POST-WAR LEARNING ENVIRONMENTS: Redefining Schools Designs in Iraq

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POST-WAR LEARNING ENVIRONMENTS
Redefining Schools Designs in Iraq

Request for Approval of Thesis Research
Project Book Presented to:

Giovanni Loreto, PhD

and to the
Faculty of the Department of Architecture
College of Architecture and Construction Management

by

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In partial fulfillment of the requirements for the Degree

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# TABLE OF CONTENTS

**Thesis Statement** ............................................................................................................... 05

**Chapter One : Thesis Research**
- Introduction ............................................................................................................. 08
- Almustansiriya (oldest school) ........................................................................... 12
- Design in Baghdad .............................................................................................. 13
- Education in Iraq ................................................................................................. 14
- Teaching Theories ............................................................................................... 17
- Traditional school typologies ............................................................................ 18
- Students daily routine ......................................................................................... 23

**Chapter Two : Precedent studies**
- German school Madrid .................................................................................... 26
- School of Art and Design Media ..................................................................... 27
- School Bridge ..................................................................................................... 28
- Woodland School ............................................................................................... 29

**Chapter Three : Site Analysis**
- Site selection ....................................................................................................... 32
- Macro site context ............................................................................................. 34
- Micro site context ............................................................................................. 36
- Programatic framework ..................................................................................... 38

**Chapter Four : Design Analysis**
- Design concept .................................................................................................. 42
- Design Process ................................................................................................... 44

**Chapter Five : Design Synthesis**
- Spacial variation ................................................................................................. 51
- Floor Plans .......................................................................................................... 56
- Section Perspective ............................................................................................ 62
- Final rendering ..................................................................................................... 64

**Bibliography** ........................................................................................................ 65
The learning environments in Iraq have been greatly affected by war and ongoing conflict in the past two decades. As a result, the drop-out rates have increased, academic achievement is low, and the students are suffering from stress. Architecturally, the existing school typologies in Iraq were designed more than 70 years ago and does not reflect the needs of the 21st century students.

By examining the most common Schools typologies in the city of Baghdad, two major typologies are commonly used: one that reflects the old style buildings and still widely used today as the U-shape or the inclusion of a courtyard; and the second style, represents a more modern trend, this being a closed school. However, none of those typologies seemed to evolve much over the past century.

This thesis is an exploration to conceptualize places for education as learning environments that are not limited by a rectangular building and traditional classrooms. If learning can be conceptualized as being experiential in a variety of spaces, then school architecture can be reinterpreted as such.

Therefore, this thesis will focus on redesigning the learning environments in Iraq, not only in terms of the programmatic functions but also considering the psychological impact on those young children. How can architecture influence the healing process in a post-war condition. The outcome of this thesis will be focusing on creating a warm, welcoming environment that positively respond to the situation by becoming programmatically diverse, architecturally innovative, and spatially integrated.

The goal is to create a new typology and provide pragmatic solution; an architectural prototype that can be adapted to other Iraqi contexts; a design of which the students and the Iraqi communities can be proud of.
CHAPTER ONE

THESIS RESEARCH
INTRODUCTION

Baghdad is the largest city in Iraq and the second-largest city in the Arab world (after Cairo) and the second-largest city in SW Asia. Located on the Tigris River, and it is one of the most crowded urban agglomerations of the Middle East. The city dates back to pre-Islamic times, historically known as the heart of ancient Mesopotamia. After 1920, the city grew prodigiously and took on all the characteristics of a modern metropolis. Iraq has an area of 437,072 sq km and is mainly divided into 3 sections: a desert area in the west, a mountainous area in the north, and a large fertile plain in the middle of its southern area that is fed with water by the Euphrates and Tigris Rivers.

Located along the Tigris River, Baghdad has low humidity which is important when the temperatures get above 48.8˚C (120˚F). It gets very hot in the summer, usually has some good rain in the fall, but there is really no spring there, average temperatures for climate in Baghdad range from higher than 120˚F in July and August to below freezing in January.
Baghdad have an affinity for gardens and family recreation. Traditionally on weekends the city’s restaurants, cafes, and public parks have been filled with people. Restaurants serve the local delicacy masguf, Tigris fish roasted over an open fire. Recreational centers include two islands in the Tigris that have swimming pools and cafes, the Lunar Amusement Park, and Al-Zawra Public Park and Zoo.

