Designer's Notebook: The Role of Architecture in Videogames

By Ernest Adams

This month's column began life as a lecture I gave to the Ars Electronica festival of electronic and computerized art, in Linz, Austria. They requested the topic, and although it sounded a bit odd at first, the more research I did, the more interesting it got. This month's column is a short version of that lecture. My audience was mostly artists and a good fourth of them had never played a videogame in their lives, so I had to include a lot of background material about game design that isn't included here.

Why Humans Construct Buildings

The most popular PC game of all time, *The Sims*, was influenced and partly inspired by the work of an architect, Christopher Alexander's book *A Pattern Language*. It has more to offer us than perhaps we realize. As I began thinking about the role of architecture in games, I started off by making a list of reasons that humans construct buildings in the first place:

- To protect people, goods, and animals from the weather.
- To organize human activity efficiently (factories, theaters, offices, sports arenas)
- To conceal and protect goods and animals from theft (warehouses, barns, shops, storage facilities).
- To offer personal privacy (toilets and private houses).
- To protect people from other people (fortifications, military installations, prisons).
- To impress, commemorate or simply decorate (civic monuments and religious buildings).

If we look at these functions with respect to games, however, some are meaningful and some are not. Weather, the primary reason for constructing most of the buildings in the world, is irrelevant. If it exists in games at all, it's usually cosmetic. Privacy, too, is normally immaterial -- most games don't let you take your clothes off anyway.

It is useful to organize human activity in games, but buildings aren't the most efficient way to do it. There's no real need to visit a building called the "Town Hall" in an online game when you could just send email to whoever works there; but the building provides a convenient metaphor for the functions that the Town Hall provides. Theft, likewise, may or may not be possible in games; if it is possible, a building provides a convenient metaphor for concealment and protection -- a way of indicating that an item is inaccessible to thieves. *In Age of Empires*, once a resource is placed in the storage pit, it's protected from theft. The storage pit is really a magic place that converts resources from being vulnerable and unusable, to invulnerable and available for consumption. The game could call it anything it likes, but it calls it a building. It's not much like a real building, though: it never fills up, and if you burn it down you don't lose the contents. The Treasury in *Dungeon Keeper* was more like a real treasury: it could get full, and people could steal money out of it if it wasn't guarded.

Two functions that do translate over directly are military activity and general decoration. Just about all wargames make use of constructed edifices as a means of concealment and protection for troops, and any game that tries to create a sense of place uses architecture to define how that place feels to be. In short, buildings in games mimic the real world when necessary or aesthetically desirable, but this is not always the case. There are no buildings in chess.

Games do have a problem portraying outdoor spaces. Because of the limitations of looking at a monitor, we can't create sweeping vistas or panoramas that feel like the real thing. If you've ever tried to photograph the emptiness of a desert or the Great Plains, you'll know what I mean: an essential part of the experience is the sense of being surrounded by vast open space. Players sitting in a room, looking at a CRT, never feel that way. Another part of that sensation comes from the sheer length of time it takes to get anywhere. Most games allow you to move pretty fast -- no more than a few minutes to walk from one side of the world to the other so, the sense of scale is diminished. And of course aerial perspectives reduce the impressiveness of everything: the Great Pyramid is no big deal from 5000 feet up.

We're not very good at natural objects, either. In 3D games, straight lines are cheap and curves are expensive, so we tend to avoid curves. But look at an oak leaf: it's nothing but curves. With thousands of leaves per tree and thousands of trees in a forest, there's a good reason why we leave forests alone. As a result, most 3D games tend to feel rather sparse and sterile. Bauhaus, yes; botanical gardens, no.

