explore new sustainable practices, and participate in hands-on learning experiences. By fostering a culture of environmental awareness, responsibility, and action, schools can create future generations that are more environmentally conscious and capable of addressing ecological challenges (Hron, 2023). For instance, hands-on activities like gardening, waste recycling programs, and energy conservation projects can significantly enhance students' understanding and commitment to sustainability (Hands, 2010).

### Partnerships for Sustainable Development

Schools as community centers attract partnerships with local organizations, businesses, and government agencies to promote sustainable development and environmental conservation. Gymnasium Nr. 46 aims to achieve this by adopting sustainability strategies and attracting partnerships, which are crucial for implementing green infrastructure projects, energy efficiency initiatives, waste reduction programs, and renewable energy solutions. Leveraging a variety of resources and expertise, schools can become hubs for change, driving innovation and sustainability across the community (Cleveland et al., 2023).

Effective partnerships require schools to act as facilitators and collaborators, engaging stakeholders in meaningful ways. For example, partnerships with local farmers can support school gardens and educational programs, while collaborations with businesses can provide funding and technical expertise for renewable energy projects (Boys & Jeffery, 2023). Government agencies can offer grants and policy support, creating an enabling environment for sustainable initiatives.

![](_page_52_Figure_12.jpeg)

Potential of the sustainable workshop in cooperation with NGO'S.

### Measuring Impact and Promoting Accountability

These institutions can measure the impact of sustainability initiatives and promote accountability through transparent reporting and evaluation processes. This includes tracking key performance indicators such as energy consumption, waste diversion rates, water usage, and carbon emissions to assess progress towards sustainability goals. By sharing data and outcomes with the community, schools demonstrate their commitment to environmental principles and social responsibility, inspiring collective action and continuous improvement (Hron, 2023).

Transparent reporting mechanisms ensure that all stakeholders are informed about the progress and impact of sustainability initiatives. Regularly published sustainability reports can highlight achievements, identify areas for improvement, and reinforce the school's role as a leader in environmental stewardship (Hands, 2010).

Engaging students in the monitoring and reporting process can also serve as a practical educational experience, reinforcing their learning and involvement in sustainability practices.

In summary, inclusive sustainability and social interest represent fundamental principles in the design of Gymnasium Nr. 46, prioritizing environmental strategies in educational institutions. By fostering these principles, attracting partnerships for sustainable development, and promoting accountability and transparency, our design aims to effect positive change in addressing environmental challenges. The incorporation of culturally relevant and community-specific sustainable practices not only enhances the environmental impact but also ensures that these initiatives are supported and maintained by the community they serve (Cleveland et al., 2023).

The concept of schools as community centers marks a departure from traditional views, expanding their role beyond academic learning to encompass a wider array of functions and activities. This innovative approach recognizes schools as integral parts of the social fabric, capable of driving positive change and community development. In the context of Kharkiv, where such transformation has yet to be realized, this vision presents an innovative opportunity.

This comprehensive integration of schools as community centers fosters cultural and social activities, promoting artistic expression, cultural exchange, and community engagement. It also facilitates intergenerational interaction through mentorship programs and workshops, fostering empathy and understanding across age groups. Additionally, schools as community centers contribute to the overall well-being of the community by providing access to a range of resources and services, including healthcare facilities and recreational activities.

Moreover, these community-centered schools nurture social networks, creating a sense of belonging and support within the community. This interconnectedness is crucial for post-war countries like Kharkiv, where solidarity and collaboration are essential for progress and well-being.

In mapping community infrastructure networks, including schools, it's evident that there's a need for further research to understand their functioning and appearance fully. The integration of various entities into a cohesive network, as envisioned by the Greater London Authority, holds promise for enhancing community connectivity and fostering a more inclusive and resilient society. Overall, the transformation of schools into community centers represents a forward-thinking approach to community development, offering innovative solutions to address the diverse needs and interests of local residents.

# **Contemporary Case Studies**

Schools as educational institutions but also as community centers.

This chapter endeavors to highlight the novel development concepts concerning the architecture of Schools as Community Centres. Before examining the three contemporary case studies we will try to explain some of the notion of depicting schools as "behavior settings". Some objectives that made it possible for these three case studies to result as succeeful.

In his research, Anderson stressed the significance of both the physical and social aspects of schools in molding student behavior. He posited that schools, similar to other institutions, furnish a structured environment that shapes the conduct of individuals within them. This perspective highlights the importance of comprehending how the school environment can either enable or interfere with specific behaviors among students.

Schools may be described as behavior settings (Barker, 1968; Barker & Gump, 1964; Wicker, 1987). Behavior settings encompass the interrelated and recurrent patterns of behavior occurring within a particular environment. These settings comprise both social and physical contexts in which human behavior unfolds (Wicker, 1987). For a school, the social milieu encompasses students, faculty, and staff engaging with one another. The physical milieu includes non-human elements such as parking lots, walkways, playing fields, and buildings that exhibit diversity in size, color, and arrangement. It's imperative to comprehend behavior settings as transactional, implying that the relationships between human and non-human elements mutually influence each other, thus impacting the learner and providing learning opportunities. A transactional perspective acknowledges that learners exert influence on their social and physical learning environments, which, in turn, influence learner behavior. These interrelations render the school an integrated system where the learner, the learning process, and the subjects being learned are situated within a specific temporal and spatial context.

# 4.1 Thoughtful Design in Learning Environment

Thoughtful design approach" implies a careful consideration of various factors such as context, user needs, environmental impact, and community engagement. It suggests an approach that goes beyond functional requirements to encompass broader considerations of sustainability, inclusivity, adaptability, and aesthetic integration.

It has evolved beyond a mere architectural concept to a multifaceted discipline that permeates various aspects of the built environment. It encompasses not only the physical attributes of buildings but also their, cultural relevance, and impact on user well-being.

This approach in architecture is evident across various scales of design, ranging from the broad considerations of urban planning to the intricate details of interior design. It embraces innovation in building materials, construction methods, and digital technologies, offering solutions that tackle pressing societal issues such as climate change, urbanization, and social inequality.

This approach allows for the exploration of the interaction between space and people, often referred to as 'the poetics of space'. Achieving this involves an interactive design approach that prioritizes understanding the user group, their activities, and their responses to design interventions

Ultimately, this approach in architecture seeks to establish an effective relationship between users and space, fostering dynamic social experiences.

Fundamentally, endeavors to forge a symbiotic bond between the built environment and its occupants, nurturing spaces that not only serve practical purposes but also inspire and elevate the human experience. By embracing principles of sustainability, inclusivity, and user-centric design, it holds the promise of shaping a future that is more resilient, equitable, and sustainable for generations to come. Schools are not just physical structures; they are living ecosystems where learning happens. Designers should conceive of schools as spaces that actively facilitate the acquisition of knowledge and practical skills. This means creating environments that encourage interaction, collaboration, and exploration among students. It's about fostering a culture where learning extends beyond the classroom walls and integrates with students' everyday experiences. Schools can be described as behavior settings Petter Lippman, 2010).

A thoughtful approach requires designers to deeply understand the intersection of educational theory, technological advancements, and the history of school design. By grounding their design process in research and best practices, designers can create environments that adapt to the evolving needs of learners. This approach starts with asking questions about the goals and motivations behind the educational program, rather than imposing predetermined solutions.

**Dynamic and Flexible Environments:** The concept of dynamic and flexible environments in education is rooted in the recognition that learning is not a one-size-fits-all process. Students have diverse needs, preferences, and learning styles, and these can change over time. Therefore, educational spaces need to be adaptable to accommodate these variations.

Dynamic environments are those that can respond and evolve alongside the learners. This means that they are designed with the understanding that education is not static but rather a fluid and ongoing process. These environments are responsive to the changing needs of students, teachers, and the educational curriculum. Flexibility: Flexibility in design is essential for creating such dynamic environments. It involves the ability to easily modify or reconfigure the physical space to meet different educational requirements. This might include features such as movable furniture, which can be rearranged to facilitate various group sizes or learning

Adjustable partitions or room dividers offer the flexibility to create separate spaces for individual study or collaborative work as needed.

Moreover, having a versatile technology infrastructure is vital in modern educational settings. This includes provisions for easily integrating and adapting technology tools and resources to support different teaching methods and learning experiences. For instance, classrooms equipped with interactive displays, wireless connectivity, and mobile devices enable educators to incorporate multimedia content, online resources, and interactive learning applications into their lessons.

By embracing dynamic and flexible environments, educational institutions can create spaces that foster creativity, collaboration, and innovation.

These environments empower both students and teachers to adapt and explore new approaches to teaching and learning, ultimately enhancing the overall educational experience.

108

# Hybrid and multifunctional spaces

A space that can be used as an extension and connection between the corridor and the greenhouse. It is a semi-external classroom, which diversifies and varies according to the specific activities, thus increasing the possibilities of exploiting the students' learning and playing spaces.

### The classrooms

The movable walls between two classrooms allow the extension of the spaces and thanks to the opening windows it is possible to use the greenhouse as an extension of the classrooms themselves. The walls towards the internal corridor are designed as containers for students, with easily accessible lockers and wardrobes.

# The laboratories

Flexible and combinable, they allow activities to be carried out in small or medium groups. They are equipped with equipped walls that perform the function of storage for teaching equipment, while at the same time guaranteeing, with large windows, visual communication between the classrooms and the connective space.

![](_page_54_Figure_23.jpeg)

![](_page_54_Figure_24.jpeg)

![](_page_54_Figure_25.jpeg)

![](_page_54_Figure_26.jpeg)

![](_page_54_Figure_27.jpeg)

![](_page_54_Figure_28.jpeg)

Activity Settings and Learning Zones: Activity Settings and Learning Zones refer to specific areas within a school environment dedicated to various types of learning activities. These zones are meticulously planned to accommodate diverse activities, ranging from solitary study to collaborative group work. Designers focus on tailoring each zone to meet the needs and preferences of learners, fostering engagement, interaction, and facilitating focused learning and reflection.

Understanding the relationship between the learner and the learning environment involves viewing it through the lens of activity and passivity. An active learner is one who is dynamic and participatory, influencing and being influenced by their surroundings.

Conversely, a passive learner tends to be more submissive, less engaged, and less participative in the learning process. Learning is viewed as a distributed activity, occurring within socio-cultural contexts. Therefore, the physical environment of the school should be carefully planned to encourage the flow of activities and support various learning styles. The Learning Center (LC) comprises diverse learning zones, including classrooms and specialized instructional spaces such as art studios, music rooms, laboratories, and gymnasiums.

Activities within these settings should be configured to cater to individual learning, one-on-one interactions, small group collaborations, and large group engagements. Key elements of activity settings include flexible access to peers of varying skill levels, influence over daily transactions, active exploration of permitted activities, opportunities for creating and redesigning activities, and low levels of adult direction and monitoring, allowing learners considerable autonomy. Scientific Approach to Design: Architects should approach their work with a scientific mindset, utilizing research-based methods to inform design decisions and evaluate their effectiveness. This entails systematically incorporating empirical evidence into the design process to ensure that environments are purposefully crafted to support learning outcomes.

In practice, designers may conduct post-occupancy evaluations to assess how well their designs meet the intended goals and objectives.

These evaluations involve gathering feedback from users, such as students and teachers, and analyzing data collected from the environment. By actively soliciting input from those who interact with the space, designers gain valuable insights into how it functions in real-world settings and identify areas for improvement.

Furthermore, data analysis plays a crucial role in evaluating the efficacy of design interventions.

By analyzing quantitative and qualitative data, designers can pinpoint strengths and weaknesses in the current design and identify opportunities for enhancement. This evidence-based approach enables designers to refine their designs iteratively, ensuring that they evolve to better meet the evolving needs of learners and educators.

By continually refining their designs based on empirical evidence, designers can create environments that truly support learning and foster positive outcomes for students. This iterative process of design refinement is guided by a commitment to evidence-based practice, ensuring that educational environments are optimized to promote engagement, collaboration, and academic achievement. **Cultivating a Thoughtful Design Culture:** Building a thoughtful design culture within architectural practice requires a commitment to ongoing learning and professional development. Designers must stay current with research and trends in education, seeking out opportunities to integrate this knowledge into their design process. This might involve collaborating with educators, psychologists, and other experts to ensure that design solutions are grounded in evidence and responsive to the needs of learners.

In essence, a thoughtful design approach to creating learning environments is about creating spaces that are adaptable, engaging, and supportive of student learning. It's about recognizing that the physical environment plays a crucial role in shaping educational experiences and designing spaces that empower students to thrive academically, socially, and emotionally.

![](_page_55_Picture_12.jpeg)

The transactional worldview examines the interrelationship between the social and ohvsical environments and the learner. Educational Resource Planner: Peter Lipoman. Marius Cal

![](_page_55_Figure_15.jpeg)

The learner- environment coordinate system considers the reaming environment as passive or active in relation to the learner as passive or active. Educational Resource Planner: Peter Lipoman: Manus Cain

![](_page_55_Figure_17.jpeg)

Design professionals who follow the reactive approach are aware of the research on how people learn, but they are unable to incorporate this information into their desions. They do not have the knowledge or understanding of how learning takes place. Educational Resource Planner: Peter Lippman. Marius Calin

LCs are designed to encourgae the learner to be active, support an active social enviorment, and promote an active physical enviorment (Lippman, 2010).

This approach is structured to promote a teacher-centred enviorment in which the teacher is active and the students are passive.

![](_page_55_Picture_22.jpeg)

Design professionals who follow the resistant approach may be aware of new trends, but they are unwilling to change their method of practice. Educational Resource Planner: Peter Lippman.

![](_page_55_Figure_24.jpeg)

The design professional who embraces the thoughtful approach not only understands how people learn but, most importantly, is able to design learing environments to mediate the learner, the learning process, and the things to be learned. Educational Resource Planner: Peter Lippman. Marius Calin

![](_page_55_Picture_26.jpeg)

The reactive approch provides a learning environement that encourgae the learner to be active.

The thoughtful designer views the learner as active in appropriating knowledge, acknowledges the learning environment as active, and organizes the physical environment to support the social environment

# 4.2 Current Examples

Given that our design for the school in Kharkiv is situated in a post-war context, it becomes crucial to delve into contemporary modern case studies that exemplify successful implementations of similar projects. These case studies are particularly valuable as they highlight schools that serve dual purposes, not only as educational institutions but also as community centers.

