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**APPROACHES TO SHAPING THE DESIGN OF PLAYGROUNDS
WITHIN THE FRAMEWORK OF A MULTI-STAGE GAMIFICATION
STRATEGY**

Qualification work for obtaining the SVO «Master»

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The qualification work contains the results of one's own research

The use of ideas, results and texts of other authors must be referenced to the appropriate source.

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INTRODUCTION

With the acceleration of urbanization, children's playgrounds, as an important part of urban public space, have gradually attracted attention. However, traditional playground designs often lack innovation and interactivity, making it difficult to meet the diverse needs of modern children. In recent years, gamification strategies have been widely used in the design of public spaces, especially in children's playgrounds. Thanks to multi-stage gamification strategies, complex and interactive scenes can be developed according to the cognitive characteristics and needs of children at different developmental stages, promoting their cognitive, emotional, and social development. With the introduction of policies such as the Child Development Plan (2021-2030) and the Guidelines for Building Child-Friendly Communities in the New Era, China has set clear requirements for the construction of child-friendly public spaces and promoted innovation in the design of children's playgrounds. Specifically, the policy encourages the integration of local culture and gamification concepts to create more communal and educational playgrounds. The purpose of this study is to explore a method for designing children's playgrounds based on a multi-stage gamification strategy, combined with the characteristics of Chinese society and culture, and to analyze how to enhance the interactivity, education, and cultural aspects of playgrounds through phased design, thereby providing a practical guide for building child-friendly communities. The ultimate goal of this research is to enhance the quality of children's playground design by applying multi-stage gamification strategies, ensuring better alignment with the physical and cognitive development needs of children. By analyzing the characteristics of different developmental stages, we propose interactive and educational designs suitable for each phase, facilitating the transformation of children's playgrounds from traditional recreational spaces into multifunctional and highly interactive educational environments. Simultaneously, in alignment with China's policy directives, we will explore how to integrate local cultural and social origins into the design to meet national requirements for building child-friendly spaces. Ultimately, the significance of this research lies in

providing theoretical support and practical guidance for the innovative design of children's playgrounds in China, fostering the creation of a child-friendly environment, enriching children's growth experiences, and promoting a sense of social responsibility and cultural value in public space design.

SECTION I. HISTORIOGRAPHY OF THE ISSUE.STATUS OF RESEARCH ON THE TOPIC

1.1.State of research on the topic

There has been a paradigm shift in designing playgrounds over the last few years from mere physical activity zones to more multifaceted environments that involve design features like imagination, exploration, and socialization. Simultaneously, gamification, which is actually bringing game design thinking into applications outside gaming, has increasingly been used to make these experiences more interesting and engaging. The blending of these two aspects has instilled interest in understanding how gamification approaches can impact play environment design.

Early studies on playgrounds were more concerned with physical safety, motor skill development, and play's role in human development. The conventional playground contained equipment such as slides and swings. Nevertheless, more contemporary approaches to designing these play spaces include what is being called playscapes, which involve play with nature. The study on playscapes indicates that nature, topography, and malleable equipment are integral to play development because they lead to imaginative play and social behavior. This is because play is both physical activity and behavioral-mental processes.

Another crucial area that is currently being investigated is that of digital and interactive change to play spaces. The result of technological advancements such as sensors and augmented reality is that there is a new concept called the intelligent play space. Research indicates that digital and interactive features can boost children's participation and teamwork, including inclusiveness among children

with special needs. The issue raised by these technologies is not only social but also encompasses aspects such as safety and access. This technology has led to an expansion of play space into a blended system with both physical and social aspects.

Concurrently, there has been a significant development within gamification theory across multiple disciplines. Gamification is typically defined as the use of gamelike mechanisms such as points, levels, and feedback to motivate behavior change. Numerous studies across educational, healthcare, and experience design domains have indicated that gamification can positively impact engagement and educational outcomes. Theories such as Self-Determination Theory and Flow Theory describe the mechanism by which gamelike design systems are able to motivate gamified audience members by cultivating a sense of autonomy, competence, and social integration. Despite this, gamification theory remains to be greatly developed within physical design, including playgrounds.

The incorporation of gamification within playgrounds is an increasingly popular but relatively nascent area. A limited range of studies have started to leverage gamification dynamics within physical environments, such as interactive art installations, reward points, and communal activities. However, a majority of such examples are conceptual rather than part of a systematic, multi-step approach. The paradigm of multi-stage gamification, which sees experiences unfold across multiple stages such as exploration, challenge, and continuation, provides a systematic method to approach design within playgrounds but remains largely unstudied within this context.

The challenge is to implement abstract gamification theory into spatial experiences. Concepts such as rewards, level progression, and challenges can no longer exist within gamified environments but rather need to be translated into a physical space experience via a sequence, spatial environment, or community engagement activity. Not to mention that understanding how to design engagement across multiple experiences is intrinsically tied to understanding how one goes

from being curious to an expert within said experience, which is currently an unsolved design challenge due to a lack of integration into overall design theory.

Another area to explore is inclusivity and accessibility. Current literature concerning digital and sensory play grounds illustrates that gamification can and should incorporate inclusiveness and accessibility regarding children with varying abilities. Play grounds incorporating multiple sensory feedback options and dynamic level sets increase social inclusiveness and emotional experiences. This area points to gamification having positive effects on inclusiveness and equality while increasing socialization at play grounds.

Despite these developments, there are some challenges faced by this field. The first challenge is that there are limited studies that shed light on how to incorporate two-stage gamification into design. The second challenge is that there is limited long-term empirical information about how gamified playground users behave. The third challenge is that design and evaluation are done on a short-term basis, which is not ideal. The fourth challenge is that there is limited interaction between design, psychology, and educational circles.

As a whole, there is currently a shift toward more interactive and adaptive approaches to designing playspaces, while gamification theory provides much leverage to structure these processes. The integration of these two, though more nascent at this stage, particularly when approached over multiple stages, requires more studies focused on building structured frameworks to describe how processes such as exploration, challenge, and continuation can themselves be mapped out. Further work into more interdisciplinary studies of gamification theory could allow for access to more aspects such as play experience, knowledge acquisition, and social engagement.

Overall, there is both promise and a gap within contemporary research trends. Playground research offers information on environmental behavior and child development, while gamification provides approaches to improve engagement and

motivation. However, there has been very limited systematic work integrating these two streams into one design paradigm. Developing such a paradigm could allow playgrounds to change from being static physical environments into dynamic experience-based settings, which constantly attract, challenge, and link their stakeholders. A future design orientation towards more engaged, more social, and more sustainable gamification processes could achieve this.

In summary, the present research landscape reveals both opportunities and gaps. Playground studies provide insights into environmental behavior and child development, while gamification offers methods to increase engagement and motivation. Yet, systematic attempts to merge these two fields into a unified design strategy are still rare. Developing such an integrated framework could help transform playgrounds from static physical spaces into dynamic, experience-driven environments that continuously attract, challenge, and connect their users. By focusing on multi-stage gamification, future playground design can evolve toward deeper engagement, stronger social interaction, and greater long-term sustainability.

1.2. Research methods

The primary objective of this research is to analyze how multiple-stage gamification approaches can be implemented within the design of playgrounds to make these more engaging, interactive, and sustainable. The research is theoretically aligned because it involves a methodical approach whereby theory is developed into practice by incorporating literature studies, surveys, observation, and prototyping. The overarching methodology is centered on making this design approach practical enough to be implemented within playfield design.

The first step within this research is literature review and analysis. The researcher investigated both local and foreign literature concerning gamification, playground design, children's behavior, and interactive experience. The differences among many theoretical outlooks and design approaches allow this research to identify significant aspects which frequently exist within gamified

design, including exploration, challenge, task, reward, and cooperation. These aspects are investigated concerning their impact on engagement and fun within non-digital settings. This step aims to garner a theoretical background and clarify the direction of this research.

