

UNIVERSITY OF PÉCS

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**TOWARD RETHINKING THE ARCHITECTURE OF ADDICTION
CENTERS IN ALGERIA: THE EVALUATION OF LIGHTING
QUALITY AND ITS IMPACT ON PATIENT WELL-BEING.**

Thesis booklet

Doctor of Philosophy in Architectural Engineering

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Abstract

The thesis aims to study the relationship between the architectural elements of reception structures for people suffering from drug dependence and well-being through their behavior in these establishments.

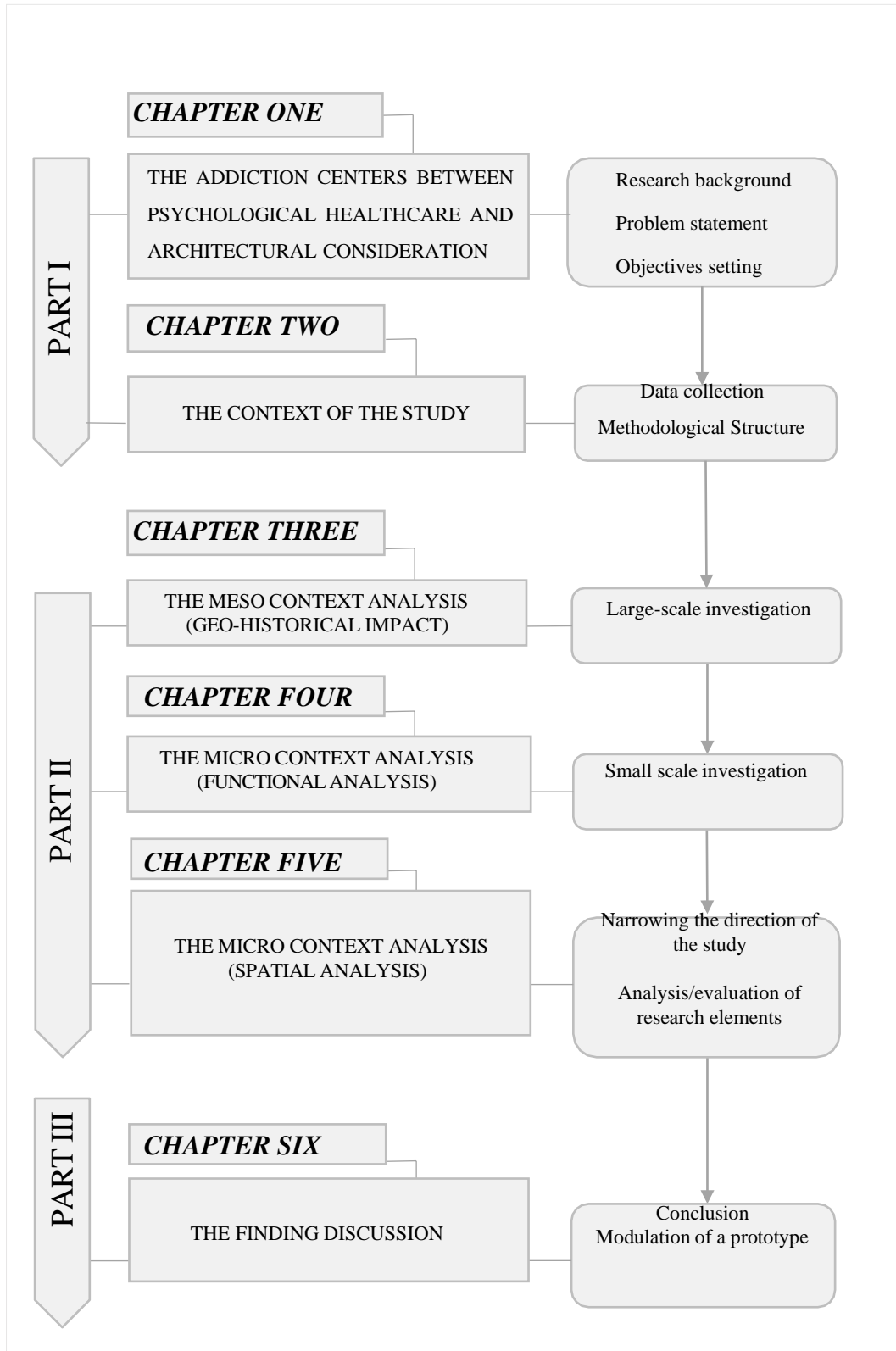
The methodology consists of considering the patient as an element contributing to the architectural quality decision in the establishment through an analysis of the spatial aspects of Algerian addiction structures and their influence on the patients' behavior. Based on a spatial quality/behavior correlation, it was noted that the architecture of drug addiction centers in Algeria follows norms and standards that favor factors other than the factor of well-being and visual comfort; this is due to the fact that detoxification establishments are included with the regulations of mental health establishments, and it lacks a protocol or manual concerning the interior architectural design of addiction centers in particular.