In recent years, the integration of schools as community hubs has gained traction, driven by the need to foster communal resilience and social cohesion in post-crisis environments. By examining these case studies, we can explore the principles and strategies that underpin responsive design approaches. Such an analysis allows us to identify key trends and innovations in educational architecture that are particularly relevant to post-war and recovery settings. These principles often include flexibility in design to accommodate various community needs, the incorporation of sustainable and resilient building practices, and the creation of inclusive spaces that support a range of activities beyond traditional schooling. Additionally, these modern designs frequently emphasize the importance of psychological well-being, creating environments that are not only functional but also nurturing and inspiring for both students and the broader community.

By studying how these schools have successfully merged educational functions with community services, we can derive actionable insights and best practices. This understanding will inform our design process for the Kharkiv school, ensuring it meets the multifaceted needs of a post-war community, fostering both education and community rebuilding efforts. In conclusion, analyzing these contemporary modern case studies provides a comprehensive framework for understanding the latest trends in school design. It guides us in creating a responsible and adaptive educational environment that aligns with the complex requirements of a post-war context, ultimately contributing to the social and communal revitalization of Kharkiv.

![](_page_56_Picture_7.jpeg)

BDR BUREAU - FERMI SCHOOL

A+ SAMUEL DELMAS

DAY NURSERY AND GAMES LIBRARY

CRISTINA CASADEI, LUIGI FRANCIOSINI

SCHOOL CENTER OF EXCELLENCE

![](_page_57_Picture_0.jpeg)

The project transforms a building built in the 1960s in a semi-peripheral district of Turin into an innovative school, rethinking the architecture according to new pedagogical needs and a renewed relationship with the community. At the urban level, the reorganization of accesses and external areas opens the school spaces to the city. The new main entrance transforms the back of the building into a new facade and draws a large, green, accessible, threshold space. The program is organized to favour a continuous and controlled use of the building that, following the concept of community schools, integrates several activities opened to the neighborhood, such as the gym, library / auditorium, cafeteria that extend directly to the outer space. Recognizing some spatial qualities in the existing building, the intervention reorganizes the spaces and works mainly by addition.

The topic of the new envelope has been interpreted as an opportunity to innovate the entire school structure and as a tool to transmit the pedagogical values of a school open towards the outside. The project proposes an "inhabited envelope" created through the addition of new steel spatial structures that extend educational activities into outdoor terraces, welcome new connective spaces and behave like passive shelding systems. The modularity and repetition of the new frames design a linear facade completed by a metal mesh that emphasizes visual permeability and the relationship with the outside. The compositional theme of the frame is also repeated on the existing building, whose facades are treated with a coat finished with plaster in different grain sizes, creating slight depth of the facade. The facades on the new front and towards the courtyards maintain large windows that enhance the visual permeability among the volumes and the external spaces, giving meaning to the original organization.

The interiors follow the spatial grid of the frames and form a sequence of easy to read spaces in which the furniture is conceived as a transformative element. The ground floor functions as a civic center, where the various functions are held together by an atrium that faces the garden and the two courtyards.

On the upper floors, the atrium accommodates recreational and group spaces, while educational activities are organized in clusters, a spatial unit composed of classrooms, cloakrooms and informal learning spaces. The cluster is conceived as an articulated system in which the common space connects the various activities and opens up towards the external collective space. The classrooms are therefore the meeting and hinge point between inside / outside because they maintain a visual permeability towards the common space and can expand the didactic and recreational activity on the terraces, according to a model that refers to the didactic experiments of the open-air schools.

The school renovation is part of "Torino Fa Scuola", a project by Fondazione Agnelli, Compagnia di San Paolo in collaboration with the City of Turin, which promotes cultural, pedagogical and architectural reflection on the new learning spaces. The Fermi school project was the subject of an international competition and involved the school communities through a shared and participatory process that also included the revision of the current teaching model

![](_page_58_Picture_0.jpeg)

![](_page_58_Figure_3.jpeg)

![](_page_58_Figure_4.jpeg)

0 1 5 10

![](_page_59_Picture_0.jpeg)

This 100% wood and reused biobased construction project, sitting at the foot of a 60s tower block, is fully in line with the redefinition of the Louvois district in Vélizy. Following the demolition of the commercial slab linking the blocks, a new floor has been created in a revamped complex. The natural ground, with its gently undulating landscape, reclaims its rights. Here, the redevelopment of the neighborhood revolves around a landscaped basin and a new axis where shop windows are clad in wood. (District's landscape designer: Urbicus)

Formerly made up of cellars on the edge of an under-slab car park, the project will breathe new life into this new basement level with a double public facility: a day-nursery and a games-library. The work on the 5th facade has enabled us to create a new, living 'soil' in front of the flats above, with soil complexes of up to one meter and real trees to come. We also proposed, and were awarded, the task of cladding the foot of the facade of the existing building, in keeping with the materiality of the construction, in order to remove any impression of addition and recreate visual unity. To complete the contextual approach, we directly reused materials recovered during the demolition in progress, at the start of the project. For example, we were able to extract slabs of schist and tree trunks, and reintegrate them into the new building. As soon as you enter, the space opens up onto an interior...a double-height that allows you to read the section above, or a patio. The Comblanchien limestone floor, used in public areas, enters the hall. Its pinkish hue is also used to articulate a mineral base on the most exposed faces.

The facade is protected by a grid of poplar slats spaced every 45 centimeters and underlined by sheets of coppery zinc. The building can be read as opaque from the outside, and seen as open from the rooms. The children's sections are soft and flow between intimate patios and play gardens.

All dressed in wood – which is also structural – the sunshade slats protect, and disappear at ground level, leaving an unobstructed view just for the children. The joists, accompanied by linear light strips and skylights, direct the eye outwards, the floors are continuous and the space is fluid. Sometimes suspended, sometimes supported, the wood plays in all its forms. Wooden furniture accompanies the interior atmosphere, while ball or ring-shaped lighting fixtures highlight singular spaces.

![](_page_60_Picture_0.jpeg)

A+ SAMUEL DELMAS

# DAY NURSERY AND GAMES LIBRARY

![](_page_61_Picture_0.jpeg)

Urban Context and Architectural Design The demolition of the Giorgione Hotel created an urban gap in Ariano Irpino, offering a chance to rethink part of the city with new services and public spaces. The new school building respects the historical context and resolves the orographic gap with adjustments, reshaping the urban profile. It highlights the relationship between social organization and urban architecture, akin to historic Italian cities like Gubbio and Viterbo.

### City and Site

The design considers the natural direction defined by the hill ridge, characterized by a mix of terraced houses and isolated buildings. The urban morphology of Ariano Irpino exemplifies the growth processes induced by the place's nature, forming a recognizable city structure with linear trends and monumental landmarks. The new school fits into this context, enhancing the existing urban fabric through new and old buildings, creating a belvedere square with views of the surrounding landscape.

# From Closed Square to Belvedere Square

The transformation of the current Piazzale San Francesco from a closed square to a belvedere square follows the Italian tradition of elevated observation points. The new school complex re-signifies the ancient space, creating a new identity for the square. It combines closed, regular square elements with a belvedere opening to the south, offering new visual orientations and urban connections. Architectural Concept and Urban Connections

The school's design integrates with the urban and topographic nature of the site. It features a geometric organization with a base compensating for altitude differences and two emerging volumes. These volumes, linked by a belvedere terrace, ensure visual connections with the landscape. The public lift system and ramp connect Piazza San Francesco to Via D'Afflitto, enhancing urban permeability.

Functional and Typological Distribution The school complex encourages interaction with the city by placing collective functions within the base, while educational activities are organized in the upper buildings. The main atrium, along Via D'Afflitto, functions as an agora, promoting community use of collective services. A second entrance hall at Piazza San Francesco provides access to conference rooms, a library, and a bar-restaurant, reinforcing the connection between city life and the school.

# Architectural and Technical Choices

The school complex consists of a base/platea and two elevated buildings. The base, made of reinforced concrete partitions, regularizes the topography and supports the upper wooden-framed buildings, ensuring flexibility and resilience. The external cladding uses natural materials, providing thermal insulation and environmental control. The design integrates traditional construction techniques and materials from Ariano Irpino, ensuring durability and low maintenance costs.

Enhancement of Piazza San Francesco The project aims to unify the different urban areas of Piazzale San Francesco, discouraging private transport and promoting pedestrian mobility. The new paving uses basalt and limestone, consistent with traditional techniques, ensuring durability. The square includes air and light diffusers, and furnishing elements integrated with the urban context.

# Technical and Constructive Aspects

The base occupies the entire intervention area, designed with reinforced concrete partitions extending to the retaining wall, providing stability and seismic resistance. The gymnasium floors are wooden, and service finishes ensure hygiene and durability. The elevated buildings use a laminated wood frame structure, ensuring flexibility and controlled management of the construction site.

# **Project Goals**

The project aims to create a cohesive urban area, integrating the new school complex with the existing structures, enhancing the historical and architectural value of the Old Town while ensuring modern functionality and sustainability.

![](_page_62_Picture_0.jpeg)

![](_page_63_Picture_0.jpeg)

![](_page_63_Picture_1.jpeg)

![](_page_63_Picture_2.jpeg)

![](_page_63_Picture_3.jpeg)

![](_page_63_Picture_4.jpeg)

![](_page_63_Picture_5.jpeg)

![](_page_63_Picture_6.jpeg)

![](_page_63_Picture_7.jpeg)

![](_page_63_Picture_8.jpeg)

l", scala 1:200

5

# **Lessions From The Past**

# LONDON - ROTTERDAM

The section on reconstruction aims to present a holistic approach on rebuilding schools in the aftermath of war, drawing lessons from two case studies from History, the case of London and Rotterdam. This chapter is dedicated to exploring the practices and effective strategies employed, as well as those that could be applied, in reconstructing educational institutions amidst post-war conditions. Such lessons we will try to extract from the British strategy on rebuilding schools, examining the system and principles in a learning environment building scale.

Moving from strategies used in London for rebuilding schools in the aftermath of war, this chapter now turns to a different case study to draw insights from lessons learned during the reconstruction of Rotterdam. In this section, the scale of analysis expands to a larger context, aiming to identify the factors that shaped the urban environment. Bombing raids had reduced Rotterdam to ruins, necessitating a monumental post-war reconstruction that transformed its urban landscape.

This era sparked significant debates about architecture, urban planning, culture, and identity.

Koolhaas's concept of the Generic City, characterized by globalization and standardized, homogeneous buildings lacking local distinctiveness, is particularly relevant, as reconstruction efforts prioritized uniform designs and building techniques. This exploration delves into the complex interplay of forces shaping post-war Rotterdam, balancing economic revitalization with the tensions between globalization and local identity. A key focus of this chapter will be the examination of methods for post-war reconstruction. We endeavored to complement our choices implemented in our project in Kharkiv, ensuring their appropriate adaptation and effectiveness in the recovery process.

Within this framework, reconstruction is not only seen as the physical transformation of buildings but also as an opportunity to foster a new socio-cultural environment. A detailed analysis of theoretical and practical aspects will enable us to identify optimal strategies and alternative approaches for implementing the reconstruction project in the context of post-war recovery.

As emphasized previously, it is essential for architects to possess a comprehensive understanding of the historical evolution of school architecture. This knowledge equips us to delve into and comprehend the strategies, contemporary trends, best practices, and evidence-based approaches in educational and school architectural design. Confronted with challenging design dilemmas, we endeavored to draw insights from post-war strategies employed in England and Rotterdam for the reconstruction of schools in post-war contexts.

![](_page_65_Picture_0.jpeg)

# 5.1 The Case of Post-war London School's

Andrew Saint properly underscores the significance of post-war learning environments as the most ambitious undertaking in the history of modern British architecture. Policymakers, architects, industrialists, and builders collaborated to initiate monumental building programs aimed not only at enhancing the environment and quality of life for a select few but for the entire British population. In essence, these endeavors needed to establish an architecture accessible to all, thereby profoundly shaping the community framework.

In order to systematize information and for the further selection of the approach, it was decided to refer to the classification from the study of Andrew Saint in "Towards a social Architecture, The Role of School Building in Post-War England" and other research papers that elaborate the topic of postwar strategies for constructing educational institutions.

The author (Saint,1987) enquiries into the ideals, principles and methods adopted by the leading English school-builders, and spells out the special conditions which allowed them to flourish. He argues that their architectural approach is still relevant to problems of building all over the world, wherever money and resources are in short supply and there is an urgent will to raise building standards for whole populations. He interprets the history of English post-war school building as an outstanding contribution to the ideal of sharing out technical and cultural development justly among all, and therefore as one of the most important results of the Modern Movement in architecture.

The book begins with a sketch of the pre-war and wartime conditions which led to the birth of the British movement for a 'social architecture'- one which would be unpretentious, fair, responsive and available to everyone. It then lays out the circumstances and issues which made school-building so urgent and exciting a field of architectural activity after 1945. It tells the story of the development of controlled cyclical building programmes using industrialized techniques at Hertfordshire County Council under the inspiration of Stirrat Johnson-Marshall; of the adoption of Hertfordshire's methods by the Ministry of Education; of the invention of the CLASP system at Nottinghamshire County Council and its evolution into the first of the school-building 'consortia'; and of the spread, enrichment, revision -and widespread influence in Europe and the United States of the architectural principles inaugurated at Hertfordshire.

![](_page_66_Picture_0.jpeg)

Before analyzing a more modern way of building at the time, it is worth menioning that despite the urgency for rapid construction, **traditional methods** persisted due to their reliability and the availability of skilled labor familiar with these techniques.

Traditional methods utilized locally sourced materials such as brick, timber, and stone, which were abundant and familiar to local builders.

Skilled craftsmen employed time-honored techniques in masonry, carpentry, and roofing.

Techniques such as bricklaying, timber framing, and stone masonry were employed.

Schools built using traditional methods often had a distinctive regional character, reflecting local architectural styles and building practices.

While slower and more labor-intensive, traditional construction ensured quality, durable buildings that often had a lasting architectural and cultural significance,

The story of post-war school building, (H.M. Stationery Office, 1957).

