Steffen P. Walz

# Approaches to Space in Game Design Research

In this contribution, we gather major academic and design approaches for explaining how space in games is constructed and how it constructs games, thereby defining the conceptual dimensions of gamespace. Each concept's major inquiry is briefly discussed, iterated if applicable, as well as named. Thus, we conclude with an overview of the locative, the representational, the programmatic, the dramaturgical, the typological, the perspectivistic, the form-functional, and the form-emotive dimensions.

Given that games formalize play (a human practice in space): What are the dimensions of a conceptual gamespace? In order to answer this question, in this contribution we will frame gamespace by reviewing recent and architecturally relevant works in the field of game design research concerned with the role of space and spatiality in games. The goal of these reviews is twofold: To filter the major existing contributions towards a spatial understanding of games, and to identify the shortcomings of those contributions as well as to suggest extensions where applicable.

We will focus on the following approaches from the field of game studies and game design research:

- the concept of the magic circle in which games take place as well as a game's space of possibility (Salen/Zimmerman 2004);
- the notion of spatiality in digital games as an allegory of physical space (Aarseth 2007);
- the view of games as narrative architectures (Pearce 1997, Jenkins 2007, Murray 1997);

in: *DIGAREC Lectures 2008/09 – Vorträge am Zentrum für Computerspielforschung mit Wissenschaftsforum der Deutschen Gamestage | Quo Vadis 2008 und 2009,* ed. by Stephan Günzel, Michael Liebe and Dieter Mersch, Potsdam: University Press 2009, 228-255. URL http://pub.ub.uni-potsdam.de/volltexte/2009/3325/ [urn:nbn:de:kobv:517-opus-33259]

- the understanding of digital games as the art of contested spaces (Jenkins/Squire 2002);
- attempts towards a typology of computer gamespaces (Wolf 2002, Boron 2007);
- the discussion about the role of perspective in digital games (Manovich 2001, Schwingeler 2008);
- functionally inspired frameworks of gamespace (Adams 2002, Küttler 2006).

Note that the body of research in this area is still limited. All cited discourses are based on publications in conference proceedings or book chapters or sections. So far, there is no integrated, full-length theory of spatiality or space in games, not to mention an overview like the one we are about to present. Nitsche (2009), whom we are not discussing here, has presented a discussion of the special field of 3D space in video game worlds, however. Also note that the term spatiality is used herein particularly in relation to the Lefebvrian and associated notions of lived space (Lefebvre 1991).

## Space of Possibility and Magic Circle

In their magnum opus Rules of Play. Game Design Fundamentals, Salen and Zimmerman (2004) developed two spatially inspired concepts that are relevant to our discussion.

## Space of Possibility

A game designer creates game rules and a game structure and defines the context of a game. The designer thereby constructs, indirectly, a "space of possibility." Salen and Zimmerman coin this term to express a number of concepts:

- the nature of a game as a designed context;
- all possible game actions that can occur during gameplay;

- all possible meanings that can emerge from the game design;
- all possible relations between game elements that render a system;
- the interactive functioning of this system, which allows for navigation and exploration (Salen/Zimmerman 2004:67).

The space of possibility, in short, describes the fact that games are interactive systems that create meaning through player action and that a game structure can play out in many ways, some of which are unpredictable. Salen and Zimmerman do not provide a more formal or mathematical definition of their umbrella term; the space of possibility, although charming as an image, remains vague, as it mixes a variety of dimensions that would be hard to compute or visualize. Therefore, the concept – which represents so holistic an approach that it can no longer really be applied in a concrete way – will not be further exploited in the following sections.

## Magic Circle

The magic circle is an idea introduced by Dutch anthropologist Johan Huizinga, adapted by Salen and Zimmerman (2004:94f.) and since then widely discussed and accepted in game studies and game design research. In *Homo Ludens* from 1938, Huizinga writes that

> [a]ll play moves and has its being within a play-ground marked off beforehand either materially or ideally, deliberately or as a matter of course…. This arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court, the court of justice, etc., are all in form and function play-grounds, i.e. forbidden spots, isolated, hedged round, hallowed, within which special rules obtain. All are temporary worlds within the ordinary world, dedicated to the performance of an act apart (Huizinga 1955:10).

Although the magic circle is only one example in Huizinga's list of "play-grounds" and is referred to as an equivalent of ritualistic spaces, Salen and Zimmerman use it as a shorthand to describe how games create special – we could say contractual, i.e. rule-bound, voluntary, and agreed upon – distinct places in space and time that feature boundaries. The concept of the magic circle adumbrates "in a very basic sense […] where the game takes place" (Salen/Zimmerman 2004:95). The concept of the magic circle may seem vague at first, but can be exemplified: Games as a framed reality of their own safeguard the player from an external reality; as Crawford (1997) asserts:

> Conflict implies danger; danger means risk of harm; harm is undesirable. Therefore, a game is an artifice for providing the psychological experiences of conflict and danger while excluding their physical realizations. In short, a game is a safe way to experience reality.