Beginning in the early 1990s, traditional patterns of recreation for city residents were disrupted by war and economic hardship.

Although a prosperous class of government and party officials and wealthy merchants continued to frequent private clubs, most residents spent their free time either at home or visiting close friends or relatives.
The vernacular architecture of Baghdad is still one of the masterpieces of world architecture, due to their achievements and architectural solutions to climate resistance, by the thick mud brick walls and the courtyard. In addition to the Tigris river breeze and with architectural solutions to seize the cooling air inside the rooms house and to replace the air conditioner to get the comfortable and healthy environment for residents.

Their narrow street and all rooms which overlooking to inside courtyard as an example of privacy and safety and because of the development of technological happening since the nineteenth century, and so far, such as the evolution of technology and the emergence of new materials, as well as the emergence of the modern movement.
VERNACULAR ARCHITECTURE IN BAGHDAD

The vernacular architecture of Baghdad is still one of the masterpieces of world architecture, due to their achievements and architectural solutions to climate resistance, by the thick mud brick walls and the courtyard. In addition to the Tigris river breeze and with architectural solutions to seize the cooling air inside the rooms house and to replace the air conditioner to get the comfortable and healthy environment for residents and their narrow street and all rooms which overlooking to inside courtyard as an example of privacy and safety and because of the development of technological happening since the nineteenth century, and so far, such as the evolution of technology and the emergence of new materials, as well as the emergence of the modern movement.

THE OLD CITY OF BAGHDAD

VERNACULAR ARCHITECTURE
This is the oldest school that still stands in the city of Baghdad today, built in 1233 A.C. It is located on the left bank of the Tigris River. Al Mustansiriyya is doubly significant as the earliest example of a universal madrasa. Although descriptions contemporary to the foundation of the school do not exist, later medieval descriptions suggest that the complex originally comprised the theological school, a library, a hospital, and a pharmacy. In 1960, it became a museum for Islamic art and culture (The Museum of Islamic Art in Baghdad).
Design in Iraq is the result of a rich mixture of cultural, geographical and even climatic elements which have shaped this land from ancient times. Since the modernisation era began in Iraq in the late 1940s there have been attempts to create a unique path based on the richness of the Iraqi culture, attempts which focused on the importance of cultural heritage in creating a contemporary design industry. The field of many of these attempts was in art and architecture. However, that caused a dilemma for Iraqi design thinking between the past and the present.

One major factor affecting the development of contemporary design in Iraq is political instability and its influence on socio-cultural aspects of Iraqi society. Baghdad was in the vanguard of a movement to build a better post-war world. Designs like the grand Baghdad Gymnasium, designed by the famous architect Le Corbusier. Also Walter Gropius faculty tower in the university of Baghdad carried his Signature at the scale of building design and architectural detail.
Today, education in Iraq is in a desperate state where on-going conflict has worsened the situation of children and adolescents across the entire education spectrum. According to the UNICEF, nearly one in five schools is out of use and since 2014, the UN has verified 135 attacks on educational facilities. Millions of children are directly affected, losing months or years of education. Since August 2014, the conflict has resulted in destruction or damage and occupation of schools. Remaining facilities are overcrowded, and under-staffed, significantly reducing the quality of education available to children. In classes that are running, the class sizes range from 35 to 60 children- and schools often operate two or three shifts a day to cope with increased numbers, significantly reducing the amount of time children have to learn.

The crisis in Iraq has affected over 3 million school-age children, denying their right to a quality education. Many children have witnessed violence and suffered disruption to their lives and their learning, which requires support and specialized care.
Students in Iraq are eligible for enrollment at the age of 6 years old. Primary School consists of 6 grades. The passing of a national examination and receipt of Primary School Certificate makes them eligible to attend middle School. Unfortunately, the classroom are exactly the same for elementary school, middle school and high school students all around the country.