The second stage is concerned with conducting surveys and interviews to clarify how different users experience and perceive playgrounds. The respondents involved were generally elementary school children and their parents. The issues raised within the questionnaire covered aspects such as how frequently children make use of playgrounds, what activities children participate in at these grounds, satisfaction with the current play features, and interest in game-like experiences. Further interviews were also done to acquire open-ended feedback on what children, parents, and teachers perceive concerning what is liked and disliked about a playground being fun/boring. This information directly helped the researcher comprehend the true needs and behavior on part of playground users.

The third stage is prototype design and conceptualizing. From the information gathered during the second stage, a conceptual design model for a gamified multi-stage play environment was developed. The design features three stages of progression: exploration, challenge, and continuation to signify how users can transition from mere interest to active engagement. The researcher developed conceptual illustrations manually and constructed 3D prototypes to represent how play environments can be visualized both in terms of spatial design and play routes. The conceptual design aimed to blend gaming features with natural aspects to make play more organic and engaging. The result of this stage formed a base for the field experiment.

The fourth stage involves observation and small-scale field testing. A community playground is selected to serve as the site to test this design, installing some gamified design elements such as hidden task cards, interactive signage, and collaborative challenge zones. The children are gathered to participate freely while being observed. The observation takes notes via photography, video, and written

documentation to document how long they spent on each part, how they engaged each other, and how they responded to both tasks and rewards. The children are asked a series of questions about which aspects they liked best and what they found difficult and/or uninteresting after engaging with this design.

While performing the data analysis, simple comparison and descriptive statistical procedures were employed by the researcher to analyze and conclude results. The behaviors observed and feedback provided by the users helped to analyze which aspects of gamification helped to increase engagement and which aspects required improvement. The results revealed that those designs which incorporated elements such as freedom of exploration along with appropriately balanced challenge points helped to keep engagement at a satisfactory level. Further, a combination of social interactions and rewards helped to increase repeat visitation and playtime significantly.

The ethics involved were observed carefully during this research. The children and their guardians obtained informed consent, and they were involved in safe and free conditions. Their privacy was observed to the fullest extent. They were not asked any personal information, and no personal information about them is revealed. The children were involved in activities which were creative and fun rather than experiments to allow them to speak freely and naturally.

The final stage involved integrating all results obtained within the earlier stages into a simple design process. The final results obtained within this study show that gamified design processes within playgrounds can successfully proceed within these five stages: review theory, needs identification, design prototype, implementation within real life conditions, and design refinement according to feedback. This cyclical design method places a strong emphasis on building experiences within design, which is anchored within actual behavior and developed into actual space solutions to enhance engagement and playfulness. The final results obtained within this study prove that gamification within multiple stages

can significantly enhance enjoyment, socialization, curiosity, and overall life spans within public spaces.

The research follows a very distinct and practical methodology that matches theoretical knowledge with practical implementation. The design incorporates literature review, surveys among the audience, design simulation, and final field implementation. The methodical design allows degrees of enhancement while ensuring that each phase helps to gain more insight into making gamification work within playground design. This design approach is very valuable to work with, both personally and professionally, to design more interactive and more inspiring spaces.

Conclusions to the first chapter

To conclude, there has been progressive but nascent integration work on research studies related to playground design and gamification. Conventional studies on playground design have concentrated on safety, physical activity, and social interaction, while more contemporary studies have begun to involve open-ended understanding and interactive notions of “playscape.” This is because there is a shift in understanding from equipment-based to experience-based design. Simultaneously, there has been increased technological development related to “intelligent playground design,” which incorporates sensors to allow interactive user engagement. While this provides opportunities, there are related issues concerning safety, sustainability, and maintenance.

Gamification, theoretically, is a very potent instrument to tap into engagement and participation. Gamification has already been successfully implemented across a range of disciplines, including but not limited to educational and medical domains, and design experiences, where gaming concepts such as tasks, challenges, feedback, and collaborative activities have shown to successfully keep one engaged and focused towards specific goals. Yet, the application of gamification concepts developed specifically across digital domains and implemented across

play environments such as play grounds remains relatively uncharted. The idea of multi-stage gamification, which is progressively divided into experience stages such as explore, challenge, and continue, is a very potent idea but remains an uncharted territory within design experiences. The remedy to this challenge is what this study will cover.

Thus, this holistic approach not only helped to identify how gamification could work within a playground setting but also helped to identify what factors were most important to its success. The findings show how gamification helped to incorporate fun into play, but also how it helped children feel like they were part of something special, by rewarding play and interacting with other children. The feedback given helped to show how having multiple stages helped to make play more rhythmic and purposeful, while also bringing about enjoyment and a sense of accomplishment to children. This shows how gamification is more than just entertainment—it is a design tool that can shape behavior, promote teamwork, and enhance creative ideas.

From a broad perspective, this study helps to enhance both the theoretical and methodological fronts on which other studies exist. On a theoretical level, this study illustrates how gamification's underlying motivational dynamics relate to spatial experiences, offering a distinct line between behavioral rewards and designing feedback. On a methodological level, rather than just conducting studies on human behavior and validating prototypes to analyze that behavior, this study is able to combine those two approaches to offer a replicable model which can easily serve to enhance other studies to come.

Overall, this research expands both the theoretical and methodological dimensions of current studies. Theoretically, it links the motivational logic of gamification with the experiential qualities of spatial design, establishing a clear progression from behavioral incentives to environmental feedback. Methodologically, it integrates user-centered data collection with prototype

validation, creating a replicable process for future research. This combination of theory and practice ensures that the proposed framework is grounded in both conceptual understanding and real-world application, providing valuable references for designers and planners of public play spaces.

In conclusion, the integration of playground design and gamification represents a promising interdisciplinary direction. The multi-stage gamification approach offers a structured model for transforming playgrounds into environments that continuously inspire exploration, encourage cooperation, and strengthen community interaction. Future research should continue to develop this approach through larger-scale field studies, long-term behavioral observation, and cross-disciplinary collaboration. By establishing systematic evaluation models and adaptable design processes, playground design can evolve toward greater interactivity, inclusivity, and sustainability—creating spaces that not only entertain but also educate, connect, and inspire.

SECTION II. REQUIREMENTS FOR THE FORMATION OF GAME SPACES

2.1 Features of the spatial organization of playgrounds for the implementation of gamification strategies

The role of space organization during gamification implementation is crucial to achieve an immersive and continuous experience. The gamified space is more concerned with building nodes and routes on tasks compared to traditional play spaces that are separated by fixed functions and equipment zones. The play space is no more a dormant environment where children play but rather a dynamic environment that holds missions, narratives, and interactions via which one progresses by exploring and completing.

The first is to introduce task nodes, which comprise the overall infrastructure on which the gamified playground is constructed. These nodes are each endowed with a specific mission or activity, and Players receive rewards such as points,

clues, and other symbolic rewards upon successfully completing these tasks. These could range across more explicit actions such as climbing, balancing, puzzle-solving, teamwork, and other activities to more implied tasks such as finding hidden figures, recognizing visual patterns, surprise responses, and other similar activities. The degree of challenge and structure required also needs to vary across these nodes to cater to players across different ages and skill sets. This gamified paradigm lends a more nuanced element to spatial interaction, turning what is simply a Playground experience into one that is more deliberate and mission-driven over a sequence of activities.

Another crucial element is route-based spatialization. Differing from functionally zoned divisions, this gamified playground is organized via routes connecting nodes corresponding to specific gamified tasks, which comprise a progressive investigation journey. Routes can trace site topography naturally, but they can also employ deliberate spatial indicators such as ground markings, light, and sounds. The beginning typically consists of the “introductory mission” or “beginning of story,” while the very last part is labeled “ultimate level” or “point of story climax.” This route-based organization provides players with an unambiguous understanding of journeying and discovering, thus reinforcing the cyclical experience of “task-exploration-achievement.” Players within this environment participate not only in physical exercises but also cognitively and affectively invest into the progressing gamified story.

