Creating Fascinating Spaces

The Assignement for Designers of both Virtuality and Reality

Sinem Cukurlu

People playing games are able to immerse themselves in fascinating worlds that both involve them and allow them to make their own decisions. Game spaces invite players to keep revisiting them, to accomplish quests or (self-assigned) tasks, and to communicate and exchange with other players. Games permit interaction with their elements. While working in an architect's office as a student employee, and playing games during my leisure time, I felt like creating virtual worlds was better developed in regard to user interaction; this is why I chose to gain more insight into creating games. I promised myself that if I started working as an architect after my studies, I would create architecture that leaves a lasting impression. And if I were involved in urban planning, I would ensure that real spaces are as inviting and interactive as those of games.

Why Architects and Game Designers are Related

As I started researching the process game designers use to create their virtual worlds, I found several common challenges for the architects of each discipline: both must negotiate the constraints of their clients and contracts; they examine and analyze the correlation of space, as well as rooms and their functionality; and they draw details that are true to scale. Of course, there are important differences in planning real and virtual architecture: costs, rules, and limits exist in both worlds and must be observed. But, in the end, the true challenge for real-life and virtual architects is to create structures and spaces that people or players must enter, in order to

experience them in the way that the architect has conceived. Both kinds of designers work on objects that live from their interactivity. "Good" games as well as architecture involve their users, and ensure that they write their own stories. In both worlds, architecture—the composition of space and positioning of elements within it—has more than just an aesthetic value. People remember how they moved through space and buildings, and how they experienced them. Regardless of whether the space is real or virtual, well-designed architecture in both worlds is narrative, arouses emotion, initiates and leaves an impact on the user—it creates "living" spaces that remain present in one's mind. Architecture is not only the exterior design of a building; it also forms space and leads its users through it. Jesse Schell, game developer and author, says that the primary function of architecture in both worlds is to control people's experiences and to "lead" them: "If all the experiences we wanted to have were to be found easily in nature, there would be no point to architecture. But those experiences aren't always there, so architects design things to help us have the experiences we desire".[1]

This is the reason why architects and game designers are more related than some might think. They need to create structures that invite users to interact, and which lead them to obtain the intended experience. Virtual spaces in 3D games can be seen as real spaces, because—just as in real spaces—virtual spaces are three-dimensional, modifiable, and provide the opportunity to explore them. Thomas Erickson, a social scientist and designer researching how people use technology for collaboration and communication, established that it is important to create spaces and rooms that not only lead the user, but that are used for more than just a single purpose in his studies "From Interface to Interplace: The Spacial Environment as a Medium for Interaction".[2] In order to be successful, or to create architecture that is successful, space must be open to a wide variety of activities. I personally experienced how the architecture of games can ascribe new meaning to space without the space suggesting it. Players

1 | Jesse Schell, *The Art of Game Design: A Book of Lenses* (Burlington MA: Morgan Kaufmann Publishers, 2008), p. 330.

2 | Thomas Erickson, "From interface to interplace: the spatial environment as a medium for interaction," in *Spatial Information Theory A Theoretical Basis for GIS*. COSIT 1993. Lecture Notes in Computer Science, eds. Andrew U. Frank and Irene Campari (Berlin/Heidelberg: Springer, 1993), pp. 391–405.

meet at a specific point in the game, such as on a bridge, to exchange items or leave their character when they are inactive. Differently than its original purpose—bridges are made for crossing—that place is imbued with a new function and meaning, due to the players' behavior. But what further functions can architecture have in games beyond the ones already mentioned?