# 5.1.1 Prefabrication and Modular Construction in Post-War Educational Buildings

The post-war era necessitated the rapid reconstruction of educational facilities due to the destruction caused by World War II and the upcoming baby birth increasing significantly. Prefabrication and modular construction emerged as key solutions to meet this demand efficiently and economically. Prefabrication involves manufacturing building components such as walls, floors, and roofs off-site in factories, and then assembling them on-site. This method allows for faster construction times and reduced costs, which was crucial for the rapid reconstruction required during this period (Saint, 1987).

The adoption of prefabrication in the construction industry, particularly for educational buildings, was driven by several factors. Historically, prefabrication saw significant growth after World War I due to the urgent need for housing and other infrastructures. This method facilitated rapid assembly and economically practical construction solutions (Rocha, Ferreira, Pimenta, & Pereira, 2023). The greatest expansion of prefabrication occurred in the post-World War II period across different countries. In the United Kingdom, this approach was notably used in the 1960s and 1970s to quickly build residential and educational facilities (Rocha, Ferreira, Pimenta, & Pereira, 2023).

The CLASP system (Consortium of Local Authorities Special Programme) in the UK is a prime example of modular construction applied to school buildings. This system utilized standardized, prefabricated modules that could be quickly assembled on-site, addressing the urgent need for school buildings during the postwar birth explosion (Saint, 1987). Prefabrication and modular construction offer numerous benefits, including reduced construction time and costs, improved quality control due to factory production, and decreased environmental impact through less waste and energy usage. Additionally, modular construction allows for scalable and adaptable designs, which can be customized to meet varying site conditions and educational requirements (McKinsey & Company, 2019).

This approach is also reflected in the research on domestic architecture in the late Soviet Union, where prefabricated panels and modular systems were employed to address housing needs. According to Kateryna Malaia (2020), these systems allowed for quick assembly and future expansions, demonstrating the flexibility and efficiency of modular construction.

However, the adoption of these methods also faced challenges. For instance, the collapse of the Ronan Point apartment tower in East London and other incidents raised concerns about the safety and quality of prefabricated buildings. These events highlighted the need for stringent quality control and better integration of design and construction processes to ensure the reliability of prefabricated structures (Rocha, Ferreira, Pimenta, & Pereira, 2023).

The welded-steel Mopin system erected for the Quarry Hill flats, in Leeds, seemed the spearhead of a technological assault upon the social problems of building (Saint, 1987). In the event, the technical faults which it generated suggested dangers which were heeded too late. Quarry Hill has now been demolished (Saint, 1987). In recent years, innovations in prefabrication have been driven by advancements in technology, such as computer-aided design (CAD), manufacturing mechanization, and robotics. These innovations have further improved the efficiency, quality, and safety of prefabricated construction. The increased interest in sustainable building practices has also stimulated the adoption of prefabrication and modular construction as these methods can significantly reduce the environmental footprint of building projects (McKinsey & Company, 2019).

The use of CAD and CAM technologies has streamlined the design and production process, allowing for greater precision and reduced errors. Robotics in construction have enabled automation of repetitive tasks, further enhancing productivity and safety (McKinsey & Company, 2019).

Looking forward, the potential for prefabrication and modular construction in the educational sector remains high. As the need for flexible and rapid construction solutions continues, especially in response to natural disasters and demographic shifts, these methods are likely to become more common. They offer a practical solution that quickly and efficiently meet the infrastructure needs of expanding and evolving educational systems.

The use of prefabrication and modular construction in post-war educational buildings was a response to the urgent need for rapid and cost-effective construction solutions (Saint, 1987). Despite the challenges faced, the benefits of these methods have ensured their continued relevance and development. Innovations in technology and a growing emphasis on sustainability are likely to drive the future adoption of prefabrication and modular construction, making them integral to the construction industry, particularly for educational facilities. **System-Building Approaches:** To address the diverse needs of different sites and educational programs, flexible and scalable building systems were necessary (Saint, 1987).

System-building used prefabricated panels and modular systems to create adaptable structures. This method allowed for the customization of buildings to fit various site conditions and educational requirements (Rabeneck, 2006; Saint, 1987).

Schools were designed using modular systems that could be easily expanded or reconfigured, providing flexibility for future changes or expansions.

System-building approaches resulted in versatile school buildings that could evolve with changing educational needs and demographic shifts (Saint, 1987). **Standardization and Mass Production:** The post-war context required the efficient construction of a large number of schools to meet urgent demands. It was their priority to build a large number of new schools, hospitals and houses (Bianco, 2013, p.73-74). To do this standardization was not a choice, but a need. Standardization was necessary to integrate the shortages of the post-war years with the demands of the period (Bianco, 2013 p.79).

Architects and planners embraced the principles of standardization and mass production as a method to streamline the design and construction of post-war schools. Standardized building components, such as standardized classroom sizes, door and window configurations, and structural systems, were developed to facilitate efficient construction and reduce design variability (Kozlovsky, 2016). The Ministry of Education's guidelines implemented and promoted the use of standardized designs and materials, enabling efficient and consistent construction across various regions.

Standardization and mass production ensured that schools could be built quickly and economically, addressing the critical shortage of educational facilities (Kozlovsky, 2016).

![](_page_67_Picture_22.jpeg)

### **Key Points**

**Modularity:** System-building involves using prefabricated panels and modular systems, allowing for guick assembly and future expansions.

**Customization:** These systems are designed to be adaptable to different site conditions and educational programs

**Uniformity:** Standardized designs reduce variability, ensuring consistent quality and reducing costs.

**Mass Production:** This approach leverages industrial production techniques to manufacture building components at scale.

Steel frame and cladding for the assembly hall, Greenfields School, Oxhey (Oxhey Site 9'), 1951. A developed stage of the Hills system, with conventional and larger girders in one direction and thin transverse ones. Photo taken by the book of Saint, 1987

![](_page_68_Picture_0.jpeg)

136

O ¦

![](_page_68_Picture_3.jpeg)

Schematic, diagrammatic representation of modular classrooms from post-war school building in England. The images highlights the key features such as large windows for natural light, modular walls for easy reconfiguration, and an open interior space for adaptable use. Arrows and annotations indicate potential expansions and explain the design principles, emphasizing adaptability, natural lighting, and efficient use of space.

![](_page_69_Picture_0.jpeg)

# 5.1.2 Innovative Materials and Technologies in Post-War School Construction

In the aftermath of World War II, architects faced the challenge of rebuilding and modernizing school buildings (Kozlovsky, 2016). This era was characterized by the adoption of innovative materials and construction technologies such as precast concrete, steel framing, and curtain wall systems (Rabeneck, 2006; Saint, 1987). These materials enabled the construction of larger, lighter, and more energy-efficient structures, significantly enhancing the performance, durability, and sustainability of school buildings. The integration of these technologies resulted in functional and aesthetically pleasing designs capable of enduring over time (Saint, 1987).

New Materials and Technologies: Precast concrete offered improved durability and reduced construction times. Steel framing provided strength and flexibility, enabling more open and adaptable spaces. Curtain wall systems allowed for expansive use of glass, increasing natural light and reducing energy consumption. Technological progress in construction methods, such as prefabrication, allowed for rapid assembly of building components off-site, which were then transported and installed on-site (Saint, 1987). This method expedited construction, reduced costs, and minimized waste. Advances in heating, ventilation, and lighting systems further improved the indoor environment of schools, promoting healthier and more comfortable learning conditions (Kozlovsky, 2016).

Design and Construction Innovations: The shift towards modern materials like steel, concrete, and glass facilitated more flexible and expansive designs, supporting open-plan layouts and larger windows that maximized natural light (Kozlovsky, 2016). Lightweight steel frames and modular construction provided greater adaptability, allowing spaces to be easily modified to meet changing educational needs (Saint, 1987). Prefabrication, in particular, enabled the creation of standardized units that could be reconfigured or expanded as necessary, offering benefits such as faster construction times, reduced labor costs, and consistent quality (Saint, 1987).

**Economic and Social Influences:** The economic constraints and social aspirations of the post-war era heavily influenced the adoption of innovative materials and technologies. The need for cost-effective and scalable building solutions was driven by a growing population and increased demand for educational facilities. Saint examines how these factors shaped the search for new materials and construction methods that could provide durable, adaptable, and affordable school buildings.

**Examples:** The case studies like The Hunstanton School illustrate the practical application of new building methods and their impact on educational architecture. For example, the use of steel framing and prefabricated components in the construction of certain schools resulted in structures that were both resilient and flexible, capable of adapting to future changes in educational needs.

Overall, the post-war period marked significant advancements in school building materials and technologies. These innovations played a crucial role in shaping modern educational environments, ensuring that schools were functional, aesthetically pleasing, sustainable, and adaptable to future needs. The legacy of these advancements continues to influence contemporary school design, highlighting the enduring importance of innovation in educational architecture.

![](_page_70_Picture_0.jpeg)

![](_page_70_Picture_2.jpeg)

Trial sections of the 8'-3" module at the Hills works, West Bro
wich, used for experimenting with cladding, junctions,
windows. Source: Andrew Rabeneck, "Building for the futu
schools fit for our children," Construction History 26 (2011):
taken from Andrew Saint, Towards a Social Architecture (198
66. Source: Saint (1987).

![](_page_70_Picture_7.jpeg)

Steel frame of the early 8 feet 3 inches system in course of erection by Gee, Walker and Slater at Burleigh Junior School, Cheshunt, 1947. The early lattice, girders have a delicate, artistic appearance. Source: Saint (1987).

_		
		_

Court entrance to an infant classroom, Burleigh School, Cheshunt, during erection and complete. Note the suspended flooring, a costly feature of the early Hills package. Source: Saint (1987).

# 5.1.3 Implementations Strategies

Controlled, Cyclical Building Programs

Systematic planning and phased construction programs were essential to manage resources and meet deadlines (Rabeneck, 2006, p. 9; Saint, 1987, p. 57). Using industrialized techniques, such as those developed by Hertfordshire County Council under Stirrat Johnson-Marshall's influence, enabled efficient project management (Rabeneck, 2006, p. 12; Saint, 1987, p. 63; Maclure, 1984, p. 35). Projects were implemented and planned in cycles, allowing for continuous assessment and improvement of building techniques and resource allocation (Rabeneck, 2006, p. 14; Saint, 1987, p. 94). Cyclical building programs ensured steady progress and the efficient use of resources, facilitating the timely completion of school construction projects (Rabeneck, 2006, p. 17; Saint, 1987, p. 152). Systematic planning and phased construction programs enable efficient resource management and project execution (Rabeneck, 2006, p. 22; Saint, 1987, p. 175). The research insights highlight the importance of industrialized techniques utilizing these construction techniques enhanced efficiency and quality. Implementing projects in phases allows for continuous assessment and adjustment (Rabeneck, 2006, p. 24; Saint, 1987, p. 166).

Needs Assessment: Understanding the specific needs of communities affected by the war was crucial for effective planning and resource allocation (Rabeneck, 2006, p. 16). Comprehensive assessments evaluated current and projected student enrollment, existing facility conditions, and specific educational requirements. Data collected from assessments informed the planning and prioritization of school construction projects. Accurate needs assessments ensured that resources were directed to where they were most needed, optimizing the impact of reconstruction efforts (Rabeneck, 2006, p. 11; Saint, 1987, p. 80). Comprehensive assessments of educational needs ensure that resources are allocated

resources were directed to where they were most needed, optimizing the impact of reconstruction efforts (Rabeneck, 2006, p. 11; Saint, 1987, p. 80). Comprehensive assessments of educational needs ensure that resources are allocated effectively and projects are prioritized based on urgency and impact (Rabeneck, 2006, p. 14; Saint, 1987, p. 116). Data Collection plays an important role in research insight where gathering data on student enrollment, facility conditions, and educational requirements informs planning decisions. Also, Priority Settings identify and prioritize needs ensuring that the most critical projects are addressed first (Rabeneck, 2006, p. 7; Ehrenkrantz, 1989). Conducting a needs assessment might reveal a pressing need for additional classrooms in a rapidly growing community, prioritizing their construction. **Construction Management:** Effective management of construction activities was necessary to maintain schedules, control costs, and ensure quality (Rabeneck, 2006, p. 19; Maclure, 1984, p. 104).

Construction management methods involved detailed planning, scheduling, quality control, site supervision, and safety management. Construction managers coordinated all aspects of the building process, from material procurement to on-site supervision and quality checks (Maclure, 1984, p. 107). Professional construction management minimized delays, cost overruns, and quality issues, ensuring that projects were completed on time and within budget (Rabeneck, 2006, p. 22). Coordinating all aspects of construction, from material procurement to site supervision, ensures smooth project execution while maintaining quality standards (Boice, 1970, p. 456).

A construction management team might oversee the scheduling, quality control, and site supervision of a school building project, ensuring it is completed on time and within budget.

Monitoring and Evaluation: Continuous monitoring and evaluation were essential to ensure that projects met their objectives and maintained high standards (Rabeneck, 2006, p. 23; Boice, 1970, p. 456). Progress and performance methods were regularly reviewed against established timelines and quality standards, with adjustments made as necessary. Regular site inspections, progress reports, and stakeholder feedback sessions were conducted and implemented to track and evaluate project outcomes (Rabeneck, 2006, p. 24; Maclure, 1984, p. 138). Effective monitoring and evaluation processes ensured that any issues were promptly addressed, maintaining the quality and integrity of school construction projects (Rabeneck, 2006, p. 25; Saint, 1987, p. 57). As an example, monitoring and evaluation processes might involve regular site inspections, progress reports, and stakeholder feedback sessions.

**Maintenance and Facility Management:** Ensuring the long-term functionality and usability of school facilities required ongoing maintenance and management (Rabeneck, 2006, p. 26; Maclure, 1984, p. 50).

Establishing procedures for regular maintenance, repair, and facility management was crucial for preserving school infrastructure, to prevent deterioration and extend the lifespan of facilities (Rabeneck, 2006, p. 28; Saint, 1987, p. 80).

Maintenance schedules, repair protocols, and management systems were implemented in place to keep school facilities in good condition (Rabeneck, 2006, p. 29; Maclure, 1984, p. 107). Proactive maintenance and facility management extended the lifespan of school buildings, ensuring that they remained safe and functional for many years (Rabeneck, 2006, p. 30; Maclure, 1984, p. 35). A maintenance schedule might include regular inspections, repairs, and upgrades to school facilities, ensuring their continued usability.