The spatial analysis steps of the research led to a gap in the quality of natural light, which indicates a remarkable impact on the behavior and the preference of specific spaces by the patients. As well as the artificial light marked a unified strategy which makes him indifferent to filling the gaps of natural light in these existing establishments.

After an analytical and evaluative process at drug addiction establishments' functional and spatial levels, the thesis proposes a triangular method. It derives a database on the principles of light design from previous research and relates it with the thesis's present functional and spatial findings, plus considering general security norms to have a specified protocol for addiction centers that takes patients as part in the conception process.

Keywords: well-being. Behavior. Addiction structure. Patients. Protocol. Spatial analysis. Natural light. Artificial light.

The organization of the research



1. The research challenges.

Despite all the studies, which present the critical influence of the built environment on the person's perception, drug addiction centers are little approached in architectural studies. Supposedly because it belongs to mental health establishments that the security conditions have eclipsed the comfort factors.

This study focuses on the physical quality of the built environment of drug addiction institutions and how it influences patients' visual perception and therefore affects their well-being and behavior in Algeria.

The aim is to change the reflection of the institutional appearance of drug addiction centers in Algeria while respecting other factors that can present obstacles, such as cultural factors and the psychological problem of the disease.

This study aims to analyze the factors influencing the built environment and the spatial quality of drug addiction centers and understand the functioning and psychology of patients within these institutions. And then make recommendations that serve to detach drug addiction centers psychological disorder appearance to provide a homely atmosphere while respecting safety norms of the institute.

The environmental psychology in mental health establishments, especially addictology centers, has much deficiency from several angles. The research is facing obstacles that may influence the methodology and treating the subject, which is listed in these restrictions:

- ❖ The age of studies on this topic.
- ❖ Treat the subject with a generality.
- ❖ lack of detailed and deep update on the subject.
- ❖ Lack of design methodology for this kind of institutions.
- ❖ The difficult psychological state of these addicts, especially in Algeria, makes it difficult to integrate them into the investigation.

2. Research questions

To respond to the main objective. The research is faced with several questions that will help trace the path of study and guide to an appropriate methodology to analyze the problem of drug addiction centers in Algeria and shed light on the imposing role of architecture on visual perception of patients and their well-being.

-Which architectural parameters may contribute to influencing the quality of the built environment of rehab institutions?

-How to prove the impact of the indoor spatial quality of rehab centers on the patients' well-being?

-How can the research correlate the spatial component to the visual perception to reach patient well-being?

-How to meet the imposing safety standards in psychiatric centers while providing a feeling of well-being and eliminating the institutional aspect in rehabilitation centers?

3. Objectives of the research

The research objectives revolve around answering questions that constitute the structure of this study and achieve its path as follows.

❖ Main objective

- Elicitation of recommendations and creation of a guideline for the scenario for addiction centers.

❖ Particular objectives

- ❖ The organization of the architectural data about drug addiction centers and the therapeutic program used within these institutions (according to the analyzed study cases)
- ❖ Approve that the indoor spatial quality of drug rehab centers can influence the patients' behavior (by analyzing the spatial element of the institutions, make comparison study, and interviewing the institution staff).
- ❖ Create a link between the functioning of services provided at the center and the emotional impression that must feel and perceive within. That can be realized by understanding the psychological part of patients, then collecting databases that link between the spatial component and their influence on visual perception.