These routes and zones can and should be adjusted according to the unique conditions of each site. As each Playground is different in topography, vegetation, and social setting, routes for gamified missions should vary accordingly rather than being configured according to a standard template. The designer can make use of natural resources like topography, water features, and vegetation to determine the spatial cadence of gaming. Elevation differences can activate “climbing missions,” while “clue-collecting missions” can take place within forested zones. A route

alongside water resources can contain “ balance missions. ” The natural environment can thus play an integral role within gaming, adding to the sensory experience while minimizing rather than maximizing construction involvement.

Moreover, the design of gamified playgrounds should incorporate elements of local culture, making play a source not only of entertainment but also of educational and social value. Finally, gamified play can incorporate themes of culture within a multiple-stage gamified design setting, acting as a thread running within each stage. This could involve a mission to a village park that takes its theme from stories within that region ’ s lore, festivals, and suchlike. The final mission could culminate at a culturally important landmark, thereby incorporating play into a social tool for interpreting culture and collective memory.

The gamified playground is spatially organized according to four aspects that are strongly interconnected: the nodes of tasks, route-based progression of experience, adaptation to environment, and incorporation of culture. The nodes of tasks serve to motivate, routes to orient, adaptation to environment to increase authenticity, and incorporation of culture to increase emotional engagement. This helps to convert a static recreation space into an interactive and educational environment that triggers interest, fosters teamwork, and develops strong linkages between human beings, environment, and culture. The above-discussed design serves as a platform to look ahead to design playgrounds on the basis of gamification.

2.2. Features of the formation of play areas in the playground

The role of gamification implementation is to enhance this play experience by using spatial organization. The notion of gamification design is centered on functional zones typical to a usual playground, which encompass safety and diversity within physical structure zones. The issue is that such parks are generally non-interactive and non-narrative. The gamification implementation idea is to turn this kind of park into a “ mission-based park ” where players change their role

from mere equipment users to active players involved within a sequence of tasks to complete, finding clues to win hidden levels and proceed to next stages of the mission. This will imbue the park with temporal characteristics, which becomes an endless flow experience where play activity shifts to an objective-driven rhythmic journey.

Another key element within the gamified environment is the creation of task nodes. A task node is typically a functional element within this environment that provides designated interactive missions or activities and is placed within this environment to serve as the main structure within which this gaming experience takes place. These nodes are developed to serve their own purpose and challenge, such as climbing, teamwork puzzle solving, information search, balance games, physical challenges, and explorations of this environment. These nodes can reward users with points, virtual items, or hidden clues upon their completion, offering access to the next level within this environment. The addition of these nodes to this environment gives it direction and structure to allow players to experience new elements with feedback within this environment.

As far as design methodology is concerned, nodes involved in tasks can range in level of difficulty according to age and skill level, thus forming a progressive journey. For example, a introductory node can be introduced close to the main entrance to attract new visitors to the site, while nodes that deal with physical or collaborative challenges can boost interface and teamwork. The final node is generally developed into what is known as “the final level,” which acquires symbolic meaning and notions of accomplishments to bring about psychological closure.

The route-based spatial design, which connects these nodes, is another complementary part of this system. A gamified playground is not organized according to separate functional zones like “kids’ zone,” “resting zone,” and “sports zone.” This design takes into account narrative routes on which

missions can be accomplished while exploring this environment. The beginning point of this route is where the introduction to this story takes place, assigning missions to those participating with this gaming activity. The middle part consists of main missions implemented on branching, intersecting, and loop design paths, promoting free player movement. The endpoint defines the final part, signifying victory accomplishment within this activity.

The route design serves not only as a physical signposting system but also helps to coordinate the psychological rhythm. The route can use ground markings, lights, sounds, color gradation, and interactive art installations to offer a “spatial guidance language” which helps to transition effortlessly between activities without having to break immersion. The route structure is very useful to allow children to generate their own cognitive map while exploring, which helps to improve children's mental comprehension of the route structure and narrative.

The allocation and design of nodes related to tasks should also comply with the principle of contextual adaptation. The design approaches should cater to adaptation according to natural conditions, topography, available infrastructure, and population characteristics rather than employing a template. For instance, on terrains characterized by hills, “climbing missions” can be developed taking advantage of height differences to design level-based missions, while in regions covered by vegetation, one can make use of light and shade variation to design “clue collection” or “hidden object” missions, while others can design “balance crossing” or “aqua puzzle” around water features.

This design paradigm—the site as play—also serves to minimize construction expenses while improving both authenticity and engagement with nature. Natural elements are endowed with playfulness, turning them into narrative elements which enhance both distinctiveness and place. The landscape can thus become part of the narrative rather than simply its setting.

Space is also a medium of culture transmission within multi-stage gamification design. Cultural integration is about integrating local history, folklore, and symbolic imagery into the structure of play. A task node can denote a part of a story while routes can denote how these parts are woven into a story. For instance, on a site which has legendary stories around it, one can design tasks around discovering mythical totems, reconstructing ancient craftsmanship, and other festival-related activities. The final level can take one to a landmark which is culturally important — such as an old stone bridge, ancient tree, temple, or sculpture—representing the final destination of play and discovery alike.

Cultural integration not only adds to the depth of themes present within the playground but also imbues this experience with educational and social relevance. As far as children are concerned, this is a method of play-based learning which helps to increase their understanding about other cultures, while within communities, this experience helps to activate collective memory and provides social cohesion. Cultural themes provided within this gamified experience help to inject community and social identity into everyday life.

Concluding, there are four main spatial features of gamified playground design: The organized placement of nodes to denote tasks, route maps to structure experiences, contextual adaptability to diversify space, and narrative enhancement by culture incorporation. These four features combine to offer a multifaceted and multidimensional experience structure that simultaneously incorporates physical movement, psychological investigation, and cultural understanding. Nodes serve to structure experiences with meaning and purpose, routes to offer continuity and flow, contextual adaptation to increase authenticity, while culture incorporation helps to enhance experiences emotionally and symbolically.

This model of spatial organization not only improves the playability and educational value of playgrounds but also signifies a change in paradigm within the design of public space—but one which shifts emphasis from functionality to

experience, and from space to narrative. This model is able to convert “play” into a holistic activity within space — exploration, socialization, and cultural knowledge acquisition being incorporated into one activity. This philosophy ultimately provides a strong base for implementing gamification strategies within play grounds.

2.3. Basic methods of forming public space design

As a crucial element within city life, public space embodies multiple functions such as recreation, socialization, cultural exchange, and city identity formation. Conventionally, design approaches to design these spaces have functioned upon aspects such as functional segregation and visual order. The objective has remained one of designing well-organized city spaces with rational circulation routes, demarcation, and visual coherence. Yet, this conventional design method pays little heed to participation and engagement aspects, resulting in organized but sterile spaces within the city. Social structure and lifestyle shifts over the years have exposed the shortcomings inherent within conventional design approaches. The modern design challenge is to re-awaken these city spaces—not merely physical environments—but shared experience spaces.

The design of public spaces, up until this point, has been led by the philosophy of functionalism, which identified each space with a specific function. Parks, squares, and pedestrian paths were equipped with standard features such as benches to sit on, grass to play on, sculpture to admire, and fountains to appreciate. Although these met the functional needs, they were less likely to provoke any activity. The experience of space remained passive, meaning that while people made use of it, they did not necessarily engage with it. The net effect is that many public spaces have over time become “visual landscapes” and/or “transit zones,” which are appreciated more because they are aesthetically pleasing rather than functional. The challenge is that design also has to lead experiences rather than just functions.