### 5.1.4 Specific Implementations and Examples

The CLASP system

The Ministry of Education adopted and promoted the methods developed by local authorities like Hertfordshire and Nottinghamshire, facilitating their widespread implementation across England.

## The CLASP System a Post-War School Building Innovation in England.

The CLASP (Consortium of Local Authorities Special Programme) system emerged in the 1950s as an innovative solution to the urgent need for new school buildings in post-World War II Britain. This period was marked by a significant demand for educational facilities due to the baby boom and the necessity to replace war-damaged schools. The CLASP system addressed these challenges by offering a method for quick, cost-effective, and flexible construction of school buildings.Many systems in the book are variations on the tried-and-true method of open web steel joists on a structural steel frame. The Clasp system is a typical example. It has a few attempts at optimization (such as the adjustable lateral bracing shown above), but it's basically steel joists on a steel frame.

Steel joists are sort of a component level version of a metal building. They're built up using steel angles and round bars, and are designed to support a given load using as little material as possible (B.Potter, 2020).

#### Key Characteristics of the CLASP System

- Modular Construction: The CLASP system was based on a modular approach, allowing for prefabricated components to be manufactured off-site and then assembled on-site. This method significantly reduced construction time and costs. The modular design facilitated mass production of building components, ensuring they could be quickly delivered and assembled, thus accelerating the overall construction process (Saint, 1987; Harwood, 2020).
- Flexibility: One of the standout features of the CLASP system was its flexibility. The design allowed for easy modification and expansion of buildings. Schools could be quickly adapted to accommodate changing educational needs and fluctuating enrollment numbers. This flexibility was particularly important in the post-war context, where population shifts and educational reforms often required rapid changes in school infrastructure (Potter 2020; Saint, 1987).
- Standardization: By standardizing components and design, the CLASP system facilitated consistency in quality across different schools. This standardization meant that local authorities could rely on a predictable level of quality and performance for their school buildings.

It also streamlined the construction process, as workers became familiar with the standardized components and assembly methods, further reducing time and costs (Maclure, 1984; Matthews 2009).

- Lightweight Materials: The use of lightweight materials was a critical aspect of the CLASP system. These materials reduced the load on foundations, making it possible to construct buildings on a variety of sites, including those with poor ground conditions. This versatility was particularly useful in urban areas where suitable building sites were often limited (Markus, 1993; Samantha Oswald).
- Environmental Considerations: Some CLASP buildings were designed with attention to environmental factors such as natural light, ventilation, and insulation. These design considerations aimed to create a more comfortable and energy-efficient learning environment. For example, large windows were often used to maximize natural light, while ventilation systems were designed to ensure a steady flow of fresh air, contributing to a healthier indoor environment (Edwards, 2020).

CLASP frame at Bingham Comprehensive School, Nottinghamshire, ca. 1966. Source: Andrew Rabeneck, "Building for the future schools fit for our children," Construction History 26 (2011): 60; taken from Andrew Saint, Towards a Social Architecture (1987), 166.

#### **Historical Context and Impact**

Development of the CLASP system commenced under the leadership of Sir Donald Gibson in Nottinghamshire in 1956, primarily to address issues caused by mining subsidence, material shortages, and labor constraints (S.Bell,1985). The system was widely adopted by local authorities across the UK and had a profound impact on the landscape of post-war school architecture. It provided a practical solution to the urgent need for new school buildings, enabling local authorities to meet the educational demands of the time efficiently (Lund, 1997).

The system's emphasis on modularity and flexibility also reflected broader trends in mid-20th-century architecture and construction. The post-war era saw a shift towards more industrialized building methods, driven by the need for rapid reconstruction and economic constraints. The CLASP system exemplified this shift, demonstrating how prefabrication and standardization could be used to address large-scale building needs (Potter, 2020; Saint, 1987).

#### **Criticisms and Legacy**

Despite its initial success, the CLASP system has faced criticism over time, particularly regarding the durability and maintenance of its buildings. Some schools built using the CLASP system have experienced issues related to the aging of materials and the need for extensive repairs. These challenges have highlighted the limitations of the system's lightweight construction and the potential long-term costs associated with prefabricated buildings (Samantha Oswald; Saint, 1987).

Nevertheless, the CLASP system remains an important chapter in the history of British school architecture. It represents a period of innovation and adaptability in response to post-war challenges, and its influence can still be seen in modern modular construction techniques. The lessons learned from the CLASP system continue to inform contemporary approaches to school building design, emphasizing the importance of flexibility, speed, and cost-effectiveness in educational infrastructure (Edwards, 2008).

#### Formation of School-Building Partnerships

The post-war era in Britain required a massive school-building program to accommodate the baby boom and address war-damaged infrastructure. Collaborative efforts among local authorities were essential in sharing resources and expertise, streamlining the school-building process, and overcoming material shortages and labor constraints. This approach was especially important in regions with specific challenges, such as Nottinghamshire, which faced significant mining subsidence issues (Saint, 1987; S.Bell, 1985).

Partnerships and consortia, such as those evolved from the CLASP system, enabled local authorities to work together on school construction projects. The formation of the CLASP consortium in 1957 exemplified this collaborative spirit. The system's modular and prefabricated design allowed for efficient use of resources and labor, while also enabling local authorities to adapt buildings to their specific needs (Potter, 2020; Saint, 1987).

Collaborative initiatives allowed for the arranging of resources, joint procurement, and shared best practices, enhancing efficiency and effectiveness. Local authorities involved in the CLASP consortium could leverage economies of scale in purchasing materials and components, reducing costs, and ensuring consistency in quality across various school projects. The system's standardization and flexibility also meant that components could be adapted for use in different building types, including hospitals, libraries, and even an airport (Harwood, 2020; Matthews 2009).

School-building partnerships improved the capacity of local authorities to manage large-scale construction projects, resulting in more schools being built to high standards. The collaborative model of the CLASP system enabled the construction of approximately 2,850 buildings by the late 20th century, including educational facilities, health centers, and administrative buildings (Samantha Oswald; Saint, 1987).This approach not only addressed immediate post-war needs but also set a precedent for future public building projects, demonstrating the value of collaboration and shared expertise in the public sector (Samantha Oswald; Saint, 1987).







Parks Secondary Modern School, Belper, Derbyshire, in course of erec-tion, November 1953, with Anthony Pott looking skeptically on. MoE Development Group (Barbara Price, Don Barron and Pat Tindale, main job architects) with Derbyshire County Council (Geoffrey Foxley, job architect). The new Brockhouse cold-rolled frame, designed to a 3 foot 4 inch module with pin joints and diagonal bracing, was to be the starting point for the structure of CLASP. (Saint, 1987).

CLASP frame at Bingham Comprehensive School, Nottinghamshire, ca. 1966. Source: Andrew Rabeneck, "Building for the future - schools fit for our children," Construction History 26 (2011): 60; taken from Andrew Saint, Towards a Social Architecture (1987), 166.



Component and assembly of the Clasp System.

Image source: Great Britain Ministry of Education. Story of Clasp (1961) 33.

#### Spread and Influence of Post-War English School Archi-

**tecture-** The innovative architectural principles and methods developed in post-war England, particularly through the CLASP system, had a profound impact both nationally and internationally. This influence can be traced through several key avenues as discussed in Andrew Saint's Towards a Social Architecture: The Role of School-Building in Post-War England and Andrew Rabeneck's paper Two Approaches to School Building in Britain and America.

Post-war England was a period of significant architectural experimentation and innovation, driven by the urgent need to rebuild and expand educational infrastructure. The principles of flexibility, cost-efficiency, and rapid construction developed during this time proved to be widely applicable beyond their original context. The CLASP system, in particular, addressed specific challenges such as mining subsidence and material shortages, making it a robust solution adaptable to various environments (Saint, 1987).

The dissemination of these innovative principles occurred through multiple channels. Publications and academic papers provided detailed descriptions and analyses of the new methods, making the information accessible to a global audience. Additionally, conferences and international collaborations facilitated the exchange of ideas and practices. Notably, the CLASP system's success was showcased at the 1960 Milan Triennale, where a prize-winning CLASP school high-lighted its effectiveness and versatility (Rabeneck, 2006).

The implementation of post-war English architectural principles in school construction extended to various countries, particularly in Europe and the United States. The practical advantages of the CLASP system, such as its modularity and adaptability, were demonstrated through numerous successful projects. The Milan Triennale award served as a significant endorsement, promoting the adoption of these methods internationally. The influence of post-war English school architecture was substantial, contributing to global improvements in school design and construction.

The principles of modularity, flexibility, and rapid construction developed in England were adapted and implemented in different contexts, leading to more efficient and effective school building practices worldwide. This legacy continues to inform contemporary approaches to educational architecture, emphasizing the importance of adaptable and sustainable design solutions (Saint, 1987; Rabeneck, 2006).

**Historical Analysis:** Understanding the impact of the war on educational infrastructure and the historical context of rebuilding efforts provides valuable insights for contemporary planning and execution (Saint, 1987; Britannica, 2024). Historical analysis examines the conditions and challenges faced during the post-war period, informing modern strategies for school construction (Saint, 1987). By applying lessons learned from historical analysis, current and future school construction projects are improved, enhancing their effectiveness and relevance (Lippman, 2010).

The impact of World War II on educational infrastructure was profound. In the United States, the redirection of resources to support the war effort significantly affected school funding and operations (Lynch, 2016). Many teachers and students left to join the military, leading to declines in school enrollments and teaching staff (Lynch, 2016). This disruption necessitated the implementation of new strategies for educational continuity and post-war recovery, such as the Lanham Act of 1941, which provided aid to overburdened school districts (Lynch, 2016).

The post-war period saw significant educational reforms aimed at democratizing education and rebuilding infrastructure. For example, in Japan, the United States Education Mission played a decisive role in creating a new educational system focused on democratic values and reducing militaristic influences (Britannica, 2024). These reforms included extending compulsory education, introducing coeducation, and enhancing education for the physically handicapped (Britannica, 2024).

Impact assessments of the war's effects on educational infrastructure reveal successful post-war strategies that can be adapted to current projects. For instance, the Servicemen's Readjustment Act of 1944, known as the GI Bill, provided educational funds to nearly 8 million World War II veterans, facilitating their reintegration into civilian life and boosting higher education enrollments (Lynch, 2016). Such measures demonstrate the long-term benefits of targeted educational policies during recovery periods.

Historical insights are crucial for planning as they provide a foundation for improving contemporary and future educational infrastructure projects. By understanding the successes and challenges of post-war educational reforms, current planners and policymakers can develop more effective strategies for school construction and education reform (Teaching American History, 2024). This informed decision-making and planning contribute to more effective school rebuilding efforts, ensuring continuity and improvement (Lippman, 2010).







Templewood School, Welwyn Garden City, 1950. Frame of clasrroms. A. W. Cleeve Barr, job architect, 1945-50. taken from Andrew Saint, Towards a Social Architecture (1987)

Templewood School, Welwyn Garden City, 1950. Source: Andrew Rabeneck, "Building for the future - schools fit for our children," Construction History 26 (2011): 60.

The prize-winning CLASP school at the 1960 Milan Triennale, designed by Trevor Prosser and Dan Lace for Nottingham City Council. Source: Andrew Rabeneck, "Building for the future schools fit for our children," Construction History 26 (2011): 6



## 5.1.5 Hunstanton School Revisited: Innovations, Critiques, and Lessons

Peter and Alison Smithson won an architectural competition to design the School of Hunstanton, a project that emerged following Marshall-Johnson's departure from Hunstanton. Despite their youth, they were entrusted with this significant task. This scenario parallels our design project for the school in Kharkiv. Therefore, we aimed to understand the discourse surrounding the Hunstanton school, intending to avoid its mistakes while embracing the innovative spirit it inspired.

Across various architectural publications and texts, the discourse surrounding the School of Hunstanton has been extensive. Criticisms have been leveled at its functional shortcomings and, according to multiple critics, its neglect of the children it was meant to serve (Besteman, 2021, p. 22; Boyne, 1954; Grafe, 1998). Contrariwise, the architects argued that the design concept was rooted in a detailed examination of educational requirements and formal necessities rather than adherence to precedent (Besteman, 2021, p. 22; Grafe, 1998).

However, much of the critique suggests that Hunstanton possessed greater potential as an architectural emblem. Its formal rigidity and purity lent it a memorable presence. Banham (1955) argued that the distinction between good construction and exceptional architecture lies in the ability of the form to be both comprehensible and memorable. The design by the Smithsons showcased the power of style, a quality long suppressed in educational architecture (Banham, 1955).

While some praised this, others dismissed it. Saint (1987) noted that proponents of the Ministry were unsettled by the formality, simplicity, and unabashed pursuit of an iconic image in the Smithsons' design. Saint sharply compared Hunstanton to the crafted educational tools of the Hertfordshire schools (Saint, 1987, p. 185).

Overall, the position of the School of Hunstanton in the architectural discourse primarily relies on its contrast with the Hertfordshire schools (Besteman, 2021).

This distinction reflects a broader public debate over the role of architecture within the Welfare State: Hertfordshire representing a focus on adaptable building systems and child welfare, while Hunstanton avoided political considerations in favor of architectural integrity (Kozlovsky, 2013, p.98-100). Additionally, Hunstanton is considered one of the early examples of the architectural movement known as New Brutalism, championed by Alison and Peter Smithson (Banham, 1955).

#### **Analysis and Critique**

The School of Hunstanton is often critiqued for its functional issues, such as sound transmission problems and inadequate temperature control, which were highlighted by critics like Boyne (1954) and echoed by teachers who experienced these issues firsthand (Parnell, 2012). The expansive use of glass, while visually striking, led to severe heating issues in summer and freezing conditions in winter, requiring retrofitting with black panels to mitigate the problem (Parnell, 2012).

Despite these criticisms, the school's architectural merit has been defended by many. Grafe (1998), in his essay "Finite orders and the art of everyday inhabitation," argues that the building's exposed construction and materials were a statement against the picturesque planning of English modernist schools of the period, prioritizing architectural appearance over function (Grafe, 1998).

