Counting barrels in Quake 4: affordances and homodiegetic structures in FPS worlds

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ABSTRACT

Since the release of Half Life (1998), first-person perspective games can be seen to drive towards an unbroken immersive experience, with fewer breaks from real-time delivery. Simultaneously, a move towards ever greater complexity and depth of game content can be seen, although the basic ludic structure of the genre has remained relatively unchanged. A discontinuity is thus established which places pressure upon the homodiegetic devices used to deliver an immersive experience. In this paper, the concept of affordances is used to illustrate the essential ludic structure of first person gaming, and ludodiegesis, a concept used to understand homodiegetic devices as means of managing immersion, is introduced to offer examples of how this discontinuity can be effectively managed.

Author Keywords

First person, games, player experience, psychology, game content

INTRODUCTION

Modern first-person games [1] can be characterized by an increasing integration of story and play. One can trace a move, beginning with Valve's Half Life (22) away from the string-of-pearls style of play/story management typified by cutscene and text-based loadscreen progression that can be found in earlier FPS games. Far Cry (5), Prey (11), Doom 3 (12), Quake 4 (13) and Half Life 2 (23) all attempt, with varying degrees of success, to integrate their narrative content with real-time gameplay, reducing the amount of information existing outside this framework. In narrative terms, one can see an emigration from heterodiegetic to homodiegetic devices, that is, literally moving the content in-world, into the reality presented. Those games which still utilize cutscenes do so sporadically, and mainly for effect,

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[1] Although we shall use the generic acronym FPS in this paper, it should be noted that we include non-combat orientated first person games within the genre.

as is the case in Quake 4 or Doom 3, or integrate them as alternate perspectives or devices for increasing narrative intrigue through the act of removing control from the player, as with F.E.A.R. (19).

This shift to in-world content places an increased pressure upon the game engine, as it is now expected to effectively fulfill two simultaneous functions that, as has been extensively noted, may often be antagonistic to one another. At the same time, the complexity of the offered experience in terms of what we may call its depth of reality has also increased, in terms of both graphical fidelity and artificial intelligence attached to agents and persistent NPCs. In keeping with the increase in the illusion of a complex reality, more complex narrative arcs and goal systems have emerged from these games. It is no longer acceptable to simply run from one location to another, blasting everything that moves, or hit one big red button after another. Complex worlds require complex sequences of action to maintain their viability, and this causes something of a problem in a genre based around a very simple ludic structure. In other words, recent developments in FPS gaming illustrate a discontinuity between ludic structure and depth of present reality, which places the immersiveness of the experience under strain. In this paper, we shall investigate this discontinuity, by firstly introducing the use of affordances, a concept drawn from J.J. Gibson's ecological perception theory (9) to elucidate and support a conceptual diagram of FPS ludic structure and to demonstrate that this simple structure has remained more or less unchanged in most FPS sub-genres. Through the use the ludodiegesis construct, designed to expose the pro-immersive functionality of homodiegetic devices and their epistemological impact upon play, we shall then offer some examples of how this discontinuity has been effectively tackled, or not, as the case may be.

AFFORDANCES

There are basically two major theories of visual perception, described by Bruce et al (2) as ecological and cognitive.

Whilst the criticisms of the former add up to a convincing repudiation (7, 16, 18), some of its conceptual tools are interesting and useful for game studies.

Perception, depending on one's affiliation to one of the camps, is either directed or direct. In other words, it is either mediated or controlled (and it should be noted that this does not refer to conscious control), or it occurs without mental processes being required. The latter is the essence of Gibson's model: that all necessary information exists in the environment and percepts (mental models) are simply extraneous, thus unlikely. Hochberg puts it thus:

"…his proposal is the many or most of the properties of the perceived world are evoked directly by the variables of stimulation that the sensory system receives from the normal ecology, and not the end-products of associative processes in which kinaesthetic and other imagery come to enrich two-dimensional and meaningless visual sensations with tri-dimensional depth and object meaning." (10:17).

