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Gaia Leandri

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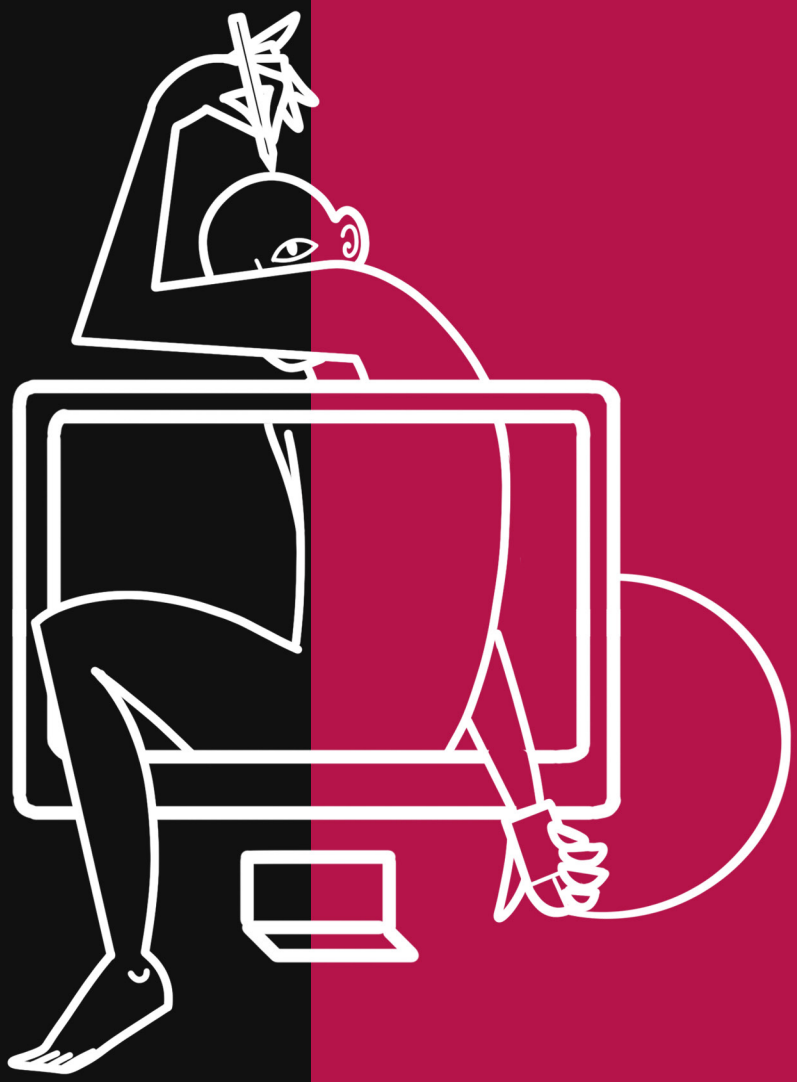
Angelo Schenone



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Part II - Design

The creative process, Human - centered Design

Keywords

Human Experience
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Performing Arts
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Empathic imagination: nurturing architectural creativity in Video Games and Virtual Reality simulations

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Università degli Studi di Genova

Abstract

Empathic imagination, namely the ability to internalize and project potential emotions, actions, and experiences anticipated in designed spaces, is an essential creative expertise architects should nurture to better perceive, understand, and shape the built environment. This essay analyzes two digital techniques helpful for studying the imaginative empathy driving designers: video games and virtual reality simulations. Both interfaces provide opportunities for free movement, first-person perspective, autonomous decision-making, sensory immersion, and emotional engagement, thus fostering architects' imaginative problem-solving skills by situating, embedding, and extending their resonating bodies. Two examples support this theoretical framework: 1) the popular life-simulation game *The Sims* clarifies our building instinct and need for direct control, a sense of agency, and affective affinities during the design process, and 2) outcomes from a workshop crafting virtual atmospheric sceneries discuss how drawing, simulation, and experience affect architectural creativity among students.

1. Empathic Imagination

For those working within the architecture field, "empathy" means, first, the appearance of a link — a link in which the architectural context represents a mediating element between the designer's imagination and the user's experience. Architects must demonstrate a mastery of inventing and anticipating the future of spaces they conceive by prefiguring how people will inhabit, move, and resonate within the landscape of praxic and affective affordances[1]. Juhani Pallasmaa calls this creative expertise "empathic imagination" (2014). It can be rationally controlled and trained or result from instinct. In any case, as Pallasmaa claims, «architecture

is born of imaginative empathy» (Pallasmaa, 2015, p. 55). Namely, «the only proper way to deal with the everyday practice of architecture is that the architect becomes the client him- or herself» (Pallasmaa, interviewed in Havik & Tielens, 2013, p. 41). We must occupy, feel, and measure the spaces we design through the bodies we have.

