ADAPTING THE GAME

Flexible Strategies for an Unpredictable Future

by

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ABSTRACT

The architecture of today severely lacks adaptability in design. Families outgrow their spaces and eventually have to move and change neighbourhoods. Spaces should grow and adapt with their users, instead of users having to adapt to their spaces.

This thesis attempts to further a discussion about the importance of implementing adaptable design strategies in the face of an unpredictable and rapidly changing future. With the use of a board game that changes and grows as it is played, this thesis will focus on the benefits of implementing participatory design, adaptability, and 'room to grow' strategies into residential design. Allowing users the flexibility to change their space to suit their needs creates a deeper connection between the user and their space. A better understanding of flexibility is crucial to designing buildings that can withstand an ever-changing future.

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INTRODUCTION

Adaptable architecture is becoming more important than ever before. The rate at which our world is changing is increasing rapidly. New technologies are being introduced and buildings need to be able to adapt to unpredictable future scenarios and changing user needs. There is also the possibility of environmental factors that are not foreseeable, such as the ongoing global COVID-19 pandemic. To keep up with the times and increase the potential for sustainability, designers must start integrating flexible design strategies at the beginning of the design process.

One of the most important texts this thesis references is the book *Adaptable Architecture: Theory and Practice* by architect Robert Schmidt III and structural engineering professor Simon Austin, two of the leading figures on adaptable design and two of the members of the Adaptable Futures Research Group at Loughborough University. The book provides an in-depth analysis and breakdown of types, layers, and strategies of adaptability. In addition to the relevant texts, precedents were vital to the study and advancement of the thesis. Schmidt and Austin define adaptable architecture as the “capacity of a building to accommodate

Adaptable

Capable of being applied or used in different conditions or contexts; capable of being modified, altered, or amended, esp. so as to be put to a new use or serve a new purpose. Able to adjust to new conditions or situations, or to changes in one's environment.¹

effectively the evolving demands of its users and environment, thus maximising value through life.”²

Every building is adaptable to a certain degree. If a window breaks, it can be replaced without having to tear down the entire building and start over. Some elements are more likely to need replacing than others. This includes elements that get damaged easily or have a shorter lifespan such as fixtures and equipment. Some elements are easier to replace than others, which includes anything that has easy connections or is not fixed and can be replaced without professional help, such as furniture and doors. This thesis defines an adaptable strategy as a design approach that accommodates changing needs and goes above and beyond standard building practices.

With the design of a board game, this thesis aims to further the discourse on adaptability and participatory design in architecture. The game aims to challenge the current conventions on how buildings are designed, constructed, and used. The game also acts as a framework that is open to change from the players and will change with each time it is played. As the game adapts to the players’ imagined futures, it furthers the exploration between games, architecture, and agency.

This thesis will attempt to bring together information about adaptability and participatory design into an easily digestible **board game** manifesto. This board game will attempt to emphasize the importance of adaptability in architecture to further the discourse on its relation to participatory design. The game will primarily focus on adaptability in residential dwellings.

Board game

A game (such as checkers, chess, or backgammon) played by placing or moving pieces on a board.²

Certain architects are indeed focusing on bringing adaptability to their projects, but it is not yet standard practice. Incorporating adaptability into projects sounds good in theory, but it is not yet a priority in today’s landscape. Adaptability is an important design consideration that could be implemented in the design decisions of all buildings. Nowadays, it is typical to

design a building and expect it to keep the same layout, systems, and function as the day it was built. However, the future-proofing of adaptable architecture is crucial to creating sustainable architecture that lasts through changing needs.

Chapter 1 of this thesis covers the study of adaptability and participatory design. A variety of precedents were selected in order to conduct an in-depth analysis on adaptable architecture to get a better grasp of what it entails and how it can be implemented. Chapter 2 includes some background information on games, as well as the ideas behind the conception of the board game and how it relates to the concepts discussed in the thesis. Chapter 3 describes the game itself, the rules, and details the future expansion of the game. The conclusion discusses lessons learned and the future of the game.

Figure 1 was the first diagram created for this thesis, to explain different adaptability types and incorporate them into the idea of the game, as easily movable pieces. The idea that adaptable architecture could be as simple as moving a game piece on a board game has driven the concept for this thesis from the very beginning.

Figure 1 Conceptual Drawing of Adaptable Architecture

1 ADAPTABLE ARCHITECTURE

1.1 The Importance of Adaptability

Changing Needs / Growth

Residential dwellings have become increasingly multifunctional. Aside from typical room requirements for residences (namely bedrooms, bathrooms, kitchens, living spaces, etc.), homes may have additional programs such as office spaces, workout spaces, art studios, and home schools. The typical homeowner/renter is demanding more from their home than ever before. COVID-19 has accelerated this demand, forcing many more people to work from home and compressing much of their lives and time into their homes.³

Spatial requirements change when big life changes occur, such as a partner moving in or a new baby, but requirements can also change daily. A dining room may need to transform into a playroom in the morning and an office at night. Larger changes may also happen over a longer time frame. These changes may be planned or unplanned. A couple may start a family and realize

Figure 2 Conceptual Drawing of Growing and Shrinking Space

they need more space than they initially thought, so they decide to add an extension to the back of their house. An ageing couple may wish to stay in their house but cannot access the second floor anymore. They may decide to convert their second floor into a separate unit so that they can rent out the second floor to fund their retirement. Changes in layout, space or function are not the only things that can change in a building. Technologies and building systems change as well. A global pandemic may happen at a moment's notice and require the mechanical systems to be updated.

Sustainability

Adaptable strategies will at times require higher costs upfront but will extend the lifespan of a building, which reduces its environmental impact. A building designed for a specific function assumes that its function will always be needed when the reality is that it might not. Adaptability is a crucial aspect of sustainability. A quote from a 2003 issue of Architectural Record magazine states: "If a building doesn't support change and reuse, you have only an illusion of sustainability."⁴ A building could be made of sustainable materials, utilize natural light and ventilation, and run off of clean energy, but if it is only used for 5 years and then gets demolished, that produces an enormous amount of waste.

The building industry is short-sighted and highly concerned with the initial cost of construction, while not considering the entire lifecycle of a building and how it can impact cost and the environment. If change is anticipated, elements can be removed easily and placed back or used somewhere else, instead of demolishing partitions and other elements that cannot be reused. Removable walls installed in a project can be easily taken down and used elsewhere, creating virtually zero waste as opposed to standard drywall partitions. This also means that homeowners may be able to make changes themselves, instead of needing to hire professionals. Incorporating adaptability into the pre-construction design of buildings saves time, money, and the environment when changes are needed at a later time.⁵

Unknown Future

Adaptable architecture is architecture that is designed to be adjusted or easily modifiable for an unknown future. New advancements in building technologies are being invented all the time. If these new technologies help the environment and save money, people would be more likely to implement them in their spaces if they can do so easily and cheaply. The future is also filled with unpredictable events. Our present global COVID-19 pandemic—which began in January 2020,⁶ and is still ongoing today—is a challenging proof of that at the worldwide scale. When talking about the pandemic and the effect it has had on cities, CEO of the Canadian Urban Institute Mary Rowe said, “If we’ve learned one thing, it should be that predictions of the future are just too difficult. So that means we need to build in flexibility in our streets, our office towers and our neighbourhoods.”⁷ Some events can be planned, and spatial changes mapped out ahead of these changes, but others like the pandemic can happen unexpectedly. There may come a time when all physical stores and restaurants close down and everything moves online. Another global Pandemic or worse Endemic situation may be in the cards in the near future. If architecture is flexible enough, society can easily adapt to these unforeseen circumstances with less money and time wasted. Some changes can be expected or planned while others are unforeseeable. Even if designers are not designing for a future pandemic in particular, they can still design with enough flexibility that it becomes easy to adapt to unforeseeable future events.