Gamification design concepts have revitalized designing spaces within the city. Gamification is basically a mechanism to incorporate game design elements into non-gaming applications to increase engagement and interest. The implementation of gamification design within spaces within the city allows such spaces to shift from being mere functional zones to being interactive platforms. Gamified design invokes the idea of play within these environments, thereby urging occupants to take up roles and play within these spaces to discover, share, and overcome. This, in effect, reshapes how human beings relate to space within an urban setting.

Another key change that gamification brings to design is related to interaction. Typically, interaction is limited to observation, and this can happen on a visual level, such as sculpture, fountains, observation decks, and other similar elements that allow interaction but do not necessarily involve behavior. Gamification, on the other hand, allows two-way interaction between the space and its users. This could happen because the space could respond to the behavior of its users by incorporating feedback mechanisms that could change brightness if there is any activity on the part of crowd movement, change sounds based on foot traffic, or use augmented reality to allow viewers to discover hidden information. This gives life to a space, making it an interactive interface where each activity results in a special experience.

Gamification is also responsible for an experience-based paradigm shift in designing public space. While designing public spaces, currently favored approaches stress visual beauty, while those involved in gamification stress experience. They design several layers of engagement with a space, encouraging people to experience it multiple times in multiple ways, depending on time and occasion. For instance, a square can serve multiple functions, such as a place to hang out and read during daylight hours, but change into a gaming arena using light effects during night hours. This philosophy thus ensures that public spaces change from single-use to continuous-use activity systems.

Moreover, gamification enables the projection of cultural expression on public spaces. The representation of a culture is naturally conveyed by static icons such as sculpture and monuments within conventional design. However, within a gamified environment, culture is part of the structure of tasks. Cultural history and heritage can be transformed into spatial missions. For example, one can participate in a “ heritage hunt ” by accumulating digital stamps on historic landmarks, experience festival missions, play collective games to reconstruct historic craftsmanship, and more. The final destination within this activity can take one to culturally significant points such as ancient bridges, temples, and squares, thus bringing about a sense of completion to this experience while expressing local culture. This results in an experience where knowledge acquisition translates to discovery, and interaction with culture translates to a significant experience.

The gamification strategy also enhances the social connectivity aspects associated with public spaces. While public spaces offer opportunities to share space together, social interaction is often observed incidentally rather than being deliberate. The gamified approach provides features that enhance deliberate social interaction. Most games developed to operate in public spaces involve teamwork and solving problems together. This results in strangers meeting each other incidentally. Examples include a puzzle to be solved together in a square, a step-counting challenge at a park, or a treasure hunt within a social setting. This is what can be referred to as social gamification.

From a methodological perspective, the main processes involved in gamified design in public space can be identified to comprise four repeated stages:

- (1) Analytical Phase – observing site conditions, user behaviors, and cultural context to identify design opportunities;
- (2) Constructive Phase – dividing the space into interactive units, planning task nodes and routes, and establishing the game structure;

- (3) Experiential Phase – testing and adjusting interactive mechanisms to ensure continuous engagement;
- (4) Reflective Phase – collecting user feedback, analyzing behavioral data, and using insights to refine the design.

This is a cyclic process that shows how gamification design is adaptable, to keep public spaces relevant to the needs that change with time.

To sum up, gamification design approaches can break free from the shortcomings found in conventional design approaches to designing public spaces, because they tend to put more emphasis on design rather than experience. As such, gamification design can turn public spaces into dynamic and interactive environments that attract the attention of individuals emotionally, mentally, and socially. This is because gamification design can offer a unique environment where exploring, learning, and socializing can take place simultaneously. As such, public spaces can change to serve as a fun environment that can function as an example of an urban playground.

Ultimately, these approaches provide a basis on which to reimagine and rethink the function of public space within modern cityscapes. They enable designers to begin to shift their attention to something more than mere construction, to something more like orchestration, to make sure that each square, each park, each corner is one that inspires curiosity, connection, and delight. The gamified narrative within design, therefore, gestures towards a future within which public space is more than functional, more than aesthetic—it is playable, it is learnable, and it is emotionally engaging.

Conclusions to the second chapter

The above analysis shown within this chapter illustrates that designing gamified spaces is an important shift within contemporary design discourse. The key point is that gamified design is distinct from conventional design approaches

to space, where space is conceived merely as a static environment within which activities happen. With gamified design, space is transformed into a dynamic and interactive experience that involves behavior, motivation, and adaptability.

Further, the discourse on approaches to forming public spaces has revealed that gamification is an effective remedy to counteract most drawbacks of design approaches. A functionalistic understanding of design, which previously highlighted order and beauty at the expense of interaction, led to aesthetically pleasing but emotionally alien places. Gamification reverses this understanding to put emphasis on interaction, feedback, and experience. The function of public spaces shifts from being observation decks to places that attract visitors to interact, cooperate, and participate. This shift is not only improving the living quality but also bringing about a whole new level to community engagement and learning.

From a methodological point of view, what is achieved with gamification is that it provides a cyclical and adaptive design method: analyze, build, experience, and reflect. This design method enables one to test, modify, and optimize these space interactions according to actual behavior, to ensure that these are constantly dynamic. This behavioral approach to design and experience is what modern design needs to address human perception more directly and combine physical design with human behavior and psychology.

Conceptually, this integration of play and design indicates a more profound shift in perception about public spaces. Gamification replaces the playground and public space with interactive stories wherein tasks, routes, and cultural signifiers combine to tell a story that is lived out by the activity of the users. This is more than a more interesting space—it is a more meaningful space, one that has the propensity to instill a sense of curiosity, sociality, and belonging.

CHAPTER III. DEVELOPMENT OF AN EXHIBITION SPACE PROJECT BASED ON THE PRINCIPLES OF SPATIAL NARRATIVE THEORY

This chapter delves into how a playground could be developed using gamification theory. The design of a playground has long involved functionality, aesthetic value, and safety. Playgrounds have long been functional because they offer recreation to children. However, they lack depth in terms of how they can emotionally relate to children and impact their behavior. The increased modern tempo and diversification of recreational behavior have rendered more apparent the need to have recreational spaces that are more active rather than passive. The gamification theory design for developing a playground tackles this challenge by focusing on transforming the playground into a more layered system.

The main conceptual paradigm within gamification theory is to incorporate game dynamics, engagement, and feedback loops into a setting outside the context of gaming to increase engagement and long-term active participation. From this perspective, implementing gamification within the design of a playground can change this setting from merely being an equipment-filled space to an experience-based arena focused on completing tasks. Using this gamified experience, consumers, especially children and parents, become less like spectators within this setting and more like game players and adventure seekers. They gain access to such an environment by completing missions, unlocking stages, and finding hidden clues within this gamified experience, which allows them to experience multiple stages of play.

The design pattern for this project is organized according to a gamification plan with multiple stages, which categorizes the experience into three distinct zones: exploration, challenge, and continuation. The exploration zone is responsible for presenting the environment to users and piquing their interest, while the challenge zone has higher engagement due to mission and collaborative play. The continuation zone keeps players engaged long-term via reward and feedback mechanisms to return to and share experiences. This is organized according to psychological theories regarding engagement escalation and is cohesive with ideas about the experience rhythm within spatial design. This

implies that the playground is no longer about presenting a static environment but rather a dynamic one responsive to user engagement.

From a spatial perspective, this project is organized around nodes representing tasks, which represent the main units within the structure of this playground. The nodes represent interactive tasks, physical activity, and/or fragments of stories and are dispersed throughout this environment. The nodes are joined by routes and clues, which form a comprehensive gaming environment to lead to discoveries. The node-driven spatial structure improves playability to allow more opportunities to play by engaging different ages and abilities. Further, this design incorporates elements within the natural environment, folklore, and sense of place within specific regions into this project's content to make this play environment well-rounded and/or comprehensive because it provides entertainment and communicates a comprehensive sense of place that is reflective of this environment's memory.