- ❖ Collection of a database linking the type of functioning of the spaces, the emotion that should be engaged by these spaces, and the adequate lighting characteristics to create the desired mood

4. The methodological structure of the research

Understanding the relationships between the patient and the therapeutic setting requires identifying the environment that serves the development of this research and which is the internal space in order to be able to understand this complex interrelation. The study is based on considering factors that can directly or indirectly impact the perception starts from a meso-context to a micro-context.

The first part of the context is a factor impacting the frame's performance, and therefore indirectly, influences the quality of perception. The second context directly relates to the interior of the frame built between the physical elements and the behavior of the patients

The methodology of this research is based on a purely analytical system at the meso-environment level for the geo-historical analysis that this study considers as a primordial factor must be affronted before going to the physical environment inside the building. The method will practice a local investigation by collecting data and then a comparative study to bring out the imposing parameters which play a role in the performance of the rehab centers.

The micro-context is linked to the internal space, highlighting the direct relationship between the patient and his internal environment. This study divides it into two parts; Invisible/visible. The first part is the key to the investigation process. It focuses on the functional aspect of the building. It arranges a database that allows understanding the functional structure and framing the research path by unifying the relevant places and spaces that share the same activities in the various institutions to organize the future stages of studies. It also evaluates and redesigns the area according to its distinctive values.

The second part is interested in the visual element of the interior space on which this research focuses. The spatial analysis of this part is based on the evaluation (space/behavior) starting from a local investigation, an observation and interviews with the staff of the institutions, and then a comparative study between the study cases.

Following the spatial element determined previously for its imposing impact on visual quality. The research-oriented towards a cognitive aspect due to the obstacles faced with applying experimental concepts. This orientation is based on a complex analysis (function/impression) that begins with a fundamental understanding of space function, its characteristics, and impressions that place is supposed to make according to its use and the notion of the therapeutic environment. Then the analysis (impression / spatial characteristic) intends to integrate the spatial characteristics of the architectural element with the desired impression in the space to give it its adequate identity and provide visual comfort and therefore not propagate or increase more stress for patients due to standardization of space. This phase rests on an objective basis derived from others previous and proven studies and experiments. Therefore, this research must select them carefully according to

specific concepts to integrate them into space's critical needs.

Furthermore, to approve the steps and move from theory to practical approval for the effectiveness of this method, the studies are driving towards a numerical application and validation. This step responds to the need for practical application and the need to emerge the theoretical concept with the norm's decisions. So, the study can be referenced as the design recommendations for this kind of health facility.