Similar internalization and projection mechanisms linking the architect to the actual perceiver develop in the opposite direction. Dwellers tend to comb their surroundings, seeking and uncovering design clues left by the professionals who have conceived their physical domain of movement and interaction. We constantly and nonconsciously «look at things as if they had been produced by a human maker», Richard Neutra reveals: «this naïve, anthropomorphic attitude is natural» (Neutra, 1954, p. 74). Neutra's words foreshadow current empathic theses elaborated on (neuro) physiological bases (Canepa, 2022a, pp. 150–163) to the extent they preempt the so-called "embodied simulation" theory (Gallese, 2005).

As the architecture historian Harry Francis Mallgrave admits (2013, p. 162), architects typically want and expect those living in their buildings to decipher their design intentions. This theory offers an innovative subpersonal and precognitive level of analysis, being that embodied simulation is «a functional mechanism through which the actions, emotions or sensations we see activate our own internal representations of the body states that are associated with these social stimuli, as if we were engaged in a similar action or experiencing a similar emotion or sensation» (Freedberg & Gallese, 2007, p. 198).

2. Learning from Video Games

Video games offer excellent examples of understanding how we engage and foster empathic imagination, considering players are often involved in defining their gaming environment. Rather than exploring preprogrammed spaces envisioned by game designers, they become authentic architects, able to operate at any scale: from the intimate domestic sphere[2], taking care of details, furnishings, and decorations, to the more complex urban dimension[3], planning entire neighborhoods or settlements.

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[1] By "praxic affordances" (according to the Gibsonian approach to perception), we mean bodily-activating triggers embedded in the environment that invite us to move, act, or do something; by "affective affordances" (also known as "atmospheric affordances"), we refer to opportunities for our bodies to emotionally resonate with our surroundings. To review the interplay between praxic and affective affordances, see Arbib & Griffero (2023).

Here, a rare circumstance appears in which someone with no specific design background or expertise plays the role of architect. Given video games' intuitive icon-based interface, becoming the architect, even for those new to design, is easily attainable. Players need only to imagine a spatial experience and combine as many desired items to build an idyllic virtual setting. The results are immediate and satisfactorily realistic — more comprehensible than professional simulations manipulated in 3D modeling software like *3ds Max* or *Rhinoceros* (where graphics experts work in wireframe meshes and abstract textures).

In *The Sims* series (one of the best-selling games of all time, first released almost twenty-five years ago)[4], the eventual goal is not precisely defined. Players create a virtual simulated world (hence the game name) where made-up avatars have fictional experiences in fully designed environments. The player's imagination fashions *The Sims* characters' lives in every aspect: physical appearance and clothing, personality and motivations, interactions with objects and friends, and so on. Although the game's intent is caregiving of one's avatars, most players seem more interested in designing and building ideal homes for their puppets.

They spend hours and hours arranging layouts, choosing decor, and improving the surrounding landscape. Players become hypnotized by the rich and miscellaneous design options[5]. Clicking on a menu mimicking a furniture catalog reveals images, prices, and technical specifications, and each item (architectural details, fixtures, and fittings) is customizable by shape, size, material, color, and texture. Therefore, it is not surprising that the original series logo is not a human silhouette but a stylized house, sketched with a dormer window, pitched roof, and smoking chimney.

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[2] *The Sims* series is the most popular case.

[3] There are some video games expressly conceived as city-building simulators, such as the *SimCity* series, *Caesar* with its sequels and spin-offs, or *Block'hood*. Other products belong to different genres, but working up architectural universes often becomes the main goal: the *Age of Empires* series (real-time strategy game) and *Minecraft* (sandbox survival-and-crafting game) are two examples.

[4] *The Sims* is a life-simulation computer game created by Will Wright, developed by Maxis, and published by Electronic Arts (also known as EA) in 2000. The game has spawned several expansion packs and three sequels: *The Sims 2* in 2004, *The Sims 3* in 2009, and *The Sims 4* in 2014. *The Sims 5* release is expected by 2025. Fifteen years after its first release, the original *The Sims* game was still leading the "Best-Selling PC Game" chart in the *Guinness World Records* (2015, p. 185).

