Playful ambience

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ABSTRACT

This research started in 2004 as a search for a pervasive game equivalent of Brian Eno's ignorable ambient music, such as 'Music for Airports'. Brian Eno explicitly stated that the attention of listeners might alter over time, from ignoring to listening intently to the music; the ambient music pervading an environment and creating a mood, "it must be as ignorable as it is interesting" (Eno, 1978) Listeners might come across the music and then choose to what extent they engage with it.

Defining ambience, and ambient properties, was particularly challenging. The concept of ambience, especially when applied to games, was not immediately clear. Building on the definition of ambience developed by Brian Eno for music (ibid.), fundamental properties of ambience as applied to games were posited. These properties included ideas of different levels of engagement by players, different levels of affect, persistence of the game when players are not present and the context of the game (where, when, who).

The game design research methodology (Dishman, 2003; Eglin, Eyles, & Dansey, 2008; Eyles, 2008b; Zimmerman, 2003) developed for this research was used with phenomenological methods (Krzywinska, 2005; Mallon, 2006) to determine the experience of players and hence throw light on the fundamental nature of games and ambient gameplay.

Following research into experimental games (M. Eyles, Eglin, R., 2007a, 2007b) which were designed to contain high degrees of ambience as previously (theoretically) defined it became clear

Proceedings of DiGRA 2011 Conference: Think Design Play.

that many existing commercial games contain some ambient (sometimes emergent) properties. They are not designed to be played ambiently, but have properties that facilitate ambient play (see ambient properties above). The research with experimental ambient games enabled the development of a phenomenologically predicated ambient lens through which these existing games could be viewed. This lens was then further refined by considering the ambience of both the experimental and the commercial games; finally arriving at a description of key features of ambient play. Constant comparisons within and between different data, and back to definitions of musical ambience, were used to ensure rigor (Glaser, 1978).

This paper focuses on the findings of this research into ambience in games, delivering a succinct and far reaching schema of ambience that has not only been applied to existing games but has some important implications for the design of future games, throwing new light on the experience of game players and in particular of the inventive, collaborative and ambiguous nature of game playing.

The applications of this research are wide reaching, in particular due to the 'gamification' (Campbell, 2011; McGonigal, 2011; Schell, 2010) of many products and services. For example, the awarding of points and rewards for use of online shops (such as Ebay) and the vine growing display of the Ford Fusion Hybrid car to denote driving efficiency (hypermilling) (Squatriglia, 2009). These applications of game mechanisms are pervasive, having many similarities to the ambient gameplay investigated in this research. The findings of this research into ambient play within games clearly indicate elements and approaches that could enhance the experience of gamified products and applications. Further this research offers a new way of looking at games, including both pervasive and commercial video games.

Keywords
Game design, ambience, ambient, design research, pervasive, analysis, phenomenology, practice based, gamification.

INTRODUCTION TO AMBIENCE

Ambience is defined in the Oxford English Dictionary (Oxford English Dictionary Online: Draft Revision, 2007) as:

"Lying round, surrounding, encircling, encompassing, environing."

"Designating atmospheric sound occurring naturally or at random in a particular environment at a particular time"

"…designed to create or enhance a particular atmosphere or mood…"

"a physical medium or environment"

"The pervading tone or mood of a place, situation, etc.; the prevailing social, psychological, or intellectual conditions or attitudes; circumstances, atmosphere."

'Ambient' has been used to describe a particular type of unobtrusive music. The term 'ambient music' was used by Brian Eno to describe the music on his 1978 album 'Ambient 1: Music for Airports'. In the sleeve notes Brian Eno gives a definition of ambient music: "Ambient Music must be able to accommodate many levels of listening attention without enforcing one in particular; it must be as ignorable as it is interesting." (Eno, 1978).

The roots of ambient music can be seen in pieces like Eric Satie's 1917 'Furniture Music' (musique d'ameublement) composition which was written 'not to be listened to; one should be no more aware of its presence than of the furniture around one' (Wilkins, 1975) page 294.