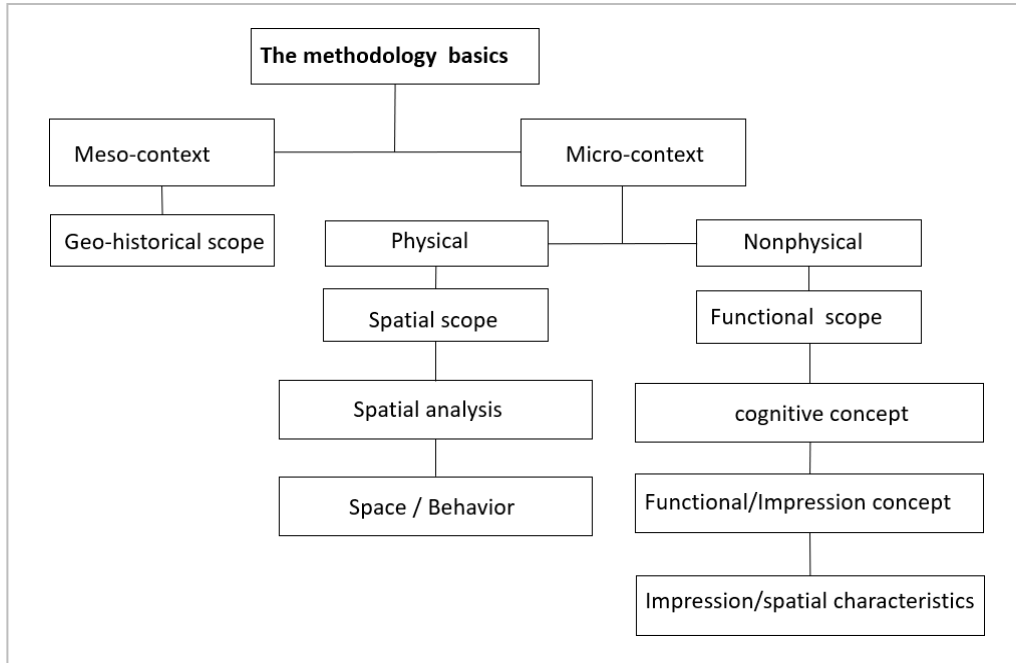


Figure. The methodological structure of the research

5. Scientific findings

1st theory

The historical factor of the establishment has a significant impact on the performance and frequency of drug addiction centers, unlike the urban context, which has not had a remarkable influence according to comparative research analyses.

Before starting the micro context analysis of institutions, it is necessary to examine other factors that can indirectly influence the rate of attendance by patients and, therefore, the performance of these institutions.

The historical analysis has shown the impact of the seniority of the establishment's performance

alongside the current occupation of the building itself, which is quite essential to improve the attendance at the institute. According to the analysis made and the testimony of employers, the function of the building is a sensitive topic for addicts, despite there are certain conditions for the hospitalization of drug addicts. Still, the patients do not agree to integrate into a unit not dedicated exclusively to addiction treatment that shared its function with psychiatry in the same structure.

2nd theory

According to the spatial and functional analysis, the addiction institutions experience a remarkable differentiation in the function of the structures, but this does not influence the treatment program and procedures. Therefore, I find out that the unification of the identification of the space according to their activities is the preliminary phase that leads to creating a clear, typical routine day of patients for the next spatial analysis process.

According to the functional analysis, the hospitalization center or the outpatient center has the same treatment system using the same functional program. However, some functions are not provided in the outpatient centers, due to their link with the accommodation services. Each of the functions classified as places of recreation is related to the fact that the patient stays inside the hospital and devotes his free time to activities that help him reduce anxiety and avoid isolation.

3rd theory

The classification of drug addiction institutions in Algeria as specialized centers with the same architectural regulations as the psychiatric institutions gives them a restricted appearance, negatively influencing its physical quality, thus patients' well-being. According to the evaluation of the openings based on the correlation space/behavior, the result shows, the more the area is responding to the need for outdoor connection and good daylight quality rated by BREEM, the area notes a high occupancy by patients.

The evaluation of the spaces of addiction centers shows the significant influence of the spatial quality on the patients' perception. That calls for reconsidering the design of addiction centers and their inclusion within mental health institutions that enter them in closed conception for security purposes, mainly since the medical aspect has settled the matter by classifying and diagnosing addiction as a chronic disease and not a mental illness.

According to the analyses conducted in this chapter, the thesis highlighted the importance of the

external environment in favoring patients, which emerged in the preference for spending time in the outer courtyard E01 and E02. Besides their preference for indoor places that provide connection to the outside and ensure visual satisfaction of the space where the daylight is enough. This deduction was made after noticing the preference rank of the play area E01 and corridor E02, which was not planned to be included in the research analysis. However, the attention is drawn to the gathering of patients in corridor E02 during free time, despite the presence of a dedicated place. Furthermore, the waiting area in the E03 is more connected to the outside due to the opening. The behavior of patients is completely different from the waiting area of E01 that has a noticeable lack in the level of lighting satisfaction. From here, it can be concluded that both the physical and visual connection with outdoor and natural lighting are responsible for an addicted patient's well-being. The regulations ignore these structures as they focus on the security aspect without considering the comfort of the patients' well-being.