User Satisfaction

Architects and academics Tatjana Schneider and Jeremy Till discuss the limits of the argument for saving money over the total lifespan of a building in their paper *Flexible Housing: opportunities and limits*.

“In the private sector, arguments about whole life costing fall[s] on the deaf ears of the developers and so one has to turn to the argument of user satisfaction, which, as studies in other countries have shown, can be increased by implementing spatial adaptability and flexibility.”⁸

It is perhaps obvious to mention that occupants are happier with their spaces when they can be adapted to their needs. The flexibility provides freedom for the occupants to do whatever they please with their spaces. Such accommodations also allow them to occupy their spaces for a longer period. Many reasons for moving out such as a lack of space or impractical layout could be eliminated with the implementation of adaptable strategies.

1.2 Existing Research

Adaptability has always been an integral part of architecture. The primitive hut, cave, and tent are all single space structures that were used for a variety of activities.⁹ A hut or a tent was made up of structure and skin, was easy to construct or deconstruct when needed and was multifunctional.¹⁰ Traditional Japanese houses use standardized building elements (tatami mats, posts, and beams, etc.) and room sizes. The houses contain no load-bearing walls, only movable partitions and each room is a large open space that can be used for any function.¹¹ Japanese culture “understood buildings to be ephemeral, empowering a mentality to construct buildings that could be changed easily through the use of lightweight materials and ‘non-permanent’ physical connections.”¹² These building methods and culture

allowed for changes to be made easily between the functions of each room, and also the ability to open up multiple rooms to create larger spaces when needed. The modularity of building elements allows for easy repairs or replacements of components and also makes expansion easy.¹³

The Industrial Revolution of the nineteenth century and the modernist movement of the twentieth century drastically changed architecture with new building materials, construction methods, building types, and spatial requirements.¹⁴ The exposed systems and structures of the modernist style along with the invention of steel, large panes of glass, new prefabrication techniques, and modular building components enabled an architecture that separated the structure from the skin and brought about the open floor plan. While many of the methods and technologies used in modernism are well suited for designing adaptable spaces, the modernist movement's "form follows function" approach assumed that each space would be used for a particular purpose and was designed around this function with the intention to perform this function forever.¹⁵ Modernism prescribed a specific ideal way of living, but in reality, people do not all live in the same way, so a single typology does not work for everyone.

"Make your spaces big enough man, that you can walk around them freely, and not just in one predetermined direction! Or are you all that sure of how they will be used? We don't know at all whether people will do with them what we expect them to. Functions are not so clear or so constant; they change faster than the building."
—Mies van der Rohe¹⁶

The concept of loose-fit architecture is to provide ambiguous generously sized space where the user could determine where to put specific rooms or functions. The space provided is more than necessary to allow for more flexibility regarding the layout of programs and spaces. The open plan was first conceived by Le Corbusier (1887-1965) with his drawing for the Maison Dom-ino

in 1914 (Figure 3), which imagined a completely open floor plan with columns supporting the floor plates. The structure and floor plates are independent from each other and offer architects and users ultimate flexibility in the design of the interior spaces.

Flexible Housing: Opportunities and Limits by Schneider and Till is a great source discussing the limitations and critiques of flexibility. They say that flexible housing has been criticized for being a “false neutrality” or “non-committed [...] open-endedness.”¹⁷ This is a valid concern about flexibility, but there is a balance to be found. Schneider and Till say, “If flexibility in housing is to achieve its full potential, it has to mean more than endless change without fixed determinants.”¹⁸ The most successful examples of flexible architecture have been buildings that provide a set number of possibilities, and not just completely open space to be used in whichever ways the occupants can imagine.

Figure 3 Le Corbusier's 1914 Maison Dom-ino

Categories of Adaptability

In the book *Adaptable Architecture: Theory and Practice*, Robert Schmidt III and Simon Austin categorize adaptability into six **adaptability types**. They are:

- Adjustable – change of task/user
- Versatile – change of space
- Refitable – change of performance
- Convertible – change of function/use
- Scalable – change of size
- Movable – change of location¹⁹

Adaptability Type

A classification for a particular change objective that shares a subset of characteristics and tactics under the umbrella of adaptability.³

Figure 4 Schmidt III and Austin's 2016 Adaptation of Venturi and Scott Brown's 'I am a Monument' graphic

Figure 5 Periodic Table of Adaptability

Some of the more common adaptable strategies have been added to the “Periodic Table of Adaptability” (Figure 5). These strategies were collected from *Adaptable Architecture: Theory and Practice* as well as from the precedents in Figure 13. The six types of change are along the bottom, containing multiple different strategies in each category. These six types also relate to the six layers of what is being changed—stuff, space, services, skin, structure, and site.²⁰ (Figure 6). Schmidt III and Austin maintain that the goal of creating and defining different types of adaptability is “to make explicit the nature of adaptability that is desired – to improve on the imprecision in language as stakeholders often struggle to articulate their goals through the design process.”²¹ This classification of adaptability types helps to clarify the thinking around the ways in which architecture can change and which type of strategy works best for a specific goal.

Figure 6 Brand's 1994 *Building Layers Diagram*

1.3 Participatory Design

Participatory design or co-design is the act of designers and the users of a space collaborating on the design of said space. There are different methods of participatory design in architecture. The first is where the architect and the users design and make decisions together from the beginning of the design process. The second is **incremental design**, where the architect purposefully designs an unfinished building and when the construction of the first part is complete, the user comes in and designs and builds the remaining portion of the building. And the third is the **room to grow** strategy, where the architect designs a finished building but leaves some room for expansion. This means that there is a designated area for expansion in case that is something the user or future users wish to do in the future.

This concept is one of the core values of the architecture firm Elemental. Elemental is a Chilean firm founded by Alejandro Aravena in 2001.²² Elemental uses participatory design in conjunction with room to grow and incremental design strategies. They are best known for their innovative social housing projects. The constraint that Elemental deals with in the majority of their projects is an extremely tight budget. The solution that they have come up with is to design and build the structure of a building, and some of the interior spaces, but to also leave parts of the building unfinished.²³ This allows for the community to provide input into what they want, satisfying needs over time, delaying the cost of some of the additions, relying on a standardized housing project, but also allows inhabitants to put their own personality into the design of their space, and the possible future expansions.