Function of Architecture in Games

In his essay "Designer's Notebook: The Role of Architecture in Videogames," game design consultant and lecturer Ernest W. Adams structures the function of architecture into primary and secondary functions.[3] He says that, firstly, architecture supports gameplay mechanics; secondly, it informs and entertains the player. For example, architecture in a game like *Mirror's Edge* (2008) determines which paths the player can use. The designer blocks specific paths and directions, or deliberately permits them. Players are subtly guided to look for new routes, while thinking the direction they are going is their own decision. But, in fact, they are being led and restricted: beams, pipes, railings, or crane masts that can be used, change the object's color to red. If they do not turn red, there is no new pathway or progress expected. In first-person shooter games, or "ego shooters," like *PlayerUnknown's Battlegrounds* (2017), architecture is used to take cover from enemies. In *World of Warcraft* (2004) a player seeks shelter from the hostile fraction in allied cities; here, architecture serves to protect players from a "boss's" abilities, and thus belongs to the gameplay. Architecture can also be a challenge and opponent. The player needs to proceed in a logical and skilful way to solve a puzzle and to progress in *The Legend of Zelda* (1986), where players interact with elements of the in-game architecture to gain access to the next room. Furthermore, there are games in which players have to explore the environment and surroundings to find out how the game space is structured, and which pathways

3 | Ernest W. Adams, "Designer's Notebook: The Role of Architecture in Videogames" *Gamasutra* (October 9, 2002), https://www.gamasutra.com/view/feature/131352/designers_notebook_the_role_of_.php (accessed June 17, 2019).

lead to which areas. In this case, it is useful for players to recognize the function of a building from afar, and can use it to orient themselves.

Often, maps are included for this purpose; but if no maps are given, the players must rely on their memories. Therefore, it is important that players are guided, or can orient themselves, with architecture in order to know which area or buildings they have already visited. Architecture requires its own clear color-language and use of forms, if it is to be a recognizable feature or symbol in games. Architecture also serves as a medium that can arouse emotions and create atmospheres by using specific materials, lighting, and space. In the words of architect James Sale: "As architects, our tools are the materials that the building is built of, but also light and space. We can contract and expand those as much as we want [...] It's what we use to give space different feelings. For example, a classic trick is to create a small threshold and then open out into a big space. You contract and then release".[4] That movement—from a small space to an exposed area—is used in many games. In *BioShock* (2007), the large, open world of *Rapture* is only revealed to the player after going through small doors and corridors. Just as in real-world architecture, such as cathedrals, the process of contracting and expanding is one way to give space a sense of narrative and feeling. Adventure games often use open and closed rooms or corridors as types of space. Virtual designers seem to consider the psychology of spaces, because every 3D game is composed of these spatial elements. How the components are dimensioned affects players' emotions or sensibility: narrow and small spaces appear threatening and oppressive, while wide spaces invite the player to explore and to journey through the environment.

Functions of architecture in games show some parallels to architecture in reality. Architecture provides shelter, protection, and orientation; it creates familiarity and atmosphere, and leaves an impression upon us. The tools that are used by real-life and virtual architects are the same: materiality, light, space, perspective, environment, shape, and form.

4 | James Sale, "From Dark Souls to Manifold Garden: How games tell stories through architecture," interview by Thomas McMullen, *Alphyr*, https://www.alphr.com/games/1002937/from-dark-souls-to-manifold-garden-how-games-tell-stories-through-architecture (accessed June 17, 2019).

Designing Game Worlds—Aspects that can be Transferred to Real-life Architecture

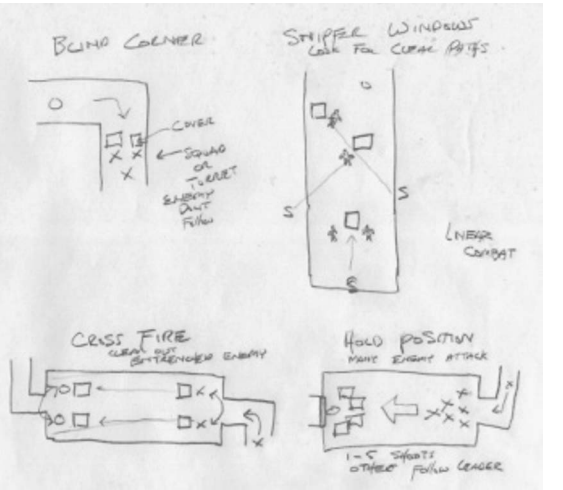
Designing virtual worlds is different than designing real-life architecture, and is obviously not limited by the same restrictions. In reality, architects must observe the constraints of construction, material, physics, safety, and land costs that are not relevant in every game. A virtual designer does not need to consider material thickness or material weight, nor construction detailing or fire safety regulations. Of course, game designers are limited, too: namely, by the costs and limits of the hardware being used. The game engine that renders frames can be very expensive. That engine illustrates a specific number of polygons, which comprise the objects, and this limits the element's precision. The more the hardware needs to "do," the more expensive it gets. Nevertheless, the virtual world does not serve real people inhabiting these constructions, but rather, it serves the playability of the game. But where to begin comparing how to design both worlds, if there are seemingly no limits (or let's say, another kind of limits)?

