A Thesis Submitted for the Degree of Doctor of Philosophy in Architecture (Third Cycle, LMD)

The Socio-Spatial Integration of the Child in the Urban Space of Collective Housing

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Date: 07 /12 / 2023

Acknowledgments

I would like to express my gratitude to my family for being a great source of support and strength. Further, I would like to thank my supervisor Abida for her continuous support, thoughtful comments, and recommendations on this thesis.

Abstract

From the first human settlements until nowadays, the urban public space has been a primary motivation for creating and improving the quality of life for all categories of citizens. Due to its importance and central role in community life, its design, function, and use have become interesting topics. Children as an important and vulnerable category of citizens are spending their life more intensively within playgrounds, green spaces, and plazas of their housing neighborhoods as their first type of outdoor living environment. Thus, these open outdoor spaces in residential areas are highly important to children, because they provide different arenas for play activities as the most necessary function for children's self-expression and development. Despite the importance of open outdoor spaces in housing neighborhoods for the child category, the urban reality in the Algerian context is quite different. These spaces are characterized by being either overcrowded or completely deserted, anonymous, monotonous, limited, unsafe, and polluted. As a consequence, these environmental conditions and the low quality of these spaces tend to provide fewer opportunities for playing, recreating, and learning. Based on this hypothesis that children's outdoor activities are highly affected by the quality of the outdoor environment, a mixed methods approach is adopted to verify the assumptions and provide responses to the research question centered around quality and usage. The research methodology consists of a combination of qualitative and quantitative procedures combining direct observations, space syntax analysis, a survey by questionnaire as well as behavioral mapping. The results support our initial hypotheses and provide a comprehensive vision of the role that open outdoor areas in residential neighborhoods play in defining and shaping the children's outdoor activities through quality components that include play structures; vegetation and natural elements; accessibility and visibility characteristics, as well as safety; condition cleanness and maintenance; and diversity. Furthermore, the inexistence of appropriate play spaces for children within the neighborhood vicinity has become a common identity for the Algerian collective housing neighborhoods. These conditions are thought to be contributing elements that lead children to sedentary outdoor play, the return to street usage as a playground, and further encourage the decline of outdoor play. This study offers to decision-makers a perspective for rethinking and considering the open outdoor spaces in residential neighborhoods regarding the child category. Finally, this research suggests more related areas of interest that might be regarded as further research paths leading to gaining a better understanding of this child-environment relationship.

Keywords: Children, Large housing estates, Open outdoor space, Quality, Play Activity.

Résumé

Depuis les premiers établissements humains jusqu'à nos jours, l'espace public urbain a été une motivation essentielle pour créer et améliorer la qualité de vie de toutes les catégories de citoyens. En raison de son importance et de son rôle central dans la vie communautaire, sa conception, sa fonction et son utilisation sont devenues des sujets intéressants. Les enfants, catégorie importante et vulnérable de citoyens, passent leur vie de manière plus intensive sur les terrains de jeux, les espaces verts et les places de leurs quartiers d'habitation, qui constituent leur premier type d'environnement extérieur. Ainsi, ces espaces extérieurs ouverts dans les zones résidentielles sont très importants pour les enfants, car ils offrent de différents espaces pour les activités de jeu, qui constituent la fonction la plus nécessaire à l'expression et au développement des enfants. Malgré l'importance des espaces extérieurs ouverts dans les quartiers d'habitation pour la catégorie des enfants, la réalité urbaine dans le contexte algérien est tout à fait différente où ces espaces sont caractérisés par le fait d'être surpeuplés, ou complètement désertés, anonymes, monotones, limités, peu sûrs et pollués. En conséquence, ces conditions environnementales et la faible qualité de ces espaces tendent à fournir moins d'opportunités pour jouer, se récréer et apprendre. Sur la base de cette hypothèse qui suggère que les activités de plein air des enfants sont fortement affectées par la qualité de l'environnement extérieur, une approche de méthodes mixtes est adoptée pour vérifier les hypothèses et fournir des réponses à la question de recherche qui est centrée sur la qualité et l'usage. La méthodologie de recherche consiste en une combinaison de procédures qualitatives et quantitatives combinant l'observation directe, l'analyse de la syntaxe de l'espace, une enquête par questionnaire ainsi que la cartographie comportementale. Les résultats soutiennent nos hypothèses initiales et fournissent une vision globale du rôle que jouent les espaces extérieurs ouverts dans les quartiers résidentiels pour définir et façonner les activités extérieures des enfants à travers des composantes de qualité qui incluent les structures de jeux, la végétation et les éléments naturels, les caractéristiques d'accessibilité et de visibilité, ainsi que la sécurité, la propreté et l'entretien et la diversité. En outre, l'inexistence d'espaces de jeu appropriés pour les enfants dans le voisinage du quartier est devenue une identité commune aux quartiers d'habitat collectif algériens. Ces conditions sont considérées comme des éléments contribuant à conduire les enfants à des jeux extérieurs sédentaires, au retour à l'utilisation de la rue comme terrain de jeu, et à encourager davantage le déclin des jeux extérieurs. Cette étude offre aux décideurs une perspective pour repenser et considérer les espaces extérieurs ouverts dans les quartiers résidentiels en ce qui concerne la catégorie des enfants. Finalement, cette recherche suggère d'autres domaines d'intérêt connexes qui pourraient être considérés comme des pistes de recherche supplémentaires permettant de mieux comprendre cette relation enfant-environnement.

Mots clés : Enfants, Grands ensembles, Espace extérieur ouvert, Qualité, Activité ludique.

ملخص

منذ المستوطنات البشرية الأولى حتى يومنا هذا، كانت الفضاءات العامة الحضرية الدافع الأساسي لخلق وتحسين نوعية الحياة لجميع فئات المواطنين. نظرًا لأهميتها ودورها المركزي في حياة المجتمع، فقد أصبح تصميمها ووظيفتها واستخدامها موضوعات مثيرة للاهتمام. الأطفال بوصفهم فئة مهمة وضعيفة من المواطنين يقضون حياتهم بشكل مكثف داخل ساحات اللعب، المساحات الخضراء والساحات في الأحياء السكنية الخاصة بهم كنوع أول من البيئة المعيشة في الهواء الطلق. وبالتالي، فإن هذه المساحات الخارجية المفتوحة في المناطق السكنية مهمة للغاية للأطفال، لأنها توفر ساحات مختلفة لأنشطة اللعب باعتبارها الوظيفة الأكثر ضرورة للتعبير عن الذات لدى الأطفال وتطورهم. على الرغم من أهمية المساحات الخارجية المفتوحة في الأحياء السكنية لفئة الأطفال، فإن الواقع الحضري في السياق الجزائري مختلف تمامًا حيث تتميز هذه المساحات بأنها اما مكتظة أو مهجورة تمامًا ومجهولة الهوية ورتيبة ومحدودة وغير آمنة وملوثة. نتيجة لذلك، تميل هذه الظروف البيئية والجودة المنخفضة لهذه المساحات إلى توفير فرص أقل للعب والاستجمام والتعلم. استنادًا إلى هذه الفرضية التي تشير إلى أن أنشطة الأطفال في الهواء الطلق تتأثر بشدة بجودة البيئة الخارجية، تم اعتماد نهج مختلط للتحقق من الافتراضات وتقديم ردود على سؤال البحث الذي يتمحور حول الجودة والاستخدام. يتكون هذا النهج من مجموعة من الإجراءات النوعية والكمية التي تجمع بين المراقبة المباشرة وتحليل بناء الجملة والمسح عن طريق الاستبيان بالإضافة إلى رسم الخرائط السلوكية. تدعم النتائج فرضياتنا الأولية وتوفر رؤية شاملة للدور الذي تلعبه المناطق الخارجية المفتوحة في الأحياء السكنية في تحديد وتشكيل الأنشطة الخارجية للأطفال من خلال مكونات الجودة التي تشمل هياكل اللعب؛ النباتات والعناصر الطبيعية؛ خصائص إمكانية الوصول والرؤية، فضلاً عن السلامة؛ حالة النظافة والصيانة والتنوع. علاوة على ذلك، أصبح عدم وجود أماكن لعب مناسبة للأطفال داخل الجوار هوية مشتركة لأحياء السكن الجماعي الجزائري. يُعتقد أن هذه الظروف هي العناصر المساهمة التي تقود الأطفال إلى اللعب في الهواء الطلق بشكل سلبي، والعودة إلى استخدام الشارع كملعب، والتشجيع على تراجع اللعب في الهواء الطلق بشكل عام، اذ تقدم هذه الدراسة لمتخذي القرار وجهة نظر لإعادة التفكير والنظر في المساحات الخارجية المفتوحة في الأحياء السكنية فيما يتعلق بفئة المواطنين الأطفال. في الاخير، يقترح هذا البحث المزيد من مجالات الاهتمام ذات الصلة والتي يمكن اعتبارها مسارات بحثية إضافية تؤدي إلى اكتساب فهم أفضل لهذه العلاقة بين الطفل وبيئته.

الكلمات المفتاحية: أطفال، مجمعات سكنية كبيرة، مساحة خارجية مفتوحة، جودة، نشاط لعب.

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Acronyms

UN	United Nations
CRC	Convention of the Rights of the Child
UNCRC	United Nations Convention on the Rights of the Child
WHO	World Health Organization
PA	Play Activity
VPA	Vigorous Play Activity
MVPA	Moderate to Vigorous Play Activity
CIAM	Congres Internationaux d'Architecture Moderne
ZHUN	Zone d'Habitation Urbaine Nouvelle
UNCHS	United Nations Centre for Human Settlements
QCOSC	Quality Criteria for Outdoor Spaces for Children
KQCOSC	Key Quality Criteria for Outdoor Spaces for Children
IAOSU	Indicators for Assessing the Outdoor Space Usage
DPSB	Direction de Programmation et Suivi de Budget
EPLF	Entreprise de Promotion du Logement Familial
OPGI	Office de Promotion et de Gestion Immobilière
VGA	Visibility Graph Analysis
UCL	University College London
IBM	International Business Machines Corporation
SPSS	Statistical Package for the Social Sciences
HU	Housing Unit

General Introduction

Introduction

From the first human settlements until nowadays, the urban public space has been a primary motivation for creating and improving the social life for all categories of citizens, from the Greek agora, the Roman forum, the medieval squares, and the markets (Souq) of the Arab-Muslim cities to the public open spaces of contemporary cities. Due to its importance and central role within community life, the design, function, and use of the public open space become an interesting topic of discussion among scholars and researchers from diverse fields of study: political, social, architectural, urban planning, etc. However, in this research, we are interested in the public open spaces that belong to large housing neighborhoods, which include all the free spaces located in the proximity of housing buildings designed according to the urban planning ideologies of the modern movement.

Since the turn of the twentieth century, the problems that emerged from industrialization and crowded cities become a current concern for planners and architects. To cope with this crisis, new schemes began to be adopted mainly as urban sprawl and zoning. Therefore, cities began to experience modernist planning approaches that arose from the stage of modern economic development and western pioneered paradigms such as mass production, specialization, and standardization. These modernist concepts were developed, materialized, and managed mainly by modernist well-known architects such as Le Corbusier and his colleagues as well as institutions such as the University of Chicago School and through events such as the International Congress of Modern Architecture CIAM (Congres Internationaux d'Architecture Moderne) while excluding the role of the urban community.

The modernist ideology has generated placeless urban environments. Particularly after the national independence in the 1960s, the nationalist perspective on planning and architecture adopted an internationalist style. In Algeria, as encountered in many Western countries before, where the public open space has experienced further changes influenced by imported planning approaches. Therefore, every Algerian city today built new large housing neighborhoods (initiated by the ZHUNs in the late 70s then allocated within different formulas), which had a uniform layout with the identical organization of space and building blocks through a plot-based approach to development plans. Consequently, this modernist ideology has resulted in heterogeneous neighborhoods, place identity issues, monofunctional

and zoned land use, as well as physical and social segregation (Irving, 1993; Augé, 1995; Hanson, 2000; Natrasony & Alexander, 2005).

Anyhow, living in cities is still the most appealing choice for societies across the world where the modern vision of cities is changing under the influence of rapid urbanization. Therefore, the importance of cities has increased significantly over the centuries, and this current growth of urban populations is seen as critical to the future in many aspects. According to expectations, half of the global population (anticipated at five billion people) will be living in cities by 2025 (UNCHS, 1996). Hence, children in the majority of the world make up around 60 percent of the total population (Malone, 2017) while the urban open spaces play an important role in responding to children's functional, psychological, and social needs as well as in their development and educational process (Ibrahim et al., 2017). However, the development from the village and rural life to urban civilization has held both social and environmental consequences (Woolley, 2003).

The children's urban environment has been always a center of interest for many researchers and scholars, especially in design, architecture, landscape architecture, psychology, sociology, and geography fields. Nevertheless, these environments of children are not always conceived as children's environments, however in many cases, these places are designed for them by adults, or at worst they are the spaces left over from the adult world (Spencer & Blades, 2005 as cited in Valentine & McKendrck, 1997). Thus, this interest in children's urban environments has been gained from the adults' views and responsibility towards the child (Malone, 2001; Hart, 2013), as well as from their recognition of the need to promote and encourage the design of children's environments through the different policies and programs for children in the urban community (Moore et al., 1992 as cited in Bedimo-Rung et al., 2005; Lynch, 1977 as cited in Bakar, 2002; Chawla, 2001).

An increasing number of children are spending their life more intensively within the open spaces of housing neighborhoods. Accordingly, residential land use is the largest sector of the urban spatial structure and housing constitutes one of the most basic human needs and it is ranged in the second position after feeding (Omuta, 1986). Housing environments have been defined variously by different scholars including the structural characteristics of the external facilities that contribute to a conducive condition of living. Therefore, the urban home environment of the neighborhood is highly important to children as major users of the outdoor spaces and thus these spaces are supposed to provide significant areas extremely

related to their life patterns and different play activities as the most necessary function of children.

To provide environments that respect children's needs, there is a necessity first to understand these needs as well as their developmental requirements, then place them in specific cultural and socio-economic contexts. Within these urban open spaces, children can engage in their daily life's various activities and participate in social interactions, and share experiences. Described as rich and well-functioning once the quality of these spaces provides physical, sociocultural, cultural, and recreational opportunities as well as enhancing social interactions and a sense of community by providing comfortable, attractive, and active space as a consequence of the relationship between space and user as well as being notable points in neighborhood development.

Various research approaches have been used earlier to understand children's environmental use, behaviors, and impact as well as to evaluate the social interaction, experiences, perceptions, and values of the quality of different urban settings. Thus, these approaches are used to stimulate the truth about their needs, and preferences within the environment by employing many methods and techniques. Within the context of this research, the convenience and satisfaction of children in the residential open outdoor spaces and the reflection of these circumstances on the children's use of space and their interactions with each other will be investigated. This study investigates as well how the overall quality of these open spaces impacts the children's daily outdoor life in order to be able to provide better environments for children by finding out the best product for their needs and preferences.

Research Problem Statement

During the last few decades, sociologists, urban planners, and environmental psychologists have emphasized the increase in traffic mobility, the decrease in the number of public open spaces, and the decline in sense of community within the urban environment which makes our cities increasingly more difficult to live in. This progressive dehumanization of the urban space has impacted in particular the category of children. Children around the world face overcrowded, anonymous, unsafe, and polluted environmental conditions that provide fewer opportunities for learning, playing, and recreating.

According to this urban reality, the open spaces within the Algerian housing neighborhoods such as playgrounds, green spaces, and plazas have been previously criticized as mostly failing to serve their intended aims. In the study context of the city of Oum El Bouaghi in the east of Algeria, the nonuse of spaces, vandalism, and outdated facilities, as well as the associated social issues, are examples of problems commonly identified with open outdoor spaces at a national level. Outdoor spaces are always qualified as degraded, deserted, abandoned spaces, consequently, their use is reduced, and their appropriation by residents remains temporary (Naceur & Farhi, 2003; Mebirouk, et al., 2005).

The awareness about children as human beings rather than human becomings, children of now rather than being considered as future citizens (Valentine, 1997; Philo, 2000), motives the investigation of their place within the open outdoor spaces in large housing estates in the city of Oum El Bouaghi focusing on the spatial quality and its impact on the outdoor play activity in these areas. Therefore, the fundamental research questions of this work are:

- **How does the quality of open outdoor spaces in Algerian large housing estates influence and shape the children's everyday life through their outdoor play activities and environmental vicinity usage?**

To complete the previous questioning, additional sub-questions need to be developed as followed:

- **How can the child-environment relationship be perceived and identified?**
- **How to evaluate the quality of the open outdoor spaces in regard to the children's category?**
- **How to evaluate and quantify the children's outdoor usage and play activities within the open outdoor spaces in large housing estates?**

Research Hypotheses

The design and quality of open outdoor spaces are considered real urban issues for designers and users, more intensively for children among users. Accordingly, it is probable that the neighborhood characteristics and features such as the spatial configuration and layout which provide different aspects like visibility and accessibility; as well as the diverse facilities, furniture, and design elements in addition to the natural elements in the open outdoor spaces

in large housing estates are factors that influence the urban product and subsequently the children's needs, opportunities, spatial use and appropriation, social interaction, well-being, and satisfaction.

To investigate the problem stated earlier, this study is based on the following hypotheses:

- The physical quality of the outdoor spaces may affect and characterize the interactive relationship between children and the outdoor environment through outdoor play duration (attendance and presence of children within a specific area), different types of activities, and children's place preferences.

- The limited quality of the open outdoor spaces leads to limited opportunities for play activities and increases passive outdoor play. Therefore, it leads to outdoor play decline and accordingly to fewer prospects of development, and well-being.

Research Objectives

Understanding the relationship between children and the outdoor environment in an Algerian context introduces the question of the built environment's impact on young people and the characteristics of the interaction between them through the investigation of the spatial experience. This thesis attempts to combine spatial and behavioral dimensions into a single methodological framework based on acquiring data on children's patterns of behavior, correlated with various variables of spatial quality.

The aims of the research are summarized as the following:

Theoretical and Conceptual Framework

- To gain an overview in regard to the child-environment relationship
- To study the significant concepts related to children's outdoor activity.
- To understand the context of the Algerian urban space in residential areas.
- To review the current problems in planning and designing residential urban spaces for children within the Algerian context.

Investigative and Analytical Framework

- To understand and perceive children's everyday lives through the case of two different neighborhoods within the city of Oum El Bouaghi.
- To highlight the attention to the significance and impact of the physical surroundings on children's everyday life.
- To investigate how children use space, choose locations, and avoid others by understanding the correlation between environmental characteristics and spatial use.
- To inform possibilities to integrate the findings into children's urban planning and design process.
- To help promote better planning and design of children's environments.

Research Methodology

To examine the urban patterns of the open outdoor spaces in residential neighborhoods and their impact on children's daily activities subjectively and objectively, our research methodology is based on two main parts (Figure 1):

The first part is exploratory, it is devoted to a detailed display of the literature related to the various concepts and knowledge associated with the child, childhood, the open outdoor spaces in residential neighborhoods of large housing estates as well as an analysis of the general context of the city of Oum El Bouaghi as a representative sample of the Algerian context through its urban statistics, characteristics, and evolution including both studies of residential neighborhoods. This part aims to provide an understanding and a familiarization with these theories and perceptions to clarify all the research concepts connected to our topic and constitute the conceptual framework and the theoretical support of the study. It was accomplished by searching a set of databases from books, theses, journal articles, reports, and other sources. The online scholarly database resources included mainly Google Scholar, Web of Science, and Science Direct.

The second part is committed to the empirical study based on descriptive and analytical approaches (as a mixed-method approach) incorporating qualitative and quantitative methods. This part itself is divided into three sub-parts; the first one is the methodology for collecting the data varies from theoretical to empirical and experimental studies including quantitative and qualitative approaches. Subsequently, an analysis of both case studies using different tools (On-site observations, Space Syntax analysis, Questionnaire, and Behavioral

Mapping). Finally, a conclusion that incorporates a set of recommendations to inform possibilities to integrate findings into children's urban planning and design process to help promote better planning and design of children's environments followed by research limitations and further perspectives.

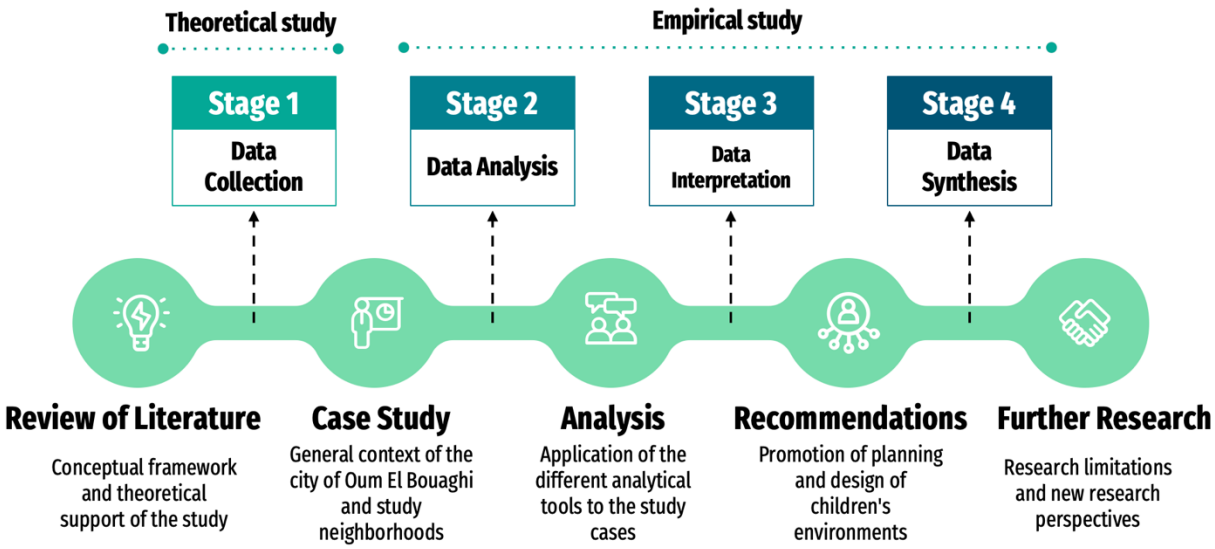

Figure 1 General research methodology framework (Source: Author).

Structure of the Thesis

This thesis is divided into two main parts which are also split into various chapters. A general introduction precedes the first part (theoretical part) followed by four chapters that illustrate the literature of review, the theories, and the study case presentation. The second part is an empirical illustration that includes two chapters followed by a general conclusion (Figure 2).

General Introduction introduces the receptacle of the research project and presents the research problem, it sets the hypotheses to be verified and the objectives to be achieved as well as the research methodology, and the structure of the thesis. This section aims to indicate the gap in knowledge concerning the open outdoor spaces in Algerian large housing estates and their impact on children's life.

Chapter One is relative to the Childhood Conception and Child-Environment Relationship, it offers an understanding of the different ways of seeing childhood and child as a life stage through needs, rights, and development across the different principles and areas in addition to the concept of play through its various definitions, theories, historical view, characteristics, and categories. This chapter explores as well how this informs our current

understanding of a child's development concerning the concept of place and the outdoor environment which is discussed in the third part. The concept of place is introduced as a step via which an understanding of the relationship between children and the urban environment is supplied. The outdoor environment is discussed mainly through outdoor play activities; spaces and places for play activities; natural elements; and children's outdoor play decline.

Chapter Two provides an overview of the large housing estates and their open outdoor spaces regarding the children category as a major element of social and political organization and a factor in the disparity between the public and the private space of life. The chapter is divided into two parts. The first part is an overview of the large housing estates through definitions, emergence, history, characteristics, problems, and criticisms. Subsequently, this section of the chapter highlights the concept of large housing estates in the Algerian context while the second part of the chapter focuses on the open outdoor spaces with an emphasis on the Algerian context. This chapter aims to provide comprehension of how these spaces are politicized, designed, precepted, and appropriated in addition to the produced impact of their characteristics and qualities, especially from children's point of view.

Chapter Three provides an insight into the concept of 'quality' and how it has been adopted within the field of outdoor environments for the child category. The first part of the chapter considers the current state of knowledge about the urban open outdoor spaces' quality regarding the child age group while the second part points to provide an overview of the notion of 'outdoor space usage' by them based on the outdoor environmental affordance and characteristics. This chapter discusses both theoretical and empirical issues regarding the correlation between 'outdoor spatial quality' and 'outdoor spatial usage'.

Chapter Four is planned to present the context of the study of this research, starting by presenting the city of Oum El Bouaghi, by addressing many data related to its location, and its historical, geographical, demographic, and urbanistic characteristics, followed by a presentation of the case studies; the open public spaces of the large housing neighborhoods of 420 housing units and 1500 housing units.

Chapter Five is devoted to the presentation of the research protocol, by proceeding to the different methods of analysis of the case studies using a mixed methodological approach. It outlines the different aspects of the research methods adopted in this thesis which integrate both children and the open outdoor spaces in residential neighborhoods. Various research

methods were used for data collection, measurements, and investigation concerning the children's interactions with their outdoor environment which helps to grow knowledge and understanding of this child-environment relationship

In **Chapter Six,** we proceed to the different findings resulting from the application of various methods of analysis for each case study using the various research techniques according to the qualitative and quantitative approaches to achieve our targeted objectives, which mainly revolve around the development of a set of recommendations related to the spatial quality, environmental characteristics and usage in housing neighborhoods to reorientate the impact of the physical surroundings and the correlation between these characteristics for children's everyday spatial use.

General Conclusion is interested in illustrating the conclusions that can be pulled from this research work where the essential findings of the thesis are submitted, emphasized, and discussed. Furthermore, this section will also deal with the potential of incorporating the results in improving the quality of outdoor urban spaces in residential areas to improve children's outdoor activity and provide better opportunities for play by recommending appropriate new approaches and practices. This section also discusses the limitations faced within the study and the different perspectives on further study outcomes.

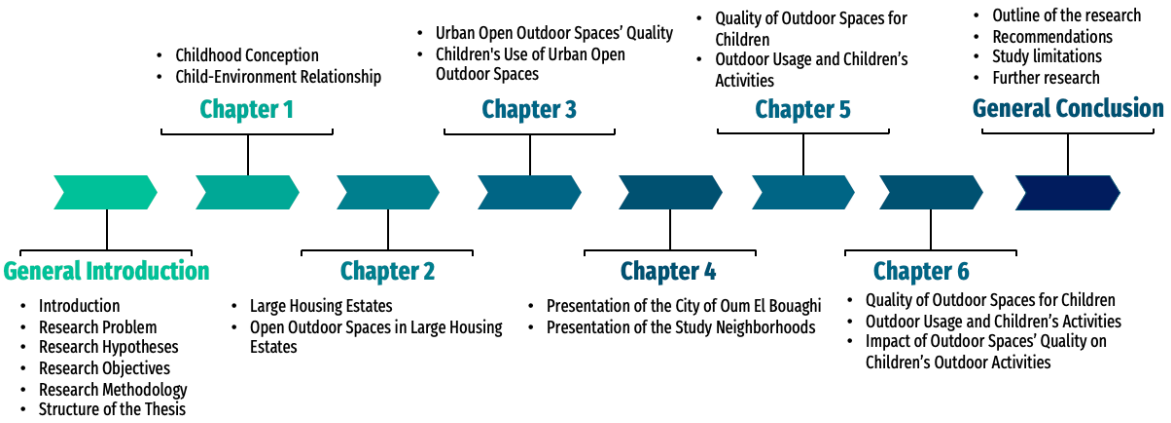

Figure 2 The general structure of the thesis **(**Source: Author).

Chapter I: Childhood Conception and Child-Environment Relationship

Introduction

There has been an increase in academic disciplines including psychology, anthropology, history, sociology, and social geography that investigate the concept of child globally during the past few decades. It has seen an increasing recognition of the importance of childhood as a stage of life that affects later adulthood while the fact that the way that childhood is experienced and lived clearly varies from one place to another. Given the cohabitation of new and traditional perspectives, childhood research is a complex area. Thus, this fact raises crucial concerns about what it means to engage with children's perspectives as a vast and interdisciplinary area that uses a variety of research methodologies.

As the concept of childhood represents one of the main variables within this thesis, considering all the aspects related to it from different perspectives and especially from an environmental one is required to provide a rounded image for our research context. As a result, this thesis's first chapter aims to provide a holistic understanding of the concept of childhood conceptualization followed by an understanding of the child-environment relationship.

This chapter is composed of two main parts. The first part considers the conception of childhood based on the research works of pioneers (such as John Lock, Jean Jacques Rousseau, Philippe Ariès, and Jean Piaget) and other highly significant ones (such as Hugh Cunningham, Colin Heywood, Sally Neaum, Kelly Weisberg and others). It deals with the concept of childhood as a complex entity that is required to be broken down into different under-concepts in order to reveal ambiguity and provide a clear understanding of the complex.

On the other hand, the second part of this chapter is interested in the child-environment relationship based on the understanding of the concepts of place and outdoors. This relationship between the child, places, and the outdoor environment is materialized through outdoor play activities. This part is based on the works of different academic researchers among them: Albert Ellis, Reginald G. Golledge, Kevin Lynch, Harold M. Proshansky and colleagues, Louise Chawla, Betty Hart, Robin C. Moore, Marketta Kytta, Jan White, Rhonda Clements, James F. Sallis and colleagues, Helen Tovey, and many others.

1. Childhood Conception

Over the two previous centuries, there was continuous progress in our understanding and perceptions of the concept of childhood in different disciplines. This progress has strongly influenced how the environment and society are constructed. In order to deeply understand the concept of childhood, the first part of the chapter aims to reveal the ambiguity related to this concept by highlighting its different definitions, historical evolution, as well as children's needs, rights, development, and activity.

1.1. Definitions

Childhood is a relatively new western concept, it is a familiar concept that tends to be universal (Dudek, 2014). The definition of the concept of the child refers to "the person who is in some fundamental way not yet developed, but who is in the process of developing" (Schapiro, 1999, p. 716). A child is a person whose age is between birth and puberty (Merriam-Webster's Collegiate Dictionary, 2022; Rathus, 2021), it is a person who has not attained maturity or the age of legal majority (Arnett, 2007). According to the Convention of the Rights of the Child (1989, p. 2), "a child means every human being below the age of eighteen years unless, under the law applicable to the child, the majority is attained earlier".

In the same context, Davin (1999, p. 15) noted, "We all know what we mean by child and childhood. Yet its properties are multiple and elusive; its limits elastic". However, the concept of childhood is defined as well by the historical, cultural, and economic contexts in which it occurs, and it considers the different experiences of children across the world, it is still difficult to provide a universal definition. As a result, the concept of childhood is a negotiable notion (Farley & Garlen, 2016).

As children's conception and mental processes are different from those of adults, the conceptualization of childhood is a different and distinct stage of life from adulthood. Neaum (2010) claims that "children were conceptualized as being in a more primitive stage of development than adults both biologically and socially" (p. 7). Furthermore, as a part of the childhood terminology, Kail (2015, p. xvi), provided several terms are used to refer to the different periods of childhood, and each term indicates a specific range of ages: Newborn (from birth to the first month); Infant (from the first month to the first year); Toddler (from the first to the second years) Preschooler (from the second year to sixth years) School-age

child (from the sixth year to the twelfth years) Adolescent (from the twelfth to the eighteenth years). However, for the purpose of this thesis, the term ‘children’ includes mainly the age range of 6–12 years (School-age children).

1.2. Emergence and Historical Evolution

The evolution of the concept of childhood had occurred gradually over the centuries. Children have long been constituted as an invisible part of society, as Tucker (1974) notes: "Children were at the bottom of the social scale" (p. 231). However, now, childhood became a valued social status while “recognition of childhood, as a separate stage of life, is a modern development (…) emerged only in the eighteenth century” (Weisberg, 1978, p. 43). These evolutions and changes in the concepts of child and childhood have continued through to the present day.

In medieval times and long before, children have long constituted an invisible force in history (Weisberg, 1978, p. 43), they were regarded as little adults, and there was no distinct phase of life admitted as "childhood". In Western countries, by the seventeenth century, the concept of childhood started to emerge, heavily influenced by the work of the philosopher John Locke (1632–1704) whose ideas about learning and education support the idea of distinguishing between adults and children. Similarly, the ideas of the philosopher Jean Jacques Rousseau (1712–1778) have encouraged the reflection on childhood and children's ways of learning, growing, and developing (Neaum, 2010, p. 6).

Nevertheless, the history of childhood officially begins with the French journalist, essayist, and historian Philippe Ariès, in his famous book " Centuries of Childhood: A Social History of Family Life" while its original title is "L’Enfant et la vie familiale sous l’Ancien Régime" first published in 1962 (King, 2007). It is a historical study devoted to the family's evolution and the child’s place in society, mainly from the Middle Ages to modern times (Ulanowicz, 2016). Since the 1960s, all of the studies related to childhood in the Middle Ages, have had a common starting point from the claim of Ariès (1962) that "in medieval society, the idea of childhood did not exist" (p. 125).

In the past years, the understanding of the historical changes in childhood has been highly influenced by the work of Philippe Ariès (Thane, 1981). His theory of childhood was the platform for numerous works (such as Hunt, 1970; De Mause, 1973; Shorter, 1975; Flandrin,

1979; and Traer, 1980) that followed, in the first stage from the mid-1960s through the mid-1980s. The next phase in the history of childhood extends from the early 1980s to the present day where the ideology of childhood had become a powerful force in middle-class Europe and North America (Cunningham, 1995).

Childhood has been constituted through various historic research works, the main in order of date of publication are those by John Sommerville (1982) "The Rise and Fall of Childhood" (from antiquity to the present); Hugh Cunningham (1995) "Children and Childhood in Western Society since 1500" (the period from 1500 to the present); and Colin Heywood (2001) "A History of Childhood" (the period from medieval to modern times) (King, 2007). This ideology has provided a conviction that how childhood was lived is crucial in determining the kind of adult that the child would become as well as highlighting childhood's rights and privileges.

1.3. Children's Needs

To develop their full potential and grow into participating and contributing adults, children's physical, emotional, social, and intellectual needs must all be fully met (Pringle, 1986). In his hierarchy, Maslow (1998) detailed the five basic needs of all humans (Prince & Howard, 2002; McLeod, 2007). These five basic categories of needs are briefly outlined in this section. As Maslow has emphasized through the concept of the pyramid, the lower level of needs must be fulfilled before a higher level of needs is even perceived (Maslow, 1998). However, this fulfillment of needs must be at an optimal level because exceeding may also be harmful (Pringle, 1986).

1.3.1. Physiological Needs

The first level of basic needs identified by Maslow is the physiological needs, these are biological needs including life-sustaining necessities such as oxygen, food, clothing, and shelter. The physiological needs should be relatively easy to fulfill, however, if these needs are not satisfied the human body cannot function optimally. These physiological needs are the basis of a person's search for satisfaction. Maslow considered physiological needs as the most important priority compared to the rest of the needs until this category of needs is met (Maslow, 1943; Prince & Howard, 2002; McLeod, 2007; Huitt, 2007).

1.3.2. Security and Safety Needs

In the case physiological needs are well satisfied, then a new set of needs emerges which is the safety needs (Maslow, 1943). "The need for safety includes security, stability, dependency, protection, and freedom from fear, anxiety, and chaos" (Elton, 1996 as cited in Prince & Howard, 2002, p. 29) as well as remaining out of danger (Huitt, 2007). Compared to adults, children display more signs of insecurity and the need to be safe (Drinnien et al., 1987).

1.3.3. Belongingness and Love Needs

Once the two previous categories of needs are fulfilled, the next category (needs for love, affection, and belonging) emerges. Children who receive sensitive and reliable care, affiliate with others, and acceptance, friendship, intimacy, and trust during the early years of their life can develop successful and secure relationships (Maslow, 1943; Drinnien et al., 1987; Prince & Howard, 2002; McLeod, 2018). This social need for interpersonal relationships motivates the children's behaviors (Huitt, 2007).

1.3.4. Self-Esteem Needs

Everyone has a need or desire for a high evaluation of themselves, for self-respect, or self-esteem, and the esteem of others. Maslow indicated that the need for respect or reputation is highly important for children and adolescents and precedes real self-esteem and dignity (Maslow, 1981). According to him, (1943), "these needs have been relatively stressed by Alfred Adler and his followers, and have been relatively neglected by Freud and the psychoanalysts" (p. 382).

1.3.5. Self-Actualization Needs

Self-actualization is the fifth category of needs addressed by Maslow, it suggests what people are capable of being, and what they must be to maintain their self-esteem, realize personal potential, self-fulfillment, and seek personal growth, and peak experiences (Prince & Howard, 2002; McLeod, 2018). This specific form of needs will vary greatly from person to person (Maslow, 1943). Low self-esteem is related to many developmental problems (Baumeister et al., 2003). Children with low self-esteem are more likely to have problems with peers being "socially withdrawn children" (Rubin et al., 2009, p. 155); more prone to

psychological disorders such as depression (Boden et al., 2008); more likely to be involved in bullying, aggressive behavior, and criminal activity (Donnellan et al., 2005; Trzesniewski et al., 2006); and more likely not to succeed in school (Marsh & Yeung, 1997).

1.4. Children's Rights

Before the nineteenth century, the prevailing jurisprudential emphasis considered the child as property. Consequently, children could be sold, abandoned, abused, and mutilated with impunity (Weisberg, 1978, p. 45). Although, the evolution of children's social status was a fundamental precondition for the development of the modern legal notion that children are juristic persons, having rights and duties. Whereas, child labor, malnutrition, and high infant mortality were the main motivations for the elaboration of the children's rights charts. The successive statements on children's rights, from The Geneva Declaration on the Rights of the Child (1924), through the UN Declaration on the Rights of the Child (1959), to the Convention of the Rights of the Child (CRC) of 1989, have materialized and given support to western ideas about the concept of childhood (Marshall, 1999).

In 1989 the UNCRC established children (under 18 years old) as 'rights-holders' in every aspect of their lives (Young et al., 2012). The United Nations Declaration of the Rights of the Child has emphasized children's needs, affirming the obligation of having necessary means requisite for their normal development both materially and spiritually (Kerber-Ganse, 2015), ensuring food, nursing, assistance, shelter, and succor for the orphan and abandoned (Kilkelly & Liefaard, 2019). The UN Convention on the Rights of the Child is the key legal instrument that is spread to the world wild for the recognition of the human rights of children (Cantwell, 2016).

This Convention of the Rights of the Child consists of three sections. The first one (Section I) contains the substantive articles (Arts. 1–41); The second one (Section II) consists of provisions relating to reporting and monitoring of the implementation of the Convention of the Rights of the Child by a Committee of independent experts known as the CRC Committee (Arts. 42–45); and the third one (Section III) concerns the ratification of the CRC, reservations and amending (Kilkelly and Liefaard, 2019). The Convention of the Rights of the Child Committee has categorized the different articles of the Convention into a total of eight clusters to facilitate reporting on the implementation by States Parties as follows: (1) General measures of implementation; (2) The definition of the child; (3) General

Principles; (4) Civil rights and freedoms; (5) Family environment and alternative care; (6) Basic health and welfare; (7) Education, leisure, and cultural activities; and (8) Special protection measures (CRC Committee 1991; 1994 as cited in Kilkelly & Liefaard, 2019; Šahović et al. 2012).

1.5. Children's Development

The child's development is holistic, it occurs simultaneously, where all of its aspects are interrelated and interdependent (Neaum, 2010, p. 41), and also cannot be understood by investigating separately each aspect of the context (Stattin & Magnusson, 1996). In order to understand the notion of development, different principles and areas of children's development will be exposed based on the works of Neaum, 2010; Bruce et al., 2012; and Rathus, 2021.

1.5.1. Principles of Child Development

Children's development has multi-determinants through biological and social factors (the context identified by culture, community, family, and peers), it occurs as a result of their lives and experiences. This development occurs in a predictable sequence and direction regarding the pace of progress, which is viewed as a network of knowledge and skills rather than a linear progression (Bruce et al., 2012). In addition, Neaum claimed that the development follows also the logic that respects the order from simple to complex, from general to specific, from head to toe, and from inner to outer.

Additionally, she mentioned that children's development is cumulative, it begins before birth and continues then. This accumulation of the different experiences from each stage is used as a basis to reinforce the next one. Furthermore, Neaum claimed that children's development is characterized as well by individual variations in the rate of progress from one area to another and from one child to another (pp. 42-43).

1.5.2. Areas of Development

In order to scrutinize the concept of 'child development and understand its holistic dimension and its different components, this section covers the different areas of development (Physical, Cognitive, Language, Emotional, Social, and Spiritual). These areas do not grow separately from one another, however, there is an overlap and interconnectedness between

them (Neaum, 2010). When children learn something related to one area, it systematically impacts the other ones. As Archer and Siraj claimed, "children do not differentiate between thinking, feeling, and moving because the mind and body are inextricably linked" (2015, p. 5).

1.5.2.1. Physical Development

Physical development depicts the advance of the child's control over his body. It is the most straightforward aspect of development to observe and measure. This advance is characterized by an increment in aptitude and complexity in activities' execution. Physical development proceeds in a set order, with simple behaviors being fine motor skills (for example: using hands and fingers) occurring before more complex skills being gross motor skills (all body movements). Physical development is related to the child's self-esteem by creating a strong sense of purpose and self-fulfillment. Children learn how to interact and cooperate with other children by participating in team sports and other activities (Neaum, 2010; Bruce et al., 2012).

1.5.2.2. Cognitive Development

Cognitive (called also Intellectual) development is interested in the construction of thought processes. It concerns the development of conceptual and conscious thought, memory, problem-solving, imagination, and creativity (Neaum, 2010, p.48). Intellectual development cannot be separated from all the other areas of development, because thinking is social, emotional, physical, and cultural, and it involves the moral and spiritual aspects of development (Bruce et al., 2012). Cognitive theorists (Mainly Jean Piaget 1896–1980) focus on children's mental processes by investigating how children perceive and mentally represent the world, and how they develop their thinking, logic, and problem-solving ability (Rathus, 2021, p. 18).

1.5.2.3. Language Development

Language is the main key to communication exclusive to humankind (Neaum, 2010). From their birth, children begin to communicate with the world around them through sounds and body language (Levine & Munsch, 2018). Language development begins even before when the child uses his first word, thus many things happen in a child's prelinguistic babblings long before true speech is heard which have important developmental significance

(McCarthy, 1954 as cited in Di Vesta & Palermo, 1974, p. 57). Children's language develops through a series of identifiable sequential stages. This progress depends on several factors such as age and experience of language in the environment where they grow and learn (Neaum, 2010).

1.5.2.4. Emotional Development

According to Neaum's (2010, p. 54) viewpoint, emotional development is the growth of a child's capacity to feel and describe their emotions appropriately (emotional responses to oneself and to people). Within this development, children are better able to control their emotions, pay more attention to their surroundings, and develop assured relationships in ways that contribute to their own and others' well-being. Children learn and develop their emotional skills by getting on with other children, making friendships, sharing, and intercommunication (Salisch, 2001; Dowling, 2014). A variety of emotional states can appear in children in different situations and contexts through positive or negative emotions such as Disgust, Fear, Anger, Sadness, Shame, Guilt, and Pride (Damon et al., 2006, p. 229).

1.5.2.5. Social Development

"Social development is the growth of a child's ability to relate to others appropriately within the social context of their life" (Neaum, 2010, p. 54). Social development consists of the development of children's knowledge about the social world. It concentrates on the child's comprehension of the relationship between the self and others (Rathus, 2021). The fundamental factor of social development is the capacity to assume the role or perspective of another person (Bengtsson & Arvidsson, 2011; Killen & Smetana, 2015).

1.5.2.6. Spiritual Development

Spiritual development in children " is the process of growing the intrinsic human capacity for self-transcendence, in which the self is embedded in something greater than the self, including the sacred" (Benson et al., 2003, p. 205), it "includes religious beliefs and practices, as well as personal codes of conduct and the quest for inner peace" (Bruce et al. 2012, p.518). It is the motor of development that drives the quest for connectedness, meaning, purpose, and contribution. It is materialized both inside and outside through religious traditions, beliefs, and practices (Benson et al., 2003).

1.6. Children’s Play Activity

Children’s activity is exposed through play which is a concept closely related to the child category. Regarding the importance of the concept of play in children’s development and well-being, it requires to be explained and illuminated. During this section, the concept of children’s activities through play will be considered according to its different definitions, historical perspectives, characteristics, levels of exercise, and importance via the relationship with the child's development.

1.6.1. Definitions

Play is a very large term pointing to a variety of activities and experiences, considering all humans ages, especially children. There is no simple definition of play, its meanings, beliefs, and understandings vary significantly and cover a vast domain. Philosophers, theorists, psychologists, and educators have been investigating the topic of play and its context for centuries according to experimentation and personal beliefs. Froebel (1887) has defined play as "the highest phase of child development (...) the most spiritual activity of man at this stage (...) gives joy, freedom, contentment, inner and outer rest, and peace with the world. It holds the sources of all that is good" (pp. 54-55). Later, Huizinga (1955) defined it as "a free activity standing quite consciously outside 'ordinary' life as being 'not serious' (...) connected with no material interest (...) proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner" (p. 13). While Freud (1961) defined it as follows: "children repeat everything that has made a great impression on them in real life, and that in doing so they abreact the strength of the impression and, as one might put make themselves master of the situation" (p. 11). On the other hand, Erikson (1963) claimed that "Play, then, is a function of the ego, an attempt to synchronize the bodily and the social processes with the self" (p. 211). However, according to Vygotsky (1967) "Play is not the predominant form of activity, but is, in a certain sense, the leading source of development" (p. 6). He does not always consider play as a pleasure activity because it is "often accompanied by a keen sense of displeasure when the outcome is unfavorable to the child" (1978, p. 92). Montessori (1967) regarded play as children's work "He becomes a man by means of his hands, by means of his experience, first through play, then through work". (p. 37). Although, Piaget (1962) through cognitive vision defined play as "primarily mere functional or reproductive assimilation" (p. 87).

Then, contemporary researchers have investigated and used traditional definitions and theories of play as an essential and critical part of all children's development (e.g., Michalopoulou, 2001; Ailwood, 2003; Clements, 2004; Stagnitti, 2004; Else, 2009; VanFleet et al., 2011; Eberle, 2014; Pyle & Danniels, 2017; Wasik & Jacobi-Vessels, 2017; Lai et al., 2018). Research into play has also been framed in ways that highlight the range of cross-cultural contexts that which the complexity and richness of the activities of children can be exposed.

1.6.2. Historical Perspectives

It is important to study the historical views on children's play to understand the foundation of early theories and their evolution for the purpose of using them as a basis for comprehending the relationship between children and the urban environment. In this section, children's play in ancient Greece and Rome; children's play in the medieval period; and children's play in the pre-modern period will be briefly discussed.

1.6.2.1. Children's Play in Ancient Greece and Rome

The notion of children's play dates back to antiquity, even before classical Athens and Greece. Archaeological excavations in ancient China, Peru, and Egypt have revealed drawings of various play scenes and toys such as dolls, rattles, and other pottery and metal toys (Frost, 2010). The importance of play has always been seen as an educational process for young children (D'Angour, 2013). Therefore, Greek and Roman Antiquity are firmly rooted in the rules, on the ground, in the forum, in the baths, in the theater, or on the steps of a temple, everyone is playing, even their Gods (Berger et al., 201). According to Golden (1990), children's play was based on productive aims such as helping to improve skills and to prepare for future professions (such as building or teaching... etc.).

1.6.2.2. Children's Play in the Medieval Period

As mentioned earlier, the medieval child was considered a small adult, and childhood was unknown until the end of the Middle Ages (Aries, 1962). During the Medieval and Renaissance period, aristocratic children played with toys (small objects such as marbles and balls of various materials), played on musical instruments, danced, learned to sing, practiced archery, played cards, chess, horseback riding, hunting, and fencing (Heywood, 2001; Orme, 2001), while poor children were sent back to school or to serve in other people's homes

(Frost, 2010). Many children in the medieval period were abused, whether by family members, schoolmasters, or employers of child laborers.