Participatory Design

A design process that involves the participation of the general public and/or the users of the building.

Incremental Design

The process of designing a building in increments over time. Slow growth of a building, in its design and construction, usually with different designers for each increment.⁴

Room to Grow

The concept of designing a fully finished building, but leaving a dedicated space for future expansion. Often with structure and/or systems in place to facilitate said expansion.⁵

Schneider and Till discuss the role of the architect in flexible architecture, which they say can either be about “extending the control of the architect, [...] or dissolving it.”²⁴ They quote Dutch architect Herman Hertzberger, who describes the role of the architect as:

“someone who can ‘contribute to creating an environment which offers far more opportunities for the people to make their personal markings and identifications, in such a way that it can be appropriated and annexed by all as a place that truly ‘belongs’ to them.’”²⁵

The participation and personalization by the occupants in their spaces is an essential aspect of the success of architecture. Architect Gerard Maccreanor, when talking about the many changes the Amsterdam canal houses have undergone says, “It is the adaptability of these buildings that creates a vibrant urban structure: ever changing and lively, with different parts of the city developing different characters and generating new forms of urban contact and sociability.”²⁶ The changing landscape of architecture brings life to a city. The architecture is no longer thought of as rigid and unmovable, but as changing with the seasons. “The architect’s work is intended to live on into the distant future. He sets the stage for a long, slow moving performance which must be adaptable enough to accommodate unforeseen improvisations”²⁷ Architect Steen Eiler Rasmussen describes architecture as a stage for a performance, which is a beautiful way to think about architecture. It sets the stage and changes throughout the show to be whatever the actors need it to be.

Robert Schmidt III and Simon Austin describe “unfinished design” as an interaction between humans and architecture, “allowing the user and the building to manifest a relationship.”²⁸ They say, “[T]he user becomes an active element of the architecture and hence the physical components are just one of the elements

Figure 7 Adjustable Diagram

Figure 8 Versatile Diagram

Figure 9 Refitable Diagram

Figure 10 Convertible Diagram

Figure 11 Scalable Diagram

Figure 12 Movable Diagram

that come to life – creating an openness, unpredictability and unfinishedness.”²⁹ They liken this experience to the user ‘teaching’ and the building ‘learning.’ There is something exceptionally fulfilling about occupying a space that you helped create, that is in tune with what you envisioned.

1.4 Precedents

A wide range of precedents both in Canada and abroad from the contemporary and modern period was chosen to do in-depth studies and were categorized in different ways to further understand and help define what adaptability means in architecture and to identify methods that could easily be utilized in architecture practices today and in the near future. These precedents included private homes, hospitals, office spaces, art galleries, and more. They range in scale, typology, and ease of use. I would like to acknowledge that there is an inherent bias regarding which precedents were chosen. Each of the precedents was chosen by me, the author, through researching different methods, systems, or issues that adaptable architecture has attempted to solve in the past. I tried to build a set of precedents that reflected the different methods or techniques that I encountered during my research. The precedents were not chosen based solely on which ones I thought were the most successful. In fact, I found that some of the precedents selected were rather unsuccessful in their attempts to be adaptable. These precedents were selected because they appeared in other texts when researching adaptable architecture, and/or because they demonstrate unique adaptable design methods.

List of Precedents (Figure 13):

- Domestic Transformer by Gary Chang, 2007
- Rietveld Schröder House by Gerrit Rietveld, 1924
- Dee and Charles Wyly Theatre by OMA and REX, 2010
- Drake by Land Ark, 2018
- Centre Pompidou by Renzo Piano and Richard Rogers, 1977
- Institut du Monde Arabe by Architecture-Studio and Ateliers Jean Nouvel, 1981
- 1111 Lincoln Road by Herzog and de Meuron, 2005
- Livinhome by Geraghty Taylor Architects, 2015
- 770 Broadway NY renovation by Frank Gehry, 2014
- Wythe Hotel renovation by Morris Adjmi Architects, 2012
- Bookstore Selexyz Dominicanen by Merckx-Girolid, 2007
- Zeitz Museum of Contemporary Art Africa by Heatherwick Studio, 2017
- O-14 by Reiser and Umemoto, 2010
- Sainsbury Centre for Visual Arts by Foster + Partners, 1978
- NEXT 21 by Yositika UTIDA, Shu-Koh-Sha Architectural and Urban Design Studio, 1993
- Crystal Palace by Joseph Paxton, 1851
- Plug-in City by Archigram, 1964
- Quinta Monroy by Elemental, 2004
- Villa Verde by Elemental, 2010
- CURA Intensive Care Pods by Carlo Ratti + Italo Rota, 2020
- Social Housing for Iquitos Peru by Rafael Arana Parodi, Carlos Suasnabar Martínez, Amed Aguilar Chunga, and Santiago Nieto Valladares, 2018
- The Nest Toolkit by Brooks & Scarpa, 2019
- Beyond the Shell by Lianjie Wu, 2018
- Habitat 67 by Moshe Safdie, 1967
- Freeland by MVRDV, 2012
- Oceanix City by Bjarke Ingels, 2019
- Ark Nova by Arata Isozaki + Anish Kapoor, 2011
- Nakagin Capsule Tower by Kisho Kurokawa, 1972

Figure 13 List of Studied Precedents

Below are a few selected precedents with a more in-depth analysis.

The Rietveld Schröder House

Adaptability Types: Adjustable, Versatile

Adaptable Strategies: Transformable Furniture, Multipurpose Spaces, Divisible/Joinable Rooms, Movable Walls, Structure Separate from Infill

Gerrit Rietveld (1888-1964) designed The Rietveld Schröder House in Utrecht, The Netherlands in 1924 for Truus Schröder-Schräder (1889-1985) after her husband passed away.³⁰ She wanted a smaller house that did not constrain her and her family. The two-story wood and concrete house uses movable planar elements that allow it to transform spatially. The walls on the second-floor slide and swing open to make one big playroom for the children during the day or close off to form three separate bedrooms at night. The windows and shutters of the house pivot open to open up or close off the house to the exterior. Mrs. Schröder lived in the house with her three children and then with Gerrit Rietveld from 1925 until her death in 1985. Architects and professors of architecture Paul Emmons and Matthew Mindrup call the Rietveld Schröder House “a living, changing dwelling.”³¹ The house feels like it is responding to its users’ needs throughout the day, transforming into whatever they need it to be in that moment. The spaces have a variety of set options for how they can be used but do not overwhelm the users with complex variations. It feels as though the people and space are in tune with each other, which is what brings this house to life.