When entering the reality of a game, a player crosses the frame, i.e. the boundary of a game. When pausing a game and resuming it shortly thereafter or a year thereafter, the player steps out of the magic circle of the game and its formalized activities (Salen/Zimmerman 2004:95). Thus, within or inside the magic circle, there is a game; without or outside the magic circle, there is no game.

Notice how the concept of the magic circle seems to serve as a means of separating the "real" world from the "gameworld," as if games were safe havens. In fact, this protectionist view declares games to be non-secular, special, and ultimately, holy. Oerter (1999:17f.) argues that games and rituals are related phenomena and that we can observe overlaps between the function of rituals in games and the function of rituals in religious practice. Rituals are signified by both repetitive behavior and self-aggrandizement; they appear to have clear phylogenetical roots – that is to say, they are biologically founded. Paradoxically, rituals set up a rigid, second-

ary structure prescinding us, Oerter argues, from the uniformity of everyday life in order to help us deal with our existence. Quotidian uniformity is therefore temporarily and spatially replaced by ritualistic uniformity expressed through existentially heightening activities such as playing or worshipping. Salen and Zimmerman's concept of the magic circle is the equivalent of our kineticist notion of the play-ground that springs forth from the activity of play. But Salen and Zimmerman reserve the magic circle category solely for rule-based play, thereby diminishing the role of playing for the sake of formalization. Still, we can name this approach to space in games the *locative* approach to gamespace.

## Allegory

Pioneering ludologist Espen Aarseth has stressed that "the defining element in computer games is spatiality" (Aarseth 2007:44), arguing that computer based games are essentially concerned with representing and negotiating spaces and, more to the point, that spaces in digital games are allegories of physical space: "They pretend to portray space in ever more realistic ways, but rely on their deviation from reality in order to make the illusion playable" (ibid.:47). Aarseth does not expand upon the original meaning and usage of the term allegory, but we will now do just that, as it is important for this discussion. In the classic academic discipline of rhetoric, the allegory – from the Greek *eirein*, meaning to speak – is the rhetorical figure of false semblance, i.e. of extended and sustained metaphor. The metaphor, for its part, can be defined as a comparison made by referring to one thing as another. A textual example of a metaphor is, "Life is a beach." An allegory, by rhetorical definition, is an extended or sustained comparison made by referring to one thing as another. In Roman rhetoric, the allegory was known as the Latin words *allegoria* or *permutatio*, and Quintilian, an orator and course book author of the 3rd century A.D., considered the allegory a conceit (Fuhrmann 1990:129). Allego-

ries often appear over the length of a whole discourse or piece of content. To return to our previous example, "Life is a beach," consider that a novel about life would take place at a beach and, in describing beach situations, would actually refer to life situations such as birth, sleep, hunger, love, and death.

According to Aarseth (2007:45), a gamespace is but a reductive operation that leads to a representation of space that is not spatial in and of itself, but symbolic and rule-bound. A computer game, then, represents a set of automated rules expressed in space. This reductive operation, which constitutes the gameworld always as an allegory of space, has one objective, argues Aarseth: to serve (and to defer to) gameplay. In more architectural terms, we could say that a given gamespace renders the game's rule base and programs gameplay. Adams (2003:2) suggests that

> [g]ames, whether computerized or not, may be thought of as lying along a continuum between abstract and representational. The more abstract the game, the more it relies on arbitrary rules to define the game world and the gameplay. The more representational it is, the more it relies on similarities between real-world situations familiar to the player, and game-world situations.

As we work towards achieving our goal of framing gamespace, we will term this approach the *representational* approach to gamespace.

## Contested Space

> [M]ost often, critics describe games as narrative art, as interactive cinema, or participatory. But perhaps we should consider another starting point, viewing games as spatial art with its roots in architecture, landscape painting, sculpture, gardening, or amusement-park design […]. Game worlds are totally constructed environments (Jenkins/Squire 2002:65).

Putting aside the question of whether or not computer games can be qualified as "art," as we are not concerned with it here, let us focus on the fact that Jenkins and Squire consider the totally constructed digital environments of games to be hybrids of the following "contested spaces":

- Sports, in which players often contest over goals or respective positions on a field.
- Board games, in which contests are won and lost depending on movements on the board.
- Literary and cinematic works that climax in spatial contests such as shoot-outs or space battles (ibid.).

