The Architectonics of Game Spaces

Or, why you should Play and Design Video Games
to become a better Architect

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REYNER BANHAM PLAYS GTA 5

Architectural historian Reyner Banham (1922-1988) famously began his book *Los Angeles. The Architecture of the Four Ecologies* (1971) with the following comparison: "So, like earlier generations of English intellectuals who taught themselves Italian in order to read Dante in the original, I learned to drive in order to read Los Angeles in the original".[1] Banham argued that, in order to understand the Los Angeles of the 1970s, one had to abandon the classical canons of architectural history and drive a car along the highways and landscapes of the city, considering the cinematic speed of the car and a specific gaze through the windshield.[2]

After publishing his book, Reyner Banham appeared in a whimsical BBC documentary on Los Angeles, entitled *Reyner Banham Loves Los Angeles*, in which he drove around in a car and talked to people: "Los Angeles needs some explaining," he says in the movie. Once again, a change in medium—from archive to car, and now from book to TV—was necessary to cope with the complexity of this post-urban phenomena par excellence. Los Angeles, the city of the future, could no longer be approached by the traditional means of walking around, or studying sources and plans in

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1 | Reyner Banham, *Los Angeles. The Architecture of Four Ecologies* (London: Allen Lane – Penguin Press, 1971), p. 23.

2 | English novelist James Graham Ballard (1930-2009) also shared this fascination with cars.

dusty archives; it called for a shift in perspective. Consequently, this implied a different understanding of architecture, shifting from singular objects to "ecologies," comprising infrastructure and landscapes.

Los Angeles remains a social and cultural paradigm of our time. As such, I would argue that, in order to understand Los Angeles in 2019, we must get out of the car—and get into a *virtual* car in a video game! We have to shift our attention from Los Angeles to *Los Santos*, L.A.'s game copy in *Grand Theft Auto 5* (2013). Thus, we require not only a change of medium and "reality," but a change in approach, turning from driving and describing to playing. As we emphasize in this book, this holds true for all of the activities one can execute in a video game, from driving a car to running through the manifold spatial landscapes one can act upon. How fun it could have been, to see Banham play *GTA 5* and comment on his playing on his own YouTube channel!

Banham thus expanded the definition of architecture to ecology and shifted the medium of his narrative. He was not the only one to approach post-urban conditions differently at this time: Robert Venturi (1925-2018), Denise Scott Brown (*1931), and Steven Izenour (1940-2001) also brilliantly exposed this lesson one year later, in their book *Learning from Las Vegas* (1972), which was the product of a research project with their students at Yale University in 1968. In this book, they pleaded for an investigation of Las Vegas by car—a place thoroughly ignored by the official architectural discourse of the time. They outfitted a car with a camera to record and understand the sign-landscape of Las Vegas—especially at night. Today, we could adjust this kind of investigation by utilizing in-game photography, which is also available in *GTA 5* (Philipp Schaerer discusses this possibility his interview in this book).

But Venturi, Scott Brown, Izenour and Venturi's former partner, John Rauch, extended their vision even further: in an exhibition held in 1976 at the Renwick Gallery of the National Collection of Fine Arts, the Smithsonian Institution, they depicted all of the invisible signs that define everyday architecture, by giving the buildings speech bubbles. Through this, what is commonly ignored or seldom-noticed information suddenly becomes visible. Moving beyond recording and interpreting, they revealed what is normally invisible.

Perhaps it is not so surprising that the subsequent work of Robert Venturi and Denise Scott Brown was focused on an architecture of façade, understood as system of signs; they inverted the modernist method of

designing a building inside-out by designing outside-in. Unsurprisingly, Venturi has often denied the spatial nature of architecture and underscored how this and the urban landscape are composed of signs, and not of forms. Their dematerialized and iconic architecture serves as an important reference for understanding architecture through the medium of the video game, and how this, in turn, can influence "real" architecture.

To delve deeper into this kind of understanding, in the following sections, a philosopher—Immanuel Kant (1724-1804)—a landscape architect—Humphry Repton (1752-1818)—and an architect—Le Corbusier (1887-1965)—play games. Through their ludic activity, we will try to learn something about the relationship between video games and architecture. We will use Kant to reflect on their mediation more generally; then Repton to propose landscape architecture rather than architecture as a reference for game spaces; and Le Corbusier, in order to hint at the many lessons architects can learn from playing video games.