Designing a game or a level is not a standardized process for a specific person, nor is it the concern of video game developers. Generally, it is a process in which a game space is created that allows for interaction. The process includes not only the placement of objects or enemies, but determines their "behavior" when players interact with them. A virtual designer needs to analyze how players act in and with their surroundings, and—in the best case scenario—ensure that they explore the world and obtain the intended kind of experience. Designing both virtual and real architecture is a technical and artistic process, in pursuit of creating impressive worlds. Before creating an entire game, the gameplay—not the actual structures of the game, but how players should interact with it—is discussed and created. The game's plot, rules, and goal are therefore the main topics of this first step. Game designers and level designers draw diagrams that explain the gameplay.

Such illustrations only show the gameplay; they do not show an actual floor plan, but rather, the players' actions and possible strategies.[5] Accor-

5 | Michael Stuart Licht, "An Architect's Perspective On Level Design Pre-Production," *Gamasutra* (June 3, 2003), https://www.gamasutra.com/view/feature/131257/an_architects_perspective_on_.php (accessed June 17, 2019).

Fig. 94: Michael Stuart Licht, Gameplay diagram from Star Wars: Bounty Hunter, 2002



ding to my experience, this process does not happen when creating real worlds. Of course, architects examine spatial plans and consider the best configuration and dependencies of rooms—but the actual simulation of user behavior almost never occurs. Another point I find lacking in the creation of real worlds is that, in the process of game development, the specific aspects of the entire game and the concept of levels are reviewed at various stages. These aspects include the game's structure, the question of whether or not players are able to find their way, if they understand the purpose of elements, and of course, if elements fulfill their purpose. *Playtesting* helps to not only check a game's playability, but also to discover, fix, and remove errors. Does that happen in architectural offices? I don't believe so—even if it ought to occur. A construction could and should be tested for functionality, circulation, route guidance, and defects within the building's structure at an early phase. Visual and functional aspects can be adjusted through the real feedback of users, instead of relying solely on the experience of architects. When it comes to designing virtual worlds, the point is to create something that does not only delight yourself, but also the users; this is why it is so important to get real feedback at an early stage. One could even imagine that playtesting might be integrated in the building information modeling (BIM) system someday. This way, projects

could be monitored and reviewed at any stage by all participants. This would facilitate communication between them when designing a new construction or renovating an existing building. The architect would not need to create a 2D floor plan, which the users might not be able to read and understand anyway.

The office of Mzo Tarr Architects in London uses "game theory" to involve users, planners, investors, and neighbors into their design process. They define this concept as follows: "Game theory is the mathematical study of decision-making between people in a situation of conflict or cooperation. [...] Any time a decision is going to be made between two or more people [...] you can use game theory to help identify which is the best decision or strategy to make".[6] By using this approach, they discover how and why a single user makes decisions, and then draw conclusions that flow into the building's design and function. Through this process, the user becomes a decision-maker in formulating the architecture without having to rely on floor plans that must be studied in order to be under- stood. After all, it is the users who must be satisfied with the realization of their new home, and feel comfortable in it. But, this London office does not take the process further than this. Game theory should be followed by 3D simulations that users enter, and communicate to the architect what should be changed in the design to fit the way they imagine it. They can discuss whether or not the windows should be bigger, or if the doors should be wider. In buildings such as museums or shopping malls, the way space behaves if only one person is present, or if instead a group of people are in it, could be simulated. After that, conclusions could be drawn about the room's, or even the whole building's, structure—without even being built. Of course, there are norms and conditions that need to be observed in this, but all participants could exchange about them and the actual user (at least in housing) could be a decision-maker.

