Role of Architecture in overcoming visual distortions. In the context of needs and social changes

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Abstract. This paper sheds light on the visual distortions that urban communities suffer due to neglect and weak law enforcement and their impact on the economic, environmental and social aspects. Architecture has a major role in addressing sagging and deformations that affect buildings, reviving them and making them more sustainable instead of consuming new lands, Contrary to the principles of sustainable and irreplaceable resources. The study relies on selecting four examples from 32 projects that deal with different issues related to the visual distortions that Lebanon's suburbs and rural areas suffer from, and to provide serious and affordable solutions in order to change the existing stereotype in the urban environment. This study focuses on the importance of the role of architecture, especially the involvement of architecture students in local universities in reformulating the scenery in the streets of the community to which they belong. This experience will have a positive impact on society and improving its livelihood and environment.

1. Introduction:
World's major cities are suffering from a huge residential and urban sprawl that has contributed to many urban infrastructure crises. The diagnosis of the causes of these spreads varies from city to city, but it is unanimously agreed that they place a great strain on the urban environment, infrastructure and services provided by these cities. In Lebanon, the demographic developments that have taken place in the region have undoubtedly led to the transformation in the architectural roles of spaces. As well as to the technical progress that has reflected itself in the appearance of technologies and atypical visual irregularities on the facades and roofs of buildings. Lebanon's building legislation has not met the demands of the community and, on certain occasions, has been postponed in accordance with the rapid reforms. These changes have led to significant visual deficiencies and deformations in several neighborhoods of the city and have added to the failure of the area which has to be saved. It was also important to study these causes and try to address them by law and, at the same time, to consider viable architectural tools and designs that would aim to overcome these pests and render the streets. Which should be the focus of attention of tourists as well as others involved in architectural history.

2. Literature review
2.1. Critical overview of urban planning in Lebanon from 1932 to 2002
The history of urban planning in Lebanon has possibly been established since 1932, when the first master plan for Beirut was introduced under the French mandate (1922–1946). Zoning was the main tool adopted and little consideration was given to building law and economic growth in general for the associated environmental consequences. Failure to comply with building regulations, promoted by the frequent
regularization of unlawful development, owing to the prevailing mentality of "laissez faire" by the authorities and widespread mercantilism. Whereby property is deemed to be an asset to be used to its fullest potential, without regard to the natural and man-made environment [1-3].

The most destructive was the uncontrolled and unregulated growth of rural and residential areas during the civil war (1975–1990) as unauthorized building broke out on agricultural property. It can be seen replicated around the coastlines and along the beautiful hillsides, creating tremendous visual noise and distortions around the coastline. In fact, rural population has risen by pushing illicit extensions and modifications to new structures, both vertically and horizontally, which included encroachment on public property [3].

2.2 Urban and demographic changes in Beirut

The Israeli invasion and the civil war in 1975 had the greatest share in changing the built and urban environment of Beirut and its suburbs. The displacement from the villages towards the city was so steady that the population exceeded the city's carrying capacity. The suburbs that absorbed the largest number have suffered and are still suffering from its negative effects. Social and psychological needs form the main pillar of the urban planning and organization approach and architecture. According to the 2007 National Survey of Family Living Conditions [4], 49% of the population lives in the center of the country in the governorates of Beirut and Mount Lebanon (including the southern suburbs of Beirut) [5]. While the rest of the population is divided between different governorates, (20.3% in northern Lebanon, 13.0% in the Bekaa, and 17.6% in southern Lebanon, including Nabatiyeh). Going back to the report itself, the figures indicate that the Lebanese society as a whole is young, according to the table below.

| Age         | Total % |
|-------------|---------|
| Under 24    | 44      |
| 24-59       | 38.4    |
| 60 and Above| 17.6    |

From this point of view, it was necessary to find certain tools to organize the massive displacement process and to try to understand its negative impact on architectural identity and to create spaces. The increase in the population has led to a hemorrhage in the needs of the population, and since the Lebanese society is a young society and the family population is always growing. We will refer later to the problems faced to the built environment, whether at the level of the internal design of the spaces or at the external level.