1.6.2.3. Children's Play in the Pre-modern Period

Jean-Jacques Rousseau (1712-1772) was a colossus among philosophers during the eighteenth century. His book "Emile, Or Treatise on Education" (1762) was a strong tool for initiating the child's education which was initially centered in the family and conducted in harmony with the nature of the child and guided by its characteristics. According to him, the most significant and valuable rule in education was "not to gain time, but to lose it." In his classic product, Rousseau made his case for play, leisure, and the growth of strong, healthy bodies. Further, he rejected the typical perception of adults toward play that play was practically doing nothing, and preferred children's natural running, jumping, and engaging in festivals, games, singing, and entertainment (Frost, 2010).

1.6.3. Characteristics of the Play Activity

Researchers agree about the existence of several characteristics that comprehensively describe the play activity and distinguish it from other behaviors. Play can be also defined, explained, and recognized by its characteristics (Frost, 1992; Pellegrini, 2011). According to several scholars and researchers such as Rubin et al., (1983); Schaefer (1993); Wood and Attfield (2005); Kernan (2007); Fleer (2009); Gray (2013), and Biddle et al., (2013), and many others, the key characteristics of play are identified as bellow:

Pleasurable. Play is a source of pleasure that expresses joy, a sense of humor, and excitement (Froebel,1887; Groos, 1911; Huizinga, 1955; Garvey, 1974). Children obtain pleasure when they materialize their ideas and share them with peers (Rubin et al., 1983). However, play may not always be a positive experience. Sometimes, it can expose the child to various risks such as being hurt, bullied, or marginalized (Kernan, 2007).

Active, Free, and Spontaneous. Play requires the player's individual active involvement through physical, verbal, and mental engagement with people, objects, or ideas (Piaget 1962; Klinger 1971 as cited in Hall, 1979; Garvey 1974; Kernan, 2007). Play may be physically active, using bodies, or may also be a mental activity, such as in a dramatic play or play with words where children explore the environment around them and engage in communication

with peers and people around them (Biddle et al., 2014). Often both physical and mental activity are involved simultaneously (Kernan, 2007).

Symbolic. Play is a simulative, unreal, symbolic behavior where children involve elements of make-believe, pretend, and imagining where people, objects, and ideas may be treated otherwise and used as symbols for other people and other objects. It is a process of transforming reality into symbolic representations of the world that aims to experiment with the rules of serious life, and create new ideas, feelings, and relationships (Sutton-Smith 1967; Fein, 1981; Frost, 1992; Kernan, 2007).

Meaningful and Self-directed. The play reflects the children's knowledge, understanding, and skills about real-life's phenomena, it is related to their real and meaningful experiences. Play provides as well an arena for building and developing knowledge and skills (Kernan, 2007). Playing is based on the activity itself rather than its outcome, it is structured and established by children to meet their needs and desires defining the characters, events, objects, locations, and actions of the game (Froebel 1887; Groos 1911; Huizinga 1955; Piaget 1962; Bruner 1972).

1.6.4. Play Activity and Child Development

All areas of a child's development previously mentioned can be simulated through play. Concerning physical development, play involves very often a physical activity because it is closely related to the development and refinement of children's gross and fine motor skills and body awareness. As children energetically and joyfully use their bodies in physical exercise, they simultaneously refine and develop skills that allow them to feel physically secure and self-assured (Isenberg & Quisenberry, 1988). For the purpose of understanding spatial relationships, children must understand firstly their own body position and size, through movement. This movement is at the heart of children's physical development and is inextricably linked to other areas of learning.

Furthermore, cognitive development occurs rapidly during the preschool years. Neuroscientists have found in their experiments that learning in terms of cognition, memory, and behavior occurs through physical activity (Archer & Siraj, 2015). In these years, children have more opportunities to explore the environment and learn new information. Preschool children are distinguished by their pre-operational thought, they have moved from the

restrictions of the sensorimotor approach in understanding their world to one of symbolism and intuitive thinking. Therefore, play is regarded as very necessary for cognitive development and a child's learning (Piaget, 1962; Ellis, 1973). According to researchers, preschoolers who spend more time engaged in play are the most advanced in intellectual development (Pepler & Ross, 1981; Frost et al., 2012).

Piaget's cognitive-developmental theory, Erickson's psychosocial theory, and Vygotsky's sociocultural theory have significant contributions to figuring out the relationship between play and social and emotional development (Lam, 2018, p. 25). Understanding how to communicate, share, make friends and get along with others in the first six years is carried out with more ease through play activities (Frost et al., 2012). During this period, children become more autonomous, they understand themselves as individuals and as part of a social world, in this stage as well, they understand how to fit into their family and a group of friends (Dyson, 1993). Through play activities, children learn rules of behavior, facial expressions of others, and expressions of their own emotions, such as fear, sadness, anger, and happiness (Archer & Siraj, 2015). As result, some important characterizations of social and emotional development are developed such as self-concept, self-esteem, self-regulation of emotions, and social competence (Houck, 1999).

2. Child-Environment Relationship

Before discussing the relationship between children and the outdoor environment, it is necessary in the first place to identify and simplify this relationship through the understanding of the concept of "Place". Subsequently, the child-environment relationship will be considered through the children's outdoor play activities.

2.1. Child and the Concept of Place

In order to understand the concept of place in correlation with children, and to deliver an understanding of the "children's self-identity" from the physical-setting properties, in other words, to understand how the physical-setting properties are significant in the growth and development of the child, this section provides firstly some definitions of the concept, subsequently, an overview of children's experience of place as a way of understanding the physical space. Furthermore, place identity and place attachment during childhood will be discussed. These early explorations (the relationship between "child" and "place") play an

important role in how children learn about the world around them. Hence, this section of the second chapter responds to the following question: How does the child understand (meaning, purpose) the form and structure of the physical environment as a part of self-identity? Here, the identity of oneself is seen through the needs in terms of space (spaces to exercise different activities).

2.1.1. Definitions

In the guise of definitions, Brey (1998, p. 240) suggested that place can be understood as “an area or space that is a habitual site of human activity and/or is conceived in this way by communities or individuals”. Moreover, academic human geographers consider "space" as an abstract concept while "place" is a space with meaning (Gardner et al., 2007, p. 5). Defining and creating a "place" from a “space” result from humans investing meaning in the space they spend time in (Williams, 1995; Ellis, 2005; Helfenbein, 2006). A given physical locality becomes a "place" when human cognition creates and attaches meaning to it (Relph, 1976). In contrast with the abstract nature of space, "place" is the result of experiences “from the inside, the resonance of a specific location that is known and familiar” (Lippard, 1997, p. 7). According to Brey (1998) "Place is lived, constructed, interpreted, conceived, or imagined through habitual human activity" (as cited in Green & Turner, 2017, p. 28).

According to Smith et al. (1997), "place fundamentally structures human experience. It is deeply human to make places and to think in terms of places” (as cited in Ellis, 2005, p. 59). In addition, Tuan (1992) claimed that "modernity has developed the need for a place as an analeptic for individuality", He (1979) claimed as well that "place" represents security and provides attachment while space symbolizes freedom and longing (Ellis, 2005, p. 59). In a similar context, Hay (1992) demonstrated the importance of place in enabling meaningful relationships and strong social networks. As a consequence, “Place” is not understood merely as a location in physical space, but as a human conception and habitual site of different human activities.

2.1.2. Children’s Experience of Place

The relationship between children and places is born through different experiences. Children's understanding of the physical space is the path that leads them to exercise their

activities. This relationship between children and places is demonstrated through the following aspects:

2.1.2.1. Scale and Place Understanding

Due to its importance, psychologists, cognitive scientists, geographers, and many other researchers have investigated the cognitive dimensions of space and scale. Scale is an important factor in understanding the role that space plays in children's lives, it provides the context in which spaces, places, and environments of different types can be integrated and understood (Bell, 2005). Size has been demonstrated as critical at the different stages of spatial interaction between children and their surroundings for the reason that young people interact with spaces of different sizes in a variety of situations.

2.1.2.2. Landmarks and Place Referencing

According to Golledge (1992, p. 201), "place is a dimensionless spatial term, conventionally it is interpreted as a multidimensional phenomenon". While recognizing a place in the spatial domain signifies being able to identify its location and characteristics, (including name, identity, and physical features such as color, shape, size, etc.). Therefore, familiarity with a place is considered the result of its easiness to be identified and the image to be created about it, through observing, visiting, or passing by frequently. Familiar places present common knowledge, they are regarded as being well-known by a significant number of people. These places are often designated as landmarks and references that provide a significant part of both individual and common cognitive maps of the environment in which people are found.

Wikipedia defines a landmark as “including anything that is easily recognizable, such as a monument, building, or other structure” while Richter and Winter claimed that "landmarks are points of references in mental spatial representations. Their function (...) is to locate other objects. This function establishes a connection to place" (2014, p. 14). Therefore, landmarks dominate general directional and orientation information when directing people and especially children. The visual-spatial knowledge provided by the landmarks helps in understanding the spatial composition of a given place as well as getting object recognition, "it develops early in childhood and is linked also to the emergence of stereo-(depth-)vision" (p. 45).

2.1.2.3. Wayfinding and Cognitive Mapping

As a part of perceiving and experiencing the environment, movement and wayfinding are considered fundamental aspects of spatial exploration. Wayfinding is defined by Golledge (1999, p. 24) as the process of making a spatial decision in order to find a destination. According to him, wayfinding is represented as the way of selecting and pursuing a path or route between a given origin and a specified destination. Furthermore, Lynch indicated that "in the process of wayfinding, the strategic link is the environmental image, the generalized picture of the exterior physical world that is held by an individual" (1964, p. 4). As stated by Downs and Stea (1973, p. 312), cognitive mapping is "a process composed of a series of psychological transformations by which an individual acquires, codes, stores, recalls, and decodes information about the relative locations and attributes of phenomena in his everyday spatial environment".

2.1.3. Place Identity and the Child

The concept of "place-identity" or what can be referred to as the physical-world socialization of the child has been employed in relation to problems of the physical environment. In order to provide a theoretical definition of "place-identity" Proshansky et al., (1983, p. 77) suggested that "it is a sub-structure of the self-identity of the person consisting of, broadly conceived, cognitions about the physical world in which the individual lives". From Proshansky and Fabian (1987)'s point of view, "place identity is conceived of as a substructure of the person's self-identity that is comprised of cognitions about the physical environment that also serve to define who the person is" (p. 22). The purpose here is to understand the relationship between the child's increasing cognition, physical environment, activities, and the emergence of place identity.

The changes in place-identity occur throughout a person's lifetime, however, the focus here is on the period of childhood. At this age, children's daily lives are complex and unique however, more stable aspects of place identity are developed. According to Proshansky and Fabian (1987), children perceive both physical and social environments in order to understand their surroundings and satisfy their needs. In place identity, competence, and control of the physical world are emergent aspects of self-identity. As a consequence, children explore the space around them at a very early age, and even before they can move (crawl, walk, run, etc.) independently, they become interested in their surrounding

environment. Place-identity changes occur in the three physical settings that dominate the child's daily existence: the home, the neighborhood, and the school. The aspects of place identity (social roles, environmental skills, and learned relationships) create "the lenses through which the child will later recognize, evaluate, create, and manipulate physical spaces and places" (p. 26).

The neighborhood is the research context of this thesis, it represents the children's outside physical world which becomes a known quantity and also presents a greater complexity for them (Streets and routes to cross, stores to recognize, as well as sounds, smells, lights, and shadows) (Proshansky & Fabian, 1987). Therefore, an environmental understanding, control, and competence over the neighborhood are required through perception and cognitive mapping defined as an internal schematic representation of given particular places and the connections among them (Downs and Stea, 1973).

2.1.4. Place Attachment and the Child

The notion of “children’s place attachment” is raised from "children’s experience of place" (Ellis, 2005). In order to understand and materialize the "children's place attachments" Chawla (1992) linked the following four diverse pieces of literature: psychoanalytic theory; environmental autobiography; behavior mapping; and favorite place analyses. Therefore, for defining children’s place attachment, she suggests that:

> Children are attached to a place when they show happiness at being in it and regret or distress at leaving it, and when they value it not only for the satisfaction of physical needs but for its own intrinsic qualities (p. 64).

According to her, on the one hand, the place provides children with three types of satisfaction: security, social affiliation, and creative expression and exploration. On the other hand, it sustains the development of self-identity by providing opportunities for children to try out predefined roles as well as by offering unprogrammed space. The Growing Up in Cities research (Chawla, 2002 as cited in Ellis, 2005) has revealed that children aged between 9 and 14 years old (in both developed and developing countries) have shown a happy status in places affording access to playmates, friendly adults, environments with the ability of manipulation, activeness, public spaces that support appropriation, cohesive communities

with positive identities, and conviviality. Chawla concluded that children "need the 'shelter' of a cohesive and friendly local culture" (Ellis, 2005, p. 61).

According to Korpela (2002), studies of childhood memories related to place' preferences (e.g., Lukashok & Lynch, 1956; Wyman, 1985; and Sobel, 1990) and studies about children's use of place (e.g., Hart, 1979; and Moore, 1986) have shown the attachment of strong emotions to places. On the one hand, places (even the forbidden ones) can provide positive feelings of privacy, control, and security and an emotional significance of attraction (Hart, 1979; Moore & Young, 1978). While on the other hand, children can develop as well negative feelings of fear and danger (Hart, 1979; Matthews, 1992).

Moreover, some investigations have indicated the existence of an influence of age differences in relation to selecting favorite places. Pihlström's (1992 as cited in Korpela, 2002) study of 7-12 years old Finnish pupils has indicated differences in selecting favorite places, where 7-9 years old selected natural settings as their favorite places more often than 10- 12 years old. Additional studies in agreement with Pihlström were mentioned by Min et al., (2006) such as Sommer (1990); Owen (1994); and Derr (2002). In contrast, other studies have found no age differences such as the study of Schiavo (1988) in the United States which did not reveal any differences between 10-13 and 17 years old in their preference for places in the neighborhood. Several scholars have conformed to the previous findings such as Malinowski and Thurber (1996).

2.2. Child and Outdoor Play Activities

The relationship between the child and the outdoor environment is materialized through outdoor play activities. Researchers have suggested that outdoor contact can have psychological, physiological, and health-behavioral benefits. In this section, the relationship between the child and the outdoor environment is considered by discussing the outdoor environment, the outdoor play activities, the environmental affordances, the spaces and places for play activities, natural elements, and the outdoor activity levels, in addition to the outdoor play decline.

2.2.1. Outdoor Environment

The outdoors provides a unique environment that is qualitatively distinct from indoors. It offers the space and a greater degree of freedom to try, explore and experiment without the

constraints associated with the indoor environment. Contrarily to indoors, outdoor environments are more open, less confined, and less controlled by adults, therefore, outdoor spaces can free up the body and the mind of young people (Tovey, 2007). As a consequence, the outdoors always comes out at the top of children's priorities and favorite places (White, 2008). The outdoor environment is dynamic and ever-changing (the air, temperature, light, weather conditions, and seasons). It is rife with unpredictability, and what distinguishes it from other outdoor environments is how diverse it is.

2.2.2. Outdoor Play Activities

Play is a natural and critical part of a child's healthy development (see Play and Child Development within the first part of this chapter). Whereas, outdoor play helps children "learn some of the skills necessary for adult life, including social competence, problem-solving, creative thinking, and safety skills" it also provides children with opportunities to "explore their community; enjoy sensory experiences with dirt, water, sand, and mud; find or create their own places for play; collect objects and develop hobbies; and increase their liking for physical activity" (Clements, 2004, p. 68). In the same context, Rogers and Evans (2006) noted that "outdoor play spaces enable children to create play spaces themselves and to exercise greater choice over materials, location, and playmates" (p. 47).

2.2.3. Spaces and Places for Play Activities

Children do not experience outdoor environments as just physical spaces, but as places with meaning (see the previous section: Child and the Concept of Place). According to Tovey (2007, p. 57), "children make their own meaning from seemingly insignificant features of the physical environment those which to adults appear to have no apparent function at all". Moreover, she claimed three fundamental points which underpin the approach taken in designing outdoor spaces for children. Firstly, the outdoor environment should never be neutral, rather it reflects values about children, their learning, and development. Secondly, children do not just see the outdoor environment as spaces full of 'things', but also as places full of meaning (as indicated in Gibson's theory of affordance that perceptual experiences include not only things and events in the environment, but more fundamentally functional meaning). Thirdly, an outdoor environment for young children should be a dynamic living place that constantly changing and not a static predetermined layout to which children have to adapt (p. 53-54).

2.2.4. Natural Elements and Outdoor Play Activities

The best resources you can offer for outdoor play in all areas of learning and well-being are natural materials. They are simple to locate and are gathered from the environment. They are well presented to children and are simple to preserve. The fact that they offer outstanding play value, which encourages and supports a variety of play and generates learning across the entire curriculum, is most significant. They are appropriate for kids of all ages and developmental stages and offer more sophisticated play opportunities as kids get older, ranging from straightforward digging and filling to more challenging steps and activities (White, 2008).

According to White, good natural materials for exploration and outdoor play may include the following elements: sand and soil, wood (logs, tree trunk slices, sections of branches, sticks, and twigs), stone (cobbles, pebbles, slate, gravel), plants (flowers, petals, herbs, leaves, grass), seeds (conkers, acorns, sycamore seeds), and shells, feathers, minerals (pp. 18-20).

2.2.5. Children's Outdoor Activity Levels

According to the World Health Organization (WHO), children's activity levels are measured and assessed according to the following areas: (1) Physical Activity (PA) and (2) Sedentary Behavior (Bull et al., 2020). PA is any bodily movement produced by skeletal muscles that require energy spending, this level of activity confers large benefits for children's and adolescents' health (cardiometabolic health, bone health, cognitive outcomes, mental health, and reduced adiposity). The PA includes different levels that can be summed up into Vigorous Physical Activity (VPA) and Moderate to Vigorous Physical Activity (MVPA).

The VPA is defined as physical activity at an energy expenditure rate of at least six metabolic equivalents lasting under 10–15 min (Ahmadi et al., 2022) while the optimal level of MVPA ranges between 30-60 min each day (for children older than 5 years), (Center for Disease Control and Prevention 1997, Biddle et al. 1998 as cited in Stratton, 2000, p. 1538). On the other hand, the WHO guidelines operationalize the definition of sedentary behavior as all waking behaviors characterized by a low energy expenditure such as sitting, reclining, or lying as well as low levels of movement.

2.2.6. Children’s Outdoor Play Decline

Despite the importance of outdoor activities for children’s category, the past several decades demonstrated awareness about its changing status which has gradually decreased due to different, diverse, and multilayered reasons. Frost (2012) discussed the decline of outdoor play among children during the past half-century as a part of the play's culture. According to his work, the causes are multiple and linked to changes in technology (cyber play), family (parental safety concerns), and schooling (controversial school testing and curricula).

These reasons and more, confine children to passive indoor activity; repress recess and physical activity; restrict available resources and opportunities. Consequently, children's play includes deficits in social, physical, cognitive, and emotional health, fitness, and well-being. Some of these reasons will be discussed in the following.

2.2.6.1. Safety and Risk Perception

O'Brien and Smith (2002) in a pioneering study through the lenses of occupational therapists have been concerned with the health-promoting aspects of children's play. According to their work, parents' perception of risk and safety is one of the factors declining children's freedom to play. However, their research suggests further investigations to discover other factors that might affect children's play. Furthermore, from a pedagogical perspective, Little (2010) in her study about safety and risk related to play opportunities suggested that professionals believe that opportunities for risk-taking are essential for all aspects of children’s development however the regulatory environment constraints their ability to provide sufficient challenging experiences.

In a study that examines safety as one of the factors that influenced childhood active free play, Holt et al. (2015) through semi-structured and walk-along interviews for 13 young adults from one western Canadian city, investigated memories and experiences of play. Results demonstrated that parental restrictions and safety concerns were limiting factors of their involvement in active free play. As a consequence, the unprecedented rise in the level of anxiety for children’s safety, as a "culture of fear" (Furedi, 2002 as cited in Tovey, 2007, p. 2) demonstrated that parental anxiety and fear of child abduction or stranger danger has had the most prevalent effect on children’s outdoor play (Valentine and McKendrick, 1997).

2.2.6.2. Lack of Play Spaces

The lack of outdoor play areas is considered a major concern for children's activities and development, especially in undeveloped and developing countries. Because communities do not often require city planners to provide such space, several metropolitan regions struggle with a dearth of playgrounds for children. Additionally, a lot of common playgrounds in neighborhoods, like community centers, have been taken over for commercial use (Clements, 2004). Furthermore, another significant factor contributing to the decrease in outdoor play places is automobiles (Rivkin, 1995). Therefore, it is predictable that a lack of suitable play spaces for some children would naturally affect their ability to play as freely as in prior generations (Sallis et al, 1997 as cited in Clements, 2004).

2.2.6.3. Technology and Screenplay

Within the context of technology, Slutsky and DeShetler (2017) discussed the ways in which technology is transforming children's play (children between 3 and 5 years old). According to the data, children are finding it easier to access technology through their parents' smartphones and tablets regularly. The interesting finding within this research work is the lack of outdoor play (lack of physical activity) in which children are engaging. Moreover, Bergen and Davis (2011) described some potential changes in the nature of children's play related to three new technologies: technology-augmented toys, video games, and virtual communities. They reviewed the research and theory about these technologies' impact on play and moral development, discussed these new technologies' positive and negative influences, and described the need for further investigation. in the same context, Tovey (2007, p. 5) claimed that: "television and the rapid growth in screen-based electronic games provide a seductive alternative to playing outside and children can enter into dynamic and exciting fantasy worlds without having to move from their seats".

Conclusion

In light of what has been said so far, the concept of childhood as a social construction and a stage of life is a modern advancement. It is connected to life and society and its emergence is based on various previous historical perspectives. During the times that postdated the Middle Ages, adults started to hold exclusively a new and different view of the nature of childhood as distinct from adulthood which led to accentuating its importance. This ideology

of child and childhood has supplied a conviction about the existing relationship between the ways childhood was lived and the kind of adult that the child would become. As a result, the determination of children's specific needs, rights, and different areas of development as a part of the childhood doctrine has materialized. Following the same doctrine, adults began to regard children's play activities in their various forms and their importance as one of the building blocks of life and consider it to be crucial in their multidimensional development.

In linkage with childhood conception, the concept of place as a part of the child-environment relationship is considered a useful conceptual perspective in understanding children's outdoor experiences. The relationship between children and places is born through different experiences which are materialized through outdoor play activities at different levels. By its very nature, outdoor play cannot be pinned down or exactly defined, making it a challenging idea. Children's play is intangible, uncertain, and unpredictable, which makes it more challenging and perhaps uncomfortable for adults to think about it. The benefits of outdoor play for young children's development are well supported by research. However, many children do not have access to outdoor play, which greatly influences their health, happiness, and learning chances. To sum up, outdoor play is about potential, it is related to words such as "opportunity" and "environmental affordance".

Chapter II: Large Housing Estates and their Open Outdoor Spaces

Introduction

Housing is a basic human requirement that also reflects social development and a person's place in society. Accordingly, everyone has a right to an appropriate standard of life, which includes having a home, according to international human rights legislation. Housing is frequently mentioned as a significant social determinant of health, acknowledging the variety of ways that a lack of housing or housing of poor quality can adversely affect health and well-being, especially for vulnerable categories such as children. As a result, governments must frequently step in when housing systems malfunction for whatever reason since they are so crucial to the lives and well-being of any society and are thus closely associated with urban conflicts and instability.

This chapter is concerned with the large housing estates and focuses on the open outdoor spaces within these housing neighborhoods. It aims at providing a clear overview of the concept of large housing estates in order to understand the genuine notion of open outdoor spaces from different perspectives. This chapter aims as well to spot the light on the children's category within the open outdoor spaces in order to understand the impact of these spaces on their outdoor activity and neighborhood functioning.

The current chapter is composed of two main parts. The first part provides an overview of the large housing estates through definitions, emergence, history, problems, and criticisms. Subsequently, this section highlights the concept of large housing estates in the Algerian context via the introduction of the national housing crisis and the emergence of new housing policies and concepts (such as the ZHUNs). This section underlines as well the other adopted strategies regarding the large housing policy and development.

On the other hand, the second section of this chapter focuses firstly on the concept of open outdoor spaces within these large housing neighborhoods through the different definitions, characteristics, and features. Secondly, this section provides an emphasis on the open outdoor spaces within the Algerian large housing neighborhoods. Furthermore, this second part of the chapter introduces the open outdoor spaces and children's category by discussing the open outdoor playgrounds for children, the open outdoor spaces and play activities and the impact of these open outdoor spaces on children's play and development.

1. Large Housing Estates

Housing neighborhoods are primordial components of the city. These entities combine the physical and the social ingredients of the urban environments (Schwirian, 1983; Gobster, 2001; Jenks, 2007). Along with this first part of the second chapter, a global overview of the concept of large housing estates will be introduced, followed by a focus on the Algerian housing estates product in order to understand the geographical, political, and sociocultural context of the study case of this thesis.

1.1. Concept of Large Housing Estates

The concept of large housing estates is an ambiguous term. Therefore, the first question to ask is: What is a large housing estate? In order to respond to this question, the current section, based mainly on the works of Frank Wassenberg (2013; 2018), delivers a set of notions that includes definitions, emergence and history, and the resulting problems and criticism.

1.1.1. Definitions

According to Wassenberg (2013, p. 27), a universal definition of housing estates does not exist, therefore, it is challenging to construct a consistent definition. However, according to the popular free encyclopedia Wikipedia, a housing estate is defined as a group of buildings assembled together as a single development entity. Moreover, the British urbanist Anne Power (1993, p. xix), defined them as "a group of dwellings built in a discrete area, normally by a single developer and/or owner". In the same context, Wassenberg (2013, p. 38) defined large housing estates as "a group of housing distinct in form, built together as a single development on a large scale for the local context". Furthermore, Dekker et al., (2005) perceive the housing estates as "artificial areas in that they are self-contained, planned developments rather than neighbourhoods that have developed organically over several generations" (p. 341).

Accordingly, the assortment of the previous definitions allows for defining a housing estate as a group of housing, uniform or quite distinct in the form which is built together as a single development unit. In order to provide a more detailed description, George (1963, p. 25) defined the housing estates (Les Grands Ensembles) as "batteries of new buildings which are suddenly erected on a front of urbanization, populated in a few months by several

thousand people who have never met before and for whom a new form of life of band". Furthermore, Vieillard-Baron (2004 as cited in De Gasperin, 2011, p. 20) provided five characters for the large housing estates as follows:

> The break introduced with the old urban fabric, the shape (towers and bars), the size (more than 500 dwellings), the mode of financing (helped by the State), and the globality design (leading to rationalization, repetitiveness, and regulatory inclusion of equipment).

1.1.2. Emergence and History

Amid the 19th century, industrialization pulled in masses of job-seeking individuals to the urban zones, where new industries were concentrated. The cities were unprepared for these expansive streams of transients, coming about in destitution, stuffing, cleanliness, maladies, and other agonies (Wassenberg, 2013). However, during the mid-twentieth-century, large housing estates were conceived as modernist urban and social utopias that would solve various urban problems at times of rapid industrialization and urbanization in most of Europe during post-World War II (Rowlands et al., 2009) then this urban form of the large housing estates has experienced an extension and international diffusion (Figure 3).

According to the Charter of Athens (prepared by Le Corbusier for the International Congress of Modern Architecture CIAM in 1933), the first large housing estates were structured by using new concepts in the way of conceiving the living space, in association with regional town planning, social housing, and architectural modernity. Subsequently, the three decades following the Second World War are often considered to be the golden age for social housing. Thus, in all European cities, millions of houses were built (Wassenberg, 2013).

Later, social housing was aimed not only at the working classes as before, but also at the middle classes, key workers, and otherwise, the lowest classes which allowed the majority of the population to share the wealth of the economic boom. Moreover, large housing estates worldwide were carefully planned at the apartment, building, and neighborhood levels, with an aim to provide working and middle-class families with quality living environments in a cost-efficient manner. Nevertheless, many housing estates were established during the post-World War II decades and the built environment and infrastructure have decayed since cheap

building materials and economical construction techniques were often used to build housing estates inexpensively and quickly (Hess et al., 2018).

Figure 3 Examples of Post-War housing estates. From left to right: Park Hill in Sheffield, England; Luchtbal housing estate in Belgium; Climat de France, Alger; The H-shaped blocks of Wong Tai Sin, Hong Kong, the Pruitt-Igoe public housing complex in St Louis, US (Source: From left to right: Conservation Wiki, 2022; De Vos and Geerinckx (2016, p.13); Web, 2022; DeWolf (2020); Thegardian.com; 2022).

1.1.3. Problems and Criticism

Since the 1960s, the housing estates have been the subject of very violent criticism describing the contortions between utopian projects and disastrous inhabitant realities, these criticisms were initiated by the press, politicians, and even architects and urbanists themselves (such as Françoise Choay and Louis Caro). In fact, the large housing estate

complexes have turned out to be out of step with the reality of the daily practices of the inhabitants. According to Toussaint and Zimmermann (2001), these projects failed to produce sociability due to the social distances between residents on a social aspect. However, on the physical aspect, the housing estates did not remain as static entities, the lack of maintenance allowed the rapid obsolescence of facilities and very quickly led to the production of an unappreciated living environment. According to Wassenberg:

> They change when used by residents, visitors, and local entrepreneurs. They age, wear out, and need maintenance and renewal. Some neighbourhoods are always doing well, while others decline and become branded as a 'problem', 'disadvantaged', 'deprived' or 'concentrated' area (...) dwellings and streets deteriorate, crime and anti-social behavior increase, services and businesses leave or go out of business, and the image of the neighborhood worsens (2018, p.48).

As a consequence, housing estates became synonymous with problems, and many large housing estates in Western countries have become poverty-concentrated neighborhoods, frequently with large shares of immigrants (Wassenberg, 2013). Therefore, in Northern and Western Europe, an overlap of ethnic, social, and spatial disadvantages has formed as ethnic minorities, often living on low incomes, settle in the most affordable segments of the housing market (Hess et al., 2018).

In relation to the characteristics and features of the housing estates, some scholars claimed some adverse characteristics such as the extreme gap with the whole history of the city in terms of the styles and traditions; by using new architectural concepts (such as flat roofs, curtain walls, pilings, panes of glass, self-supporting roofs, etc.), new construction materials (concrete, steel), and new techniques and structural processes (prefabrication) in addition to the absence of ornament and focusing only on simplicity and purity that expresses monotony.

1.2. Large Housing Estates Policy in Algeria

The Algerian housing policy has been developed and changed throughout history. In this section, we will expose the different processes and progress of this policy based on three main periods which are during the colonial period (1945-1962); between 1962 and 1990; and after 1990.

1.2.1. Development Policies During the Colonial Period (1945-1962)

Housing construction in Algeria was mostly left to private initiative until the 1940s (Heraou, 2012). The housing situation in Algerian cities was dire in 1945 since the indigenous population's average household size was eight people per housing unit and the entire housing stock was projected to be 850 100 dwelling units. The formal housing stock increased to 1 220 221 housing units and the average household size increased to 7.76 between 1945 and 1954 as a result of the construction of numerous dwellings. Subsequently, a housing initiative was implemented by the French colonial authorities during the Algerian War (1954–1962) to keep Algerian society out of the conflict which is the Plan de Constantine (Djafri et al., 2021).

1.2.2. Development Policies and Strategies Before 1990

After gaining its independence, Algeria inherited a market-oriented economy created to cater to the requirements of the local, dependent European minority. Subsequently, a housing policy had to be concerned with land, housing financing, construction techniques and materials, and finally the adopted housing model. As a consequence, a number of initiatives, or what may be considered an urban policy, that was started in the middle of the 1970s accompanied the late interest in cities (Mouaziz-Bouchentouf, 2017). Population growth, ongoing migration to cities, inconsistent agricultural policy, and failings of some national organizations could only result in rapid urbanization, overcrowding in housing, and tensions in urban areas. These circumstances have signaled an awareness of the issue of habitat, and this awareness has manifested with the introduction of the 1977 Habitat Charter and the subsequent appearance of ZHUN (New Urban Habitat Zones).

1.2.2.1. Habitat Charter of 1977

After the frightening statistics from the 1977 census, the housing issue becomes urgent. The TOL were 6.78 and 8.33 between 1966 and 1977. The Ministry of Housing and Construction was established in 1977 with the slogan "housing is everyone's business," and the decision to construct 700,000 housing units during the first five-year plan from 1980 to 1985 reflects the shift in mindset and objectives (Guerroudj, 1992, p.4). The housing-related introduction note in the official journal of February 9, 1977, highlights the major tenets of the policy in this area as well as the steps to be taken to address the dire housing situation. As a result, a

massive program is designed to achieve the goal of 100,000 new homes annually starting in 1980 (Mouaziz-Bouchentouf, 2017).

1.2.2.2. Housing in Development Plans

In Algeria, planning was done through a three-year plan (1967-1969), two four-year plans (1970-1973 and 1947-1977), and two five-year plans (1980-1984 and (1985-1989). The second was not completed due to the change in the policy of the Algerian state. However, 1978 and 1979 are years without a plan.

The 1967-1969 three-year plan: aims for the reconstruction of villages destroyed by the war and the completion of abandoned sites (20,000 rural housing units and 20,000 urban units completed).

First four-year plan 1970-1973: aims to achieve 40,000 housing units built in urban areas. The share of housing in the investment is 5.48% corresponding to 1.52 million Da.

Second four-year plan 1974-1977: housing receives 13.25% of all national investments (14,610 million dinars).

First five-year plan 1980-1984: housing receives 16.5% of all national investments (92.5 million dinars).

1.2.2.3. New Urban Habitat Zones (ZHUN)

The housing development plans were materialized through ZHUNs. This concept of ZHUN has occupied a large proportion of Algerian policy, geography, economy, and society and aimed to solve the housing crises as an advantageous urban product. However, the ZHUNs demonstrated another dimension that has resulted in disadvantages and criticism. In order to deliver a deeper optic, this section will provide a vision of the ZHUNs' emergence, policy, and criticism within the Algerian context.

ZHUN as a Solution for the Housing Crisis

As an urgent response to this crisis, the Algerian authorities opted for the New Urban Habitat Zones procedure during the late 1970s which was strongly influenced by the construction method widespread in the 1950s in European countries (Semmoud & Aït-Amirat, 1998;

Benlakhlef et al., 2005 as cited in Rouaibia & Zeghiche, 2017; Benlakhlef, 2007) which was quickly implemented and therefore made it possible to build the greatest number of dwellings in record time (some examples are demonstrated within Figure 4). This new urban concept was materialized in the construction of collective housing complexes longing for its various advantages in comparison with the existing slums highly populated and associated with poverty. However, unfortunately, like the policy of large housing estates, the ZHUN procedure has proven to be unable to quantitatively follow the pace of housing requests, and unable to respond qualitatively to the needs of the inhabitants (Mebirouk et al., 2005). In the beginning, this model of housing was considered a social promotion that allows entry into the consumer society and accession to modernity, however, very fast, problems related to environmental quality and social integration and adaptability emerged.

Figure 4 Examples of ZHUN in Algeria. From left to right: the ZHUN of Boussouf, Constantine; ZHUN of USTO, Oran; ZHUN of 1000 dwellings, Biskra (Source: Djermouni, 2015, p. 82; Kettaf, 2013, p. 207; Alouane, 2011, p.126).

Policy and Funding of the ZHUN

With regard to housing policy, the Algerian political authorities attempted during the first decade of independence to manage the inherited housing programs and the cities. However, the planning period of the 1970s was one that witnessed the reorganization of the set of regulatory texts, the implementation of instruments for controlling urban growth in adaption to the economic situation, and the concretization of a series of operational urban planning operations.

However, among all the development programs, it was only with the second four-year plan (1974-1977) that the authorities expressed their great concern for housing. In order to make up for the delay, the authorities initiated a very large complex of ZHUN adopted in almost every Algerian state for three main advantages: modernity, socialist character (collective housing), and speed of implementation. Thus, more than 100 agglomerations were affected by the establishment of more than 250 ZHUN which have a total area of 23,000 hectares with a capacity of more than 650,000 housing units. Thus, each ZHUN covers an average of 90 hectares for a capacity of 2,600 dwellings. The largest ZHUN had areas of more than 400 hectares located in the cities of Algiers, Blida, and Sétif, for an average density of 25 dwellings per hectare while some ZHUN even presented densities of the order of 15 dwellings per hectare (Alouane, 2010).

Funding the housing estate sector is an obligation for each country, which must meet the housing needs of the most vulnerable populations (the poor and also the middle strata which includes civil servants, teachers, and private sector employees). Each State establishes the funding formula(s) intended for the population groups differentiated by income (according to the finance law) (Mouaziz-Bouchentouf, 2017). The funding of the housing estates sector has always been one of the primary concerns of the Algerian State. It consists of mobilizing allocated funds either for the construction of housing, real estate development or even for access to housing for the different social strata (Ouadah Rebrab, 2008).

With this funding, Algeria has moved from a state monopoly system to a free market system. It is the transition from exclusive funding from the public treasury to funding procedures that distribute capital over the various categories of housing, supported by different developers and intended for different users. Banks and funds, project management institutions, local authorities, and public bodies are the guarantors of housing financing of

all categories; helped by the contribution of solvent households who participate through rent, wind, and savings (Rifi, 2008). The funding is used to set aside the budget needed to buy land and build housing in order to rent it out or resell it to beneficiaries. Beneficiaries reimburse the State by paying rent or by paying for their housing over a long period. In addition to providing new dwellings (cohabitation, renting from individuals, etc.), the funding aims as well to relocate slum dwellers and the inhabitants of ruined buildings threatening to collapse (Mouaziz-Bouchentouf, 2017).

Problems and Criticism of the ZHUN

Like all large housing estates complexes around the world, Algeria nowadays endures numerous issues which have a negative effect on the city and society. The housing estate sector in Algeria is experiencing a multidimensional crisis, in design, construction, financing, management, etc. This crisis is the result of an incoherent urbanization policy with poorly defined objectives (Djermouni, 2015). The construction of large ZHUNs across the Algerian territory has generated suburbs composed of buildings-bars and/or buildings-towers and oversized roads constituting a fragmented urban fabric and a discontinuous and fragmented structure (Amirèche, 2000 as cited in Mebirouk et al., 2005). In addition, both morphological and social issues are developed where the urban fabric is characterized by the presence of an undeniable social heterogeneity (Zerdoumi-Serghine, 1996 as cited in Mebirouk et al., 2005), a monotonous built space, and an unbuilt space impoverished under the pressure of lower cost and the concealment of elementary foundations of living.

Despite the advantages of rapid construction and the moderate cost of the large complexes of buildings, the population is served in a standard manner without providing a quality living environment. Moreover, the site plans are presented as a group of residential blocks with leftover plots where facilities are often absent. This new type of urbanization is characterized by a break with the old centers and a monotonous repetitive architecture highlighting the existence of two urban forms (old fabrics and ZHUN) which coexist but are not complementary (Alouane, 2010).

To sum up, the problems commonly posed by large housing estates since the 1960s, are reproduced in the Algerian ZHUN but with greater acuity which justifies why this model of urban composition is the subject of strong national criticism. The poor quality of the buildings (due to rapidity under the pressure of urgency and the low cost), the inadequacy

between housing layouts and the population's lifestyles, as well as the repetition and monotony of forms and materials, are the heaviest consequences of a dreadful adopted urban policy.

1.2.3. Development Policy and Strategies After 1990

Since oil had a substantial impact on the introduction of large-scale projects at this time, the housing sector received tremendous priority, and a significant budget was devoted to ending the housing crisis. Four national development plans have subsequently been introduced as part of a series of public sector investments made through the economic recovery support program for the years 2001 to 2004. It was followed by the 2010-2014 five-year plan, the 2015-2019 five-year plan, and the supplementary program to assist economic growth for the years 2005 to 2009. As a result, between 2010 and 2017, 3 585 572 units were finished (Services du Premier Ministre, 2017 as cited in Djafri et al., 2021).

In contrast to the previous period (Before 1990), social housing was only still offered to low-income groups, while intermediate groups received direct financial assistance. Due to Algeria's transition from socialism to capitalism, the housing program now looks to other sources of finance. According to Acidi et al. (2011), the housing programs are the following:

Participatory social housing is for those whose monthly income is between 12,000 and 45,000 DA, with the government subsidizing 30% of the total cost of housing and the price of housing not to exceed 2,500,000 DA. With a tax of one percent (1%), the bank contributes fifty percent of the remaining cost of the housing, and the property owner contributes the remaining funds.

Rural housing is completely subsidized by the government subsidizes for people making less than 12,000 DA per month.

Rent-to-buy housing is destinated to people whose monthly income is between 70,000 DA and 45,000 DA. The house buyer pays 8,000 DA per month in rent for a period of 25 to 30 years. The benefit of this method is that the monthly payment includes both the rent and the cost of the item.

Promotional housing is destinated for persons with monthly incomes over 70,000 DA. There is no government support for this procedure. The purchaser deposits 800,000 DA, and

the remaining sum is either provided by the lending Bank or is paid by the purchaser over a number of periods in installments.

2. Open Outdoor Spaces in Large Housing Estates

The public open outdoor spaces in large housing estates occupy an important place, they are fundamental elements of the urban environment and of the architectural and aesthetic aspects of the built environment of cities. These spaces contribute to the development of social relationships and are even elements of social cohesion (Mebirouk et al., 2005). In this section, the concept of open outdoor space in housing neighborhoods will be discussed in general then in specificity to the Algerian context.

2.1. Concept of Open Outdoor Spaces

The aim of this section is to provide a clear understanding of the concept of open outdoor spaces in large housing estates. Based on the research works of pioneers and well-known researchers interested in urban studies (such as Jacobs, 1961; Gehl, 1987; Marcus, and Francis, 1997; Rappoport, 2002; Madanipour, 2010 and others) some definitions and characteristics will be presented subsequently.

2.1.1. Definitions

According to Sendi et al. (2009, p. 131), social scientists have frequently acknowledged how challenging it is to accurately and precisely define the concept of "public space". According to them, this difficulty in defining the concept of open outdoor spaces in large housing estates is due to two primary causes. First of all, public space and the majority of events that occur there defy easy institutional categorization. The second issue is the difficulty in defining public space itself due to the difficulty in explaining behavior in public areas.

However, the urban open spaces of the large housing estates are clear spaces located in the proximity of the buildings (Figure 5). According to Trancik (1986) and Gehl (1987), these spaces are associated with the built environment's form, shape, plan, structure, and functions and considerably impact residential environment quality. The urban open spaces present high similarities with the urban public open spaces, however, the urban open spaces of the large housing estates are destinated to a specific population that belongs to the neighborhood

contrarily to the urban public open spaces which are of public accessibility. The definition of open spaces within the residential neighborhoods in this research includes roads, parking lots, green spaces, playgrounds, and leftover spaces.

Figure 5 Examples of urban open spaces of large housing estates. From left to right: Poblado Dirigido de Orcasitas; Havanna housing estate, Budapest; Buildings by Oswald Mathias Ungers, built 1964; Vacant shop units and public open space at Grattosoglio (Source: From left to right: Urban, 2018, p.249; Kovács et al., 2018, p.198; Uceda et al., 2018, p. 249; Petsimeris, 2018, p.274).

Scholars such as Jacobs (1961) and Rappoport (2002) claim that public open spaces at the housing estates' level play a significant role in people's everyday life as everyday spaces of community. In the same context, Madanipour (2010) argues as well that "public space is intertwined with everyday life in neighbourhoods" (p.107). Furthermore, neighborhoods have been proposed and designed to create spaces of greater social interaction and improve neighborliness (Chitrakar, 2015). The definition of neighborhood open space embraces both

physical and social components, public space as a key physical feature of the neighborhood facilitates the social purpose of neighboring.

Open spaces can be categorized into four groups: public, semi-public or semi-private, and private spaces (Azad et al., 2018). The private spaces are specific to individual residential buildings, while the semi-public or semi-private areas (such as streets within the neighborhood) are the in-between zones separating dwellings from the public spaces. Moreover, some of these spaces are bounded or preserved by fences, walls, or gates (Madanipour, 1999).

2.1.2. Characteristics and Features

There has been an increased academic interest in the public open space's characteristics related to use and activity in order to justify why people (children in our case) do or do not engage in activities within these spaces. According to the research by Marcus and Francis, a set of characteristics of urban open space will be summarized and exposed. According to them (1997, pp. 9-10), these spaces are located where it is easily accessible and visible to potential users which clearly conveys the message that the place is available for use and is meant to be used. These spaces are generally beautiful, engaging, and furnished. They provide a feeling of security, safety, and relief of stress and enhance the users' health and emotional well-being in regard to sun and shade, and windiness. Moreover, they encourage space use and conviviality among different categories (including children and disabled people) by providing manipulative and change components (e.g., sand play in child care, raised garden beds in housing for the elderly, interactive sculpture, and fountains in urban plazas).

2.2. Outdoor Open Spaces in Algerian Housing Estates

The open space constitutes a structuring space for the large housing estates and a connection between dwellings and inhabitants. However, these spaces are considered one of the largest issues in public mass housing in Algeria where most of them are constructed as peripheral extensions and conceived in apartment blocks arranged in extended open spaces (Naceur, 2013). The open outdoor spaces in Algeria housing estates present a serious mediocrity formed by the precariousness related to a non-respect of the standards of construction and the absence of upkeep and maintenance. In this section, an overview of the open outdoor

spaces will be introduced through policy and design, use and appropriation, and dysfunctions, weaknesses, and failures.

2.2.1. Policy and Design

The housing policy in Algeria is too often reduced to that of dwellings because it ultimately retains the number of housing units as the only criterion for the solvency of the housing crisis (see Large Housing Estates Policy in Algeria). Therefore, the policy and design criteria for the open outdoor spaces in large housing estates result from the implementation of the dwellings blocks. Thus, these resulting open spaces are exploited in providing mainly parking lots in addition to some green spaces (including traditional sandbox playgrounds for children) and pathways.

The only Algerian urban policy related the outdoor play spaces (playgrounds) in collective housing neighborhoods, is included as a part of the outdoor green spaces and summarized through the standards for green spaces providing only data about surfaces as follows (from the interdepartmental circular of October 31, 1984):

Garden for children < 4 years old: 0.20 m²/inhabitant;
Garden for children from 4 to 10 years old: 0.80 m²/inhabitant;
Sanded area for free games: 0.50 m²/inhabitant;
Playground for children > 10 years old: 3 m²/inhabitant:
Open meeting spaces (in squares and boulevards): 0.5 m²/inhabitant.

These data are considered to be very old compared to the development of international urban policies. Here resides one of the most important issues related to the Algerian housing estate.

2.2.2. Use and Appropriation

From a psychological point of view, appropriation is a set of needs (the need for security and stability; the need for influence and control; and the need for identity and personal values) that are linked to the concept of attachment (see chapter 1). Accordingly, Fischer (1983), in his work on environmental psychology, defined the concept of appropriation as:

> A fundamental psychological process of action and intervention on a space in order to transform and personalize it; this system of control over places encompasses the forms

and types of interventions in space that translate into relationships of possession and attachment" (Loyer & Doyon, 2019, p. 112).

Individuals' appropriation of space enables us to understand the spatial clash between urban planning practices and population practices and highlights the dialectic between the circumstances of production and uses of space (Semmoud, 2007). Regardless of the chosen definitions for the appropriation of space, the reality is more complicated since appropriation involves historical, economic, and socio-cultural variables, the interference of which cannot be understood solely from an urban perspective. Therefore, an attempt to visualize the concept of appropriation from an Algerian urban context is required.