Jenkins and Squire further argue that computer gamespaces, as totally constructed environments of contest, offer affordances, encourage activities such as exploration, provide resources, effectively evoke emotions, and, overall, provide a stage that programs play. We agree with many of their observations, some of which resemble, from the point of view of play, topics that have already been discussed, such as play pleasures. From a narratological perspective, their suggestion that games constitute a mix of sports and story is all the more convincing when highlighted by another source:

> The most common form of game – the agôn, or contest between opponents – is also the earliest form of narrative […]. The Greek word agôn refers to both athletic contests and to dramatic conflicts, reflecting the common origin of games and theater (Murray 1997:145).

Being less etymologically minded, we consider it highly questionable that all digital games contain contests, especially considering that there are play pleasures that are not built on agonal competition. We are also sceptical of the assertion that all games are inspired by

sports. Consider, for example, activities such as role-playing or exploration, which do not necessarily involve the attempt to beat an opponent. The most valuable observation, in my opinion, is made by Jenkins and Squire when they argue that some games have "hard rails" while other games have "soft rails." The former tightly program the player's movements, while the latter allow for multidirectional play (2002:69). Some games consist of predetermined paths that a player must follow in order to reach an objective; others program the player to explore solutions using many different paths and often feature various alternate endings. Game environments, in other words, can be divided into proposed promenades and imposed promenades.

Overall, however, Wigley (2007:484) is right, even where emergent gameplay is concerned: "To choose a game is to choose an architecture." If we think of digital games as totally constructed environments, we can think of this approach towards gamespace as the *programmatic* approach, the approach closest to Le Corbusier's *promenade architecturale* in that it traces the actual process of gameplay during a game – traces, that is, how kinesis and play rhythms are organized over time.

## Narrative Space

It has been argued that not all games have stories and that though many games have narrative ambitions, it is unlikely that they will tell stories the way other media do. In her pioneering *Interactive Book*, my colleague Celia Pearce coins the term "narrative architecture." Pearce argues that architects, when designing a building, knowingly or not, create "nonlinear experiences with variable paths or outcomes" (1997:26). Pearce extends her argument, looking not only at physical architecture as a medium – a "spaceplay" (ibid.) the designer has come up with – but also at virtual spaces, multimedia works and games; the latter which, from her perspective, can be aligned with theme parks. Players, so to say, enter an environment, visit loca-

tions in a certain order and begin to make use of the space so that it comes alive. Games can thus be seen as narrative spaces in which storytelling takes places environmentally. Jenkins (2007) claims that there are at least four ways that spatial stories can evoke preexisting narrative associations; they can provide a staging ground on which narrative events are enacted; they may embed narrative information within their mises-en-scène; or they provide resources for emergent narratives.

Jenkins not only points out that narrative possibilities can be mapped onto and into gamespace, but also that games are often embedded into larger narrative systems that communicate story information with the help of books, comics, films, and other media. This model reveals that the narrative space of games unfolds within the games themselves, but also around the games and that the way a game's story is told environmentally has both functional and structural implications.

In *Hamlet on the Holodeck*, Janet Murray argues that digital environments such as those in digital games feature four unique and essential properties: they are procedural, participatory, spatial, and encyclopedic. According to Murray (1997:71), digital environments are procedural because the defining, intrinsic ability of the computer is "to execute a series of rules," which are fed into the computer engine in the form of algorithms and heuristics. Murray further holds that digital environments are participatory because they are responsive to input — an observation that, when considered together with computers' inherent capacity to process rules, "is what is most often meant when we say that computers are interactive" (ibid.:74). Digital environments represent space we can move through: "The computer's spatial quality is created by the interactive process of navigation" (ibid.:80). Finally, the infinite expanses of digital environments, all potentially networked, enable their fourth characteristic – namely, that they induce encyclopedic expectation whereby "all

the world's resources seem to be accessible, retrievable, immediate" (ibid.:84). Both Jenkins' and Murray's framework allow us to look at digital games as narrative, dramaturgical spaces.

Pioneering adventure games such as ADVENTURE (1976) or ZORK (1980), for example, are presented entirely textually and serve as outstanding examples of the way, game uncertainty is organized spatially and fictionally, and the way a game can be viewed as an integrated narrative gamespace. Both ADVENTURE and ZORK exemplify Jenkins' claims that spatial stories can evoke preexisting narrative associations. In ZORK, for example, the player encounters a text-only interactive underground world filled with technological and fantasy elements: "The surroundings particularly enrich the game and give context to the puzzles and figures encountered, providing backstory and helping to defamiliarize the everyday" (Montfort 2007:65). Both ZORK and ADVENTURE can be said to be strongly narrative in that they are quite textually descriptive and that their stories are embedded into their mises-en-scène. Though Jenkins doesn't mention it, there is also a technological explanation for the latter phenomenon: both ADVENTURE and ZORK took advantage not only of the then prevalent command line paradigm, but also turned a weakness into a strength by turning the uncertainty created by the textuality of both games into a positive experience of exploring both game narrative and gamespace.