Many theories questioned traditional teaching methods and the traditional layout of the classroom. **Education reform stated that the traditional style of teaching creates passive students rather than students who are active in the learning process.** Teaching philosophies believed that the traditional methods were unresponsive to the needs of the individual child, or The Whole Child. The Whole Child concept believes that every child is unique and that the education system and teaching methods should adapt to each special need.
“If we put before the mind’s eye the ordinary school room, with its rows of ugly desks placed in geometrical order, crowded together so that there shall be as little moving room as possible, desks almost all the same size, with just space enough to hold books, pencils, and paper, and add a table, some chairs the bare walls, and possibly a few pictures, we can reconstruct the only emotional activity that can possibly go on in such a place. It is all made ‘for listening’ – because simply studying lessons out of a book is only another kind of listening; it marks the dependency of one mind upon another…” – John Dewey, American Philosopher of education 1900

Maria Montessori is an Italian physician and teacher, believed that children will always learn best by teaching themselves and their peers. Children are independent and self-discover their way through school. This idea thus changed the idea and role of the teacher. She believed that the teacher could only assist in what she considered to be a natural discovery and realization of one’s self. The belief that children best actively learn by themselves and in groups has led to physical changes from the traditional fixed classroom.
TYPOLOGY RESEARCH - TRADITIONAL SCHOOL MODELS IN IRAQ

FULL COURTYARD

U-SHAPE COURTYARD

SEPERATED BLOCKS COURTYARD

CLOSED BUILDING

Old style - school designs
(1950s-1960s)

New style - modern design
(1970s-present)

HAIFA STREET, BAGHDAD
ALSIYADA ELEMENTRY SCHOOL

ZAYONA, BAGHDAD
ALBAWASIL ELEMENTRY SCHOOL

ZAYONA, BAGHDAD
BADIR-ALKUBRA SECONDARY SCHOOL
Total Area : 11,740 SF

About 210 Students

Classrooms Area : 3,700 SF

Ave : Classrooms area per student = 18 SF per Student

Ave : 1 Teachers for every 35 - 42 students
U-SHAPED SCHOOL TYPOLOGY (ONE-STORY BUILDING)

Total Area: 26,680 SF

About 180 Students

Classrooms Area: 5,180 SF

Ave: Classrooms area per student = 28 SF per Student

Ave: 1 Teachers for every 30 - 34 students

U-SHAPED SCHOOL TYPOLOGY (ONE-STORY BUILDING)

YARD

CLASSROOMS
teachers room
storage
green space

30' - 0"  29' - 8"  24' - 0"
50' - 7 15/32"
35' - 6"
9' - 8"
25' - 0"
17' - 6"
24' - 6"
30' - 11 1/8"
23' - 7 29/32"
18' - 4 3/32"

35' - 0"  20' - 0"  35' - 0"
34' - 7 15/32"
25' - 0"
16' - 9"
9' - 9"
27' - 11 1/8"
7' - 0"
6' - 4"
10' - 3"

CORE AND WINGED CIRCULATION

Square Footage Analysis

- Classrooms: 31%
- Administration: 8%
- Restrooms: 5%
- Storage / Unused space: 5%
- Entrance / Circulation: 48%
Total Area: 46,200 SF

About 360 Students

Classrooms Area: 12,460 SF

Ave: Classrooms area per student = 34.6 SF per Student

Ave: 1 Teachers for every 28 to 32 students
This plan drawing represents the **typical classroom model** that is repeated in all of the different school typologies in elementary schools, middle schools as well as high school buildings. These classrooms lined children in rows of desks and the teacher would stand at the front of the room with the chalk board. Typically The size of the classroom is usually in the range of 580 to 624 Square feet where three to four rows of desks are arranged facing the doorway. Windows are usually on one side of the classroom facing the school yard (**inward**) while the opposite wall is usually a plain wall. Very few schools have small windows facing outward but they are designed to be very high (2 to 3 feet) below ceiling height.

**Traditional building materials for school building are bricks and reinforced concrete**: The roof terrace is built by reinforced concrete slab with a layer of asphalt, layer of soil and concrete tiles and this in turn increases the thermal burdens in the summer and winter. The concrete slabs used for finishing the roof terrace which absorb very little water, they reduces very slight amount of the roof surface temperature by evaporating.
The diagram above shows the typical Iraqi school routine. Since schools are usually located in residential districts where roads are not wide enough for heavy traffics, parents are unwilling to allow their children to walk or bike to school due to the traffic congestion and perceived traffic danger during student arrival and dismissal.
- Using multiple courtyards to connect the individual school buildings together. The kindergarten, the primary school and the secondary school, each frame an inner courtyard.