[5] Over the years, the software company has released multiple *Stuff Packs* to nurture players' creativity. Additionally, players can share or sell customized add-ons. The variety of interior solutions becomes endless.

At first glance, *The Sims* seems to be a dazing «IKEA game» (Pearce, 2004, p. 150), where the architect (that is, the player) and the client (the character) flow into one another. Researchers, however, have noted deeper meanings in the spatial experiences offered by this video game.

The copious engagement of empathic imagination is the crux. Mary Flanagan, who is an artist and professor in digital humanities, clarifies that «known also as the "dollhouse" game among parents, the space of *The Sims* is a site of negotiation between the real and the virtual domestic experience. [...] Both computer gaming and playing house are mechanisms of fantasy»(Flanagan, 2009, pp. 48–49). To reinforce players' sense of immersion, their visual interaction with the gaming set is dynamically manageable through user-adjustable cameras, which rotate freely and provide first-person-view options. By controlling speed and perspective, Simmers design interiors moving as if they were *there*. «As [a] director, camera operator, and production designer, the player has an active role within the visualization and is able to enjoy [the] mastery of the environment through consumption of household goods, architectural construction, and navigation» (Flynn, 2002, p. 47).

Absorbed in the creative process, players recall their lived experiences and transfer them into simulation. They collect and organize memories to better identify with their characters' behavior and taste. Most players build houses they would like to inhabit, often molded on familiar spaces where they have felt safe and happy, such as their childhood home. In the end, affective connections drive these choices more than conscious preferences (Graham *et al.*, 2015, pp. 346–347). The architect Christopher Alexander, a paramount influencer in the invention of *The Sims*, explains our innate need for affinities and agency: «people cannot be genuinely comfortable and healthy in a house which is not theirs». Annotating, «people will only be able to feel comfortable in their houses, if they can change their house to suit themselves, add on whatever they need, rearrange the garden as they like it» (1977, pp. 393-394).

As a nodal game (Leigh McGregor, 2007) — that is, a game where the architectural environment acts as a container with imposed spatial usages related to specific social patterns — *The Sims* «rely[s] on not subverting popular conceptions of architectural and landscape roles» (p. 541). Will Wright, *The Sims* series' creator, derived this spatial pattern-based logic from his architectural background (even if not fully developed)[6].

[6] Will Wright (b. 1960) began his college career by studying architecture for two years before switching to mechanical engineering.

«I'm interested in the process and strategies for design», he stated when making the game. «The architect Christopher Alexander, in his book *Pattern Language*, formalized a lot of spatial relationships into a grammar for design. I'd like to work toward a grammar for complex systems» (Wright, interviewed in Kelly, 1994, n.p.). Despite original intentions, the game's underlying vision of architectural dynamics is limited (Lauwaert, 2007). The creative potential of design performance is strongly conditioned by structural elements (e.g., the grid used for mapping terrain), which hinders formal composition. Besides, prebuilt styled rooms and objects weaken aesthetic diversity, homogenizing or stereotyping the made-up solutions. The building-block approach promotes component collection more than atmospheric refinement, although players can improve light quality (generator of atmosphere par excellence: Canepa & Condia, 2024) by adjusting color and dimming the intensity.

The Sims focus uncovers how video games are unique testing opportunities to study the empathic imagination force driving designers' creative work. This life-simulation game puts into practice Pallasmaa's admonishment: «you have to become the dweller» (Havik & Tielens, 2013, p. 41). Learning from video games is a productive strategy for design endeavors, theoretical debates, and teaching tasks. Especially nowadays, where a crisis afflicts our relationship with the world and the spatial experiences we live in. Paradoxically, «in the past we had problems understanding the world, today we have problems living in the world that we have created» (Scherer, 2016, p. 8). Our bodies, privileged tools to experience and conceive architecture (Robinson, 2019), have become progressively weaker, losing references and connections to physical reality. Several factors are responsible: the emergence of new spatial domains becoming increasingly digital and intangible; the predominance of images in our media-obsessed society; and social isolation affecting how we live in private and public places. Unusual forms of spatial perception are developing. Above all, architecture is becoming more and more *virtual*.

3. Learning from Virtual Reality

The most immersive way to experience and design virtual architecture is through virtual reality (VR), a technology sponsored by the video gaming industry and which has been employed for scientific research since the early Nineties when the National Aeronautics and Space Administration (NASA) started to use head-mounted displays and computer-generated images for mission-oriented applications, such as simulated explorations of Mars' surface (McGreevy, 1990, 1993). The first interactive architectural walkthroughs date back to the Seventies (Whyte, 2002, pp. 13-14). Over

the years, due to technological progress, VR techniques have enhanced the sense of *presence* and *immersion* we feel in digital environments (Güler, 2022, pp. 59–64), giving the sensation of moving within a real, tangible world[7].