4th theory

The unification of lighting strategy within all the studies cases rooms guides the thesis to evaluate its impact on improving the lack of daylight in the room. The comparative study shows that the occupation rate in the rooms is only related to daylight quality, and artificial light does not influence the strong or weak rate of frequency. That proves that the unification strategy strips the space from any impression related to its function and makes it indifferent.

A spatial layout method was performed to assess the existing quality of illumination that answers the effectiveness of statement four that suggests artificial lighting as a solution to improve spatial quality. The results showed the incapacity of the current artificial light to influence the frequency of the spaces. The answer for enhancing the spatial quality is to find a correlation that would link the lighting strategies with the emotional cognition of the patients, that will create an atmospheric space that meets the needs of each function and create domestic areas.

5th theory

Artificial light can be suggested as a solution for the existed cases study to correct the lack of visual comfort. That is carried out by focusing on the qualitative parameters formulating the visual quality of the illumination and the visual impact that each parameter can have on the impression that the patient should perceive. The process of the application and the validation of the results is orientated toward the Triangulation methodology that will include others statements' findings to support the research.

The previous chapter of the thesis focused on the daylight quality inside the room, without counting the artificial lighting contribution, for figuring out the daylighting sufficient and its influence on patients. Moreover, assessing the cases where the daylight was insufficient and even with the contribution of the existing artificial light of the institute could not fill in the lack of lighting quality to achieve the visual comfort, which was noticeable in areas of the institute, where

the daylight factor was low. The existed artificial light was unable to change the result spatial quality/ patient behavior.

So, in the cases tv room and bedrooms of the E02 when daylighting was insufficient, and the tv room case in the E01 when the daylight distribution was inadequate to the norms. the contribution of the existed artificial light had no positive effect on changing the results of patients' preferences.

The thesis concluded that the use of artificial light only to fill a gap or complete the visual task is not sufficient to achieve visual comfort and influence the preference of the space in a positive way.

So lighting is not just a standard calculation is a concept that occupants can perceive and be affected by its emitted atmosphere. Thereby the failure in lighting design might cause displeasure. That is also confirmed during the observation of the lighting design adopted in those spaces, where the institutions opt for the same lighting techniques in all the spaces, using institutional aspects.

As part of the objective of this thesis, which is to eliminate drug addiction centers from the institutional aspect, for a domestic aspect to improve the visual perception of patients, and provide a suitable environment that guarantees the comfort and well-being of patients, the strategy opted to use artificial light to complete the visual task and the visual comfort by using the qualitative aspect of natural light, which gives identity to the space and provides a domestic atmosphere.

6. The Findings discussion

The first results relating to drug addiction cure establishments in Algeria confirm that there are indirect factors that influence in the first place the overall performance of the establishment (the historical background and the functional mechanism). These two factors indirectly affect the flow of patients to the establishment, the more senior the establishment, the wider the field of attraction. Moreover, the functional destination of the establishment has shown in the first step a negative impact, where the admission of drug addiction with the mental disorder facility influences and narrows the spatial environment controlled by the drug addict patient. Therefore, it affects the acceptance of integration within the institution.

Decreasing the research scale to the objective of the thesis, which is the interior architecture of the establishment. Previous studies have already addressed the influence of the visual properties of interior space on the user. However, this study was limited to specific fields, and it was not extended to the field of drug addiction. Especially since the architecture of this institution in Algeria completely neglects the topic of improving the visual quality by involving the psychological aspect of the architectural characteristics of the space. This observation is made after collecting the architectural data of each establishment, where it noticed that there is unification in the use of materials, colors, textures. According

to the investigation, the health system in Algeria experienced three phases after the heritage of the French system, the 1962-1992 phase and then 1993-1995, and finally 1995 to the present day where hospital equipment is subject to international standards.

Therefore, no official protocol specifies the quality of materials and the internal quality of health establishments in Algeria, but only a standard protocol that focuses on the security aspect. These data raise questions about the relationship of patients to these places and the factors affecting this relationship. After the data classification, I made a limitation to the factor that appears the most different in each space and which may influence the visual quality by its properties, and which is the openings.