IMMANUEL KANT PLAYS DOOM

Referring to Kant and his concept of *Architektonik* (architectonics)[3] might initially appear far fetched and even presumptuous, yet for many philosophers before and after him—Arthur Schopenhauer (1788-1860) and Friedrich Nietzsche (1844-1900), in particular—architecture was one of the chosen metaphors for describing the "building" of philosophy. What makes the notion of architectonics so suitable for our purposes is the fact that Kant uses it to explain the relationship between philosophy and architecture, in which the latter is not only a metaphorical double, but a *system* going far beyond any formal or simple comparison. Thus we are not talking about a simple *image* of architecture translated to video games, but about the possible *natures* of architecture. This allows us to discuss how "architecture" is translated into games and video games, and what its relationship is to its virtual counterpart. At the same time, we must acknowledge that, even today, we do not yet have a convincing or shared

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3 | Kant was not the only one to use this concept. For example, Johann Heinrich Lambert (1728-1777) published *Anlage zur Architektonik oder Theorie des Einfachen und Ersten in der philosophischen und mathematischen Erkenntnis* in 1771, only one of his many other works.

definition of what architecture is, which makes it even harder to discuss in the context of video games.

Kant, in his attempt to bridge between empiricism and reason, often returns to the metaphor of architecture as a construction of reason, which must be built upon solid ground and a solid foundation.[4] But he goes further, explaining how one of the main problems with his critique of pure reason in terms of architecture is that it is built through aggregation; the plan, the idea behind this aggregation, can only be intelligible once the building has been completed: "It is, however, a customary fate of human reason in speculation to finish its edifice as early as possible and only then to investigate whether the ground has been adequately prepared for it".[5] The term "architectonics," or "the art of systems," thus encompassed the impossibility of the *a priori* innate to this kind of endeavor.[6] The same reasoning can be found at the beginning of Kant's *The Critique of Judgment* (1790), when he describes the relationship of philosophy to a critique of pure reason as one in which the latter is not part of the former, but is necessary to design and test—"*entwirft und prüfet*"—the former.[7]

Kant's position is one of distance, at the forefront of similar attempts throughout human history, particularly in metaphysics. In this, a second metaphor appears; one which is particularly apt in discussing architecture in these terms: the ruin. On one hand, existing knowledge is described in terms of "scattered ruins," with which the impossible *a priori* building could be constructed.[8] On the other hand—and this seems even more

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4 | "Now it might seem natural that as soon as one has abandoned the terrain of experience one would not immediately erect an edifice with cognitions that one possess without knowing whence, and on the credit of principles whose origin one does not know, without having first assured oneself of its foundation through careful investigations, thus that one would all the more have long since raised the question how the understanding could come to all these cognitions a priori and what domain, validity, and value they might have." Immanuel Kant, *Critique of pure reason* [1781], translated and edited by Paul Guyer and Allen W. Wood (Cambridge: Cambridge University Press, 1998), p. 139.

5 | Ibid., p. 140.

6 | Ibid., p. 691.

7 | Kant, Immanuel, *The Critique of Judgment* [1790] Translated with Analytical Indexes by James Creed Meredith (Oxford: Clarendon Press, 1989), p. 9.

8 | Kant 1998, pp. 692–3.

pertinent for our discussion—at the end of *Critique*, he dares to gaze upon his own theory-building, and all he can see are ruins: "The title stands here only to designate a place that is left open in the system and must be filled in the future. I will content myself with casting a cursory glance from a merely transcendental point of view, namely that of the nature of pure reason, on the whole of its labors, hitherto, which presents to my view edifices, to be sure, but only in ruins".[9]

If we thus utilize Kant's architectonics to discuss what architecture is, it is because we hope to clearly diverge from an understanding of architecture as something built, solid, concrete, and understandable. On a basic level, this can be interpreted as a reference to the weightlessness of architecture in video games: it can never have a solid foundation, as it has no corporeality. But architectonics is more than that: it is a condition of instability, and a metaphor for the attempt to counteract this instability and the impossibility of the *a priori* plan. Only through making—*der Entwurf* — do architects truly understand their plans. Architecture is always doomed to ruins. The architectonics of Kant therefore mean an understanding of architecture as something impossible and unstable. If we wish to imagine Kant playing *Doom* (1993) or *Quake* (1996)—admittedly suspending more disbelief than imagining Banham playing *GTA 5*—it is because of the gaming logic of constantly moving forward, without a clear plan, of constantly being frustrated in the attempt to gain ground, of fighting against continuously appearing monsters and being in a space which is both open and closed, and therefore ambiguous.