Murray analyzes ZORK in the context of her properties of digital environments, considering the game to be a fantasy world of dungeons that responds to typed commands. Based on ZORK, Murray suggests that the key to creating a compelling participatory narrative world (something we would call positive valence) is to script the interactor – in our terms, to provide a formulaic, comprehensible, and usable repertoire of play-movements like, for example, "Go north," "Open the window," and "Drink water," and to further extend this repertoire (Murray 1997:79). At the same time, ZORK is traversable; its

space is navigationally created by the interactor. An event in ZORK such as a trapdoor crashing shut after the player has gone "Down" through it, is directed at and caused by the player – that is to say, the play-other responds in a surprising way. Together, participation and navigation on the basis of the computer processing rules co-create dramatic power, or that which we could call the *dramaturgical* approach to gamespace.

In contemporary digital games, we can find an abundance of Murray's encyclopedic property. In the interactive and cross-media fictions of Alternative Reality Games, players visit Websites to find clues, use databases to research puzzles, and chat with other players to collaboratively solve the fiction's challenges. In fact, these games require that all the world's resources be accessible, retrievable, and immediate in order for the narrative to successfully unfold.

## Typology

In a manner similar to Jenkins and Squire, Wolf (2001:51-75) examined screen-based digital gamespaces, concentrating on gameplay modalities reflected by visual representation. Though later, Boron (2007) critically extended Wolf's observations, Wolf was the first to attempt to set different representations and particularities of gamespace into relation, and name them. In the chapter "Space in the Video Game" of his book *The Medium of the Video Game*, Wolf lists eleven types of gamespaces, ranging from no visual space/all text based, to interactive three-dimensional environments:

- One screen, contained.
- One screen, contained, with wraparound.
- Scrolling on one axis.
- Scrolling on two axes.
- Adjacent spaces displayed one at a time.
- Layers of independently moving planes (multiple scrolling backgrounds).

- Spaces allowing z-axis movement into and out of the frame.
- Multiple, nonadjacent spaces displayed on-screen simultaneously.
- Interactive three-dimensional environments.
- Represented or "mapped" spaces.

Wolf's typology is inconsistent, although it manages to comprehensively map the historical evolution of gamespace from text spaces to one-screen spaces to 3D environments. In an attempt to formulate a spatial taxonomy, Wolf mixes qualities of gamespaces such as depth of space and point of view or traversability/navigation and representation of space. But though he mixes diverse spatial qualities of game experiences within his analysis, Wolf does not foresee or at least discuss mixed types, i.e. hybrids. Combinations of types 4 or 5 with 6 are, however, quite frequent, in this case serving as the basis of a typical sidescrolling Jump-and-Run game. Boron (2007:28), for example, complements Wolf's rather rigid – but, all in all, helpful – typology by introducing more types of gamespaces, like, for example, isometric yet 3D-look-alike gamespace.

Still, a typological approach to gamespaces should reflect the many different ways a game can take place with or without the assistance of computing technologies. Note that the cited authors discuss digital display-based, i.e. visual spaces only. Adams (2003:4) mentions that even in digital games, we cannot think of visual space without auditory, tangible, olfactory, or other sensually evoked spaces. And in a pioneering study, Stockburger (2007:112) reflects on how sound affects the spatiotemporal nature of games, finding that in each game, there is an intrinsic rhythm that creates a sonic space that "aurally traces and defines the outer borders of the gameplay process and thus links the player's body to the machine." Type, then, can be analyzed according to the following two major inquiries:

What are the primary physiological – i.e. exteroceptive and proprioceptive – methods by which the player perceives the game? For humans, exteroceptive possibilities include vision, audition, gustation, olfaction, tactition, equilibrioception (i.e. balance), and, although not everyone may be able to perceive fluctuation in magnetic fields, magnetoception. Proprioceptive methods include the way a game is perceived body-internally, mainly by the relative position of the body and/or limbs, independent of vision. Other senses are called interoceptive senses. One example of such a sense is nociception, i.e. pain reception, a term coined by Charles Sherrington (1906) in *The Integrative Action of the Nervous System*, offering a design space for games that has been successfully examined with the help of the PAINSTATION (2001) game machine installation. PAINSTATION penalizes players of a PONG arcade game using heat impulses, electroshocks and a miniature lashing whip built into the machine.