The development process of this project encompasses three lines of thought: spatial design, behavioral studies, and game design. The design perspective defines spatial rationality via topographical studies and circulation design. The behavioral perspective studies user activity and surveys to detect their interests, behavior, and activity patterns. The design perspective defines player engagement via point reward mechanisms, level progression, and cooperative missions. The addition of digital media technology features like AR recognition, sensor-driven interaction, and visualizations improves immersion due to actions being converted into feedback within the environment.

From a research perspective, building a playground on gamification theory is not only a methodological breakthrough but also a cultural shift within park design. The utilization of playfulness as a platform translates to a reconstruction of relationships between individuals and space, between community and culture. The incorporation of activities, interaction, and storylines within this design constructs

a new type of socialization space — spaces that favor children ’ s inquiry and development while promoting emotional engagement among families and communities. This is because gamification is not only an approach to engagement but a holistic philosophy anchored on behavioral psychology and participatory culture.

The remaining sections within this chapter shall consider the theoretical framework, spatial structure, distribution of nodes, and experience paths within this project. This work seeks to incorporate theoretical understanding with design implementation to prove how gamification ideas can correspond to spatial terms and mechanisms to ultimately form a basis within which this project can be realized.

3.1. CONCEPT

The design and implementation of a project about building a playground using gamification theory involve not only understanding how game mechanisms work, but also understanding how space, behavior, and experience interact with each other. An effective gamified playground is not something that can exist because of one creative insight or one technology idea, but rather is created as a result of systematic thinking and collaborative design work across disciplines. From design to implementation, no detail is too small to affect the continuity, educational impact, and emotional effects of such experience.

Further, it is important to acknowledge that one of the main values of gamified design resides not only within its playfulness, innovation, and fun nature but also—more importantly—within its ability to evolve and enrich. That is to say, each node, each installation, and each narrative within this space should, within itself, function almost like a medium within which personal development may occur — whether within children, within family, within culture. To offer an important lesson to gamified space designers seeking to initiate similar ventures

within their own communities, this next section provides an overview of the crucial gamified design experiences developed during this project.

A gamified environment requires identification of the audience and experiential goals to be achieved within this environment. Different audience members, such as children, teens, parents, and seniors, have unique physiological capabilities and goals. Observations, surveys, and prototype tests need to be performed to understand engagement habits and interests to optimize gamified experiences. In the Entrance Area scenario, gamified activity “Family Registration Mission” requires engaging with a QR code, forming a team, and choosing a theme for personal development (Nature Exploration, Cultural Discovery, and Parent-Child Interaction respectively). Thus, role-immersion is achieved immediately after entry to allow audience members to formulate their goals and engagement strategies. Role immersion can significantly aid in designing activities suited to audience members’ specific psychological and behavioral attributes rather than engaging them in mere entertainment activities.

2. Establish Multidisciplinary Collaboration

The construction of a gamified playground requires teamwork between several disciplines, such as landscape architecture, educational psychology, interaction design, and technology. The early formation of an interdisciplinary team ensures scientific relevance and functionality. Therefore, take, for example, the design of the Sunshine Lawn Area, where “Collaborative Kite Challenge” was devised with contributions from behavioral psychologists, who advised on a collaborative mission to boost parental and children’s communication and trust.

3. Ensure Safety and Accessibility Standards

Safety is paramount to all gamified environments. All nodes involved in tasks and interactive equipment should align with global playground safety regulations (such as those meeting standard EN 1176 or ASTM F1487) and incorporate water-

and slip-resistant materials. Accessibility is also required within this area to include children and seniors with physical handicaps and strollers. For instance, within the Water Park Area, “Water Trail Mission” is specially designed to incorporate low-sloped and anti-slip floors complete with audio and light signals to enable the visually impaired to successfully traverse it.

4. Balance Game Mechanics with Spatial Functionality

The functions and aesthetics of a space should not be affected but rather assisted by game elements. A balance between entertainment and functionality is required to provide comfort and fun to visitors alike. To exemplify, within the Tea Garden Area, there is the “Tea Aroma Quest,” where one is supposed to distinguish between different species and smells of tea prior to taking a break at a shade structure to actually take a tasting. The activity is a combination of knowledge acquisition and break time, turning a social habit into a game activity. The objective of gamification is actually experience extension rather than a competition element. As such, activities should naturally connect to the environment to allow visitors to gain knowledge and enjoy themselves.

5. Emphasize Local Context and Cultural Integration

An effective gamified project should be both culturally and environmentally relevant. The integration of cultural aspects into stories within gamified activities allows visitors to explore and appreciate their cultural identity via play.” For example, within the Entrance Area, there is a “Cultural Discovery Mission,” which requires visitors to search within murals to discover hidden symbols related to regional stories. Similarly, within the Tea Garden, there is a “Tea Craft Heritage Task,” which requires visitors to emulate ancient processes of making tea.”

6. Implement Interaction Feedback and Behavior Tracking

Immediate and meaningful feedback is also crucial to sustaining engagement. This can be achieved by having interactive elements like light sensors, sounds, and digital display screens to show visitors how their actions affect them. Featuring this is the Pet Paradise Area, where “Caring Companion Task” enables visitors to engage with animatronic pets, which they can feed, groom, and engage with mini-games to gain their Care Points. A giant screen shows each team’s Warmth Index, while collective information is projected on the leaderboard outside. Furthermore, integrating feedback mechanisms can provide relevant behavioral information (task completion rate, duration, and return rate) to allow better evaluations to take place at a later phase.

7.Design Multi-Stage Experience Structures

The multi-stage experience design model is what gives gamification its structure. The project is divided into three increasingly elaborate stages: Exploration, Challenge, and Reward. The project starts off with the Exploration Stage in the form of the *Entrance Area* where missions and story background are introduced to the player, while *Water Park and Pet Paradise* represent the Challenge Stage which focuses on teamwork and knowledge acquisition, culminating finally at *Sunshine Lawn* with the *Celebration Ceremony* which is reflective of mastering one’s emotions.

Well-organized circulation is critical to a smooth experience. Paths can direct visitors between zones, weaving a logical narrative. Visual guidance, such as color-coded routes on the ground, can make this more functional. To see this, one can take the route between the Tea Garden and the Sunshine Lawn, which passes through the Path of Growth. This is a colored route that allows visitors to stamp each clue at ten meter intervals, turning walking into a mission.

9.Plan for Maintenance and Sustainable Operation

Plan for Maintenance and Sustainable Operation Gamified spaces may contain interactive devices which require attention and updating on a regular basis.

The design phase should take into account ease of repairability and updating of contents. The Water Park features a “Sensory Spray Mission” which is changed seasonally to keep it fresh, while the quiz about cultures on the Tea Garden and Pet Paradise is changed via a digital management platform. Furthermore, involvement with respect to updating can come from the community and schools themselves, which could take up a role in building a play ecology whereby residents will take part in contributing to missions.

10. Conduct Post-Evaluation and Community Feedback Studies

Conduct Post-Evaluation and Community Feedback Studies Post-occupancy evaluation is necessary to evaluate social, educational, and emotional effects that occur due to this project. To analyze this, there can be surveys, interviews, and behavioral studies to identify how much this playground is capable of generating knowledge out there. Say, there can be surveys about how much this Final Ceremony Mission on Sunshine Lawn affected parent-child relations, how much this Tea Garden Cultural Task affected knowledge about local culture among visitors, and much more. Further, there can be Message Walls to take feedback about this playground.