According to Semmoud (2009, pp. 102-104), uses and appropriations of space in the Algerian context seem marked by the modulated articulation of the cultural heritage borne by society and the need for adaptation imposed by the economic context and social change. The reproduction of the model of Western large housing in Algeria which is marked by a social bond traditionally based on close proximity has cushioned the crisis and allowed the functioning of public companies and administrations, however, the main beneficiaries of housing, do not have any less produces a habitat whose image is quite often negative. The large housing estate standardized created a gap between the functions assigned by the plan to certain public spaces and the abandonment of these spaces.

One of the most common forms of appropriation in Algerian housing estates is the attempt by nearly all households that occupy the ground floor to illegally appropriate part of the immediate environment (Figure 6). This appropriation often begins with the planting of trees that are protected by a metal fence to create a private space that can be extended to include the dwelling. This practice of outward extension is more related to a strategy that allows households to fill the spatial deficit (Bakiri et al., 2005).

Figure 6 Some forms of spatial appropriation of the open outdoor space in Algerian housing estates (Source: From left to right: Bakiri et al., 2005, p. 64; Semmoud, 2009, p. 107).

2.2.3. Dysfunctions, Weaknesses, and Failures

In most developing countries, the inadequate designs of open outdoor spaces seem to be the rule rather than the exception (Abu-Ghazzeh, 1996). Among the various weaknesses that the Algerian open outdoor spaces in mass housing neighborhoods (ZHUN) present today, is the incapacity of promoting successful open spaces (Naceur & Farhi, 2003; Mebirouk, 2008, Naceur, 2013; Bendjedidi et al., 2018). Most states of public open spaces are at the zero stage of their development and quality (Mebirouk et al., 2005). These weaknesses within the layout diagram influence the patterns of use and appear as abandoned, deserted, leftover, incomplete, poorly furnished, and deprived of their required facilities and degraded open spaces (Naceur, 2013) (Figure 7). Consequently, the urban fabric is characterized by the presence of an undeniable social heterogeneity (Zerdoumi-Serghine, 1996), a monotonous built space, an unbuilt space, and the degraded elementary foundations of living.

Figure 7 Examples of open spaces. From left to right: ZHUN of Plaine Ouest, Annaba which transformed into mud floods during the rainy period; ZHUN in Oum El Bouaghi; ZHUN in Zeralda, Algiers; Deserted open space within the ZHUN of Boussouf, Constantine (Source: From left to right: Mebirouk et al., 2005, p. 9; Author; Lemidi-dz.com, 2009; Djermouni, 2015, p. 82).

2.3. Outdoor Open Spaces and Children's Category

As mentioned earlier, the relationship between the child and the outdoor environment is materialized through outdoor play activities while the outdoors provides a unique environment that is qualitatively distinct from indoors and comes out at the top of children's priorities and favorite places (see chapter 1). Although there is a sizable body of national literature that examines challenges with open outdoor spaces in large housing estates, hardly any academic work had addressed these issues in consideration of the children's category. Accordingly, this section discusses the open outdoor playgrounds for children in general besides the open outdoor spaces and play activities in addition to the concept of open outdoor spaces and children's satisfaction.

2.3.1. Open Outdoor Playgrounds for Children

The playgrounds are the most ideal type of open outdoor space for children to play, hence they are crucial and essential in housing estates (Stoiljković, 2006). Within this section, some definitions, history, and the emergence of the playground will be introduced in addition to the main different types of these entities.

2.3.1.1. Definitions

According to the English dictionary Merriam-Webster, a playground is "a piece of land used for and usually equipped with facilities for recreation, especially by children" (Merriam-Webster, n.d.). On the other hand, the Britannica dictionary defines the playground as "an outdoor area where children can play that usually includes special equipment (such as swings and slides)" (Encyclopedia Britannica, n.d.). Furthermore, Joe Frost indicated that the term playground can include different kinds of such as school playgrounds, park playgrounds, wilderness playgrounds, zoo playgrounds, street playgrounds, rooftop playgrounds, loose parts playgrounds, check-a-child playgrounds, imagination playgrounds, accessible playgrounds, intergenerational playgrounds, natural playgrounds, etc. According to him, "playgrounds vary by location, play materials, functions, and purposes" (Frost, 2012: 1). However, in this thesis, the term “playground” refers to open outdoor spaces in large housing neighborhoods that include natural and building equipment and structures destinated for children’s play.

2.3.1.2. History and Emergence

According to Frost et al. (2012), children's outdoor play spaces throughout history were the wilderness, the fields, streams, and hills of the country, the roads, streets, and vacant places of villages and towns. Therefore, the term playground refers to all the places where children gather to play their free and spontaneous games. Furthermore, initiated by Froebel with his first kindergarten in Blankenburg, Germany in 1837, playgrounds became a common universal need while the first playground in the United States was called "gymnasia". The early American kindergartens responded to Froebel's call for play and self-activity by adding swings, climbing devices, and various toys to their playgrounds (Figure 8). As a result, the early 20th-century playgrounds included featured manufactured equipment and emphasized the children's physical development. This progress in the childhood outdoor world was reinforced by the works of early 20th-century child research provided by researchers such as Piaget, Vygotsky, Bruner, et al, Huizinga, and other pioneers (see chapter 1).

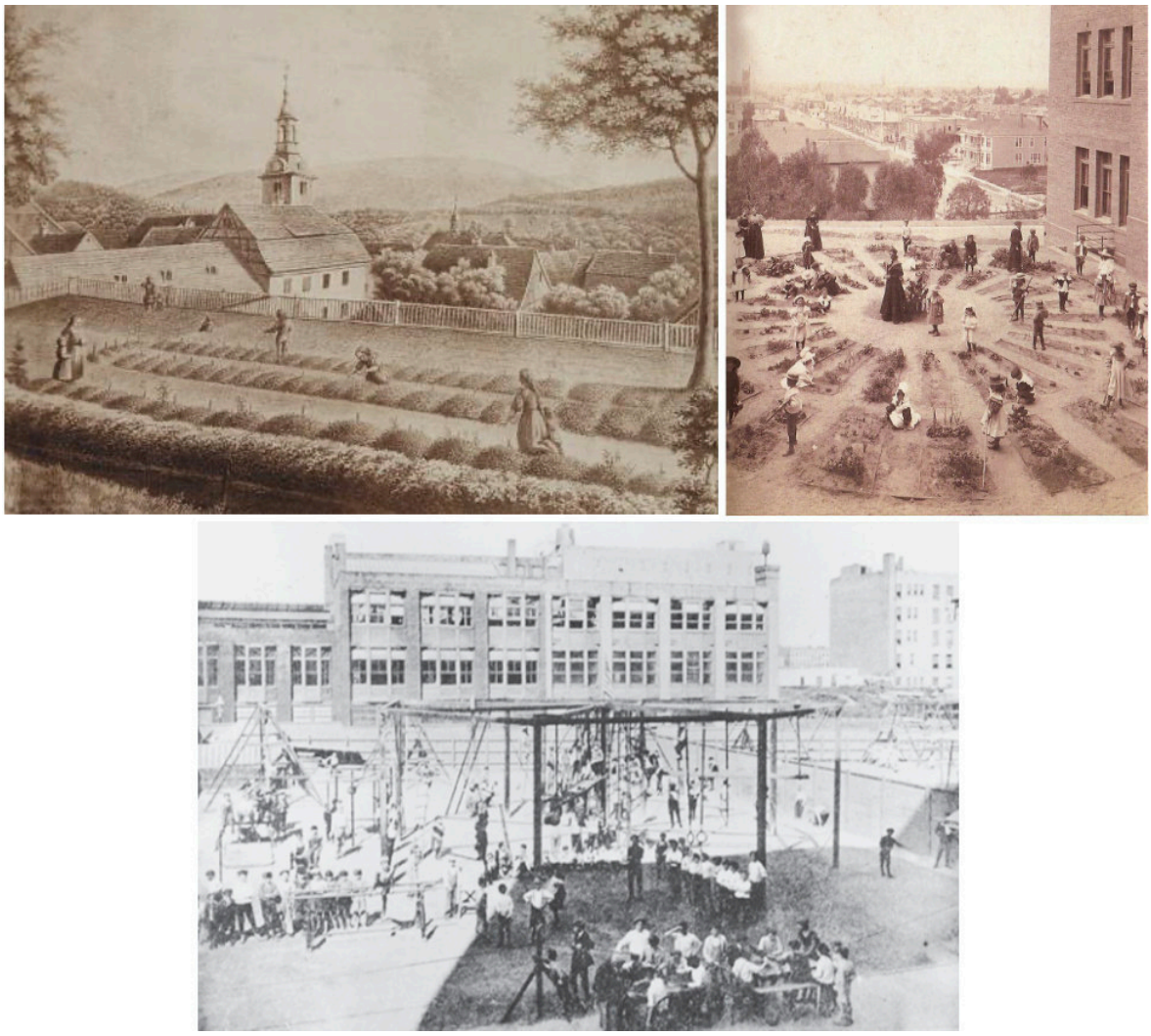

Figure 8 Examples of the first kindergartens. From left to right: Froebel's first kindergarten in Blankenburg, Germany in 1837; Los Angeles' Kindergarten circa, 1900; One of the first organized playgrounds in the United States "gymnasia" (Source: Online; Frost, 2012).

2.3.1.3. Types of Playgrounds

There are different types of playgrounds according to their components (equipment, structures, natural elements, etc.), location, and affordances. In order to provide a deeper perspective on playgrounds, some of these different types will be introduced within this section. The three types of playgrounds are identified as follows: the traditional playground (traditional equipment), the contemporary playground (modern type), and the adventure playground (creative or exploratory) (Figure 9).

Figure 9 The three types of playgrounds. From left to right: Traditional-equipment playgrounds; Contemporary type of playground; Adventurous playground (Source: Online).

The Traditional Type called also traditional-equipment playgrounds (Hayward et al., 1974) is the most common, and it includes swings, seesaws, slides, and other common items. They fulfill the requirement for physical activity but do not provide many chances for social or cognitive growth. These playgrounds restrict some of the options for outdoor play and instead focus children's attention and activities on the typical playground equipment, denying them the opportunity to experience the outdoor features (Stoiljković, 2006). This type of playground offers an insufficient response to the children's needs (Matthews, 1985). Nevertheless, these traditional-equipment playgrounds seem to enjoy widespread support from the public and the community and are still being constructed (Hayward et al., 1974).

The Contemporary Type (modern type) contains the so-called composite play structure, which is made up of a variety of devices and pieces of equipment combined together to make a whole (superstructure). They are both pricey and few in number (Stoiljković, 2006). These structures emphasized novel forms, textures, and different heights in esthetically pleasing arrangements (Hayward et al., 1974, p. 134). Since they are more engaging and challenging compared to the regular ones, children enjoy and prefer them more. Additionally, they boost instructive playing and learning (Stoiljković, 2006).

The Adventurous Type (called also creative or exploratory) includes a variety of elements, notably sand, water, grass, trash, etc. (Stoiljković, 2006). This type is based on providing play materials rather than traditional play equipment which has been mentioned as a way to increase the variety of play options available to children (Hayward et al., 1974). This range of components provides the opportunity for play that encourages imagination, investigation, and experimentation with various materials. These playgrounds offer significant flexibility in that they let kids create their own playthings. They promote the growth of the mind, body, and spirit. Playgrounds like this encourage a high quality of unhindered playing and inquisitive learning because the spaces are informal and natural, which shows the superiority in meeting the children's play needs (Matthews, 1985; Stoiljković, 2006).

2.3.2. Streets as Playgrounds for Children

In Third World cities, streets are the most attractive spaces for children's play (Abu-Ghazzeh, 1998, p. 799). As claimed by pioneers (Moore and Young, 1978; Ward, 1978 and others), street play is a global cultural phenomenon. Children of all ages used streets, sidewalks, and alleys as playgrounds before the motorcar took over these spaces (Esbensen, 1990). Unlike developed countries, in Third World countries including Algeria, we still see many children on the streets exercising different kinds of activities, especially wheeled games (Figure 10).

With cramped living conditions and a lack of playgrounds, the street provides an open and freely accessible playful urban space. It is only in the street (Zenka) that the child exercises through play activities a free autonomous activity (Benghabrit, 1997). According to her, children participate in the configuration of their neighborhoods by appropriating public streets as play areas. This represents a major sign of ignorance of planners of deep social reality. The absence of specialized spaces for play has encouraged the traditional reappropriation of the immediate environment. Therefore, the street is transformed into a playground by the children, which is the most alarming sign of the failure of a certain urban policy in Algeria. Moreover, the massive presence of children in the street is the form taken by the contestation of a policy made without them and against them.

Figure 10 Examples of street play between past and present. From left to right: during the early 1900s in Western countries; Nowadays in Algeria (Source: The online museum of London docklands; Author).

2.3.3. Outdoor Open Spaces and Play Activities

As mentioned earlier, young people use open outdoor spaces in active and creative ways in order to qualify themselves and prepare for adult life. They create their own spaces and territories in public open spaces, where they can be together undisturbed, pursue their interests and develop their skills. They want to be seen and create something of their own. Thus, they appear as important actors in these public spaces (Lieberg, 1994). However, at the Algerian level where young people represent a large proportion of the total population of ZHUN, they invade building entrances, the street, and parking lots for recreational activities (Mebirouk et al., 2005) (Figure 11). In order to provide a deeper understanding of the relationship between open outdoor spaces and play activities, this section will expose some literature reviews related to the impact of these spaces on children's play activities.

Figure 11 Children playing in outdoor open spaces. From left to right: playing in the building entrances; while others play in the streets and parking lots (Source: Mebirouk et al., 2005; Author).

2.3.3.1. Impact of Open Outdoor Spaces on Children's Play Activities

An increasingly recognized truth is that the living environment has an impact on its users' health and well-being as well as their lifestyles (Bedimo-Rung et al., 2005; Croucher et al., 2007; Abraham et al., 2010). According to World Health Organization, the living conditions of the urban environment are considered the key to the health and well-being of its inhabitants (Lestan et al., 2014). Evidence from the literature consistently indicates that there is an association between the built environment, health and well-being, and levels of physical activity (Giles-Corti et al., 2005; Kaczynski & Henderson, 2007; Holt et al., 2008). Some of this evidence will be exposed subsequently.

Herrington and Studtmann (1998) developed a research project conducted in the outdoor play yards at the Child Development Laboratory, at Iowa State University. Their research investigated the outdoor environment's natural materials and conditions that can contribute to the development of young children from 2 to 6 years old. The analysis of their research data revealed that installing plant material and other landscape elements provided additional impact on outdoor activity and thus on the realms of development compared to the existing playgrounds.

To examine the relationship between the built environment and physical activities through the overweight status in children, Grafova (2008) investigated 2482 children aged 5–18 and their primary caregivers. In addition, a number of built environment characteristics were examined: population density, alpha index of connectivity, urban design, pedestrian fatality from motor vehicle crashes, restaurant density, and grocery store and convenience store densities. Moreover, he examined the children's neighborhood physical conditions, such as the condition and upkeep of the buildings and street surface on the block were analyzed. The results of this study highlighted the importance of the neighborhood's environmental conditions for outdoor activity and therefore for the weight status of children and adolescents.

Using behavior mapping data, Cosco et al. (2010) indicated that physical activity levels vary across different types of behavior settings including pathways, play structures, and open areas where the same type of setting with different attributes, such as circular versus straight pathways, and open areas with different ground surfaces, such as asphalt, compacted soil, woodchips, and sand, attracted different levels of physical activity.

In a comparative study, Robertson et al. (2020) compared the frequency and complexity of outdoor play of two groups of fifteen 4–5-year-old children in two outdoor spaces differing in natural elements, resources, and spatial characteristics using field notes and behavior mapping. As a consequence, findings showed that frequent and complex play is supported by the following elements: balanced conjunction of man-made resources and significant vegetation and natural loose parts; opportunities for seclusion and lack of overcrowding; linking pathways and open-ended design.

The previous examples of academic studies confirmed the existing impact of the outdoor environment on play activity. In order to synthesize this impact of the outdoor spaces' conditions and qualities, Gehl provided a model that attests to the impact of the quality of the urban open spaces on the levels of outdoor activities (optional selective activities and social activities) are influenced by (Hajialiakbari et al., 2022) (Figure 12). However, this impact will be considered in detail within the next chapters of this thesis.

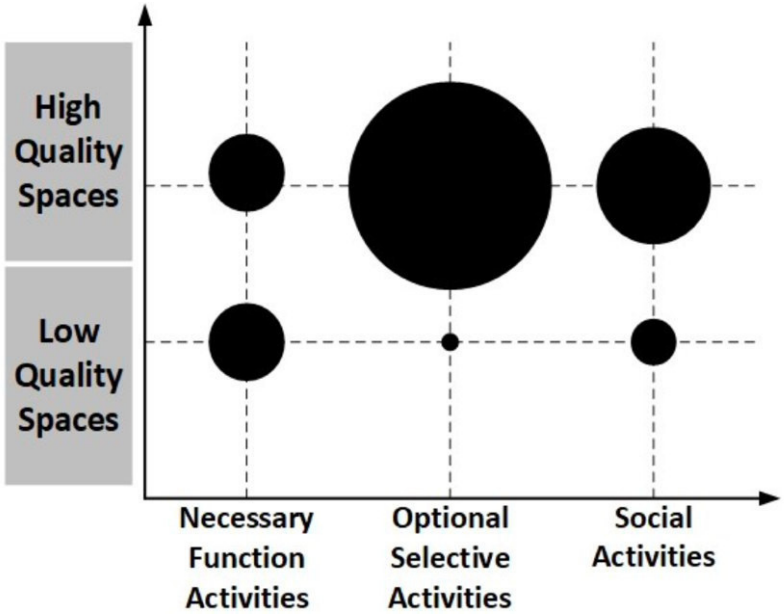

Figure 12 Gehl's Model of the impact of space quality on different activities (Source: Hajialiakbari et al., 2022, p 61).

2.3.3.2. Open Outdoor Spaces and Children's Satisfaction

Satisfaction is a multi-dimensional construct concentrating on diverse aspects (physical, social, symbolic, or cultural) at the neighborhood level (Severcan, 2019). It is conceptualized as the difference between the actual and ideal conditions perceived by the person (Galster & Hesser, 1981) where the degree of congruence (incongruence) between the actual and the

desired conditions reflects the degree of satisfaction (Li & Wu, 2013). Satisfaction has a strong correlation with the concept of place attachment as an effective link between a person and a place (Low & Altman, 1992; Brocato, 2006), it promotes as well the social and political involvement in the protection of the physical and social features of the neighborhood (Mesch & Manor, 1998)

A range of factors may affect children's satisfaction with the open outdoor spaces of the neighborhoods (Severcan, 2019). Various studies have mentioned the quality and quantity of open spaces as factors monitoring children's residential satisfaction. Among these factors, the accessibility to recreational places (Hadjiyanni, 2000); visual attractivity, and safety (Severcan, 2012 as cited in Severcan, 2019); hygiene and cleanliness (Loukaitou-Sideris & Stieglitz, 2002); and natural elements (Chatterjee, 2006; Castonguay & Jutras, 2010) as well as the neighborhood location, playground equipment, the adequate maintenance, the existence of good friends and social interactions. Furthermore, individual factors may have an effect on children's satisfaction as well, such as age (Schiavo, 1988); income, and length of stay in a residence (Basolo & Strong, 2002; Chapman & Lombard, 2006; Lu, 1999); and also, some living experiences (Li & Wu, 2013).

Conclusion

As already mentioned, large housing estates represent one of the main components of the urban entity, combining physical and social ingredients, however, their multidimensional composition (units of dwellings, in-between spaces, and outdoor open spaces) and vocation (different age and ethnic categories) lead to their complexity. In this chapter, we have seen as well the importance of open outdoor spaces as an essential component in large housing neighborhoods. These spaces are essential in enhancing the quality of life and urban environment while offering residents physical, social, environmental, and economic benefits, especially the child category.

In spite of the previous facts, the Algerian context presents a serious mediocrity formed by the precariousness of the dwellings and the external spaces due to the history, economy, and policy of these estates, which resulted in the non-respect of the standards of construction and the absence of upkeep and maintenance. Accordingly, the children's category in the Algerian housing estates seems to have a low quality of open outdoor spaces, impacting their quality of life and development. As a consequence of the deteriorating quality of life in urban

environments, making large housing neighborhoods better places for children (and residents in general) has become an important debate. In order to discuss this quality of life for the children's category through the open outdoor residential environments, the next chapter will debate the concepts of outdoor quality and space usage.

Chapter III: Quality and Usage of Urban Open Outdoor Spaces

Introduction

'Child-driven free play' (Castonguay & Jutras, 2009, p. 101) is the type of play that typically occurs in neighborhood outdoor spaces, it has unique developmental benefits, and it affects the physical, cognitive, social, and emotional development (see areas of child development in chapter 1) while there are many ways in which the characteristics of open outdoor spaces influence this development of children. Therefore, the set of characteristics, components, and dimensions of the open outdoor spaces represents its whole quality conception.

The aim of this chapter is to provide an insight into the concept of 'quality' and how it has been adopted within the field of outdoor environments for the child category. On the other hand, this chapter points to provide an overview of the notion of 'outdoor space usage' by children based on the outdoor environmental affordance and characteristics. The current chapter discusses both theoretical and empirical issues regarding the correlation between 'outdoor spatial quality' and 'outdoor spatial usage'.

In order to attain the previous objectives, this chapter is divided into two sections, the first section will be a theoretical framework that provides research-based data related to the concept of quality based on the different academic works of various authors such as Carmona and Sieh; Heft; Kayttä; Cosco and colleagues; Herrington and Lesmeister; and many others. In this section, we consider the current state of knowledge about the urban open outdoor spaces' quality from a childhood perspective. This section synthesizes then the contextual background related to outdoor space quality to provide a list of key quality criteria that will be employed in measuring and assessing this outdoor spatial quality.

On the other hand, the second section of the chapter provides an overview of the notion of 'outdoor space usage' according to the child category. This section of the third chapter of this thesis is interested in examining the impact of the quality of the urban open outdoor spaces as being the main factor that controls and manages the children's outdoor activities and thus guides the manners of use of these urban entities. In this part, outdoor space usage will be considered through its different modes, affordance, and the different ways of space usage quantifying based on the different academic works of various authors such as Kyttä; Heft; Stapleton and Lynch; Herrington and Brussoni; de Wit and colleagues; Tovey; Waters; and others.

1. Urban Open Outdoor Spaces' Quality

As stated in the previous chapter, the open outdoor spaces for the children's category in large housing estates are of high importance (see outdoor open spaces and children's category in chapter 2). However, the quality of these outdoor spaces plays an important role in their functioning and usage. Therefore, the first section of the third chapter will focus on the quality of these urban open outdoor spaces for children. This section first aims to explore the concept of quality and then to develop a quality identification framework for designing and assessing these spaces based on the various works of literature review.

1.1. Concept of Quality

The concept of quality is a multidimensional concern. Researchers tried to define this concept of quality and identify its different components and dimensions. In this section, an approach to the notion of quality will be presented in reference to the works of Carmona and Sieh (2004) as well as Sebastianelli and Tamimi (2002) which are based mainly on the research conducted by Garvin (1984; 1987).

1.1.1. Definition of Quality

There is a general feeling among people that they are able to recognize quality when they see it or experience it (they are capable of making judgments about what is good or bad). However, according to Carmona and Sieh (2004), a definition of what quality means is not so straightforward, since the term itself is ambiguous and has different meanings depending on the situation.

In the same context, Sebastianelli and Tamimi (2002) provided a deep definition of the concept of quality according to different approaches. From a transcendent approach, the definition of quality is emanated from Plato's discussion of beauty as synonymous with innate excellence. However, from a user-based approach, quality is defined as "the extent to which a product or service meets and/or exceeds customers' expectations". While from a manufacturing-based approach, quality is defined as "conformance to specifications relates to the degree to which a product meets certain design standards" (pp. 443-444). According to Carmona and Sieh (2004), quality should be seen as "the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs" (p. 22). Thus, the first step in measuring quality is to understand what it refers to.

1.1.2. Dimensions of Quality

Carmona and Sieh in "Measuring Quality in Planning" stated that quality refers to three key dimensions: quality refers to the degree or level of excellence that something has; to the notion of a benchmark that reflects excellence; and to the characteristics or features of something (2004, p. 14). Whereas, the well-known framework of Garvin (1984; 1987) for thinking about product quality offers eight product quality dimensions which are: Performance, Features, Reliability, Conformance, Durability, Serviceability, Aesthetics, And Perceived Quality (Table 1) (Sebastianelli & Tamimi, 2002). Garvin contends that understanding the different dimensions of quality is necessary to build a vocabulary for discussing quality and to construct a strategy for delivering it. The concept of Quality is a multidimensional concern, thus, in order to get a rounded picture of it, judgments must be made across these different dimensions.

Table 1 Gavin's product quality dimensions (Source: Sebastianelli & Tamimi, 2002, p 445).

Dimension	Definition
Performance	The primary operating characteristics of a product
Features	The secondary characteristics of a product that supplement its basic functioning
Reliability	The product's probability of failure-free performance over a specified period of time
Conformance	The degree to which a product's physical and performance characteristics meet design specifications
Durability	A measure of useful product life, i.e., the amount of use a customer gets from a product before it deteriorates or must be replaced
Serviceability	The ease, speed, courtesy, and competence of repair
Aesthetics	How the product looks, feels, sounds, tastes or smells, a matter of personal preferences
Perceived Quality	Quality based on image, brand name, or advertising rather than product attributes and, of course, is subjectively assessed

1.2. Quality Identification Framework

As it was mentioned earlier, quality is a difficult concept to define, since it should always be considered in relation to a specific service or product. In order to identify quality in our study context, we must break down the concept of quality and its dimensions into manageable and less complex parts by developing a framework that identifies what constitutes quality within urban open outdoor environments for children. Although this process is not always straightforward, a large work of literature is required. As a result, monitoring and managing quality can then be accomplished through such quality indicators presented in this thesis as a set of Quality Criteria for Children's Urban Open Outdoor Spaces.

1.2.1. Quality Criteria for Children's Urban Open Outdoor Spaces

Numerous outdoor spaces for children (including public outdoor spaces, neighborhood outdoor environments, as well as schools' playgrounds and childcare centers' outdoor spaces) have been the subject of much literature. The literature study for the design and evaluation of outdoor play spaces for children is presented in this section based on a review of 17 academic research papers from around the world that were published between 1988 and 2022.

Several decades ago, preliminary studies were conducted on outdoor spaces for children and discussed various related quality criteria. Based on Gibson's (1979) concept of affordances, and using various research references including Barker and Wright (1951; 1955), Ward (1978), Hart (1979), Moore (1986), and other studies, Heft (1988) provided prior research about the affordances of children's environments as a practical approach to environmental description. As a result of his pioneering work, he identified a set of properties of children's environments and proposed a preliminary taxonomy for these properties.

Heft's taxonomy included ten different categories of properties of children's environments that will be exposed as follows: Flat, relatively smooth surface; Relatively smooth slope; Graspable/detached object; Attached object; non-Rigid, attached object; Climbable feature; Aperture; Shelter; Moldable material (e.g., dirt, sand); and Water (p. 36). According to Heft, this functional taxonomy may provide a more psychologically meaningful perspective on children's environments compared to the standard form-based classification of environmental features.

A decade later, Gallagher et al., (1999) analyzed the childcare rules and regulations based on the literature and under a study of “Child Care, Cost, and Quality” according to different aspects (Environment, Administration, Operations, Personnel, Content). Concerning the Environmental aspect, the authors provided the following list of quality criteria: "a spacious, comfortable, varied, attractive, stimulating environment for children, with well-defined activity centers and playgrounds that have accessible age-appropriate materials available to promote cognitive, language, social-emotional, self-help and physical growth, and low child-to-staff ratios, and small group sizes" (p. 318). According to the authors, the physical environment's regulations were rated using criteria for creating and maintaining a healthy and safe environment.

In a cross-sectional study based on individual interviews with 8-9-year-old children in Finland and Belarus, Kayttä (2002) used the taxonomy developed by Heft (1988) to study the children’s environments of varying degrees of urbanization (included urban, suburban, small-town, and rural environments in both countries) adding new affordances concerning sociality to Heft's original taxonomy. However, Cosco (2006) has led to a more profound investigation of the outdoor environments' characteristics and children's physical activities. The author employed a variety of methods that prescribes the association between different types of play area design and the level of physical activity of 3-5-year-old children. As a part of the findings, Cosco demonstrated that children show greater amounts of physical activity in environments containing play equipment, vegetation, pathways, and areas for wheeled toy use, large setting size, and natural settings that offer colors, textures, movement, and shadow patterns (pp. 119-121).

Herrington and Lesmeister (2006) developed a set of Key criteria called "Seven Cs" identified from their first phase of a five-year multidisciplinary study. Findings were gathered from data from a review of the literature concerning landscapes designed for children and a comparison of 12 sample outdoor play spaces at child-care centers in Vancouver, Canada. The Seven Cs contains the following criteria: Character which indicates the overall character, feel and design intent of outdoor play spaces (p. 66); Context indicates on the one hand the correlation between the space's size and the number of children while on the other hand, it refers to the micro-climatic conditions resulted from the location of the play space vis-à-vis the ground plane, the degree of transparency related to the surrounding context, and the degrees of sun and shadow; Connectivity indicates the play space's physical,

visual, and cognitive connectedness (p.69); Furthermore, Change pertains to the variously sized spaces designed for the play area and how these spaces alter throughout time (p. 72); The Chance criterion involves a situation that provides a possibility for the child to create, manipulate, and leave their mark on the play area (p. 73); the Clarity criterion includes physical legibility and perceptual imageability (p. 76); and Challenge speaks for the range of both physical and mental challenges that a play area offers (p. 77). According to the authors, these key criteria assist as a set of design guidelines.

A considerable amount of literature concerning outdoor environments for children has been published during the previous decade (2010-2020). For example, the research work by Cosco et al., (2010) used a behavioral mapping research method as a tool for linking preschool physical activity and outdoor design. The authors involved various perceived properties of the physical environment (affordance) as follows: pathways, play equipment, sand play, open areas, and ground surface. The authors also emphasized the significance of seasonality and climate, which includes elements like sun orientation, precipitation, plant features, and climatic zones.

Moreover, Colabianchi et al., (2011) examined whether specific features or amenities of parks or playgrounds are associated with physical activity using a detailed environmental assessment tool and direct observation. Their findings indicated a number of play features and qualities including types and numbers of play equipment (hang from, slide down, climb up/through, stand/walk on, swings, climbers/spin on, blacktop game, spring toy, imaginary play structure, and play panel); overall condition (from poor to excellent); overall cleanliness; overall quality; overall safety; the presence of benches and presence of trash cans; and coverage/shade (pp. 3-4).

Another study by Ter (2011) sought to identify the quality standards that are useful in judging urban parks as qualified and successful places for the residents of Konya, Turkey, particularly the children. The main categories of the key quality criteria are Activity and variety, Access and linkage (Legibility, Continuity, Proximity, Convenience, Walkability, Accessibility, and Connection with activities), Comfort and Image (Safety, Sittability, Greenness, Cleanliness, and Landscape Elements), and Sociability (Cooperation Friendliness, Interactivity, Diversity, Storytelling, and Friendliness). These categories are defined by using a literature research approach (p. 5369).

In a related geographical context, a qualitative research method in the city of Tehran, Iran was adopted by Oloumia et al., (2011) in order to determine the environmental characteristics of child-friendly outdoor spaces based on an interdisciplinary research approach (observation, questionnaire, drawings' analysis, and practical participation in the process of design). According to their findings, the following categories are the most effective in terms of designing appropriate outdoor environments for children's development: scale (an appropriate children's space), amenity (openness, clear visibility, and pleasantness of the surroundings), safety (comfortable physical and mental condition), accessibility (high walkability), sociability (gathering and communication), and variety (motivation, attractiveness, and diversity) (p. 437). Oloumia et al. provided some physical settings that reflect the previous design criteria such as variety in the pavement; the suitable scale of trees; suitable height of signboard for children tallness; appropriate edge; support and safety in the playground; natural area; the correct junction between ways and edge; space for group children play.

Ferguson et al. (2013) briefly reviewed the evidence for relations between child development and the physical environment in Western and global South contexts. Contrarily to previous studies, the authors provided a set of significant effects on the quality of physical environments for children which includes toxins, pollutants, noise, crowding, and chaos. Their research sought to provide light on how to lessen the negative impact of several environmental risk factors on children's cognitive and socioemotional development worldwide. Ferguson et al. mentioned some physical qualities that most children growing up in the global South live in:

> High levels of air and water pollutants; nonexistent or inadequate collection of household waste; poor drainage; poor sanitation; proximity to busy street traffic; and limited or absent access to childhood resources such as open green space, grocery stores, schools and hospitals, and play space (p. 454).

One year later, Spencer and Wright (2014) published a scholarly study based on a survey of high-quality outdoor play areas for young children. According to them, the key quality criteria are the following: Multipurpose open spaces (open play spaces where children can engage in gross motor activities such as running, jumping, and rolling); Anchored play equipment (climbing structures, swings, slides, and spring riders); Natural elements (trees, stumps, boulders, long grass, water, and pebbles); Risk and challenge (exciting and

adventurous); Manipulative equipment (objects such as balls, jump ropes, ribbons, and hula hoops); Sand play area; Water play features; Loose parts (materials for building that include different items such as crates, building blocks, and branches); Decorative elements; and others.

Furthermore, Czalczynska-Podolska (2014) used an observational study of child behavior in 10 modern public playgrounds to examine the effect of playground spatial elements on children's play. The employed approach includes the identification of play zones, on-site observations, statistical evaluation of zones (playability and sociability), and investigation of relationships between feature categories and play zones' ratings. Her research suggests that the playground should be designed to incorporate a number of essential elements, including Appearance (magical and unique playscapes), Usage (provision of challenges, variety of equipment, and flexible materials), and Arrangement (visual boundaries, linkages to surrounding context) (p. 134).

On the other hand, Czalczynska-Podolska defined the following features as key features for evaluating the playgrounds' quality: Uniqueness (landmarks, animal features, fantasy shapes, diversity in topography); Contrasts (diversity in scale, texture, color, materials); Curiosity (changed, modified, and manipulated interactive features); Variety (Multi-activity settings, open areas, natural objects); Challenge and Achievement (moving equipment, and safe-risk elements); Enclosure (functional clarity, and visual and tangible boundaries); and Continuity (integration, linkages, and access) (p. 140).

Based on the interpretation of children's drawings in an impoverished area in Tehran, Ghanbari-Azarneir et al. (2015) identified various features of child-friendly environments. The characteristics are categorized as being: accessible, controlled, safe but not without risks, adventurous, diverse, sociable, flexible, and containing natural elements (p. 27). Besides that, Zhang and Li (2017) assessed the friendliness of Taiwanese communities toward children's activities based on the following five environmental characteristics: safety (traffic safety and fear of crime), amenity (openness and aesthetics), accessibility (convenience and walkability), sociability (conduciveness to gathering and staying), and attractiveness (variability, challenge, and complexity) by using an observational methodology to identify neighborhood environmental features that influence children's outdoor activities (p. 51).

More recently, Jeon and Jun (2021) have provided a set of design criteria for an adequate environmental outdoor playground based on the collected opinions of experts in child development, child physical education, and playground designs from South Korea. The research yielded results that defined 9 design criterion categories and 23 elements within those categories for outdoor playgrounds. The nine categories are the followings: Effectiveness (the degree of goal achievement); Innovation (changing the old to the new, breaking away from the former traditional playgrounds); Diversity (shape and style); Interest (the feelings of enjoyment and excitement and the character of storytelling); Efficiency (achievements of minimal effort); Complexity (combination of different functions); Stability (unchanged and constant of the fixed equipment); Relationship (connected targets and linkage to surroundings); and Connectivity (interaction with the space) (pp. 12-13).

Another study from Sweden by Cheng (2021) investigated the impact of a playground in the city of Malmö on young children's play from a design perspective. Using affordance theory, findings provide four factors for assessing the quality of play spaces in the early stages of design. These factors are the followings: Rich natural features; Suitable play equipment, Stimulating elements; and High-quality parent-child interaction. On the other hand, Cheng indicated some environmental qualities that support certain of the previous affordance such as Flat, relatively smooth surfaces; terrain variations, malleable and Loose natural materials (grass, leaves, twigs, and stones); Climbable features; Shelter; Moldable material; and water (pp. 13-14).

Most recently, Moreira et al. (2022) investigated the relationship between the quality of kindergartens' outdoor physical environment and preschoolers' social functioning in Gondomar, Portugal. The outdoor quality was measured by a specific physical environment rating scale. Findings suggested the following set of quality criteria: playgrounds with various and diverse surfaces (grassy areas, asphalt), natural play materials, functional equipment (slides, fixed swing), and loose parts. Additionally, the availability of specific types of play materials (sandboxes, trees to climb, sand toys) (pp. 8-9).

In order to further understand the previous quality criteria and characteristics of designing and assessment of outdoor environments for children, the following grouping (table 2) classifies all the data obtainable from the literature review.

Table 2 Quality Criteria of Outdoor Spaces for Children (Source: Author).

Author	Quality Criteria	Settings
Heft (1988)	-Flat/smooth surface -Smooth slope -Graspable/Detached object - Attached object -Non-rigid/ Attached object -Climbable feature -Aperture - Shelter -Moldable material -Water	Smooth planes; greenness; tree branches; dirt clod; rock; sandpile; crates.
Gallagher et al. (1999)	-Spacious -Comfortable -Varied -Attractive - Stimulating - Accessible - Age-appropriate materials	playgrounds; and activity centers.
Kayttä (2002)	-Heft's (1988) quality criteria - Sociality	Playgrounds; safe facilities; home yards; sports grounds; and nature environments (large green areas, forests, and fields);
Cosco (2006)	-Play equipment -Vegetation - Pathways -Areas for wheeled toy use -Large setting size -Natural settings -Colors -Textures -Movement -Shadow patterns	Swings; play house; water play; arts & crafts; benches; shade structure; pergola; lawn; wood chips; sand; flowers; grasses; rocks, trees and moving parts.
Herrington & Lesmeister (2006)	-Character -Context -Connectivity -Change -Chance -Clarity - Challenge	Space's size; shadow; vegetation and stones; sand buckets; overhead canopy; water troughs
Cosco et al. (2010)	-Pathways -Play equipment -Sand play -Open areas -Ground surface -Climate adaptation	Hard surface (asphalt, compacted soil, and concrete); curvy pathways;

		number and type of play equipment.
Colabianchi et al. (2011)	-Play equipment -Condition -Cleanliness -Safety -Shade	Benches; trash cans; coverage elements.
Ter (2011)	-Activity and variety -Access and linkage -Comfort and Image -Sociability	Location; size; benches; bins; lighting units; greenery and trees; and sculptures.
Oloumia et al. (2011)	-Scale -Openness -Clear visibility -Pleasantness -Comfortable physical and mental condition -Safety -Accessibility -Walkability -Sociability -Variety -Motivation -Attractiveness	Variety in pavement; suitable scale of trees; suitable height of signboard for children tallness; appropriate edge; support and safety in playground; natural area; correct junction between ways and edge; space for group children play.
Ferguson et al. (2013)	-Absence of toxins -Absence of pollutants -Absence of noise -Absence of crowding -Absence of chaos	High levels of air and water pollutants; nonexistent or inadequate collection of household waste; poor drainage; poor sanitation; proximity to busy street traffic; and limited or absent access to childhood resources (open green space, and play space).
Spencer & Wright (2014)	-Multipurpose open spaces -Anchored play equipment -Natural elements -Risk and challenge -Manipulative equipment -Sand play	Climbing structures, swings, and slides; Trees, stumps, boulders, long grass, water, and pebbles; Objects such as

	area -Water features -Loose parts -Decorative elements	balls, jump ropes, ribbons; Crates, building blocks, and branches.
Czalczynska-Podolska (2014)	-Appearance -Usage -Arrangement -Uniqueness -Contrasts -Curiosity -Variety -Challenge -Enclosure -Continuity	Magical and unique playspaces; a variety of equipment; flexible materials; visual and tangible boundaries; landmarks; animal features; fantasy shapes; diversity in topography; diversity in scale, texture, color, and materials; changed, modified, and manipulated interactive features; multi-activity settings, open areas, natural objects; moving equipment, and safe-risk elements; and access.
Ghanbari-Azarneir et al. (2015)	-Accessible -Controlled -Safe but not without risks -Adventurous -Diverse -Sociable -Flexible -Containing natural elements	Flat alleys; slow slope; large flexible outdoor space; and natural elements.
Zhang & Li (2017)	-Safety -Openness -Aesthetics -Convenience -Accessibility -Walkability -Conduciveness -Sociability -Attractiveness -Variability -Challenge -Complexity	Large scale of the spaces; winding streets; pavements; green open space; tidy facades; plenty of trees; organic street patterns; grid patterns; and mixed land.
Jeon & Jun (2021)	-Effectiveness -Innovation -Diversity -Interest -Efficiency -Complexity	Modern playgrounds; shape and style; and fixed equipment.

	-Stability -Relationship -Connectivity	
Cheng (2021)	-Rich natural features -Suitable play equipment -Stimulating elements -High-quality parent-child interaction	Flat, relatively smooth surfaces; terrain variations, malleable and loose natural materials (grass, leaves, twigs, and stones); climbable features; shelter; moldable material; and water.
Moreira et al. (2022)	-Playgrounds -Functional equipment -Loose parts -Specific types of play materials	Various and diverse surfaces of playgrounds; grassy areas; asphalt; natural play materials; slides; fixed swings; sandboxes; and trees.

1.2.2. Key Quality Criteria for Children's Urban Open Outdoor Spaces

Based on the previous quality criteria for outdoor spaces for children (QCOSC) derived from the literature review, this section will summarize these criteria to provide a list of key quality criteria for outdoor spaces for children (KQCOSC) that will be employed in measuring the quality of our case study (Table 3.3). the quality criteria for children's open outdoor spaces include the following: Play Equipment and Structures; Vegetation and Natural Elements; Accessibility and Visibility; and Diversity. In order to conduct an investigation of the study cases in our research, the mentioned key criteria will be used as guiding parameters.

1.2.2.1. Play Equipment and Structures

Play equipment and structures are considered the most important elements composing outdoor spaces of quality for children. These elements have various parameters that guide their design, implantation, and maintenance related to children’s needs for activities and safety. According to the literature of review, the play equipment, and structures within the playgrounds have to be considered according to their localization, size, scale, number and types of facilities, flexibility, stability, and mobility of structures, in addition to the provision of sandboxes, loose parts, the inclusion of a variety of materials and types of surfaces taking into consideration the safety measures. One of the most important elements incorporated into

the outdoor spaces' quality for children is the overall conditions and the regular maintenance of the play equipment and structures, the different types of floors, and the pedestrian paths.

1.2.2.2. Vegetation and Natural Elements

Vegetation and natural elements are considered primordial components of outdoor spaces of quality for children. Exposure to greenness has been associated with both physical and mental health as well as well-being through promoting physical activity, reducing stress, enhancing social interaction, and reducing various pollution types (Dadvand et al., 2014 p.1329). According to European regulation, fully urbanized areas set a minimum of fifteen square meters of public green space per inhabitant while any urbanization project intended for the residence of more than five hectares should include 10% of green space accessible to the public (Delnoy, 2015 p.114). According to the literature review, the vegetation and natural elements within the outdoor areas must be considered according to their size, topography, textures, colors, variety of types, and conditions and maintenance while taking into consideration the safety measures.

1.2.2.3. Accessibility and Visibility

Accessibility and walkability are seen as fundamental requirements for children's pedestrian movements and safety in the context of child-friendly urban environments. The primary driving forces behind accessibility and walkability are effective walking width, spatial connectivity, visual integration, visual obstructions to pedestrian safety, completeness of crossing facilities, and the impact of traffic density. Children's walking accessibility is guaranteed by having accessible and secure walking networks and locations. Different levels of meso and micro usage of the road environment are evaluated for this criterion in order to ensure safety through accessibility and walkability (Zhao et al. 2022). In the framework of child-friendly urban environments, visibility and boundaries also represent key needs for children's pedestrian movements and safety. Visibility is a quality of the spatial organization that is connected to walkability and accessibility. Visibility refers to the visual information offered to observers and is directly connected to the geometry of space, the openness of the areas, boundaries, enclosure, and linkage to the environmental surroundings as well as pedestrian movement, natural surveillance, and children's safety. Because of the relationship between movement and geometry, visual fields have their own form (Gomes et al., 2019) (the concepts of Accessibility and Visibility will be deeply explained in chapter 5).

1.2.2.4. Diversity

Diversity is a large quality criterion of outdoor spaces for children. It includes a vast field of characteristics, settings, and elements that incorporate designing and enhancing the quality of the outdoor space. Based on the previous quality criteria of outdoor spaces for children derived from the literature review, outdoor spaces with a diversity of characteristics could be: comfortable, attractive, stimulating, challenging, motivating, unique, innovative, complex, rich, adventurous, safe but not without risks as well as having character, particular context, and enable change as well as enhancing sociability and pleasantness. Diversity features include mainly urban furniture such as benches, trash cans, lighting units, shade structures, coverage elements, various textures, colors, materials, mixed lands, and regular overall cleanness and maintenance and overall safety.

Table 3 Key Quality Criteria for Children's Urban Open Outdoor Spaces (Source: Author).

Key Quality Criteria	Settings
Play Equipment and Structures	Localization, size, scale, number and types of facilities, flexibility, stability, and mobility of structures, sandboxes, loose parts, variety of materials and types of surfaces, and maintenance.
Vegetation and Natural Elements	Size, topography, textures, colors, variety of types, and conditions and maintenance.
Accessibility and Visibility	Geometry of space, openness, boundaries, enclosure, linkage to the surroundings and movement, walking width, spatial connectivity, visual integration, visual obstructions, crossing facilities, traffic density, pedestrian movement, natural surveillance, and children's safety.
Diversity	Urban furniture, benches, trash cans, lighting units, shade structures, coverage elements, textures, colors, materials mixed lands, and regular overall cleanness and maintenance and overall safety.

2. Children's Use of Urban Open Outdoor Spaces

Children are the most affected category by the outdoor environment than any other age group (see the child-environment relationship in chapter 1). Therefore, the quality of the urban open outdoor spaces is considered the main factor that controls and manages children's outdoor activities and thus guides the manners of use of these urban entities. In order to verify the assumption related to the impact and role of the quality of urban open outdoor spaces on children's usage of space through play activities, the concept of outdoor spaces' use must be considered profoundly. In this section, outdoor space usage will be considered through its different modes, affordance, and ways of quantifying space usage based on the different academic works.

2.1. Outdoor Space Usage

Children demonstrate different levels of activity (see Children's Outdoor Activity Levels in chapter 1), and these different levels of activity are reflected in their outdoor space usage. In this section, we will introduce two distinctive ways of outdoor space usage among children. the first type is via movement and physical activity while the second is materialized through stillness and quietness.

2.1.1. Modes of Outdoor Space Usage

Outdoor space usage is a concept of various facets which are related to different factors (environmental, sociocultural, and individual). These modes of usage are categorized into two main categories: movement and physical activities and stillness and quietness. These couple of modes are exposed in the following:

2.1.1.1. Movement and Physical Activity

Human-human interactions, such as sharing observations, conversing, and engaging in interpretive nature games, are what give the movement its character (Stapleton & Lynch, 2021). The life of early childhood is one of movement, running, learning new things through movement, and feeling life (McMillan 1930 as cited in Tovey, 2007). Therefore, space (especially vast) is almost as desired from age one to seven as food and air. Accordingly, Children can better grasp the play area in terms of time and space by using a hierarchy of pathways, for instance, to map movement within the space. However, restricting the focus of attention in play to only children's engagement in physical activity or movement may miss

a more nuanced understanding of the value and importance of play (Herrington & Brussoni, 2015). Children need opportunities to move because of the connection between movement and conceptual development. According to Athey (1990), these opportunities are provided for children by moving "horizontally, vertically, diagonally, to encircle, go through tunnels, over and under bridges, along planks, in between boulders, to hide inside small enclosures, to cross boundaries, and so on" (Tovey, 2007, p. 78) (Figure 13).