## Perspective

Panofsky's (1991) influential essay from 1927 tied the idea of perspective to the idea of how an artistic image depicts space, how the image is produced technically, and how it is perceived, as opposed to classifying the depicted form. It could be argued that our eyes render a physical space as a series of images, that this stereoscopic image projection can be mathematized, and that like everything else we see, it is subject to perspective. However feasible this argument, speaking of a physical experience solely in terms of an image experience – which, if one takes pervasive games into consideration, can be partially computer generated, thus complicating the issue – seems far too narrow to explain the experience of (formalized) play practices. In the context of digital games, we can, however, discuss the way that a space and a navigator through this space together produce types of perspectives. Naturally, this discussion would resemble Le Corbusier's discussion of the *promenade architecturale* as well as our discussion of play as a co-created activity.

Schwingeler (2008) focuses on the way perspective is rendered in computer game "images," adapting Wolf's typology for demonstrating the concept of perspective games and building theoretically on Manovich (2001:389), who contends that

> Computerization of perspectival construction made possible the automatic generation of a perspectival image of a model as seen from an arbitrary point of view – a picture of a virtual world recorded by a virtual camera.
>
> [And further:] The perspective algorithm, a foundation of both computer graphics and computer vision, is used to generate perspectival views given a geometric model and to deduce the model given a perspectival view (ibid.:395).

So according to Manovich, geometric, i.e. algorithmic vision, is subject to automation. Schwingeler suggests a name for this hyper-subjective view of the player in games: arbitrary perspective (2008:140). Perspective in videogames is simulated and fully mathematized, as Wolf and Boron demonstrated. Manovich and Schwingeler, for their part, show that in comparison to Renaissance perspective, the construction of perspective in videogames engenders infinite possible points of view. This finding can, in turn, be related back to Salen and Zimmerman (2006:67), who commented that "space, it seems, is in the eye of the beholder."

Taking all this research together, we suggest three possible player perspectives for primarily visually transported games or play situations:

- A first-person perspective for fully physical experiences.
- An arbitrary perspective for fully computer-simulated, i.e. virtual experiences.
- A hybrid perspective for experiences involving both physical and virtual experience.

## Primary and Secondary Functions of Ludic Space

In an article for online game development portal Gamasutra.com, Adams introduces the concept of architectural functions to the discussion of space and spatiality in videogames. In a hands-on discussion mainly directed at professional level and game designers, the term architecture is used to connote the "traditional role of designing constructed edifices and landscapes" (Adams 2003:3). According to Adams, then, architecture embodies graphically constructed ludic space in videogames.

Adams distinguishes between two different functions of architecture in videogames. The first function is to present the player with challenges and shape and support the actions available; in other words, to support the gameplay of the game. The secondary function, on the other hand, is "to inform and entertain in its own right way" (ibid.). Fig. 1 paraphrases the most important forms crucial to each function. From my perspective, these functions are kinetic properties that determine how play rhythms come into being. Note that the "exploration" fails to describe what Adams means in architectural terms; as a substitute, I suggest using the term "orientation," which also embodies the concept of disorientation (i.e. that the spatial situation affords limited orientation or none at all).

| Primary function | Gameplay role |
|---|---|
| Constraint | Provide boundaries; guide player; constrain player; challenge. |
| Concealment | Offer protection to player; hide game elements from player; surprise player. |
| Obstacles or tests of skill | Challenge player's logic and observation; challenge player's hand-eye coordination. |
| Exploration | Orient player; help player understand gamespace; in mazes: disorient player - orientation |

| Secondary function | Gameplay role |
|---|---|
| Familiarity | Offer place and event related cues to the player. |
| Allusion | Refer to real architectural styles to evoke mental images. |
| New worlds | Create a sense of unfamiliarity. |
| Surrealism | Warn player about game's surreal rules. |
| Atmosphere | Inspire an emotion via an object that gives visual form to that emotion. |
| Cliché | Set scene and establish / meet player expectation, but without referring to real-life architecture (see familiarity). |

*Fig. 1: Adams (2002): Functions of architecture in videogames*

One could argue that Adams' general view of architecture as landscape and structure, as well as his view of architecture in videogames, seem quite conventional. Although Adams himself even suggests as much, it is undeniable that his contribution has been highly valuable, at least for the field of game design, in that it helped establish a vocabulary of spatial configurations and their effect on gameplay. In our opinion, the underlying assumption of Adams' model can be traced to the father of architectural modernism, Lewis H. Sullivan, and his widely known design law, derived from natural observation, that "form ever follows function" (Sullivan 1947:208). So how does Adams relate to Sullivan?

We can illustrate the relationship between the two by applying Sullivan's "law" to an *ideal* videogame. A design brief for such a hypothetical game would likely mention that the desired result should:

- have a form that makes clear to the player what type of game it is (for example, an action-adventure game);
- express to the player both its inner life – "the native quality"

(ibid.: 207) that many would agree is the game's rule-base – and the nature of its materials, construction, and purpose;
- reveal its structure when played;
- avoid unnecessary decoration.

Although (or because) Sullivan's "law" may indeed be somewhat conventional and has been widely criticized as a principle of a biologistic Modernism, it is part of the accepted architectural discourse and a compulsory topic in architectural and other design schools.