This element was evaluated according to its effect on the visual quality of places by analyzing daylight quality and connection with the external environment.

Daylight analysis adopted is based on the daylight factor; the method is used to assess daylight inside each room using Dialux software for calculation and BREEAM regulation for data interpretation.

The connection factor with the external environment is based on a visual and physical connection, where patients can have visual access and physical accessibility.

By projecting the spatial analysis results with the patients' behavioral survey, there is a correlation between the daylight quality and the continuity with the external environment in improving the spatial visual quality; therefore, the preference and the use of these areas were found by the patients. Furthermore, the absence of one of those elements can influence the occupation of the space inversely. This result proves that

- ❖ The current quality of space is not adequate for the well-being of patients
- ❖ There are no design protocols about natural lighting quality to follow to ensure an environment that responds to the need for visual comfort of patients in Algeria.

Joachim Teichmüller the founder of the Institute for lighting technology in Karlsruhe, pointed out that "artificial light can surpass daylight if it's applied purposefully in a differentiated way". This argument took the research into questioning the nature of the artificial light in the rooms of establishments and its effect on the physical quality of the place; what is meant here is the lighting design that gives the place different impressions according to its function

To investigate the effect of artificial light on the impression of different places, I categorized its elements in terms of quantitative and qualitative and selected the features that help the course of this investigation

by analyzing the behavior of these elements in each room to extract the logic and concept of exploiting artificial light. The results indicated that there is general uniformity in all rooms, regardless of their different functions, which means that the existing light aims only to provide a source of illumination for the visual tasks, with complete disregard for other aspects.

Projecting this artificial light analysis with previous natural light results showed that artificial lighting design within institutions does not enhance the emotional aspect of the space.

In the field of lighting and the advancement of research on perceptual psychology, the concept of artificial light has become no longer a quantity that provides simple visibility to objects but can be applied on the same set to create different impressions for time or even emotionally. That can significantly influence the visual quality of the space by giving it an identity appropriate to its function and therefore affects the user to assimilate all the information of this space without difficulty. Thus, generates visual comfort for him. Unfortunately, this research revealed that this concept is not yet applied to addiction rehabilitation centers, particularly in Algeria, where this study was carried out. It is still limited by international standards that include the architecture of addiction centers with the mental illness norms and the missing of defined protocols for interior finishing design, which showed in the results.

The study was based on the hypothesis that the physical environment of drug addiction centers could impact the behavior of drug-addicted patients in Algeria because of including it with architectural standards of the construction of mental illness without a specialized study on drug addiction. To investigate the hypothesis, the thesis was oriented for an analysis based on (spatial quality/behavior) which considers the patient as a 3rd part of the design. After an analytical and evaluative process, the research has pointed out results that lead to the following recommendation;

- ❖ In terms of the functional specialization of the center, it should be directed to the addicted category only and not collect any other psychological diseases that would affect the restriction of the functional program as is the case in the institution (E02).
- ❖ Organizing a protocol that ensures an appropriate quality of natural light in the rooms in relation to a visual connection with the external environment improves the interior spatial quality and, therefore, the well-being of patients.
- ❖ Relying only on ensuring the visibility of objects in space makes the area visible. However, it strips it from any emotional impression, which negatively impacts patients' well-being and thus their frequency to the space. After the research result, it is recommended to involve lighting design as

an element that can control the emotion of space to provide the appropriate impression for relaxation or stimulation according to each area's function. The institutional aspect resulting from the unification strategy will be excluded through the recommended method.

The emotional space is achieved by considering the qualitative elements that control the quality of the artificial light according to the activities that take place in each establishment. The method builds on the research finding of artificial lighting evaluation as a database to identify space requirements. Therefore, link it with a triangular method, including others' previous statements on lighting design plus the conditions and safety terms of drug addiction centers. In short, this method integrates the other statements studies about lighting design strategy through a triangular projection on these research findings and topic data to validate the recommendation.