The constant need to destroy without the possibility to construct is a rather fitting spatial metaphor for Kant's concept of architectonics. Video games—and games in general—quite literally celebrate ruin and destruction. Even if this might be an all-too-simple transposition from architecture in "reality" to architecture in video games, beyond the simple lust and pleasure in destroying things—which, as Werner Oechslin points out in his interview in this book, always has a serious and problematic equivalent in reality—this opens architecture up to a dimension, which is normally neglected in the everyday practices of the discipline.[10]

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9 | Ibid., p. 702.

10 | Andri Gerber and Philippe Koch, "Architektur muss als Ruine gedacht werden (um politisch zu sein)," *Archithese* Vol. 4, (2017), pp. 8–16.

Part of the difficulty of describing architecture—that which makes it architectonics—is based on its "ungraspable" spatial nature.[11] In many instances, the spatial dimension has been recognized as a key component of video games[12]; this is, obviously, a significant link to architecture when understood as the "thoughtful making of spaces".[13] At the same time, there is probably nothing more highly debated than the nature of space in architecture: the epistemological, cognitive, or phenomenological perspective, among many others.[14] What can be said is that the experience of space relies on all of our senses, and is tightly bound to our bodily presence. Research into the notion of "embodiment" and our relationship to virtual avatars are fundamental in this regard[15]; this concept has been widely discussed in the context of video games.[16] We can agree that the experience of architectural and urban space requires rest and a slow pace—you quietly walk into the Pantheon and then rest in the middle, or you walk along the boulevards of Paris and let your gaze wander—and with rare exception, these are qualities many games do not offer, when they are e.g. founded on speed and action.

What works against the sense of architectural space is not only the speed of the game, but also its extended scale. Even in the space of *Mario Bros.*, which seems to be contained by the size of the screen, we are always moving forward anticipating what comes next, and the game's narration is subordinate to movement. In this sense, in games, the dimension of time

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11 | Andri Gerber, *Metageschichte der Architektur. Ein Lehrbuch für angehende Architekten und Architekturhistoriker* (Bielefeld: transcript, 2014).

12 | Espen Aarseth, *Cybertext: Perspectives on Egodic Literature* (Baltimore MA: Johns Hopkins University Press, 2007), p. 44.

13 | Louis Kahn, "Space and the inspirations," [1967] in *Louis Kahn, Essential Texts*, ed. Robert Twombly (New York: W.W. Norton, & Company Inc., 2003), pp. 220–227.

14 | See Jörg Dünne and Stephan Günzel, *Raumtheorie: Grundlagentexte aus Philosophie und Kulturwissenschaften* (Frankfurt am Main: Suhrkamp, 2015).

15 | Isabella Pasqualini, "The Architectonic Avatar – Multisensory Aspects of Architecture," in *Proportions and Cognition in Architecture and Urban Design* [2017], ed. Andri Gerber, Tibor Joanelly, and Oya Atalay Franck (Berlin: Reimer Verlag, 2019), pp. 95–108.

16 | See for example: Gordon Calleja, *In-game: from immersion to incorporation* (Cambridge: MIT Press, 2011).

seems to dominate the spatial dimension. Space here is never as strong as time, unlike in architecture, where time is subordinate to space.

An equivalent to the spaces of DOOM or Quake would more likely be a garden than a building. Even better would be a hybrid of the two, such as the Villa Giulia in Rome, created for Pope Julius III (1487-1555) by several architects, primarily Jacopo Barozzi da Vignola (1507-1573). Here, architecture is in the service of experiencing the garden. In this villa, there are three gardens, all of which are on different levels, and they culminate on the lowest level in the Nymphaeum; the garden was also always considered a threshold to other "faunal" worlds. When moving through the garden of the *Villa Giulia*, one constantly questions the nature of architecture and its relationship to the gardens, and that's why, one has no specific goal but movement itself.

Translated back into game spaces, these ideas are *architectonic* rather than *architectural*; its spaces are clearly connected to the order of landscape gardens, rather than to the order of buildings.