Figure 14 Gerrit Thomas Rietveld's 1924 *Rietveld Schröder House*

Centre Pompidou

Adaptability Types: Adjustable, Versatile, Refitable, Convertible, Scalable

Adaptable Strategies: Multipurpose spaces, Upgradable/ Replaceable Components, Access to Services, Excess Service Capacity, Structure Separate from Infill, Over Dimensioned Structure, Modular

The Centre Pompidou is an art gallery in Paris, France that was designed by Renzo Piano and Richard Rogers and constructed in 1977. The structure, services, corridors, and elevators are all located on the exterior of the 6-storey building, which allows for large column-free open spaces on the interior. The building uses four colours to denote different building elements. Blue is for circulating air, yellow for circulating electricity, green for circulating water and red for circulating people.³² Piano described the building as a “big urban toy,”³³ because the interior can be rearranged into countless possibilities and can be played with as a constantly evolving and changing structure, which is apt to the frequent changes required by a museographic institution. Museums change their art and their layout consistently, as different exhibitions get added or changed. The needs of the artists are a changing variable that is hard to predict, therefore it is in their best interest to design their interiors to be changed. Adaptability was an important criterion that was designed into this museum. Piano and Rogers separated the structure, services, skin, and spaces from each other by exposing them.

Different elements of a building require maintenance or replacing at different points in the building’s lifetime. Separating systems acknowledges that one of the architects’ considerations was providing easy access to them so that they could be easily maintained or replaced if necessary. All of these adaptable strategies mean that Piano and Rogers foresaw the lasting duration of the Centre Pompidou.

Figure 15 Renzo Piano & Richard Rogers’ 1977 Centre Pompidou

Crystal Palace

Adaptability Types: Convertible, Scalable, Movable

Adaptable Strategies: Multipurpose Spaces, Structure Separate from Infill, Over Dimensioned Structure, Kit of Parts, Modular, Dismantlable, Easy Connections, Transportable Components

Gardener Joseph Paxton's steel and glass Crystal Palace is an example of how architecture was shaped by the Industrial Revolution.³⁴ The main goals for the project were to design a temporary building that was economical in materials and labour, able to be constructed and deconstructed quickly, able to expand, and built of fire-resistant materials.³⁵ Initially erected in 1851 in London's Hyde Park for the first world fair, The Crystal Palace was then dismantled in 1852 and rebuilt in Sydenham Hill in 1854 and remained there until it was destroyed by a fire in 1936.³⁶ The construction took seventeen weeks, in large part due to prefabrication techniques and standardized building components.³⁷ The modular grid of the building was defined by the size of the components used and the structural columns left wide open interior spaces that could be used for many different programs. The connections were easy to fasten and undo and were designed for the purpose of dismantling the building so that it could be moved to another location.

Figure 16 Joseph Paxton's 1851 Crystal Palace

Next 21

Adaptability Types: Refitable, Scalable

Adaptable Strategies: Excess Space, Access to Services, Raised Floors, Dropped Ceilings, Upgradable/Replaceable Components, Structure Separate from Infill, Over Dimensioned Structure, Dismantlable

Next 21 is an experimental low-rise 18-unit housing project. It was built in 1993 in Osaka, Japan and was designed by 13 architects.³⁸ Each component of the building was placed into one of four groups (structure, cladding, infill, and plumbing), which all differ in their life expectancies. Each of these components

Figure 17 Yositika UTIDA, Shu-Koh-Sha Architectural and Urban Design Studio's 1994 Next 21

was kept separate from each other, with easy access to allow users to easily replace or upgrade each of them.³⁹ Each unit has raised floors and lowered ceilings to allow areas for these services to pass through. The entire structure of the building is made of poured-in-place concrete, while the cladding materials differ for different units. One unit had to be renovated, and all the work was done with minimal disruptions to the other inhabitants. Furthermore, 90% of the materials that were removed were successfully placed back, minimizing the total waste created.⁴⁰ The lifecycle of the building was well thought out from the conception of the project. All the building components and systems are designed to be easily disassembled and reused or recycled.⁴¹ Next 21 was “designed to meet not just the need and lifestyle of initial occupants but also those of the future adaptively. It is also intended to flexibly accommodate future building technologies as they continue to innovate.”⁴² The building contains house zones, street zones, and public zones. The collaboration that went on between the designers of the structure, the designers of the various units, and the inhabitants is quite unique and successful in this project.

Quinta Monroy

Adaptability Types: Scalable

Adaptable Strategies: Incremental Design, Room to Grow, Modular

Completed in 2004, Quinta Monroy was Elemental’s first social housing project. The architects were given a budget of \$7500 per residence and were asked to design a community of one hundred homes in Iquique, Chile.⁴³ The site was an informal slum with a hundred families living in temporary housing.⁴⁴ The only way Elemental could make their proposal work for the budget and space requirements and get the approval of the community was to build the structure of the building and provide pockets of space where the inhabitants could expand their homes into. The possibility of expansion was an important requirement for the community. Throughout the design process of Quinta Monroy, the architects made sure that each of their design decisions was

Figure 18 Elemental’s 2004 *Quinta Monroy*

approved by the community. This was true for the houses as well as the public spaces. Community participation was important from the very beginning through to the future of the project. The fact that the building was left unfinished meant that the residents could personalize their spaces. The more complex elements were constructed for them (structure, kitchens, and bathrooms) and some of the less complex spaces were left up to the inhabitants to construct themselves, while additional space was left open for future expansion or an additional apartment.⁴⁵ Elemental also provided design counselling, technical support, and supervised construction quality of expansions that occurred right after the end of the project.⁴⁶ Some of the residents did the expansion work themselves while others hired contractors. Either way, since the structure was already provided, the construction cost per square meter was much lower for the expansions than for the original building.

Figure 19 Precedent Table

Analysis of Precedents

A precedent table (Figure 19) was created to analyze and categorize the chosen precedents. The list of precedents is in the left column and the different ways of categorizing them are on the top row. The six adaptability types and the six layers of what is being changed (stuff, space, services, skin, structure, and site) by Schmidt III and Austin were used as a point of departure for the analysis of the precedents, with a column given for each.

Other scales or categories were added to further analyze the buildings. These included: the physical scale of the change (from detail to urban scale), the time scale of how often the change was made (from daily to after 30+ years) and the difficulty of change (on a scale from 1-5, 1 being extremely easy and 5 being extremely difficult).

Certain patterns begin to emerge from this data table (Figure 19). The facet of time in adaptability is an interesting one because the frequency of a change occurring, the difficulty of the change and the scale of the change seem to be related to each other. When the adaptability strategy was small in its change, it was often easier to make the change and it was also a change happening more often on the time scale. As the change grew in scale, it happened less often, was more difficult to make the change. While these patterns did not apply to every project, they were common in the chosen precedents.

The buildings that completely changed function were all the way at the end of the most difficult change because those buildings, at least those in the chosen examples, were not ever intended to change use, so it can be argued that they did not implement any adaptability strategies prior to construction, but instead just made changes after the building had finished serving its intended purpose.