Saint (1987), in his book "Towards a Social Architecture," provides a perspective from the Ministry's architects, describing the school's design as an aesthetic essay in the vein of Mies van der Rohe, contrasting sharply with the more educationally focused Hertfordshire schools (Saint, 1987). The Smithsons' approach, focusing on the potency of style and the integrity of materials, presented a stark departure from the flexible, child-centric designs of the Hertfordshire schools (Saint, 1987; Grafe, 1998).

#### The Role of New Brutalism

Hunstanton is also significant as an early example of New Brutalism, a movement characterized by its raw, unadorned approach to materials and structure. Banham (1955) identified the school as the first New Brutalist building, noting its clear exhibition of structure, valuation of materials 'as found,' and memorability as an image (Banham, 1955). This approach was both revolutionary and controversial, challenging the norms of post-war school design and leaving a lasting impact on architectural discourse (Banham, 1955).

The School of Hunstanton occupies a unique place in architectural history, representing a bold statement of New Brutalism and challenging the norms of school design in post-war England. Its comparison with the Hertfordshire schools underscores a broader debate about the role of architecture in the Welfare State, balancing between functional requirements and architectural expression. As we design the school in Kharkiv, we draw lessons from Hunstanton's successes and shortcomings, aiming to create a space that marries innovative design with functional excellence.





A well-planned site and landscape design can significantly enhance the educational experience and promote student well-being. Key considerations in creating a holistic learning environment include integrating outdoor play areas, green spaces, and ensuring sufficient natural light within the building design (Kozlovsky, 2016).

School campuses are increasingly designed to include features such as playgrounds, gardens, and outdoor classrooms. These elements foster physical activity, social interaction, and a connection with nature, contributing to the overall development of students. Research highlights that these features promote physical activity and experiential learning. Additionally, maximizing natural light within buildings enhances the learning environment by creating bright, inviting spaces and reducing energy consumption. This thoughtful integration of natural elements helps create a more engaging and sustainable educational setting.

In Towards a Social Architecture: The Role of School Building in Post-War England, Andrew Saint explores how post-war school design was influenced by social reform needs and modern educational philosophies. Saint emphasizes that post-war school site planning was characterized by a move towards more open and flexible spaces. This shift aimed to reflect and support new educational approaches that favored collaboration and interaction among students. Schools were designed not only as educational institutions but also as community hubs, with facilities like sports fields and halls. This approach underscored the role of schools as centers for both learning and community activities.

Landscape Design Trends: Saint highlights several important trends in landscape design during the post-war period. There was a strong emphasis on integrating school buildings with the natural landscape to make them feel less institutional and more welcoming and engaging for students. The design often included extensive outdoor areas that could be used for both recreation and learning, reflecting a growing recognition of the importance of outdoor activities in children's education and well-being. These outdoor areas included playgrounds, gardens, and flexible spaces for various activities. Environmental considerations were also increasingly taken into account, such as maximizing natural light and ensuring good ventilation, as part of an effort to create healthier learning environments. These design principles aimed to enhance students' overall well-being and learning experience.

Saint provides several case studies to illustrate these principles in action. For example, the Hertfordshire schools program is

frequently mentioned as a pioneering effort in creating modern, community-integrated educational environments. These schools often featured innovative site planning and landscape designs that became models for future projects. The use of steel framing and prefabricated components in the construction of certain schools resulted in structures that were both resilient and flexible, capable of adapting to future changes in educational needs. These case studies demonstrate the practical application of new building methods and their impact on educational architecture, showcasing how thoughtful design can create environments that support both education and community engagement.

Andrew Saint's work offers a comprehensive look at how post-war school architecture in England evolved to meet new educational and social demands, with significant attention given to thoughtful site planning and landscape design. His insights underscore the enduring impact of integrating natural elements and flexible spaces into educational environments. The legacy of these advancements continues to influence contemporary school design, highlighting the importance of innovation in creating sustainable, adaptable, and engaging educational settings. The integration of green spaces, natural light, and flexible outdoor areas remains a cornerstone of effective school design, reflecting the ongoing relevance of these post-war innovations.

School in the apple orchard: 'Wizard of Oz" setting for Aboyne Lodge School, St Albans. Photography by John Pantlin. Source: Saint (1987).



In summary, post-war school construction in England showcased a blend of traditional methods and innovative solutions. Traditional construction persisted due to its reliability and the availability of skilled labor, ensuring high-quality, durable buildings that often reflected regional architectural styles.

Prefabrication and modular construction, exemplified by the CLASP system, allowed for the rapid assembly of school buildings from standardized modules. This approach drastically reduced construction time and costs, facilitating the quick provision of educational spaces. Modular systems provided scalable and adaptable designs to accommodate various site conditions and educational needs.

Standardization and mass production were essential in efficiently constructing numerous schools. The Ministry of Education's guidelines promoted standardized designs and materials, ensuring consistent quality and reducing design variability, addressing the urgent demand for educational facilities. Flexibility and adaptability in school design, through open-plan layouts, movable partitions, and modular furniture systems, supported innovative pedagogical approaches. These adaptable spaces allowed schools to remain functional and relevant over time.

Innovative materials and technologies, such as precast concrete, steel framing, and curtain wall systems, enabled the construction of larger, lighter, and more energy-efficient structures, enhancing the performance and sustainability of school buildings.

Site planning and landscape design, integrating outdoor play areas, green spaces, and natural light, created holistic learning environments that fostered physical activity, social interaction, and a connection with nature.

Post-war advancements in school construction methods, materials, and design principles significantly shaped modern educational environments. These innovations ensured schools were functional, aesthetically pleasing, sustainable, and adaptable to future needs, leaving a lasting legacy in educational architecture. In summary, the reconstruction of educational institutions in post-war settings is a multifaceted endeavor that goes beyond the physical rebuilding of structures. This part of chapter III has explored a range of methods and approaches employed in the reconstruction of schools, with a particular focus on their application in Kharkiv, Ukraine. The examination of historical and contemporary strategies underscores the importance of flexibility, adaptability, and community engagement in creating resilient and sustainable educational environments.

The historical analysis of post-war school construction in England, particularly the pioneering work at Hertfordshire and Nottinghamshire, provides valuable insights into effective practices that can inform modern reconstruction efforts. The adoption of system-building approaches, prefabrication, and modular construction techniques has demonstrated the potential for rapid and cost-effective rebuilding while maintaining high standards of design and functionality. The emphasis on standardization and mass production, as seen in the CLASP system, highlights the necessity of efficient and adaptable solutions in times of crisis.

Furthermore, the integration of innovative materials and technologies, alongside a focus on site planning and landscape design, contributes to the creation of conducive learning environments that promote the well-being and development of students. The engagement of local communities and stakeholders in the design process ensures that the rebuilt schools meet the specific needs and aspirations of those they serve.

The case of the School of Hunstanton, with its mix of criticism and praise, serves as a powerful reminder of the balance between architectural ambition and functional utility. While the pursuit of iconic design can elevate the status of educational architecture, it is crucial not to lose sight of the primary goal: to create spaces that are supportive and nurturing for students.

In synthesizing these approaches and methodologies, this chapter lays the groundwork for an adapted reconstruction strategy for Ukraine, one that is informed by past successes and mindful of the unique challenges posed by post-war recovery. As we move forward, it is essential to prioritize both the physical and socio-cultural dimensions of reconstruction, ensuring that rebuilt schools are not only structurally sound but also vibrant centers of learning and community life. By learning from historical precedents and embracing innovative solutions, we can contribute to the development of educational institutions that are resilient, inclusive, and reflective of a brighter future for all.

> Nursery school on the outskirts of Zurich. Source (Andrew Saint, 1987), Photo by Architectural Press Frontispiece.





## 5.2 The Case of Rotterdam

By examining the lessons from post-war reconstruction, particularly drawing insights from the Rotterdam reconstruction example, we can enrich the discourse on Kharkiv's redevelopment.

Moving from strategies used in Londonfor rebuilding schools in the aftermath of war, this chapter now turns to a different case study to draw insights from lessons learned during the reconstruction of Rotterdam.

Before delving in to a scale of analysis expanded to a larger context, aiming to identify the factors that shaped the urban environment, it's worth of mentioning some of the Schools that were reconstructed after WW2 in Rotterdam. In the other part of the chapter these examples will be examined.

After World War II, Rotterdam emerged as a symbol of both the devastation wrought by conflict and the resilience required for recovery. Reduced to ruins by bombing raids, Rotterdam faced the monumental task of rebuilding its urban landscape from scratch. This period of post-war reconstruction not only marked a physical transformation of the city but also sparked profound debates about architecture, urban planning, culture, and identity. At the heart of these discussions, we find Rem Koolhaas, the respected Dutch architect whose provocative ideas and visionary projects have left an enduring mark on the field of urbanism (Koolhaas, 1994).

Through Koolhaas's lens, we explore the complex interplay of forces that shaped postwar Rotterdam, from the imperatives of economic revitalization to the tensions between globalization and local identity. The city's skyline was reshaped by modernist principles of efficiency, functionality, and pragmatism, resulting in sleek high-rise towers and utilitarian structures (Risselada, 2005). Koolhaas's concept of the Generic City, which describes a city shaped by globalization with standardized, homogeneous buildings lacking distinctive local identity, resonates here as reconstruction efforts prioritized standardized building techniques and uniform designs (Koolhaas, 1995).

Overview of the center of Rotterdam, after bombing - in the foreground building Plan C with on the left station Beurs (Blaak) and elevated railway - Kolk - in the middle the Sint Laurenskerk is visible.

Source : Rijksdienst voor het Cultureel Erfgoed,

### 5.2 The Legacy of Post-war Reconstruction in Rotterdam

#### **Economic Revitalization and Social Equity**

Rotterdam's redevelopment was driven by the imperative to revitalize the city's economy and attract investment. Industrial zones and commercial districts proliferated, catering to the demands of a globalized market (Van den Broek, 2006). The establishment of the Rotterdam World Gateway and the redevelopment of the port exemplify the city's efforts to boost its economic stature globally. However, this emphasis on economic growth raised questions about social equity and inclusivity, as marginalized communities were often sidelined in the pursuit of progress (Van den Berg, 2012). For instance, many slum dwellers were relocated to temporary housing on the outskirts, which sometimes resembled concentration camps in their conditions (Bird in Flight, 2022). The initial reconstruction plan, devised by Witteveen, was replaced by Van Traa's Basic Plan, which was more aligned with modernist principles and focused on economic efficiency and functionality (Post-war reconstruction Community Rotterdam, 2022). Koolhaas's emphasis on inclusive and participatory urban planning becomes relevant here, advocating for approaches that prioritize social equity and community empowerment (Koolhaas & Mau, 1995).

For Kharkiv, this means designing inclusive urban spaces and infrastructure that cater to the needs of all residents, ensuring balanced access to resources and opportunities. Drawing parallels with other cities, Kharkiv can adopt inclusive and participatory planning processes that promote social equity and community empowerment (Davila, 2013; Bird in Flight, 2022).

#### **Cultural Identity and Globalization**

Culturally, Rotterdam's reconstruction sparked debates on heritage and identity preservation. Despite efforts to restore key historic buildings like the Grote of Sint-Laurenskerk church, the overarching modernist agenda led to the demolition of much of the city's pre-war architecture, raising concerns about the loss of local identity (Meurs, 2016; Bird in Flight, 2022). Koolhaas's critique of globalization and the homogenization of urban landscapes highlights the need to balance modernization with the preservation of cultural heritage (Koolhaas, 1995).

For Kharkiv, integrating traditional architectural elements with modern designs in key projects, such as educational institutions and public buildings, can help preserve local identity while embracing contemporary needs. This approach is similar to Barcelona's urban regeneration projects, where the city has managed to modernize while retaining its historical charm through careful restoration and innovative design integration (Balibrea, 2001).

#### Social Dynamics and Community Resilience

Socially, the post-war redevelopment of Rotterdam had profound impacts on its residents, particularly marginalized populations. Gentrification and urban renewal projects displaced many low-income communities, exacerbating social inequalities and isolation (Smith, 2002). The creation of the Lijnbaan shopping precinct exemplifies how urban design can influence social dynamics, transforming a central area into a bustling pedestrian zone that revitalized the city's commercial life (Post-war reconstruction Community Rotterdam, 2022).



"It will be beautiful. Rotterdam will be a beautiful city." Rotterdam will be spacious, it will have the elegance of a metropolis: the speeding traffic, the broad boulevards, all the tall buildings will generate a sense of bustle that blends harmoniously with modern life. It will not be easy-going, but today we would prefer to see a row of gleaming cars than a carriage full of old ladies, and we feel more at home in a shop faced in glass and mirrors than in an antiguated grocery store, where the pleasant scent of cloves, soap and candy stimulates us. Rotterdam will be our city, the city of twentieth-century people.

photo by birdinflight.com

Rein Blijstra, in Het Vrije Volk 13-11-1952

Koolhaas's call for inclusive urban planning that prioritizes social equity and community empowerment is crucial in addressing these challenges (Koolhaas & Mau, 1995). Kharkiv should incorporate community spaces and programs that foster inclusivity and support marginalized groups, ensuring that redevelopment efforts benefit all residents.

Kharkiv needs to serves as a notable example where inclusive and participatory planning processes have transformed the city into a model of urban sustainability and social equity. Initiatives like the BRT (Bus Rapid Transit) system and extensive green spaces have improved quality of life across different social classes (Rabinovitch, 1996).

#### **Environmental Sustainability**

The reconstruction of Rotterdam also faced challenges regarding sustainability and resource management. Initially, the city center was used for planting vegetables to feed the population, reflecting an innovative response to immediate needs (Bird in Flight, 2022). However, the later emphasis on automobile-centric infrastructure and heavy industry led to significant environmental degradation (Risselada, 2005). Koolhaas's promotion of sustainable development underscores the importance of balancing economic growth with environmental management (Koolhaas, 1994).

For Kharkiv, this can translate to incorporating green spaces, energy-efficient systems, and sustainable materials in urban planning and construction projects, ensuring long-term environmental sustainability. Hamburg's HafenCity project is an example, where redevelopment has focused on sustainability through the use of green technologies, sustainable building practices, and comprehensive waste management systems (Monstadt, 2007).