The Primary Function of Architecture in Games

The primary function of architecture in games is to support the gameplay. Buildings in games are not analogous to buildings in the real world, because most of the time their real-world functions are either irrelevant -- the real-world activity that the building serves isn't meaningful in the game -- or purely metaphorical. Rather, buildings in games are analogous to movie sets: incomplete, false fronts whose function is to support the narrative of the movie. Movie sets create context and support suspension of disbelief. They also diverge from the real world for narrative purposes. Consider New York as seen in a movie by Woody Allen, who loves the place, versus New York as seen in Taxi Driver. Sets are part of the story; they can make a place seem more (or less) beautiful, dangerous, tacky, etc. than it really is.

Gameplay (in non-social games) consists of challenges and actions taken to overcome them; architecture supports the

gameplay by helping to define the challenges. There are four major ways in which this happens: constraint, concealment, obstacles or tests of skill, and exploration.

Constraint: In board games like chess and checkers, there are no boundaries except for the edge of the board. The challenge of the game is created by the rather arbitrary rules governing how the pieces may move. In representational games, we want units to move the way they would in real life, not according to some artificial rule; but most of the time we don't want them moving anywhere they like. Architecture establishes boundaries that limit the freedom of movement of avatars or units. It also establishes constraints on the influence of weapons. As a general rule, projectiles do not pass through walls (no matter how flimsy) nor do explosions knock them down, nor fires burn through them.

Concealment: Few computer games are games of perfect information, in which the player knows everything there is to know about the state of the game. Architecture is used to hide valuable (and sometimes dangerous) objects from the player; it's also used to conceal the players from one another, or from their enemies.

Obstacles and tests of skill: Chasms to jump across, cliffs to climb, trapdoors to avoid -- all these are part of the peculiar landscape architecture of computer games. Some of them can be surmounted by observation and logic, others by hand-eye coordination.

Exploration: Not quite the same as overcoming obstacles, exploration challenges the player to understand the shape of the space he's moving through, to know what leads to where. Mazes are of course one of the oldest examples of such a challenge. If the game doesn't give the player a map, he may have to rely on his memory to learn his way around. In recent years we have started making better use of subtle clues: sunlight coming through a window means that we're near the outside; a differently-shaded patch of wall indicates a secret door.

Persistent worlds like *Everquest* use buildings for a variety of social functions as well, of course, but as those are largely obvious and symbolic, I won't address them here.

Some time ago I came across the website of Canadian game designer Peter Lok (http://www.dragonridge.com). Included on his site was a sketch of a long ventilation shaft leading from the roof of a building straight down into an equipment room on the ground floor. The sketch included the following notation:

> *Shutters that open and close. Must jump down when open and fan is on. When closed you plummet and shutters are electrified. Have 2 sets of fan/shutter. Must land on ledge above fan. Blades will kill you.*

> *Equipment room with ducts and access doors to labs.*

Considered as real-world architecture, this is isn't very sensible. The fans must blow out rather than in (that's why you don't plummet if you jump in while they're on). You might need two fans in order to move a given volume of air, but why would you need two sets of shutters? And why in the world are the shutters electrified? Above all, the remainder of the building is undefined. Like a movie set, it's just a false front, a container for the ventilation shaft and the equipment room below.

As game design, however, it's perfectly functional, though not entirely obvious to the inexperienced gamer. It supplies constraint (the player starts on the roof and must go down the ventilation shaft to get to the equipment room); an obstacle challenge (the fan blades and electrified shutters which, reading between the lines, we can tell must go on and off at intervals); and an exploration challenge (the player doesn't know what's at the bottom of the shaft until she gets there).