In other words, Gibson argued against the existence of percepts as the basis of the conversion of signal into meaning. Instead, he argued that the environment contained enough information in itself and introduced the concepts of affordances and invariants to support this idea. An invariance is a fixed point of reference within a visual field, an idea that finds some analogy with Plato's ideals. For example, a table, viewed from a plethora of angles, nevertheless contains invariant data, allowing it to protrude from the field in an identifiable manner. Affordances have proven very useful, if somewhat contentious in the field of the field of virtual reality (1, 6, 21) as they replace the phenomenology of physical properties with an action-based set of properties. Zahorik & Jenison sum this is up:

"A basketball is not represented by the features *round, orange* and *rubber*, but instead is viewed for it *throwability, its rollability, or its bouncability* by the system." (24:84)

The concept of affordances is a powerful tool in ludic analysis, as the environments presented in FPS games are vastly reduced artificial systems whose affordances are, by definition, non-accidental. In other words, although there remains space for the interpretation of devices, events and sequences, fixed and self-evident affordances can nevertheless be extracted from the field of stimuli. Or even, we can assert that everything in a virtual space exists for a reason, whether or not this is explicitly designed into the action structure. A floor in Quake 4 affords the action of walking upon; a health kit, when activated by co-location, affords a state change to the avatar. A particular type of affordances can be described: ludic affordances, those that enable a direct play action to take place. Further, we can divide the types of affordances we find in FPS environments into two classes – those attached to the environment, and those attached to the avatar. Within these

classes, we can identify distinct affordances types as follows.

Some objects within an environment have no ludic affordances; they afford no action. They may retain a function in terms of aesthetics, engagement or narrative, but they remain oblivious to the activity of play - although this is not to say, however, they do not assert an active influence upon player behaviour. As an example, Strogg computer terminals are a common sight throughout Quake 4, but these are for the most part inert and static. They have a function in terms of corroboration of the reality, but that is the limit of their involvement in play; the player cannot manipulate them, they do not allow any action or force a state change (unlike the ubiquitous radioactive slime pit of the sci-fi shooter). This lack of affordances extends to passive interaction: the player cannot use them for cover or climb upon them. This differentiates them from the second type: those objects that yield an environmental affordance. Such items have fixed and permanent function. Floors afford walking on; stairs afford the transition between vertically distinguished spaces. These are to be further distinguished from those objects that may be said to be passive in their affordances. The range of affordances in these devices are expanded, but fixed and permanent, and reliant upon activity initiated elsewhere. Static barrels and crates are the definitive item in this type; a player may hide behind a crate for example, but there are no internal states to the object itself. The affordance of cover is not altered by its activation, in other words. Crucially, there is also no trigger for these affordances, unlike a door that requires 'opening' – the use of an affordances attached to the avatar, such as movement or interaction. In the case of Quake 4, where most useable doors are automatic and operate simply with avatar proximity, we may be tempted to include them in this type.

Fig 1. A Strogg terminal in the wall yields no ludic affordances. By contrast, the wall itself does exert an affordance upon play, in the form of a constraint to

movement, which may be seen as an aid to ludic navigation through the game world.

Those items which contain more than one state, or whose affordances may be permanently affected by interaction deserve separate classification. A manually operated door thus has two states, open and closed, that exert control over its other, more basic affordances, such as exerting a control over movement or visual perception. Power-ups, be they health kits or ammo clips, also fit this category, as they exert an active influence upon play, but require triggering: avatar co-location being the most common. What distinguishes these objects is that this triggering yields a state change in the object itself (upon trigger, it vanishes from the environment in the case of most power-ups). An example from Quake 4 would be the Strogg health terminals that when operated, deliver a positive state change to the player up to an internally determined maximum value, at which point the device literally exhausts its affordances and reverts to a passive item. This last point may be seen as evidence that a dominating temporal-structural characteristic of FPS environments is tendency to move towards a simplified state as play progresses. We should use this category to separate out the common exploding barrel device from its more inert counterparts. We should also note a distinction between ludically significant affordances and insignificant affordances. However, although this distinction is sometimes clear, often the degree of significance will be a matter of subjective state of play. A health kit only really becomes significant when it is needed, for example.