GENERAL CONCLUSIONS

This study explores how gamification theory can be applied to the design of playgrounds to create spaces that are educational, interactive, and culturally meaningful. Through a comprehensive theoretical framework and a practical design project, the research establishes an integrated methodology for constructing multi-stage, experience-oriented playgrounds that engage users emotionally, cognitively, and socially. The thesis moves from conceptual theory to applied design, demonstrating that gamification is not merely a form of entertainment but a design philosophy capable of transforming space into a medium for learning, storytelling, and social growth.

The first part of the research reviews the current state of playground design and identifies its main limitations. Traditional playgrounds tend to emphasize physical safety, visual appeal, and basic functionality, often neglecting the experiential, educational, and emotional dimensions of play. These designs lack narrative coherence and interactive depth, resulting in fragmented experiences that fail to stimulate long-term engagement. With the rise of the experience economy and participatory design approaches, gamification has emerged as a new design paradigm. By integrating task systems, feedback loops, and motivational structures, gamification transforms public and recreational spaces into dynamic systems of interaction. This theoretical review provides the foundation for the subsequent practical framework developed in the thesis.

The second part of the study focuses on methodology, combining literature analysis, field observation, behavioral studies, and model prototyping. The core of the methodology lies in the concept of behavioral mapping through space—observing how users move, interact, and emotionally respond within an environment, and translating those behavioral patterns into spatial logic. The research employs both quantitative and qualitative approaches: collecting measurable data such as flow density and task completion rates, while also analyzing qualitative experiences like emotional resonance and user feedback. This mixed-method approach establishes a scientific foundation for designing multi-stage gamified experiences that are behaviorally and psychologically grounded.

Subsequent chapters analyze the spatial organization and design characteristics of gamified environments. The findings reveal that successful gamified spaces rely on three key structural components: task nodes, route-based organization, and cultural integration. Through the deliberate placement of task nodes and narrative routes, the playground evolves from a collection of independent zones into a continuous spatial journey. Users progress through a sequence of missions and challenges that gradually unfold a story embedded within the space. Cultural and contextual integration further deepens this narrative,

linking local identity and community memory with the act of play. Thus, users are not passive visitors but active participants who construct meaning through their movement and interaction.

In examining the principles of public space design, the thesis highlights that gamification not only reshapes the physical logic of playgrounds but also redefines their social role. Public spaces, once characterized by passive observation, are reimagined as interactive and participatory environments. Gamification encourages users to engage, collaborate, and learn, transforming public environments into experiential platforms where behavior, education, and emotion intersect. The research identifies spatial storytelling, behavioral guidance, and multisensory interaction as the three essential dimensions for designing meaningful experiences. A well-designed public playground thus becomes not just a leisure facility but a form of social education and cultural communication.

The third major contribution of this research is the development of a practical gamified playground project. The project validates the theoretical framework through real-world application. The playground employs a multi-stage experience structure, dividing the user journey into phases of exploration, challenge, and reward. The Entrance Area introduces the story and objectives; the Water Park, Tea Garden, and Pet Paradise form the main challenge zones where interactive and cooperative missions take place; and the Sunshine Lawn serves as the final celebratory space, representing emotional closure and collective achievement. Each phase not only reflects changes in spatial function but also mirrors a psychological rhythm of curiosity, engagement, and fulfillment. Furthermore, the integration of cultural learning (e.g., tea-making heritage), family bonding (e.g., cooperative tasks), and ecological awareness (e.g., water-flow missions) elevates the project beyond recreation, positioning it as a model of social and cultural education through play.

The study also summarizes ten key design and implementation principles derived from practice:(1) clarifying design goals and user groups;(2) establishing

multidisciplinary collaboration;(3) ensuring safety and accessibility;(4) balancing functionality with playability;(5) integrating local culture;(6) implementing feedback and data tracking systems;(7) designing multi-stage experiential structures;(8) optimizing spatial circulation and visual guidance;(9) planning for sustainable operation and maintenance; and(10) conducting post-evaluation and community engagement.

These principles transform gamification from a theoretical concept into an actionable design methodology, offering a replicable framework for future projects. The emphasis on behavioral analysis, cultural context, and iterative feedback reflects a broader trend toward data-driven and human-centered spatial design.

In summary, this research establishes a coherent design framework that integrates spatial narrative, behavioral motivation, and cultural embedding. Methodologically, it proposes a cyclical process of research–design–testing–optimization, aligning with contemporary experiential design practices. Conceptually, it demonstrates that gamified design enhances not only the quality of spatial experience but also its educational and social value.

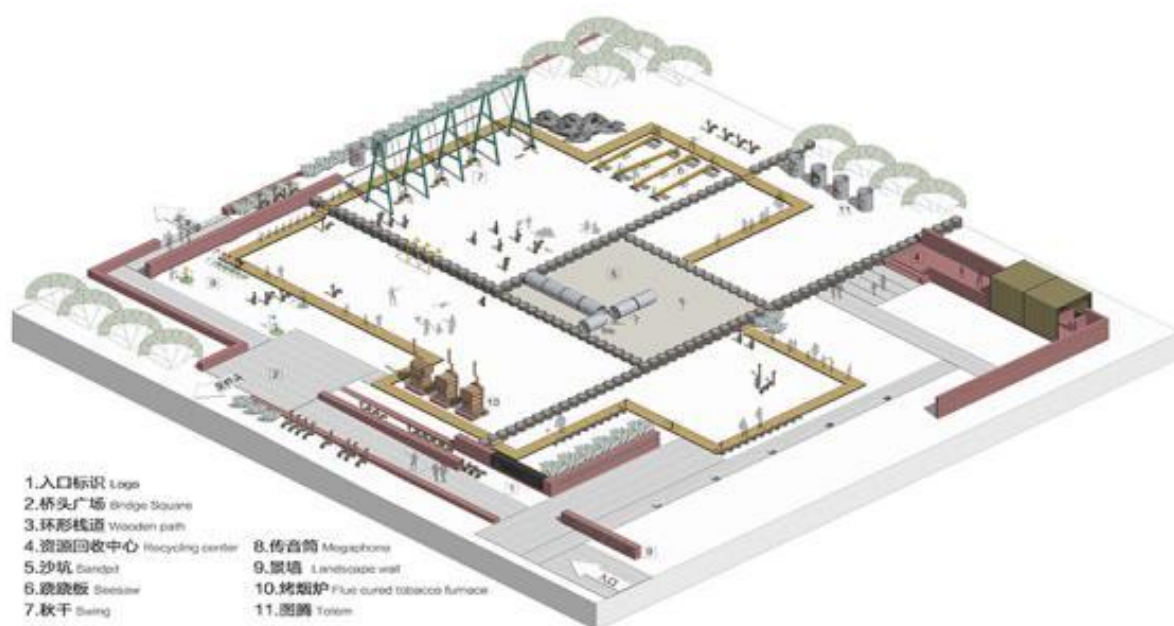
Ultimately, the study concludes that future playground design should further expand the connection between gamification and social development. Play should not be viewed solely as entertainment but as a medium for personal growth, cultural transmission, and community cohesion. By combining interactive storytelling, emotional engagement, and participatory learning, gamified playgrounds can serve as bridges between people, nature, and culture—spaces where joy, creativity, and learning coexist.

In this sense, the gamified playground is more than a place to play; it is a living narrative, a public classroom, and a social catalyst that enables collective growth within the urban environment.