Humphrey Repton Plays Zelda

In Diane Morgan's book on Kant, she describes one of the most appropriate novels on the topic of the landscape garden: the *Elective Affinities* (1809), by Johann Wolfgang von Goethe (1794-1832). In doing so, she utilizes a game metaphor: "In the novels, the owners of the estate, Charlotte and Eduard, are like players of a *Space Invaders* computer game. They hopelessly attempt to parry dangers that come from all directions".[17] There is no higher reference for landscape gardens than that of the English landscape garden. Born out of an anti-urban sentiment, it became the foil of the French garden—a metaphor of absolute power—and came to represent the more democratic English form of government embodied by the *Glorious Revolution* (1688) and the *Bill of Rights* (1689). At the same time, it was as "undemocratic" as the French garden, as it provided a well-guarded and closed enclave for the wealthy, even though it simulated openness. The invention of the *ha-ha wall* illustrates this point particularly well: the terrain in a garden would slope downwards toward a recessed wall, such

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17 | Diane Morgan, *Kant Trouble. The Obscurities of the Enlightened* (London/ New York: Routledge, 2000), p. 22.

that the wall itself did not obscure the line of sight within the landscape. This provided the illusion of openness, while at the same time securing the garden.

One of the main sources of inspiration in laying out gardens came from landscape painting; many garden pioneers, such as William Kent (1685-1748) or William Gilpin (1724-1804), were painters. Probably the most influential artist was French painter Claude Lorrain (1600-1682), who was famous for his picturesque aesthetics. The "Claude glass," or an oval, convex, and darkly-tinted hand-held mirror, was named after him because it reflected an image as an abstracted, idealized landscape. As if reality would not suffice!

Several theories of the sublime and the picturesque were developed through the experience of gardens, yet none subscribed to a unified discourse. On the contrary, this lead to many discussions and quarrels about the true nature of the sublime and the picturesque, particularly in regard to its relationship with beauty.

The English landscape garden emphasized wandering through an organic landscape, without symmetric order, in which the gaze was oriented toward points of view, such as temples or fake ruins. These garden sometimes even contained an "ornamental garden hermit," or a man paid to play this role. The garden represented an enacted fiction, a game to play for the bourgeoisie. Furthermore, its dimension and natural character should evoke the sublime, while the crumbling of fake monuments should make the beholder tremble. As absurd as it may sound, the English landscape garden was often much more expensive in its construction than the French formal garden, as it often implied major groundwork and even the creation of artificial lakes. In one of the main treatises on the picturesque, by William Gilpin, he describes how one should treat a Palladian Villa in order to make it more picturesque:

A piece of Palladian architecture may be elegant in the last degree. The proportion of its parts, the propriety of its ornaments, and the symmetry of the whole may be highly pleasing. But if we introduce it in a picture, it immediately becomes a formal object and ceases to please. Should we wish to give it picturesque beauty, we must use the mallet, instead of the chisel: we must beat down one half of it, deface the

other, and throw the mutilated members around in heaps. In short from a smooth building we must turn it into a rough ruin.[18]

*Fig. 67: Unknown artist, Claude glass, 1775-1780*
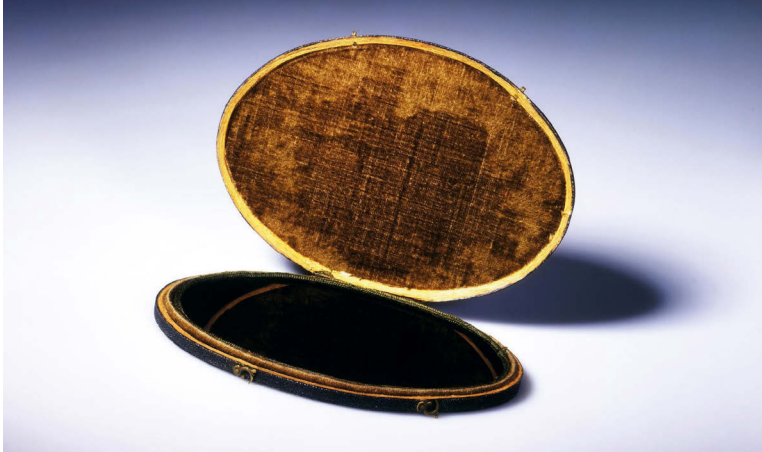
One of the main champions of the English landscape garden was Humphrey Repton (1752-1818), who came to the profession after having failed in many other endeavors. It was Repton who introduced the term "landscape gardening" to describe his work.[19] One of his peculiarities was his "red books," in which he would create delightful images of a site before and after his planned intervention, allowing his client to see the advantages and changes his project would engender. In these books, the alternative scenery was evoked either by slipping a languet on the side or by setting aside a page with the existing situation. What made Repton's work so appealing was his thorough understanding of situating build-

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18 | William Gilpin, *Three Essays on the Picturesque* (London: R. Blamire, 1792), p. 7.