Fig 2. The static crates offer passive affordances – they have no internal states. The armour and ammunition afford a state change to the player's avatar but require activation through co-location (these are singular affordances, the objects are removed from play once the affordances are activated). The troops are independent, they have internal states and self-managed affordances. The lead troop is also attached to a singular affordance – he gives the player a new weapon (a parameter upgrade)

Enemy avatars should also be considered as a type of device that exert a self-contained influence upon the game. Agents are the primary example of this: each is equipped with both a range of affordances and at least two states, and a sub-set of the former are capable of deployment within the game space without any triggering. The potential for affordance is anchored within the state of the object itself, and this state is active and independent. Thus, unlike a button-activated lift, a Strogg grunt exercises its own capabilities for movement and affecting state-changes to other objects within the world, principally, of course, the player. We can also consider timed sequences to belong to this category: once triggered, a cascading sequence may be seen to have its own internal momentum that will continue independently although, of course, it may be subject to further influence by the player. For example, consider a sequence, initiated originally by the player's location within the environment, which establishes an NPCs attempt to reach a location and trigger a further device – planting a bomb would be an appropriate FPS example, although on could also consider the actions of friendly NPCs attempting to reach a location – the now common goal of 'Protect X while they do Y' - Quake 4 utilises this goal structure repeatedly. Within this sequence, the actual actions of the NPC are nonetheless independent, as is their state change (unless the player impinges upon this). In other words, the would-be bomber will move about the environment, presumably avoiding negative state-changes and optimising their chances of achieving their goal. In the case of friendly NPCs, this may, and in Quake 4's case certainly will, include the capacity to both avoid enemy avatars and actively, and tactically engage them.

There is an additional, special class of objects: those whose affordances are singular and critical to game progression. Exit buttons are the obvious example here, but some keycards or specific objects may also be included. It is important to note that some of these objects may, one serving their critical function, revert to another class. An example here would be a new power-up, say a new weapon. Finding this item may be introduced as an episode goal – one of Marathon's episodes (3) is based around finding a Fusion weapon – but once this is accomplished, the item's upgrades are added to the player's capabilities, or their affordances are expanded where appropriate, such as with a new nanotech augmentation in Deus Ex (14). Cutscene triggers are another important device within this class and, obviously, these specific affordance triggers are often closely mapped to narrative progression within the game. In a real sense, this type of device is the point at which narrative and ludos may co-exist in real time within the game space. Identifying them from this perspective provides a means of evading the traditional narrative / interaction opposition by identifying points where ludic activity is focussed onto a singularity, thus enabling a linear or entirely self-enclosed state-change to be made upon the

overall game experience. It should be noted, however, that these critical affordance objects are being distinguished from other active affordance objects that, in a manner of speaking, are also critical to play. In other words, without opening a door, play will be restricted and progression suspended. The distinction is made on singularity, and direct relationship to goal: Quake 4 contains many doors and lifts to be activated, but only one of each of the critical objects, and there is no direct reward attached to each of the former.

We should also consider the player's avatar as a device with it's own set of affordances, and it is there that we can directly illustrate the ongoing simplicity of FPS play. Quake 4's avatar affords eight basic actions, each with a range of adjustable parameters: *Move* in four cardinal directions, including strafing; *Look* in 360o; temporarily move the avatar up the vertical axis by *Jumping*; move the avatar down the vertical axis by *Crouching*; use the *Flashlight* to alters the parameters of *Look* by increasing visibility in dark areas; *Shoot*, or exert a (negative) state change upon objects in the environment; and *Absorb* negative state changes from the environment. Finally, *interact* is limited as an affordance to those objects who have an active or one-off affordances attached to them available to the player (lift buttons, or end of level exits). Interact is thus not a generally available affordances. Every action in Quake 4 falls into one of these categories, and every change to the avatar reduces to altering the parameters by which these affordances may be carried out. Yet, according to the story and reality presented by Quake 4, Matthew Kane is party to hacking the Strogg communication grid, planting demolition charges, being cybernetically altered beyond the human, defending convoys, rescuing squad mates and so on. There is a discontinuity between the actions available to the player and the actions presented by the game, and this discontinuity may be found in all contemporary FPS games. Indeed, Half Life 2 shares this affordances set. F.E.A.R. extends it by adding a bullet-time function; Thief: Deadly Shadows (15) increases the parameters of movement adjustment with wall-hugging and greater significance of crouching; Prey adds a spirit walking, which establishes an separate and distinct set of parameters to the same basic affordances, allowing a different degree of movement. Even RPG-crossover games such as Deus Ex do not deviate far from this, they add an enlarged degree of configurability, or player-control, to the determination of the parameters of the affordances, but once again, even the ability to crack locks and hack computers does not really extend the eight principal affordances in any significant way. FPS games are inherently simple, there is a distinct reason for this, and we suggest it revolves around the epistemological process of manipulating how a player behaves in play. Before turning to this, we should consider the fundamental ludic structure of the genre itself, as a means of further illustrating the