Figure 13 Example of movements and physical interactions among children in urban open outdoor spaces where children move, run, spin, and climb horizontally, vertically, diagonally, and encircle (Source: Tovey, 2007).

2.1.1.2. Stillness and Quietness

On the other hand, space for quietness and stillness is of equal importance as space for dynamicity and movement. Therefore, young children ordinarily choose the outdoors as a place for retirement and noiseless companionship (Tovey, 2007). She claimed that "nature itself invites quiet contemplation or intense fascination, and it is not unusual to see children outdoors silent and still as they watch a snail or gaze at clouds moving in the sky" (p. 78). Children can be calm, dream, watch, and find quiet connections with others in small, semi-private spaces, seats, comfortable grassy areas to sit or lay, and swinging seats (Figure 14).

Figure 14 Example of stillness and quietness in an open outdoor space where children sit, talk and interact (Source: Tovey, 2007, p. 79).

In the same context, Stapleton and Lynch (2021, p. 13) proclaimed that "stillness is important because it provides space and opportunity to notice and see. In other words, Stillness ushers in meaningful ways to interact with the more-than-human". As already mentioned, the different spatial arrangements can lead to different interactions. Accordingly, Tovey explained that:

> smaller spaces, circular hollows or enclosures, spaces between or behind bushes, spaces under bridges, and canopies over hiding holes or barrels for example are rich spaces for friendships to flourish often because they are secret, partially hidden, and therefore rich places for pretense" (2007, p. 79).

2.2. Affordance Supporting Outdoor Usage

This section's purpose is to provide light on the idea of "affordance" and how it has been applied to the world of outdoor play. It reviews the origins and development of the concept and consideration of its applicability in the context of children's outdoor activities. This section is broken down into four parts: first, the origins of the theory of affordance are discussed in correlation to the physical environment, then, briefly discussing the concepts of constraint and affordance. After that, affordance is discussed in regard to children's outdoor play Finally, this section concludes with the idea of affordance approached as a sociocultural theory.

2.2.1. Origins of the Affordance Theory

The concept of affordance was introduced by the ecological psychologist James Gibson (an American psychologist in the field of visual perception) to refer to the action possibilities of the environment (de Wit et al., 2017). His theory of affordance (1977, 1979) was created as an ecological framework for considering and comprehending visual perception. Gibson's theory of affordance offers a potential framework for considering the mechanism between an "agent human" and the "environment". Therefore, the terms "environment" and "agent" have been later used by psychologists to describe and consider discrete entities (Waters, 2017, p. 41) while this section outlines how the aspects of affordance theory, (from the ecological branch of psychological theory) are adopted for considering children's use of space.

2.2.2. Constraints and Affordance

Waters provided a definition for the term 'constraint' being a useful concept "to encapsulate the mediated, contextual understandings through which behavior is enacted" (2017, p. 46), however, the term 'constraint' is usually introduced within language as a negative term. According to her, the term 'constraint' can be adopted to identify the socio-culturally distinct features of a specific time and location in connection to a specific person that could influence behavior. The constraint notion will be further explained through Ingunn Fjørtoft's suggestion. According to her (2001, p. 111):

> "If a rock is big enough to fit the hand, it might be perceived as an object to grasp or to throw; it affords grasping or throwing. A tree that is appropriately branched and stemmed, will likewise be perceived as climb-on-able; it affords climbing-on".

Similar examples are provided by Waters (2017) which expose these constraints as rules set out by the adults for the children to convey the community's cultural understandings and might be connected to concerns about safety and appropriate behaviors.

2.2.3. Affordance and Children's Physical Activity

Children's daily experiences with physical activity are vital for health promotion. It is crucial to experience well-being through physically active play; the environment's affordances may facilitate such behavior. Accordingly, different researchers adopt the concept of affordance in the context of children's outdoor play.

According to Kyttä (2002, p. 109):

> "Affordances are the functionally significant properties of the environment that are perceived through the active detection of information (…) Affordances include properties from both the environment and the acting individual. Affordances are always unique and different for each individual and each specific group of people. Therefore, the concept is well suited for describing the psychologically essential qualities of children's environments".

Furthermore, Heft (1988, p. 29) claimed that "the affordances of the environment are its functionally significant properties considered in relation to an individual". Environmental features afford certain possibilities thus things become much more than their physical characteristics (Tovey, 2007).

In order to clarify the concept of affordance in the outdoor environment for children, Tovey provided the following example: "depending on their age, children might see a fallen tree trunk as affording scope for pulling up to stand, sitting, straddling, galloping, balancing, or even pushing and rolling" (2007, p. 54). According to this viewpoint, the environment offers opportunities for multidimensional play that adults may not always be aware of. Moreover, the affordance theory relates to physical activity devotes little attention to how context-specific sociocultural factors influence how things get done.

2.2.4. Affordance and Children's Social Interactions

Human activity revolves around the interaction between people, which takes place in a setting where people are also engaging with the objects that are present (Waters, 2017). On the other hand, Kyttä (2004, p. 181) stated that the concept of affordance "has the potential to be extended to comprise even emotional, social, and cultural opportunities that the individual perceives in the environment". Accordingly, the term 'interactional affordance' is used to describe interactions between children and adults as well as those of these children with the environments in which they act. Moreover, Carr stated that "the power of social practices to `reframe' the perception of physical affordances" (2000, as cited in Waters, 2017, p. 48). As a consequence, it is asserted that the act of recognizing an affordance of an object or a place for interaction, is always socioculturally mediated. In light of this, Waters simplified this concept of social affordance and interaction within Figure 15.

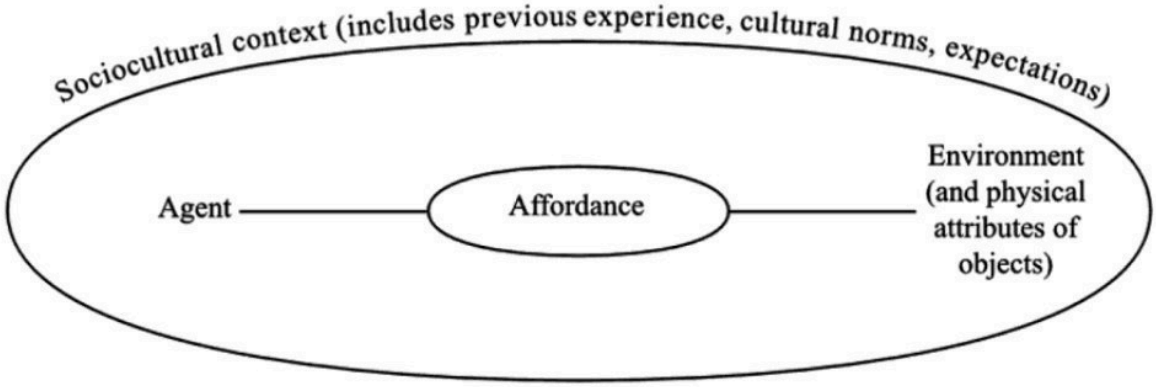

Figure 15 Affordance is located between the agent and environment and is mediated by the sociocultural historical context in which both reside (Source: Waters, 2017, p. 48).

2.3. Assessment of the Outdoor Space Usage

According to van den Dobbelsteen and Wilde (2004, p. 82), the use of space for a certain activity may be considered in different dimensions. The two-dimensional level may consider the use of one layer of floor or ground space while the three-dimensional level consists of a set of pictures of all two-dimensional layers. Furthermore, the fourth-dimensional level is time (the space is observed over a period of time. van den Dobbelsteen and Wilde demonstrated as well the ability of a quantitative assessment of the space's use by means of a typical (personal, functional, etc.) use of floor area or land through its translation into spatial efficiency indicators.

2.3.1. Indicators for Assessing Outdoor Space Usage

In order to quantify and measure the usage of urban open outdoor spaces in our study context, a group of Indicators for Assessing Outdoor Space Usage (IAOSU) are synthesized based on the previous literature. Past studies looked at a range of spatial measures in order to understand their relationships to children's behavior. There is no single method for measuring space use. A number of space usage measures provide accurate utilization data. It may employ one or all of the following metrics, depending on the location and users' information:

2.3.1.1. Time Frame

Time spent playing outdoors is one of the potential measures of children's activity and outdoor space usage (Burdette et al., 2004). The outdoor play activities and children's usage of the outdoor environment have been measured using a wide variety of techniques including both objective measures using accelerometry (Pfeiffer et al., 2006; Raustorp et al., 2012; Klinker et al., 2014; Bates and Stone, 2015; Gray et al., 2015) and/or global positioning systems (Cooper et al., 2010; Oreskovic et al., 2012; Lachowycz et al., 2012; Borghese & Janssen, 2018) and subjective measures such as questionnaires (Soori & Bhopal, 2002; Sleddens et al., 2012; Wiseman et al., 2019), activity logs and interviews (Cullen, 1993; Castonguay & Jutras, 2009; Pawlowski et al., 2016); or combine both objective and subjective measures (Bringolf-Isler et al., 2009; Wang et al., 2018). This literature allows us to conjure a picture of the ways in which children's outdoor activity and outdoor spatial usage can be measured through the indicator of the time frame.

2.3.1.2. Play Activities

Some basic information is needed for observing, analyzing, interpreting, and understanding the play activities of children. Over the course of several decades, researchers identified a variety of play categories and behaviors that were associated with children's physical, cognitive, and social development. Based on Frost's (1992) categorization, three categories will be reviewed as follows.

Physical Play Activities

Physical play, especially among boys, frequently entails activities requiring eye-hand coordination, such as climbing trees, using gymnastic equipment, or playing football. It also frequently entails estimating the trajectory of moving objects, like balls, or moving more freely within relatively complex spatial configurations, such as basketball plays (Bjorklund & Douglas Brown, 2008). Children's physical play can also be referred to as exercise play, locomotor play, or physical activity play because it frequently involves strong physical activity (Pellegrini & Smith, 1998).

Cognitive Play Activities

The complicated concept of cognition usually refers to specific abilities or knowledge of the physical environment (Goswami, 2014). However, the category of cognitive play activities refers to the set of play games that consider the cognitive development of the child through challenging, complex, and interactive play. The cognitive play behaviors are classified into five groups according to Rubin (2001 as cited in Zamani, 2016, p. 2) as follows:

> **Functional** which involves simple or repetitive motor behavior, such as jumping, climbing, and so on. **Constructive** concerns behavior happens when children manipulate and shape an already familiar material with a direct goal in mind. **Exploratory** is identified when children examine the qualities of objects to gather visual data about physical features. **Dramatic** occurs when children play the role of someone, engage in a pretend activity with an object or someone, or assign life to an inanimate object. and **Games with rules** which are identified when children employ a sense of competence with peers while creating regulations for games.

Social Play Activities

Social play occurs among small and larger groups. It happens when a child is driven to play with others while he or she is able to control emotional arousal; when the child has the necessary social abilities to approach another child; and when the social overtures are reciprocated. Social play often comprises two (or more) children engaging in functional sensorimotor, constructive, dramatic activities, and games with rules, compromising the linked conceptions of social involvement, social competency, and sociability. Additionally,

it includes children actively conversing with one another as they interact, deciding on play roles, and establishing game rules (Coplan et al., 2006, pp 75-76).

2.3.1.3. Play Spaces and Place Preferences

In this thesis, outdoor spaces relate to community open spaces and communal facilities in a neighborhood that children regard as particularly essential in terms of psychological, behavioral, and symbolic meanings that children find useful for their outdoor experiences (playgrounds, green spaces, streets, etc.). In order to figure out if children are using the outdoor space to its fullest potential, tracking space utilization by types of spaces and activities can offer various data by analyzing differences in use through activity levels and space occupancy and frequency as well as place preferences. The frequency with which a space is used (and not used) reveals how well it is utilized. Various studies have investigated the space occupancy of children through outdoor activity depending on different variables (Homel & Burns, 1987; Lai et al., 2019). This occupancy is measured as well using the behavioral mapping method which allows for assessing behaviors linked to detailed physical characteristics of outdoor areas (Charlop et al., 1983; Min & lee, 2006; Veitch et al., 2008; Cosco et al., 2010; Onojeghuo et al., 2019).

Conclusion

The concept of space that architects and urban planners use shapes the notion of the lived environment, whose quality directly affects children's activities and interactions. Therefore, the usability of the space and its ability to be practical and suit users' demands are crucial indicators of the quality of the space. The usability of the open outdoor space is related to the quality through the intermediate of 'affordance'. With its roots in the ecological branch of psychological theory, the concept of affordance enables us to initially think theoretically about the "distance between" the environment and a human agent. By the combination between the 'outdoor spatial quality', 'outdoor spatial affordance', and 'outdoor spatial usage', the chapter provides a unique perspective on the ideas along with the benefits and drawbacks of applying them to the larger realm of outdoor play and development.

Chapter IV: Case Study Presentation

Introduction

This chapter aims to define the context in which our object of study is located based on a descriptive and analytical approach. The chapter gives general information about the context of the study which is the city of Oum El Bouaghi. The first part describes the geographic; historic; demographic; climatic; and economic frameworks as well as the urban development and the urban form and housing development. Furthermore, the second part focuses on the presentation of the considered neighborhoods separately providing data about their location, population, and urban components.

1. Presentation of the City of Oum El Bouaghi

Since 1974, the city of Oum El Bouaghi is considered a part of the administrative promotion of small rural centers within the framework of an urban planning model (Layeb, 1999; Mazouz, 2007) which aimed to solve the problems of regionalization and urban development. Since the intervention of the state in 1974, in a colonial, rural, and agricultural center, this small town of Oum El Bouaghi has undergone profound changes in terms of its socio-economic and spatial-urban framework.

This change did not affect only the urban economy and the built space, but it also modified the networks of urban and interurban relations. This public urban investment resulting from the voluntarism of the State in the city of Oum El Bouaghi has created a demographic dynamism (the strengthening of the urban network of eastern Algeria), an interesting evolution of the job market (the increase in the volume of jobs created) and a considerable extension as well as an evolution of the built surface of the city.

1.1. Geographic Framework

The city of Oum El Bouaghi is one of the medium-small Algerian cities, it is the capital of the State (Wilaya) of the same name since the administrative division of 1974. It covers an area of about 6,187 km². The state of Oum El Bouaghi is located in the northeast of the country of Algeria between a longitude of 7.3693 and a latitude of 335.7309. The state of Oum El Bouaghi is limited to the North by the wilaya of Constantine, to the North-East by the Wilaya of Guelma and Souk Ahras, to the North-West by the Wilaya of Mila, to the

South-West by the Wilaya of Batna, to the South by the Wilaya of Khenchela, to the Southeast by the Wilaya of Tébessa (Figure 16).

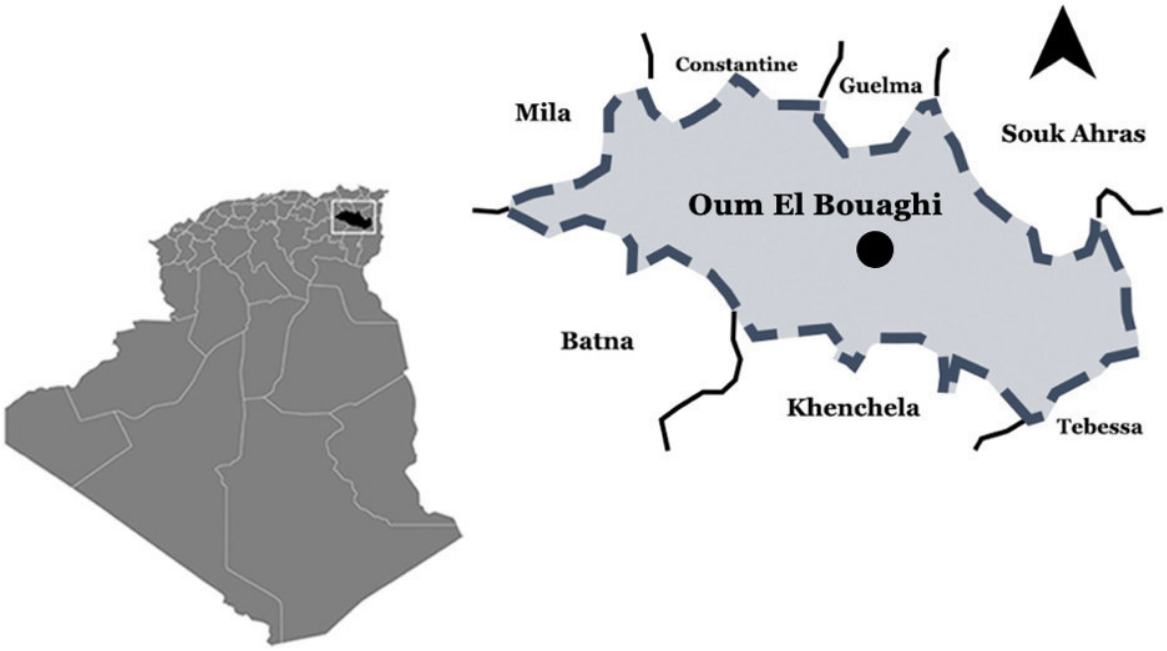

Figure 16 Oum EL Bouaghi's location and limits of the Wilaya (Source: Author).

The city is situated in the high plains of the Tell Atlas Mountains, about 65 km southeast of Constantine city. The city is about 500 km far from the capital of the country, Algiers. The city occupies an area of 414 km², bordered by: the village of Sidi Arghis and Tuzlin from the west, on the obliteration of the national road No. 10. Bir Khashabah from the east on the axis of Road No. 32. The village of Abbas Laghrour from the south on the axis of the national road No. 32. From the northern side, it is bordered by Mount Sidi Arghis.

1.2. Historic Framework

The history of the state of Oum El Bouaghi goes back considerable years, as its roots go to the primitive eras and times, as the human presence in it dates back to 8000 BC, and the monuments in this state testify to that period. Oum El Bouaghi represented a very important region of the Numidian Kingdom. During that period, economic life flourished, which depended primarily on the cultivation of olive trees, which made "Qadyuvala" (Kasr Sabihi) and Makomadas (Oum El Bouaghi) central to a degree of importance in the commercial exchanges.

In the first century AC, the Numidian Kingdom fell under the authority of the Roman Empire. Therefore, the grain of wheat and barley became a major activity for the population,

but the only beneficiary was Rome. In that period, Makomadas turned into a dumped wheat supply for Europe. However, the rebellious Berber revolutions in the Aures region against this presence, led to the expulsion of the Romans from all of the region, leaving archaeological evidence such as Al-Dalaa, Al-Rahia, and the ruins of Ain Al-Beida and Sigus.

During the Vandal period, Oum El Bouaghi witnessed a social and economic deterioration, as the Vandals destroyed all the facilities built by the Romans, and even the centers of commercial exchange were ruined. However, during the Byzantine period, it was not on the sidelines of the events that followed the Aures region and the high plateaus due to its many advantages. After the Berbers expelled the Vandals, the Byzantines, disbanded the people of the region of their possessions and fertile lands. The ruins of this period are the Qadyuvala castle in Kasr Sabihi and the ruins of Jebel Busif. The history of Oum El Bouaghi during the Ottoman era is almost unknown, and there are no sources that touched on this stage in detail. However, it was known that it is affiliated with the Beylik of Constantine and is subject to the laws and authority of the Bey in an indirect way.

The French occupation did not succeed in overthrowing the state of Oum El Bouaghi until the year 1842. During this period the residents lived in very harsh conditions at all levels, as they were organized in the form of thrones and tribes. The state is a natural extension of the historical state (Oras, Batna, Al Namamsha) during the Great Liberation Revolution (1954-1962) and it was known during this period as "Canrobert" in relation to a French Marshal.

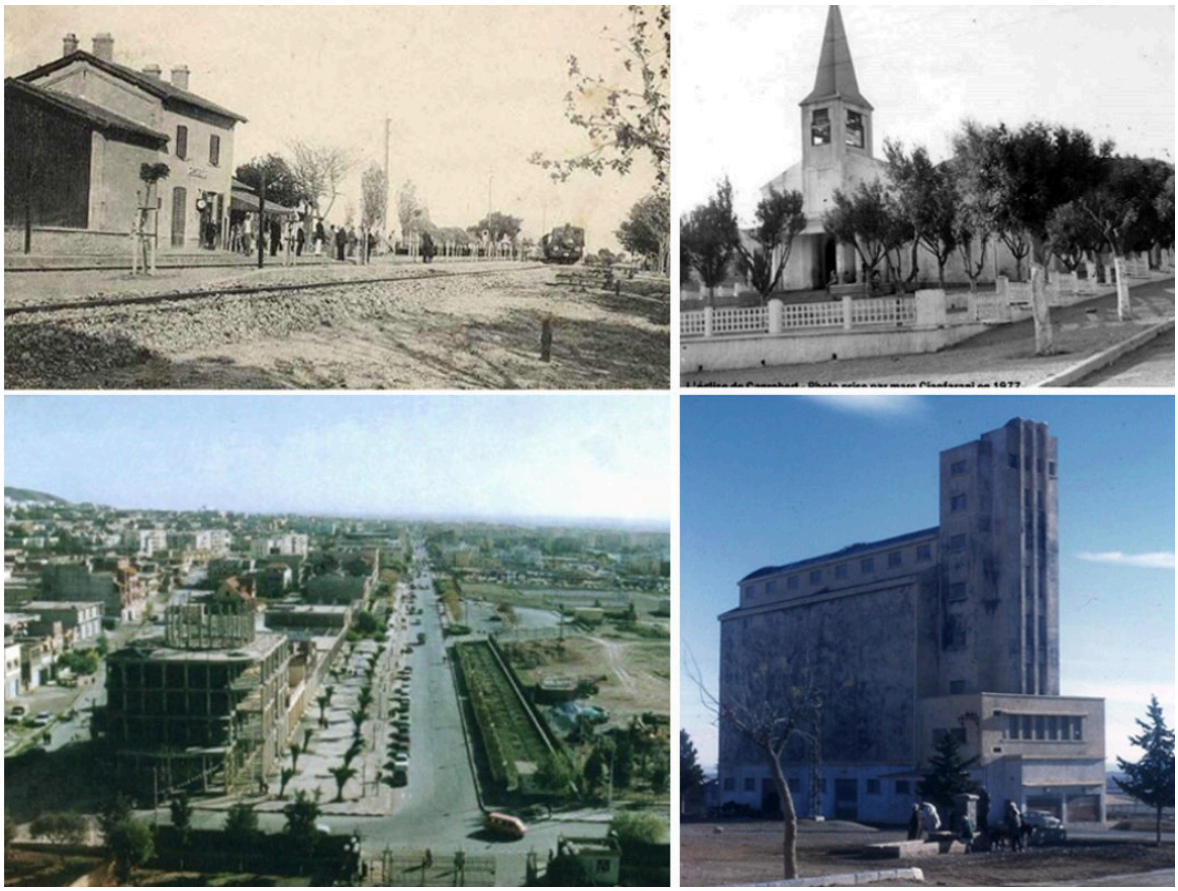

Figure 17 Old pictures of the city of Oum El Bouaghi. From left to right: Train station, Church, Urban fabric, and Factory (Source: Web, 2020).

1.3. Demographic Framework

The state of Oum EL Bouaghi includes 835,262 inhabitants with a density of 135 inhabitants/Km². However, the city includes a population estimated at 106,357 inhabitants divided into 18,992 families. The population's density is 257 inhabitants/Km². This population rate represents about 11% of the State's total population (Estimations of the DPSB, 2021). As this research work is interested in the children's category, therefore estimations about this age group are presented according to the ones of the population from the DPSB, 2021. Estimations by Sex and Age Group represent a high rate of the children's categories compared to the rest of the population (Table 4). Thus, the total number of children aged between 0-14 is estimated at 232,505 distributed between 117,384 males and 115,121 females with a total rate of 27.83% of the whole population.

The children's category between 0-14 years old is divided into three sub-categories. Children aged between 0-4 are 80,738 children distributed between 40,872 males and 39,866 females with a total rate of 9.66% of the whole population. Children aged between 5-9 are among

75,375 children distributed between 38,157 males and 37,218 females with a total rate of 9.02% of the whole population. While children aged between 10-14 are 76,392 children distributed between 38,355 males and 38,037 females with a total rate of 9.14% of the whole population.

Table 4 Estimations by Sex and Age Group for the children's category compared to the total population of the State (Source: Estimations of the DPSB, 2021).

Age Group	Male	Female	Total	%
0-4	40,872	39,866	80,738	9.66
5-9	38,157	37,218	75,375	9.02
10-14	38,355	38,037	76,392	9.14
0-14	117,384	115,121	232,505	27.83
Total	**419,663**	**415,599**	**835,262**	**100**

1.4. Climatic Framework

The state of Oum El Bouaghi is characterized by a semi-arid continental climate, cold and rainy, with dry winters and hot summers, where the annual precipitation rate is between 200 to 400 mm. While the average temperature ranges between 20° to 40° from April to September, and between 8° to 25° from October to March. Sirocco winds blow at a rate of 30 to 50 days per year, and the number of ice-covered days is estimated at 37 days per year (Table 5).

Table 5 Climatic data of the State (Source: Estimations of the DPSB, 2021).

	Average Min Temperature (°C)	Average Max Temperature (°C)	Average Normal Temperature (°C)	Precipitation Amount (Mm)	Humidity Percentage (%)	Average Wind Speed (M/S)
January	02.06	13.50	7.80	7.80	68	03.70
February	03.03	17.6	10.3	02.4	58	02.6
March	03.01	16.1	09.6	09.0	67	01.7
April	07.50	21.4	14.1	30.2	63	02.3
May	12.10	27.0	19.5	74.0	62	02.2
June	18.50	34.2	26.5	07.4	43	02.2
July	19.30	37.4	28.4	00.2	39	01.3

August	19.80	37.1	28.3	28.9	41	01.0
September	17.30	31.9	24.1	09.8	54	02.7
October	09.50	21.8	15.4	21.0	68	02.7
November	05.10	15.7	10.1	12.0	74	03.2
December	01.20	13.3	06.9	31.1	79	03.2

1.5. Economic Framework

Oum El Bouaghi, like almost all small cities in Algeria, depends on services and commerce to build its economy. According to statistics, more than 65% of the inhabitants carry out commercial, service, and administrative activities while more than 23% of them are involved in activities relating to the field of construction and building. The rest of the working inhabitants are divided into two categories with very low rates of around 6% for industry and 5% for agriculture. Oum El Bouaghi has a high unemployment rate of 18.49% of the total population (Estimations of the DPSB, 2021). Oum El Bouaghi like the rest of all the Algerian cities will need to shift toward a more diversified economy to lift job prospects which are crucial given its young demographic profile.

1.6. Urban Development

The city of Oum El Bouaghi inherited an urban situation rooted in the colonial period and then developed through subsequent periods. The city has undergone during the last decades some deep changes in its socio-economic and spatial content (Layeb, 1986). The evolution of the urban agglomeration of the city is characterized by six main periods as follows:

1.6.1. The Period Before 1954

The low availability of physical, urban, and geographical data makes it difficult to describe this era carefully. However, this period is marked by the arrival of populations from the metropolises from the beginning of the 20th century to form a hybrid population (settlers and natives) and a central urban core of the future city of Oum El Bouaghi. A slow spatial evolution was marked from the first urban core in the form of a colonial checkerboard followed by vernacular constructions scattered all along with national road number 10. These houses are based on stones and sloping tiled roofs (Haouch-Arab) which signifies the patio house.

The total area of the urban fabric was only 34 hectares. With such a low population rate, the first foundations of a colonial central core were born, accompanied by an extension toward the Southeast (Figure 18). The population rate experienced a high-value growth between 1881 and 1901 to reach 8.87% of the total population and then a drop during the period 1936-1941 to reach 2.43%.

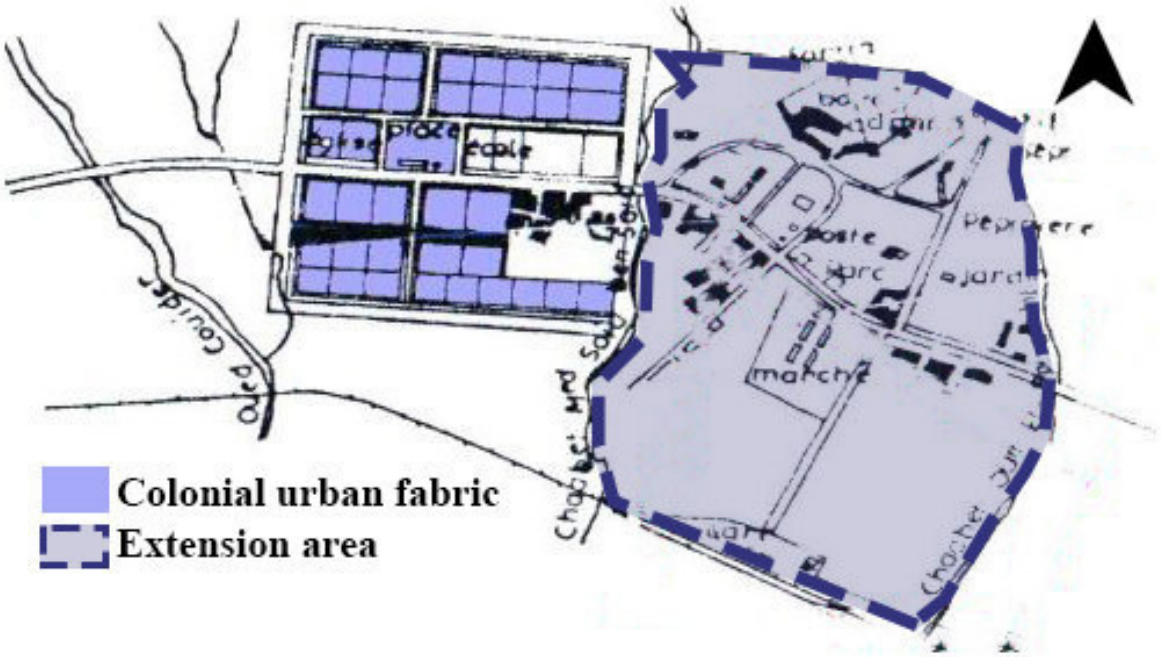

Figure 18 The urban sprawl of the city of Ouml El Bouaghi before 1954 (Source: Mazouz, 2007 and author's adjustments).

1.6.2. The Period Between 1954 and 1977

Due to migration and the rural exodus, the growth of population knew an increase from 2881 inhabitants in 1954 to 9282 inhabitants in 1966 with an annual average of 600 inhabitants. With the advent of the new administrative division, Oum El Bouaghi experienced a new situation and a new status that was accompanied by population growth (raised from 9282 in 1966 to 15123 in 1977) recording a rate of 62.92%, however, the urbanization level has remained low. The urban extension based on the colonial heritage was materialized to the east by repetitive individual constructions along the main road axis of the city in addition to a zone of activities while to the north and south by the traditional housing type "Dechras" and new districts of modern collective housing, and to the west by a wooded area (Figure 19). The total area was then 80 hectares.

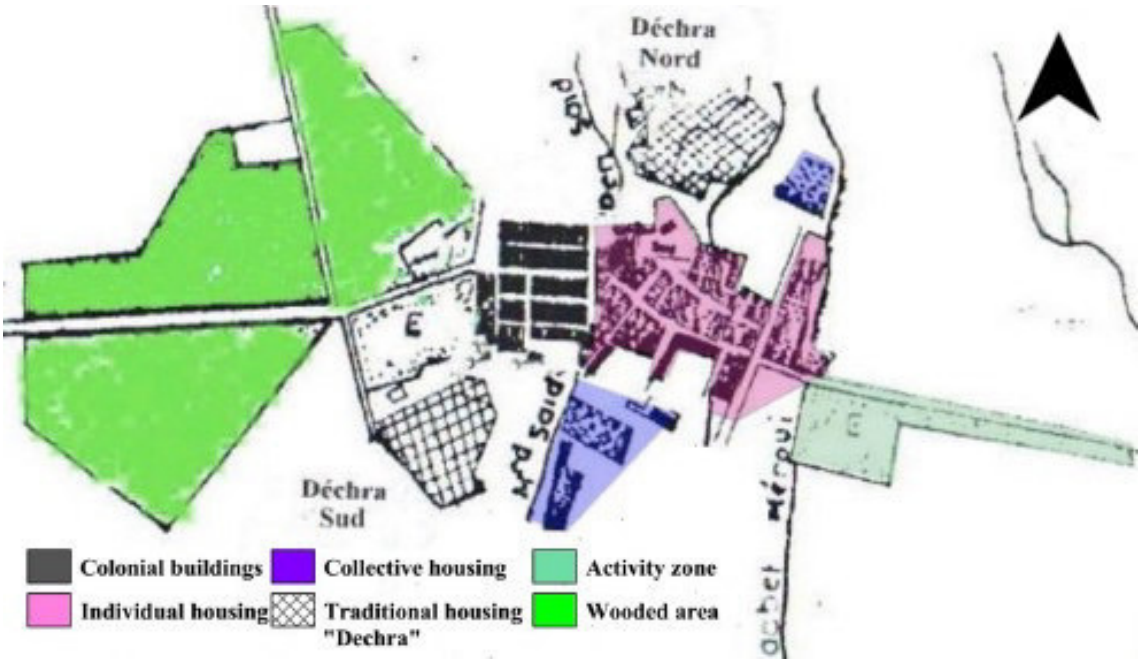

Figure 19 The urban sprawl of the city of Ouml El Bouaghi between 1954 and 1977 (Source: Mazouz, 2007 and author's adjustments).

1.6.3. The Period Between 1977-1987

Due to migration as well, the population of the city has doubled from 15,123 inhabitants in 1977 to 34,257 inhabitants in 1987 with a growth rate of 126.5%. Between "Oued Meroui" in the East and "Oued Kouider" in the West, the axial extension along national road number 10 was materialized by the various construction of collective housing and equipment to participate in the transformation of the village into a developing city (Figure 20).

Figure 20 The urban sprawl of the city of Ouml El Bouaghi between 1977 and 1987 (Source: Mazouz, 2007 and author's adjustments).

1.6.4. The Period Between 1987 and 1999

The population increased from 34,257 inhabitants in 1987 to 47,835 in 1999. This demographic growth was accompanied by an urbanization development (The period after 1990 is witnessing the continuation of the achievements of the various projects included in the programs of the 80s). The new urban extension in the form of collective and individual housing consisted of approximately 8175 housing units in 1988.

The city is spread over an area of 1462.50 hectares. However, the needs in terms of land were more than 90 hectares for the sector to be urbanized (reserved for the short and medium-terms), and to meet these needs, the Land Use Plan "A" and "B" (POS) were added in the southwest and west of the city. Therefore, for the future urbanization sector, the Master Plan of the city "PDAU" has planned the POS "C" with an area of 163 hectares, located to the east of the city.

1.6.5. The Period Between 1999 and 2008

During this period, the population of the city increased from 47,835 inhabitants in 1999 to 66,517 inhabitants in 2008 with a growth rate of 39.05%. In this period, Oum El Bouaghi city was characterized by demographic stability and urban continuous development (Figure 21). The various projects included in the programs of the 80s continued to be achieved.

Figure 21 The urban sprawl of the city of Ouml El Bouaghi in 2004 (Source: Google Earth and author's adjustments).

1.6.6. The Period after 2008

During this period, the population of the city of Oum El Bouaghi continued to grow to reach a rate of 84,631 inhabitants in 2010 with a density rate of 204 inhabitants/Km², 87,878 inhabitants in 2012 with a density rate of 212 inhabitants/Km², 89,618 inhabitants in 2013 with a density rate of 216 inhabitants/Km², 91,392 inhabitants in 2014 with a density rate of 221 inhabitants/Km², and 95,485 inhabitants in 2016 with a density rate of 232 inhabitants/Km². However, the actual rate of population is 106,357 inhabitants with a density of 257 inhabitants/Km² (According to the estimations of the DPSB, 2010; 2012; 2013; 2014; 2016; and 2021). The rate of urbanization has accelerated the urban expansion where 83% of the population has become urban (Figure 22). Therefore, the disadvantage of this extension of the city results in the appearance of new centers dispersed in the urban space.

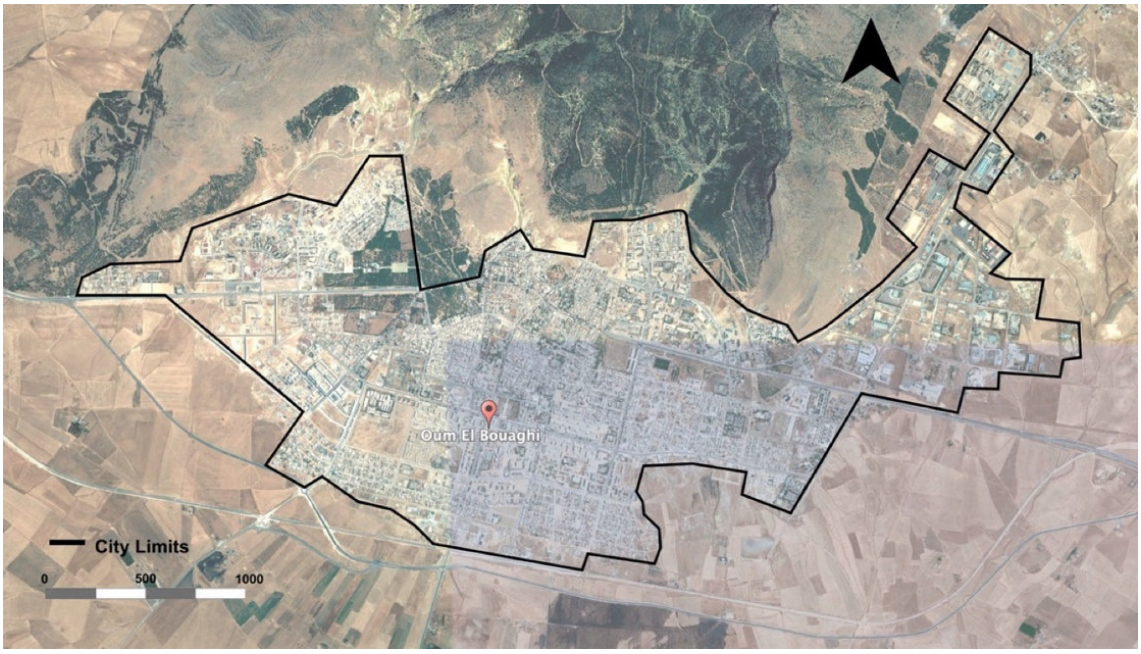

Figure 22 The urban sprawl of the city of Ouml El Bouaghi in 2009 (Source: Google Earth and author's adjustments).

1.7. Urban Form and Housing Development

The urban form and housing development of the city of Oum El Bouaghi were mainly influenced by its population's growth. From the first colonial core to its actual form and morphology, the city is in permanent development to respond to its population's needs in terms of habitat and services. The typology of habitat has undergone different forms in relation to the construction period and the population needs. This typology is represented as follows:

1.7.1. Individual Housing

As an agricultural village, the city of Oum El Bouaghi was mainly founded due to the development of individual housing. This development was initiated by the construction of traditional vernacular and colonial houses, subsequently followed by the modern individual housing type (Subdivisions). The city of Oum El Bouaghi has always been characterized more by individual housing than collective one with an occupational rate of about 50% of its total area while the rest is shared between the rest of different spaces (collective housing, equipment, services, public spaces, roads... etc.) (Figure 23).

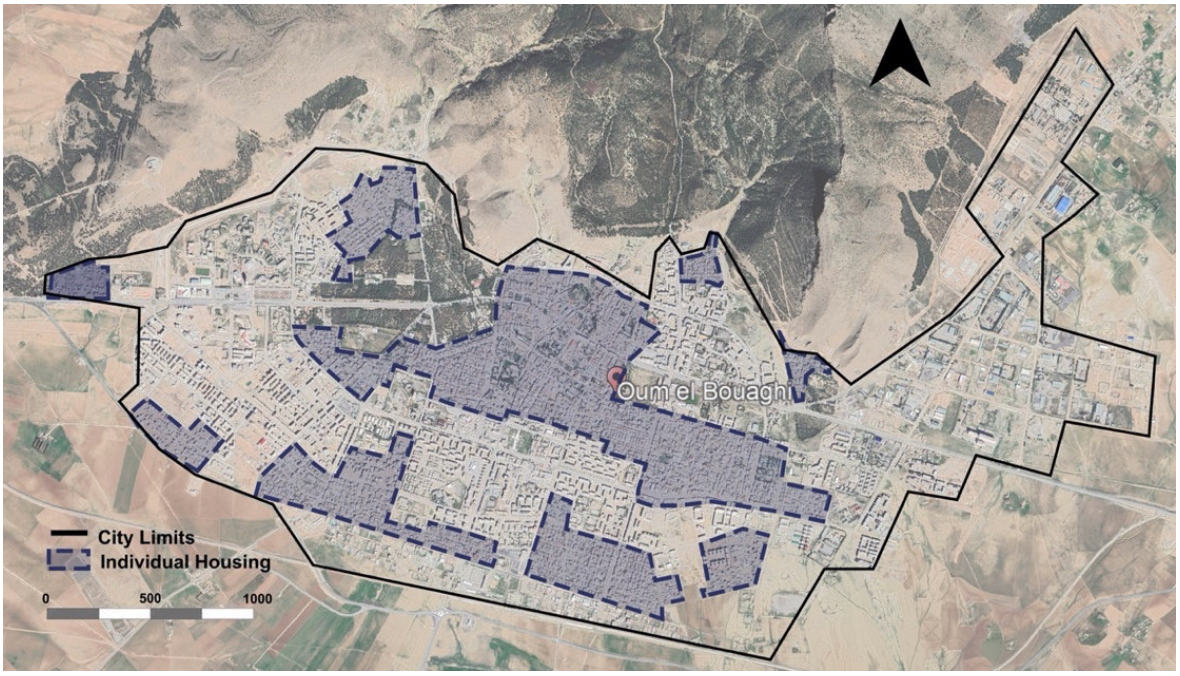

Figure 23 The localization of the different types of individual housing within the city (Source: Google Earth and author's adjustments).

1.7.1.1. Colonial Individual Housing

This type of habitat is considered a part of the colonial heritage of the country. The 132 years of French existence in Algeria, have been marked by its achievements. The city of Oum El Bouaghi has inherited a small part of the colonial trace which is materialized in a small urban fabric of individual houses. These houses occupy a small fragment of the old center of the city. All the houses are on the ground floor with or without yards. This type of house is characterized by: an extroverted organization of spaces (large windows that overlook the outside), the ornamentation of the facades, and a sloping roof. This type of habitat represents

homogeneity in the composition of forms and facades (openings, slopes, building materials, colors, and textures) (Figure 24).

Figure 24 Different types of Colonial Individual Housing within the city of Oum El Bouaghi. From left to right: with a front yard, and without a yard **(**Source: Author).

1.7.1.2. Traditional Individual Housing

Traditional individual housing is a vernacular type related to the Chaoui region. This type of housing occupies also a small fragment in the old center of the city with constructions that are on the ground floor level as well. This type is characterized by an introverted spatial organization around a central courtyard (patio or Haouch). The exterior facades are blind with a basic architectural aspect either outside or inside the houses. This type of housing is in permanent deterioration, although it represents the oldest commercial showcase and daily public services of the city (Figure 25). This scheme also considerably structured the methods of appropriation of the rural population who came to the city at the time of independence (Semmoud, 2007).

Figure 25 Traditional individual housing within the city of Oum El Bouaghi (Source: Author).

1.7.1.3. Modern Individual Housing (Subdivisions)

The subdivision is an urban planning procedure that allows the creation of an urban fabric by servicing fragmentation, and the right to build plots of land integrated into the communal land reserves. The city of Oum El Bouaghi has a large land area intended for the individual modern housing type with a surface of approximately 40% of the total area of the city. This area includes different neighborhoods as follows: Lafri, Taggouft, Lekmine, Bir Eterch, Mostakbal, Saada, EPLF, Hydra, Sas, El Hadika, and Ennassim (Figure 26).

Figure 26 Modern individual housing within the city of Oum El Bouaghi (Source: Author).

1.7.2. Collective Housing

Demographic and societal changes (increase of the population, modification of family structures) are converging to produce an increased need for housing. Therefore, collective housing is required to fulfill the necessity. The city of Oum El Bouaghi did not benefit from

a collective housing program during the colonial period. The first collective housing constructions emerged during the 1980s. With a restricted housing program, collective housing has less surface compared to individual housing, it occupies only about 15% of the total surface of the city (Figure 27).

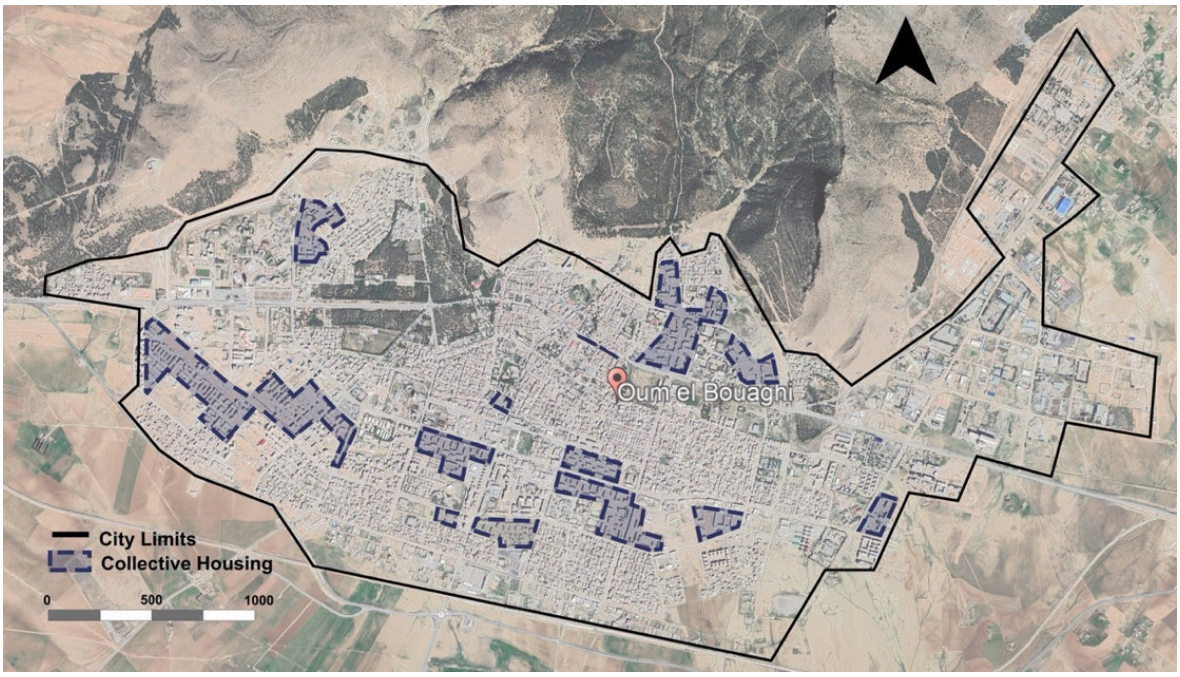

Figure 27 The localization of the collective housing within the city of Oum El Bouaghi (Source: Google Earth and author's adjustments).

2. Presentation of the Study Neighborhoods

This section aims to provide a helpful representation and a deep description of the two neighborhoods chosen for the study investigation according to their location, characteristics, and spatial composition. The choice of a couple of neighborhoods as a case study provides an understanding of the different interactions existing between the research variables. It helps as well to better understand the dynamics of each case and affords different perspectives on the same research question.

The main selection criteria for these two neighborhoods are based on the one hand, on the different types of morphology and distinct spatial configurations of the buildings in terms of shape and arrangements that both quarters present. While on the other hand, the choice is based on the historical framework of the neighborhoods where the neighborhood of 420 housing units is recently constructed (the neighborhood has been inhabited since 2010).