19 | Humphrey Repton, *The Art of Landscape Gardening. Including his Sketches and Hints on Landscape Gardening and Theory and Practice of Landscape Gardening* [1794], ed. John Nolen (Boston/New York: Houghton Mifflin Company, 1907), p. 3.

ings, shaping the terrain, and his use of vegetation, which he discussed in several publications and represented in a series of well-known diagrams.[20]

Fig. 68: Humphrey Repton, Diagram, 1794
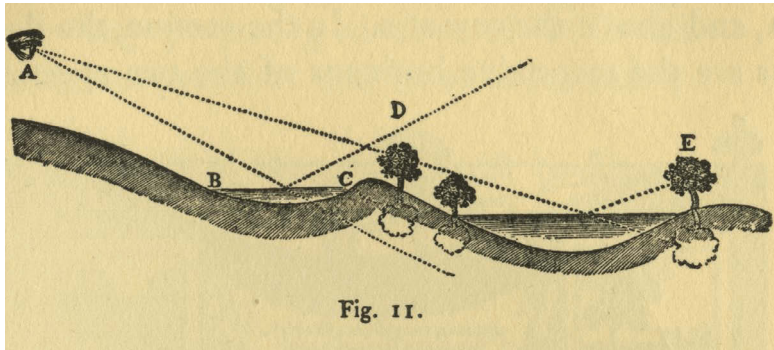
Kant once again becomes relevant, as he discussed the nature of the sublime in its relation to beauty in the landscape garden extensively. Kant would juxtapose architecture against the landscape garden, as the latter has no function or end. Landscape, then, represents a "free play of the imagination in the act of contemplation," and has no other function than to please.[21]

The English landscape garden is therefore a far better reference for game spaces than architecture: it is, in essence, a realization of pictures or paintings, it is strongly artificial, and it is based on a story that unfolds along a path (see the interview with Silke Steets in this book). It is not about bounded spaces; on the contrary, exactly as in video games, it is about concealing the boundaries that are there, yet should not be perceived by the users. It is about time and movement through an "open" landscape, and movement is directed towards selected *point de vues* and architectures. The entire landscape is constructed around a certain atmospheric effect, which should—in the best case scenario—evoke the sublime. Even if just literally, the fake ruins are actually akin to the doomed nature of the architectonic, in which ruins are real—but not actual.

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20 | Ibid., p. 43.

21 | Morgan, 2000, p. 12.

It is therefore unsurprising that the term "ludic sublime"[22] has been used to describe the aesthetic experience of games such as *The Elder Scrolls IV: Oblivion* (2008) or *Dark souls (2011)*. In reference to the latter, theorist Daniel Vella has emphasized—also by using Kant—how the experience of the game is constructed around "the player's drive towards mastery of the game coming face-to-face with the impossibility of obtaining complete, direct knowledge of the underlying system".[23] This creates a gap, in which a player can locate the very possibility of this "ludic sublime." Repton, as an expert of making the sublime, would have loved to play and design such games!

Le Corbusier (Really) Plays Fröbel

It is not by chance that modernist architects developed an obsession with games and play, as they used them to break a static, conservative, and "serious" understanding of architecture. At the same time, their interest in games was tied to the development of innovative pedagogies such as the Bauhaus, and in general, to early childhood development. The best example of these kinds of games were the *Fröbel Gifts*, developed by German pedagogue Friedrich Fröbel (1782-1862). They had a widespread influence in kindergartens in Europe as well as the United States.[24] In his autobiography, American architect Frank Lloyd Wright (1867-1959) recounts the formative impact that these games had on his development and his architecture[25]; the same influence has been assumed in the case of Le Corbusier (1887-1965), as he frequented a kindergarten in Neuchatel where *Fröbel Gifts* were used.[26] One can easily imagine a young Charles-Édouard Jeanneret playing with them, and becoming inspired for his later career

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22 | Philip Shaw, *The Sublime* (Abingdon: Routledge, 2006).

23 | Daniel Vella, "No Mastery Without Mystery: Dark Souls and the Ludic Sublime," *Game Studies*, Vol. 15, No. 1 (July 2015) http://gamestudies. org/1501/articles/vella (accessed April 22, 2019).

24 | Norman Brosterman, *Inventing Kindergarten* (New York: Harry N. Abrams, 1997); Canadian Centre for Architecture, *Toys that Teach* (Montréal: CCA, 1992).

25 | Frank Lloyd Wright, *An Autobiography* (London: Longmans, 1932).