- All children meet in the foyer courtyards before dispersing in their individual school buildings.

- The sculptural strength of the polygonal skylights creates a captivating play of light, providing the students with valuable shade.

- All patios open up to the surrounding landscape.

- The School is more than a matrix of classrooms; it is the centre of the students’ living environment and shape their understanding of both the built and natural worlds as well as their sociocultural experience.

- Programatic functions including educational program and evening theatre performances and concerts.
- Two sweeping green roofs create a mesmerizing effect that turns the building into pure landscape.

- The roofs serve as informal gathering spaces, challenging linear ideas and stirring perception.

- The roofs create open space, insulate the building, cool the surrounding air, and harvest rainwater for landscaping irrigation.

- The building design challenges the traditional linear system of education with a clear teacher-student arrangement. Here, given the sloping nature of the architectural form, many of the teaching spaces come in different shapes and volumes which could be easily adapted to different needs.

- The carpet of grass controls storm water by soaking up monsoon, significantly reduces cooling loads.
- The building has a mixed programme that is a school, a cultural centre, and a habitable bridge. It's entire conception is to enliven an old village, and sustain traditional village cultures.

- Beneath the bridge structure is a second pedestrian bridge made of steel with timber decking. It navigates pedestrians out, over the stream below, to avoid the bridge landing.

- It is done by combining few different functions into one space – a bridge which connects two old castles cross the creek, a school which also symbolically connects past, current with future, a playground (for the kids) and the stage (for the villagers).

- A project that has successfully energize the entire community, contains social sustainability through architectural intervention.
- The educational program for the school makes use of directed learning, small group activities, skill building, individualized instruction, and project-based learning.

- This is reflected in the design that features a series of shared spaces and small learning communities.

- School is organized around grade-level learning. Each grade occupies one floor in the academic wing.

- Educators can easily shift from classroom environments to large-group events, team projects, and small-group work sessions in the adjacent learning commons.

- Sinks and flexible furniture are included within the project areas to support “messy” hands-on activities.
The story of Baghdad begins between the banks of the Tigress and the Euphrates. The city is Iraq’s heart of **politics, economics and culture**. Despite being smaller than its neighboring governates, Baghdad is the most populated with roughly **7.6 million inhabitants**. Today’s Baghdad consists of nine districts; four on the west of the Tigris; Rashid, Mansour, Kadimiyah, and Karkh. On the east side of the river is Adhamiya, Nisreen, Karradah, Rusafa and Al-Thawr.

### Baghdad Area
1,758 Square miles  
(1.5% of Iraq)

### Population: 7.665 Million  
(21.1% of total population)

**Urban:** 87.2%  **Rural:** 12.8%

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North of Baghdad
Despite the rapid changes the city has undergone in the past decade, **the center is still one of historic souks (commercial area), schools, mosques and churches. Al Rusafa**, is considered one of the most important areas in Baghdad’s center because it contains most of its transportation hubs, administrative districts, and public markets such as Souk Al-Arabi, Shorja, and Al-Rashid Street.

Almost 2 decades ago, this city was considered a **multi-ethnic city** with **churches and mosques of all sects, shrines and temples.** The city’s neighborhoods enclose urban centers where public, social and cultural events occur. **Each neighborhood’s center is connected to other centers.**
“People may feel safer inside their neighborhoods, but are more wary of venturing outside them. A short journey across the city can take hours with roads blocked off and numerous checkpoints, discouraging people from visiting relations and friends and reinforcing the sense of isolation.”