2.3 Legislation issues

While several countries slid into a severe economic recession in 2008, Lebanon experienced spectacular economic growth. Over the past few years, Beirut’s evolving center has not only witnessed a massive construction boom, but also other parts of the country. In 2009, the tourism sector also broke all records. The imaginary annual growth rates in the real estate sector, which exceeded 30 percent, are increasingly attracting capital from gulf states and wealthy Lebanese expatriates. Demand for luxury properties has reached levels that have made land fit for construction difficult to reach. This trend was reinforced by a fictional project to develop an artificial island in the form of rice. Which was met with a campaign of rejection by environmental activists and specialists before the idea was dropped due to the bankruptcy of the promoted company.

Although there is a blueprint for the Greater Beirut area, Beirut’s suburbs are almost suffocated by the huge numbers of construction workshops. The guideline, prepared in the 1950s, did not observe the data available for a livable environment, no footpaths and bicycles, no standards for public spaces, no air purity, no noise reduction. constructing buildings as real estate desire. The only limitations are in terms of
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2.3.1. Everyone has the right to build

The right to build for all without urban regulation for every landowner in Lebanon, regardless of the location of his land, is legally entitled to build houses within four layers on 10/20 percent of the land area [6]. The only exceptions are nature reserves and Mediterranean beach lands. There is no need for binding site plans or public hearings to approve the building permit. The State is expected to provide public services such as electricity, water, sanitation and roads, even in remote areas. Only about 10 percent of all Lebanese territory is covered by binding local guidelines that replace common law with special building regulations. About one fifth of these regulations remain legally non-binding. Although there are local guidelines in key residential areas, they cover only about 40 percent of populated areas. Negotiations between planning services, ministries and local authorities take a very long time, as much money is involved in deliberations.

During the years of the Civil War, most data collection systems collapsed. Even now, the Directorate of Statistics is struggling hard to develop a reliable database of the country. Since the last statistic was conducted in 1932, the directorate can operate only by estimates based on registered buildings, house numbers and voter registrations. However, this does not reflect the actual population, because people who have moved or migrated are still registered. A new statistic is not on the table of government, as this could threaten the fragile sectarian balance and the current political situation.

About one third of Lebanon is not yet on the land register. Only Beirut, the coastal area, agricultural areas in the Bekaa Valley and a narrow strip on the Damascus road are included in land records. Many of the areas affected by the current construction boom, such as Mount Lebanon and the area between Beirut and Sidon in the south and north to Batroun, have no land record.

About 10 percent of Lebanon's population is Palestinian refugees living in camps on the outskirts of Beirut, Sidon, Tyre and Tripoli. Legally, these places are "humanitarian havens" for which the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) is responsible. It is experiencing significant population growth and remains outside any planning, services or administrative structures.

2.3.2. Weakness of state agencies

After the French Mandate, the dynamic private sector dominated the administrative structures in urban and regional planning. Although the Lebanese state has always maintained minimal interventions and laws, bureaucratic procedures are widespread. For example, obtaining permission to build a large shop requires about 20 bureaucratic procedures, but none of them addresses the environmental impact or the concept of urban development. The interests of the population are not seen, and no efforts are made to develop the project or to improve basic infrastructure to cope with increased needs. Moreover, there is a significant backlog of unfinished bureaucratic work due to the hiring freeze since 1995 [7].

With or in the absence of a guideline, each building application is submitted to the head of the local administration. However, local authorities rarely have the expertise or funds to address sustainable urban planning. Often, there is no political will to do so. Therefore, the way construction applications are handled is often subject to the discretion of the mayor or influential citizens. Many local authorities did not take up the first municipal elections after the civil war until 1998.
The Council for Development and Reconstruction was established in 1977 as an independent authority that directly refers to the Council of Ministers. With its comprehensive national plan for the regulation of Lebanese territory, the Council has theoretically laid the foundations and guidelines for the preparation of regional guidelines. In its final report, however, it addresses various criteria and problems related to regional planning, which appear to be not being pursued in planning. Environmental issues and resource protection are limited to specific small reserves. The government's policy of reducing the number of women in the country's main political parties has been very limited. However, while the comprehensive national plan is a step in the right direction, it is a kind of general recommendation with little impact on local plans.