The wide range of music that has had the description 'ambient' attached to it is indicative of the imprecision of the idea of ambience in music.

However, there are some core features of ambience as described by Brian Eno that seem axiomatic and form the basis for the definition of ambience used in this research:

- Engagement: the music is both ignorable and in the background and interesting and in the foreground. The listener may focus their attention on the music if they wish, shifting it from ignorable/background to interesting/foreground.

- Affect: the ambient music creates a mood and may affect the way the listener is perceiving, or thinking about, the location. This is also true of listening to other types of music, but is a stated intention of ambient music. With ambient music the listener may not be fully aware of the music.

- Persistence, and continuance: the ambient music continues in the background at a location, whether listeners have selected it or not. The listeners may not necessarily have the ability to stop or start the music. A property of persistence might be duration. The ambience of music is not dependent on duration; the tracks on Music for Airports vary in length from 6 to 16½ minutes (Eno, 1978), on his Ambient 4: On Land album tracks are as short at 3 minutes (Eno, 1982). However, duration is still a property of all music, including ambient music.

- Context: the ambient music occurs at some location and the listeners' experience of that location may affect and be affected by the music.

The first two properties, Engagement and Affect, are concerned with the experience of the listener, the second two, Persistence and Location, are concerned with easily measurable physical properties of the music. Each of these features are also applicable to other types of music. However, with ambient music the dials on each of these properties are turned to a relatively extreme position:

Engagement: the music is both intensely interesting and attention grabbing while simultaneously being ignorable and in the background. A great deal of music is primarily designed to be both very engaging and in the foreground. Lift music and muzak is designed to be unengaging and in the background. Ambient music is intended to be simultaneously both engaging and unengaging: 'There is no longer a sharp distinction between foreground and background.' (Eno, 1982)

Affect: the primary function of the music is to create a mood, to evoke a sense of place, to create 'an atmosphere, or surrounding influence: a tint.' (Eno, 1978)

Persistence: the music plays continuously (for the length of the piece) in the background. This property is less crucial when differentiating between types of music, but becomes significant when considering games. Musical pieces are normally listened to in one sitting from beginning to end (though recorded music may be paused).

Location: ambient music is ‘environmental music’ (Eno, 1978) designed to affect the space that it is played in. Once again this property becomes significant when considering games.

These four properties might be considered as possible dimensions of ambience and are used in this research when considering both ambient music and the idea of ambience in games.

These properties established guidelines when developing experimental games that might share some of the properties of ambient music.

THE AMBIENT GAME STUDIES

Three studies have been carried out using three research games; two versions of Ambient Quest: Pedometer and an RFID based game, Ambient Quest: Pirate Moods.

The first study was an exploratory one intended to determine if a simple pedometer game ‘Ambient Quest Pedometer’ could yield some useful results. Additionally it tested an iterative game design research methodological approach (Eyles, 2008b), ascertaining if this would allow the gathering of useful data.

The Ambient Quest: Pedometer game was designed to exhibit elements of ambience. Players carried a pedometer to track the distance they walked each day; then used the number of steps to control the movement of a game character. The further they walked in the day the further their player character could travel in the game, either under their direct control or automatically under the control of the computer. This allowed the gathering of game data (steps) in the background, with the option of becoming more or less engaged with this process. Similarly controlling the game character allowed more or less player engagement.

The second study built on this with an updated version of the Ambient Quest: Pedometer game and was designed to generate more data, teasing out what the experience of playing this game in more detail. This study ran over eight weeks and some very clear themes emerged.

The role of gaming equipment was core to the research games; initially it was thought that they might be wholly embedded in the environment, independent of any player carried equipment. However, financial constraints precluded this. At the time of this research GPS mobile phones were not as readily and inexpensively available as they are now and it was not easily possible to remotely track player movements in the real world. The use of a pedometer seemed to give players a link to the game, symbolizing their involvement in the game and allowed locative play at a very low cost.