## Additional Primary Functions

In her German language master's thesis in architecture at the University for Applied Sciences Bochum, Küttler (2006) refers to both Sullivan and Adams – so implicitly to the former, explicitly to the latter. Küttler expands Adams' model and makes some valuable observations that complement his functional hold on gamespace. Unfortunately, Küttler dismisses Adams' orientation function without clearly explaining why. We can understand Küttler's categorization as a hands-on and helpful approach to aspiring designers for considering kinetic forms embedded into the gamespace. Because Küttler argues descriptively, often forsaking a structured and obvious system of sub-classification:

*Boundaries:* Adams calls this category constraint, cf. Adams (2002). A game needs borders. These can be macro borders that define the gameworld (e. g. an ocean shore as the end of the world) or micro borders that guide, restrict, or divert the player (e. g. a street, an open door, obstacles blocking the player's path). In a very concrete sense, boundaries are representations of the demarcational concept of the magic circle.

*Game content and game goal:* Architectural design and urban planning can be both the content and objective of a game. The game's main function, then, is designing, constructing, and managing, all of which are embodied in the "creation" play stimulus (Fritz 2004).

Adams and Rollings (2006) suggest a whole genre for this function, which they call "construction and management simulations." Likewise, Küttler, Adams and Rollings cite SIMCITY (1989) as the most typical computer game that represents free-form construction and construction from default settings (Adams and Rollings 2006:596).

*Challenge and opponent:* Adams calls this category "obstacles or tests of skill" (Adams 2002). Küttler means that architectures in games often represent challenges that must be overcome by the player or sometimes even opponents that must be vanquished by the player. Küttler offers the example of the TONY HAWK'S (since 1999) skateboarding game series, in which a player must look for a ramp on which to perform an ideal stunt; for that player, the environment actually becomes the opponent against which one must play. In her contribution to the book Space Time Play, Küttler reviews TONY HAWK'S and, in doing so, clarifies the terminology. When architecture in TONY HAWK'S becomes the challenge of the game and topography the opponent, Küttler explains, the role of architecture can also serve as ally. When the player spots a perfect edge for carving (Küttler 2007:125), for example, the environment is not longer foe, but friend. Küttler suggests we call this phenomenon an utilizability function. But is Küttler's characterization sufficiently precise? Not all environmental challenges, topographical or not, automatically render an environment an opponent. Thus we suggest differentiating between degrees of functional opposition. Depending on the type of kinesis involved, these degrees could be characterized as follows:

- Challenge: The gamespace or property thereof minimally challenges the player (for example, a gap to jump across).
- Opposition: The gamespace or a spatial property thereof opposes the player in a problem situation for which a solution exists.
- Antagonism: The gamespace or a spatial property thereof strongly oppose the player throughout gameplay or for a portion of gameplay.

- Assailantism: The gamespace or a spatial property thereof attacks the player.
- Protection: In Adams' model (2002), this is known as "concealment."

As the player's ally, the gamespace can protect or support the player in performing an activity. For example, environmental shading in stealth games serves the protection function. Similar to the degrees we have defined for functional opposition, we can also detect varying qualities of spatial support, which we can term functional support. We suggest some exemplary, architecturally sound terms to describe positive interactions between player and gamespace: alliance, adjustment, support, etc.

- Symbol: Like McGregor (2007), Küttler recognizes the symbolic function architecture can have in gameplay and cites construction simulations in which functionalities are symbolized by architecture.
- Game progress reward: Graphical representations can serve as a reward and, simultaneously, an incentive.
- In the GOD OF WAR (2005) Playstation 2 game, the lavishly beautiful graphics encourage the player to keep on playing, to explore the next section in the game. The same can be said of the architecture in ICO (2001). Pre-rendered cut scenes serve a similarly encouraging function.
- Architecture as an interface to player reality: In designated digital environments such as SECOND LIFE (2003), player-created content such as clothing, houses, vehicles, animations, or games is not only permitted, but constitutes the basis of the world's attraction.

Today, we understand that a game such as SPORE (2008) takes the idea of player creation much further, letting clients create not only world objects, but also creatures, which can then be shared with other players during gameplay. Players create their own gameplay and gameplay world within the constraints of the game's design. Because Küttler's term is a bit clumsy, we suggest renaming this category "player-created architecture."