Another aspect of game development that could be (re)transferred to designing real spaces is the examination of storytelling and "pathfinding." Francine Rotzetter, a former student of the Zurich University of the Arts (ZHdK), points out that guidance systems, or pathfinding systems, in games originate from real-life architecture, which is why they can also be transferred back into reality. Both the architect and the game designer are

6 | Mzo Tarr Architects, "About the studio," https://www.mzotarr.com/about/ (accessed June 17, 2019).

mindful of the user's guidance, and as such, strategically plan the user's or inhabitant's perception from their arrival to their departure. Moreover, in public places, guidance systems must quickly lead many people to a lot of destinations. If a system of guidance is ambiguous or misleading, the system's effectivity suffers.[7] This is the reason why reaching or creating intuitive guidance in architecture, rather than using signs, is worth striving for. Le Corbusier's (1887-1965) concept of the *promenade architecturale* deals with a viewer-oriented path through built space, and is a central element of his architectural and urban planning designs. He realized that linear guidance systems trigger the strongest architectural experience. Using "tree" structures or "foldback" structures, which are used in a lot of games as storytelling techniques, could, for example, impact a promenade, as well as what happens to it and the buildings around it, if a visitor suddenly has more paths to walk along. Thus, the visitor's experience and memory concerning the architecture could be reinforced. Maybe including rewards and achievements could be something to consider, too. A visitor to a museum could receive a reward, such as an impressive view, discover a special shortcut, or earn a souvenir for choosing a path that is not clearly obvious. The visit becomes more and more interesting, and remains present in their mind, because the visitor experienced something unexpected. Not everyone will find that inconspicuous pathway—but may come back later and begin to search for the path that brings a reward. With the help of augmented reality, a visitor could even collect points or see exhibits through a smartphone, experiencing some form of virtual museum.

Architecture in games is very focused on an event and is structured accordingly. As such, virtual designers concentrate on interactivity and the actual use of space and elements. The design of virtual worlds and its elements are deduced from their function or purpose. Although this principle may remind one of the "form follows function" maxim touted by Louis Henry Sullivan (1856-1924)—perhaps the most famous sentence a former student of architecture like me can recall—the aspect of interaction is often inadequately addressed in architecture. Because game spaces need to steadily mesmerize or captivate the player and always be interest-

7 | Francine B. R. Rotzetter, *Game Guidance—Nonverbale Leitsysteme in Open-World-Games*, unpublished Ph.D. dissertation (Zurich: Zurich University of the Arts (ZhdK), 2017), p. 83.

ing, the placement of elements as well as the entire architectural structure is linked to activity. The spaces we come across in games are dynamic: we interact and engage with elements, we can change and reposition things. If architects keep this in mind, we would, for example, have more urban spaces that enable activity, or in which events can take place. In reality, architects may need to create more architecture with which users can interact and change their world. These aspects are not new to architecture, but still they are not considered and implemented in every case.

Why Architects and Game Designers Make for Great Symbiosis

In game spaces, architecture takes an important role; it is often decisive for the atmosphere and gameplay, which is why it needs to be developed and designed in consultation and with regard to its function within the game. Games can be made so realistically that players are able to immerse themselves in the virtual world. When games are designed to refer to real life, our real architecture provides great potential for inspiration. Game designers already consider typologies and psychologies of spaces, as well as building history and culture, and use them as reference material. Games like *Assassin's Creed II* (2009) or *The Witness* (2016) show how great a collaboration between game designers and architects can be.