26 | Marc Solitaire, *Au retour de la Chaux-de-Fonds: Le Corbusier-Froebel* (Martigues: Éditions Wiking, 2016).

as an architect. For to him, architecture would become an endless game: "*Ce jeu est sans limite*".[27]

Fig. 69: J. F. Jacobs, Manuel Pratique des jardins d'enfants de Fréderic Froebel, 1874

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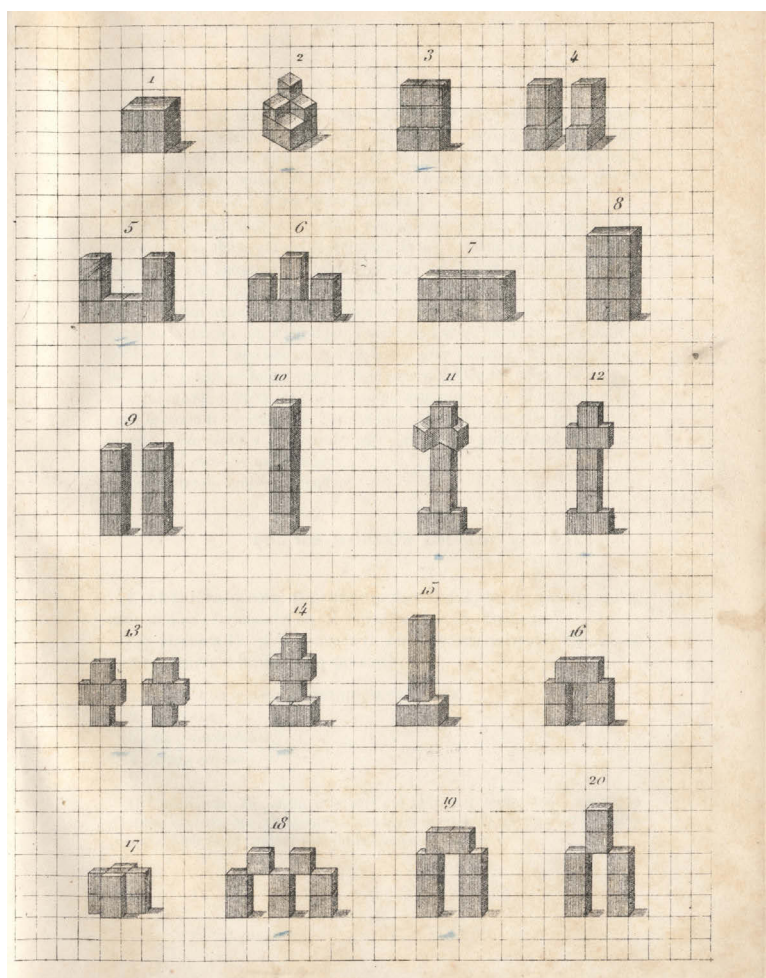
27 | Le Corbusier, *Le Modulor [I], Essai sur une mesure harmonique à l'échelle humaine applicable universellement à l'architecture et à la mécanique* (Boulogne: Edition de l'Architecture d'aujourd'hui, 1950), p. 94.

Simultaneously, modernist architects developed construction-related games, such as the marvelous glass construction set *Dandanahm* (1921) by Bruno Taut (1880-1938), or in an extended version to the scale of reality, as with *Baukasten im Grossen* (1923) by Walter Gropius (1883-1969) and Fred Forbàt (1897-1972). An unrealized design by Walter Gropius and Adolf Meyer (1881-1929) was even made for the *Friedrich Fröbel Haus* in 1924.[28] To stay in the context of the revolutionary pedagogy of the Bauhaus, one has only to consider the "functionalist" chess design by Josef Hartwig (1880-1955): *Bauhaus Schach* from 1924. Here, the pieces were designed so that their form revealed their function, that is, the movements they could make on the board.

Games and play were considered both enriching and a trigger to over-come old-fashioned understandings of architecture. If we extend this logic to the contemporary praxis of architecture—beyond our critique of their belonging to the order of a landscaper garden—what could we learn? The main argument for playing video games, from this perspective, is the fact that they can enhance certain skills: first and foremost, a person's spatial ability!

Video games have long time been associated with a negative bias and with the stereotype of a nerdy, white, male "gamer" spending hours in a basement, instead of doing homework. The addictive nature of games is always one of the main criticisms put forth against games. Furthermore, games are considered simple amusements with no further value. But what if there are also things that can be learned from gaming, particularly for architects?[29] Without romanticizing the potential of positive effects, there is an important point to be made—corresponding with a long tradition of doing so—that games can indeed have also a positive impact. As stated in one of the many psychology papers that have investigated these questions:

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28 | Canadian Centre for Architecture, *Toys and the Modernist Tradition* (Montréal: CCA, 1993).