Adaptable Futures Research Group members Alistair Gibb, Simon Austin and Andrew Dainty wrote about the distinction between pre-configuration and re-configuration in adaptable buildings in their paper "Towards Adaptable Buildings: pre-configuration and re-configuration – two case studies."⁴⁷

"The most obvious application of adaptability in the built environment is re-configuration of a building or facility during its life-cycle after construction. This is the re-use part of sustainability's 'three-Rs' (Reduce/Re-use/Recycle). [...] The second aspect of adaptability is pre-configuration, where building systems are used to maximise the variation in first-build end product. Again, the goal is that this would be achieved at no extra cost, rather that the cost would be significantly reduced through the industrialisation of the process, reduction in variation of parts and so forth. This has long been the 'holy grail' for open building systems"⁴⁸

Buildings that undergo re-configuration are on the high end of the ease of change scale because their changes are done as an afterthought. These changes are done to a building after it is no longer useful in its existing configuration. Buildings that undergo pre-configuration are designed prior to construction to be capable of changing in specific ways.

The ease of change is a good method for figuring out how much thought went into the ways buildings anticipate change over time. Typically, when a change is easy to make, it is because it was anticipated and planned for. The typologies found in the 1-2 range were changes that were easier to make, and as a result, typically meant changes that happened more often. The typologies in the 3-4 range were still meant to adapt to different conditions, but they were bigger changes that happened less often. On a scale of 1-5, typically anything found in the range of

Figure 20 Precedent Web Diagram

1-4 was anticipating change, while a 5 meant that a building had had changes done to it but did not have any adaptability design or construction methods that helped facilitate these changes.

Using the scale from 1-5 on ease of change, the next step was categorizing different adaptability methods within this scale. A Precedent Web Diagram (Figure 20) was created; this diagram goes more into detail about how exactly adaptability methods were implemented in the precedent projects and the difficulty of making changes using these methods. Many projects contained multiple adaptability methods, with varying levels of difficulty. Time is an important layer to adaptability that helps us plan for different types of change.

Figure 21 is an attempt at intersecting adaptability and participatory design strategies within the context of the chosen precedents. This matrix plots the precedents on an ease of change scale along the y-axis and a participatory design scale along the x-axis. It is a visual representation of the correlation between adaptability strategies and participatory design within the chosen precedents.

Figure 21 Matrix of Precedents

2 CONCEPTUALIZATION OF THE GAME

2.1 Learning From Games

“[T]he reality is that we are faced with uncertainty throughout our lives—and that much of our effort is devoted to managing and ameliorating that uncertainty. Is it any wonder, then, that we have taken this aspect of our lives, and transformed it culturally, made a series of elaborate constructs that subject us to uncertainty—but in a fictive and nonthreatening way? I am talking about games of course.”⁵⁰

This quote from the book *Uncertainty in Games* by game designer Greg Costikyan is a beautiful comparison about how games take something we avoid in real life—uncertainty—and make it a positive quality. In real life, people try to avoid uncertainty at all costs, but games thrive on uncertainty. Without uncertainty there would be no fun, no reason to play. Why would someone play a game where they already know the outcome before they even begin? What if architecture embraced uncertainty and was

prepared to adapt to inevitable changes? If architects reframed uncertainty as a fun challenge instead of pretending it does not exist, they could come up with architecture that thrives in dynamic, unpredictable circumstances.

Games are not fixed. Every time a game is played, it is different; there are countless possible outcomes. Games are interactive. There is interaction between the players or between each player and the game mechanics. Connections can be drawn between games and architecture, but there is still so much to be learned from games that can be implemented into the field of architecture.

Marc Prensky, a writer and keynote speaker on education, discusses the importance of play in learning in his book *Digital Game-Based Learning*. He calls play the universal teacher and says “play has a deep biological, evolutionary important, function, which has to do specifically with learning.”⁵¹ He advocates for incorporating more games into education because it has been proven to improve learning in children.

This thesis approaches the questions of adaptable architecture through the setting of a game. The game designed for this thesis, “Adaptability 01” can cast different scenarios for the players. Through the strategies of this game, instead of treating architecture as static, strategies can be implemented to make the architecture more flexible. Encouraging interaction to transform spaces to suit the users’ needs creates a deeper connection between the user and their space.

2.2 Scope of the Game

The game is called Adaptability 01, implying that it is the first version of the game in a long line of possible versions to come. The game is **cooperative** and the board, which represents a fictional floor of a condominium building, contains various units that gradually get added to it. The community of people who live on this floor must work together. A community that works together is a happier community. The players are all on one team and are playing against the unpredictable future that the game throws at them. The players take turns building units, placing walls, specifying program, implementing adaptable strategy upgrades, and drawing event cards on each of their turns. The initial game board setup being a floor of a building was chosen for its ability to be arranged in a variety of options. There is a good amount of space, while still being challenging, which adds to the fun of the game. It also was an ideal setup for a cooperative game where the players have to work together to make sure their spaces work together, which fosters a sense of community. There is a quality of unity between neighbours and community, and it can be designed in a way so that there is room to grow. A residential setting was chosen for the game because homes accommodate many different spaces for a multitude of functions. Homes are very personal and the needs of a home change quicker than most other building types. The game is also meant to be inclusive as everyone has experienced being in a residential space. Anyone can contribute to a conversation about how to improve their space, or what aspects they wish they could change in a future iteration of the game.

Some elements are fixed or more difficult to change, some of which you are given from the beginning and must work around. These elements represent the structure or services that are typically built in a space and are more difficult to move.

Cooperative Game

A game where the players work together as a team against the game itself. A collaborative effort to the same end goal. The team either wins or loses together.⁶

Participatory design is incorporated into the game. The first phase is the Building Phase, where the player gets to provide input into how they would like the layout of their space to be. The second phase is the Events Phase, where life events occur and may change the wants of the character and the players must try to adapt their spaces to it. Throughout this phase, some types of events occur more often than others and some changes are easy, while others are more difficult. There is also designated space for communal areas that may be bought by characters who require more space to expand their units, integrating room to grow strategies. One of the main reasons people move out of their residences is a life event that requires more space. Providing spaces where players could expand their units was essential to making sure they could adapt to unexpected events. The element of uncertainty was implemented in the game through the use of decks of cards. These decks of cards will be randomized by shuffling them before each game. There is uncertainty in the initial layout of the unit, in the spatial requirements of the character you will be given, and in the events that will happen to your character and their space after it is built.

The game itself will also be adaptable, as each time it is played the players change the game in some way. This makes it so that every experience of playing the game is unique and slowly changes the game over time. The first version of the game (01) provides the framework for the collective as they can design their spaces and choose what to put where and how they interact with each other. The game itself will become a collective design, where people can add to the game and implement different board designs, characters, events, pieces, or goals that make up a game. It is an ever-changing game that reflects the things that a collective community finds to be important to them or contains events that reflect their reality or their imagined future. This framework allows people to implement aspects of architecture, space, and community that are important to them, transforming and adapting to the people who play it and reflecting a new

reality that is made up of many points of view, many realities, and many people who will leave their mark on it. This collective vision for the future is similar to the idea of participatory design, where architects and users design together to create a more successful, resilient design.