In *Assassin's Creed II*, Maria Elísa Novarro, who teaches the history and theory of architecture, worked with the company *Ubisoft's* game designer team in Montreal. Her assignment was to verify contemporary clothing and the character's weapons, to correct architectonic mistakes that were possibly made while translating real-life architecture into virtual space, and to elaborate the details of the buildings.[8] The game takes place between 1476 and 1504, and contains elements of the Italian Renaissance. A player meets Niccolò Machiavelli (1469-1527) and Leonardo Da Vinci (1452-1519) while walking through Florence, Venice, and San Gimignano. For the gameplay design—which primarily consists of architecture in

8 | Maria Elísa Novaro, "What It's Like to Be an Architectural Consultant for Assassin's Creed II," interview by Manuel Saga, translated by Matthew Valata (October 7, 2015), https://www.archdaily.com/774210/maria-elisa-navarro-the-architectural-consultant-for-assassins-creed-ii (accessed June 17, 2019).

Assassin's Creed—as well as for character design, the team had to become acquainted with the Italian Renaissance. A player's path not only leads through streets and alleys, but the player also interacts with the environment and climbs up the buildings. Because being very close to the architecture as a player is so important, and because *Ubisoft* emphasizes authenticity in general, the architecture must be executed in accordance with the era.

Fig. 95: The detailed architecture in the concept art from Assassin's Creed II, 2009

The Witness, for which the game developer Jonathan Blow sought advice from architects, is another great example of a successful collaboration: "[Jonathan] wanted an architect who was a praciticing architect, not a video game artist or someone who was in that industry. I think he feels that that is how you actually start to elevate games to a higher level, an art form, by breaking out of certain ways of thinking".[9] This architect, Deanna van Burren, convinced Blow that no building can or could be designed without including the landscape, especially because the game's plot and environment is a desert island, which comprises more landscape than buildings. Eventually, architects, landscape architects, and virtual artists from *Fletcher Studio* and *FOURM* design studio worked together to perfect the game.

9 | Deanna Van Buren, "Behind the scenes of 'The Witness', a video game designed by architects," interview by Nicholas Korody, *Archinect* (August 23, 2016), https://archinect.com/features/article/149964654/behind-the-scenes-of-the-witness-a-video-game-designed-by-architects (accessed June 17, 2019).

At the time the architect joined the game's team, the game was already playable—but only assembled with buildings that fulfilled their purpose, and didn't really look realistic. With the help of the architects, the buildings were integrated to the landscape: textures, details, and the scale of the objects were fixed and placeholders such as buildings, which were only cubic volumes, were finely rendered with regard to their function and structure within the game.

Fig. 96: Placeholders for buildings in a quarry in The Witness, 2016

Fig. 97: *The buildings and quarry after involving architects in the design process*, 2016

In return, architects also need to see and use the creative potential that games provide. They need to experiment with space, form, and dimension within the virtual worlds that offer seemingly unlimited possibilities. With the help of games, architects can even approach and involve broader civil societies in their design process.

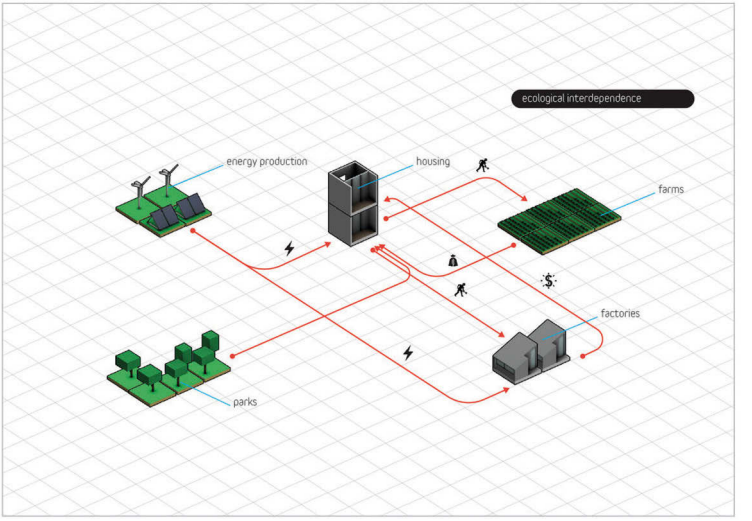
Engaging Civil Society to Create and Understand the Complexity of their Surroundings