For the third study game, Ambient Quest: Pirate Moods, a decision was made to incorporate some kind of player tokens to represent players in the game. The use of pedometers had successfully attached players to the first two games, reminding them they were playing and also acting as a focus for their play. In Ambient Quest: Pirate Moods the game was embedded in the environment (RFID aerials and a monitor screen), with players carrying RFID chips attached to pirate cards.

The third study was used to see if findings of the first two studies were applicable to a very different game; that was still designed to contain elements of ambience. This game was designed to be embedded in a single environment, rather than carried around with the player in their every day life. The third game, Ambient Quest: Pirate Moods, was built using RFID (radio-frequency identification) technology with players carrying RFID cards representing pirates around notice boards on which RFID aerials were mounted. The pirates gathered different resources (rum, cannon balls, canvas and so on) while their cards were near specific aerials (and notice boards).

The object of the game was to keep the pirates' resources in balance and defeat enemy kraken (with the cannon balls), as displayed on a monitor screen. Players could choose their level of involvement, either closely monitoring and controlling the resource gathering, or just letting it happen automatically as they moved around the notice boards.

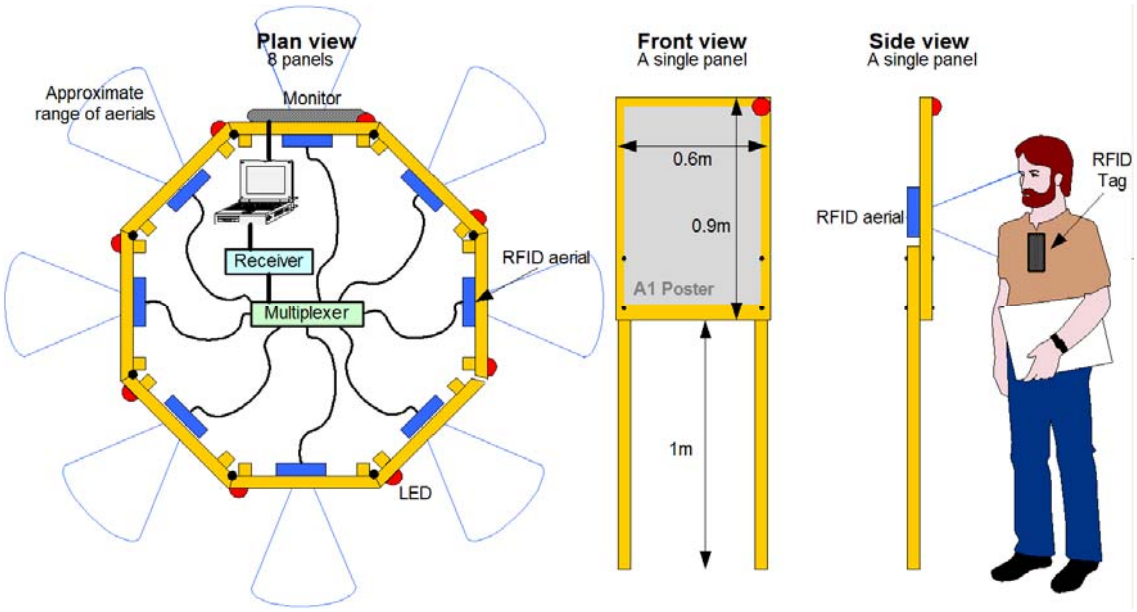

Figure 1: Ambient Quest: Pirate Moods

Qualitative data was gathered throughout all three studies using a mixture of observation, interviews, video recording and photography. This data was then analysed with the help of computer assisted qualitative data analysis, specifically Nvivo 8 (QSR International, 2009).

Descriptions of these studies and initial findings (particularly of the first two studies) have been reported at a number of conferences and presentations (M. Eyles, 2007a, 2007b; M. Eyles, Eglin, R., 2007a, 2007b; Eyles, 2008a, 2009). The first study was reported on the GameSpot UK website (Boyes, 2007) and The Guardian website's game blog (Krotoski, 2007).