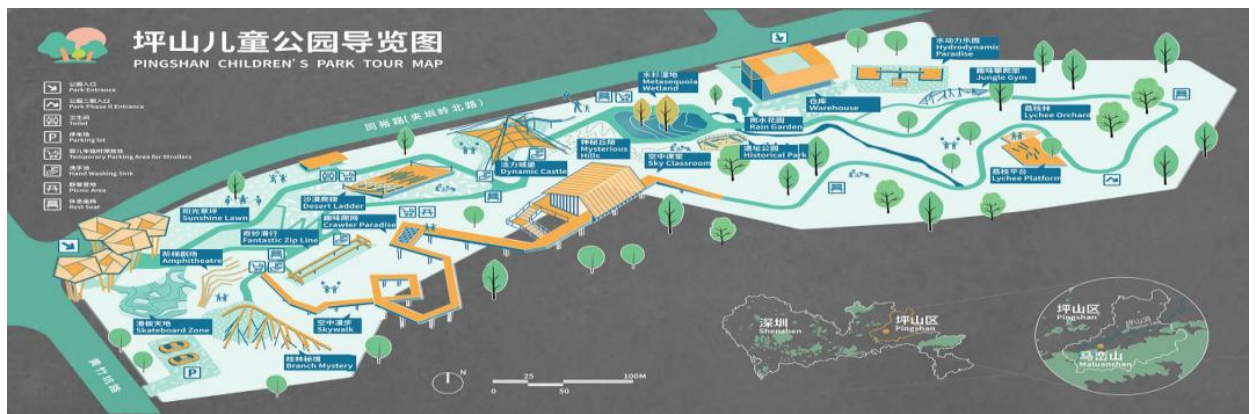
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APPENDIX A



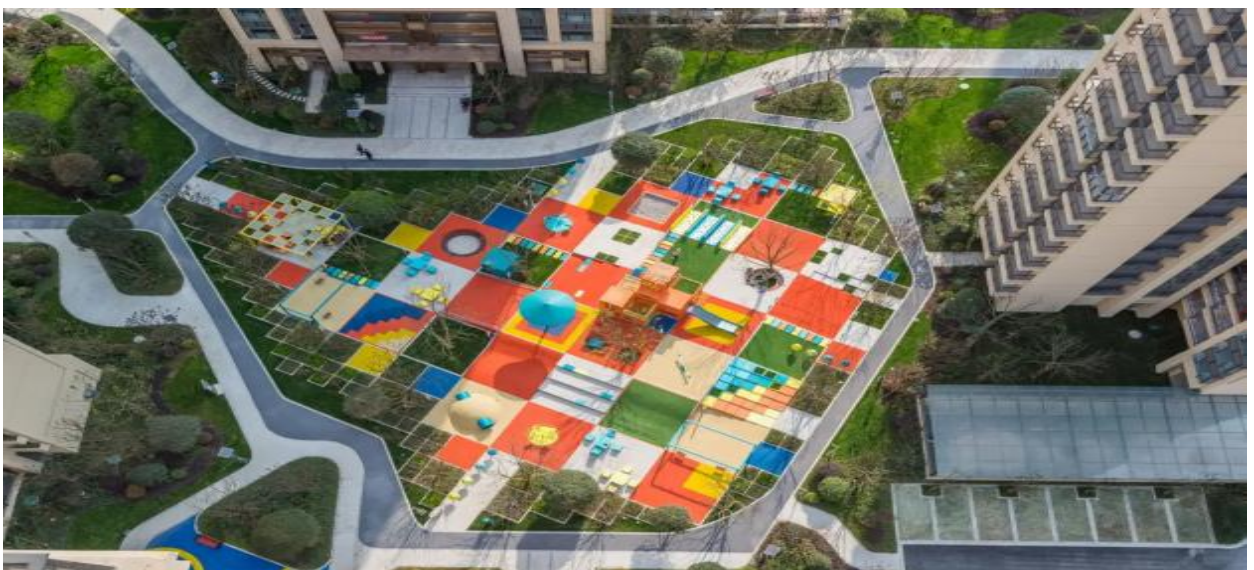
Children's Park Zhongguankun in Tongzi County, Guizhou



Shenzhen Pingshan Children's Park (Great Tree School)