## A Merged Model of Functional Forms

Küttler (2006) provides four new functional categories for how architecture in games supports gameplay, while paying no further heed to Adams' "exploration" function. If we merge both models, insert findings from other researchers, and include the suggestions presented in our own critical discussion, we can identify eight primary functions in the construction of ludic architecture:

- Constraints and boundaries
- Concealment and protection
- Opposition
- Orientation
- Objective
- Symbol
- Reward
- Player creation

Secondary functions, as can be seen from Adams' list, are functions that program mindset and emotion in the player. As Fullerton (2008) argues, they serve dramaturgical ends, whereas primary functions serve formal ends. Secondary functions are thus responsible, for example, for what can be called spatial premise. We will thus call primary functions formal functions and secondary functions dramaturgical functions. The latter assist in arousing feelings of association and

curiosity in the player, to which the gameplay then caters. Stylistically speaking, the expectations raised by dramaturgical functions can be ignored, rather than met. For example, it can be charming to set a game in the desert, give it a Western feeling, and then merge it with an alien zombie theme.

It is thus clear that the list of dramaturgical functions suggested by Adams can be extended endlessly and that the inscenation of gamespace is, rhetorically speaking, a question of stylistics discussed, as it were, throughout *Space Time Play* (von Borries et al. 2007).

## Space and Spatiality in Game Research

In this contribution, we gathered major academic and game design approaches for explaining how space in games is constructed and how it constructs games, yet ignoring approaches to games in architectural research, as well as leaving out how play types fundamentally relate to space, and vice versa, as described in Walz (2009).

Based on these collected approaches, we can conclude here by offering several typical questions one should ask about games when considering their spatial construction and programming. These questions should be helpful for anyone analyzing or designing games. Fig. 2 provides an overview of the concepts introduced, each concept's major inquiry, and a classification of the various types of approaches. The table sums up the dimensions of our conceptual gamespace from a game research perspective; these are the locative, the representational, the programmatic, the dramaturgical, the typological, the perspectivistic, the form-functional, and the form-emotive dimensions.

| Concept | Contributor(s) | Inquiry | Approach |
|---|---|---|---|
| The Magic Circle | Salen and Zimmerman (2004) | Where and when does a game take place, and how is it demarcated or does it demarcate itself from the everyday? | Locative |
| Allegory | Aarseth (2007) | How does the digital game represent and implement space and with the help of what kind of physicality deviation? | Representational |
| Contested space | Jenkins and Squire (2002) | How are the game environment and game elements implicitly and explicitly constructed to program kinesis and play rhythms (i.e. gameplay)? | Programmatic |
| Narrative | Pearce (1997); Murray (1997); Jenkins (2007) | What experience does a spaceplay designer intend to bring forth? How is the narrative embedded into the game? How can the player participate? And how can the story be navigated? | Dramaturgical |

| | | | |
|---|---|---|---|
| Type | Wolf (2002); Boron (2007); spw | What are the primary physiological methods by which the game is perceived, and what are the main spatial qualities these methods use? | Typological |
| Perspective | Manovich (2001); Schwingeler (2008) | Which of the theoretically infinite number of perspectives does the player take on to play the digital game, over time? | Perspectivistic |
| Primary & secondary function | Adams (2002); Küttler (2006) | How is the gameplay of a videogame supported and instantiated by game architecture, and how does this architecture affect the player? | Form-functional and form-emotive |

*Fig. 2: Overview of gamespace dimensions in game design research*

Our table illustrates that the wide variety of computationally driven as well as coming hybrid ludic spaces can be approached from a number of perspectives. Eventually, the table also underlines that for both designerly and analytical purposes, a more wholesome view of space and spatiality in games is needed; this will address a game situation from at least the standpoints we have identified.

This paper is a revised version of a chapter appearing in the author's forthcoming book *Toward a Ludic Architecture. The Space of Play and Games*.

## References

**Aarseth, Espen** (2007): "Allegories of Space. The Question of Spatiality in Computer Games", in: *Space Time Play. Computer Games, Architecture and Urbanism – The Next Level*, ed. by F. von Borries, S.P. Walz und M. Böttger, Basel et al.: Birkhäuser, 44-47 [2001].

**Adams, Ernest** (2002): "The Role of Architecture in Video Games", http://www.designersnotebook.com/Columns/047_The_Role_of_Architecture/047_the_role_of_architecture.htm.

— /**Rollings, Andrew** (2006): *Fundamentals of Game Design*, Upper Saddle River: Pearson Prentice Hall.

**Boron, Dariusz Jacob** (2007): "A Short History of Digital Gamespace", in: *Space Time Play*, 26-31.

**Borries, Friedrich von/Walz, Steffen P./Böttger, Matthias** (Eds.) (2007): *Space Time Play. Computer Games, Architecture and Urbanism — The Next Level*. Basel et al.: Birkhäuser.

**Crawford, Chris** (1997): *The Art of Computer Game Design*, Chap. 1, http://www.vancouver.wsu.edu/fac/peabody/game-book/Chapter1.html [1982].