Even so, the use of virtual reality in theoretical and experimental architecture studies is still limited and focused on multisensory implementations, the issue of presence vs immersion, and cybersickness reverberations (Angulo, 2015, § 1; Güler, 2022, pp. 64–78). Recent research introduced a neuroscientific approach to design investigation through VR performances tracked via (neuro)physiological sensors (Mostafavi, 2021). The aims of collecting bodily measurements in VR-supported experiments include observing neurophysiological reactions in space appreciation (Vecchiato *et al.*, 2015), monitoring brain dynamics of architectural affordances (Djebbara *et al.*, 2021), and testing the priming effects of a place's atmosphere on our first impressions (Canepa, 2023a; Canepa, Djebbara *et al.*, 2023).

Virtual reality is enticing to architects as a *design tool* and not only as a visualization device, being the sole creative medium capable of physically situating and embedding designers into a targeted space[8]. In virtual simulations, there is an embodied, enactive, and extended interaction between the designer's body, the surroundings, and peripheral devices, especially if their sense of presence, immersion, and agency is intense enough to feel like being *there*. Based on the creative potential of virtual reality and spurred by research and teaching experiences documenting the pedagogical effectiveness of VR tools on architectural education[9], I included hands-on VR experimentation in a two-week workshop[10] aimed at crafting a library of visual atmospheric stimuli. This project collects spatial patterns born from a selection of *generators of atmosphere*, which are architectural features (such as lights, colors, materials, and proportions) designed to afford specific atmospheric choreographies and influence emotions, behaviors, and appraisals of those perceiving them (Canepa, 2022b, pp. 35–41).

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[7] For a correct use of the terms "presence" and "immersion", see Berkman & Akan (2019).

[8] Without counting the possibility of working in a full-scale mockup or the architect's performance in a construction site dialoguing with artisans to discuss and refine design solutions while the project is being built.

[9] Kharvari & Kaiser (2022) developed a systematic review of how extended reality technologies (including VR) affect architecture students' learning and performance. See also Vegetti (2022), who designed an experimental course on the phenomenology of space using virtual reality.

Thirteen 5th-year students trained in Atmospheric Design produced a series of corridors, grown from a shared baseline and altered according to compositional-atmospheric themes freely established by each student. They elaborated an emotion-based hypothesis about the chosen generator of atmosphere, tested it through five variations, and assessed the perceptual effects of their proposals by rating every space in terms of arousal and valence (the two dimensions of core affect)[11]. Even if atmosphere is a complex multisensory and multifactorial phenomenon (Canepa, 2022a, pp. 15–42), we adopted a reductionist approach, focusing merely on vision and working on one atmospheric factor at a time to ensure a correlation between a particular change and its related effects. The final output was a database of first-person-perspective images and videos depicting a baseline element and sixty-six variations. A 365-participant online survey verified our stimuli and propositions (Canepa, Güler *et al.*, 2023).

Here, I will discuss three observations about students' empathic imagination engagement throughout the design process. The first comment involves the role of drawing within creative thinking. As frequently occurs in our contemporary image-saturated culture, students supplemented sketches with archives of pictures to draft the atmospheric sceneries. They built a two-by-five-meter panel (Figg. 1–2) and arranged photographs, magazine clippings, and art-historical references to map examples of spatial transitions and compositional patterns. Inspired by the *Mnemosyne Atlas*, a project by German art and culture scholar Aby Warburg from 1924 to 1929 (Haus der Kulturen der Welt & the Warburg Institute, 2020), the juxtaposition of images generated debate and meaning. We learned through *vision*, namely our predominant sense to perceive space — a biological dominance that is also socio-culturally reinforced (Hutmacher, 2019).

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[10] "The Language of Atmosphere" workshop taught by Elisabetta Canepa, fall term 2022, Department of Architecture, College of Architecture, Planning and Design, Kansas State University, Manhattan, KS, United States. Special thanks go to Brittany Coudriet, Yvette Fabela, Samantha Hite, Abigail Hutchinson, Gabriela Elizabeth Maggi Velilla, Alex Mendoza, Reid Posinski, Joshua Robertson, Anna Scarlett, Amanda Shearhart, Sullivan Stavneak, Jesika Tieszen, Daniel Timmons, and Albert Ybanez.