To increase profit margins, policymakers seem to be focusing on strengthening the construction industry regardless of the existing guideline. Little interest is paid on how new building will affect and interact with streets, neighborhoods, society, environmental concerns and how to deal with the build-up of these pressures. The needs of real expansion are never discussed in any administrative or planning decision, despite the existence of unbuilt properties and countless barren land.

Except for a few nature reserves in the mountains, the possibilities for recreation and the overall appearance of the landscape are ignored. This is a serious problem, especially in crowded areas where public spaces are scarce.

2.3.3. Waste of resources
In fact, many of the recommendations of the Comprehensive National Plan have now been overridden by the actual construction boom. While the Development and Reconstruction Council is still preparing the details of the comprehensive and regulatory plan, especially for coastal areas, new resorts, housing and industrial facilities will be built, and Greater Beirut will expand without controls to a nature reserve designed for the Beirut River catchment. An additional problem is the failure to update old laws, sometimes dating back to the 1920s. For example, the penalty for operating a stone quarry is still 100 LP, equivalent to less than $0.08.

Only 21 percent of Lebanon’s coastline remained intact. The government's efforts to curb extraction have so far failed. Only in 2005, pressure from 18 NGOs and a lawsuit succeeded in closing illegal counterfeiters in Al-Jiyeh and The Kalb River.

2.3.4. Privatization of public spaces
In the absence of sustainable development concepts for residential areas equipped with adequate infrastructure or open spaces, and because decision makers are ignorant of people's requirements, public and semi-public spaces are confined to spaces between buildings and streets. Beirut residents must accept 0.8 square meters per capita of open spaces, while European cities allocate more than 10 to 20 times more space.

Non-governmental organizations and universities are actively working to make local, regional and environmental regulation a common task. Lebanon's urban and regional planning tools appear insufficient to address the problems associated with the construction boom. As a result, they hinder the country's sustainable development. Urban development focuses on short-term economic gains. Where there are domestic guidelines, they are ignored or, like the comprehensive national plan, excluded.

The united nations must be able to make the most of the world's resources. There is a significant imbalance between a particular structural framework and the unbroken construction boom. This situation is not merely the result of a blind pursuit of profit by the economic elite. It is possible only in a State that does not have full control over power and is not determined to develop a legal system and put it into practice and follow transparent guidelines. As long as many decision makers in ministries and local authorities receive a share of the valuation of buildings and real estate. Also, polluters are not held accountable for the damage caused by the uncontrolled construction boom of the population and the environment, the situation will worsen.
Sustainable urban and regional planning must be comprehensive, and the guidelines for the comprehensive national plan should be mandatory for each local planning. In order to achieve this, a special justice department for this sector needs to be developed and put into practice.

3. Research methodology
The methodology relied on a quantitative and qualitative approach. Projects have been done and assessed through long a procedure. This Procedure has measured issues of projects and categorized them through different groupings. Categories vary between the type of the location of the building (City, Suburb and rural), type of building (residential, commercial, public and mix), the height of the buildings, issues (Visual distortion, Social, technological and other), rehabilitation pillars applied and finally the solutions. In addition, a form has been filled that explains the procedure and data in accordance with picture and visualization analysis of final outcome 32 projects were assessed in this process.

Serious architectural issues have been escalating. It shows the influence of this sprawl on the built environment concerning social, humanitarian, and visualization aspects. We are going to mention and discuss some examples that most cities all over the world have been facing. These examples were executed by architectural master students conducting an experiment and a cure for sick cities under the supervision of urban planning specialists in the Faculty of Architecture and Fine Arts at the Lebanese University in Beirut. These efforts are going toward assessment of built environment conditions, by defining the issues, planning for an approach then execute the solutions. These case studies started with buildings from different places such as cities, suburbs, and rural. The second step will move toward streets then districts.

4. Survey
Projects were studied with questions addressed to the architects involved in this experiment to explain their point of view of the urban problems they observed and worked to address. The questions were different, multiple choice, some of which were descriptive and needed clarification in order to help understand the importance of finding sustainable solutions to the addressed issues.