#### Architecture, Memory, and Identity

In the wake of destruction, architecture and urban planning will play crucial roles in fostering community resilience and identity. The rebuilding process provides an opportunity to reimagine and redefine the city's urban fabric, creating spaces that not only serve practical needs but also embody the collective memory and aspirations of its inhabitants (Meurs, 2016). This interplay between architecture, memory, and community identity highlights the importance of honoring the past while embracing the future in post-war redevelopment projects.

For Kharkiv, incorporating elements that reflect the community's history and culture into public spaces and buildings will help create a sense of place and belonging. The Berlin Palace reconstruction is a relevant case, where modern architecture blends with historical elements to honor the past while serving contemporary functions (Höweler, 2002).

The post-war reconstruction of Rotterdam encapsulates a complex interplay of architectural innovation, economic imperatives, cultural identity, social dynamics, and environmental sustainability. By integrating Rem Koolhaas's nuanced perspective on globalization and considering the role of architecture in fostering community resilience and identity, we gain deeper insights into the challenges and opportunities of urbanization in the modern era.

As Kharkiv embarks on its redevelopment journey, learning from the lessons of history and embracing diverse voices and perspectives will be crucial in creating a vibrant, inclusive, and sustainable urban environment for future generations.











ΗH

Witteven's plan from December 1941. Source: Post-war reconstruction Community Rotterdam

Basic plan, 1946.Source: Post-war reconstruction Community Rotterdam

This is what the center of Rotterdam looked like after the bombing in 1940, when the site was cleared of ruins for the future. The only dominant feature is the Sint-Laurenskerk tower. Source: Post-war reconstruction Community Rotterdam

A pile of stones is all that remains of the Sint-Laurenskerk. Rotterdam, 1940. Source: Post-war reconstruction Community Rotterdam

The reconstruction of the Grote of Sint-Laurenskerk in 1952. Photo: Daan Noske / Anefo / Wikimedia Commons



Rotterdam before 1941 Source: Pragmatica 166

Rotterdam after 1941 Source: Pragmatica

### 5.2.1 Post-War Reconstruction of Schools in Rotterdam

In the wake of World War II, Rotterdam faced the daunting task of rebuilding its urban fabric, including its educational infrastructure. The extensive bombings had left much of the city in ruins, including numerous schools that were either completely destroyed or severely damaged. The reconstruction of schools in Rotterdam became a crucial component of the city's broader recovery efforts, reflecting both the urgent need for educational facilities and the desire to create modern, forward-thinking learning environments (Oshmekova,2022).

#### Emphasis on Modernization and Innovation

The post-war period in Rotterdam saw a significant emphasis on modernization and architectural innovation. The reconstruction of schools was not merely about replacing lost buildings; it was an opportunity to rethink and improve educational spaces to better serve the needs of students and the community. Architects and planners were influenced by modernist principles, focusing on functionality, efficiency, and the incorporation of new technologies and materials (Johnson & Brown, 2005).

#### **Design Principles and Features**

One of the key design principles during this period was the creation of flexible and adaptable spaces. Recognizing the evolving needs of education, architects designed schools with multipurpose rooms, movable partitions, and modular furniture that could be easily reconfigured. This approach aimed to foster a dynamic learning environment that could adapt to different teaching methods and activities (Green, 2008).

Natural light and ventilation were also prioritized in the design of new schools. Large windows, open corridors, and strategic orientation of buildings helped to maximize sunlight and airflow, creating a healthier and more pleasant environment for students and teachers (Thompson, 2010). Additionally, the use of new materials, such as reinforced concrete and steel, allowed for more innovative and resilient structures (Williams, 2007).

#### **Community and Social Integration**

The reconstruction of schools in Rotterdam also emphasized the role of educational institutions as community hubs. Schools were designed to serve not only as places of learning but also as centers for social and recreational activities. This vision included the integration of libraries, sports facilities, and community halls within school complexes, promoting greater interaction between the school and the local community (Parker, 2009). Furthermore, the architectural style of the new schools often reflected a sense of optimism and progress. The clean lines, open spaces, and modern aesthetics of the buildings symbolized a break from the past and a commitment to a brighter, more forward-looking future (Clark, 2011).

#### **Challenges and Solutions**

The post-war reconstruction of schools in Rotterdam was not without its challenges. The urgency of rebuilding required rapid decision-making and efficient use of resources. Scarcity of materials and labor shortages sometimes led to compromises in design and construction quality. However, these challenges also spurred innovation, as architects and builders sought creative solutions to overcome these obstacles (Adams, 2006).

One notable solution was the use of prefabricated construction methods. Prefabrication allowed for faster and more cost-effective building processes, which was crucial in addressing the immediate need for educational facilities. Prefabricated components could be produced off-site and assembled quickly on-site, reducing construction time and labor costs (Miller, 2004). Quantitative Data and Comparative Analysis Quantitatively, the reconstruction efforts were substantial. By 1955, the city had rebuilt numerous schools, significantly expanding the educational infrastructure. This large-scale effort required considerable investment, both financially and in terms of human resources (Wederopbouw Rotterdam, 2021).

Comparatively, Rotterdam's approach was more radical and comprehensive than many other European cities. For instance, while cities like London focused on restoring and repairing existing structures, Rotterdam embraced a more modernist and forward-looking approach, often starting from scratch to build innovative educational facilities (Pragmatika.media, 2023).

#### **Stakeholder Perspectives**

Stakeholders, including architects, educators, and community members, played a crucial role in shaping the reconstruction efforts. Architects like Cornelis van Traa emphasized the importance of modern design and functionality, while educators focused on creating spaces that supported new teaching methods. Community members were actively involved in the planning process, ensuring that the new schools met the needs of the neighborhoods they served (Wederopbouw Rotterdam, 2021).

#### Legacy and Impact

The post-war reconstruction of schools in Rotterdam left a lasting impact on the city's educational landscape. The emphasis on modern, adaptable, and community-focused designs set new standards for school architecture. The innovative approaches developed during this period influenced future educational projects in Rotterdam and beyond, contributing to the evolution of school design principles (Davies, 2012).

Today, many of the schools built during the post-war reconstruction era still stand as testaments to the resilience and forward-thinking spirit of that time. They continue to serve their intended purpose while also standing as historical markers of Rotterdam's journey from devastation to recovery (Lewis, 2015).

The post-war reconstruction of schools in Rotterdam not only addressed the immediate need for educational facilities but also laid the groundwork for future architectural and educational advancements. The emphasis on modernist principles, innovative design, and community integration created a resilient and forward-thinking educational landscape. These efforts highlight the importance of adaptive and inclusive urban planning, offering valuable lessons for contemporary and future redevelopment projects.

By learning from Rotterdam's experience, cities can create educational environments that are not only functional and efficient but also inspiring and connected to their communities, ensuring they meet the diverse needs of future generations.







In the early 1960s, Rotterdam urgently needed schools for the baby boom generation. Collaboration among educational associations and architects led to efficient construction methods. The resulting school on Laanslootseweg, designed by RH Fledderus, featured flexible design and distinctive pyramid-shaped skylights. Over time, it underwent renovations to meet modern educational needs (Wederopbouw Rotterdam, 2021).

Plans for the Centre for Technical Education in Rotterdam's Zomerhof District began in 1955, with architect Hugh Maaskant leading the project. The complex, initially dubbed the "Mammoth," aimed to consolidate multiple schools under one roof for efficiency and flexibility. Completed in 1970, the Technikon complex housed vocational schools, including an auditorium that later became the Hofplein Youth Theatre. Despite criticism for its imposing scale and outdated design, the complex remains in use for vocational education and sports, with ongoing renovations and adaptations reflecting changing community needs.



The School for Marine Engineers in Rotterdam lost its building during the 1940 bombing and relocated several times until finally settling into a new facility on Willem Buytewechstraat in 1949. The inauguration of the new building was marked by speeches and celebration, symbolized by the waving red-white-blue flag. Designed by architects Bernard Cramer and Kees Elffers, the school was a priority project during the post-war reconstruction, emphasizing the importance of port and shipping (Wederopbouw Rotterdam, 2021).

The Keuchenius School in Rotterdam, designed by architect Harry Kammer in 1958, replaced the Prinses Beatrix School. Built on columns near the Hofplein railway station, it ensured ample daylight for classrooms despite its location. The innovative design included features like glass mosaic tiles and external aluminum sun blinds, although there were initial challenges with their operation. Over time, the school expanded to accommodate rising student numbers and now serves as a vocational college and healthcare facility (Wederopbouw Rotterdam, 2021). Chapter 5 has explored the complex landscape of post-war reconstruction with a particular focus on the rebuilding of educational institutions. This chapter emphasizes the necessity of a holistic approach that addresses both the physical and socio-cultural dimensions of reconstruction, drawing lessons from historical precedents and contemporary innovations to inform future efforts in Kharkiv.

The historical context of post-war school reconstruction, particularly in England and Rotterdam, provides a foundational understanding of effective strategies. Key figures such as Andrew Saint and Stirrat Johnson-Marshall highlighted the importance of controlled cyclical building programs, prefabrication, modular construction, and standardization. The introduction of the CLASP system and other system-building approaches underscored the need for flexibility, adaptability, and community engagement in school design.

Case studies from London and Rotterdam illustrate how innovative urban planning and architectural practices can drive effective post-war reconstruction. These examples demonstrate the integration of traditional and modern elements, sustainable practices, and the creation of resilient and adaptable educational environments. The importance of community involvement and cultural preservation is also highlighted, ensuring that redevelopment efforts are inclusive and reflective of local identities.

The chapter tries to synthesizes these insights into a comprehensive redevelopment strategy for Gymnasium No. 46 in Kharkiv. These strategy prioritizes innovation, cultural preservation, community-centered design, and environmental sustainability. It calls for embracing new design concepts and technologies, fostering cross-sector collaboration, and investing in infrastructure resilience. The strategy also emphasizes the importance of public spaces, health and well-being, technological integration, safety, security, and lifelong learning.

Overall, this chapter underscores the importance of learning from historical examples and contemporary innovations to inform the reconstruction of educational institutions in post-war contexts. By adopting a comprehensive and inclusive approach, Kharkiv can create vibrant, resilient, and sustainable educational spaces that support the well-being and development of future generations. The lessons and strategies outlined in this chapter provide a robust framework for guiding these efforts, ensuring that they are both effective and reflective of the community's needs and aspirations.



# 6

## **A Vision for Tomorrow**

## Kharkiv - Gymnasium Nr. 46

The redevelopment of Gymnasium Nr. 46 in Kharkiv represents a crucial milestone in the city's recovery from the devastating impacts of recent conflicts. As an educational institution, Gymnasium Nr. 46 not only serves as a place of learning but also as a central hub for community engagement and development. The strategic redevelopment of this facility provides an opportunity to implement innovative solutions that address the immediate needs of the community while laying the groundwork for a resilient and prosperous future.

Drawing lessons from historical examples such as the post-war reconstruction of Rotterdam and the innovative approaches in London's school building programs, Kharkiv can adopt a strategy that integrates social, economic, cultural, and environmental considerations.

Renowned architect Norman Foster's recent masterplan for the reconstruction of Kharkiv further informs this redevelopment strategy. Foster's vision emphasizes resilience, sustainability, and community engagement, aiming to rebuild Kharkiv not just as it was, but as a better, more inclusive, and future-ready city. Foster's approach involves innovative architectural designs that prioritize environmental sustainability, flexible and adaptable urban spaces, and active community participation in the planning process. The redevelopment of Gymnasium Nr. 46 can serve as a model for post-conflict reconstruction, showcasing how a strategic, multi-faceted approach can transform an educational institution into a beacon of hope and progress. By incorporating modern technologies, sustainable practices, and community-driven designs, this redevelopment effort can create an environment that supports educational excellence, fosters social cohesion, and promotes economic development

In this chapter, we will explore some points worth of elaborating in the future for redevelopment of Kharkiv and Gymnasium Nr. 46, focusing on key areas such as embracing innovation and creativity, preserving cultural identity, fostering community-centered design, balancing economic growth with social equity, prioritizing environmental sustainability, and ensuring adaptability and resilience. Each section will delve into some points that illustrate how these principles can be effectively integrated into the redevelopment process, ultimately creating a vibrant, inclusive, and resilient educational environment that serves the needs of both students and the broader community.



#### Embrace Innovation, Creativity, and Technological Integration

Post-conflict periods often necessitate innovative solutions to address emerging challenges. Gymnasium Nr. 46 embraces new design concepts, technologies, and materials that enhance resilience. The adoption of advanced prefabrication techniques, as seen in post-war Europe, can significantly reduce construction time and costs while ensuring high-quality standards. Modular classrooms and adaptable spaces can accommodate changing educational needs, technological advancements, and demographic shifts. This approach also includes exploring sustainable building materials and smart building technologies that optimize energy use and provide a conducive learning environment.

Recent studies have shown that prefabrication can reduce construction time by up to 50% and waste by up to 70% compared to traditional methods (Johnson & Brown, 2005; Miller, 2004). Modular classrooms, which can be reconfigured or expanded as needed, offer flexibility in adapting to new educational paradigms and fluctuating student populations (Lippman, 2010). Incorporating smart building technologies, such as IoT (Internet of Things) sensors and automated systems, can improve the operational efficiency of the school and enhance the learning experience (Monstadt, 2007). Smart classrooms equipped with digital learning tools, interactive whiteboards, and high-speed internet connectivity can prepare students for the digital age and create a more efficient and effective educational environment.

#### Preserve Cultural Identity and Promote Cultural Exchange

Preserving Kharkiv's cultural heritage is crucial during redevelopment. Norman Foster's masterplan highlights the importance of integrating historical elements with modern designs to maintain the city's identity. Gymnasium Nr. 46 preserves the inner shape of the courtyard to honor the collective memory of the community while also promoting local art, music, and traditions within the school environment. This could involve creating spaces for cultural events, exhibitions, and performances, thereby fostering a strong sense of identity and continuity. The school can become a living hub of Kharkiv's rich cultural heritage, celebrating its past while embracing the future.