Here's another example of how game design diverges from reasonable architecture. Notice the strange and wasteful design of this building complex from *Quake*. This building is designed to be explored, not used.
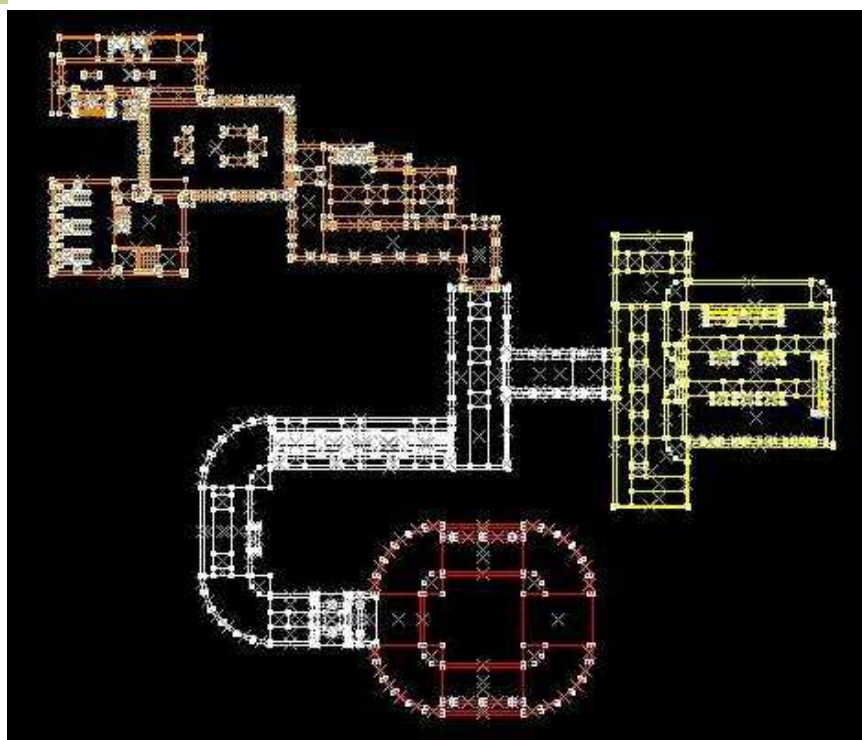

Figure 1. A map of a building in *Quake*.

Or consider this oddly-shaped valley from the Militia level in *Counter-Strike*. The building at the end is fairly rational, but the shape of the valley itself is optimized to create combat challenges through constraint and concealment. It's designed with lots of things to hide behind, allowing small numbers of snipers to cover the whole valley -- in both directions.
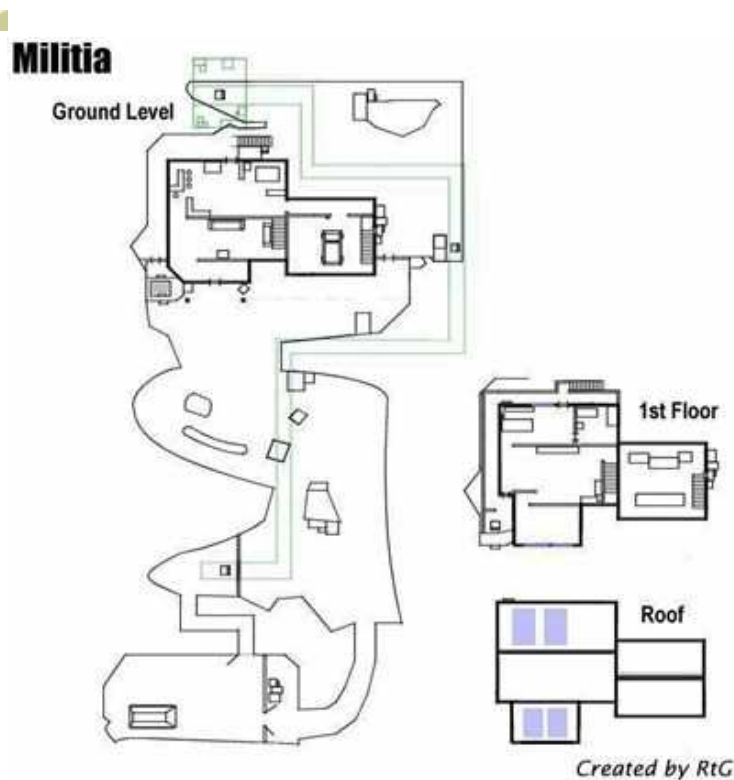

Figure 2. The Militia map in *Counter-Strike*.

All these things are examples of the environment supporting the gameplay, even if they're rather peculiar in real-world terms.