discontinuity between complexity of presented reality, and underlying structure.

LUDIC STRUCTURE
One might argue that little has changed in FPS games since 1973's Maze War:

1. An environment is presented for exploration. You may move through this environment in a number of standard ways (turning on the vertical axis 360°; moving in the four cardinal directions; possibly moving vertically by jumping, climbing or falling).

There is at least one other hostile avatar within the environment. This avatar may be controlled by a computer or another player.

2. You have the capacity to negatively affect this avatars state at a distance, within constraints such as range or accuracy. Usually, you will require line of sight to affect this change.

3. The avatar has the capacity to negatively affect your state, with similar constraints, and will endeavor to do so.

4. Both player and avatar have a finite capacity for negative state changes. Beyond this point, either you will die and the game will be over, or the avatar will die and the game (for you) will continue.

In addition to these basic rules, modern FPS games also use an increasing amount of embedded objects to enhance play.

5. In addition to static, passive, embedded details and decoration, the environment may contain a number of objects that will affect change. These may be taxonomised as follows:

    a. Objects which positively affect your state, for example health kits

    b. Objects which raise your basic capabilities, for example, new weapons or power-ups

    c. Objects which negatively affect your state: slime pits or lava

    d. Objects which may be manipulated to change the environments state: doors, levers, buttons

Some of these objects will affect change automatically, through co-location or by proximity. Others may require active manipulation by the player.

Further, we can split FPS gaming into single and multiplayer. The occasional co-operative multiplayer FPS

notwithstanding, generally multiplayer games take place within a single map:

    7i. Multiplayer FPS games are usually played with a set goal. Once this goal has been completed the game ends. Examples of this goal include:

        a. Play continues until only one player is left

        b. Play continues until the first player reaches a total score (usually determined by the number of kills they have accumulated).

        c. Play continues for a predetermined time, after which the player with the highest score wins and the game ends.

        d. Play continues until one player has achieved a predetermined goal, which involves affecting the environment in a particular way (the classic example of this being Capture the Flag, which requires a player to relocate an object from one set of environmental co-ordinates to another).

        e. Some multiplayer FPS games allow players to co-operatively play in teams against opposing teams. In these cases, 'player' can be replaced by 'team' in all the above rules.

Single player FPS games tend to be episodic, and thus generally apply rule 7d in one form or another. Rule 7 can be written as follows for single player games

    7ii. FPS games are based around the completion of a set goal. This goal is achieved when a predetermined state is present in the environment. This state may be predicated on population of environment (nothing left to kill); location of player (found the secret room); manipulation of an object (flipped the switch); or relocation of an object (retrieved the circuitboard). This list is not exhaustive, but represents the vast majority of all FPS goals.

Finally, the eighth rule distinguishes FPS titles from other genres.

    8. All perceptual action in the game is carried out using a direct mapping between player and avatar perspective, even if these do not obey normal rules of physics and perception.

The vast majority of single player FPS games thus work within a very basic ludic structure. An (unknown) environment, filled with objects and avatars is presented. As play progresses, the environment becomes both more known and less populated – it simplifies. At the point of highest simplicity, the game ends; in more prosaic terms, when there is nothing left to kill and no doors left to open, the chances are the level is complete

Regardless of this essential simplicity, it is clear that contemporary FPS games attempt to widen and deepen the affective experience of play. Freeman's concept of emotioneering (8) is recognizable in the attempts to attach emotional significance to the increasing numbers of persistent NPCs we find in the genre. The information load of the environments are richer and more complex in structural terms. Temporal sequences and inferred histories are commonplace: inter-NPC relationships are more dynamic and more visible; non-ludically significant details fill the corridors and citadels. In short, the presented world has increased in complexity, which runs the risk of presenting a higher expectation of affordances, whilst the actual structure and affordance set available have remained consistent and small. Ludodiegesis is concerned with the management of this discontinuity.