2.3 Goals

The target audience for the board game is people who are not necessarily in the construction or architecture field but would like to learn more about adaptability and changing spaces. One of the methods to making architecture more adaptable is to change the demands of the public. If the general public realizes the benefits of adaptability, they will demand it of their spaces and the market will have to adapt to their demands. The game teaches the community about how spaces interact with each other or how they can be used together. The game is not about the essential norms of the building code as they are applied in architecture practice, it is about learning about the notions of uncertainty and co-design and about changing the culture of architecture.

The point of the game is not to design the formal qualities of a building so that it may be built in real life. The game is intended to bring together a community and get them to think about architecture in a different way. How does architecture change over time? What types of events would change what someone wants and needs out of a building? What can be done to mitigate the impact of these changes? The game asks people to think beyond their use in it, and speaks to the greater life cycles and time frames of a building. The game is also intended to help build a greater sense of community, to help each other out when others need help, to lend a hand when others are struggling. A community can play the game to help them determine what they value out of their space, while each person gives their input so that it can be a better place to live. Occupants can collaborate with their neighbours, but also leave enough flexibility so that future residents can bring their own wants, needs and values to the building and/or game.

In a study about using board games as a tool for learning about environmental issues, the results showed that board games acted as “simplified environmental simulations.”⁵²

“[The] main findings suggest that board games can be highly effective in illustrating and visualizing the connections between a player’s actions and their impact on the game board. [...] They also hold some promise as an answer to the call for more relatable, understandable, concrete and simplified forms of communication about the environment and the social issues.”⁵³

Games are often a simplification of certain aspects of life’s challenges. The power of games is that they are simplified ways to communicate a message and reinforce relationships between concepts. It becomes easier to learn about a topic if you are playing through a simple simulation of the challenges that would be faced in a real-life scenario. The challenges and possible solutions become easier to recognize and understand as you play.

2.4 The Digital Space

Many prototypes for the game were made physically. The ability to quickly make changes, scribble on cards, and physically cut and paste different pieces was beneficial to the creation of the game. The final game ended up being on Figma. Figma is a cloud-based digital design space that allows multiple people to collaborate on a project simultaneously. This space ended up being the perfect host for the game since it allowed the game to be accessible to the widest range of people and allowed for easy playing and modifying from players. A digital game allows players to easily make copies of certain elements of the game, or create new ones, without the barrier of needing to print and cut new cards, 3D print additional elements, or edit and reprint the rulebook.

3 ADAPTABILITY 01

An online version of the game can be viewed here:

[Adaptability 01](#)

3.1 Overview

The game takes place on a single floor of a residential condo building. The players will each receive a character card pertaining to a character that will be part of the community of people on this floor. The game has 3 phases. Phase 1 is the Building Phase. In the Building Phase, the players will each draw a character and design a residential unit that suits their unique needs. The units will then be placed within the floor plate of the building, attaching to the circulation core. Once this is complete, the players will move on to Phase 2, the Events Phase. In the Events Phase, players will take turns drawing event cards and trying to adapt their units to these events. If players can successfully adapt their spaces to these events, they will move the **happiness** meter up. The third phase is the End Game Phase. If the happiness meter reaches 20 points, the game ends and everyone wins together as a community. If the happiness meter reaches 0, everyone loses.

Happiness

Relative to the board game, happiness is the overall well-being and/or feeling of contentment felt by the occupants of the building. Happiness increases when needs are met.⁷

After the game has ended, players can put their mark on the game by adding their own character, event or precedent cards to the game, which can be used in future games.

3.2 How to Play

See below for the rulebook for the game Adaptability 01.

ADAPTABILITY 01

Rulebook

Adaptability 01 is a board game about how residential spaces change based on changing needs and unpredictable futures. It is a game for 2-4 players where each player is designing a residential unit for a specific character. The game is co-operative, so each of the characters must co-exist on a single floor of a residential condo building as a community.

The game consists of 3 phases - the Building Phase, the Events Phase and the End Game Phase. Players must first build their units based on their character's needs. Once they are built, they must be placed within the floor plate of the building, attaching to the core. Moving on to Phase 2, players will draw event cards and must adapt their spaces to the changing needs caused by these events. If players can successfully adapt their spaces to these events, they will move the happiness meter up. The third phase is the End Game Phase, where it is determined whether all the players win or lose as a community, and then make changes to the game to affect future games.

COMPONENTS

- A Game Board
- B Character Cards
- C Precedent Cards
- D Residential Unit
- E Player Area
- F Structural Walls (Brown) & Regular Walls (Grey)
- G Money (\$1 & \$5 coins)
- H Room Program Tokens
- J Communal Spaces
- K Ownership Tiles
- L Character Event Decks
- M Upgrade Cards
- N Shop
- P Happiness Tracker
- Q Building Core

GOAL OF THE GAME

The game is cooperative, so all players either win or lose together as a team! The goal of the game is to reach a certain level of happiness points (listed below depending on number of players).

# Players	Happiness Goal
2 Players	20
3 Players	25
4 Players	30

SETUP

- 1 Shuffle each of the decks on the table.
- 2 Decide who will be player 1, 2, etc.
- 3 Each player must draw a character card and place it in their individual player area. This is the resident you are designing for.
- 4 Take the corresponding character event deck and place it in your player area.
- 5 Draw the top 3 upgrade cards and place them face up on the table in the upgrade shop. If any upgrades are bought, flip the next card so that 3 upgrades are always showing in the shop.
- 6 Take \$10 and place it in your player area.
- 7 Draw 2 precedent cards each. Place brown walls and program markers as shown on the cards in your unit's floor plan. These brown walls are structural and cannot be moved as easily as white walls.

PHASE 1 - BUILDING

Each character has a certain number of actions and money that they will receive at the beginning of their turn. They also have unique space requirements. These are minimum space requirements. If the marker has a square around it, these spaces need to be enclosed in walls. If it does not, the space can be open or enclosed. These space requirements can change. If a card ever changes your space requirements, move the corresponding slider on your character card to keep track of your new requirements.

TURNS

- 8 Starting with Player 1, each player takes a turn in clockwise order. On your turn, take the amount of money listed on your character card and perform up to as many actions as listed on your character card. See below for the possible actions you can do on your turn. Money left over remains in your player space to be used in future turns. Leftover actions are not carried over to future turns.

Once a player has completed all their requirements for the character they have chosen, they can move on to Phase 2 on their next turn.

PHASE 2 – EVENTS

- 9 Your unit is now built! Place your unit on the board so that at least one side of one entrance block is touching the building core. Also place a 4 square communal space on the board, touching either your unit and the central core or touching multiple players units on the board. This contains 4 spaces that may be bought by you or other players that are adjacent to the spaces.
- 10 Raise the Happiness tracker by 1.