The Secondary Function of Architecture in Games

If architecture were only about supporting the gameplay through constraint, concealment and so on, it could all be bare grey concrete. But architecture has a secondary, and still highly valuable role to play: to inform and entertain in its own right. It does this by a variety of means:

Familiarity. Familiar locations offer cues to a place's function and the events that are likely to take place there. If we see a kitchen, we don't expect to find a blacksmith making horseshoes. We rely on players to use common sense about the function of certain kinds of familiar spaces, and it's cheating (a conceptual non-sequitur) to violate their legitimate expectations without any explanation. If you can crawl through the ventilation ducts to get past the security guards, it's not reasonable to meet another security guard inside the ducts -- unless you've made so much noise that one has gone in to investigate.

Figure 3. Gabriel Knight is waiting for the maid to finish cleaning this hotel room.

Allusion. Game architecture can make reference to real buildings or architectural styles to take advantage of the ideas or emotions that they suggest. There's a vast amount of material to borrow from in the real world, from the ruinous spiritual grandeur of Stonehenge to the gruesome expediency of the gas chamber at San Quentin.

Figure 4. *Soul Reaver* is a game about a vampire that eats souls, so a cathedral has powerful connotations.

New worlds require new architecture. To create a sense of unfamiliarity, create unfamiliar spaces. This has the disadvantage that it robs the player of a frame of reference, and can create confusion rather than emotional resonance. To avoid this problem, you can name the buildings when necessary. Among the buildings in Figure 5 is the Brothel for Slaking Intellectual Lusts, a place where you can pay scholarly prostitutes to talk to you about philosophy and art.

Clerk's Ward

The Brothel of Slating Intellectual Lusts.

Figure 5. An aerial view in *Planescape: Torment*. Note the extreme variety the of buildings and the lack of cues as to their function.

Surrealism. I complained about pointless surrealism in my first "Bad Game Designer, No Twinkie!" column, but architectural surrealism does have a point if it's connected to the gameplay. It creates a sense of mystery and more importantly, it warns the player that things are not what they seem. A surreal landscape tells him that the game may

require extreme lateral thinking or strange leaps of logic to win.

Figure 6. *Myst* had a strong surreal element in its architecture.

Atmosphere. To create a game that feels dangerous, make it look dangerous. The city street in The Longest Journey, below, looks like the concrete canyons of Manhattan with their looming high-rises, dim light, and graffiti. The rose window of the cathedral, partially hidden in the background, suggests a place of sanctuary nearby.

Figure 7. The city of Stark, from *The Longest Journey*.

Comedic effect. Not all game worlds are familiar, dangerous, or weird; some are supposed to be lighthearted and funny. Note the Disneyesque bulging walls and off-kilter windows of Planet Threepwood, below. This isn't so much a building as an architectural joke.

Figure 8. *Escape from Monkey Island*.

Architectural clichés. Games, like other forms of popular media, often rely on clichés and stereotypes to set a scene and establish player expectations quickly. These are a sort of variant on familiarity, without the benefit of being informed by real-life examples. The scene from Dark Age of Camelot below includes all the necessary elements to suggest a sort of Lego-land medievalism: you have your dragon, your symmetrical castle complete with banners, your Olde Worlde half-timbered building, and even your mystic runes graven in stone. This place may not look like any place in the real world, but thanks to Hollywood and earlier games, we know exactly what's supposed to happen here.

Figure 9. *Dark Age of Camelot*.

Conclusion

Architecture -- meaning both landscapes and structures -- is what turns the bare grid of the chessboard into the living world of the computer game. Its importance is on a par with character design in creating the player's visual experience. Character design tells you who you are; architecture tells you where you are. But more than that, it also tells you what might happen to you there, and even sometimes what you ought to be doing.

Perhaps there will come a time when student game artists in college routinely study Viollet-le-Duc and Vitruvius, Gaudí and Gropius. I hope so. Our games can only be the better for it.