[11] Briefly, *arousal* defines the intensity of the emotional state, that is, how strong the reaction is; *valence* describes the extent to which an emotional state is positive or negative, that is, pleasant or unpleasant. See Canepa (2023b, pp. 290–293) for further details, particularly about how to apply these notions in design.

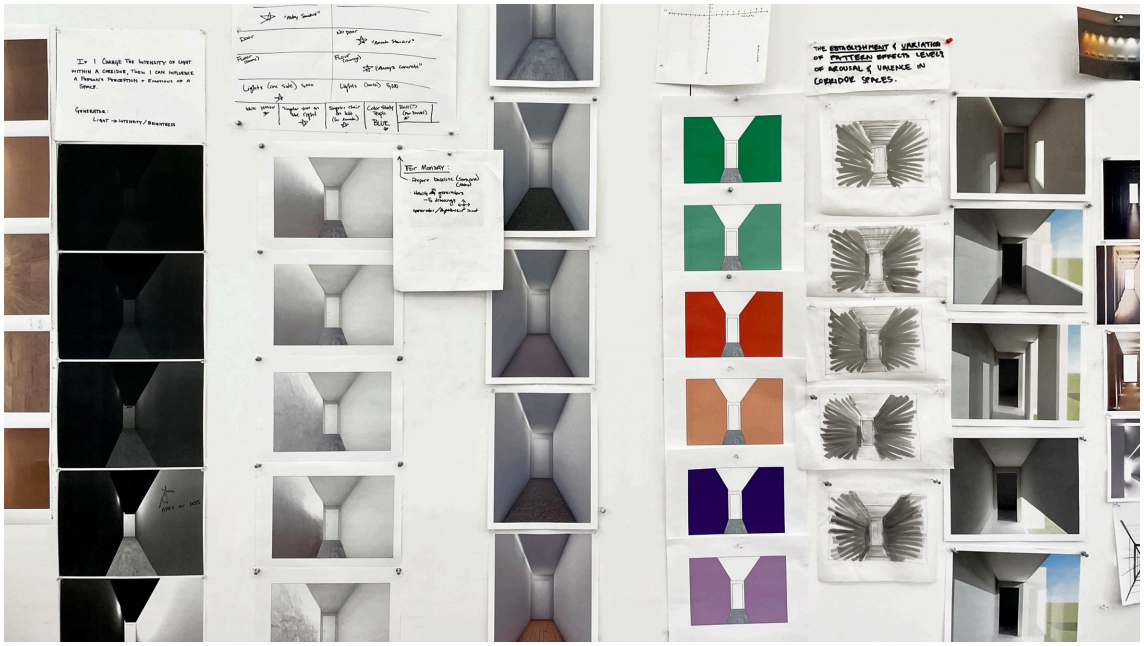

Figure 1 - “The Language of Atmosphere” panel, fragment. © Elisabetta Canepa, 2022.