29 | One obvious positive aspect, which is closely related to architectural design, is "creative mode": the possibility to design parts of the game world, such as levels, or even the game itself. Minecraft allows one to choose a "world type"; in *Super Mario Maker*, the entire game was about designing the levels for Mario. This kind of adaptation is almost as old as video games themselves, called "modding" (from the "mod-" of modification), and was promoted both by gamers themselves through coding and by game platforms.

"At very least, the research on the negative impact of these games needs to be balanced with evidence for the cognitive benefits of the same games".[30]

The potentially positive impact of (non-digital) games on their players is a long-established insight. Child psychologist Jean Piaget (1896-1980) noted the importance of games in early childhood development, both for the development of spatial ability as well as the ability to locate and relate objects and the self in space. Since then, educational psychology has conducted several investigations into the cognitive and educational effects of video games, emphasizing their benefits, ranging from: cognitive, motivational, emotional, social benefits[31] to autonomy, competence, and relatedness.[32] Gaming, in particular action games, "enhances several aspects of vision",[33] fosters social skills, problem solving skills, spatial skills, and cultivates "a persistent optimistic motivational style".[34]

This idea is not only relevant to developmental theory, but has already been explicated in literature and film. One of the first examples is by American author Orson Scott Card (*1951), with his short story *Ender's Game* (1977) and its subsequent novelization in 1985. He imagined a future conflict between humans and aliens, and a program set up to train the most gifted earthling children through complex war video games. The most talented would become commanders of their war fleets. This idea was adapted into the movie *The Last Starfighter* (1984), by Nick Castle (*1947). Similarly, in the *South Park* episode entitled *Best Friends Forever* (2005), Kenny plays the PlayStation game *Heaven vs. Hell* and reaches level sixty, when he is hit by a car and falls into coma. While the episode revolves around the ethical question of whether or not to turn off his life-support machines, Kenny arrives in heaven to discover that the game *Heaven vs. Hell* was actually designed by God and the angels, in order to find somebody to guide a heavenly army against the army of hell. As Ken-

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30 | Isabela Granic, Adam Lobel, and Rutger C. M. Engels, "The Benefits of Playing Video Games," *American Psychologist*, (January, 2014), p. 70.

31 | Ibid., p. 66.

32 | Adam Eichenbaum, Daphné Bavelier, and C. Shawn Green, "Video games: play that can do serious good," *American Journal of Play*, Vol. 7, No. 1, (2014): pp. 50–72.

33 | Ibid., p. 56.

34 | Granic, Lobel, and Engels, 2014, p. 71.

ny was the only human ever to have reached level sixty, he had developed the necessary skills to be the chosen leader.

Of all the skills gaming can transmit, spatial skills are the most relevant for architects, as they build on the kind of knowledge that allows them to imagine and design spaces. In the context of a Swiss National Science Foundation-funded research project by the Institute Urban Landscape at the Zurich University of Applied Sciences (ZHAW), in collaboration with the Chair of Cognitive Sciences and the Chair for Research on Learning and Instruction at ETH Zurich, we developed a new psychometric test for assessing the spatial abilities of architects.[35] This test targets specific spatial mental processes expected in architects' work, such as the transition between 2D and 3D perspectives, the manipulation of volumes, the capacity to move back and forth between an allocentric and egocentric perspective, and changes in the scale of objects. The project started in 2016 and was completed in the fall of 2019. We tested approximately 600 architecture students, both on the bachelor and master level. These students filled out a questionnaire and were asked about their gaming habits. Interestingly, more than 40% of the students answered that they never play video games; 24% said they do so rarely; 11% responded that they played regularly in the past; 12% play occasionally; 7% play 2-3 times a week; and only 2% answered that they play daily. If we compare the results of these students in our test, overall, people who reported playing computer games tended to do better on spatial tasks than those who either never or rarely played. Performance was positively correlated with frequency of game playing. Though these correlations were typically small (around .20), the pattern was consistent. One possible explanation for this covariation is that playing certain video games has a positive effect on the development of spatial ability, though we cannot directly infer this causality from the way our study was designed (we did not inquire about the type of game in our survey).