Beijing Longtan Zhonggu Achilles About the nature park

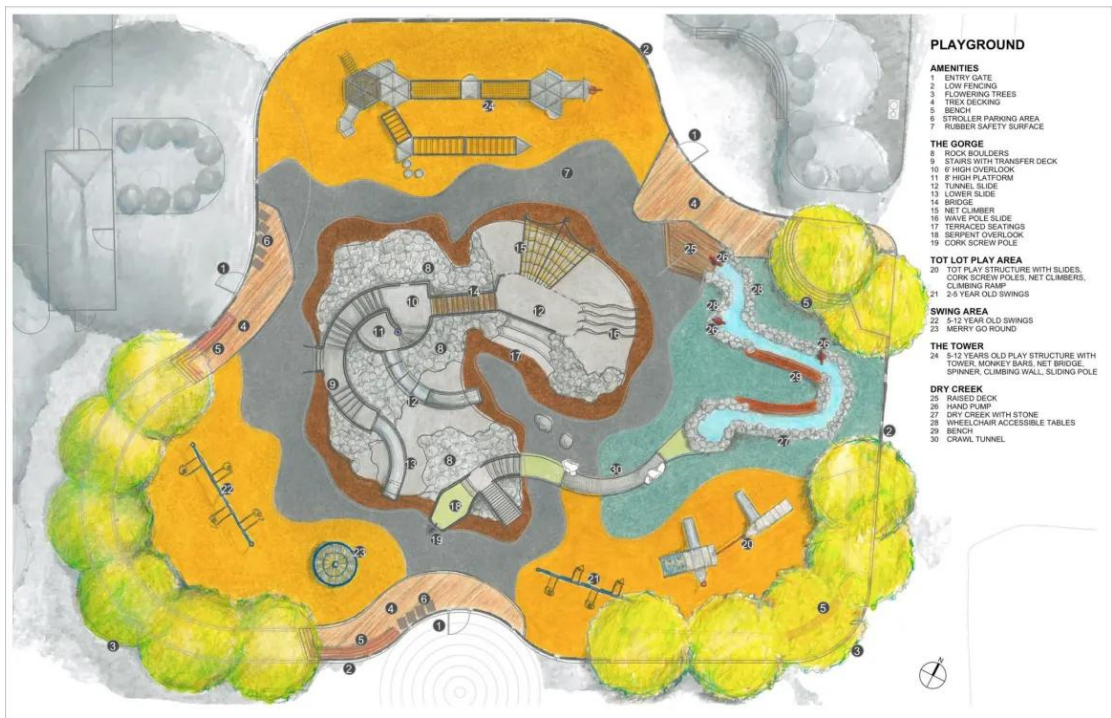


Sichuan Mianyang Pixel Park



Guangdong Zhaoqing Guanglan Coastal Economic Zone





Lafayette Park





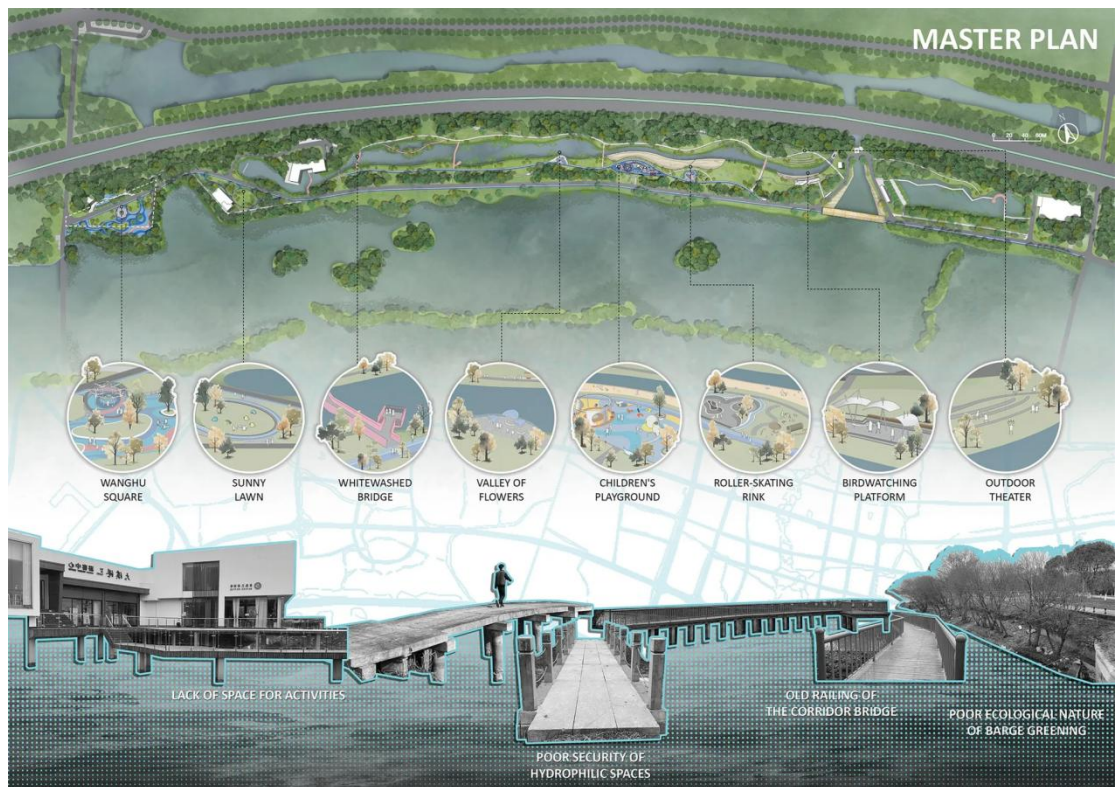
Playscape Children's Development Center, Beijing



The Adventure Park in the Afei Forest, Tianfu New District, Sichuan Province

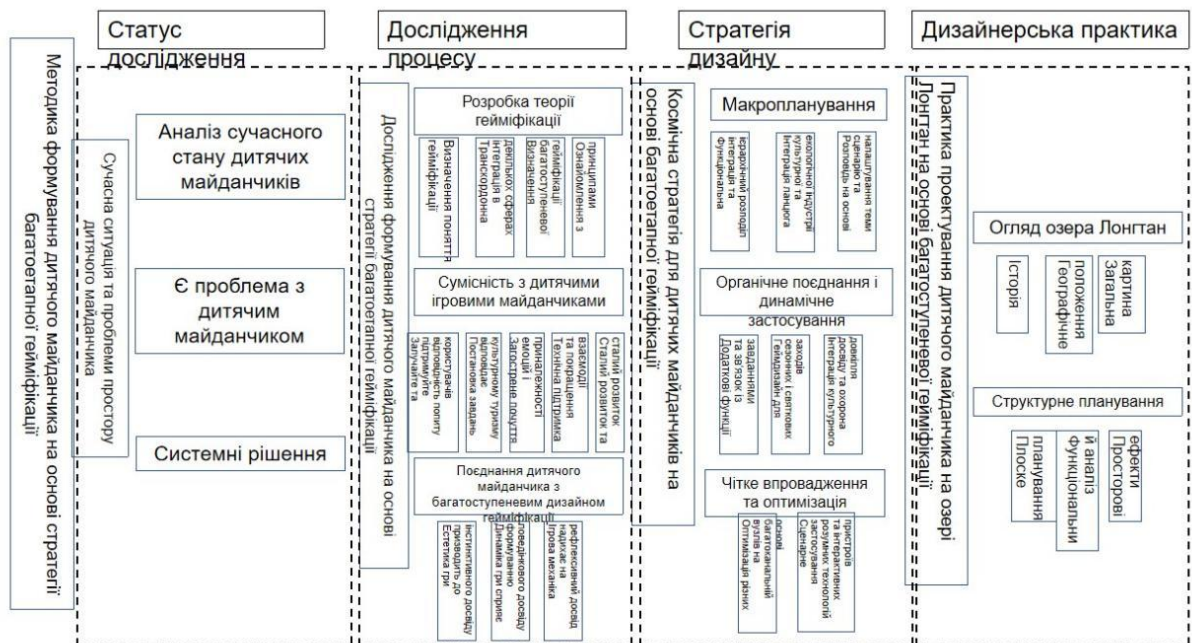


Dongguan Rice Field Children's Park



Daxigang Huwan, a children-friendly wetland park: restoring children's connection with nature / inspiring design

APPENDIX B



CONIFEROUS DECORATIVE PLANTS

	Common name	Latin name	Photo	Height (m)	Diameter (m)
01	Norway Spruce	Picea abies		25 - 50	<1.5
Growth rate: rapid, annual growth of up to 60 cm, sunny, can adapt to semi-shade environment, cold climate, but also adapt to temperate climate, flowering period is spring (March to May), maturity: 20-30 years to mature, drought tolerance: medium, can withstand a certain amount of drought, irrigation requirements: high soil moisture requirements, need to keep the soil moist.					
02	Hemlock	Tsuga		15-20	1.6
Growth rate: medium, annual growth of about 30 cm, like semi-shade or cool environment, like cool humid climate, cold resistance, no significant flowering period, maturity: 15-20 years or so, a certain degree of drought tolerance, but like wet environment, need appropriate water, keep the soil moist.					

03	Scots Pine	<i>Pinus sylvestris</i>		15–45	0.4-0.7
Growth rate: fast growth, an average annual increase of about 30-60 cm, light-loving, suitable for full sunshine, cold-loving, cold-resistant, suitable for cold areas, flowering period: April to May, usually in about 10-20 years began to mature, more drought tolerant, but still need appropriate irrigation, irrigation requirements: soil to keep moist, drought need additional watering.					
04	Scots Pine	<i>Pinus sylvestris</i>		20–40	0.5–1
Fast growth, annual increase of about 30-60 cm, light-loving, suitable for full sunshine, strong adaptability, both can tolerate cold environment, can also grow in warm areas, flowering period: April, maturity: 15-30 years, more drought tolerance, can adapt to dry environment, water requirements are not high, drought tolerance, but the initial planting needs appropriate watering.					
05	Chinese Flowering Crabapple	<i>Malus spectabilis</i>		5-8	0.3-0.8
Medium growth rate, like sufficient sunlight, lack of light will affect flowering and fruit, cold resistance is strong, can winter in the north, but the summer high temperature needs appropriate shade, flowering period: In April-May, the flowers are gorgeous, and it is an important ornamental plant, and the fruit ripens in September-October, and has a certain ability to tolerate drought, but it needs to be watered properly during dry periods to keep the soil moderately moist, especially before and after flowering and during fruit growth.					
06	Japanese Zelkova	<i>Zelkova serrata</i>		<25	1-1.5
The growth rate is relatively slow, like a sunny environment, but also has a certain tolerance of negative, cold resistance, strong adaptability to the climate, flowering: April, October around the fruit mature, has a certain ability to tolerate drought, but in a long-term drought environment will be affected by the growth, keep the soil moist, avoid water.					

07	Tree of Heaven	<i>Ailanthus altissima</i>		15-20	0.5-1
Fast growth rate, love light, strong adaptability, cold, drought, heat resistance, soil requirements are not high, flowering: May to June, September to October fruit mature, drought tolerance, but not water wet, appropriate watering in drought, to avoid water.					
08	English Walnut/ Persian Walnut	<i>Juglans regia</i>		10-20	0.5-1.5
Moderate growth rate, but the juvenile growth is relatively slow, moderate growth rate, but the juvenile growth is relatively slow, cold tolerance is strong, suitable for temperate regions, but the summer high temperature needs appropriate moisture and shade, flowering period: The fruit ripens in April-May, September-October, and has a certain ability to withstand drought, but in the expansion period of the fruit, adequate water is needed, and reasonable watering according to the growth stage and climatic conditions to keep the soil moderately moist.					

APPENDIX C