However, the neighborhood of 1500 housing units is dated to an earlier period and is considered one of the oldest neighborhoods in the city (Figure 28).

Figure 28 The localization of both neighborhoods within the city of Oum El Bouaghi (Source: Google Earth and author's adjustments).

2.1. The Neighborhood of 420 Housing Units

The study neighborhood of 420 housing units will be considered according to its location, spatial description as well as spatial composition as follows:

2.1.1. Location and Description

The neighborhood is located in the southwest part of the city (Figure 4.13), it is about two and a half kilometers far from the city's old center. The urban context of this quarter is dense, surrounded by several districts and public facilities. The neighborhood is limited to the North by an administrative neighborhood (Post office, Professional formation center, culture department), to the North-East by the individual housing quarter "Taggouft", to the East by the military barracks and customs department, and to the South and Southwest by the collective housing neighborhood "Nasri" (Figure 29). The neighborhood was constructed during the 2000s, it is one of the most dynamic districts in the city of Oum El Bouaghi. It is the first recent collective housing neighborhood built within the city.

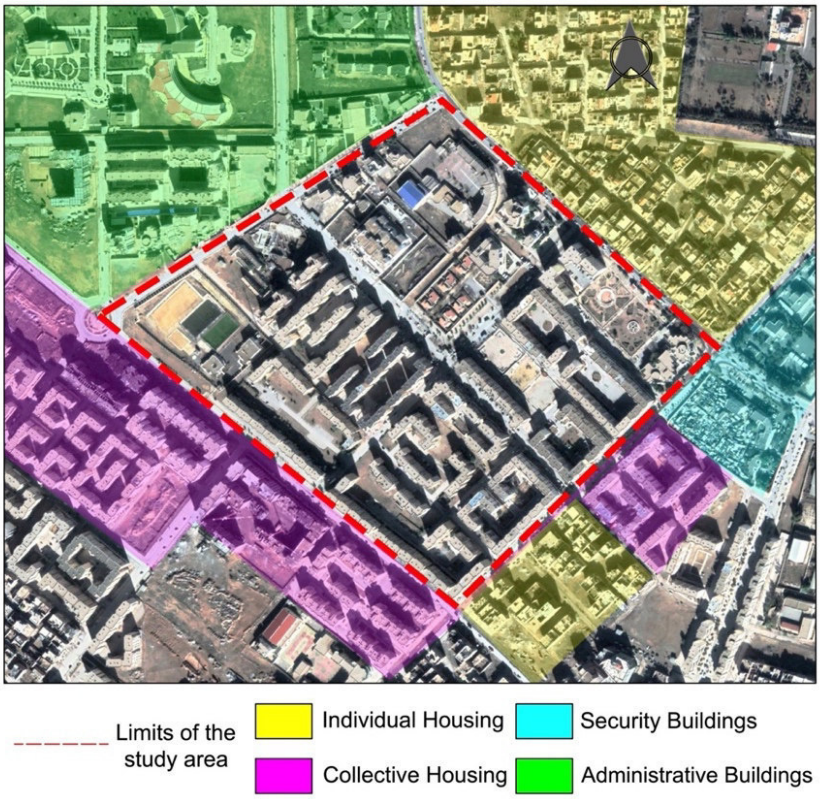

Figure 29 The localization and surroundings of the neighborhood of 420 housing units (Source: Google Earth and author's adjustments).

2.1.2. Spatial composition of the neighborhood

The neighborhood's total area is about twenty-seven (27) hectares, it is composed of 420 units of dwelling and different equipment and services (Figure 30). The dwellings are divided into F4 and F3 apartment types including shops on the ground floor. All the buildings are of the same high (Ground floor + 4) however, they represent different spatial variants in the form of four types of arrangements: I, L, U, and G shapes (Figure 31) by assembling several block units in a linear or/and angled manner. The open spaces of the neighborhood are destined to be: green spaces, playgrounds, parking lots, plazas, and pedestrian paths (Figure 32). Nevertheless, a large surface area of these open public spaces is represented as leftover areas. The different types of building arrangements have created various types of spatial configurations as follows: Open configuration; Semi-Open configuration; and Semi-closed configuration (Figure 33).

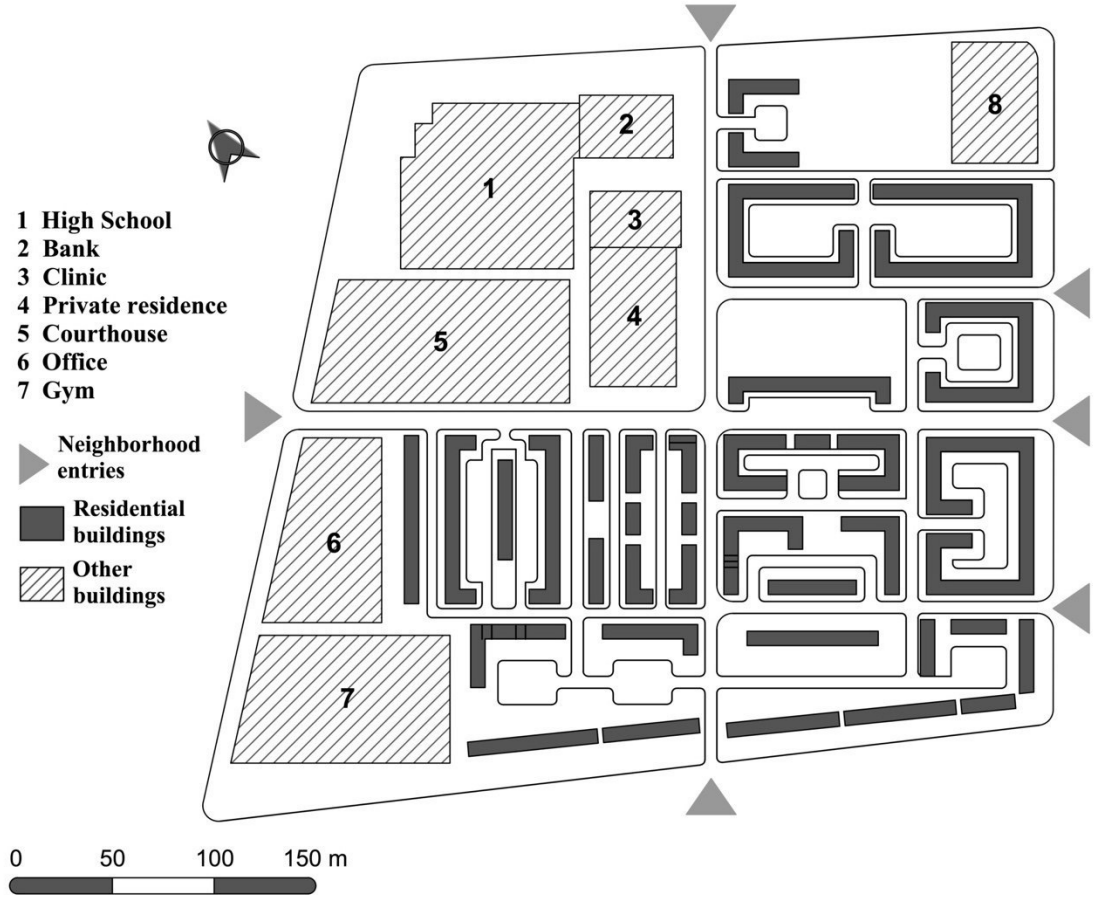

Figure 30 The spatial composition of the neighborhood of 420 housing units (Source: Author).

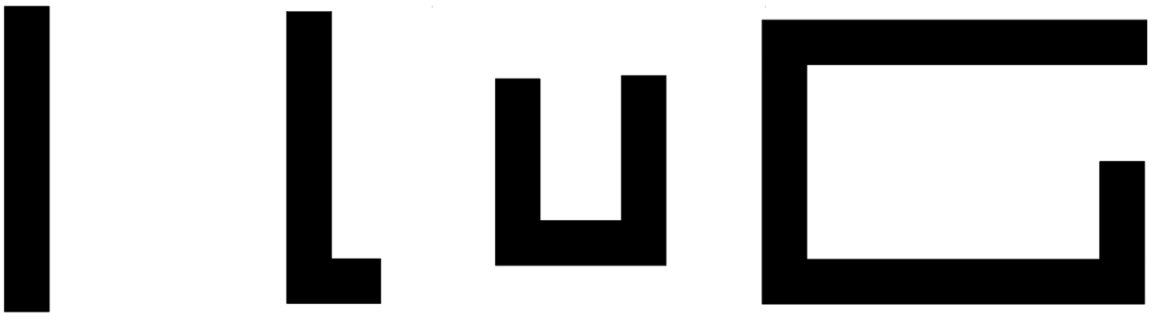

Figure 31 Different forms of the buildings' arrangements within the neighborhood of 420 housing units. From left to right: Buildings in the form of I, Buildings in the form of L, Buildings in the form of U, and Buildings in the form of G (Source: Author).

Figure 32 Some illustrations demonstrate the different open spaces of the neighborhood of 420 housing units. From left to right: Greenspace, Leftover plot used by children as a playground, Playground (Source: Author).

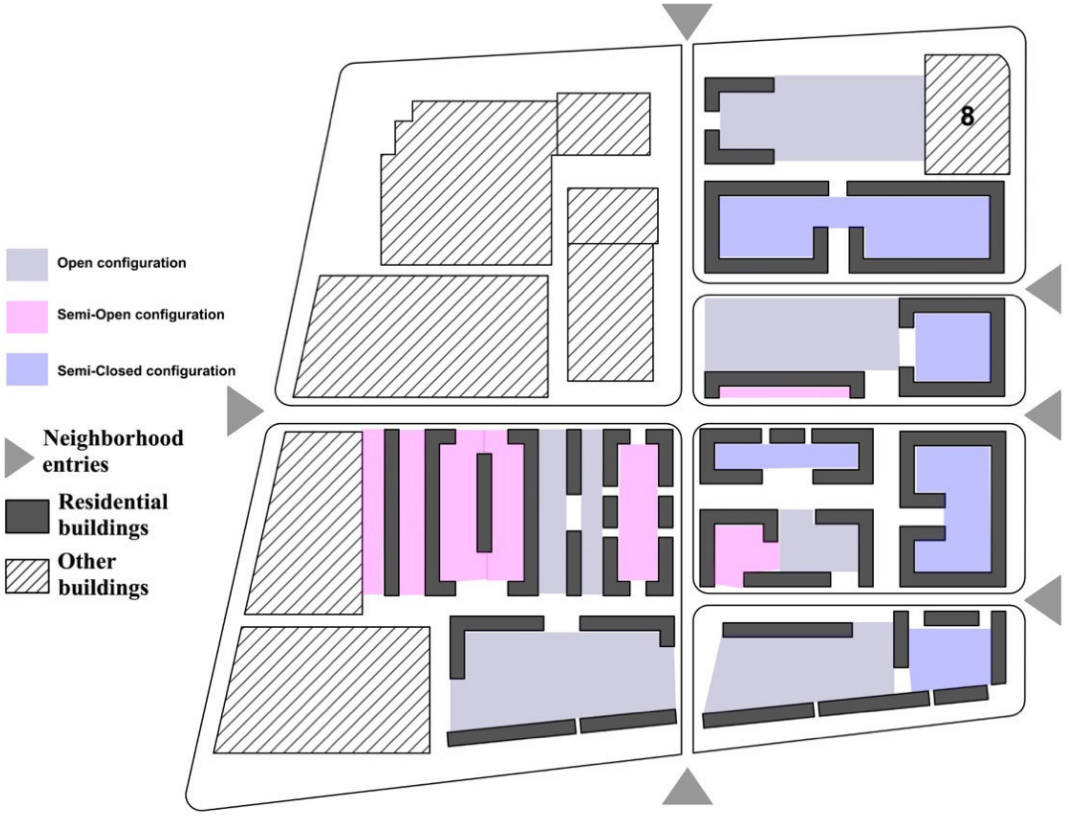

Figure 33 Different types of spatial configurations of the neighborhood of 420 housing units (Source: Author).

2.2. The Neighborhood of 1500 Housing Units

The study neighborhood of 1500 housing units will be considered according to its location, spatial description as well as spatial composition as follows:

2.2.1. Location and Description

The neighborhood is located in the southeast part of the city, it is about one kilometer far from the city's old center. The urban context of this quarter is dense, surrounded by several districts and public facilities. The neighborhood is limited to the North and the Northeast by the individual housing neighborhood (EPLF), to the South and Southeast by collective housing neighborhoods (El Alouane and El Wiam), and to the West by different administrations (Islamic complex, the communal assembly, and Telecom Administration) (Figure 34). The neighborhood is relatively dynamic, especially at the level of the main road which passes through and divides it into two entities. This quarter is one of the oldest collective housing neighborhoods, among the first ones built within the city of Oum El Bouaghi (the late 1980s). The contracting authority for the operation was the OPGI while the project manager and the construction company (Pittance) were of French nationality.

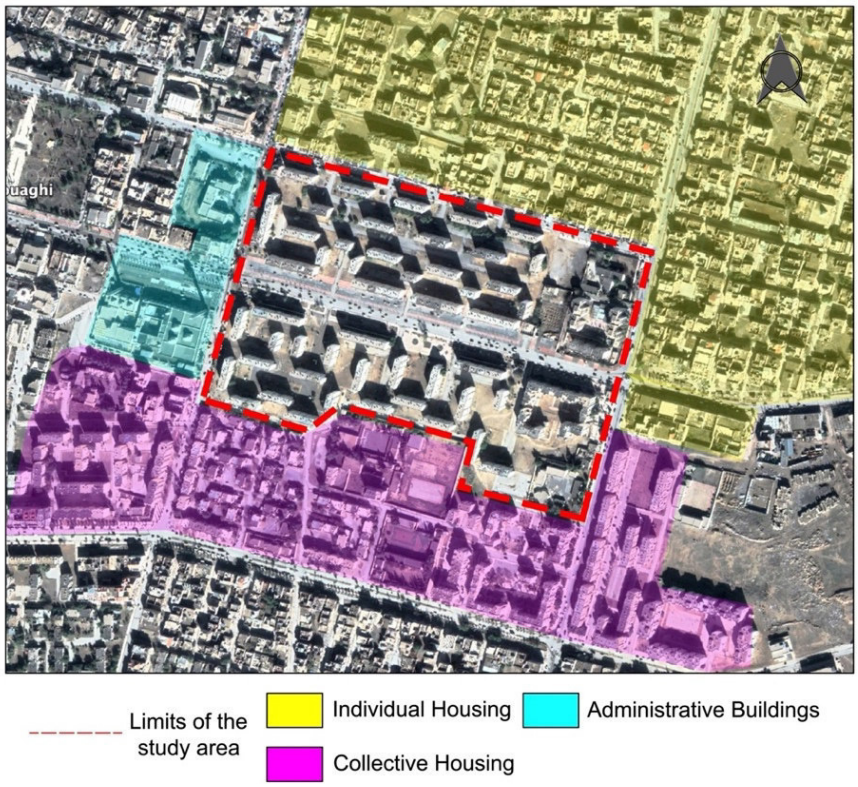

Figure 34 The localization and surroundings of the neighborhood of 1500 housing units (Source: Google Earth and author's adjustments).

2.2.2. The spatial composition of the neighborhood

The neighborhood's total area is about twenty (20) hectares, it is composed of 1500 units of dwelling and some equipment and services (Figure 35). The dwellings are divided into F4 and F3 apartment types including some shops on the ground floor. However, a large surface area of these open public spaces is represented as leftover areas. The different types of building arrangements have created two different types of spatial configuration Open configuration and Semi-Open configuration (Figure 36). The open spaces of the neighborhood are destined to be: green spaces, playgrounds, parking lots, and leftover spaces (Figure 37). All the buildings are of the same high (Ground floor + 4) however, they represent different layout variants in the form of three types of arrangements: I, L, and U shapes (Figure 38). The units of the building are assembled only in a linear manner; therefore, the L and U shapes are created without a direct junction between the buildings.

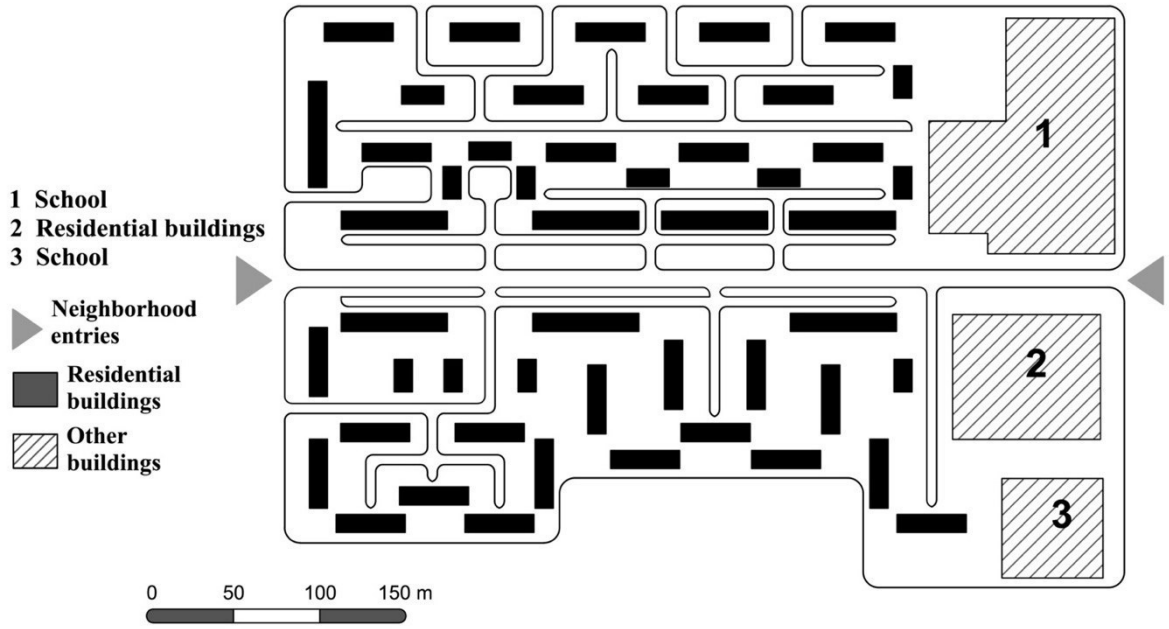

Figure 35 The spatial composition of the neighborhood of 1500 housing units (Source: Author).

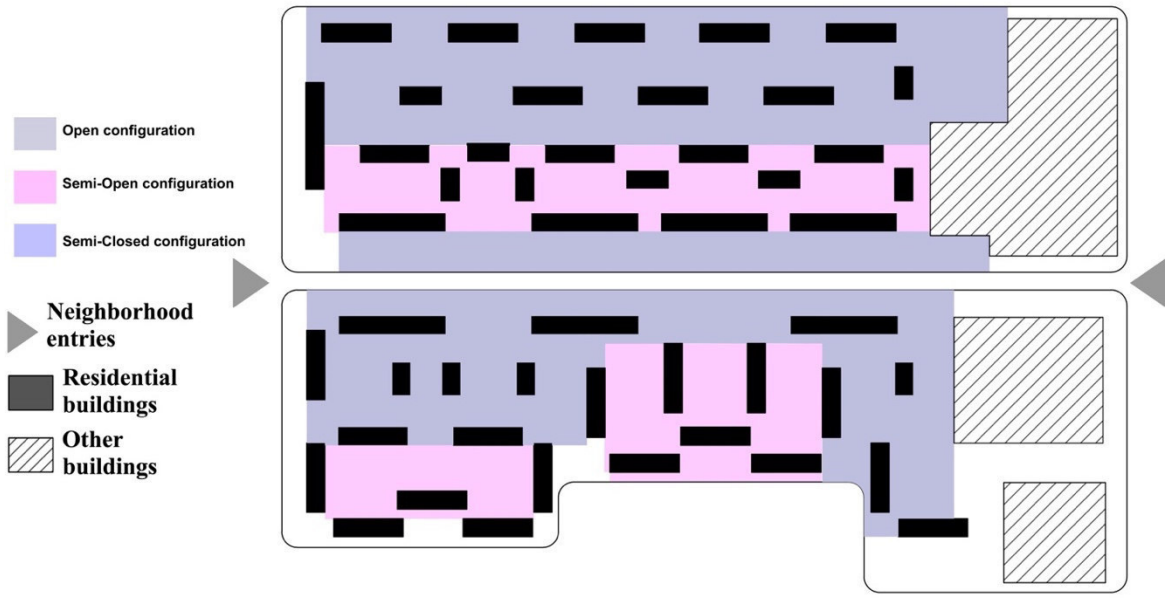

Figure 36 Different types of spatial configurations of the neighborhood of 1500 housing units (Source: Author).

Figure 37 Some illustrations demonstrate the different open spaces of the neighborhood. From left to right: Playground, Parking lots, Leftover plots, and green space (Source: Author).

Figure 38 Different forms of building arrangements within the neighborhood. From left to right: buildings in the form of I, Buildings in the form of L, and Buildings in the form of U (Source: Author).

Conclusion

The urban and geographic context of the study resides in a couple of collective residential neighborhoods within the city of Oum El Bouaghi. The city of Oum El Bouaghi is still uncommon in the field of urban research, hence this chapter provided it an identification through its geographical, historical, and administrative situation as well as through its demographic and urban development during the different historical periods. In a particular way, both selected neighborhoods (neighborhood of 420 housing units and neighborhood of 1500 housing units) were identified as well through their location, physical description, spatial composition, and spatial configuration.

Chapter V: Research Methodology

Introduction

This chapter outlines the different aspects of the research methods adopted in this thesis which integrate both children and the open outdoor spaces in residential neighborhoods. Various research methods are used for data collection, measurements, and investigation concerning the children's interactions with their outdoor environment which helps to grow knowledge and understanding of this child-environment relationship (see chapter 1). According to Creswell (2014), the researchers' philosophy and doctrine can significantly impact the research design, especially in terms of the choice of the research approach and methods.

The methodological approaches for this study draw on the findings of the literature review and the specificity of the study context and objectives. It adopts the benefits of using both qualitative and quantitative methods separately and collaboratively to interpret the factors affecting children's activities. Among the many different methods of information gathering with children and the environment, this research will employ the following ones: direct observations, space syntax analysis, a survey by questionnaire, and behavioral mapping.

The mixed-methods approach is selected for this thesis's research approach for the following reasons. First, the research topic cooperates with both concepts of "Outdoor Open Space" and "Child" which makes it highly complex and interdisciplinary, thus it cannot be interpreted through qualitative or quantitative methods separately. Second, the mixed methods approach is advantageous in terms of inclusiveness and comparativeness. Additionally, findings from mixed-methods research offer a holistic view of a phenomenon and provide additional insights into it which might help to produce greater certainty and wider implications in the conclusion (Maxwell, 2016; Morgan, 2014) as well as to generate substantive theories (Venkatesh et al., 2013). Our data collection tools previously mentioned will be presented in detail later in this chapter.

1. Quality of Outdoor Spaces for Children

In order to examine and evaluate the quality of the open outdoor spaces in the study neighborhoods, two methodological approaches will be employed. It is pertinent to note that the first methodological approach consists of a set of direct observations while the second

one is based on space syntax analysis. These previously mentioned methods will be explained in detail in the following sections.

1.1. Direct Observations

In order to assess the quality of open outdoor spaces in the study neighborhoods (study areas are exposed in chapter 4), the first methodological approach employed here is the direct observations (on-site observations). In our study case, the method of direct observation will be used to assess the quality of the open outdoor environments of the study neighborhoods according to the following three key quality criteria for outdoor spaces for children (KQCSC) (see Table 3) derived from the literature of review as follows: Play Equipment and Structures; Vegetation, and Natural Elements; and Diversity (as explained in chapter 3), however, the rest of the quality criteria (Accessibility and Visibility) will be analyzed using different research method.

The direct observations are considered the oldest and the commonest instrument of scientific research. It is considered also one of the most useful methods in research whether as the main approach or a complementary one. Its systematic use in research on child environments has become particularly notable during the past years. This method is used in studies of all aspects of young children's environments, development, usage, and behavior, and it has been widely applied in homes, care centers, classrooms, playgrounds, and outdoor public spaces. Direct observations of outdoor spaces for children in housing neighborhoods provide much more flexibility, reliability, and validity vis-à-vis the research hypotheses and theories.

Pellegrini (2001) used direct observations to examine the role of play and assessment in the lives of young children. based on observing play in the classroom and in the playground. Furthermore, using data from direct observation as well, Brown et al. (2009) described the physical activity behaviors and the accompanying social and environmental events of those behaviors for children to determine which contextual conditions were predictors for moderate to vigorous physical activity and non-sedentary physical activity for 3-, 4-, and 5-year-old children during their outdoor play.

In addition, Lucas and Dyment (2010) used a momentary time sampling direct observation instrument to investigate six pre-determined target areas within an Australian primary school over an 11-day period for the purpose of examining where children choose to play on school

grounds with a diversity of play spaces. Moreover, many different other studies integrated the direct observation method to investigate children's environment, such as Gubbels et al. (2011) who used it as a part of their research methodology to investigate the association between the child-care environment and physical activity of 2- and 3-year-old children based on an ecological view of environmental influences on health behavior. The findings helped the authors to classify the outdoor observed activities into different groups related to physical activity intensity. In the same context, Barbosa and Oliveira (2016) used the direct observation method as well as a part of their research methodology to determine the level of physical activity of children during the period of stay in preschools, and the associated factors. Last and not least, Imai et al. (2022) evaluated children's risky play which limits their validity and reliability, and examined the relationship between the frequency of risky play and social behavior among Japanese preschoolers by using a valid and reliable method which is direct observation.

In our case, the visits for the two case studies take place during 2021 and 2022 at various points under diverse circumstances, over the four seasons (spring, summer, autumn, and winter), and at various times of the day (morning and evening). In addition to the observation sessions, numerous notes from children and families are also collected, along with photography for the investigated locations. This process is conducted in order to assess the quality of these outdoor spaces while particular attention is paid to the physical characteristics of the outdoor environment. The results of the objective and subjective observations of the physical attributes and settings that adhere to the key quality criteria of outdoor spaces for children will serve as a foundation for an investigation into the children's outdoor activities and space use. This leads to an understanding and a better articulation of the relationship between the physical characteristics of the open outdoor spaces of the collective housing environments and children's behavior related to outdoor play activity.

1.2. Space Syntax

Within the same process of assessing the quality of open outdoor spaces in both study neighborhoods, the second methodological approach employed is space syntax analysis. The space syntax approach is one of the most significant methodological tools for assessing the characteristics related to visibility and accessibility for both built and open environments based on spatial configurations. According to the key quality criteria for outdoor spaces for children (KQCSC) (see Table 3), the use of space syntax analysis will be employed for

verifying the quality criteria related to Accessibility and Visibility. These characteristics are considered among the basic elements to evaluate children's outdoor accessibility and the degree of safety within residential outdoor environments.

The space syntax approach has different techniques and tools that allow the urban environment to be considered through various independent variables. The space syntax analysis aims to measure the configurational properties of spatial systems and demonstrates their impacts on spatial use, natural surveillance, security, movement, co-presence, and even social interactions. The space syntax provides tools to collect data to further understand and assess the role of spatial characteristics in creating a safe, vital, and rich outdoor environment. Nevertheless, as the notion of space syntax was considered largely in many research works, its theory and methods in this thesis will be exposed briefly (for more details concerning the theory and method of space syntax see chapter 4 in the thesis of Bendjedidi, 2019 and Van Nes & Yamu, 2021). Moreover, not all of the terms included in the space syntax are covered in this research study, yet, it takes into account those who are directly tied to it. Correspondingly, the representation of this method and its use will be exposed within the following sections through its theories, definitions, and literature review; from the perspective of space as configuration and via its application Software.

1.2.1. Definitions and Theories

Created in the 1970s by Bill Hillier and his colleagues at the Bartlett School of Architecture, University College London, space syntax is a theory and method for analyzing spatial relationships (Van Nes & Yamu, 2021). Subsequently, Hillier et al. (1987) define the space syntax through syntactic analysis as "a model for representation, analysis, and interpretation of settlement space" (p. 217). As well as an attempt to explain human behaviors and social activities from a spatial configuration point of view (Hillier, 1997). According to Hillier and Hanson (1984) in their well-known publication "The social logic of space", the use of the space syntax method resides in the measure of configurative spatial relationships in the built environment to provide an understanding of the impact of buildings' arrangement in various contexts (spatial, social and cultural) on social organization. Ultimately, it is a set of techniques that can be applied separately or in correlations depending on the research question for analyzing spatial relationships for one or several urban systems under scrutiny. The first research works using space syntax were applied in basic manners and on a small scale (only small settlements and buildings). However, with the advent of computers, their

scale of use has been expanded to consider the complex relationships in larger cities and metropolitan areas (van Nes & Yamu, 2021). Afterward, the space syntax method has been applied at different scales from interior design to urban studies worldwide creating a large database (Hillier, 2007).

1.2.2. Literature of Review

Space Syntax has been used in a large field of research works. In many cases of empirical pioneers' studies, it has been used to inquire into a social phenomenon. The most explored theme using space syntax was the relationship between the morphological structure of the urban environment and movement patterns such as works executed by Hillier et al. (1983); (1987b); (1989a); (1990); (1993); Hillier and Hanson (1984); Peponis et al. (1989); (1997). Furthermore, space syntax was also used as a tool for urban renewal projects such as projects conducted by Miller (1989); and Hanson (1989). Other relevant research topics were studied such as the function of the morphological structure of buildings conducted by Peponis et al. (1990), social settings of housing developments by Hillier et al. (1987a); Hillier et al. (1987b), interaction patterns, and productivity by Choi (1999); Penn, et al. (1999), and urban crime by Hillier (1988); Hillier et al. (1989b).

Afterward, following the lead of the pioneers' studies, many researchers around the world used the space syntax method to investigate various research projects. Along with that, Algerian researchers have used the method as well in different research applications to analyze construction such as Brown and Bellal (2001) who analyzed vernacular domestic spaces in Algeria. Bellal (2007) investigated the spatial interface between inhabitants and visitors in M'zab houses in south Algeria. Within the same context, Assassi and Bellal (2016) applied an approach based on the space syntax program for decoding the interior spatial constants in traditional dwellings in a Saharan region in Algeria. Furthermore, Hamouda (2018) used space syntax as a tool to analyze space at an architectural scale. While Benyahia et al. (2021) integrated the space syntax technics to decode the spatial configuration of the Ottoman Palace in Algeria.

Other studies within the Algerian context investigated the urban spaces such as Laouar et al. (2017) who investigated the topic of space and crime in the north-African city of Annaba to understand the strategy of offenders in the choice of location of street crime. Araba and Mazouz (2018) verified the integration of a spontaneous housing district. However, Laouar

et al. (2019) measured the accessibility of urban fragmentation in colonial cities in north Algeria. Bendjedidi et al. (2018) analyzed the open spaces within two mass housing neighborhoods in Biskra using the visibility approach while. Zerouati and Bellal (2020) evaluated the impact of mass housings' in-between spaces' spatial configuration on users' social interaction. Another recent study by Hamouda et al. (2021) concerning archaeology, this study tented to decode the spatial framework of Roman-African Domus in the case of Cuicul (Djemila).

However, the use of space syntax with the category of children is relatively unexplored. Only a few research studies have used the space syntax method in investigating children's environments. Özgece et al. (2015) investigated the perceptions and children's experiences with regard to outdoor spaces in order to discover children's landmark recognition and preferences of outdoor spaces. Their main results confirm the impact of city proprieties on the spatial perceptions of children. In addition, Meinert et al. (2019) investigated the relationship between children's use of urban spaces and the quality level of living environments in two different neighborhoods in Bergen, Norway using segment analysis and the urban microscale tool. The findings indicate the importance of children's use of urban spaces as the main factor in choosing living environments. Moreover, Loit (2021) has explored children's access to playgrounds in Stockholm using space syntax, and his findings reveal the existing conflicts between creating a safe play environment and the ambition of designing accessible areas. Although the rich history of studies involving space syntax techniques and tools, few of these studies have made a substantial impact on the outdoor environments of children and youth. Accordingly, our research will be an important addition to the context of children's outdoor environment investigated and measured using space syntax techniques.

1.2.3. Space as Configuration

Based on the theory that emerged from "Space is the Machine", Hillier (2007) demonstrates the role of the city as a container of activities. Various behaviors occur in urban space as "encountering, congregating, avoiding, interacting, dwelling, conferring" (p. 20) in interaction with space patterns. According to him, the relationship between people's social existence and space resides at the level of the configuration of space. He defines the configuration as " a set of interdependent relations in which each is determined by its relation to all the others" (p. 24). Spatial configuration is a key concept in spatial syntax analysis.

The aims intended by using the space syntax are "to understand configured space itself, particularly its formative processes and its social meaning" (Bafna, 2003, p. 18) and to describe and measure the spatial configuration of urban spaces (Long et al., 2007) as well. As already mentioned, space is used by human societies to organize their living, according to this fact, space syntax's act is described by Bafna as "turning the continuous space into a connected set of discrete units" (p. 18). Thus, space syntax is considered a tool for subdividing continuous space into a multitude of subspaces.

The spatial syntax has developed a set of basic configurational notions to understand configured space. The concept of permeability is defined as the flow of spaces, from one to another (Ephes, 2006). It is a property that indicates the direct relationship between two spaces (direct accessibility). While the concept of depth is defined by Van Nes and Yamu (2021) as the number of spaces that must be passed through from a chosen starting point to a given destination in a system. The spatial configuration of a given space is examined according to the space representations, through different syntactic analyses in order to obtain a set of various configurational measures. These space representations, syntactic analyses, and configurational measures will be explained in the following sections.

1.2.3.1. Space Representation

The relationship between physical space and society is conditioned by degrees of physical accessibility and visual accessibility (Van Nes & Yamu, 2021). Using space syntax techniques, the space representation of our study cases' quality assessment will be provided based on two key parameters: "Accessibility" and "Visibility".

"Accessibility refers to the ease to arrive to facilities, activities or goals, which could be appointed in general as opportunities" (Era, 2012, p. 3). Therefore, the space representations based on the concept of accessibility are the first to be adopted by space syntax. Thus, these descriptions of the relationships between the different spatial components are exposed through two types of representations; the convex map and the axial map (Bouarroudj, 2018). In this sense, accessibility, as it has been considered in this research, is related to the pedestrian movements and walkability of children within the open outdoor spaces of their neighborhoods.

On the other hand, “Visibility refers to visual information provided to observers at any given location and is directly related to the geometry of space as much as to the movement of observer” (Güney, 2007, p. 38). Therefore, based on the notion of the isovist explained by Benedikt (1979) as “the set of all points visible from a given vantage point in space and with respect to an environment” (p.47), the space representations depend on the concept of visibility using the different visual fields offered by the spatial system analyzed by the computer tool.

Therefore, spatial representation is an objective way of demonstrating the spatial network of accessibility and visibility in urban spaces via the different following products: axial maps, segment maps, and other various methods that include Convex Maps, Visibility Graphs, Isovists, and Agent-Based. These various products are obtained by using different types of analysis which will be exposed according to our research requirements in the next section.

1.2.3.2. Syntactic Analysis

The analysis of the urban settlements will be conducted using a variety of techniques. This section will outline how the different syntactical analyses are used to analyze visibility and accessibility based on space syntax. This section will explain the use of visual graph analysis VGA and all-line axial analysis.

Visibility Graph Analysis (VGA)

In order to examine the visibility and accessibility and promotes a quantitative analysis of visual properties in the built environment of our study areas, Visibility Graph Analysis (VGA) will be used as well. The VGA is a method for analyzing the intervisibility connections of urban spaces, it investigates the properties of a visibility graph derived from a spatial environment. A spatial layout can be understood at two levels, eye level, which describes what people can see, and knee level, which illustrates how people move. Furthermore, the principles of the VGA are based on the work of Benedikt (1979) that has been developed later by the works of Turner and colleagues (2001).

This analysis allows using the computer tool as well, to calculate several configurational properties from a given space (Ostwald, 2011; Bouarroudj, 2018). The Visibility Graph Analysis can be applied in two different ways (Figure 39). For the point-depth analysis, a syntactic step is taken from one cell to the next cell (raster-based and root cells). For the

through-vision analysis, the large visible surfaces as a whole were taken as one syntactic step (for more details, see Van Nes and Yamu, 2021, chapter 3).

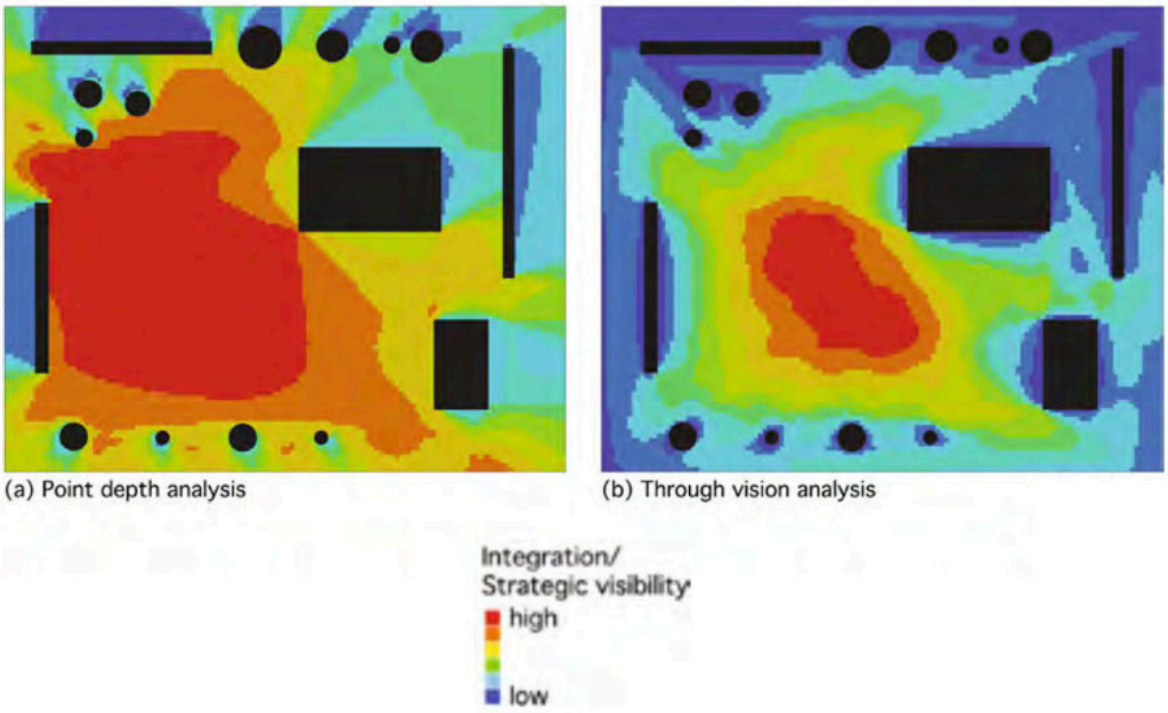

Figure 39 The VGA analysis for Park X (a) point-depth analysis and (b) through-vision analysis (Source: Van Nes and Yamu, 2021, p 99).

All-line Axial Analysis

Hillier (1996) and Turner et al. (2005) define the all-line axial map obtained through the all-line axial analysis as "a set of lines made up of all lines drawn tangent to vertices that can see each other" (Van Nes and Yamu, 2021, p. 103). The all-line axial map is created from a public space represented as one spatial entity considering spatial obstacles. Moreover, the all-line axial analysis demonstrates the degree of integration of all possible sightlines in the urban area under scrutiny. According to Hillier (1996), this technique demonstrates how the physical forms in open space influence human actions and orientations. Therefore, the produced line models are used to measure the configurational values of the spatial structure (Rezig, 2013) according to the different colors (Figure 40). The all-line axial analysis will be employed to examine the children's mobility and walkability in the built environment of our study areas.

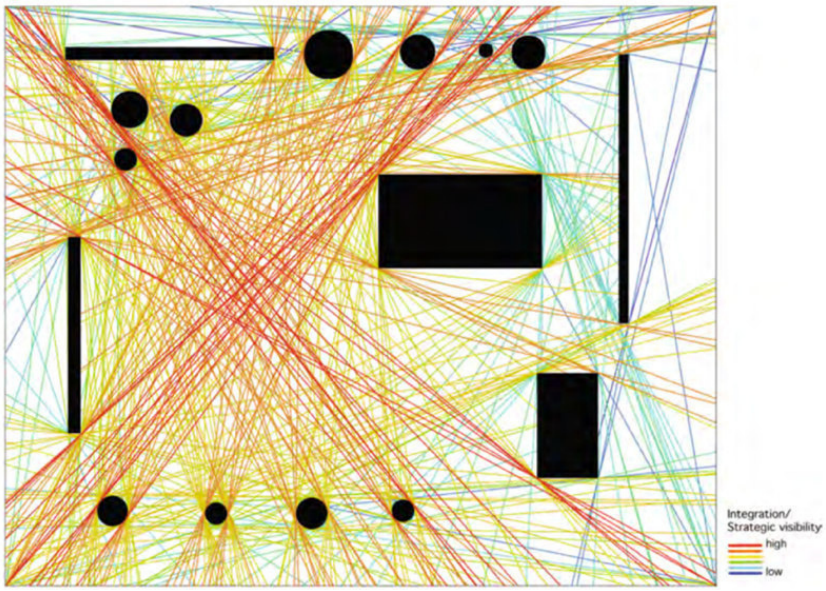

Figure 40 The All-line axial analysis for Park X (Source: Van Nes and Yamu, 2021, p 103).

1.2.3.3. Configuration Measures

According to Hillier et al., (1987), an urban system has both static and dynamic properties, the first type consists of a fixed system of spaces (configuration) and the second is a set of mobile (individuals). On the other hand, the urban system is considered according to the "local" and "global" spatial properties, where the global scale concerns the entire spatial structure of the whole system and the local scale describes the position of each spatial element according to its surrounding environment.

As a consequence, Hillier and his colleagues suggested a two-level measurement model based on the previous dimensions, in which "first-order" measures are direct measurements of the system of space (Connectivity, Integration, Choice, and Control), while the "second-order" measures (Intelligibility and Movement Interface) are obtained from the correlations between the first order measures. These measurements will be explained subsequently according to our study requirements (Figure 41). According to our study requirements, only Connectivity, Integration, and will be employed.

Connectivity is considered one of the key measures used in syntactic analyses of a given space (Mahmoud & Omar, 2015; Zerouati & Bellal, 2020). It is a static local measurement tool that expresses the number of connections of space with regard to other spaces in the environment under scrutiny (Araba & Mazouz, 2018). Connectivity is measured by the number of lines directly connected to the one being analyzed (Mazouz, 2013).

Integration is considered the most important measure in space syntax as the main indicator of movement in cities (Hillier, 1996). It is a measure of syntactic and non-metric which express "depth" rather than "distance". The integration value of a space is a mathematical way of calculating the mean number of lines and changes in direction required to move from one space to all other spaces within the spatial system (Mahmoud & Omar, 2015; Zerouati & Bellal, 2020). Integration is also an indicator of co-presence that improves social interactions and conviviality (Benyahia et al., 2021).

Intelligibility is the correlation between connectivity and integration, it is the most important measure from the second-order measurements (Hillier et al., 1987). Intelligibility is defined as " the degree to which what can be seen and experienced locally in the system allows the large–scale system to be learned without conscious efforts" (Hillier, 1996, p. 171). The definition concerns the relationship between the local measure of connectivity and global integration and explains how the spatial configuration can be read from its parts.

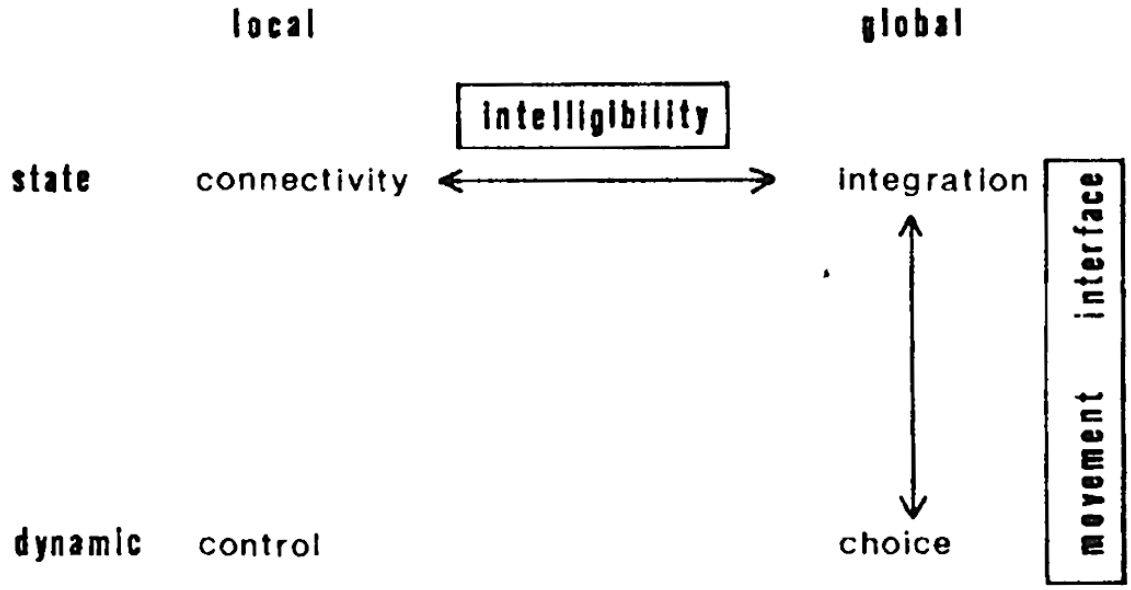

Figure 41 The model of fundamental syntactic measures (Source**:** Hillier et al., 1987, p 236).

1.2.3.4. Space Syntax Software

According to the UCL Space Syntax (2022) website, the DepthmapX is one of the key tools (besides the qgisSpaceSyntaxToolkit) currently being used in space syntax analysis. It is a computer program that is free open-source multiplatform software developed to perform a set of spatial network analyses in order to understand the social processes within the built environment (Al Sayed et al., 2014).

The software takes aims at understanding the potential impact of the configurational structure of urban spaces on social behavior and economic activity (Hillier, 1996). DepthmapX allows the accessibility and visibility analysis of architectural and urban systems (Turner, 2004). This program was initially written by Alasdair Turner (2000- 2010), then, by Tasos Varoudis (2011- 2015), and is currently being developed by Christian Sailer and Petros Koutsolampros.

In our study case, DepthmapX is used to examine the quantitative description of spatial configuration. This software can produce different sorts of spatial analyses on different scales. Firstly, the proper map of the city is drawn on the basis of the basic map of the city (the master plan), which is cleaned and updated based on the actual situation of the study areas using images from Google Earth where the missing or modified parts are inserted and repositioned on the actualized map. The final city map was drawn utilizing the AutoCAD software then the analysis was produced by the DepthmapX software from the export of a file in DXF format.

2. Outdoor Usage and Children's Activities

In order to examine and quantify the open outdoor spaces' usage in the study neighborhoods, two methodological approaches will be employed. The first methodological approach consists of a survey by questionnaire and the second one will be behavioral mapping. Both methodological approaches will be introduced within this section.

2.1. Survey

In our methodological process, a survey is also undertaken as a follow-up to the previous methods while it aims to evaluate outdoor utilization by the child category. Survey research is "the collection of information from a sample of individuals through their responses to questions" (Check & Schutt, 2012, p. 160). This type of research allows for various methods to incorporate participants and collect data using various instrumentation methods. Survey research can use quantitative research strategies such as questionnaires with numerically rated items, qualitative research strategies such as open-ended questions and interviews, or both strategies together as mixed methods (Ponto, 2015). Questionnaires and interviews are often used in mixed-method studies (Harris, 2010) while questionnaires can provide

evidence of patterns amongst large populations and qualitative interview data often gather more in-depth insights into participant attitudes, thoughts, and actions (Kendall, 2008).