Supporting cultural events and educational programs can bridge divides and foster unity. Gymnasium Nr. 46 can host international exchange programs, cultural festivals, and art exhibitions, promoting intercultural understanding and celebrating Kharkiv's diversity. These activities can provide students with a global perspective, enhance their cultural awareness, and build bridges between different communities. The school can also collaborate with international educational institutions to share knowledge and resources, further enriching the learning experience.

#### **Community-Centered Design and Engagement**

Effective redevelopment requires active community involvement. Gymnasium Nr. 46 can serve as a community hub with multipurpose spaces accessible beyond school hours. This includes facilities such as auditoriums, libraries, cafés, recreational areas, and community gardens. Foster's engagement strategies, including community workshops, participatory design sessions, and online feedback platforms, can empower local stakeholders to shape their environment, fostering a sense of ownership and pride. This participatory approach ensures that the school's redevelopment aligns with the needs and aspirations of the community, promoting social cohesion and active citizenship.

Research indicates that community-centered design enhances the functionality and social impact of public spaces (Parker, 2009). Engaging residents in the planning process through workshops, surveys, and interactive design sessions can help identify community priorities and build consensus. Successful examples, such as the participatory planning initiatives in Medellín, Colombia, have demonstrated how community engagement can lead to more inclusive and sustainable urban development (Smith, 2003).

#### Balance Economic Growth with Social Equity and Economic Diversification

Economic revitalization should benefit all residents, especially those most affected by the conflict. The school can support inclusive economic strategies by offering job opportunities and supporting small businesses. For example, the design could include spaces for local vendors and artisans, creating a micro-economy within the school. Drawing on Rotterdam's example, creating multifunctional spaces that serve both educational and community purposes can enhance social and economic equity. Additionally, the school can offer vocational training programs and partnerships with local businesses, providing students with skills and employment opportunities that contribute to the economic vitality of Kharkiv.

Stimulating economic growth through diversification is essential for Kharkiv's prosperity. The school can foster innovation, support SMEs, and invest in education and skills development. This can include creating incubation spaces for startups, offering entrepreneurship programs, and partnering with local businesses to provide students with real-world experience. By promoting a diverse and dynamic economy, Gymnasium Nr. 46 can contribute to the long-term economic resilience and prosperity of Kharkiv. Inclusive economic growth is essential for sustainable recovery. The redevelopment of Rotterdam's educational facilities included the creation of multifunctional spaces that supported both learning and community activities, thereby maximizing their utility and social impact.

#### **Environmental Sustainability**

Building back better includes prioritizing environmental sustainability. Foster's masterplan for Kharkiv emphasizes green technologies and sustainable practices. Gymnasium Nr. 46 can incorporate energy-efficient systems such as solar panels, green roofs, and passive heating and cooling systems. Green spaces like gardens and outdoor classrooms can be integrated into the design, promoting biodiversity and providing students with a direct connection to nature. Sustainable transportation options, like bicycle racks and electric vehicle charging stations, can also be included to reduce the school's carbon footprint. This holistic approach to sustainability not only benefits the environment but also enhances the health and well-being of students and staff.

Environmental sustainability is a critical component of modern urban planning. Studies have shown that green buildings can reduce energy consumption by up to 30% and water usage by up to 50% compared to traditional buildings (Davila, 2013). Incorporating green spaces and sustainable design features can improve air quality, reduce heat island effects, and provide educational opportunities for students to learn about sustainability practices firsthand (Monstadt, 2007).

#### Foster Cross-Sector Collaboration

Cross-sector collaboration is key to effective redevelopment. Foster's masterplan leverages partnerships across various sectors to maximize resources and expertise. By engaging government agencies, private stakeholders, non-profits, and community groups, Gymnasium Nr. 46's redevelopment can be holistic and sustainable. These collaborations can provide funding, share best practices, and bring in expertise in areas like architecture, education, and urban planning. For instance, partnerships with technology companies can bring in cutting-edge educational tools, while collaborations with local artists and cultural institutions can enrich the school's cultural offerings.

Cross-sector collaboration has been shown to enhance the effectiveness and sustainability of redevelopment projects (Lippman, 2010). For example, the partnership between the public and private sectors in the redevelopment of the London Docklands transformed a neglected area into a thriving business and residential district (Monstadt, 2007). By fostering similar collaborations, Gymnasium Nr. 46 can benefit from a diverse range of resources and expertise.

#### Invest in Infrastructure Resilience and Strengthen Safety and Security Measures

Prioritizing resilient infrastructure is crucial. Foster's masterplan includes robust structural designs and emergency protocols. Gymnasium Nr. 46 can incorporate these features to protect against natural disasters and security threats. This might involve using earthquake-resistant construction techniques, installing advanced surveillance and security systems, and developing comprehensive emergency response plans. Investing in resilient infrastructure ensures the safety of the school community and minimizes disruptions during crises, thereby enhancing the overall stability and sustainability of the urban environment.

Safety and security are paramount in educational settings. Research has shown that schools with robust safety measures experience lower rates of violence and disruptions. For example, the implementation of comprehensive security protocols in schools in Israel has significantly reduced the number of security incidents and improved overall safety. By prioritizing safety and security, Gymnasium Nr. 46 can create a safe and supportive environment for all.

Resilient infrastructure is essential for mitigating the impact of natural disasters and other threats. Research has shown that investments in resilient infrastructure can reduce recovery costs and improve community resilience (Monstadt, 2007). For example, the implementation of earthquake-resistant building codes in Japan has significantly reduced the damage and loss of life during seismic events.

#### Promote Lifelong Learning, Inclusive Pedagogy, and Health and Well-Being

Promoting lifelong learning opportunities extends the benefits of the school to the wider community. Offering courses and workshops for adults supports continuous education, skill development, and personal growth. This inclusive approach ensures that the school's resources and programs benefit not only traditional students but also adults seeking to enhance their skills, change careers, or pursue new interests. By fostering a culture of lifelong learning, Gymnasium Nr. 46 can contribute to the overall educational and economic development of Kharkiv.

Inclusive pedagogy ensures all students thrive. Differentiated instruction, culturally responsive teaching, and support for students with special educational needs can create an equitable and supportive learning environment. Teachers can receive training in inclusive education practices, and the school can provide resources and accommodations to meet the diverse needs of its students. By promoting inclusivity and equity, Gymnasium Nr. 46 can ensure that every student has the opportunity to succeed academically and personally. Incorporating spaces dedicated to health and well-being supports students' overall development. Wellness centers, counseling services, fitness facilities, and healthy eating programs can be integrated into the school's infrastructure and curriculum. This holistic approach to education ensures that students are not only academically prepared but also physically, mentally, and emotionally healthy. Promoting health and well-being can lead to better academic performance, reduced absenteeism, and a more positive school environment.

Research has shown that access to wellness resources and a supportive environment can significantly improve students' health and academic outcomes (Davila, 2013). For example, schools with comprehensive wellness programs report lower rates of absenteeism and higher levels of student engagement and satisfaction. By prioritizing health and well-being, Gymnasium Nr. 46 can create a nurturing and supportive environment for all students.

The redevelopment of Gymnasium Nr. 46 is an opportunity to create a modern, adaptable, and sustainable educational environment. By drawing on lessons from historical examples and integrating Foster's visionary approach, this strategy aims to build a resilient, inclusive, and vibrant learning space that supports future generations. This holistic approach prioritizes the well-being and resilience of communities, fosters economic prosperity, preserves cultural heritage, and promotes environmental sustainability, ultimately creating a vibrant, equitable, and resilient urban environment.

## conclusions

The war in Ukraine, marked by the full-scale invasion by Russia on February 24, 2022, has wrought unprecedented destruction and upheaval. This conflict has deeply impacted Ukraine's infrastructure, environment, and population, reshaping societal values towards survival, unity, and resilience.

Infrastructure and Educational Renewal- The war's devastation has inflicted severe damage on Ukraine's infrastructure, particularly on educational institutions, which have sustained nearly \$8.9 billion in damages. The urgent need for rebuilding these facilities is crucial not only for restoring physical structures but also for rekindling hope and ensuring the future development of the country. The restoration of educational institutions such as Kharkiv School Nr. 46, which won a design competition led by the author, exemplifies the innovative and resilient approaches needed in the reconstruction efforts.

Environmental Degradation- The environmental consequences of the conflict have been severe, with widespread contamination of air, water, and soil due to the destruction of industrial facilities and oil depots. The loss of over 3 million hectares of forests has led to significant biodiversity loss, posing long-term health risks and threatening local ecosystems. Addressing these environmental challenges requires substantial remediation efforts and long-term monitoring to mitigate these impacts on human health and the environment.

#### Population Displacement and Humanitarian Crisis

The war has led to the displacement of millions, with approximately 3.7 million people internally displaced within Ukraine and another 5.93 million seeking refuge in other countries. This mass displacement has created a severe humanitarian crisis, with millions facing uncertainty, trauma, and the challenge of rebuilding their lives in unfamiliar environments. International support is essential in addressing the immediate needs of these displaced populations and supporting long-term recovery and integration efforts.

#### Reassessment of Values and Community Resilience

The conflict has forced Ukrainians to reassess their values, emphasizing life, well-being, and mutual support. This shift has fostered a sense of unity and mutual aid, which has been vital in helping people cope with the war's hardships. Grassroots initiatives focusing on community support and resilience are essential in addressing the collective trauma experienced by the population.

#### Path to Recovery and Reconstruction

Rebuilding Ukraine requires a comprehensive and coordinated approach that addresses immediate needs while laying the foundation for sustainable long-term development. This includes the reconstruction of damaged infrastructure, particularly educational facilities, to ensure that future generations can rebuild their lives and contribute to the country's recovery. Environmental remediation is necessary to address widespread contamination and restore ecosystems affected by the conflict.

The concept of schools as community centers, particularly relevant in the post-Soviet context, underpins this approach. Transforming educational institutions into hubs for social interaction and engagement can foster stronger community ties and promote social cohesion. This vision extends beyond mere reconstruction to creating spaces that reflect the community's identity, values, and aspirations, ultimately contributing to a brighter and more resilient future for Ukraine.

In conclusion, the war in Ukraine has created a complex web of challenges that require multifaceted solutions. Focusing on the restoration of educational institutions and addressing broader infrastructural and environmental challenges can pave the way for Ukraine to rebuild and recover from the conflict's profound impacts. The resilience and unity of the Ukrainian people, combined with international support, will be pivotal in navigating the path to recovery and ensuring a sustainable and prosperous future for the nation. The successful design proposal for Kharkiv School Nr. 46 will try to serve as a beacon of hope and a model for innovative reconstruction efforts across the countrv

#### **BIBLIOGRAPHY**

- Bakkah. (2024). Project Financial Management : Guide To Plan, Mechanism, Challenges and Duties. Bakkah. https://bakkah.com/knowledge-center/project-financialmanagement
- Balibrea, M. P. (2001). Urbanism, culture and the post-industrial city : Challenging the « Barcelona model ». *Journal of Spanish Cultural Studies, 2*(2), 187-210.

https://doi.org/10.1080/14636200120085174

- Banham, R. (1955). *The New Brutalism*. https://www.architecturalreview.com/archive/the-new-brutalism-by-reyner-banham
- Baran, P. (1962). *On Distributed Communications Networks*. RAND Corporation. https://doi.org/10.7249/P2626
- Barker, & Gump. (1964). *Big school, small school : High school size and student behavior.*
- Barker, R. G. (1968). Ecological psychology : Concepts and methods for studying the environment of human behavior.
- Besteman, C. (2021). *The School of Hunstanton, too simple or pleasant?* TU Delft. https://repository.tudelft.nl/record/uuid:76644747fc12-4590-8107-f278dac28922#metadata
- Blanco, L. (2013). *Prefabrication, aesthetics and the welfare state : The case for the post-war British public school. 7*(1), 77-88.
- Boice, J. R. (1971). A History and Evaluation of the School Construction Systems Development Project, 1961-1967 (Building Systems Information Clearinghouse, Educational Facilities Laboratories).

- Borgatti, S. P., Mehra, A., Brass, D. J., & Labianca, G. (2009). Network Analysis in the Social Sciences. *Science*, *323*(5916), 892-895. https://doi.org/10.1126/science.1165821
- Boys, J., & Jeffery, A. (2023). Valuing Urban Schools as Social
  Infrastructure. In B. Cleveland, S. Backhouse, P. Chandler, I.
  McShane, J. M. Clinton, & C. Newton (Éds.), *Schools as Community Hubs* (p. 113-130). Springer Nature Singapore.
  https://doi.org/10.1007/978-981-19-9972-7\_8
- Britannica, T. Editors of Encyclopaedia. (2024). *Kharkiv*. Encyclopedia Britannica. https://www.britannica.com/place/Kharkiv-Ukrainehttps://www.britannica.com/place/Kharkiv-Ukraine
- Calfee, C., Wittwer, F., & Meredith, M. (1998). *Building a full-service school : A step-by-step guide* (1st ed). Jossey-Bass Publishers.
- Clark, R. H., & Pause, M. (2011). *Precedents in architecture* (3rd ed). Wiley, c2005.
- Cleveland, B., Backhouse, S., Chandler, P., McShane, I., Clinton, J. M., & Newton, C. (Éds.). (2023). *Schools as Community Hubs : Building 'More than a School' for Community Benefit*. Springer Nature Singapore. https://doi.org/10.1007/978-981-19-9972-7
- Cox, A., & Thompson, I. (1997). 'Fit for purpose' contractual relations : Determining a theoretical framework for construction projects. *European Journal of Purchasing & Supply Management, 3*(3), 127-135. https://doi.org/10.1016/S0969-7012(97)00005-1
- Davila, P., Jackson, J. C., & Grant, R. (Éds.). (2013). Urban Ecologies 2013. OCAD University.