**Fritz, Jürgen** (2004): *Das Spiel verstehen. Eine Einführung in Theorie und Bedeutung*, Weinheim: Juventa.

**Fuhrmann, Manfred** (1990): *Die antike Rhetorik. Eine Einführung*, Munich/Zurich: Artemis.

**Huizinga, Johan** (1955): *Homo Ludens. A Study of the Play Element in Culture*, trans. by R.F.C. Hull, Boston: Beacon [1938].

**Jenkins, Henry** (2007): "Narrative Spaces", in: *Space Time Play*, 56-60 [2004].

— **/Squire, Kurt** (2002): "The Art of Contested Spaces", in: *Game On. The History and Culture of Videogames*, ed. by L. King, New York: Universe, 64-75.

**Küttler, Dörte** (2006): */spiel/architektur. Architektur und Stadtraum in Computer- und Konsolenspielen*, Master's Thesis, University for Applied Sciences, Bochum.

**Lefebvre, Henri** (1991): *The Production of Space*, trans. by D. Nicholson-Smith, Oxford: Basil Blackwell [1974].

**Manovich, Lev** (2001): *The Language of New Media*. Cambridge/London: MIT.

**McGregor, Georgia Leigh** (2007): "Situations of Play. Patterns of Spatial Use in Videogames", in: *Situated Play. Proceedings of DiGRA 2007 Conference*, http://www.digra.org/dl/db/07312.05363.pdf.

**Montfort, Nick** (2007): "Zork. Text-based Spatiality", in: *Space Time Play*, 64-65.

**Murray, Janet** (1997): *Hamlet on the Holodeck. The Future of Narrative in Cyberspace*, Cambridge/London: MIT.

**Nitsche, Michael** (2009): *Video Game Spaces. Image, Play, and Structure in 3D Worlds*, Cambridge/London: MIT.

**Oerter, Rolf** (1999): *Psychologie des Spiels. Ein handlungstheoretischer Ansatz*, Weinheim: Beltz.

**Panofsky, Erwin** (1991): *Perspective as Symbolic Form*, trans. by C.S. Wood, New York: Zone [1927].

**Pearce, Celia** (1997): *The Interactive Book. A Guide to the Interactive Revolution*, Indianapolis: Macmillan.

**Salen, Katie/Zimmerman, Eric** (2004): *Rules of Play. Game Design Fundamentals*, Cambridge/London: MIT.

— (2006): "Game Space. What does Space Contribute to the Experience of Play?" in: *The Game Design Reader. A Rules of Play Anthology*, ed. by K. Salen and E. Zimmerman, Cambridge/London: MIT, 64-69.

**Schwingeler, Stephan** (2008): *Die Raummaschine. Raum und Perspektive im Computerspiel*, Boizenburg: vwh.

**Sherrington, Charles S.** (1906): *The Integrative Action of the Nervous System*, New Haven: Yale UP.

**Stockburger, Axel** (2007): "Listen to the Bulk of the Iceberg. On the Impact of Sound in Digital Games", in: *Space Time Play*, 110-113.

**Sullivan, Louis H.** (1947): "The Tall Office Building Artistically Considered", in: *L.H. Sullivan: Kindergarten Chats and Other Writings*, New York: Wittenborn, 202-213 [1896].

**Walz, Steffen P.** (2009): *Toward a Ludic Architecture. The Space of Play and Games*, Pittsburgh: ETC.

**Wigley, Mark** (2007): "Gamespace", in: *Space Time Play*, 484-487.

**Wolf, Mark J.P.** (2001): *The Medium of the Video Game*, Austin: Texas UP.

ADVENTURE (1976), Will Crowther/Don Woods, PDP-10.
GOD OF WAR (2005), Sony Computer Entertainment, Playstation 2.
ICO (2001), Sony Computer Entertainment, Playstation 2.
PAINSTATION (2001), //////////fur//// art entertainment interfaces, Installation.
PONG (1972), Atari, Arcade.
SECOND LIFE (2003), Linden Lab, PC Online.
SIMCITY (1989), Maxis, PC.
SPORE (2008), Electronic Arts, PC.
ZORK: THE GREAT UNDERGROUND EMPIRE (1980), Personal Software, Apple II.

TONY HAWK'S (since 1999), Activision, Playstation.

## Biography

**Steffen P. Walz**, PhD
Senior Research Associate in the Computer Aided Architectural Design Group, ETH Zurich.

Research:
Game Design Research, Game Architecture, Pervasive Games, Cross-Media Games, Mobile Games, Serious Games, Interaction Design.

Publications:
– *Toward a Ludic Architecture. The Space of Play and Games*, Pittsburgh 2009.
– *Space Time Play. Computer Games, Architecture and Urbanism* (ed. with Friedrich von Borries und Matthias Böttger), Basel et al. 2007.

spw.playbe.com
walz@arch.ethz.ch