An ordinary trip to visit a family member, or go to school entails a degree of danger. ‘Shiites and Sunnis still take long, circuitous routes to work to avoid each other’s neighbourhoods. Different zones, streets and bridges are restricted by different militias.”
Baghdad suffers of schools shortages and a lack of accessible public spaces. According to Population Pyramid.net, the largest percentage of population in Baghdad is the elementary school ages. Therefore, many Schools operates two shifts a day to keep up with the increased numbers of students in most Baghdad’s districts.
On the right of the Tigris river we see the Adhamiyah neighborhood and east-central district of the city of Baghdad, Iraq. It is one of nine administrative districts in Baghdad. Adhamiyah is located north-west of the city center and is an upscale area. It has 100,000 inhabitants. This area was 85% Sunni, 15% Shi’ite before the war in 2003. Now, it is serves as one of the few points of refugee for Baghdad, and nearly totally Sunni in its religious composition.

On the Left of Tigris river, comes a relatively smaller neighborhood located northwest of the city center in Baghdad. It is at one end of the Al-Sarafiya bridge and it is mostly a Shia neighborhood across the Tigris River from Al-Adhamiya district.
On the right of the Tigris river we see the Adhamiyah neighborhood and east-central district of the city of Baghdad, Iraq. It is one of nine administrative districts in Baghdad. Adhamiyah is located north-west of the city center and is an upscale area. It has 100,000 inhabitants. This area was 85% Sunni, 15% Shi'ite before the war in 2003. Now, it serves as one of the few points of refuge for Baghdad, and nearly totally Sunni in its religious composition. On the left of the Tigris river, comes a relatively smaller neighborhood located north-west of the city center in Baghdad. It is at one end of the Al-Sarafiya bridge and it is mostly a Shia neighborhood across the Tigris River from Al-Adhamiya district.
In response to the different needs of Adhamiya and Utayfia neighborhood in the city of Baghdad, several key issues need to be considered in the design phase. The elementary school is the main aspect of this thesis, however, key issues like diversity, safety and a sense of community for the families are significant factors that need to be addressed as well.
The river acts as a boundary from dangerous situations that could happen on the streets. The Ferries that are already parked by the side of Adhamiya neighborhood can be used to transport students to safer districts in Baghdad along the Tigris river.
The program of the school will be separated in groups of different grades (from 1st to 6th). The groups are split into first and second grades, third and fourth grades, and fifth and sixth. Each group will have different curriculum but similar physical learning spaces.

The design concept does not only provide a physical function - an elementary school and a pedestrian bridge, but also presents a community gathering center for the parents and families of the two neighborhoods. Programmatic functions and site forces combined together to create the form while providing many spatial variations on each floor. The level of privacy increases on the higher levels while the bridge serves as a public space on the water level. In terms of safety, the location provides a great control in the two entry points on both ends of the bridge while it opens to the public in the after-school hours.

By connecting Adhamiya and Utayfia neighborhoods together, the school becomes the bridge that does not only connect physically but also to bond the people and those young students back together in a warm welcoming environment.

The learning types that are identified are represented with the symbols and colors on the diagram below. These learning types are found in different learning environments throughout each age development group and it is very likely, that multiple learning types can happen in one learning environment. In this case, the lower and upper divisions while have these different learning types based on the needs of each division.
CHAPTER FOUR

DESIGN ANALYSIS
The design concept does not only provide a physical function - an elementary school and a pedestrian bridge, but also presents a community gathering space for the parents and families of the two separated neighborhoods. Programmatic functions and the site forces combined to create the form while providing many special variations on each floor. The level of privacy increases on the higher levels while the bridge serves as a public space above the water level. In terms of safety, the location provides a great control in the two entry points on both ends of the bridge while it opens to the public in the after-school hours. By connecting Adhamiya and Utayfia neighborhoods together, the school becomes the bridge that does not only connect both communities physically but also to bond the people and those young students back together in a warm welcoming Environment.
Warm Welcoming Learning Environment + The new Pedestrian Bridge will replace the existing, unsafe temporary bridge + Community Outdoor Space for the public
The design concept does not only provide a physical function - an elementary school and a pedestrian bridge, but also presents a community gathering center for the people and those young students back together in a warm welcoming environment.

In terms of safety, the location provides a great control in the two entry points on both ends of the bridge while it opens to the public in the public space on the water level. The level of privacy increases on the higher levels while the bridge serves as a semi-public space.

The learning types that are identified are represented with the symbols and colors on the diagram below. These learning types are found in different learning settings.