First question: Location of studies buildings
46.9 % of the projects were in rural; 
18.8 % in suburb; 
34.4 % in cities (Figure 1).

Second question: Buildings uses
84.4 % Residential; 
3.1 % Commercial;
12.5% Residential + Commercial stores on Ground Floor.

**Figure 2.** Buildings uses, Source: Writer

Third question: Number of Stories
- **40.6%** Between 1-2;
- **25%** Between 2-3;
- **25%** Between 4-5;
- **9.4%** were 6 and above.

**Figure 3.** Number of stories, Source: Writer

Fourth question: Issues of buildings?
- **59.4%** Visual distortion;
- **6.3%** Social issues;
- **9.4%** Technological issues;
- **6.3%** Bad shape & condition;
- **3.1%** Distorted and technological issues;
- **3.1%** Distorted and technological issues with deformation;
- **5.2%** Un-healthy and aged Building;
- **3.2%** Structural issues;
- **4%** All the Above.
Fifth question: Rehabilitation pillars

- Treatment of unorganized water drainage, corrosion, electrical wires, and air conditioning units on the building’s main façade.
- The goal was to maintain the building with a better image, NOT a different one.
- Fixing the building facade in a modern style.
- Solving the visual distortion based on improving the architectural side and taking into consideration (and in the first place) the function of each part of the building (its elements: windows/ kitchen and staircase location / water tanks...). In addition, looking to conserve the social function of the street and its relationship with the building in order hoped to create a better sense of architecture.
- Improving elevations of buildings with local materials.
- Improving the facades that exist and turning them into modern facades, while maintaining two basic elements: the arches style of facades that reflects the identity of the Lebanese house and the green(garden) that emphasizes most Lebanese houses.
- Connecting the building to its surroundings (sidewalks, parking).
- Improving the image of the urban scene to unite in the whole neighborhood to give an aesthetic image embodied in the structured and proper urban character.
- Connecting architectural blocks to a frame while preserving the basic elements of the building so that it does not lose its original identity.
- Restoration of materials, by using technological materials and modern ones. Architectural side and keeping the functional side the same to no damage the residence. Socially, keeping the street ways and the relationship between people and the building the same but enhancing their landscape.
- Improving social fabric by ensuring a decent living while maintaining housing structure in order to improve the social fabric.
- Creating a nucleus for renewal and change that produces culture and a way for change in neighboring communities. Which also contributes to improving the image of the city and the aesthetic sense of the general public.
Sixth question: Have you solved the issue(s)?

- **84.4%** Yes;
- **15.6%** Partially with some limitations;

![Figure 5](image)

**Figure 5.** Have you solved the issue(s),
Source: Writer

**Limitations:**
- Preserving identity of the buildings facades which added some constraints to the solutions.
- Difficulty of internal changes due to the un-flexibility of the building laws.
- Laws breaches and un-linear buildings setbacks.
- Limited materials used due to building laws constraints.

**Seventh question: How did you solve it?**

Here some answers of applicants:

- Assigning the columns proportionally and placing windows and doors in harmony with the building, in order to improve the visualization and decrease deformation.
- Proposing a design interface and a change in the materials and colors of the shell.
- Adding pitched roof panels in some projects.
- Dealing with the entourage of buildings.
- Using sustainable material and executing eco-energy solutions.
- Focusing on enhancing the facades of buildings.
- Adding new materials such as Aluminum, glass openings.
- Benefits from balconies to add a green touch.
- Placing a private parking lot surrounded by sidewalks in front of the entrance to prevent random parking.
- Make the added blocks to the building consistent with the original building.
- Placing green elements around the building.
- Removal and hidden rewiring of exposed electrical cables.
- Adding louvers and facade elements that help hiding the sanitary installations and other installation (AC, electrical installation.) which gives better appearance.
- Take advantage of the floor protrusion to create flowerpots due to the lack of green buildings approaches.
Highlighting some blocks by giving them different materials, as well as changing storefronts to become more regular and attractive.

Improving the overall entrance of the project by adding sidewalks and traffic lights and identifying parking spaces.

Add a touch to the fences of the buildings.

Use the appropriate night lighting for security reasons.

Facade stone treatment.

Replacement of existing balustrades.