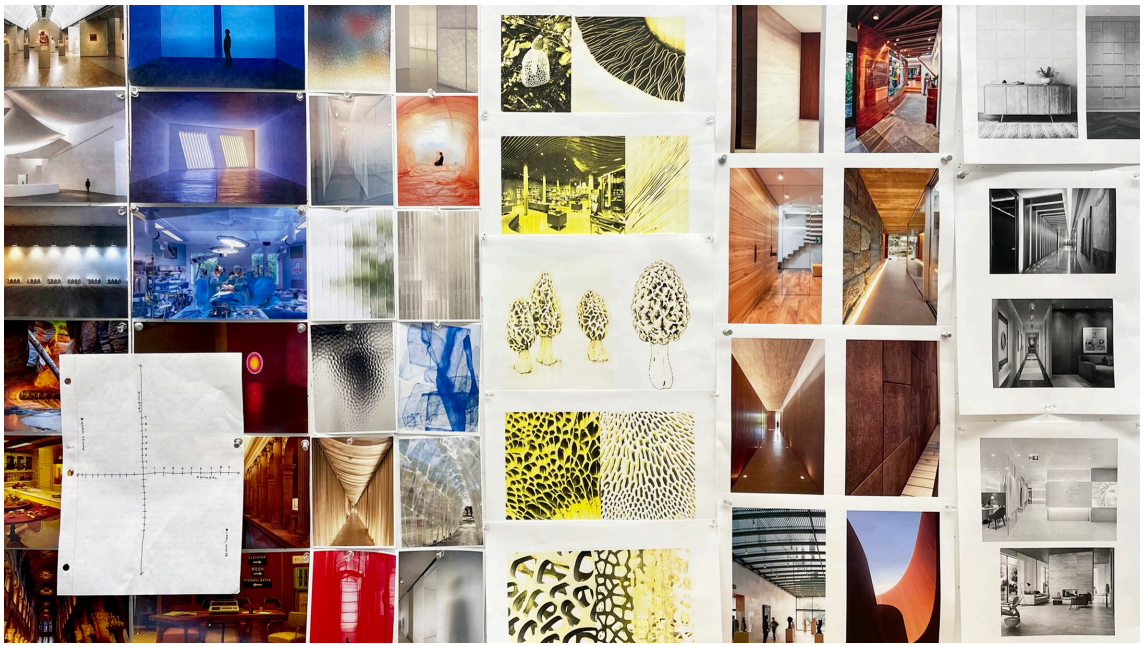

Figure 2 - “The Language of Atmosphere” panel, fragment. © Elisabetta Canepa, 2022.

Figure 3 - “The Language of Atmosphere” VR simulation. © Alex Mendoza, 2022.

As David Ross Scheer points out, for the first time since the Renaissance, architectural drawing is «in question [...] overthrown by *simulation*», which, instead of representing construction, «exist[s] to anticipate building *performance*» and «it is *experience* that the simulation reproduces» (Scheer, 2014, pp. 9–10, original italics). After synthesizing their compositional principles from the picture atlas, students refined their ideas by modeling 3D environments and simulating light conditions, material textures, and geometric patterns. Testing their perceptual assumptions, students went beyond still images by preparing short videos, where first-person camera views allowed space exploration as if they were walking along the corridor (as happens in many first-person-perspective video games). We learned through *movement*, which Siegfried Giedion identifies as the concept permeating «our thinking and feeling in all their ramifications» (Giedion, 1948, p. 14).

The third remark relates to the employment of VR technology. Five of the thirteen students voluntarily integrated walkthroughs in a virtual environment with similar dimensions and characteristics as the workshop corridors (Fig. 3). Augmenting their sense of (co)presence and interaction possibilities nudged their empathic imagination to propose more sculptural effects and engage sensations that privileged light and texture manipulation (Figg. 4–9). We learned through *immersion*, which empowered students' architectural creativity and atmospheric sensitivity by shaping a flow of body movements, sensory information, and emotional *triggers*.

Figure 4 - "The Language of Atmosphere" baseline corridor. Edited by Reid Posinski, 2022.

Figure 5 – Generator of atmosphere: organic patterns. Designed by Yvette Fabela, edited by Reid Posinski, 2022.

Figure 6 – Generator of atmosphere: light intensity and rhythm. Designed by Alex Mendoza, edited by Reid Posinski, 2022.

Figure 7 – Generator of atmosphere: texture density and noise. Designed by Joshua Robertson, edited by Reid Posinski, 2022.

Figure 8 – Generator of atmosphere: wall material transparency. Designed by Amanda Shearhart, edited by Reid Posinski, 2022.

Figure 9 – Generator of atmosphere: light temperature and color. Designed by Brittany Coudriet, edited by Reid Posinski, 2022.

4. Conclusions

Analyzing spatial perception and conception in video gaming and virtual reality dynamics emphasizes how «architecture is an act of imaginative problem solving that resonates with the deepest levels of our connection to our environment» (Johnson, 2001, p. 88). The more designers' bodies are present and engaged, the better they can anticipate and project inhabitant experiences. We should consider *empathy* as a tacit disposition of reading, feeling, and imagining, where «the observing researcher and designer patiently perceives, records, registers, and collects the sensuous issues of architecture's (vibrant) physicality» (Buchert, 2021, pp. 87–88) to attune to their interlocutors' needs and expectations. The examples offered by *The Sims* avatars and the atmospheric corridors invite us to join our project's system of actions, experiences, and emotions, refusing to design for generic end-users (Canepa, 2023b, p. 299) who are void of individual identity, a feeling body, and affective complexity.

Credits

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The second IDEA 24 symposium aims to establish a connection between the disciplines of creative design and scientific research, with a focus on the automation of the creative process and artificial intelligence. Interdisciplinary contributions were grouped according to three major areas: *design*, *innovation*, and *application*, covering topics such as mental imagery, robotics, naval design, theatrical representation and the new challenges of education in the era of technology.

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