LUDODIEGESIS

Why does Doom 3 fail where Quake 4 succeeds? This has been ascribed to a lack of narrative progression, characters to empathize with, overly similar level design, poorly defined goals and repetitive action sequences. We would like to suggest another potential reason and, in doing so, highlight the essential approach of the ludodiegesis model: Doom 3 does not deliver what it promises the player in terms of the depth and complexity of the reality on offer.

Ludodiegesis is drawn from a player experience perspective based upon observations from cognitive science (20). It argues that our conscious experience of reality is formed from a subset of available information and, further, that this natural filtering system is historically manipulated to great effect by a large number of non-technological virtual realities such as ritual. Simply put, we are pre-disposed to accepting reduced sets of stimuli as significantly real. That is not to say we are fooled for a second into thinking game worlds are *really* real, but that we can operate seamlessly within them as if they were real on their terms, according to their rules, and within their affordance sets without problem, provided the reduction is managed and maintained effectively. Ludodiegesis thus looks for the epistemological function in homodiegetic devices that may or may not have a direct ludic significance, or attached ludic affordances. The relationship between Kane and Tech Strauss in Quake 4 is a good example of this. Strauss certainly serves some ludic functions: it is he that hacks the Strogg's computer systems and essentially delivers the Nexus, under Kane's protection. The kinds of acts that are necessary to fulfill Quake's world of sci-fi war, such as the ability to use a computer rather than just blow them up, do not fall within the affordance set of the avatar in any convincing way: Quake makes some effort to evade the 'big red button' school of supercomputer use that dominates early FPS titles. Necessary actions are thus mapped across to NPCs to deliver, enabling the affordance set of the player to be virtually expanded-by-affiliation. Further, Strauss is

characterized as an arrogant genius figure, positioned above Kane in terms of status. Quite literally, Strauss does the thinking, he tells the player what to do. There is no expectation of Kane to actually engage with the Strogg mainframe, just to protect the man who can. Strauss' non-ludic attributes can therefore be seen as exerting an influence upon player behavior; they are significant in terms of setting expectations on the player's part. This kind of need-to-know approach to solutions can be found in the relationships between Gordon Freeman and Alyx Vance in Half Life 2; Doyle and Carver in Far Cry; the unnamed cyborg and S.H.O.D.A.N. in System Shock 2 (17).

Non-ludically significant homodiegetic devices, in other words, may not contain any affordances themselves, but they may be used to influence, or directly constrain, the affordance set of the tool the player uses to interface with the reality, the avatar. In Quake, the player becomes swiftly used to obeying orders, not seeking solutions to anything other than the immediate situation themselves; they exist within a structure than controls their interface with the wider reality. Similarly, Cortana acts as the interface between play and the epic mythos that gives Halo (4) its charge.

Doom 3, by contrast, opens with a world that both supports a fair degree of environmental interaction, and offers a complex reality – the player meets a large number of characters, all with a perspective on the events unfolding as part of the narrative conspiracy. This complexity is withdrawn incredibly rapidly, sudden stranding the player in a reality that has shrunk massively in size. Although a sense of isolation is important to many FPS games, with recurrent invasion and escape themes legitimizing the lengthy periods of lone activity, this needs careful management in order to not appear artificial and constraining. The early levels of Doom 3 maintain the sense of a wider, external reality through the radio broadcasts of panicking and overrun marine squads, but once the trick of radio silence has run its affective course, the player is abandoned with reference, wholly and totally reliant upon only what is offered in the immediate ludic space. Whilst localisation reduces the need for affordances; the virtual expansion of the world beyond the play space deepens the affective potential of the experience and, importantly, allows the small actions of play to be situated within a much wider context. The opening level of Halo may essentially just comprise of repetitively engaging Covenant forces within featureless identical corridors, but this small action is understood in the context of a desperate escape from a starship in the midst of an intergalactic war and the landing on an alien artefact by the doomed crew. Significance is thus attached to the looping sequences of action. A similar tactic is used in Deus Ex, where the initial conditions of repelling a terrorist attack deepens the small actions of sneaking and shooting. This virtual expansion of world beyond the accessible subsets of environments and actions that make up the playspace is not limited to opening