**Eighth question: Did you use any technological tools?**

78.8% Yes;

21.2% No;

Tools used in the procedure:

- Large glass openings (Vec – Spyder).
- Aluminum louvers.
- Underground fiber optics wiring.
- Using pre-stressed concrete.
- Treated wood panels.
- Environmental treated exterior paint.
- Artificial exterior cladding stone.
- Solar panels on roofs.

![Figure 6](image)

**Figure 6.** Did you use any technological tools, Source: Writer

5. **Discussions**

The importance of this experiment is that it was carried out on existing buildings that suffer from various problems that have been mentioned earlier. Based on the pillars in the transformation of these buildings from dilapidated facilities to habitable and usable facilities. It is necessary to go through many analyses and changes affecting the parts of these internal and external facilities to focus on improving the quality of housing or providing services by renewing and improving the internal and external appearance by addressing the sciences of sociology and internal and external architecture in order to meet the needs of its inhabitants and users to achieve the success of this approach.

Returning to the basic problems suffered by these buildings can be summarized by visual distortion (see figure), which was the largest percentage to reach 59.4% followed by technological problems 9.4%.
Which were expressed by specialists using technological resources without paying attention to their impact on the facades of buildings and their distortion of public space such as air conditioners on the external walls with random form and electrical wiring that move between floors without regard for the minimum public safety.

The third element is the social aspect that has contributed significantly to these distortions. The contribution is due to the use and utilization of legal loopholes in the building law as example: some of the spaces of the balconies were randomly added and unstudied by various arguments, including family, by marrying one of the children or by renting rooms to increase the material return. Poor material conditions and legal loopholes played a major role in distorting the built environment of cities. We'll discuss some projects and how to find architectural solutions to suit the improvement of the exterior and hide defects.

**Project 1: Multi-story Residential building**

This building (Figure 7) is in the southern suburb of Beirut, as we note in the picture it suffers from a large deformity mainly for various reasons including the age of the old building, and the lack of the necessary maintenance, especially for its facades. So that the appearance of wooden windows in floors and in other floors we note the presence of aluminum, another problem appears and is the structural problems and the fragmentation of concrete, especially in the high floors. Which poses a direct danger to public safety. We can also observe the presence of electrical wiring that is visible and randomly in addition to the air conditioners located on the external walls arbitrarily. Where this has increased the rate of distortion, the changes in the external openings without studying its effect on the mass in general and finally we notice the bad exterior paint.

![The existing building](image1.png)  ![After the architectural interventions](image2.png)

**Figure 7. Before & After (by Jana Zeineddine, License in Architecture)**

In the approach of visual distortion that we referred to in figure 7, work was done in the right of the figure to address all the gaps. So that architectural solutions and improvement of the quality of the building and exterior facades appear by adding some architectural elements such as wooden blocks that added a kind of stability and balance to the building and contributed to the formation of the ending on the roof. Also, the materials of the windows were unified where we noticed the designer's interest in unifying the size of these areas and openings organized to take a uniform shape. In addition, aluminum composite panels were added along with the wooden material with the same colors of wood to reduce the extent of heat while maintaining air entry.
Project 2: Two stories commercial - residential building

The second project (Figure 8) is a multi-service building with shops on the ground floor, a residential apartment on the first floor and a terrace on the second floor. It is surrounded by buildings over eight stories high. The building suffers from obvious architectural distortions and a lack of arrangement that constitutes visual pollution to the pedestrian. We start with the storefronts that are heterogeneous and lack the appropriate arrangement, especially with regard to billboards in terms of their heights, widths and relationship to the first floor, in addition to the lack of transparency in the display of goods and the lack of use of glass. The second problem relates to the structural aspect and is caused by the age of the building and the absence of maintenance periodically. Which led to cracks in the concrete on the facades, which poses a danger to public safety.

![The existing building](image1)

![After the architectural interventions](image2)

**Figure 8.** Before & After (by Lina Chrara, License in Architecture)

The third problem is the neglect of the maintenance of the exterior paint of the building and the poor implementation of the roof terrace on the second floor. Which increases the danger and finally the recurring problem faced by the designer is the electrical wires and air conditioners and its negative impact on people passing by.