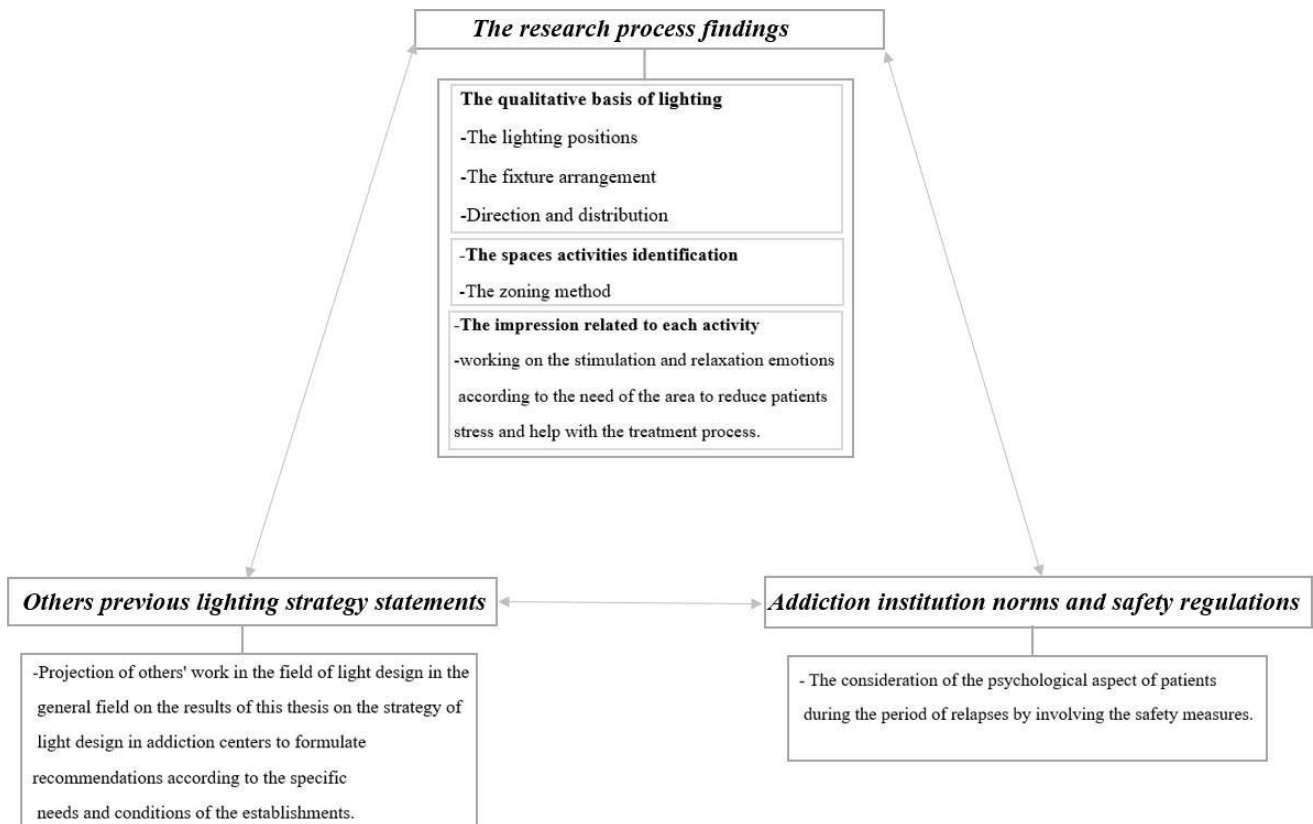


Figure. The resulting triangular method to validate the lighting strategy within addiction institutions

7. The research contribution

The thesis establishes an analytical method through which it treated the correlation between the physical space of rehabilitation institutions and the visual perception of patients. The results contribute to opening the door to rethinking the architecture of drug addiction centers by integrating the well-being of patients as an element of interest and not just including these establishments in standard norms and systems.

The dissertation constitutes a first step toward producing a manual of recommendations that frees the establishments of drug addiction from their institutional aspect due to the pure application of the norms and regulation that ignores the side of design.

The analysis process established in this research can be used as a qualitative approach to evaluation and the development of other criteria that can address the physical aspect of space in relation to user behavior.