environments and sequences: Quake 4 extensively uses this device, reinforcing the message that the player is a just a cog in a vast military campaign, albeit an increasingly important one, and this is made explicitly clear when Kane, helplessly undergoing Stroggification, is actually rescued by his NPC squad mates. Expanding the context for play functions as a significance management device, giving meaning to gameplay. Doom 3 is an interesting example of where this process breaks down: after early levels are significantly populated with narrative devices, the mid-phases of the game have no sense of context, rendering the action taken by the player both repetitive and, perhaps more importantly, relatively meaningless. The environment ceases to function in terms of its ludic reality, and gameplay is stripped of depth.

Thus, by placing the action in an inferred context, delivered through homodiegetic devices, Quake 4, Halo and Half Life 2 extend the world beyond what the immediate, or the available affordances set. There is only so much wandering lost, desperate to escape, without any frame of reference a player can maintain interest in, and although Doom 3 does attempt a degree of goal diversity, there is no real context for this to exist in, and the game is forced to return to the unconvincing 'big red button' version of interacting with technology. F.E.A.R. suffers this to an extent too; although the environments may change, level after level is predicated simply on the meta-goal of chasing Paxton Fettel. Players require different levels of interest to engage with, especially if a complex world is to be presented.

Thus, although integrated content presents a challenge to developers, especially in regard to managing convincing relationships with persistent NPCs – one reason why so many of which are predominantly undertaken over radio, rather than face-to-face – it is actually this homodiegetic content which enables the increased fidelity and complexity of the world to be managed. Highly detailed environments cannot help but raise expectations, as they draw upon real world schema for engagement and recognition. A phone is a highly visible known artifact, thus its real-world expected affordances need managing. F.E.A.R. uses occasional answerphone messages to manage this: bypassing the question of why a trapped operative with a malfunctioning radio would not simply call his office, but training the player to accept a reduced affordances set attached to the object: blinking red light means content can be accessed by interaction, no light and the object is inert.

MORE CONTENT, NOT LESS

Devices without ludically significant affordances are not mere embellishments that increase the sense of reality and thus the likelihood of environmental engagement, empathy and presence. They can be used to directly influence player expectations and player behavior, training a player what to expect from an environment and assisting them in accepting a small affordance set and simple structure for action.

Increases in engine technology, allowing for greater visually fidelity, scale and agency do not simply enable more content, indeed, they become increasingly reliant upon it. As the surface of an in-game world becomes more complex, so the expectations of its depth become more of an issue. It is evident that even in the classic run-and-gun shooters that operate around a hub of fast, short bursts of action, such as Half Life 2, Halo, Quake 4, Doom 3 and F.E.A.R. the need to use more complex non-ludic structures such as narratives or characterizations has been noted, and when these games are at their best, exploited effectively. Those games that offer more complex affordance configuration, such as Deus Ex, System Shock, or Thief, use these structures as contextual devices to assist the player in attaching meaning to their configurations, to make sense of the difference between one augmentation or another on the basis of their 'real world' functions.

It has been argued that describing in-game objects according to their affordances – what action they enable – is a powerful means of understanding the underlying structure of FPS environments. Further, asking what affordances an avatar has available, and seeing progression as a means of parameter configuration, assists analysis by exposing the simplicity of most available actions and highlighting the discontinuity between system affordances and presented world. It has been further argued that by looking for the epistemological function of devices which may not have any ludic affordances can help understand how games train players to avoid the problems of the system/presented reality discontinuity. This approach leads us to the conclusion that as FPS worlds become more sophisticated and detailed, so they rely ever more on well crafted content in order to stand-up to the scrutiny of play. The re-emergence of the story-driven shooter is not accidental – homodiegetic devices are at the core of managing an effective and convincing ludodiegesis.

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