Block'hood (2017) is a strategic city-building and management-simulator video game by architect, programmer, and game designer Jose Sanchez. The game conveys its players the essentials of architecture, economy, and ecology, focusing on ideas of interdependence and decay. Players can choose from around two hundred modules to build their own compact city; they must be able to place the bricks side by side, or one below another. They must arrange the modules such that the bricks work together as an ecological system and none of them decays. *Block'hood* is based on the real concepts of ecology and entropy, which is why the modules require both "input" and "output" to survive.

Trees need water, an apartment needs electricity and water, and so on. Just like in reality, these elements have specific requirements to survive; in return, they produce an output. The player has to keep the input and output in balance, and is thus able to understand complex dependencies of elements in a city. Sanchez believes that games like *Block'hood* can serve as new tools to solve the global challenges facing architecture. He sees the potential of games as tools to get experts and society to call attention to complex issues in urban design and architecture, in order to solve them together: "Games are great for understanding systems because they simulate interactions. [...] Being able to see how interactions play out is achieved through simulation".[10]

10 | Jose Sanchez, "Designing the Metaverse: The Role of Architecture in Virtual Environments," interview by Susan S. Szenasy, *Metropolis Magazine* (July 19, 2017), https://www.dezeen.com/2016/03/07/jose-sanchez-block-hood-video-game-tools-solve-global-challenges-architecture/ (accessed June 17, 2019).

Fig. 98: Jose Sanchez, Ecological dependence of elements in Block'hood, 2017



BlockWorks is doing exactly that. For *The Guardian*, a British daily newspaper, they created the "Climate Hope City" in *Minecraft* based on real and sustainable green technologies and prototypes, to show how a city can and should operate. They used vertical farms, kinetic pavements, and green roofs. Players interact with elements, turning them on and off to see their impact on the city. The goal was to visualize the challenges of climate change in an easy and understandable form, and to illustrate that, with technologies that already exist, it is possible to combat climate change and create a real word that can be almost emission-free. Another project by *BlockWorks* is the charity called *Block by Block*. *Minecraft* (2009) is used in workshops to get members of civil society to work on their own environment and city.

The advantage of *Minecraft* is not only that it is played online, but that it contains the potential to exchange and work in real-time. Architect Bjarke Ingels (*1974) says, in a movie filmed for the *Future of Storytelling* summit in 2014, that *Minecraft* brings a more democratic and populistic approach to architecture—and that nowadays, more than one hundred million people populate *Minecraft*, where they can build their own worlds and inhabit them through play. He emphasizes that architecture needs to

do more to allow the public to change and interact, to truly transform their own environments.

Fig. 99: A "Place for Play" in East Jerusalem by 50 resident youth engaged by Block By Block, 2016

Understanding Game Spaces and Games as Tools for Better Architects

Today, games are part of society's everyday life, and they have developed into a cultural artifact independent of age and gender. Virtual spaces as well as real spaces have their specific functions and claims on aesthetics. Game designers already draw on known styles of real architecture; they craft structures based on reality, and they have realized that architectural skills are valuable to their industry. Architects and city planners are taking more and more notice of games as a medium with which to communicate. Of course, games are not a replacement for the architect's CAD tools—but these tools are not made for their clients. Games can allow the architect to approach more people, because games are quite easy to understand and even entertain people. Beyond this, games can be used as more than a tool to involve society or all participants in planning. Structures and storytelling techniques in games are strong qualities that architects also need to take note of. Through digital games, we can expose people to challenges of architecture while improving the visual literacy of the pop-

ulation. Presently, many members of our global society are spending time in well-designed digital environments. If we harness the power of games, we can reverse-engineer the effect of starting to expect more from our real environments.