However, in our survey's investigation, the questionnaire will be the employed instrument in investigating children's outdoor space usage in neighborhoods according to the indicators for assessing the outdoor space usage (see chapter 3) is ensured to acquire various and complementary data to uphold the previous findings and improve their interpretation. Whereas, the use of the interview instrument will be considered in further research due to financial constraints and time limitations.

2.1.1. Questionnaire

The questionnaire is a quantitative methodological tool that applies to a sample of people comprising structured questions to collect information to understand and explain a given phenomenon. Questionnaires are considered a large-used method of investigation with children in different research fields, including outdoor activities. Some literature on the questionnaire method with the child category and outdoor space usage will be exposed afterward.

Rifas-Shiman et al. (2001) opted for self-administered activity questionnaires of 6782 girls and 5110 boys, aged 9–14 years in order to assess the usual activity of children over the entire year. While Treuth et al. (2005) deployed a questionnaire for children between 7 and 19 years of age to measure their physical activity as well as to evaluate the reliability and validity of this methodological tool. Moreover, Harris and Reid (2005) employed the questionnaire method in a particular category of children with cerebral palsy aged 8 to 12 years, their work aimed to explore the degree of motivation children exhibit during virtual reality play sessions.

On the other hand, Rieffe (2007) identified some new aspects in a developed questionnaire for children aged 9–16 to measure emotional awareness. Furthermore, Wang et al. (2020) conducted a questionnaire on 1772 children between the age of 3 to 6 years in neighborhood environments in northern China (physical and sociocultural environments) to identify regional differences in outdoor activity time and screen-viewing time of preschool children in urban and rural areas and to provide data on the environmental factors to identify modifiable determinants for each region.

In our study, the questionnaire was designed to supply information that may not appear during the behavioral mapping process. In addition to collecting information on children's environmental settings, perceptions, experiences, and preferences outdoors. Furthermore, this questionnaire investigates the modes of use in terms of time and type of activities, appropriation of the space in terms of the kind of space and spatial preference as well as children's interactions.

2.1.1.1. Participants and Sampling

The questionnaire is designed for the children category, specifically for the age range of school children. The age range of school children is declared to be between 6 and 12 years old, however, in our investigation children of the first grade who are less than 7 years old are excluded because of their weak capacities of reading and writing). On the other hand, as it is impossible to investigate the whole children population in both study neighborhoods, we opted for choosing a group of children according to simple random sampling (which is the purest type of probability sampling where individuals are chosen randomly, giving each member of the population an equal chance of being selected as the subject). As a result, one hundred sixty (160) copies of the questionnaire were distributed directly by the author on the site in both neighborhoods (Eighty copies for each neighborhood).

2.1.1.2. Procedure and Scheduling

A close-ended questionnaire (questions of the "yes/no" or "set multiple choice" variety) is carried out, these kinds of questions allow children to select from a specific range of pre-defined answers. The questionnaire is elaborated in English and then translated into Arabic (both versions of the questionnaire are available in the appendix section). Afterward, the Arabic version of the questionnaire was verified and analyzed by a child psychologist in order to prove the linguistic syntax and the adaptation of questions to the children's abilities of understanding and responding. The questionnaire was developed according to the different indicators for assessing outdoor space usage (see chapter 3) through five main sections as follows: General Information; Time Frame; Play Activities; Play Spaces and Place Preferences and others.

The distribution of the questionnaires was scheduled during the month of July 2021 within the following dates: for the first neighborhood: Thursday, Friday, Saturday, and Sunday

(from 1st to 4th July); and for the second neighborhood: Thursday, Friday, Saturday, and Sunday (from 8th to 11th July). However, before the questionnaire distribution process began, a pilot group of discussion was carried out with a small sample of children to authenticate their understanding of the questions and the terminology used in the questionnaires.

2.1.1.3. Data Analysis Process

Data processing will be done using the IBM SPSS (Statistical Package for the Social Sciences) tool. Before entering information from the questionnaire into the SPSS a codebook is prepared. Preparing the codebook involves defining and labeling each of the variables as well as assigning numbers to each of the possible responses. Then data from the questionnaire are coded, analyzed, and enter into SPSS using cross-tabulated containing numbers that represent numerical data of different variables in simple descriptive statistics. The computing procedure allows the analyst to perform mathematical operations on variables. After the numerical values are obtained, the SPSS software provides a number of different types of graphs (or charts) such as histograms, bar graphs, line graphs, scatterplots, and boxplots.

2.2. Behavioral Mapping

It has been determined that using mapping techniques is an excellent way to describe activities that take place in specific locations and to interpret behavioral patterns in children. Therefore, this methodological approach will be used in our thesis to complete the picture drawn by findings delivered from the previously applied methods.

The behavioral mapping approach is regarded as an original method of learning how children interact with their local neighborhood's outdoor spaces. In this section, we first introduced the behavioral mapping method through its different definitions, importance, and its purposes. Furthermore, a brief representation of its use within the field of outdoors is related to the child category. On the other hand, this section demonstrates an extended explication of the behavioral mapping procedure.

2.2.1. Definitions

Behavioral mapping is a technique first introduced to environmental psychology by William Ittelson, Leanne Rivlin, and Harold Proshansky in 1970 at the City University of New York (Ng, 2016). It is a "graphical representation of use and occupation of space that allows the association between attributes of the environment, the occurrence of observable behaviors, and the time when they occur" (Klein et al., 2018, p. 608). In addition, it is defined as "a technique used in environmental psychology and related fields for recording people's behaviors and movements systematically as these behav-iors occur in particular locations" (Bechtel & Zeisel, 1987 as cited in Ng, 2016, p. 30).

Behavior mapping is defined as well as "an unobtrusive, direct observational method for recording the location of subjects and measuring their activity levels simultaneously" (Cosco et al., 2010, p. 514). Ng claimed also that "a behavioral map is basically a record of where people are, what they actually do, and how their behaviors are distributed in a space" (2016, p. 30). In the childhood research field, mapping techniques have been identified as a useful research method for this category (Morrow, 2001) since they have several advantages over self-reporting behaviors (Ng, 2016).

According to Sommer and Sommer (2002, as cited in Ng, 2016, p. 30), there are two forms of behavioral maps: A place-centered map displays the locations of people who are present in a specific location at a specific moment and are participating in various activities. Place-centered mapping is useful when evaluating how a certain region or location is used. On the other hand, an individual-centered map is a timeline of a person's movements and activities inside. Individual-centered mapping is appropriate when learning about a person's or a group's activities in relation to place and time. Based on the previous categorization of behavioral maps and following our research purposes, the place-centered map will be used to quantify outdoor space usage.

2.2.2. Importance and Purposes

Ng (2016) has highlighted three main benefits of the behavioral mapping method for all categories of people. Whereas, these benefits will be adapted to the child category as follows. First, the technique of behavioral mapping may be a useful and honest way to respond to inquiries about what children do in their everyday lives or where and how they perform

specific activities, due to the children's personalities or often their inability to respond to queries directly. Second, particularly in relation to normal actions, children may not precisely recall if they have done something or how frequently they have done something.

Finally, it's possible that children are often unaware of their actions. Consequently, this method will be valuable for collecting objective data related to our research question. In the same context, Cosco et al. (2010) added that behavioral mapping offers researchers an original way to evaluate behavior related to specific physical properties of outdoor environments.

Ittelson and his colleagues (1970 as cited in Ng, 2016) uncovered four general purposes of behavioral mapping's applications. According to them:

> "The first use is for describing the distribution of behaviors throughout a particular space. The second use is for comparing two different situations or conditions, such as usage by men and by women. The third use is to identify general patterns in space use in various settings, such as when usage peaks. Finally, behavioral maps can be used to provide quantitative predictions of the distribution of behaviors in a new facility before the facility is constructed or occupied, mainly in architectural programming" (p. 31).

However, the goal of behavioral mapping in this thesis (as used in correlational research) is to examine the presumptions underlying the planning of spaces and facilities (the question of space quality) by observing children's movements and behavior in order to spot any issues and take corrective and preventative measures to enhance the provision of the usage of space.

2.2.3. Employment in Research

In the childhood research field, the technique of behavioral mapping is known to be useful. Sanoff and Coates's (1971) research is considered the first that introduced behavioral mapping techniques to investigate children's environments. This research is based on the assumption that a connection exists between children's play behavior and the elements provided for their outdoor residential environment. Through successive observations, Sanoff and Coates claimed that residential site planning arrangements (particularly for low-income contexts) offer specific perceptual indications and obscurities for individual and group activities, depending on individual factors such as age and gender.

Later, Charlop et al. (1983) investigated autistic children's behaviors in three classrooms using behavioral mapping techniques in different settings. The findings demonstrated a positive correlation between the classrooms and children's behaviors where they showed that specific settings in a learning environment were linked to high rates of some behaviors and low rates of others.

Min and Lee (2006) discussed various parts of place theories, in particular how a child's psychologically significant location emerges at the neighborhood scale using behavioral mapping. Behavior observations confirmed that children's frequent and active usage of a setting was positively connected to their perception of the environment as important. This observational analysis demonstrates that settings children identify as significant to them are used more frequently than their counterparts, displaying a range of behaviors, incorporating more intentional activities, supporting group behaviors, and giving children a sense of their own territorial play area. The study shows that the creation of such significant locations in children's neighborhood environments is related to use patterns and that certain essential characteristics and fundamental behaviors considerably influence children's place experiences.

Veitch et al. (2008) explored how socioeconomic class, age, and gender affect children's (Australian children of 8–12 years) access to places in their neighborhood for active free play using the behavioral mapping method. According to the results, Veitch and colleagues claimed that some children could have a hard time finding opportunities to be active because they have poor access to secure public spaces or have limited independent mobility that prevents them from going to play areas. Due to the dearth of parks nearby, especially in outer-urban regions, and the common problem of many children having limited independent mobility, some children may find it challenging to engage in active free play in their neighborhood.

Cosco et al. (2010) introduced behavior mapping as a direct observation technique based on the theories of behavior setting and affordance to show how sensitive it is to collecting environmental and physical activity data at a level of detail necessary to influence built environment design policy. According to them, behavioral mapping is a promising technique for assessing the links between physical behavior settings and directly related activity levels are behavior mapping. According to findings related to preschool children's (3- to 5-year-olds) outdoor activities, Cosco and his colleagues found that the levels of physical activity

at the two facilities under investigation differed across several behavioral settings, including pathways, play structures, and open areas while the same type of setting with different attributes attracted different physical activity levels. Therefore, the authors recommended behavior mapping as a potential approach to objectively measure correlations between physical behavior settings and directly related activity levels.

Contrary to the previous works, Onojeghuo et al. (2019) introduced the use of GIS (Geographic Information Systems) in behavioral mapping in order to visualize and analyze how children utilize their play spaces. The authors offered a non-intrusive method for incorporating locational information into behavior data collected from video recordings of preschoolers' indoor playing. According to them, this gridding methodology was demonstrated to be a cost-effective means of obtaining locational information on children from video recordings of their indoor physical activities and social behaviors. It was also done using bubble pie charts, which allowed for merging numerous categorical information on one map. The potential to determine what kinds of equipment or play places may support various physical activities and social behaviors among preschool children was given by including locational information about other play activities and social behavior data. However, in addition to the increased cost of the procedure, the requirement to attach positioning devices to children during observations might generate ethical questions regarding the privacy of the children and methodological issues with children playing less organically.

2.2.4. Behavioral Mapping Procedure

In our behavioral mapping procedure, we have followed the same original procedure based on the work of Ittelson et al. (1970) which is introduced by Ng (2016, pp. 33-34) in five successive steps as follows:

2.2.4.1. Creation of a Base Map

The first step is to create a base map, a scale drawing of the physical space, identifying each area with the salient environmental features that may affect the behaviors of interest to the researcher. In our case, the same map used in the space syntax analysis (the accurate map of the city which is drawn on the basis of the basic map of the town -the master plan- after being cleaned and updated regarding the actual situation of the study areas using Google

Earth data and the author's on-site observations where the missing or modified parts are inserted and repositioned on the actualized map) (see Figure 4.15 and Figure 4.20) will be used in the behavioral mapping procedure. The recording data will be first demonstrated as tables (for each of both study neighborhoods) in which the different behaviors (activities), the time frame, and the number of children is presented.

2.2.4.2. Definition of the Behavioral Categories and the Development of a Coding System

In this step, we will define the behavioral categories (clear, unambiguous, and comparatively restricted) that are relevant to the research problem under analysis. The process of behavioral categorization will pursue the following three sub-steps: (1) cataloging observed behaviors, (2) generalizing the behaviors into categories for observation, and (3) combining observational categories into analytic categories. In our study case, the observed behaviors are chosen based on the different modes of outdoor space usage (see chapter 3). These modes of outdoor space usage are movement and physical activity (moving and playing); and stillness and quietness (sitting and standing). The coding of these different behaviors is illustrated within circles of various colors where green represents the sitting behavior; yellow for standing; blue for moving, and red for playing. Subsequently, the observed behaviors are combined into different time frames in order to provide some analytic categories.

2.2.4.3. Scheduling and Zoning of Observations

After defining the behavioral categories, our behavioral observations are framed to time. This time frame is scheduled on two different days for each neighborhood: weekday (morning and evening) and weekend (morning and evening) during October 2021. The weather conditions were good, and the temperature was moderate (between 20-25°C). Accordingly, the observations were taken in the morning time (from 10 to 12 am) and in the evening time (from 4 to 6 pm) registering the different activities; sedentary (sitting and standing) and vigorous (moving and playing). On the other hand, both study neighborhoods' outdoor spaces are split into many small zones (Figure 47) in order to structure and organize the observation process based on the possible visual fields. The observations are time-contingent at a fixed interval of 10 minutes for each zone within the study neighborhoods.

Figure 42 Zoning of the study neighborhoods. From up to down: 420 housing unit neighborhood; 1500 housing unit neighborhood (Source: Author).

2.2.4.4. Development of an Observation Procedure

Our study cases' observations recorded the number of users (children) on data sheets that include the holistic information about the neighborhood; the procedure's time frame; the children's different behaviors (Moving, Playing, Sitting, and Standing); and the various investigated zones from A to S (see Table 6). In addition to the use of data sheets,

photography and video recording are also utilized. In this process, we avoided direct involvement in the children's activities to keep the play activity natural.

Table 6 The data sheet used in both study neighborhoods for the behavioral procedure (Source: Author).

Neighborhood :

Time frame	**Weekday** ☐ **Morning** ☐ **Evening** ☐ **Weekend** ☐ **Morning** ☐ **Evening** ☐			
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**	
	Moving	**Playing**	**Sitting**	**Standing**
Zone A				
Zone B				
…				
Zone X				

2.2.4.5. Training and Pre-Testing

Before starting the process of behavioral mapping, we already spend considerable time in the study areas in order to become familiar with the behaviors and activities of the children. The current step of the process helps to ensure that the observation process, behavioral categories, and environmental aspects of the location are all coded with high levels of agreement. This pre-testing helps to find any issues that need to be fixed before the study is carried out and it also provides an approximate overview of the process duration.

Conclusion

In this chapter, we have defined the tools and methodologies used in our research work. We have demonstrated a convergent parallel mixed methods design which will be implemented to gain a holistic overview of the quality of outdoor spaces in housing neighborhoods in addition to providing a comprehensive understanding of these outdoor space usage according to the child category. Both quantitative and qualitative data were gathered concurrently with each other in order to facilitate verification and enhance the understanding of findings.

The assessment of the quality of outdoor spaces for children in the study neighborhoods will be conducted according to two methodological approaches (Direct Observations and Space Syntax). These methodological approaches allow for the examination of a series of physical

characteristics and criteria related to play equipment and structures, vegetation and natural elements, accessibility, and visibility as well as a set of other various aspects.

On the other hand, outdoor usage and children's activities will be measured according to two additional methodological approaches (Survey via Questionnaire and Behavioral Mapping). These couple of methodological approaches permit the investigation of the children's different modes of space usage and their behaviors according to a set of indicators that includes time frame, various outdoor activities, occupancy for the diverse spaces and places as well as the ability of mobility and the sense of safety.

The use of mixed methods research in this thesis through combining various instruments and tools of quantitative and qualitative research aimed to answer our research question related to the impact of the open outdoor quality in housing neighborhoods on children's use of space and behaviors. In the following chapter, we will discuss the findings and results that have been obtained through the application of the previous methodological approaches and the analysis of the different collected data.

Chapter VI: Results and Discussion

Introduction

This chapter constitutes the results of the exploratory study about the relationship between children and the quality of outdoor environments in Algerian residential contexts. Alternatively, the outdoor environment's impact on young people and the characteristics of the interaction between them through the investigation of the spatial experience. This study is based on a mixed approach developed in chapter five. The results of the analysis and the discussions are divided into three main parts:

The first part discusses the quality of the open outdoor spaces in both study neighborhoods (the neighborhood of 420 housing units and the neighborhood of 1000 housing units) based on the results provided by the application of both methodological approaches: direct observations and space syntax analysis. The application of these methodological approaches is conducted according to the Key Quality Criteria of Outdoor Spaces for Children (KQCOSC) which include four main aspects (Play Equipment and Structures; Vegetation and Natural Elements; Accessibility and Visibility; and Diversity).

The second part of our chapter discusses the outdoor spatial usage and children's activities within both study neighborhoods (the neighborhood of 420 housing units and the neighborhood of 1500 housing units) based on the results provided by the application of both methodological approaches; a survey by questionnaire and behavioral mapping. The outdoor spatial usage and children's activities in both neighborhoods will be investigated according to the indicators for assessing the outdoor space usage (IAOSU) which are the following: time frame; play activities; play spaces and place preferences; and mobility and safety. This section will discuss the results derived from evaluating and quantifying different usage modes.

The third part is a materialization of the impact of the quality and characteristics of the open outdoor spaces within both studied neighborhoods (the neighborhood of 420 housing units; the neighborhood of 1500 housing units) on children's activities. This sterilization will be conducted through some correlations between the different results obtained from the previous application of all the research methods (part one and part two). These correlations will be discussed in this section under the following forms: spatial configuration and outdoor use; outdoor spaces and activity levels; space appropriation and play activity; as well as safety and outdoor use.

1. Quality of Outdoor Spaces for Children

Based on the results provided by the application of both methodological approaches: direct observations and space syntax analysis (see chapter 5), this first part of our findings discusses the outdoor physical characteristics from a perspective of outdoor quality within both study neighborhoods (the neighborhood of 420 housing units and the neighborhood of 1500 housing units). Accordingly, the space characteristics and physical settings of both neighborhoods are investigated according to the Key Quality Criteria of Outdoor Spaces for Children (KQCOSC) as follows: Play Equipment and Structures; Vegetation and Natural Elements; Accessibility and Visibility; and Diversity (as explained in chapter 3). This section will discuss the results derived from evaluating and analyzing different quality criteria.

In accordance with direct observations, multiple visits were conducted in each neighborhood several times during 2021 and 2022, and during different seasons and times of the day. These visits were reinforced with photography, videography, and taking notes. The main objective of this section is to identify and evaluate the different physical characteristics and settings of the open outdoor spaces within the mentioned residential neighborhoods leading to an overall assessment of these outdoor spaces' quality. In this section, direct observation findings will be exposed and discussed.

1.1. Play Spaces, Equipment, and Structures

Both neighborhoods' play equipment and structures are observed and evaluated according to the previously exposed physical characteristics criteria (Table 3). These settings include the different playgrounds, play structures, loose parts, floor types, sand play, and conditions of cleanness and maintenance will be exposed as follows.

1.1.1. Playgrounds and Play Structures

According to the direct observations, the neighborhood of 420 housing units contains only one playground that incorporates a very limited number and types of play structures (three damaged swings and two damaged slides). These play structures are extremely vandalized and damaged (Figure 43) which makes them useless and thus exceedingly dangerous for children. In such cases, Chawla (2002); and Christensen and O'Brien (2003) indicated that urban environments can frequently be described as dangerous places to children. On the

other hand, the neighborhood of 1500 housing units does not contain any equipped playgrounds or any specific places for children's outdoor activities but only the rest of some very damaged and vandalized structures (Figure 44). Accordingly, children are driven to play in almost every available place within the neighborhood such as in the building's entrances, around the buildings, on the streets, parking lots, and especially in the leftover areas that are supposed to be green spaces and gathering areas.

Furthermore, a small group of children was observed trying to adjust the play structures by adding some elements such as cardboard papers, ropes, and plastic materials but the structures still could not be properly functional. These behaviors reflect the importance of the play structures and the needs that children have for these play facilities. The deterioration of the playgrounds and especially the play structures in both neighborhoods (420 and 1500 housing units) makes these areas inappropriate for all children's outdoor activities. As a consequence, these spaces for external activities have failed in providing features for the different needs of children while succeeding in displaying and encouraging negative behaviors such as participating in vandalism. These problems are commonly experienced by most Third World cities as a result of the struggle with urban problems while having a low priority and poor funding and implementation. As proclaimed by Geason (1989), vandalism and graffiti are usually images that reflect behaviors from socially and economically disadvantaged populations.

Figure 43 The damaged play structures of the neighborhood of 420 housing units (Source: Author).

Figure 44 The damaged play structures of the neighborhood of 1500 housing units (Source: Author).

1.1.2. Loose parts

Along with playgrounds and play structures, a large group of children in both neighborhoods was observed using different loose parts (detached objects as named by Heft, 1988) such as tree branches, rocks, plastic bottles, cardboard boxes, and other available materials and tools to try out different compositions and to practice constructive, imaginative and dramatic play activities. As claimed by Maxwell et al. (2008); and Spencer and Wright, (2014), these elements have been shown to promote different types of outdoor play, encourage the development of fine and gross motor skills, and stimulate creativity. As confirmed by Tovey (2007), instead of adults who perform, the diversity of shapes and materials appears to be one of the fundamental ideas that might guide children's playthings development. As a result, creativity and imagination can develop in areas with lots of moveable or loose pieces.

1.1.3. Floor Types and Sand Play

Both neighborhoods' outdoor spaces are composed mainly of hard floors and surfaces made of asphalt, concrete, pavement, and compacted soil (Figure 45). Yet the single playground in the neighborhood of 420 housing units has a very small area dedicated to sand play, contrary to the neighborhood of 1500 housing units that contain no areas destined for it. The concept of sand for outdoor play as a moldable material for children to explore and discover the qualities of natural elements affords a tactile experience and the chance to discover motor skills as children dig and play in it. Sand areas and sandboxes provide wide possibilities for body development and physical behaviors promotion where children are able to sit, stand,

lay, bend, or squat (Spencer and Wright, 2014). Moreover, it promotes some non-locomotor skills and social interaction between peers (Cosco et al., 2010). Therefore, despite its importance for the physical and social development of the child, the sand areas in our study cases represent minor elements in the composition of the outdoor spaces.

Figure 45 The different types of floors exist within both study neighborhoods. From left to right: asphalt; pavement; compacted soil; and sand (Source: Author).

1.1.4. Conditions, Maintenance, and Cleanness

The neighborhood of 420 housing units is demonstrated by the fact that its only playground has been worsened because it does not receive any regular and proper maintenance, making its components unsafe urban tools for children (Figure 46). Furthermore, the lack of maintenance does not only concern the play structures, but it is also apparent to the floors (trash, poor drainage, and water-logged areas), and the walls (in the form of graffiti) (Figure 47). In addition to all the problems commonly exposed by the housing estates of 420 housing units, the open outdoor spaces within the 1500 housing units are also rapidly degrading. For example, the only playground within the neighborhood is now completely destroyed, and all the play structures have been vandalized, with just a few structures showing that they once existed (as demonstrated in Figure 44). The condition assessment reveals the poor situation of the outdoor play spaces in both neighborhoods which affects the functionality as well as the quality of the features. According to our observations, the overall cleanliness was significantly associated with less utilization of the outdoor play spaces by children. Similarly, Colabianchi et al. (2011) indicated that in quality considerations, attributes considered for any type of equipment usually included condition and cleanliness.

Figure 46 Some unmaintained play structures while used by children within the playground of the 420 Housing Units neighborhood (Source: Author).

Figure 47 Different forms of lack of maintenance (floors and walls) within the playground of the 420 Housing Units neighborhood (Source: Author).

1.2. Vegetation and Natural Elements

The vegetation and natural elements within both neighborhoods (the neighborhood of 420 housing units and the neighborhood of 1500 housing units) are observed and evaluated

according to the physical characteristics and settings previously exposed (see Table 3.3). These settings include the different types of vegetation and greenness investigated by size, color, and texture in addition to the topographic elements and variety while highlighting the conditions of cleanness and maintenance.

1.2.1. Vegetation and Greenness

As a result of direct observation, most of the areas in both neighborhoods that are supposed to be green spaces are left to become abandoned zones with compacted floors, with the exception of a few anarchic lawns and trees that were planted by residents as a volunteer effort (Figure 48). Thus, the quantity of green spaces in both neighborhoods is very insufficient when compared to the required quantity per child (see vegetation and natural elements in chapter 3).

Figure 48 The vegetation and Greenness in both neighborhoods. From up to down: the 420 Housing Units neighborhood; the 1500 Housing Units neighborhood (Source: Author).

Natural settings offer children challenging playscapes that are rough and energetic and which offer shelters and trees for climbing, meadows for running and tumbling (Fjortoft, 2001) based on Heft's (1988) alternative approach that gained its roots from Gibson's (1979) theory of affordance that describe the environment and focuses on function rather than form. However, in our study cases, maintenance of green spaces is never considered a priority by either community members or local authorities. There is a positive correlation between greenness and vegetation in the neighborhood and self-reported health, physical activity, and

mental health in children; therefore, the size, types, textures, and colors of the vegetation in the neighborhood should be considered.

1.2.2. Topography and Variety

In addition to the vegetation and greenness, topographic variation is also an important set of natural elements within outdoor play spaces, it provides children with inherent challenges, such as slopes and rocks (Fjortoft, 2001). However, this element is completely absent within both studied neighborhoods where all grounds represent the same slope and roughness as topography's most important descriptive variables. On the other hand, the open outdoor spaces are very poor in terms of variety and natural diversity as stimulating elements (such as differences in sizes, colors, and textures). Accordingly, the open outdoor spaces within both neighborhoods are characterized by monotony, boringness, and a lack of attractivity, challenge, a sense of adventure, curiosity, and motivation.

Contrarily to our study cases, the general natural elements serve to create a welcoming and visually appealing environment that provides variety, interest, and elements of perceived risk and adventure (Spencer & Wright, 2014). Correspondingly, Frost (1992) stated the importance of these natural elements as quality features of outdoor play environments for children that challenge artificial playgrounds and structures. From a qualitative perspective, Fjortoft and Sageie (2000) provided an example from a kindergarten boy that confirms the high importance of natural elements to children's outdoor play compared to the traditional playground: "Climbing rocks is more fun than climbing trees, but climbing trees is more fun than the boring playground equipment" (p. 83). As a consequence, the children's experience of place is related to how they integrate and interpret (question of affordance) the available natural elements into play activities.

1.3. Accessibility and Visibility

Using space syntax tools, multiple analyses were conducted in each neighborhood in order to identify and evaluate the different physical characteristics and settings of the open outdoor spaces within the study neighborhoods through the aspects of Accessibility and Visibility as a part of an overall assessment of these open outdoor spaces' quality. This section will expose and discuss findings related to space syntax analysis.

The Space Syntax analysis is produced using the Depthmap software, based on the export of a DXF format file (see chapter 5) containing the visible limits of spaces under scrutiny including obstacles. In this section, we present the analysis of the visibility carried out on the basic visibility model of both 420 and 1500 housing units' neighborhoods on a couple of scales; the macro scale which represents the neighborhood according to the entire city, and the micro-scale, where the analysis will be delimited only at the borders of the neighborhoods.

1.3.1. Macro Scale

The axial map of the city of Oum El Bouaghi using the integration method shows the integration values of each street in different colors. The color spectrum used in space syntax is from dark blue representing the least integrated streets to dark red representing the most integrated ones. According to the global integration analysis of the city of Oum El Bouaghi, the neighborhood of 420 housing units is moderately integrated and averagely connected within the city while the 1500 Housing Units neighborhood is well integrated and connected within the whole of the city (Figure 49).

Figure 49 The global integration axial map (fewest-line) of the city of Oum El Bouaghi, including the location of both neighborhoods. From left to right: 420 housing units; 1500 housing units (Source: Author).

1.3.2. Micro Scale

In order to assess the qualities of accessibility and visibility, two types of analysis are used for both neighborhoods. The first analysis is the Visibility Graph Analysis while the second is the All-line Axial Analysis through the syntactic measures of integration, connectivity, and intelligibility.

1.3.2.1. Visibility Graph Analysis (VGA)

As mentioned earlier in chapter 5, the Visibility Graph Analysis VGA is a method for analyzing the intervisibility connections between urban spaces in order to obtain several configurational properties from a given space. Hence this tool promotes a quantitative analysis of visual properties in the built environment by supplying the different following syntactic measures: Global Integration, Connectivity, and Intelligibility.

Global Integration

The results from the Visibility Graph Analysis of the neighborhood of 420 housing units show that the most integrated parts of the neighborhood (represented in red with a maximum value of 13.6695) are found in the middle of the spatial entity, in particular along with the main road of the neighborhood. Nevertheless, the least integrated parts are the open spaces between the building blocks (represented in dark blue with a minimum value of 4.16427) while the rest of the open spaces within the neighborhood are moderately integrated (represented in shades of green with average values of around 7.99001).

However, the results from the Visibility Graph Analysis of the neighborhood of 1500 housing units demonstrate that the most integrated parts represented in red are registered with maximum values over 13.90, these spaces are located in the western part of the spatial entity, in particular within the main boulevard of the neighborhood. Nonetheless, the least integrated parts are the open spaces between the building blocks (represented in dark blue with a minimum value of 4.13) while the rest of the open spaces within the neighborhood are moderately integrated (represented in shades of green with average values of between 7.00 and 9.00) (Figure 50).

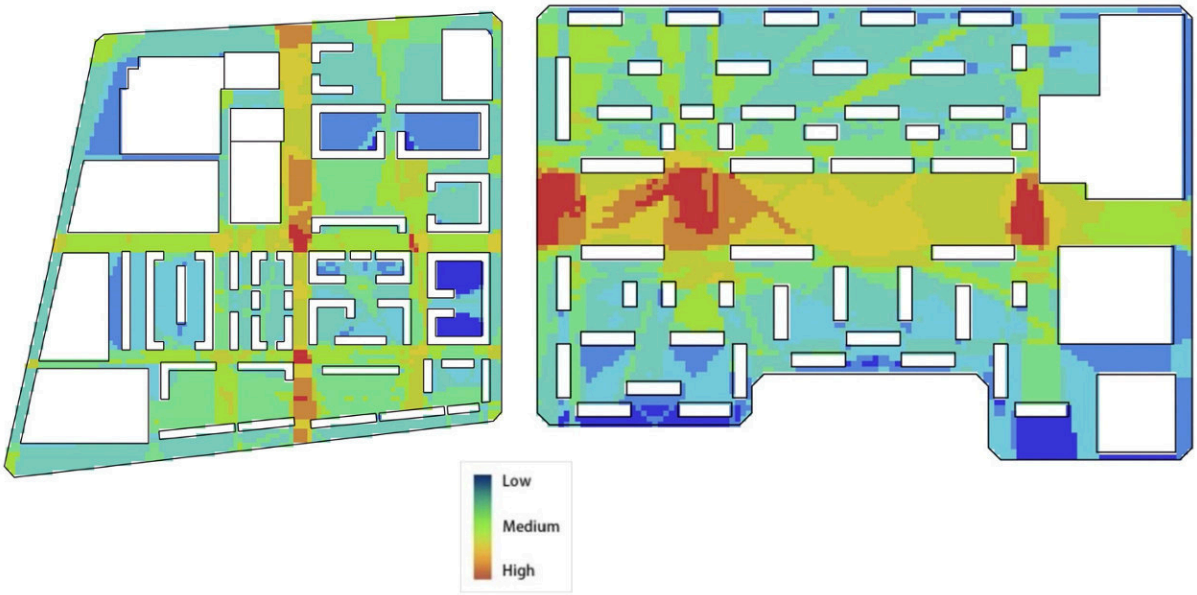

Figure 50 Visibility Graph Analysis Integration graph of both neighborhoods. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

Connectivity

The results from the Visibility Graph Analysis of the neighborhood of 420 housing units show as well that the most connected parts of the neighborhood (represented in red with a maximum value of 8316) are found again within the middle of the spatial entity, in particular lengthways with the main road of the neighborhood. However, the least integrated parts are the open spaces between the building blocks (represented in dark blue with a minimum value of 53) while the rest of the open spaces within the neighborhood are moderately integrated (represented in shades of green with average values of around 2950.97).

On the other hand, the results from the Visibility Graph Analysis of the neighborhood of 1500 housing units show as well that the most connected parts of the neighborhood (represented in red with a maximum value of 2077) are found within the middle of the spatial entity, in particular lengthways with the main road of the neighborhood. However, the least integrated parts are the open spaces between the building blocks (represented in dark blue with a minimum value of 34) while the rest of the open spaces within the neighborhood are moderately integrated (represented in shades of green with average values of between 700 and 900) (Figure 51).

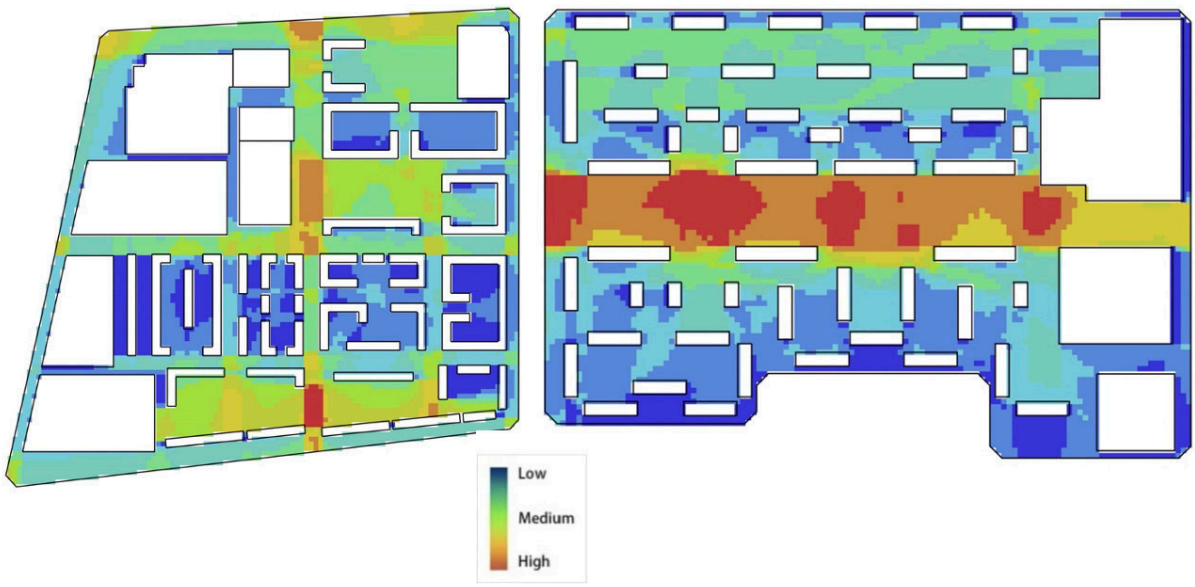

Figure 51 Visibility Graph Analysis Connectivity graph of both neighborhoods. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

Intelligibility

Intelligibility as mentioned in the previous chapter is a second-degree measurement of Space Syntax and the most commonly used correlation, it is calculated as the correlation between visible global integration and visible connectivity. Based on the VGA findings, the results from both neighborhoods show that the scatters shape a linear set of points and upsurge accordingly with the raise of both global integration and connectivity.

This syntactic measure of intelligibility is based on the correlation coefficient (R^2) where the closer the correlation coefficient is to one, the more orientable and thus intelligible the built environment under scrutiny is. In the previous findings, the coefficient (R^2) within the neighborhood of 420 housing units was moderate ($R^2 = 0.55$/ $0.5 < R^2 < 0.7$). However, for the neighborhood of 1500 housing units, the coefficient (R^2) was high ($R^2 = 0.81$/ $0.7 < R^2$) (Figure. 52).

The previous results indicate that the outdoor spaces in both neighborhoods are moderately vital and relatively easy to orientate in and navigate through as well as the spatial hierarchy of open spaces is reasonably clear. Consequently, this stands for how easy it is for children in a local position to infer the structure of the whole neighborhood setting from one situated point of observation.

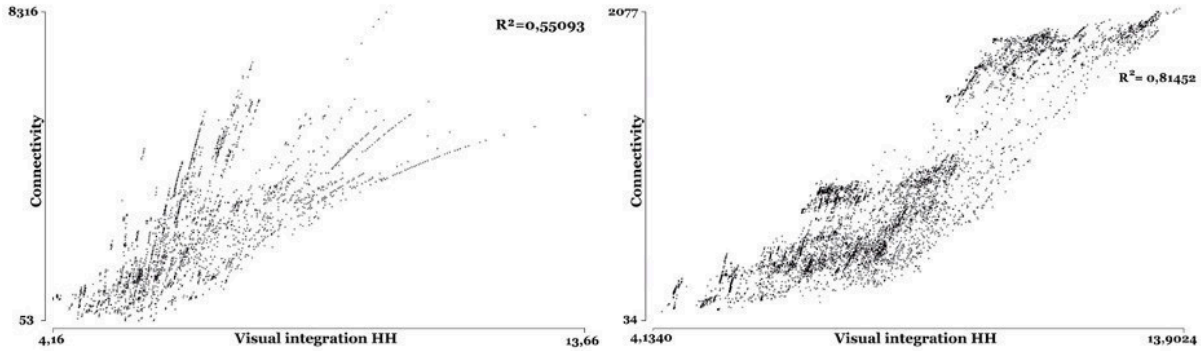

Figure 52 Intelligibility Graph based on the VGA results of both neighborhoods. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

1.3.2.2. Visibility and Natural Surveillance

Regarding the difference in visibility levels between the different portions of the study areas in both neighborhoods, the difference is firstly due to the size of the areas produced larger convex zones (produced by the geometry of space, and openness), which are more likely to have visible points from a wider range of locations. Accordingly, it is clear that the central areas are much more porous to their surroundings visually, which undoubtedly significantly impacts the overall visibility level. However, there are fewer and narrower points of connection to the surrounding lengthways of the edge areas, which are meaningfully more closed due to visual obstructions.

The visibility levels are positively correlated with natural surveillance. Jacob's view (1960) asserts that pedestrians in streets, represented by strangers and inhabitants, serve as a natural type of monitoring. Moreover, the degree of topological depth (the number of changing directions from one location to another) from private space to public space and the intervisibility between doors and windows across streets are the main aspects of providing natural surveillance (Van Nes & Yamu, 2021). These aspects have influenced empirical studies on safety and crime in outdoor spaces. Accordingly, the parents' perceptions of stranger danger and road safety are identified as key sources of parental anxiety (Bjorklid, 1994; Hillman & Adams, 1992 as cited in Shamsuddin et al., 2013). Accordingly, children as a vulnerable category of the inhabitants need to be protected and controlled (Matthews & Limb, 1999) by surveillance. However, these worries may lead parents to limit their children's outdoor play (Loprinzi & Trost, 2010) and lead to children's decreasing level of independent mobility. As an outcome, the design of outdoor spaces affects the parents' perception of safety and thus the children's play activity and independent mobility.

1.3.2.3. All-line Axial Analysis

After the Visibility Graph Analysis axial analysis is produced, then the All-line Axial Analysis will take place. As mentioned earlier (see chapter 5), the All-line Axial Analysis represents a set of lines made up of all lines drawn tangent to vertices that can see each other. It is created originating from the public space represented as one spatial entity considering all the spatial obstacles. Hence this tool also promotes a quantitative analysis of visual properties in the built environment and supplies different syntactic measures: Global Integration, Connectivity, and Intelligibility.

Global Integration

The all-line axial analysis demonstrates the degree of integration of all possible sightlines in the urban area under scrutiny. The produced line models are used to measure the configurational values of integration of the spatial structure according to the different colors. According to the integration graphs, the most integrated axes in the neighborhood of 420 housing units represented in red with the highest values (more than 13.00) are located in the middle of the neighborhood space along with the main road, while the spaces between buildings show either moderate values (around 8.00 represented in shades of green) or lower values of integration (3.00) represented in dark blue.

On the other hand, the most integrated axes in the neighborhood of 1500 housing units are represented in red with the highest values (a maximum of 12.98) located in the western part of the neighborhood space within the main boulevard, while the spaces between buildings show moderate values (around 7.00) which are represented in shades of green, however, the lower values of integration (around 3.00) are represented in dark blue and surrounded by buildings (Figure 53).

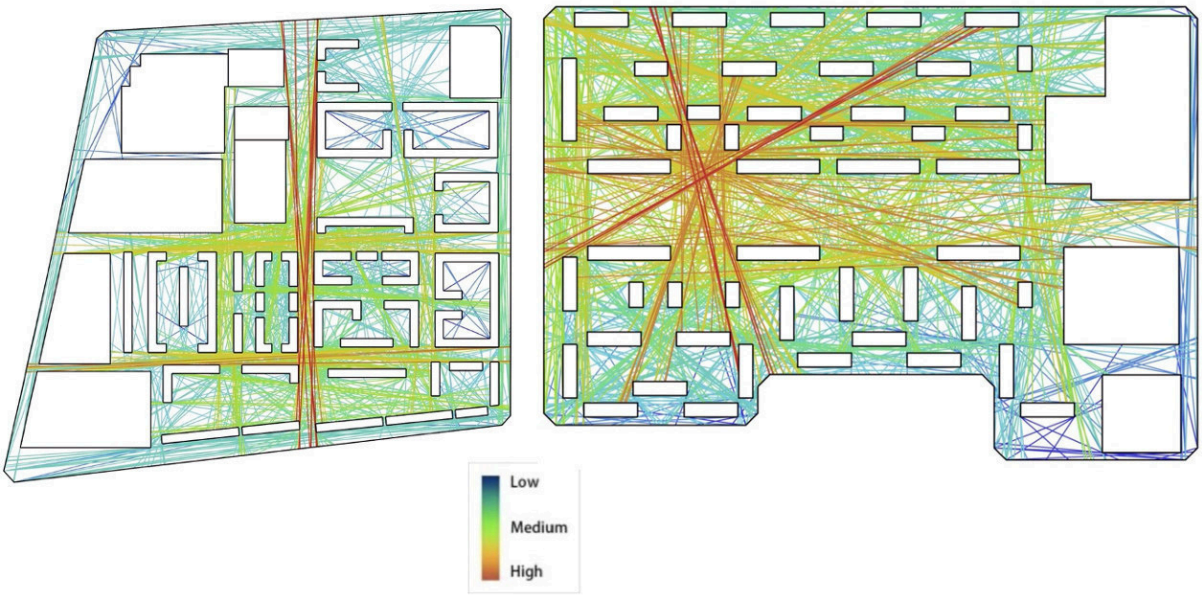

Figure 53 All-line Axial Analysis Integration graph of both neighborhoods. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

Connectivity

The all-line axial analysis demonstrates the degree of connectivity of all possible sightlines in the urban area under scrutiny. The produced line models are used to measure the configurational values of connectivity of the spatial structure according to the different colors. According to the connectivity graph, the most connected axes in the neighborhood of 420 housing units represented in red with the highest values (more than 400) are located in the middle of the neighborhood space along with the main road, while the spaces between buildings show either moderate values (around 200 represented in shades of green) or lower values of integration (30) represented in dark blue.

On the other hand, the most connected axes in the neighborhood of 1500 housing units represented in red with the highest values (a maximum of 469) are located in the middle of the neighborhood space within the main boulevard, while the spaces between buildings show either moderate values (between 180 and 200) which are represented in shades of green or lower values of integration (a minimum of 14) which are represented in dark blue and surrounded by the building blocks (Figure 54).

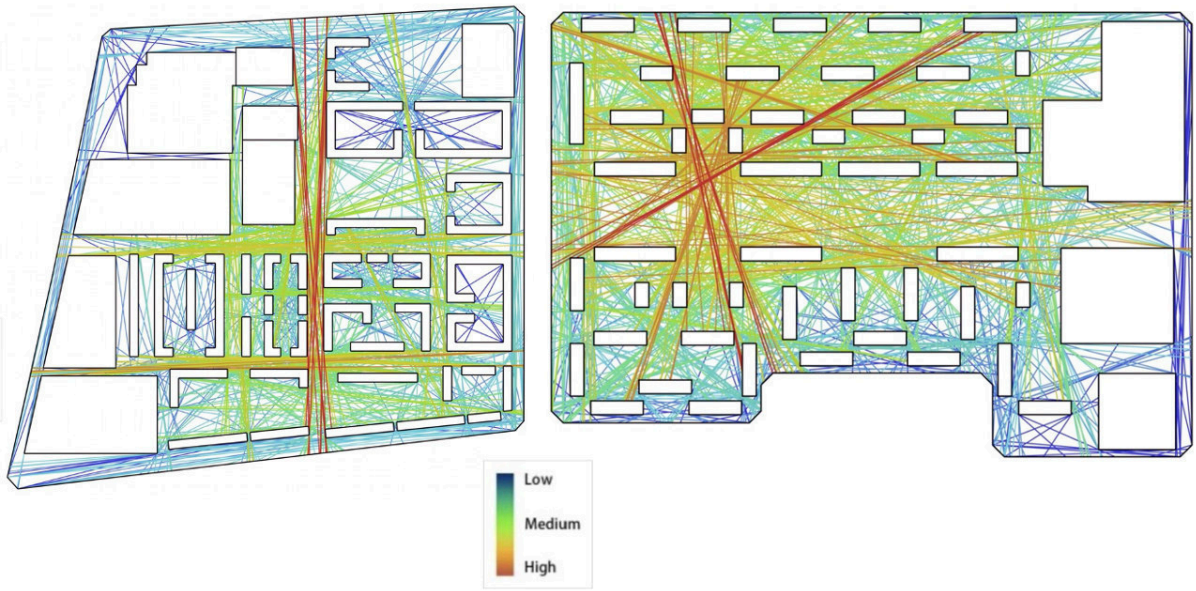

Figure 54 All-line Axial Analysis Connectivity graph of both neighborhoods. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

1.3.2.4. Accessibility and Pedestrian Movement

Regarding the difference in accessibility levels between the different portions of the study areas in both neighborhoods, the pedestrian movements vary greatly from space to space within a small geographic area. According to the axial analysis of the urban spatial structures, the more assertive correlations of pedestrian movement in the study areas were along with the axial lines. Concerning the neighborhood of 420 housing units, the only playground is placed next to a major thoroughfare (the most integrated and connected axis in the neighborhood), which made it become a component of the foreground network.

This placement of a playground put children's safety at risk because such streets are inevitably subject to a greater volume of motorized traffic (Loit, 2021). Children's independence of mobility and access to playgrounds is affected by accessibility. The playground's utility is further constrained because the locations are frequently selected without conducting extensive location and context analyses, which results in accessibility issues with the playground (Veitch et al., 2007). According to Prellwitz et al. (2001), many play activities cannot be carried out if accessibility is insufficient, and children's interaction with these environments will be limited or eliminated.

1.4. Diversity

In complement with the basic and functional elements of the outdoor play space, these spaces require special places that provide children with diversity, esthetics, flexibility, change, and values through various aspects such as the different colors, textures, and shapes which can offer attraction, excitement, and positive vibes. Nevertheless, the observations within the open spaces of both neighborhoods exclude any of the previously mentioned aspects while considering monotony, similarity, rigidity, and mediocrity. Therefore, the open spaces deliver discouragement, boredom, and negative vibes (these aspects are already presented within the previous figures).