Certainly, playing video games alone does not lead to becoming a successful architect, but it might be an additional means to develop the spa-

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35 | Andri Gerber, Michal Berkowitz, Beatrix Emo, Stefan Kurath, Christoph Hölscher, and Elsbeth Stern, "Does Space Matter? A Cross-Disciplinary Investigation upon Spatial Abilities of Architects," in *Research Culture in Architecture. Cross-Disciplinary Collaboration*, eds. Cornelie Leopold, Christopher Robeller, and Ulrike Weber (Basel: Birkhäuser Verlag, forthcoming).

tial abilities architects require for their work. It should be noted that studies in spatial ability have consistently found gender differences in some types of spatial ability tests (mental rotation, in particular), with higher scores for men.[36] As a consequence, measures for improving women's performance have been investigated, including the use of the game *Tetris* (1984).[37] Our findings replicated this gender gap, on the level of bachelor students in particular. In addition, we found that playing video games was less common among the women of our sample. When we evaluated if gender and playing video games predicted test performance, we found that both contributed to their score. Interestingly, gender differences in test performance became very small on the master level, indicating that women had a proportionally higher increase of spatial ability compared to men. Therefore, it is not surprising that current literature points to video-game training as a possibility for increasing spatial ability, in particular for women.[38] Although further longitudinal studies are needed to definitively confirm these findings, playing video games might prove useful in improving the spatial ability of architects and reducing the gender gap.

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36 | Melissa Terlecki and Nora S. Newcombe, "How Important Is the Digital Divide? The Relation of Computer and Videogame Usage to Gender Differences in Mental Rotation Ability," *Sex Roles*, Vol. 53, No. 5/6, (September 2005): pp. 433–44.

37 | Nora S. Newcombe, "Picture This. Increasing Math and Science Learning by Improving Spatial Thinking," *American Educator*, Vol. 34, No. 2, (2010): pp. 29–35.

38 | "Possibly the most intriguing finding was that when provided with videogame practice, the women in the study improved significantly more on spatial Visualization than the women who were not provided with videogame practice. Similar to the findings of previous research, the males scored significantly higher than the females on both spatial orientation and visualization. Although the women initially scored significantly lower than the males on 'Targ' and Spatial Visualization, they were able to equalize their scores when provided with videogame practice." Diana Gagnon, "Videogames and Spatial Skills: An Exploratory Study," *ECTJ*, Vol. 33, No. 4 (1985): p. 273.

Conclusions

When discussing architecture in "reality" and in a video-game environment, we cannot simply apply a definition of the former to the latter without first understanding the transformations it underwent in translation. *Architectonics* is the most apt term of comprehending the architecture of game spaces; it is more a condition than an object, and one that conveys the impossibility of the plan and the inescapable condition of ruin. This definition allows us to compare the two conditions, which can only help us better understand what architecture could be when evaluated together and in order to do so, we must expand our definition of architecture to include landscape architecture.

When Reyner Banham described his travelogue through Los Angeles, he not only referenced looking forwards, but also backwards, through the rear window: "But while we drive along the freeways that are its crowning glory or prime headache, and con the rear-view mirror for historical illumination, what shall be the route?"[39] This perspective is reminiscent of the *Angelus novus* figure painted by Paul Klee (1879-1940), and Walter Benjamin's (1892-1940) interpretation thereof as metaphor of history:

A Klee painting named 'Angelus Novus' shows an angel looking as though he is about to move away from something he is fixedly contemplating. His eyes are staring, his mouth is open, his wings are spread. This is how one pictures the angel of history. His face is turned toward the past. Where we perceive a chain of events, he sees one single catastrophe, which keeps piling wreckage upon wreckage and hurls it in front of his feet. The angel would like to stay, awaken the dead, and make whole what has been smashed. But a storm is blowing from Paradise; it has got caught in his wings with such violence that the angel can no longer close them. The storm irresistibly propels him into the future to which his back is turned, while the pile of debris before him grows skyward. This storm is what we call progress.[40]

Video games, in a sense, represent both progress and impossibility, because the pace of the game does not allow to look backwards. When play-

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39 | Banham, 1971, p. 36.
40 | Walter Benjamin, "Theses on the Philosophy of History", in *Illuminations*, trans. Harry Zohn (New York: Schocken Books, 1969), pp. 257–8.

ing *GTA 5*, images in the rear-view mirror are blurred—due to computing power—and as such, the game—like most games—is predicated on a constant gaze forward. Yet, the landscapes of these games have a history, as they are related to a reality that has been shaped over centuries. We can only hope that games will someday include this view backwards. Architecture—or better yet, architectonics—and landscape architecture, with their rich histories, might just be able to contribute to this endeavor of understanding "reality".[41]

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