The idea was to improve the conditions of the building and make it more orderable by taking some steps. Starting with the architectural intervention of the mass some added the necessary balance for the entrance block with the other block. Some architectural elements, including aluminum louvers and an extra concrete sunscreen, have been added to some green spaces and planting ponds under windows and terraces. Unifying the size of the windows and doors and adding glass to the handrail. Focus on organizing and unifying billboards to become clear and visible in a way that does not adversely affect the building, especially the residential apartment on the first floor.

Project 3: Multi-purpose Building

The third project is a multi-purpose building (Figure 9) in the city that contains shops on the ground floor, a large showroom on the area of the building on the first floor and apartments on the remaining four floors. The building suffers from random distribution of shops and we notice a difference in the heights of these facades and the lack of consideration of the external shape of the people passing by. The showroom on the first floor and the arches that distinguish it from the rest of the floors do not conform with the shape of the building and its identity and show that these arches are not in their proper place. The problem of the remaining floors is the incomprehensible breakage of the balconies and the unjustified distortion of the
middle block between the balconies. In addition, we note the presence of electrical wires that are randomly visible, and the exterior paint of the building is not maintained.

The designer was interested in working on merging the building with its surroundings where he relied on glass in the facades to get a kind of harmony. So, he adopted them in the facade’s shops on the ground floor and the showroom on the first floor by removing the archways and then treated the cracks in the balconies of residential floors and made its angles 90 degrees. The designer was able to connect the various balconies in the facades with a prominent architectural element of treated wood to give a balance to the block. On the other hand, he showed his interest in the environmental aspect where he focused on the development of a planting ponds in addition to hiding electrical wires and air conditioners from the façade.

Project 4: Heritage classified house

As for the fourth project, it is an archaeological house (Figure 10) under the protection of the Ministry of Tourism. It is worth mentioning that the house is uninhabited due to its poor condition, showing in the picture structural problems in the exterior facades and interior spaces. We will present some problems as the designer has performed a complete rehabilitation operation externally and internally. This type of building is usually characterized by a special architectural style and law that is different from other buildings. From here we can observe the disappearance of tiles from the roof, the disappearance of glass and wood for windows and doors. As well as, the poor construction of the building and the exterior cladding as well as the parking lot. The exterior staircase that leads to the first floor is demolished.
The designer focused on finding solutions to preserve the building's heritage identity, so most of the interventions were completely unchanged but to improve and arrange what was left of the building. Hence, the designer proposed the installation of tiles on the roof in accordance with the law on such buildings and equipped the windows and doors with the necessary glass and wood indicating his history and identity. Work was done to clean the outer cladding to not change the features and the parking lot of the building was attached and made a mass connected to each other. The designer clearly identified the entrance to the building and worked on arranging the outer spaces with green elements.

After reviewing projects of different uses, clearly the methodology of the work by discussing the problems and identifying them and then working to solve them for the sole purpose of improving the reality of the built environment.

6. Results

After reviewing some of the project models, it should be noted that these interventions have contributed significantly in improving the built environment and have found serious, adequate and inexpensive solutions in the context of the treatment of sagging, and dilapidated buildings.

Many positives at the social, economic and environmental levels could be easily observed. At the social level, it helps reduce social screening and proves the stabilization of population in these neighborhoods and raises their happiness index. At the economic level, it contributes in raising the real estate value, attracting investments and contributing to the revitalization of different sectors. At the environmental level, it contributes to the sustainability of the land, reduces the consumption of new lands and corrects existing visual pollution.

Therefore, this participatory methodology must be generalized due to the need to such approach. It is not only in Lebanon; it extends to the corners of the world. Thus, a specific framework must be created that simulates the requirements of the built environment and work to improve it and maintain it with the same methodology.

The study relied on different buildings as an experiment and a model, but it can be developed and worked at the level of streets and neighborhoods more broadly. Hence, it is necessary to benefit from the abilities of university students and volunteer them by allocating a subject that simulates improving these conditions in cities and appreciating ideas for municipalities and cooperating with them for the best interests of the "human".

Figure 10. Before & after (by Omar Mougharbel, License in Architecture)
7. Conclusions
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