As already mentioned previously, the perception of risks and dangers is highly associated with numerous parts of the urban environment. The concept of children's unsafety within the outdoor environment is perceived from two different sources. The first one is the insecurity from eventual injuries that can be produced by the different physical components of the urban environment such as the damaged play structures, the different types of floors, the traffic, and the interaction with peers. While the second source is provided by human adults, this danger is materialized through physical and psychological abuse and harassment.

As was mentioned earlier, the conditions of the play structures and the floors as well as utilizing the streets and parking lots as play spaces in both neighborhoods help increase the possibility of injuries among children. Moreover, the physical composition and layout of both neighborhoods do not present any clear boundaries between the neighborhood entity and the rest of the urban space which makes it hard to control and track entrances and movements, particularly for strangers, except for the control process ensured through the intervisibility provided by the existence of doors and windows in sight of each other, especially on the ground floors.

1.5. Outdoor Spaces' Overall Quality

Referring to the direct observations, the investigated neighborhoods (420 and 1500 housing units) demonstrate numerous similarities and few differences. For the physical characteristics, both neighborhoods are having deteriorated situations to different degrees despite the difference in the construction period (see chapter 4). Both neighborhoods are very poor in terms of playgrounds as the main structures for the children's outdoor activities.

Despite the existence of a playground within the neighborhood of 420 housing units, its flawed condition due to vandalism and lack of maintenance does not offer many play opportunities. Similarly, the only playground in the neighborhood of 1500 housing units is nothing but the worst, this latter does not provide any play opportunities but only some vestiges that testify to its previous existence. As reported by the direct observations, both neighborhoods are demonstrating almost the same situation within the outdoor open spaces. At the neighborhood's scale, a monotonous image of the outdoor spaces exists, created by the leftover plots which are characterized by randomly grown lawns, and some planted trees gradually fade in the absence of maintenance.

Middle and low-income neighborhoods are typically environments of poor quality. Their outdoor spaces are characterized by more hazardous play spaces, limited natural features, poorer services and structures, more traffic and violence, and higher levels of physical deterioration compared to high-income and more advantaged neighborhoods as confirmed by Evans (2004); and Castonguay and Jutras (2010). According to the indicators of socioeconomic composition, playgrounds within these neighborhoods are less safe, less accessible (Cradock et al., 2005), have less comfort quality (Smoyer-Tomic et al., 2004), and deteriorated conditions. On the other hand, traffic and street risks are important problems for children who play mainly within roads and parking lots.

The outdoor environment quality and children's outdoor play activities have always been a topic of discussion. Some studies such as Johns and Ha (1999); Chow et al., (2008); and Loucaides et al., (2004) considered the poor outdoor environment as a factor in outdoor activity decrease and even decline. However, other studies including Valentine and McKendrick (1997), Thomson and Philo (2004), and Karsten (2005) approved the children's capacity of exercising outdoor recreational activities despite the inadequate conditions and deteriorated quality of these spaces. Although this poor and deteriorated quality of the outdoor environments, children are more likely to play outside. Therefore, children tend to show a large adaptation to the outdoor surroundings and high exploitation of their outdoor components in order to guarantee the functioning and the continuity of their play activity.

This part of our findings described the situation within the open outdoor spaces taking into consideration that most of the open spaces within both neighborhoods (as well as almost all the housing estates neighborhoods in the city of Oum El Bouaghi and also at the national level) demonstrate poor and deteriorated conditions which reflects the effects of the national

housing crisis and financial policies (see chapter 2). Therefore, the examined characteristics appeared as evidence for illuminating the image of the actual situation of the open outdoor space.

2. Outdoor Usage and Children's Activities

Based on the results provided by the application of both methodological approaches: a survey by questionnaire and behavioral mapping (see chapter 5), this second part of our chapter discusses the outdoor spatial usage and children's activities within both study neighborhoods (the neighborhood of 420 housing units and the neighborhood of 1500 housing units). Accordingly, outdoor spatial usage and children's activities in both neighborhoods are investigated according to the indicators for assessing the outdoor space usage (IAOSU) as follows: Time Frame; Play Activities; Play Spaces and Place Preferences; and Mobility and Safety (as explained in chapter 3). This section will discuss the results derived from evaluating and quantifying different usage modes. According to the results of the questionnaire, foremost, data related to the age and gender of the respondents are introduced in order to understand both variables (Figure 55).

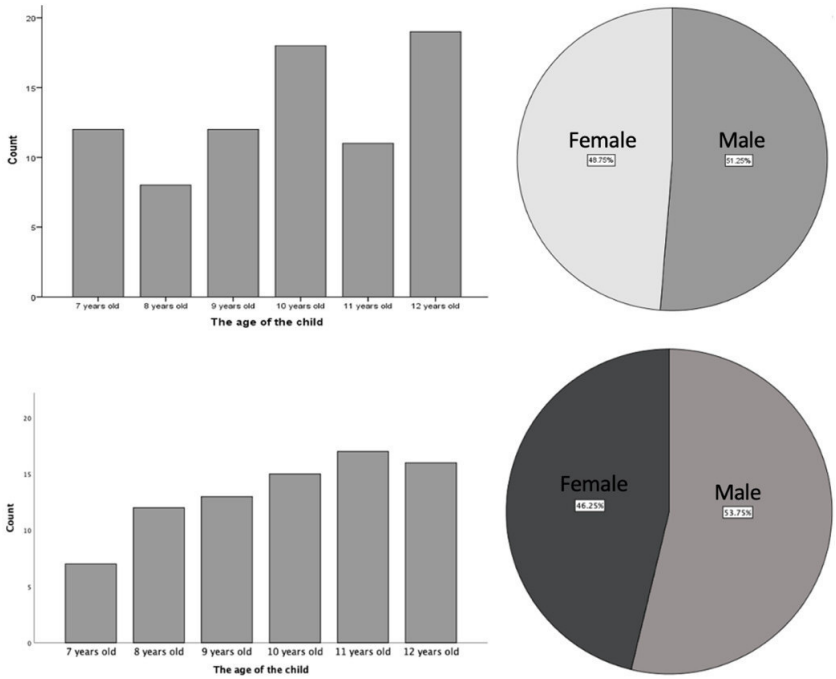

Figure 55 The distribution of respondents according to their age and gender. From up to down: The neighborhood of 420 housing units and the neighborhood of 1500 housing units (Source: Author).

The first graph represents the distribution of respondents according to their age where the distribution is the following: 15% were aged 7 years old; 10% were aged 8 years old; 15% were aged 9 years old; 22.5% were aged 10 years old; 13.8% were aged 11 years old; 23.8% were aged 12 years old. However, the second graph represents the distribution according to the respondent gender (male and female) where the percentages are relatively close with 51,25% of males and 48,75% of females which guarantees an equilibrium in the collected responses.

2.1. Time Frame

The attendance and presence of children within the open outdoor spaces of the neighborhoods per time are investigated through three different data types (Table 7) (Figures 56 and 57). The first data type represents the results from answering the following question: **When often do you play outdoors?** where the replies were the following: for the 420 H.U: 76.3% of children play daily; 11.3% only during the weekends; 11.3% only during the holidays, and 1.3% rarely play outdoors while 77.5% of children play daily; 20% only during the weekends; 2.5% only during the holidays and 0% rarely play outdoors for the 1500 H.U.

Moreover, the second data type represents the results from answering the following question: **At what time of the day do you usually play?** where the replies were the following: for the 420 H.U: 5% of children play all day; 2.5% play in the morning, and 92.5% play in the evening while 20% of children play all day; 2.5% play in the morning and 77.5% play in the evening for the 1500 H.U. Accordingly, the third data type represents the results from answering the following question: **How much outdoor play time do you usually spend?** (Hour/day) where the replies were the following: for the 420 H.U: 3.8% less than 1 hour; 11.3% between 1 and 2 hours; 33.8% between 2 and 3 hours; 51.3% more than 3 hours while 1.3% less than 1 hour; 10% between 1 and 2 hours; 31.3% between 2 and 3 hours; 57.5% more than 3 hours for the 1500 H.U.

Table 7 The attendance and use of the open spaces per time within both neighborhoods (Source: Author).

How often do you play outdoors?					
Area	**Daily**	**Weekends**	**Holidays**	**Rarely**	**Total**
420 H.U	76.3%	11.3%	11.3%	1.3%	100%
1500 H.U	77.5%	20%	2.5%	0%	100%
At what time of the day do you usually play?					

Area	All Day	Morning	Evening	Total
420 H.U	5%	2.5%	92.5%	100%
1500 H.U	20%	2.5%	77.5%	100%

How much outdoor play time do you usually spend?					
Area	**<1 hr**	**1 to 2 hr**	**2 to 3 hr**	**>3 hr**	**Total**
420 H.U	3.8%	11.3%	33.8%	51.3%	100%
1500 H.U	1,3%	10%	31.3%	57.5%	100%

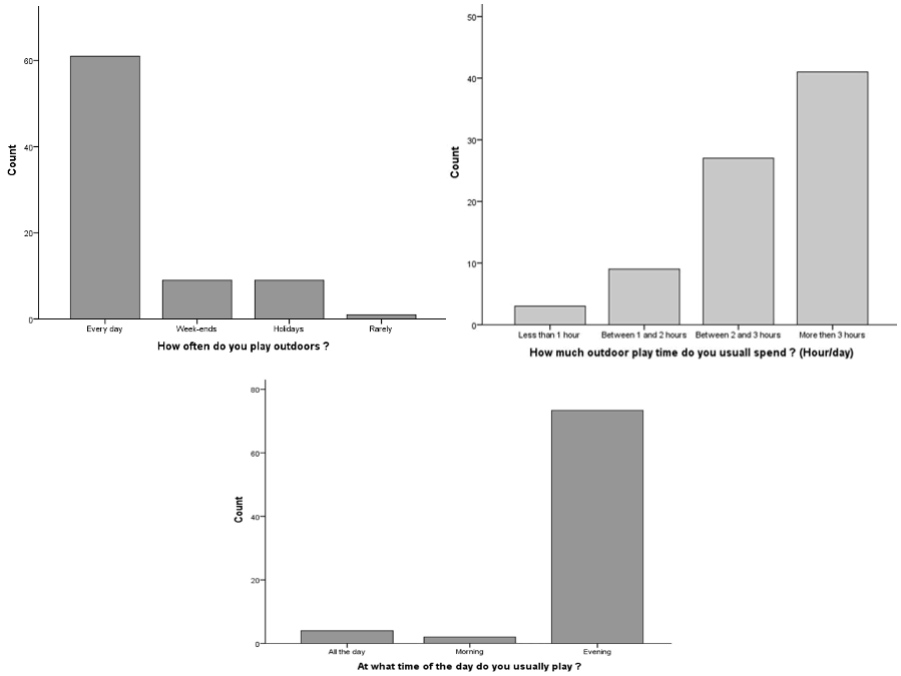

Figure 56 The attendance and presence of children within the open spaces of the neighborhood of 420 housing units. From left to right: according to the different periods; according to the different periods per day; and according to the number of hours per day (Source: Author).

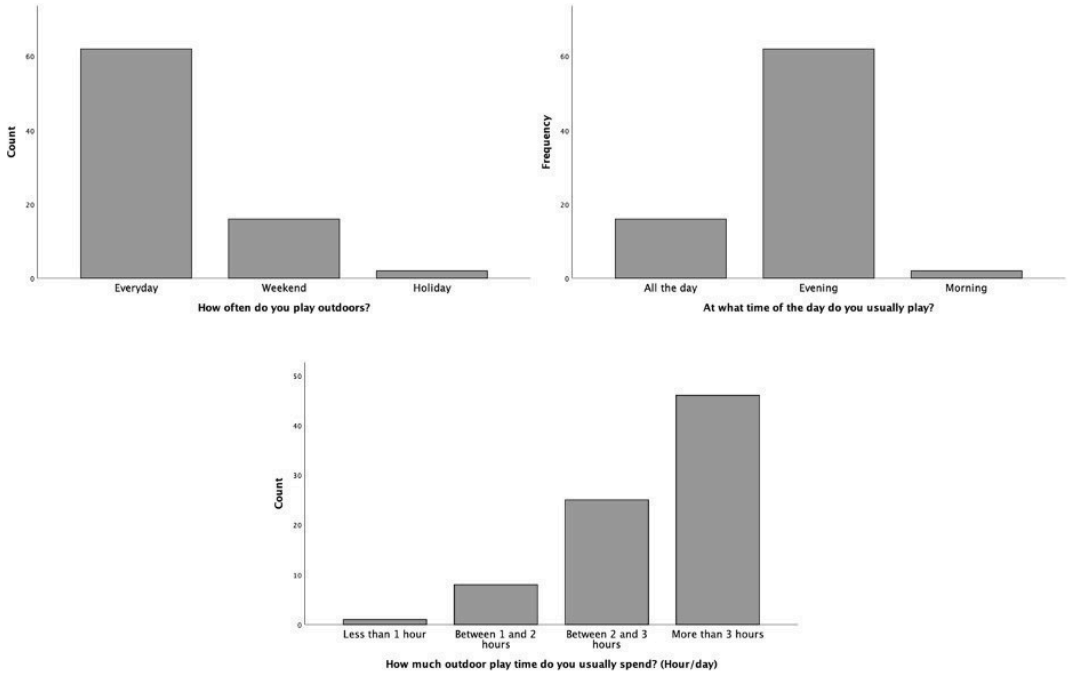

Figure 57 The attendance and presence of children within the open spaces of the neighborhood of 1500 housing units. From left to right: according to the different periods; according to the different periods per day; and according to the number of hours per day (Source: Author).

The correlation between the results obtained from asking the previous questions: How often do you play outdoors? And how much outdoor play time do you usually spend? reports that children play mostly every day for more than three hours a day (Figure 58). The time spent outdoors was a significant predictor of the play activity. According to the attendance and children's presence within the outdoor spaces, children in both neighborhoods attend outdoor spaces with the same time frequency. Most of them use the outdoor spaces daily for play and recreation, especially during the afternoon and evening (depending on the season) for an increased extent of about three hours per day.

In agreement with other studies, time spent outdoors corresponds to approximately 3 hours per day (Klinker et al., 2014). However, this duration is considered increased compared to children in western countries (Wen et al., 2009; Cooper et al., 2010). The findings from this study indicate as well that boys spent more time outdoors than girls which is approved by some studies (Cleland et al., 2008) and disapproved by others (Cooper et al., 2010) therefore further studies are needed to confirm this finding. These previous data provide facts about the high attendance and existence of Algerian children outdoors through the play activity. Besides, it highlights the importance of these neighborhoods' spaces for this category.

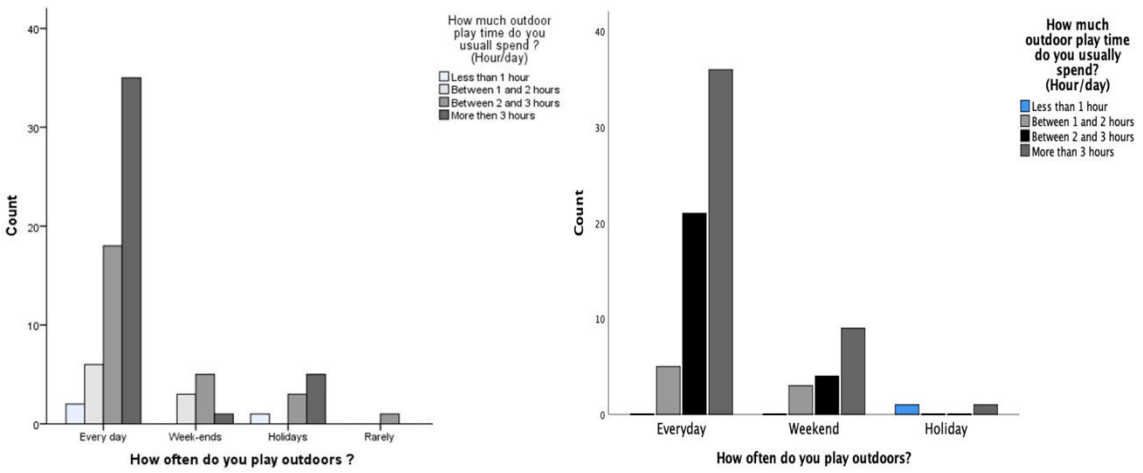

Figure 58 Correlation between the different aspects of attendance and presence of children. From left to right: within the neighborhood of 420 housing units; within the neighborhood of 1500 housing units (Source: Author).

2.2. Play Activities

Concerning the different play activities, the investigation was conducted by answering the following question: What are the exercised activities during play? The replies were treated and categorized by the authors into four categories (physical, cognitive, social, and multiple) according to the play activity categories (see chapter 3) (Table 6.2) as follows: for the 420 H.U: 55.0% for physical activities; 2.5% for cognitive activities; 5% for social activities; while 37.5% for multiple activities as two or more from the previous types while 46.3% for physical activities; 11.3% for cognitive activities; 7.5% for social activities; and 35% for multiple choices from the previous activities for the 1500 H.U (Figure 59).

Table 8 Different activities exercised in both neighborhoods (Source: Author).

What are the exercised activities during play?					
Area	**Physical**	**Cognitive**	**Social**	**Multiple**	**Total**
420 H.U	55.0%	2.5%	5%	37.5%	100%
1500 H.U	46.3%	11.3%	7.5%	35%	100%

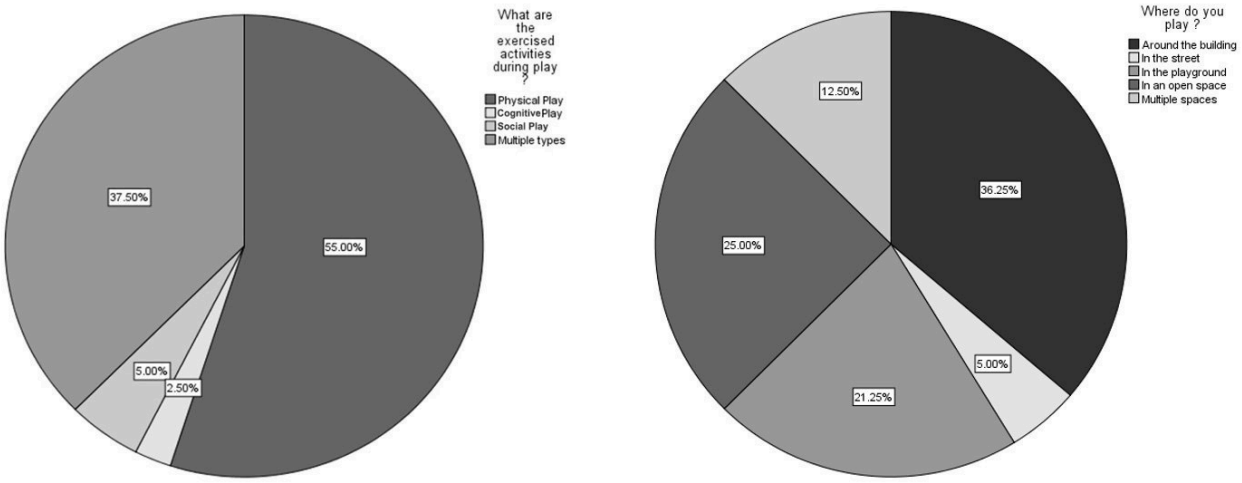

Figure 59 Data related to the exercised activities within the neighborhood of 420 housing units. From left to right: the rate of the different exercised activities during play; the exercised activities according to the play spaces (Source: Author).

2.3. Play Spaces and Place Preferences

The results from answering the following question: Where do you play? provides replies as the following (Table 9): for the 420 H.U: 36.3% around the building; 5% in the street; 21.3% in the playground; 25% in an open space (leftover spaces); 12.5% in multiple spaces of the ones previously mentioned while 21.3% around the building; 40% in the street; 0% in the playground (because of the inexistence of playgrounds); 28.7% in an open space (leftover spaces); and 10% play in multiple spaces from the ones that were previously mentioned for the 1500 H.U (Figures 60).

Table 9 Different play spaces and place preferences in both neighborhoods (Source: Author).

Where do you play?						
Area	**buildings**	**Street**	**Playground**	**Leftovers**	**Multiple**	**Total**
420 H.U	36.3%	5%	21.3%	25%	12.5%	100%
1500 H.U	21.3%	40%	0%	28.7%	10%	100%

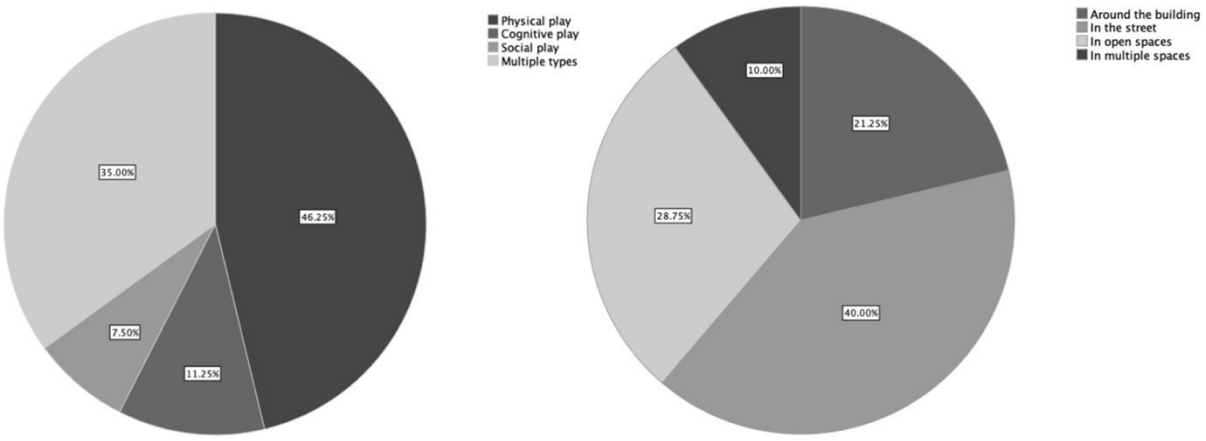

Figure 60 Data related to the exercised activities within the neighborhood of 1500 housing units. From left to right: the rate of the different exercised activities during play; the exercised activities according to the play spaces (Source: Author).

2.4. Correlated Indicators

After investigating each one of the previous indicators independently (time frame, play activities, and play spaces and place preferences), this section provides some correlations that will be conducted to better understand the holistic phenomenon. In this section, data will be obtained first from the questionnaire findings and subsequently according to the behavioral mapping results.

2.4.1. Correlation by Questionnaire Data

Firstly, the correlations between the results from the three following questions: **How much outdoor play time do you usually spend? What are the exercised activities during play? and where do you play?** provides meaningful discoveries that children exercise highly in the physical activities type with a rate of more than three hours per day within the leftover plots and around the buildings (Figure 61). On the other hand, the correlations between the results from the three following questions: **How much outdoor play time do you usually spend? How often do you play outdoors? and where do you play?** proclaims that children who spend less than one hour in the play activity, are mostly located around the building during different periods (daily, weekend or holidays). However, children tend to be in multiple spaces as much as they spend more time playing outdoors (Figure 62).

These perceptions emphasized the flow of children's behavior and enabled the examination of their activities. Concerning the different spaces and activities in both neighborhoods, children during outdoor time practice various types of activities: vigorous physical activities

(ball games, running and chasing, cycling...etc.), cognitive activities (constructing objects, cards, Target toss, hopscotch...etc.), social activities (guessing games, pretending games, hide and seek, games with dolls...etc.), and Multiple activities (different types of the previously mentioned games including digital games). In both neighborhoods, children as regular users of open spaces (Naceur, 2013) used the entire width of the leftover plots, and the street, including the parking lots. Castonguay and Jutras (2009; 2010) indicated that streets, alleys, and sidewalks accounted for among places liked by children. Therefore, the streets and parking lots witnessed the most intensive use particularly for football and for different wheeled toys. Abu-Ghazeh (1999) also showed the importance of streets in Jordanian residential neighborhoods as a symbolic environment for children's outdoor play.

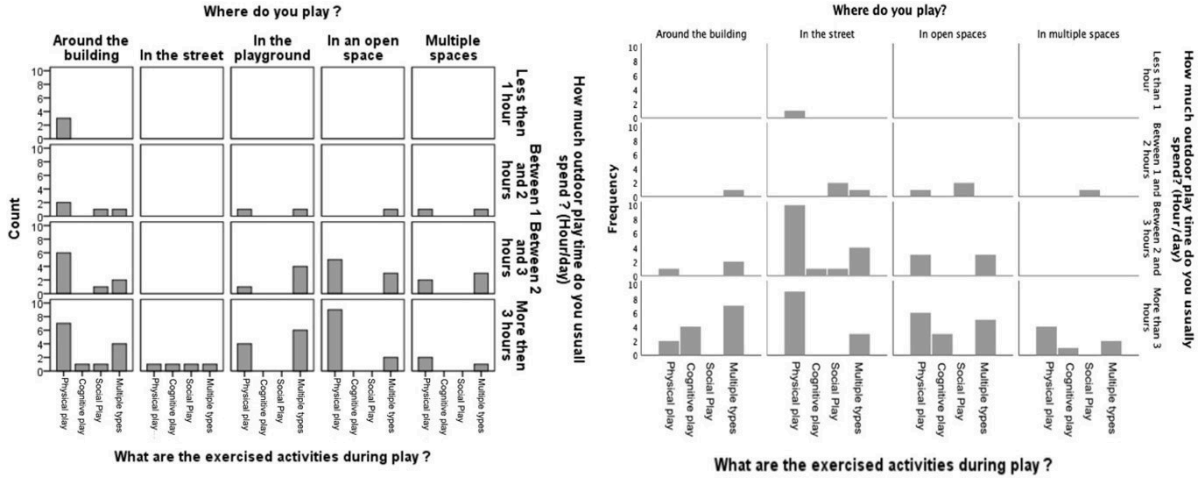

Figure 61 Correlation between results from the time spent in hours per day and the different play activities and types of space. From left to right: within the neighborhood of 420 housing units; within the neighborhood of 1500 housing units (Source: Author).

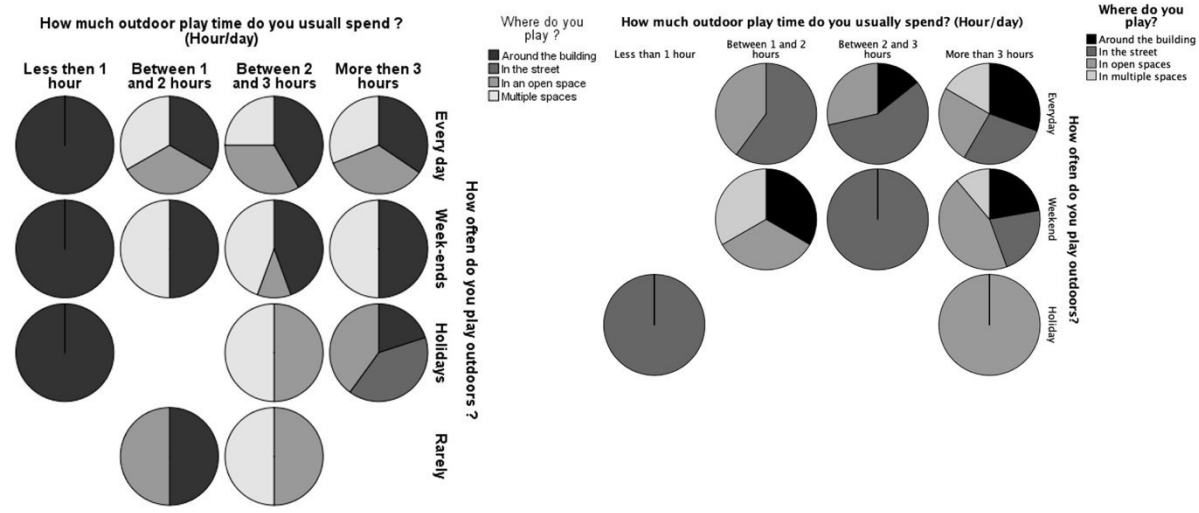

Figure 62 Correlation between the results from the time spent in periods and in hours per day and the different types of space. From left to right: within the neighborhood of 420 housing units; within the neighborhood of 1500 housing units (Source: Author).

2.4.2. Correlation by Behavioral Mapping Data

On the other hand, an overview of the results from the behavioral mapping application is organized accordingly (Table 10). The following maps (Figures 63 and 64) indicate the different locations and types of activities practiced by children per time. Therefore, the green circle represents a sitting child, the yellow circle represents a standing child, the blue circle represents a child in movement and the red circle represents a child playing (as mentioned in chapter 5).

Table 10 The behavioral mapping data for the different activities in both neighborhoods regarding the time frame (Source: Author).

			Number of children					
Activity			**Sedentary activities**		**Vigorous activities**		**Total**	
Time Frame		**N/ H U**	**Sitting**	**Standing**	**Moving**	**Playing**		
Weekday	**Morning**	**420**	4	3	17	31	**55**	**326**
		1500	5	3	12	17	**37**	
	Evening	**420**	20	32	14	80	**146**	
		1500	22	13	21	32	**88**	
Weekend	**Morning**	**420**	24	16	11	70	**121**	**553**
		1500	13	8	7	46	**74**	
	Evening	**420**	48	43	42	98	**231**	
		1500	19	7	23	78	**127**	

Figure 63 Behavioral mapping results from the 420 Housing Units neighborhood. From left to right: weekday morning; weekday evening; weekend morning; and weekend evening (Source: Author).

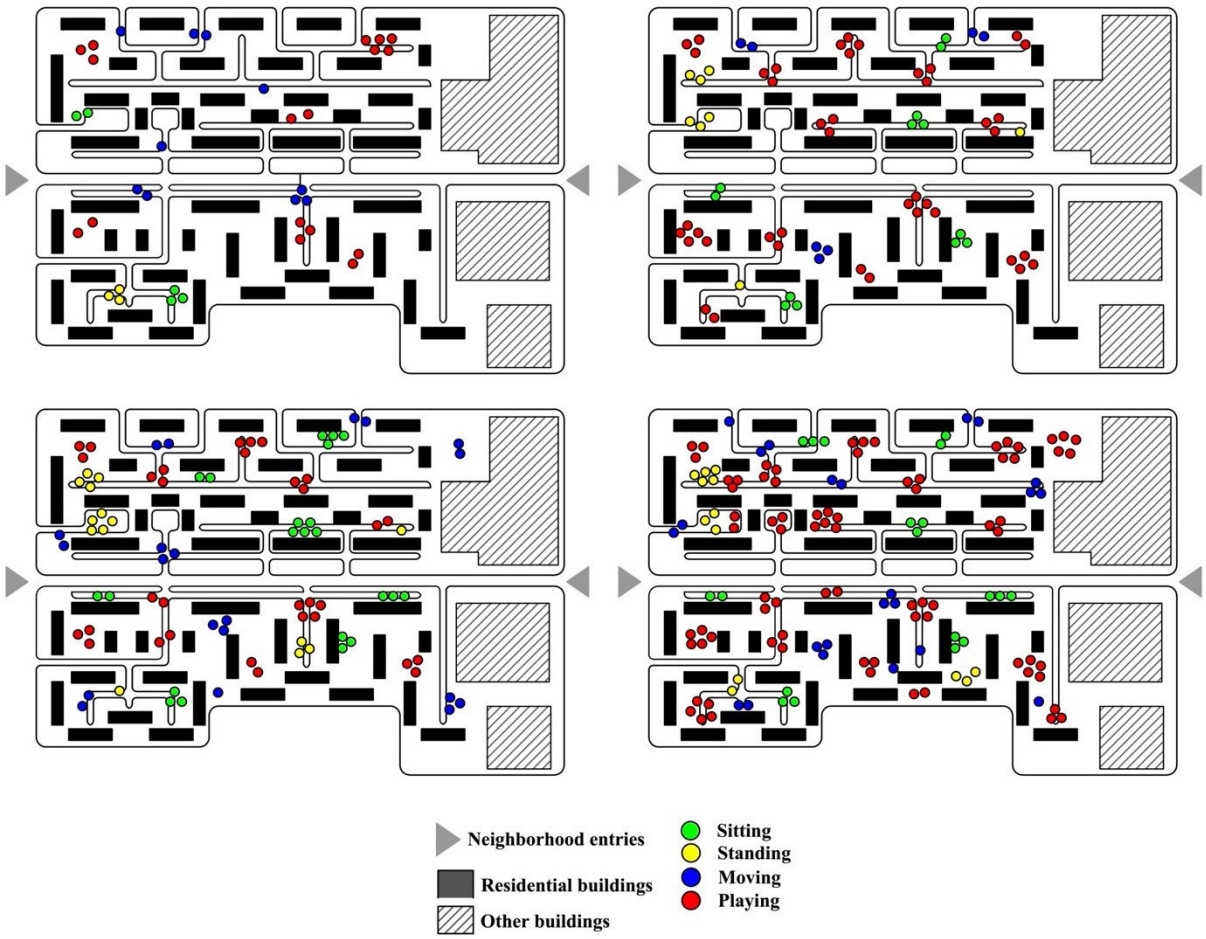

Figure 64 Behavioral mapping results from the 1500 Housing Units neighborhood. From left to right: weekday morning; weekday evening; weekend morning; and weekend evening (Source: Author).

The results of the behavioral mapping from the weekday morning registrations indicate a low presence of children and a modest interaction within the open outdoor spaces. Most children are at school or not allowed to be in outdoor spaces during the parent's absence (the majority of parents are full-day workers). Activities counted are the following; 4 Sitting, 3 Standing, 17 Moving, and 31 Playing (420 H.U) while 5 Sitting, 3 Standing, 12 Moving, and 17 Playing (1500 H.U).

In the evening of the weekday, the behavioral mapping results demonstrate a significant change in the number of children, types of activities, and interactions. The activities counted are as follows: 20 Sitting, 32 Standing, 14 Moving, and 80 Playing (420 H.U) while 22 Sitting, 13 Standing, 21 Moving, and 32 Playing (1500 H.U). Therefore, a higher presence of children and space attendance within the open spaces are registered compared to the morning period (Figure 65). This difference is due to children being back from school and the parents' presence that allows them to play outdoors.

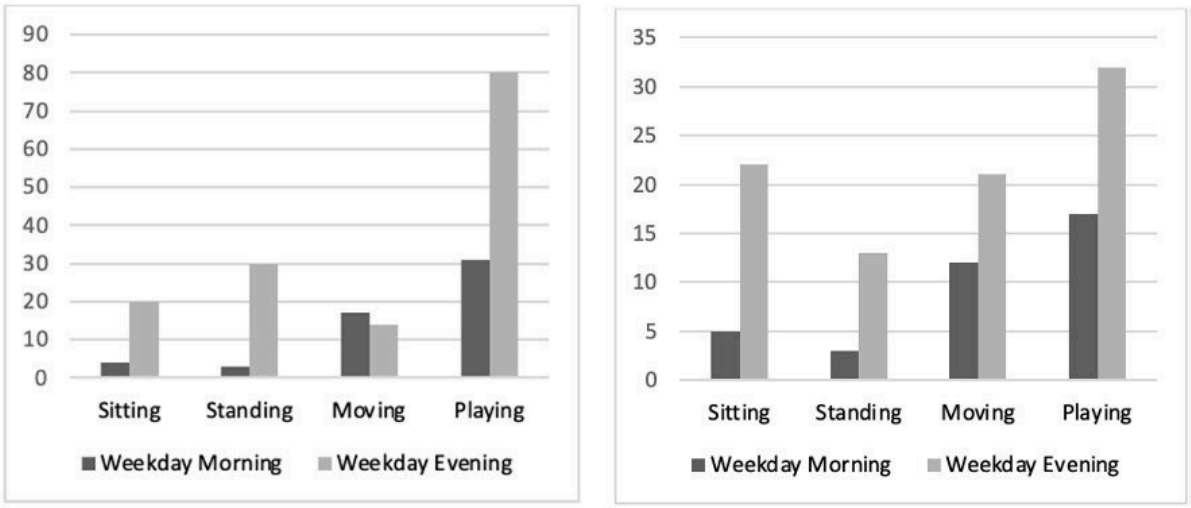

Figure 65 Comparison of the different results from the weekday morning and evening. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

During the weekend morning, the behavioral mapping results were relatively close to the ones of the evening on the weekday. In this case, most children frequent the open spaces of their neighborhood during the weekend morning according to the activities counted as follows: 24 Sitting, 16 Standing, 11 Moving, and 70 Playing (420 H.U) while 13 Sitting, 8 Standing, 7 Moving, and 46 Playing (1500 H.U). Compared to the morning on a weekday, the rate of presence of children in the open spaces during the weekend morning is higher than double, this is due to the availability of children (except for some of them who have additional learning courses).

In the evening from the weekend, it can be seen that the open spaces are very occupied by children exercising various types and levels of activities besides a high vibrance in terms of movement. The highest numbers of children were registered as follows: 48 Sitting, 86 Standing, 42 Moving, and 98 (420 H.U) while Playing 19 Sitting, 7 Standing, 23 Moving, and 78 Playing (1500 H.U). Compared with the previous counts (Figure 66 and 67), the highest numbers of children's presence in different activities are recorded in this time frame. The number of children in the various activities is almost doubled compared to the morning of the same day and to the evening on the weekday.

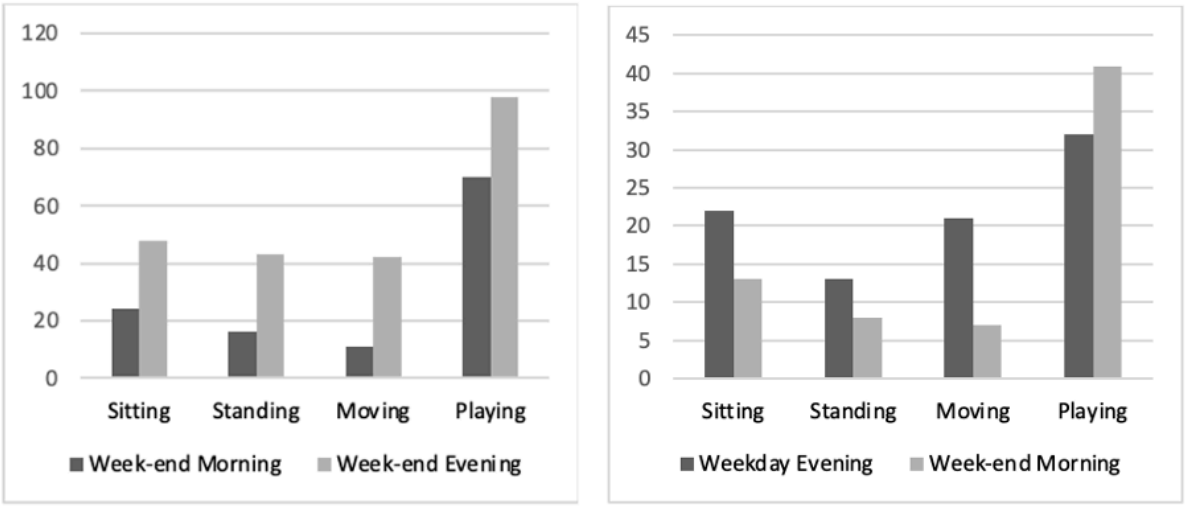

Figure 66 Comparison of the different results from the weekend morning and evening. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

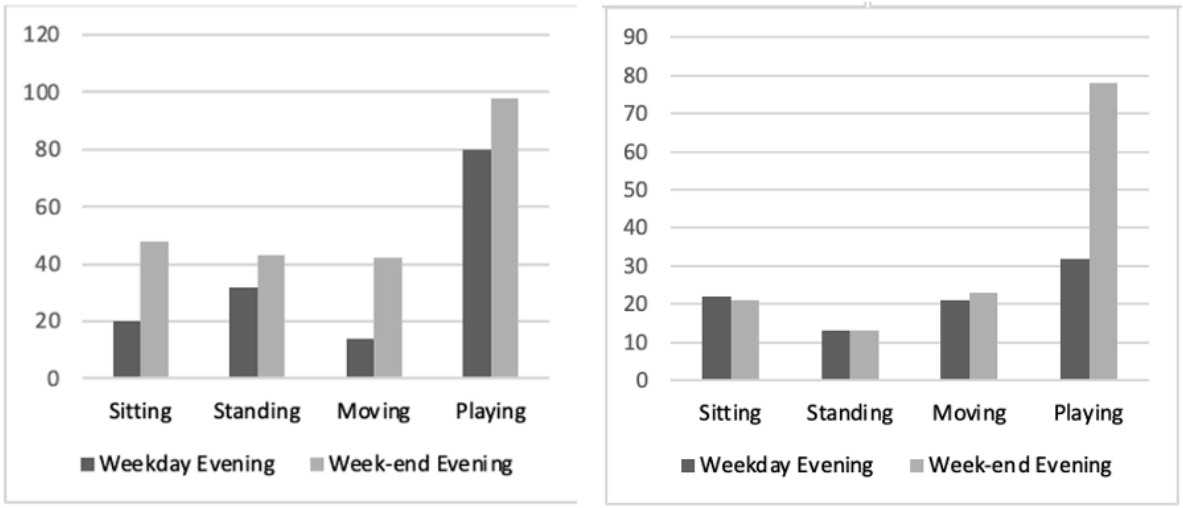

Figure 67 Comparison of the different results from the weekday evening and the weekend evening. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

3. Impact of Outdoor Spaces' Quality on Children's Outdoor Activities

In order to materialize the impact of the quality and characteristics of the open outdoor spaces within both studied neighborhoods (the neighborhood of 420 housing units; the neighborhood of 1500 housing units) some correlations between the different results obtained from the previous application of all the research methods (including) will be conducted. These correlations will be discussed in this section under the following forms: spatial configuration and outdoor use; outdoor spaces and activity levels; space appropriation and play activity; as well as safety and outdoor use.

3.1. Spatial Configuration and Outdoor Use

From the earlier behavioral mapping results, we synthesized that the children play the most in the evening time and during the weekends. Based on these findings, a correlation between the quantitative and qualitative factors will be conducted by using the different types of spatial configurations (see Figure 4.18 in chapter 4) and space syntactic proprieties (results provided from the application of the space syntax analysis).

The different statistics related to the diffusion and clustering of children within the different types of spaces in both neighborhoods (Figure 68) show that the open spaces with open configurations are the most attractive spaces for children with a rate of more than 72% (420 H.U) and 67% (1500 H.U) of the total open space mainly for the playing activity. However, both spaces with semi-open and semi-closed configurations show considerably lower rates of 8,65% and 18,61% respectively in 420 H.U while 33% and 0% in 1500 H.U (Table 6.5).

Table 11 The different statistics related to the diffusion of children within the different types of spaces in both neighborhoods (Source: Author).

	N/ H U	**Type of space configuration**		
Activity type		**Open spaces**	**Semi-open**	**Semi-closed**
Sitting	**420**	44	1	3
	1000	10	9	0
Standing	**420**	29	6	8
	1000	6	1	0
Moving	**420**	28	2	12
	1000	17	6	0
Playing	**420**	67	11	20
	1000	53	24	0
Total	**420**	**168 (72,20%)**	**20 (8,65%)**	**43 (18,61%)**
	1000	**86 (67,71%)**	**40 (32,29%)**	**0 (0 %)**

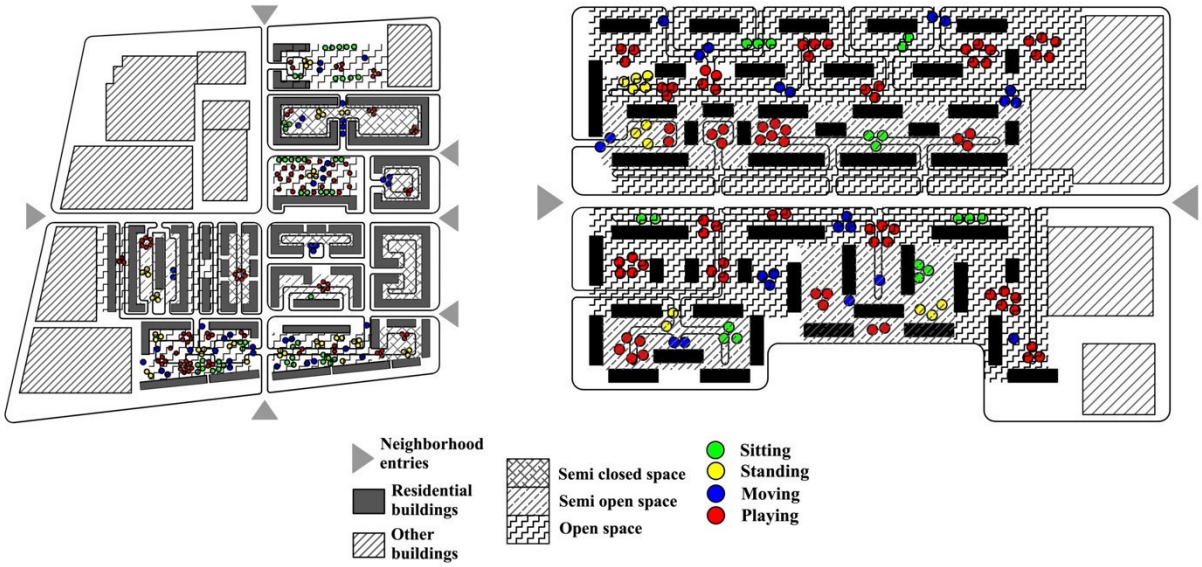

Figure 68 Correlation between behavioral mapping results during the time frame of the weekend evening and the different types of spatial configurations in both neighborhoods. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

On the other hand, the correlations between behavioral mapping in both neighborhoods during the time frame of the weekend evening and the VGA global integration results (Figure 69) demonstrate that the spaces with moderate integration and open configuration show the highest concentrations of children while the spaces with less integration within the semi-open and semi-closed configurations show a remarkable decrease in the children's concentration. These results proclaim a correlation between visibility proprieties and open outdoor space use. Children occupy mainly the most open spaces which provide high visibility. As a result, the level of space visibility is considered a factor in enhancing space occupancy, this finding is assisted by previous studies by Hillier (1996); Trova et al. (1999); Desyllas and Duxbury (2001); and Bada (2012).

These differential patterns of use serve as important indicators of the kinds of social interaction. Children were often observed in groups (with three or more companions and children similar to them in age). Moreover, children were usually unaccompanied by an adult and allowed to go alone in all places within the neighborhood vicinity. According to Kim (1999), the interaction between the built environment and the spatial experience can be viewed as an ongoing process, therefore, he defined the basic functioning of this process as "architectural intelligibility". Related studies indicated the existence of a correlation between the spatial configuration interpreted through spatial intelligibility and people's behavior, movement, and use of these spaces (Hillier, 2005; Bada, 2012).

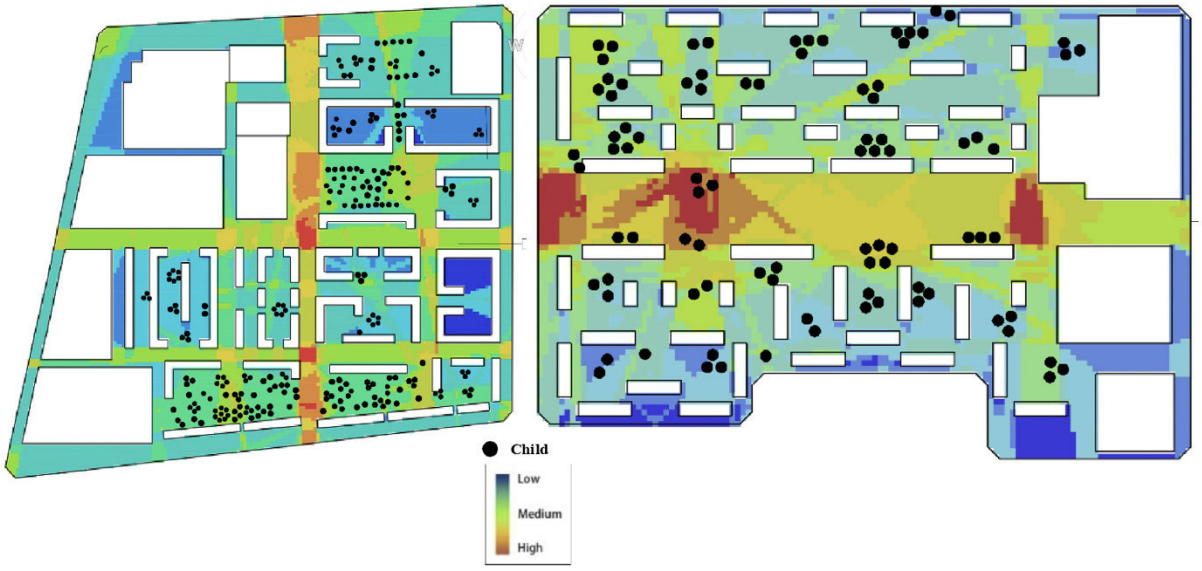

Figure 69 Correlation between behavioral mapping results during the time frame of the weekend evening and the VGA global integration results in both neighborhoods. From left to right: the neighborhood of 420 housing units; the neighborhood of 1500 housing units (Source: Author).