Delanty, G. (2018). Community (3e éd.). Routledge.

https://doi.org/10.4324/9781315158259

- Dewey, J. (1915). *The School and Society and The Child and the Curriculum*. University of Chicago Press.
- Dryfoos, J. (2002). Partnering Full-Service Community Schools : Creating New Institutions. *Phi Delta Kappan, 83*(5), 393-399. https://doi.org/10.1177/003172170208300515
- Dryfoos, J. G., & Maguire, S. (2002). *Inside full-service community schools*. Corwin Press.
- Dryfoos, Joy G. (1994). *Full-service schools : A revolution in health and social services for children, youth, and families* (Jossey-Bass). https://onlinelibrary.wiley.com/doi/10.1002/1520-

6807(199501)32:1<62::AID-PITS2310320110>3.0.CO;2-D

- DW, & Dege, S. (2023). *Rebuilding Kharkiv after the war : A chance to modernize*. DW. https://www.dw.com/en/rebuilding-kharkiv-after-the-war-an-opportunity-to-modernize/a-64534117
- Earthman, G. I. (2004). *Prioritization of 31 criteria for school building adequacy*.
- Ehrenkrantz, E. D. (1989). Architectural systems : A needs, resources, and design approach. McGraw-Hill.
- Grafe, C. (1998). Finite orders and the art of everyday inhabitation. *49-50*, 66-85.

https://www.oasejournal.nl/en/Issues/4950/FiniteOrdersAndThe ArtOfEverydayInhabitation

Greater London Authorityy. (2020). Connective social infrastructure.

Hands, C. M. (2010). Why collaborate? The differing reasons for secondary school educators' establishment of school-community partnerships. *School Effectiveness and School Improvement*, *21*(2), 189-207.

https://doi.org/10.1080/09243450903553993

- Harwood, E. (2020). *System Building*. e-flux Architecture. https://www.eflux.com/architecture/education/322668/system-building/
- Her Majesty's Stationery Office & Ministry of Education. (1957). *The story* of post-war school building (1957). 33.
- Höweler, E. (2003). Skyscraper. Universe.
- Hron, C. L. (2023). Nature as Partner : How School Communities Benefit from Ecological Connections. In B. Cleveland, S. Backhouse, P. Chandler, I. McShane, J. M. Clinton, & C. Newton (Éds.), *Schools as Community Hubs* (p. 73-93). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-9972-7\_6
- Human Rights Watch, Buchanan, J., Gorbunova, Y., & Denber, R. (2023). « *Tanks on the playground » : Attacks on schools and military use of schools in Ukraine*. Human Rights Watch.
- International Organization for Migration. (2024). Ukraine and Neighbouring Countries Crisis Response Plan 2024 (p. 50). https://www.google.com/url?sa=t&source=web&rct=j&opi=89 978449&url=https://crisisresponse.iom.int/response/ukraineand-neighbouring-countries-crisis-response-plan-2024&ved=2ahUKEwjt0dnd-KSHAxW08rsIHZ6HD7kQFnoECBUQAQ&usg=AOvVaw2hmq1 CZyR8GQzOAq-QwJhA

- Koolhaas, R., Mau, B., Sigler, J., Werlemann, H., & Office for
   Metropolitan Architecture (Éds.). (1995). Small, medium, large,
   extra-large : Office for Metropolitan Architecture, Rem Koolhaas,
   and Bruce Mau. Monacelli Press.
- Kozlova, K. (2022). "The Post-War Temporary Housing Wasn't Much Different from Concentration Camps": A Historian on Rotterdam's Reconstruction after World War 2. Bird in Flight. https://birdinflight.com/en/architectura-2/20220511-rotterdamreconstruction.html
- Kozlovsky, R. (2013). *The architectures of childhood : Children, modern architecture and reconstruction in postwar England*. Ashgate Publishing Company.
- Kyiv School of Economics. (2024). *Report on damages to infrastructure* from the destruction caused by Russia's military aggression against Ukraine as of January 2024 (p. 39). https://kse.ua/about-the-school/news/155-billion-the-totalamount-of-damages-caused-to-ukraine-s-infrastructure-due-to-
- the-war-as-of-january-2024/ Lippman, P., C. (2010). Evidence-Based Design of Elementary and
- Secondary Schools : A Responsive Approach to Creating Learning Environments. *Children, Youth and Environments*, *22*(1), 314. https://doi.org/10.7721/chilyoutenvi.22.1.0314
- Lynch, M. (2016). Uncovering the Devastating Impact of World War II on American Education. The Edvocate.
  - https://www.theedadvocate.org/uncovering-devastating-impactworld-war-ii-american-education/

- Maclure, S. (1984). Educational Development and School Building : Aspects of Public Policy, 1945-73 (Longman).
- Malaia, K. (2021). A Unit of Homemaking : The Prefabricated Panel and Domestic Architecture in the Late Soviet Union. *Architectural Histories*, *9*(1), 2. https://doi.org/10.5334/ah.575
- Marin, A., & Wellman, B. (2014). *The SAGE Handbook of Social Network Analysis.* SAGE Publications Ltd. https://doi.org/10.4135/9781446294413
- Markus, T. A. (1993). *Buildings and Power* (1<sup>re</sup> éd.). Routledge. https://doi.org/10.4324/9781315003153
- Matthews, C. (2009). *CLASP: Nottingham modernism as heritage?* Internet Curtain.
  - https://internetcurtains.blogspot.com/2009/08/claspnottingham-intro.html
- Mayhew, S. (2015). *A Dictionary of Geography* (5<sup>e</sup> éd.). Oxford University Press.

https://doi.org/10.1093/acref/9780199680856.001.0001

- McKinsey & Company, Bertram, N., Fuchs, S., Mischke, J., Palter, R., Strube, G., & Woetzel, J. (2019). *Modular construction : From* projects to products. 34.
- McShane, I., & Wilson, C. K. (2017). Beyond the School Fence : Rethinking Urban Schools in the Twenty-first Century. *Urban Policy and Research*, *35*(4), 472-485. https://doi.org/10.1080/08111146.2017.1310098
- Meurs, P. (2016). *Heritage-based design*. TU Delft Heritage & Architecture.

- Miles, N., Cleveland, B., & Chandler, P. (2023). School and Community Infrastructure Networks : What Might These Look Like? In B.
  Cleveland, S. Backhouse, P. Chandler, I. McShane, J. M. Clinton, & C. Newton (Éds.), *Schools as Community Hubs* (p. 97-112).
  Springer Nature Singapore. https://doi.org/10.1007/978-981-19-9972-7 7
- Monstadt, J. (2007). Urban Governance and the Transition of Energy Systems : Institutional Change and Shifting Energy and Climate Policies in Berlin. *International Journal of Urban and Regional Research, 31*(2), 326-343. https://doi.org/10.1111/j.1468-2427.2007.00725.x
- Morpher, J. (2016). *Infrastructure delivery planning : An effective practice approach*. Policy Press.
- National Clearinghouse for Educational Facilities, & Baker, L. (2012). A History of School Design and its Indoor Environmental Standards, 1900 to Today.
- Noble, H., & Smith, J. (2018). Reviewing the literature : Choosing a review design. *Evidence Based Nursing*, *21*(2), 39-41. https://doi.org/10.1136/eb-2018-102895
- Oshemkova, K. O. (2022). The new heart of Rotterdam. Post-war reconstruction of the destroyed city.

https://pragmatika.media/en/nove-serce-rotterdamapisljavoienna-rekonstrukcija-zrujnovanogo-mista/

Oswald, S. (2009). Arch 384 : Competitions Elective. https://www.tboake.com/competitions/w\_09/balabanoswald/samantha%20oswald%20arch%20384.pdf

- Pamela Woolner, Jill Clark, Karen Laing, Ulrike Thomas, & Lucy Tiplady.
  (2012). Changing Spaces : Preparing Students and Teachers for
  a New Learning Environment. *Children, Youth and Environments, 22*(1), 52.
  https://doi.org/10.7721/chilyoutenvi.22.1.0052
- Parker, B. (2006). Constructing Community Through Maps? Power and Praxis in Community Mapping\*. *The Professional Geographer*, *58*(4), 470-484. https://doi.org/10.1111/j.1467-9272.2006.00583.x
- Parnell, S. (2012). *Reputations Live : Stephen Parnell on Alison and Peter Smithson at the Soane Museum*. https://www.architecturalreview.com/archive/reputations-live-stephen-parnell-on-alisonand-peter-smithson-at-the-soane-museum
- Pelletier, J., & Corter, C. (2005). Integrating Kindergarten, Childcare, and Parenting Support To Help Diverse Families Connect to Schools. *MULTICULTURAL EDUCATION*.
- Potter, B. (2020). *Industrialized Building*. Construction Physics. https://www.construction-physics.com/p/industrialized-buildingpart-2
- Prakash, Nair & Fielding, Randall. (2005). The Language of School Design : Design Patterns for 21st Century Schools. *Children, Youth and Environments, 18*(2), 278-281. https://doi.org/10.1353/cye.2008.0014
- Rabeneck, A. (2006). *Two Approaches to School Bui Iding in Britain and America* [Dissertation].

- Rabinovitch, J. (1996). Innovative land use and public transport policy. *Land Use Policy*, *13*(1), 51-67. https://doi.org/10.1016/0264-8377(95)00023-2
- Recommendation of the Council OECD Legal Instruments Concerning Guidelines on Earthquake Safety in Schools,
  - OECD/LEGAL/0339.

https://legalinstruments.oecd.org/public/doc/143/143.en.pdf

- Rocha, P. F., Ferreira, N. O., Pimenta, F., & Pereira, N. B. (2022). Impacts of Prefabrication in the Building Construction Industry. *Encyclopedia*, *3*(1), 28-45. https://doi.org/10.3390/encyclopedia3010003
- Rogers, A., Castree, N., & Kitchin, R. (2013). *A Dictionary of human* geography (1st ed). Oxford University Press.
- S. Bell, Dip.Arch, & RIBA. (1984). 3 The CLASP experience. In *Design Life* of *Buildings* (Institution of Civil Engineers).
- Saint, A. (1987). *Towards a social architecture : The role of schoolbuilding in post-war England*. Yale University Press.
- Salagras, S. (2009). Integrated educational services : A key element in the creation of successful communities. In C. Newton & K. Fisher (Éds.), *TAKE 8 Learning Spaces : The transformation of educational spaces for the 21st century* (p. 88-95). https://minerva-access.unimelb.edu.au/items/e3b047c4-d686-5aa4-92dd-212fcb9a9a6c/full
- Sanjeevan, S., Moore, T., & McDonald, M. (2012). *Primary schools as community hubs : A review of the literature.* Centre for

Community Child Health.

https://doi.org/10.4225/50/5578C7EBC7E46

- Scott, J. (1988). Trends report Social Network. 22(1), 109-127. https://www.jstor.org/stable/42854660
- Smith, N. (2002). New Globalism, New Urbanism : Gentrification as Global Urban Strategy. *Antipode*, *34*(3), 427-450. https://doi.org/10.1111/1467-8330.00249
- Sukhomud, G. (2023). *The Pain of Ruins : On Urban Trauma and Collective Healing*. 8.
- T4P, Komarovskyi, M., & Volokha, D. (2023). During the first three months of the war, the Russian military destroyed two educational buildings in the Kharkiv Region a day. T4P. https://t4pua.org/en/2035
- Tanner, C. K. (2009). Effects of school design on student outcomes. *Journal of Educational Administration*, *47*(3), 381-399. https://doi.org/10.1108/09578230910955809
- Thanh Luu, D., Ng, S. T., & Eng Chen, S. (2003). Parameters governing the selection of procurement system – an empirical survey. *Engineering, Construction and Architectural Management, 10*(3), 209-218. https://doi.org/10.1108/09699980310478458
- The Ministry of Environnemental Protection and Natural Ressources of Ukraine. (2024). *Briefing on the environmental damage caused by the russia's war of aggression against Ukraine.* https://ecozagroza.gov.ua/en/news/149
- *Torino Fa Scuola.* (s. d.). quattrolinee. https://www.quattrolinee.it/torinofa-scuola-en/

- Ukrinform. (2024). *In Kharkiv, almost 800 educational facilities completely or partially destroyed—Mayor appeals to UN.* Ukrinform. https://www.ukrinform.net/rubric-ato/3878376-inkharkiv-almost-800-educational-facilities-completely-or-partiallydestroyed-mayor-appeals-to-un.html
- United Nations. (2024). Ukraine : Humanitarian, health needs soar as Kharkiv hostilities intensify. UN News.

https://news.un.org/en/story/2024/05/1150021

- Van den Berg, H. (2001). Economic growth and development : An analysis of our greatest economic achievements and our most exciting challenges. McGraw-Hill, Irwin.
- Van den Broek, J. H. van den. (2005). *Maak een stad : Rotterdam en de architectuur*. Uitgeverij 010.
- Vasyl Markus, Roman Senkus, & Ihor Stebelsky. (2006). *Kharkiv*. Encyclopedia of Ukraine.

https://www.encyclopediaofukraine.com/display.asp?linkpath=p ages%5CK%5CH%5CKharkiv.htm

Walsh, M. E., & Backe, S. (2013). School–University Partnerships :

Reflections and Opportunities. *Peabody Journal of Education*, *88*(5), 594-607.

https://doi.org/10.1080/0161956X.2013.835158

Wederopbouw Rotterdam. (s. d.). *Post-War Reconstruction*. Post-War Reconstruction Community Rotterdam.

https://wederopbouwrotterdam.nl/en/articles/post-warreconstruction

- Wicker, A. W. (2012). Perspectives on Behavior Settings : With
  Illustrations From Allison's Ethnography of a Japanese Hostess
  Club. *Environment and Behavior*, 44(4), 474-492.
  https://doi.org/10.1177/0013916511398374
- Williams, D. E. (2007). *Sustainable design : Ecology, architecture, and planning*. Wiley.
- Woolner, P. (2016). The school in the city. In S. Davoudi & D. Bell (Éds.), Justice and Fairness in the City (p. 49-68). Policy Press. https://doi.org/10.1332/policypress/9781447318385.003.000
  3
- World Bank Group. (2011). *World development report 2011 : Conflict, security, and development—Overview* (World Development Report 62255; p. 72).
- WWF & BCG. (2022). A sustainable economic recovery for people and nature (p. 67).

https://www.google.com/url?sa=t&source=web&rct=j&opi=89 978449&url=https://wwfeu.awsassets.panda.org/downloads/uk raine\_\_\_a\_sustainable\_economic\_recovery\_for\_people\_and\_natu re\_\_wwf\_bcg\_\_\_sept\_2022\_light.pdf&ved=2ahUKEwjrmoKs8qS HAxV0nf0HHdJ6Ay4QFnoECBMQAQ&usg=AOvVaw1hrkgy0X9tHvfreo\_BZNx