**ABSTRACT DESIGN CONCEPT - SCHEME A**

- **REGULAR CLASSROOM**
  - Semi-Private
  - Semi-Private
  - Semi-Public
  - Public Space
  - Bridge

**SPACES FOR DIFFERENT LEARNING TYPES**

- **1ST GRADE 2ND GRADE 3RD GRADE**
- **4TH GRADE 5TH GRADE 6TH GRADE**
- **LOWER DIVISION**
- **UPPER DIVISION**
- **ADMINISTRATIONS (TEACHERS AND STAFF)**
- **SMALL GROUP LECTURE**
- **ONE-ON-ONE TEACHING**
- **GROUP STUDY (COLLABORATION)**
- **INFORMAL LEARNING**
- **HANDS ON / WET LAB**
- **GALLERY / PIN UP SPACE**
- **COMMUNITY OUTDOOR SPACE FOR THE COMMUNITY**
- **PARKS AND PLAY AREA**
- **SPORTS FACILITIES**
- **COMMUNITY OUTDOOR SPACE FOR THE COMMUNITY**
- **PARKS AND PLAY AREA**
- **SPORTS FACILITIES**

**DESIGN PROCESS (BUILDING FORMS) SCHEME A**

Invisible vertical courtyards
Overlapped Elements - Creating complex spaces
DESIGN PROCESS (BUILDING FORMS) SCHEME C

Multiple Continues Courtyards
Balanced linearity - creating a shared volume in the middle
CONCLUSION

Those studies helped the final building form to be more simplified than the ones made earlier. The initial idea behinds it was to create special complexity through continuous linear geometry that bridge the two districts together. Schemes A & B seemed to be very complicated for a learning environment, even though it had a lot of potential in creating unique special experience. However, Scheme D seemed to be the most successful because it was a more simplified version of the design concept. The clarity of the building form from the outside helped to organize the students based off their grade levels while creating a more complex volumes in the inside.
CHAPTER FIVE
DESIGN SYNTHESIS
The key element of change is the shift from the existing traditional classroom to alternative environments where variety of spaces are designed for a specific learning type of activity. Spaces that host small group instructions, tutoring, labs and other activities rather than a series of generic replicated space for the entire school. The variety of these spaces will be designed in every single floor, so each group of students in a certain level grade have the freedom to express themselves in the informal gathering spaces as well as their daily participation in the classroom.
This is the bridge level floor where the first social lounge (shown in red) is the connective mezzanine between 1st floor and the 2nd floor (first & second grade students) The mezzanine continues from the interior to the exterior spaces where it branches out to a ramp on one side and connects to the opposite building mass on the other side.
This is the 2nd floor where the second social lounge (shown in red) is the connective mezzanine between the 2nd floor and the 3rd floor (second & third grade students). The mezzanine continues from the inside to the exterior volume as a one interior space where it connects to the opposite building mass on the other side.
This is the 3rd floor where students can have access to the library and beautiful reading spaces along the windows looking down to the atrium below. The students on this level is connected to the social lounge on the 2nd floor but they still have their own private gathering spaces.
SPACES FOR DIFFERENT LEARNING TYPES

INTERIOR SPACIAL ORGANIZATION IN BOTH DIVISIONS

This is a mix between the traditional classroom setting and the small group instruction.

These spaces are used for informal gatherings between the students to promote physical interaction between students.

These spaces are active group settings where students discuss and learn from one another with the guidance of a teacher, technology, or an assigned project.

These spaces are used for hands-on learning.

Those individual learning spaces are considered more personal out of the others learning types.
SOCIAL LOUNGE LEVEL A (BETWEEN 1ST AND 2ND FLOORS)

- Shared informal gathering space between 1st and 2nd grade
- Ramps to bridge
- Shared informal gathering space between 4th and 5th grade
3RD FLOOR (ABOVE SOCIAL LOUNGE B LEVEL)

THIRD GRADE STUDENTS (LOWER DIVISION)

SIXTH GRADE STUDENTS (UPPER DIVISION)
STUDENT INFORMAL ACTIVITIES

- Play Yard
  - Public space (After school)
- Interior and Exterior
  - Social Lounges
- Flexible reading Space
- Hanging out Steps
- Display Area


“Makkiya.” Daniel Ramos Obregón, cargocollective.com/makkiya.