3.2. Outdoor Spaces and Activity Levels

Based on the previous findings, space use is typically associated with space characteristics, configurations, and qualities. The direct observations within the open spaces of both neighborhoods revealed that these spaces are used for a range of recreational activities which are considered based on the outdoor activity levels (see chapter 1) under the following:

3.2.1. Vigorous Play Activities

On the one hand, active recreation is usually taken to mean vigorous activities such as football, running, cycling, and other games that require active movement and engagement. According to the observations and behavioral counting, a large category of children practices active play activities as a main mode of space use regardless of the obstacles provided by outdoor areas' characteristics and qualities.

3.2.2. Sedentary Play Activities

On the other hand, sedentary recreations are taken to mean activities such as watching children or others, looking at sights or views, resting, or meeting and talking to friends. Within the open spaces of both neighborhoods, static or passive activities were noted during the observations and the behavioral counting. A considerable group of children practices

passive recreations by watching their other peers playing or waiting for their turn to play due to the highly restrained number of functioning play structures, moreover, others gather in groups sitting or standing playing with some objects or making group discussions (Figure 70).

Figure 70 Different sedentary activities within the outdoor spaces of both neighborhoods (Source: Author).

Findings indicated that play structures were associated with children's outdoor physical activity and sedentary behaviors. In our case, the play structures did not encourage the play activity, consequently, they offered little opportunity for children to play, however, their deteriorated state, in turn, increases their sedentary time. This finding is supported by different experimental studies investigating the relationship between play structures and children's behavior through the different play types (active or sedentary). Among these studies, Hannon and Brown (2008) added some activity-friendly equipment to an outdoor preschool playground. Findings indicated a significantly decreased in sedentary behaviors and a significantly increased in light, moderate, and vigorous physical activity as measured by accelerometry. Moreover, Farley et al. (2008) conducted observations at a schoolyard with various play spaces and play equipment availability. Their findings indicated that children were more likely to play in locations with more play equipment installed than in a

wide-open grassy field. To sum up, the outdoor environment quality appears to have a strong influence on where children play and a moderate influence on levels of activity.

3.3. Space Appropriation and Play Activity

Children do not use only the playground areas, they play mostly beyond the immediate vicinity of their homes (around buildings, in streets, parking lots, and leftover plots). Thus, the residential environment is the children's usual play location. Accordingly, the residential environment has retained its importance for children, as most studies have found it to be their usual play location (Cunningham & Jones, 1996; Kyttä, 2002; Valentine & McKendrick, 1997; Veitch et al., 2006). This represents the case for children from low-income neighborhoods (neighborhoods of social habitat), who have less access to individual home yards suitable for outdoor play. Sobel (2002, as cited in Bergqvist, 2021) illustrates this appropriation of spaces for play activity as a guide to a sense of ownership and a sense of place, through experiences of curiosity and exploration. The appropriation of the outdoor vicinity fulfills several of the children's physical, social and cognitive needs and many of the security needs expressed by parents (Furneaux & Manaugh, 2018).

3.4. Safety and Outdoor Use

The perception of risks and danger is highly associated with numerous parts of the urban environment. The concept of children's unsafety within the outdoor environment is perceived from two different sources. The first one is the insecurity from eventual injuries that can be produced by the different physical components of the urban environment such as the damaged play structures, the different types of floors, the traffic as well as the interaction with peers. While the second source is provided by human adults, this danger is materialized through physical and psychological abuse and harassment.

As was mentioned earlier, the conditions of the play structures and the floors as well as utilizing the streets and parking lots as play spaces in both neighborhoods help increase the possibility of injuries among children (Figure 71).

Moreover, as mentioned through the syntactic analysis, the physical composition and layout of both neighborhoods do not present any clear boundaries between the neighborhood entity and the rest of the urban space which makes it hard to control and track entrances and movements, particularly for strangers, except for the control process ensured through the

intervisibility provided by the existence of doors and windows in sight of each other, especially on the ground floors.

Figure 71 Different sources of risks and injuries in outdoor open spaces (Source: Author).

Both neighborhoods provide almost the same possibilities of risks and insecurity. The injuries related to the different physical components and social factors such as the play structures, different floors, traffic, interaction with peers, and social and psychological abuse and harassment are perceived as threats to children's outdoor safety and well-being. Accordingly, traffic and parental concerns about safety were associated with less time playing outdoors (Bringolf-Isler, 2010; Aarts et al., 2012). Many studies have identified the lack of neighborhood safety as a potential barrier to children's play activities (Carver et al., 2008). However, children's perception of danger in their neighborhood might differ from

parental views (Timperio et al., 2005) and thus explain the use of streets and other outdoor environments freely as play areas.

Synthesis

Referring to the direct observations, the physical characteristics of the open spaces shape the children's behaviors and use of these spaces. By retrieving their perceptions about their own play, neighborhood vicinity, places, and social interaction, an image concerning the impact of the outdoor environment can be drawn. Furthermore, the results obtained via the Space Syntax application and behavioral mapping highlight several factors that also affect outdoor play activity. The combination of these previous findings and the literature of review indicates that both objective and subjective variables account for young people's active use of outdoor spaces. This combination provides a multidimensional set of factors that include physical, sociocultural, and individual factors (Figure 72).

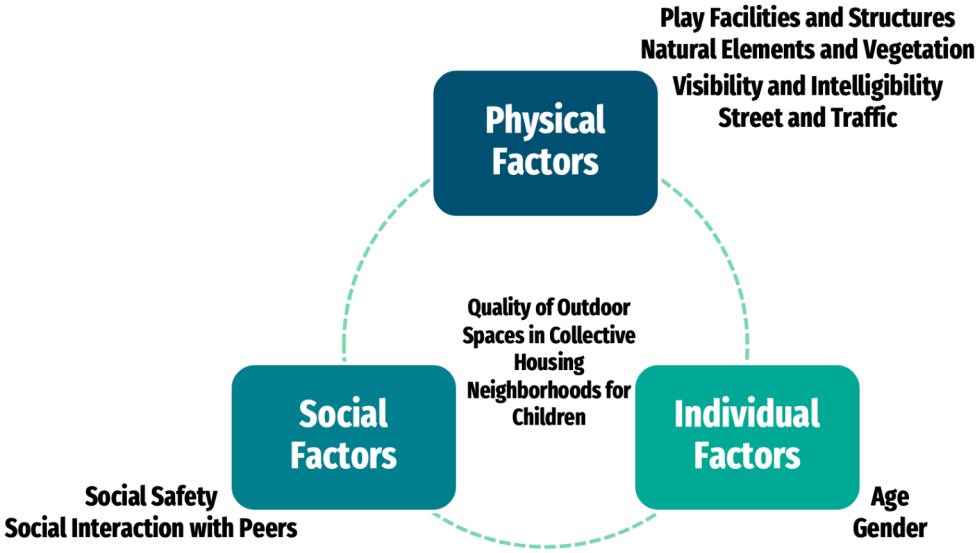

Figure 72 Different factors that influence the children's outdoor activity (Source: Author).

Physical factors include three main features: the presence and quality of play facilities and structures; natural elements and vegetation; and street and traffic. The association between outdoor play activities and play structures is multi-dimensional. According to our findings, the absence of facilities and play structures does not eliminate outdoor activity (Veitch et al., 2008; Aarts et al., 2010; Bringolf-Isler et al., 2010; Reimers et al., 2018), however, their presence and quality are associated with more play, motivation of the children to play outdoors, and enhancement of their interaction. The influence of playgrounds and facilities

on children's outdoor play is related to their quality and accessibility (Karsten, 2003; Burke, 2005; Ferré et al., 2006; Veitch et al., 2006; 2007; Castonguay & Jutras, 2009; Brockman et al., 2011a; Horton & Kraftl, 2018). Furthermore, unfavorable aspects like damaged structures, graffiti, pollution, and unmaintained playgrounds prevent children from playing. However, the capacity for maintenance and renovation of equipment is considered essential to keep children inquisitive (Karsten 2003; Veitch et al., 2006; Ferré et al. 2006; Castonguay & Jutras 2009; Horton & Kraftl, 2018). On the other hand, playgrounds' attractiveness and capacity to provide fun and prevent boredom are also implicated (Horton & Kraftl, 2018).

Our study revealed the importance of natural elements through children's and parent's perceptions, they mentioned natural features such as bushes, trees, grass, water features, etc. as preferred elements and materials during outdoor playtime. Accordingly, various qualitative studies included green space as an important factor in children's play activities (Burke, 2005; Veitch et al., 2006; 2007; Holt et al., 2008; Castonguay & Jutras, 2009; Brockman et al., 2011a; Horton & Kraftl 2018). However, this importance is often frowned upon while vegetation is considered by some parents to be a source of unsafety (Castonguay & Jutras, 2009). Natural elements include as well the needed amount of shade, temperature, and daylight.

The spatial configuration patterns interpreted through spatial intelligibility are considered factors impacting the children's outdoor activity. According to our findings, children occupy mainly spaces mostly open which provide a high level of visibility (Hillier, 1996, Trova et al., 1999; Desyllas & Duxbury, 2001; Bada, 2012). These spaces provide more accessibility and attractiveness for children (Loit, 2021) and are perceived by parents as safe areas that adhere to control and natural surveillance (Bouarroudj, 2018) providing social connections and eyes on the street (Witten et al., 2013).

A positive association was found between traffic safety and children's outdoor activity (Bringolf-Isler et al., 2010; Veitch et al., 2010). The traffic density leads to less play (Yoon & Lee, 2019) while children play in streets with low traffic volume and speed, on cul-de-sacs and sidewalks to ensure safety. Cul-de-sacs are considered a destination for play that is protected from traffic (Veitch et al. 2006; Holt et al., 2008; Brockman et al., 2011b), especially for younger children unallowed to move further from home (Holt et al., 2008).

Social factors include social safety and social interaction with peers. Parental perceptions of the social environment are critical for their children's outdoor activity (Carver et al., 2008). Parental fears are generally related to the physical characteristics of the neighborhood's outdoor vicinity, the presence of strangers, the children's conflicts and violence, and the traffic density. Thus, the extent of outdoor activity is also related to the extent to which parents perceive the neighborhood to be safe or unsafe (Beets & Foley, 2008; Handy et al., 2008). This culture of parental disproportionate anxiety influenced the interaction between children and their peers and the outdoor environment (Visser & Van Aalst, 2022). These matters are elevated in neighborhoods with low socio-economic status (Veitch et al. 2006, 2007; Horton & Kraftl 2018). On the other hand, overcrowded homes and limited opportunities for recreational school activities increase the children's outdoor activity (Castonguay & Jutras, 2009).

The presence of other children in the neighborhood influenced outdoor play. Our findings indicated the association between friends nearby and time spent playing outdoors (Bringolf-Isler et al., 2010; Veitch et al., 2010). Some children indicated the importance of the presence of other children as an essential factor for outdoor play (Reimers et al., 2018) often a reason to play outside (Burke, 2005; Veitch et al., 2006; 2007; Castonguay & Jutras, 2009; Horton & Kraftl, 2018) and a positive indicator for the parental perception of safety.

Individual Factors are the combination of age and gender. This range of factors is among the common factors that influence children's place and play preferences. The social and physical characteristics of the outdoor environment influence children differently according to their age and gender. Age has a moderating role associated with outdoor play, children of low ages tend to play near their houses considering the safety concerns and parental surveillance (Handy et al., 2008) while older children were allowed more independence and mobility. Girls' outdoor play is positively associated with their perception of fear and safety (Page et al., 2010), they prefer to stay close to their own homes (Brockman et al., 2011a). Boys were more likely to play in green spaces or on the streets while traffic safety concerns negatively influence the boy's outdoor playtime (Wilkie et al., 2018). Gender differentiation creates often divided or limited territories (Karsten, 2003) for their different game types (Ferré et al., 2006).

Conclusion

Different physical, social, and individual factors influence the children's outdoor activity within the neighborhood's outdoor vicinity. Combining these factors provides instructions for guaranteeing a certain outdoor space quality for children's play, recreation, and interaction. This chapter has provided a significant mass of findings from all the methods of investigation. Accordingly, these findings from both neighborhoods are analyzed, discussed, and compared. Findings emphasized that the outdoor spaces of a neighborhood impact children in a multidimensional manner. Quantitative and qualitative analyses provided clear factors that influence play activities and children's interaction. This study demonstrates as well how the neighborhood's context matters for different children's groups. Furthermore, a general conclusion of the thesis and deliberated recommendations will be presented in the following chapter.

General Conclusion

General Conclusion

This chapter is interested in demonstrating the conclusions that can be pulled from this research work. Accordingly, some of the essential findings and issues submitted by the research will be emphasized and discussed. The research has provided valuable information on the differences and similarities between two large housing neighborhood cases in Algeria based on different research methods. Moreover, a part of this chapter will also deal with the possibilities for integrating the findings within the process of enhancing the quality of outdoor urban spaces in residential areas in order to improve children's outdoor activity and provide better opportunities for play by suggesting appropriate new approaches and practices. Furthermore, this section will discuss the limitations faced within the study as well as the different perspectives of further study outcomes.

1. Overview of the Study

The first type of outdoor living environment for urban children refers to outdoor spaces adjacent to the house which promote a wide range of stimulation and allow movement, exploration, play, and recreation. Thus, children's outdoor environments and their activities often integrate affective sensations (children are very attached to their outdoor environments) and environmental concerns. This study initially considered the key aspects of outdoor quality and space use in the process of investigation as a multidimensional entity focusing on different factors such as spatial features, human features, and interpersonal features, and then, as an evaluation of these previous features.

The quality of these open urban spaces includes physical characteristics such as features and furniture, vegetation and natural elements; condition cleanness and maintenance, and spatial configuration; accessibility and visibility as well as social characteristics such as safety and control and diversity characteristics which tend to shape and formulate the children's outdoor activities in quantitative and qualitative ways. Accordingly, these characteristics are considered highly important factors in increasing and developing place usability, place satisfaction counting, and children's backgrounds and perceptions. However, they participate often in delimiting the field of daily recreation and decreasing entertainment opportunities. The expression of children's perceptions concerning their urban environment demonstrates their cognition in a sense of understanding their knowledge and experience of outdoor spaces

by providing a wider sense of description and evaluation of these urban entities. This perception involves information, experiences, values, fears, ambitions, and other real and imagined elements.

1.1. Children Without Playgrounds

Despite the urban development that the world is living in currently, the Algerian production of playgrounds and outdoor spaces for the child category is still struggling. The majority of collective housing neighborhoods including the anciently and the recently constructed, provide low-quality outdoor spaces. Moreover, the situation is worse in poor neighborhoods, where there are more problems and resources of lower quality than in more advantaged ones. The inexistence of appropriate playgrounds for children within the neighborhood vicinity has become a common identity for the Algerian collective neighborhoods, while children are getting used daily to playing everywhere except in playgrounds.

Environmental structures such as parks and playgrounds act as a platform for children to engage in various outdoor play activities (physical, social, and cognitive). Playgrounds are structures that intend to promote children's play activities and social interaction. However, the urban physical characteristics of the local outdoor living environment delimit the field of daily exploration of children and effects the spaces they frequent.

In today’s time, the deterioration in open areas and loss of playgrounds are affecting adversely the creativity and the positive considerations of the upcoming generations. Therefore, more engagement in digital instruments such as mobiles, televisions, computers, and Internet browsing are becoming new modes of recreation that impact children's natural development and leads to negative propensities. Therefore, the decline in playgrounds and the debilitation of play facilities are rapidly causing a lack of physical activity, which is one of the greatest contributors to childhood development, exposing children to antisocial behaviors and minimizing social interaction with their peers and parents.

1.2. The Return to the Concept of "Street as a Play Space"

In many western cities, there has been a gradual trend toward the loss of the street as an environment for children. However, in the Algerian case, the residential streets are still performing the function of playing and illustrating an important role in cities as play spaces for children. The absence of playgrounds and any other specific areas for children to play in,

pushes them to choose the streets as the most attractive locations for playing. Residential streets have played an important role in cities as play spaces for children, these streets are now defined as playgrounds.

Nevertheless, in today's car domination within cities, children have limited freedom to use these spaces due to parental fear of traffic and the minor opportunities provided by these spaces. This contemporary local and national urbanization concerning collective housing neighborhoods has not prevented the traditional appropriation of the streets for the play activity as parts of the immediate environment. As consequence, the current massive presence of children within the residential streets reflects a form of the failure of urban residential policy.

Spontaneous informal child play on streets has been largely accepted within the local and national urban context. However, efforts by parents, politicians, and planners have to be reunited in order to provide a large number of parks, playgrounds, and large backyards that will satisfy children's recreation needs, and thus, there will be no requirement for children to use streets as play areas.

1.3. Urban Outdoor Profile and Outdoor Play Decline

The absence of playgrounds, the use of streets as play areas, and the sense of anonymity covering the neighborhood's outdoor vicinity have created an urban outdoor profile specific to the Algerian collective housing neighborhoods. This urban outdoor profile has a large impact on outdoor play activities and it is considered one of the main reasons leading to concerns about outdoor play and its decline. The decline of children's outdoor play in our national context is often blamed on the outdoor urban environment's substandard, poor, and unsatisfactory qualities. On the other hand, parents today have more fears about allowing their children to play outdoors than parents in the past decades, and furthermore, technology coverage certainly plays a role in this decline.

1.4. Places for Children vs Children's Places

According to Rasmussen (2004), the key difference between "children's places" and "places for children" is that adults can identify "places for children" while only children can show and talk about the "children's places". More specifically, "places for children" become "children's places" only after children connect with them physically. Even if these "places

for children" are designed for children, child informants generally guide adults to the many contradictions and restrictions within these places of play and recreation.

The critics concerning the playgrounds created by adults for children started in western countries in the 1970s. However, this typology of playgrounds in Algeria is still adopted and produced for all urban projects. One would expect that early childhood playgrounds would be able to provide such various play opportunities but, unfortunately, many playgrounds are not designed to provide these objectives. Many of the spaces in the neighborhood island are poor open spaces with hard surfaces, which children appropriate as play spaces. Imagination and creativity guide their activities, where a parking lot is transformed into hopscotch games or a cycling path and a small street into a soccer field, the entrances of buildings into protected spaces from weather conditions, and a leftover area into a multifunctional parcel.

During the process of designing "children's places", awareness has to be oriented toward the children as social and cultural actors within these spaces. Furthermore, attention must also be introduced to the adults' understanding of needs and possibilities concerning places for children to consolidate the child-outdoor relationship. The child-outdoor relationship is supposed to find resonance in the spaces bordering the home, particularly for freedom of action, physical skills, self-fulfillment; challenges; the acquisition of knowledge and values; appreciation as well as solitary and social activities. Therefore, these challenges, physical skills, and personal and collective achievements will be proportional to the available space.

1.5. Learning From Urban Environments Abroad

In the past decades, western countries experienced many problems and concerns related to outdoor play spaces for children in urban environments. Consequently, the child-friendliness concept has been adopted to solve these problems and enhance the city's quality. Accordingly, spaces for children have been the top priority for city planning. These spaces have been valued by theorists who relate them to urban residents' and communities' social, political, and physical health. In a line with this, wider international discussions have been established responding to new professional references about the health and well-being of young people in Western countries. Van Eyck's Amsterdam playgrounds and Gibson's ecological approach to the human environment are two examples among other pioneering examples that testify to the beginning of a revolution that criticized the concepts of space and time and introduced an understanding of how to experience a meaningful child-centered

environment and urbanism. Furthermore, within the child-friendly context, growing recognition of the value of enabling children to participate in society becomes an important implication for all of those who research, plan and design environments for children. Contrary to the abroad experience and progress, national cities are still being designed without considering children in their outdoor local context.

2. Recommendations

In this study, a comprehensive list of design criteria for enhancing outdoor environment quality for children is based on the different findings and includes diverse studies and research to provide significant recommendations. This list of design criteria can be used as a checklist in the design process of child outdoor environments.

For the Physical Factors:

- The policies concerning the creation of outdoor play environments have to be reviewed and improved according to children's needs and rights. As well as the funding and implementation of this field of outdoor play spaces which have to be reconsidered and enhanced.
- The playgrounds including the different physical play structures and features have to provide adequacy, accessibility, adaptability, safety, variety, satisfactoriness, and conviviality.
- The play spaces should be designed in a way to boost the physical, mental, cognitive, and educational development of children via the creation of multifunctional play spaces and provide different spaces for daily recreation except for the traditional sandbox playgrounds and soccer fields.
- The play spaces' distribution should be made in a balanced way in order to provide equal play options for all children. The play equipment should be also located by considering pedestrian mobility.
- The outdoor spaces with open configurations are greeted for their ability to enhance and encourage the play activity as well as ensure security and urban mixture.
- The leftover spaces have to be enhanced by giving them different vocations and integrating them as part of the daily outdoor play for children.

- The natural elements must be integrated within the outdoor play areas for their impact on children's health and environmental diversity.
- The regular and appropriate maintenance of the different structures and urban components is necessary for protecting the outdoor urban image and providing proper functions and safer use for children.
- The provision of diversity by various surface treatments; colors, pavement, drawings, and other elements that stimulate creativity, imagination, and curiosity of children.

For the Social and Individual Factors:

- The spatial layout of outdoor spaces within the residential neighborhoods has to be conducted following diverse elements taking into consideration the number of children within the area as well as the different age ranges.
- The play spaces should allow children from different age groups to play together using the clustered spaces with different functions for creating more attraction and interaction.
- The social and play spaces for different age groups should be created according to their needs taking into consideration children with disabilities in order to allow them to use the outdoor spaces freely and to play together with peers.
- The younger children need to have more sheltered spaces to ensure safety during play without being accompanied such as fences, barriers, vegetation, or other design elements that could be used to create safe spaces for them.
- The spaces for parents and adults have to be integrated and located at a safe distance or separated with semi-permeable design elements to provide children a sense of independence as well as to allow parents to supervise their children while having a social space to interact with other parents or neighbors.
- The local communities and organizations have to take an active role in enhancing the outdoor qualities of the neighborhood outdoor vicinity and also in maintaining the best living conditions for the inhabitants, especially children as a vulnerable category of residents.

3. Strengths and Limitations of the Study

This is the first nationally representative investigation concerning the quality of the open outdoor spaces and children's play activities. The strength of this research work resides as well in the use of a multidimensional methodological approach that includes qualitative and quantitative strategies. Another strength of this study is the investigation of several parameters of the urban environment including physical activities, social interaction, and individual behaviors separately and in correlations. Despite the ability of quantitative and qualitative research to provide extremely valuable insight into the investigated issues, the main limitation is the sample of children which represents merely a small fraction of the total child population while a much larger sample of the population could be required. Furthermore, from the managing experience acquired in this work with children, another limitation is the challenging process of investigation and supervision vis-à-vis a larger sample of children due to their particular nature. The factor of time and financial constraints represent limitations as well. Moreover, the study area of two residential neighborhoods is relatively diminutive to be used as a strong foundation for decisions and a source of generalization.

4. Further Research Perspectives

The various methodological approaches used in this research provided diverse responses that complement each other. However, there is also the flexibility to accommodate other possible methods and involve a wider spectrum of participants from different ranges of age groups and professions from diverse backgrounds related to the entity of outdoor residential environments. Hence, there might be some different ways to incorporate younger and adolescent children in a broader-scale research project focusing on social and cultural environments as well as emphasizing political and financial aspects. This study suggests that more related areas of interest might need further research in the future. Areas for further research may include childhood memories; children's participation in the planning and design of the outdoor environment; the concept of a child-friendly city and much more.

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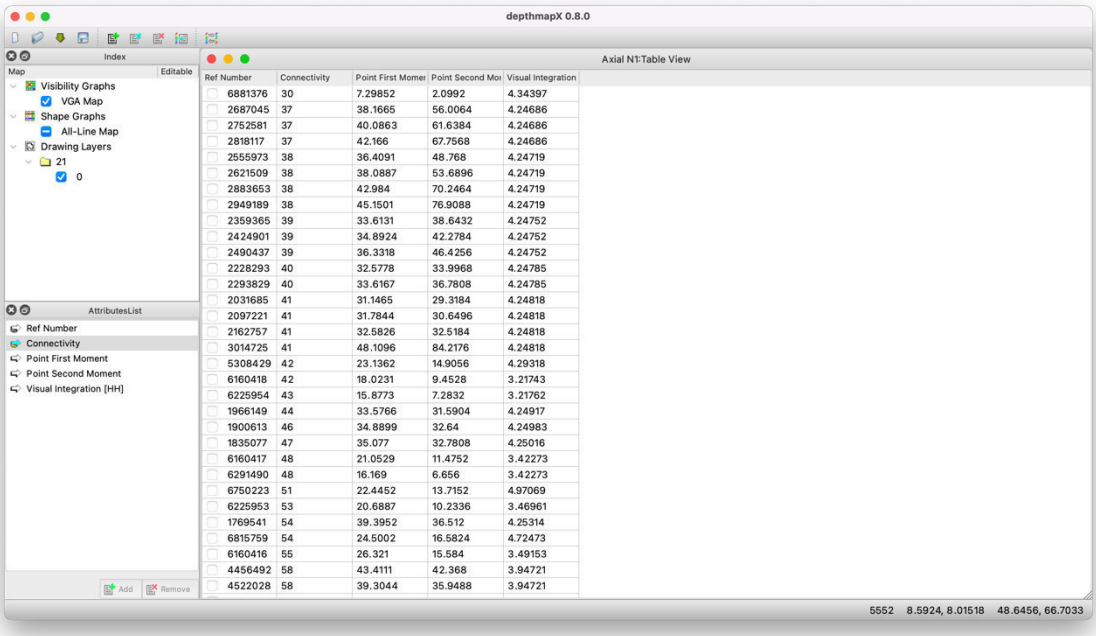
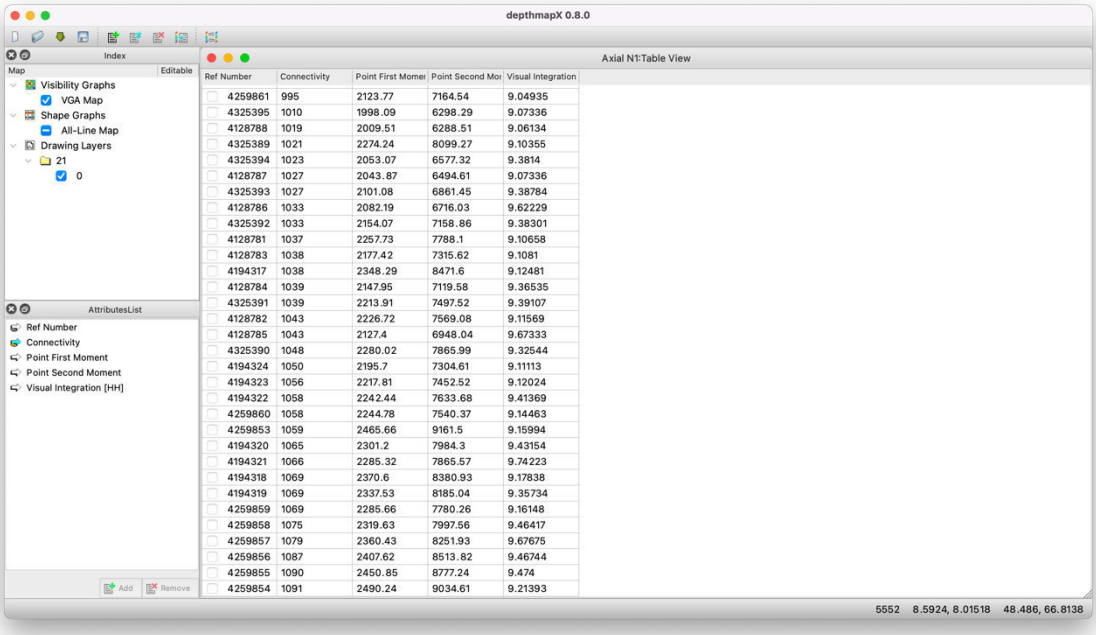
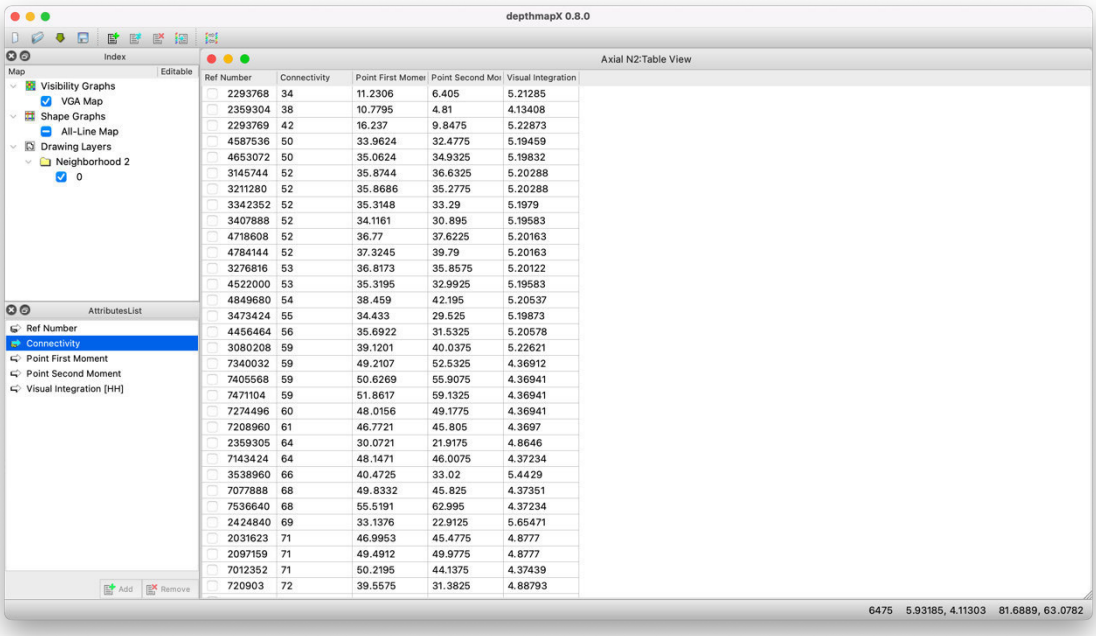
Appendices

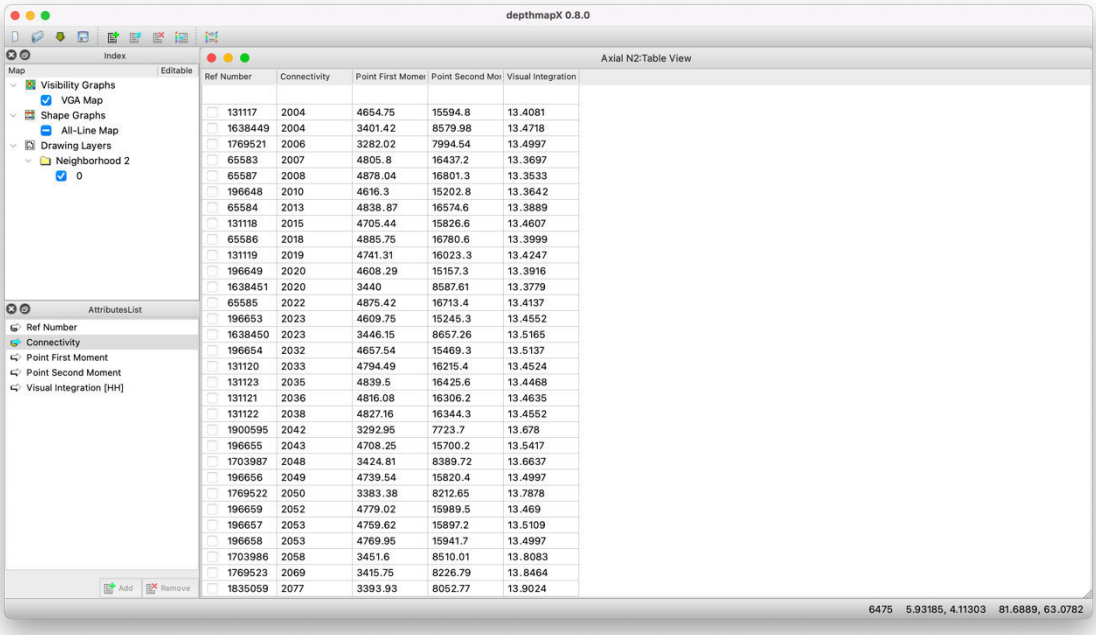
<u>Appendix 1:</u> Extraction of the syntactic data (Neighborhood of 420 housing units)





<u>Appendix 2:</u> Extraction of the syntactic data (Neighborhood of 1500 housing units)





Appendix 3: Questionnaire (English Version)

I. General Information

Name: .....

Age	7 years old	☐	8 years old	☐	9 years old	☐
	10 years old	☐	11 years old	☐	12 years old	☐

Gender	Male	☐	Female	☐
Residence	Neighborhood of 420 housing unit	☐	Neighborhood of 1500 housing unit	☐
	Other neighborhood	☐		

II. Time Frame

How often do you play outdoors?	Everyday	☐	Holydays	☐
	Week-ends	☐	Rarely	☐
At what time of the day do you usually play?	Morning	☐	After noon	☐
	Evening	☐	Night	☐
How much outdoor play time do you usually spend? (Hour/Day)	Less than 1 hour	☐	Between 1 and 2 hours	☐
	Between 2 and 3 hours	☐	More than 3 hours	☐

III. Play Activities

What are the exercised activities during play?	Football	☐		Building things	☐
	Hide and seek	☐		Pretending	☐
	Bike/Rollers	☐		Cooking	☐
	Running/Jumping	☐		Small Balls	☐
	Swinging	☐		Electronics	☐

IV. Play Spaces and Place Preferences

Where do you play?	Inside the building	☐		At the entrance of the building	☐
	Next to the building	☐		In the street	☐
	In the playground	☐		In the garden	☐
	In an open space	☐		In the grass	☐
Is the play space?	Very far	☐		Far	☐
	Near	☐		Very near	☐
Is the play space?	very tight	☐		Tight	☐
	Large	☐		Very large	☐
How is the playground bordered?	Fenced	☐		Opened	☐
What type the playground floor is?	Clay	☐		Sand	☐
	Grass	☐		Paved	☐
Is the play space?	very dangerous	☐		Dangerous	☐
	Safe	☐		Very safe	☐

Where do you play during adverse weather conditions? (Too hot, too cold, too wet)

Indoor ☐ Outdoor ☐

If outdoor, where?

.....

.....

What encourages you to play outside?

Group playing ☐ Open spaces ☐

Play equipment ☐ Nature elements ☐

Other:

.....

.....

V. Others

Do you participate in the cleanup and reforestation initiative in your neighborhood?

Yes ☐ No ☐

What would you like to add to your neighborhood play space?

.....

.....

.....

.....

If you had the opportunity to change your place of residence and move away from your neighborhood, would you accept?

Yes ☐ No ☐

If you answered yes, why?

.....

.....

.....

Appendix 4: **Questionnaire (Arabic Version)**

معلومات عامة

الإسم.....

العمر	7 سنوات	☐	9 سنوات	☐	11 سنوات	☐	
	8 سنوات	☐	10 سنوات	☐	12 سنوات	☐	
الجنس	ذكر	☐	أنثى	☐			
العنوان	من حي 420 سكن	☐	من حي اخر	☐			

أوقات اللعب

متى تلعب خارج المنزل؟	كل يوم	☐	ثناء العطل	☐			
	نهاية الأسبوع	☐	نادر	☐			
في أي وقت من اليوم تلعب خارج المنزل ؟	صباحا	☐	مساءا	☐			
	بعد الظهر	☐	ليلا	☐			
ما هو متوسط مدة اللعب؟ (ساعة / يوم)	أقل من 1 ساعة	☐	بين 1 و 2 ساعة	☐			
	بين 2 و 3 ساعة	☐	أكثر من 3 ساعة	☐			

فضاءات اللعب والأماكن المفضلة

أين تلعب خارج المنزل ؟	بجانب المبنى	☐	داخل المبنى	☐			
	في الطريق	☐	في مدخل المبنى	☐			
	في فضاء مفتوح	☐	في فضاء اللعب	☐			
	في العشب	☐	في الحديقة	☐			
هل فضاء اللعب؟	بعيد جدا	☐	بعيد	☐			
	قريب	☐	قريب جدا	☐			
هل فضاء اللعب؟	ضيق جدا	☐	ضيق	☐			
	واسع	☐	واسع جدا	☐			

هل فضاء اللعب؟	مغلق	☐	مفتوح	☐
هل فضاء اللعب؟	خطير جدا	☐	خطير	☐
	أمن	☐	أمن جدا	☐
ماهي نوعية ارضية فضاء اللعب؟	تراب و حجارة	☐	رمل	☐
	عشب	☐	معبدة	☐
أين تلعب في الطقس السيئ؟ (حار جدا ، بارد جدا ، ممطر جدا)	داخل المنزل	☐	خارج المنزل	☐

اذا كنت تلعب خارج المنزل فأين؟

.....

ما الذي يشجعك على اللعب بالخارج؟	اللعب الجماعي	☐	المساحات المفتوحة	☐
	اللعب الحر	☐	عناصر الطبيعة	☐

اشياء اخرى اذكرها

.....

اخر

هل تشارك في مبادرة نعم للتنظيف وإعادة التحريـج في منطقتك؟

.....

.....

ما الذي ترغب في إضافته إلى مساحة اللعب في منطقتك؟

.....

.....

.....

إذا أتيحت لك الفرصة لتغيير مكان إقامتك والابتعاد نعم عن منطقتك، هل تقبل؟ إذا أجبت بنعم، لماذا؟

.....

.....

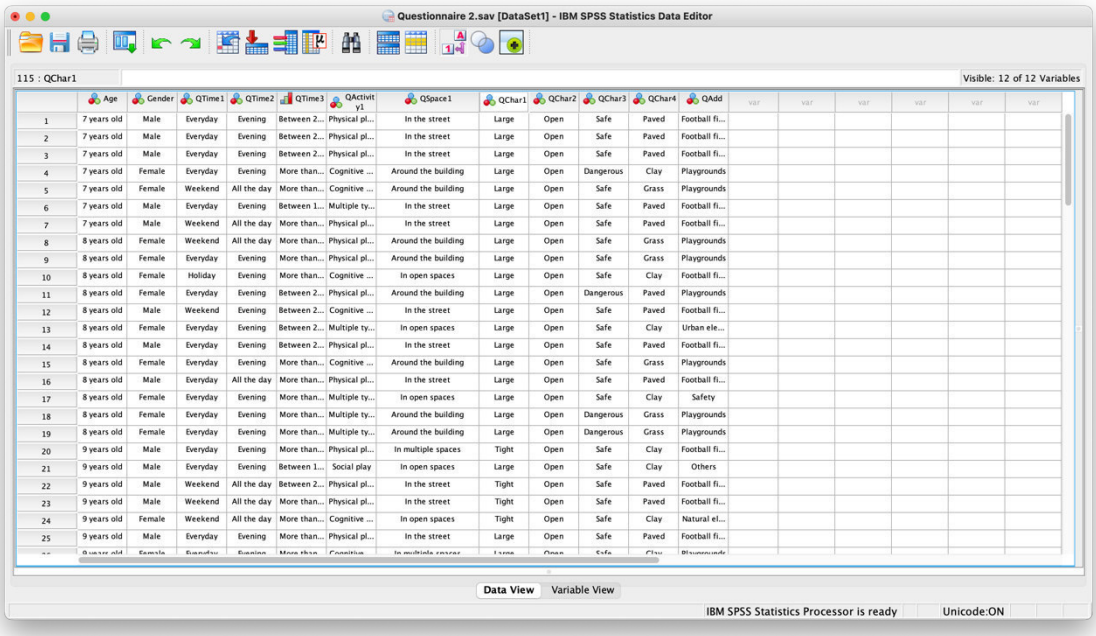
<u>Appendix 5:</u> Analysis of the Questionnaire (Data Modeling)

Variable Values

Value		Label
Age	7	7 years old
	8	8 years old
	9	9 years old
	10	10 years old
	11	11 years old
	12	12 years old
Gender	0	Male
	1	Female
Residence	1	Resident of the neighbourhood
	2	Not a resident of the neighbourhood
QActivity01	1	Every day
	2	Week-ends
	3	Holidays
	4	Rarely
QActivity02	1	All the day
	2	Evening
	3	Morning
	4	Night
QActivity03	1	Less then 1 hour
	2	Between 1 and 2 hours
	3	Between 2 and 3 hours
	4	More then 3 hours
QActivity04	1	Physical Play
	2	Constructive Play
	3	Fantasy Play
	4	Others
	5	Multiple types
QActivity05	1	Around the building
	2	In the street
	3	In the playground
	4	In an open space
	5	Multiple spaces
QActivity06	0	Near
	1	Far
QActivity07	0	Tight
	1	Large
QActivity08	0	Fenced

QActivity09	1	Opened
	0	Safe
	1	Dangerous
QActivity10	1	Clay
	2	Sand
	3	Grass
	4	Paved
QOthers11	1	Play equipment
	2	Natural elements
	3	Urban elements
	4	Play grounds
	5	Football field
	6	Safety
	7	Others

Appendix 6: Extraction of the Variable File



Appendix 7: **Data of Behavioral Mapping**

Neighborhood: 420 housing units

Time frame	**Weekday X** **Weekend**	**Morning X** **Morning**	**Evening** **Evening**	
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**	
	Moving	**Playing**	**Sitting**	**Standing**
Zone A	3	/	/	/
Zone B	/	2	/	/
Zone C	3	6	4	3
Zone D	1	/	/	/
Zone E	/	/	/	/
Zone F	/	3	/	/
Zone G	/	/	/	/
Zone H	/	/	/	/
Zone I	2	/	/	/
Zone J	2	/	/	/
Zone K	3	10	/	/
Zone L	3	10	/	/

Neighborhood: 420 housing units

Time frame	**Weekday X** **Weekend**	**Morning** **Morning**	**Evening X** **Evening**	
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**	
	Moving	**Playing**	**Sitting**	**Standing**
Zone A	2	3	3	/
Zone B	/	6	/	/
Zone C	2	15	6	/
Zone D	/	3	/	/
Zone E	/	3	/	/
Zone F	/	3	/	/

Zone G	/	5	/	/
Zone H	/	/	/	/
Zone I	/	2	/	1
Zone J	/	/	3	/
Zone K	2	11	6	2
Zone L	5	17	5	3

Neighborhood: 420 housing units

Time frame	**Weekday** **Weekend X**	**Morning** **Morning X**	**Evening** **Evening**	
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**	
	Moving	**Playing**	**Sitting**	**Standing**
Zone A	/	5	6	3
Zone B	1	10	/	/
Zone C	4	14	9	4
Zone D	/	4	/	/
Zone E	2	/	/	/
Zone F	/	2	/	/
Zone G	/	2	/	/
Zone H	/	2	/	/
Zone I	/	/	/	/
Zone J	/	4	/	/
Zone K	3	16	2	3
Zone L	4	23	3	4

Neighborhood: 420 housing units

Time frame	**Weekday** **Weekend X**	**Morning** **Morning**	**Evening** **Evening X**
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**

	Moving	Playing	Sitting	Standing
Zone A	3	8	11	3
Zone B	5	8	5	3
Zone C	7	25	12	3
Zone D	/	/	/	/
Zone E	3	/	/	/
Zone F	/	5	1	/
Zone G	/	6	/	/
Zone H	2	6	/	6
Zone I	/	3	/	/
Zone J	/	/	/	/
Zone K	8	10	10	15
Zone L	13	27	11	11

Neighborhood: 1500 housing units

Time frame	**Weekday X** **Weekend**	**Morning X** **Morning**	**Evening** **Evening**	
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**	
	Moving	**Playing**	**Sitting**	**Standing**
Zone A	/	5	/	/
Zone B	2	/	/	/
Zone C	1	3	2	/
Zone D	/	/	/	/
Zone E	/	/	/	/
Zone F	/	/	/	/
Zone G	/	2	/	/
Zone H	/	/	/	/
Zone I	/	/	/	/
Zone J	1	/	/	/
Zone K	/	/	/	/
Zone L	/	/	/	/

Zone M	/	/	/	/
Zone N	/	/	/	/
Zone O	3	2	/	/
Zone P	/	3	/	/
Zone Q	/	/	/	/
Zone R	2	2	/	/
Zone S	/	/	3	3

Neighborhood : 1500 housing units

Time frame	**Weekday X** **Weekend**	**Morning** **Morning**	**Evening X** **Evening**	
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**	
	Moving	**Playing**	**Sitting**	**Standing**
Zone A	2	2	2	/
Zone B	/	4	/	
Zone C	2	3	/	6
Zone D	/	3	/	/
Zone E	/	/	/	/
Zone F	/	/	/	/
Zone G	/	3	3	1
Zone H	/	2	/	/
Zone I	/	/	/	/
Zone J	/	/	/	/
Zone K	/	/	/	/
Zone L	/	/	/	/
Zone M	/	4	/	/
Zone N	/	/	3	/
Zone O	/	5	/	/
Zone P	/	2	/	/
Zone Q	3	/	/	/
Zone R	/	8	3	/

Zone S	/	2	3	1

Neighborhood : 1500 housing units

Time frame	**Weekday**	**Morning**	**Evening**	
	Weekend X	**Morning X**	**Evening**	
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**	
	Moving	**Playing**	**Sitting**	**Standing**
Zone A	4	/	/	4
Zone B	/	4	/	/
Zone C	2	3	/	8
Zone D	/	3	2	/
Zone E	/	/	/	/
Zone F	/	/	/	2
Zone G	/	2	/	/
Zone H	/	/	5	/
Zone I	/	/		/
Zone J	/	/	3	/
Zone K	3	/	/	/
Zone L	3	/	/	/
Zone M	/	3	/	/
Zone N	/		3	/
Zone O	/	5	/	3
Zone P	/	2	/	/
Zone Q	4	/	/	/
Zone R	/	7	2	/
Zone S	2	/	3	1

Neighborhood: 1500 housing units

Time frame	**Weekday**	**Morning**	**Evening**	
	Weekend X	**Morning**	**Evening X**	
Zones/Behaviors	**Movement and Physical Activity**		**Stillness and Quietness**	
	Moving	**Playing**	**Sitting**	**Standing**
Zone A	2	10	/	/
Zone B	/	4	5	/
Zone C	5	3	/	5
Zone D	2	7	/	/
Zone E	/	3	/	/
Zone F	3	/	/	/
Zone G	/	3	/	/
Zone H	/	6	3	/
Zone I	/	5	/	3
Zone J	/	/	/	3
Zone K	/	2	/	/
Zone L	1	3	/	/
Zone M	1	8	/	/
Zone N	/	/	3	3
Zone O	4	5	/	/
Zone P	/	3	/	/
Zone Q	3	6	/	/
Zone R	/	18	2	/
Zone S	2	5	3	2