TURNS

- 11 Draw an event card from your character deck. If the event card modifies your character card, move the markers on your character card to change your requirements from now on.
- 12 Using your set number of actions, if you can complete it, spend the necessary money and/or actions (See below for possible actions you can do on your turn), make the changes, and increase the happiness meter by the amount listed on the card. If you cannot complete it, keep it in front of you to attempt to complete it on your next turn. If these discarded cards made changes to your character card, undo these changes, and decrease the happiness tracker by the amount listed on the discarded card.

PHASE 3 - END GAME

If you have reached the happiness points goal, everyone wins! If you have reached happiness level 0, everyone loses.

The player who ended the game must take an empty precedent card from the box and draw the walls that surround the indicated square and the program in that square. Add it to the precedent deck for the next players who play the game.

As a team, make a change to the game. You can add a new event card, a new upgrade card. See section “Adapting the game”

ACTIONS

(Any of these actions can be done on your turn)

- Build a (grey) wall (1 action each)
\$2 per wall placed
- Remove a wall (1 action each)
\$2 per grey wall removed
\$4 per brown wall removed
- Place a program (1 action each)
\$2 per program token placed.
- Remove a program (1 action each)
\$1 per program token removed.
- Buy an upgrade (1 action) - Max 1 per turn
Purchase a face-up upgrade and place it in your player area.
- Buy an extra space (1 action)
(This action can only be performed in phase 2)
Pay \$5 to purchase a communal space on the board to add to your unit. Place an ownership tile of your colour on the space.

BUILDING RESTRICTIONS

- Entrance (yellow)
At least one side of one of the entrance blocks must touch an exterior side of your unit.

PRECEDENT CARDS

Precedent cards contain walls and program that you must build the rest of your unit around. At the beginning of phase 1, every player draws 2 precedent cards, and places the listed walls (brown) and program tokens in their unit. If you do not wish to build around these walls and program, you can also spend some of your actions and money to remove them.

CHARACTER CARDS

There are 6 possible character cards you can get. Each card lists the amount of actions you have per turn, the amount of money you receive at the beginning of each of your turns, and the room requirements for your character.

If the circle on the sliding scale does not have a box around it: ●, then you are only required to have that many coloured room program tokens in your unit. All tokens for a given room must be adjacent to each other. If the circle on the sliding scale has a box around it: ■, then these spaces need to be enclosed with walls.

The possible programs are: Entrance, Outdoor Space, Bedrooms, Bathrooms, Kitchen, Living Space. The number shows the number of spaces required for each room type, except for bathrooms and bedrooms. Bathrooms are always 1 square, and bedrooms are always 2 squares, so the number for these rows correspond to the number of bathrooms and the number of bedrooms.

BUILDING YOUR UNIT

Each residential unit contains 12 blank square white spaces. You can either start building your unit by building walls or placing programs (See section on actions for cost and actions required for each of these). Walls must be placed along the light grey grid lines and programs must be placed in the white square spaces.

If you are required to build an Entrance, Outdoor Space, Kitchen or Living Space that is larger than 1 space, all of the program tokens for each need to be adjacent to the rest. For example: You cannot have 1 Kitchen token

It is normal for your unit to have some empty spaces after you have completed placing all the required program tokens in it. These spaces can be used later to add additional program that you might need.

3 ROOMMATES

ACTIONS: 5

WEALTH: \$5

Incorrect

Correct

Entrances must have at least 1 space on the perimeter of the unit so that it can attach to the core.

Hint: While you are each building your respective units, try to plan out where your units will go on the game board. Keep in mind where your entrance will have to be placed for the configuration to work with your neighbours and the communal spaces.

UPGRADE CARDS

Three upgrade cards will always be face up in the shop and available to purchase on your turn. If an upgrade card gets bought, flip over another card to refill the shop. A maximum of 1 upgrade card can be purchased on each turn. Upgrade cards are very helpful ways of upgrading your unit to make changes much easier in the future. They often will save you money or actions in the long run, and will remain in play even if your character changes.

MOVING TO PHASE 2

Once your unit is built, you may move up to Phase 2 on your next turn, even if other players are still in Phase 1. Players can be in different phases.

CONNECTING TO THE CORE

Once the construction on your unit is complete and you have moved on to Phase 2, on your next turn place your residential unit on the floor plate, attaching your entrance adjacent to the yellow core on the game board. Also place a 2x2 communal space tile, which must attach at a minimum to either 2 separate units or to 1 unit and the central core. And increase the happiness meter by 1.

BUYING COMMUNAL SPACE

Each tile of communal space contains 4 spaces that can be individually purchased with the “Buy extra space” action on your turn. After a space has been purchased, that player must place an ownership tile of the same colour as their character, to mark it as their property. You will also need to build walls around this space.

If at any point you no longer need a communal space you have bought, another player can buy it from you for the same price as they would an empty one, but the money spent goes to the player who originally owned the space, and any room program tokens or walls will remain on the space for the new owner to use.

EVENT CARDS

Event cards are drawn in Phase 2. Event cards can affect the program requirements, the number of actions and the amount of money a character begins with every turn. If the event card modifies you character, move the markers on your character card by sliding the program requirements trackers or by typing in your new number of actions or wealth.

If you successfully complete your event card, increase the happiness meter by the amount listed on the card.

If you cannot complete it, keep the card in your player space. You have 1 more turn to attempt to complete it. On your next turn, you must draw a new event card, and attempt to complete your older event card and then your newest one as well. If you cannot complete it by your next turn, discard the event card, revert the program requirements on your character card to what they were before you drew this card, and subtract the happiness meter points by the number listed on the discarded card. (You lose happiness points for not completing an event card)

MOVING OUT!

If you draw the event card “Moving out!”, draw a new resident card and take their event deck. Return all your money back in the bank and take the amount of money this character has listed on their card. If you have any ownership tokens on the board, swap them for the colour of your new character. Do not discard your upgrade cards.

Go back to Phase 1 and make changes to your unit until all your character’s program requirements are met. Once they are, move to Phase 2, rule #10.

ADAPTING THE GAME

Once the game is complete, the players are asked to each make a change to the game. If you have won the game, add event cards that add more difficulty to the game. If you have lost the game, add upgrade cards that make the game a bit easier.

If you would like to add a new event card, think of an event that has altered your needs from a space, or perhaps someone else’s needs. The name of the card is the event taking place, and the description explains which needs will be altered. Decide which character deck(s) this event card should be added to.

If you would like to add an upgrade card, think of adaptability methods that would help you make changes more easily. Examples that make moving walls easier: more structure, easy connections, kit of parts, movable / sliding / extending / dismantlable / inflatable partitions. Examples that make rooms change more easily: multipurpose / oversized spaces, dropped ceilings, raised floors, access to services, non-fixed objects. The

The beauty of the game is that it will change and grow as more people play it, just like adaptable architecture.

Figure 22 Game Board

56

Figure 24 Character Cards

Figure 25 Event Cards

Figure 26 Update Cards

3.3 Collective Changes

Once version 01 was completed, I got a group of people to play through the game from beginning to end. Here is a link to the video recording of how it played out: [Playthrough](#)

Their contribution to the game was the addition of a collective event deck (Figure 27), in which, after each player has made it to the Event Phase, after each round, the players draw a card from the collective event deck. These cards can contain goals that require the players to work together to earn additional happiness points or an event that affects every player. Sometimes the cards tell the players to utilize the communal spaces on the board as community spaces that can benefit each of the residents of the building and increase the overall happiness. This deck is also open to being added to in the future by other players.

The players did a fantastic job of picking up on the themes of the game and how they thought the game could build on these themes and be improved. To them, the aspect of collaboration was not something hindering them or the way they played but was an important factor that was to be celebrated and used as a valuable asset.

Figure 27 Collective Event Cards

CONCLUSION: THE FUTURE OF THE GAME

Many games have “house rules” which are unofficial modifications to rules that the players come up with. In a personal essay about house rules, the author Oliver Kinne says,

“Some of us are purists and feel that you have to play games with the rules they came with, because otherwise you won’t get the experience that the designer intended. Others feel that tweaking a few rules here and there can make a game more fun for you and the people you play with and that designers want us to enjoy their games.”⁵⁵

House rules can make the game more fun, more challenging, or easier depending on what the group of players want from the game.

Many games also have expansions, which are additional rules and/or components for an existing game. They can change the complexity of the game or other aspects of the game, such

as how many players are able to play. 'Legacy' games are board games that have set expansions or permanent changes that occur after each playing of the game, where the game designer has designed and included secret packages that must be opened one at a time after each game. This allows for people to get used to the base game and learn all the rules, and allows them to slowly build up the complexity of the game, and it usually means that the way the game plays each time affects the future games. If the players lose a game, they cannot further the story and must retry that portion of the game and they are given additional cards or items that will help them to achieve their goal next time. And if they win, they are able to continue to move the story forward, but the game also becomes harder for the next time they play. Legacy games change and adapt with the players. This adds a personalization to the game, just as participatory design in architecture does, and creates a stronger connection or feeling of responsibility between the building and the occupants, or between the game and the players.

Adaptability 01 is a game about adapting. That means as the needs change, the spaces adapt, and the game itself adapts to the players and what they want it to be, or think is important for the game. The growth is the point of the game, and one day the game may be unrecognizable. That changing of the game could be more interesting than the game itself. The game has a lifecycle and journey of its own, just like a building would.

By playing the game with other people, I learned that everyone has set expectations for how they think the game will play out. I also learned that most people imbue their personal life experiences, wants, or goals onto the game. For example, even though they are designing for a specific character, they imagine what they would personally want from their space as this person. If they are designing for a single person, they dream about getting married and having kids, and if they are designing for an elderly person, they imagine them with a huge garden that they tend to. Just as it was inexecutable for me to remove myself and my biases

from the game, it is also implausible to expect others to remove themselves from the characters they are playing.

The game was initially intended to interact, engage, and implement adaptable strategies onto a fictional building. This allowed players to test strategies and reveal their potential to adapt when encountered with randomized events and changing needs. While this still applies to the game, it also evolved into a framework as a board game, where the game adapts to the players and the game could improve through the input of multiple people.

In between the overlapping of adaptability, participatory design, and games, there remains a question of agency—the agency of the players, the game designers, the architects, the users, and the community. Who should be making design decisions? The collaboration between players—in the game as well as in the creation of the additions to the game—acts as an analogy for the design and use of buildings. The game has improved since other people have added to it, just as architecture could be improved with more collaboration. It is important for these collaborations to happen both at the beginning of a project, as well as after it is put out into the world. The life of a building is always changing, therefore these collaborations must happen continually. These collaborations happen between different people and between different periods of time. Participatory design and adaptability facilitate this collaboration, giving the power to the collective rather than any one individual. This exploration into the link between games and architecture and between adaptability and collaboration provides a deeper understanding of how people can work together to prepare and adapt to inevitable, unpredictable futures.

GLOSSARY

Adaptable

Capable of being applied or used in different conditions or contexts; capable of being modified, altered, or amended, esp. so as to be put to a new use or serve a new purpose. Able to adjust to new conditions or situations, or to changes in one's environment;

The capacity of a building to accommodate effectively the evolving demands of its users and environment, thus maximising value through life.

Adaptable Strategy

A design approach that accommodates changing needs and goes above and beyond standard building practices.

Adaptability Type

A classification for a particular change objective that shares a subset of characteristics and tactics under the umbrella of adaptability.

Board game

A game (such as checkers, chess, or backgammon) played by placing or moving pieces on a board.

Cooperative Game

A game where the players work together as a team against the game itself. A collaborative effort to the same end goal. The team either wins or loses together.

Game Expansion

Additional rules and/or components for an existing game. They can change the complexity of the game or other aspects of the game, such as how many players are able to play.

Happiness

Relative to the board game, happiness is the overall well-being and/or feeling of contentment felt by the occupants of the building. Happiness increases when needs are met.

House Rules

Unofficial modifications to rules that the players come up with. House rules can make the game more fun, more challenging, or easier depending on what the group of players want from the game.

Incremental Design

The process of designing a building in increments over time. Slow growth of a building, in its design and construction, usually with different designers for each increment.

Legacy Games

Board games that have set expansions or permanent changes that occur after each playing of the game. Legacy games change and adapt with the players.

Participatory Design

A design process that involves the participation of the general public and/or the users of the building.

Room to Grow

The concept of designing a fully finished building, but leaving a dedicated space for future expansion. Often with structure and/or systems in place to facilitate said expansion.

APPENDIX

The adaptation of Thesis Titles

As the scope of the thesis changed, the thesis title adapted and changed as well. Here is a list of all the previous names of this thesis:

Transformable Spaces: Adaptable typologies in architecture

Transforming Space: Adaptable Architecture in a Changing World

Changing the Game: Adaptable Architecture for a Flexible Future

Adapting the Game: Flexible Architecture for an Adaptable Future

Adapting the Game: Flexible Strategies for an Unpredictable Future

Physical Game Prototype

Physical Game Prototype

Physical Game Prototype

Physical Game Prototype

Physical Game Prototype

Adaptability 01 Thumbnail

Game 2-Player Playtest

Game 4-Player Playthrough

Figma Behind the Scenes Components

ENDNOTES

MAIN TEXT

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- 4 This definition is the author's understanding of participatory design after reviewing many precedents, most notably those from the architecture firm Elemental.
- 5 This term and definition was created by the author, as a specific strategy of incremental design that was found in a number of precedents.
- 6 The author's own definition, from her experience playing many cooperative board games, including games such as: Pandemic, Flash Point: Fire Rescue, Magic Maze, Burgle Bros., Mysterium, Hanabi, Sherlock Holmes: Consulting Detective, Mechs vs. Minions, Zombicide, Mansions of Madness, and more.
- 7 This definitions was created for the game Adaptability 01.

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