FINDINGS

Players became engaged in the Ambient Quest: Pedometer game when it was first played at the Women in Games 2007 Conference. There was an influence on the mood at the conference and some of the players changed their behaviour as a result of playing it. Player's attention on the game varied greatly over time; they were able to ignore it or focus more fully on it. They rapidly started to invent their own rules and were finding ways to 'cheat', by, for example, shaking their pedometers. Players were also reporting how they had walked further in order to increase their pedometer readings; for example, walking to the conference instead of getting a taxi.

One of the participants also made an interesting observation about the way people were reduced to 'steps'. The 'steps' then transformed into 'squares' when using the scalar pedometer reading to determine the vector moves on a 2D game map; a numerical to graphical transformation. Perhaps there is a sense of enlargement when taking the scalar steps and using them to create vector moves. In his book 'Little, Big', John Crowley describes a world behind our world in which 'the farther in you go, the bigger it gets' (Crowley, 1981).

Beyond the moves on the 2D map there is an avatar with attributes, armour, weapons, supplies, gold, experience and so on. The deeper the player delves into the game the more complexity they will find and the richer the game experience.

This ambient game was intended to be as 'ignorable as it was interesting' (Eno, 1978) and to allow players to determine their own levels of commitment, from ignoring the game to fully engaging with it. The Ambient Quest: Pedometer game supported this with participant engagement lying on a spectrum of 'full' to 'superficially slight'.

The results of this preliminary study informed changes to the Ambient Quest: Pedometer game ready for the next study. Improvements included giving players more control over the data entry and so on, as well as graphical improvements. The suitability of the iterative game design research approach was also demonstrated as the new version of the Ambient Quest: Pedometer game was incorporated into the second study. Useful data was being generated and was informing the design of subsequent versions of the game in order to investigate emerging themes.

Data from the second study, using Ambient Quest: Pedometer, was initially analysed using a 'systemic domain model' framework (Eglin et al., 2008; Eyles, 2009), using a phenomenological template analysis approach (King, 2008; Langdridge, 2007). Having confirmed that systemic domain elements were present in the game it became clear that additional themes were emerging (Eyles, 2009). The limitations of the systemic domain model soon became apparent; although it described some basic features, it was not able to capture all the themes that were emerging. An iterative process of constant comparison was employed (Glaser, 1978) to further develop the emerging themes.

Other new themes that emerged were: use of equipment, cheating, complexity, difference of research games (Eyles, 2009). As research and analysis continued the importance of ideas of the granularity of time at which the game was viewed emerged. When investigating gameplay in both the first and second studies it became clear that the time periods being considered when investigating the game had significant affects on the perception and descriptions of the game.

For example, the experience of a game second to second might vary greatly, while describing the overall experience of a completed game could be very different. This way of looking at a game in the context of different time periods, or temporal granularity, correlates closely to nested objectives in games. Players have short term objectives that they must achieve second to second while playing (i.e. shoot baddies); medium term objectives that they achieve over an hour or so (i.e. complete a level) and long term objectives that they achieve over the whole of the game (i.e. complete the game). These nested objectives were referred to as 'nested loops' by Ben Cousens in his Game Developers Conference 2005 presentation on 'Low Level Game Design' (2005). In the book Patterns in Game Design (Björk & Holopainen, 2005) not only are goals and subgoals described but also different levels of closures, such as the closure of completing a level and closure for eating a pill in Pac-Man (Namco, 1980). These all capture similar ideas to temporal granularity.

Note that although ideas of temporal granularity are particularly easy to apply to real time games, when considering turn based games thinking about gameplay loops or goals and subgoals may be more useful.

Whether considering a turn based or real time game the reported player experience of a game often varies depending on the time period under consideration. Additionally the design imperatives at different temporal granularities vary.

Coding of the data from the third study was started before all the play sessions had finished and once again an iterative process of constant comparison was employed (Glaser, 1978). The themes previously identified were confirmed and refined during this process.

These core themes were then used to further develop the evolving schema, showing how they might be linked together in order to better understand the way they related to each other.

A number of successive schemas were developed and refined by constantly referring back to the data. The development of these schemas started while coding the second study and continued through and after the end of the third study finally resulting in the schema shown in figure 6.

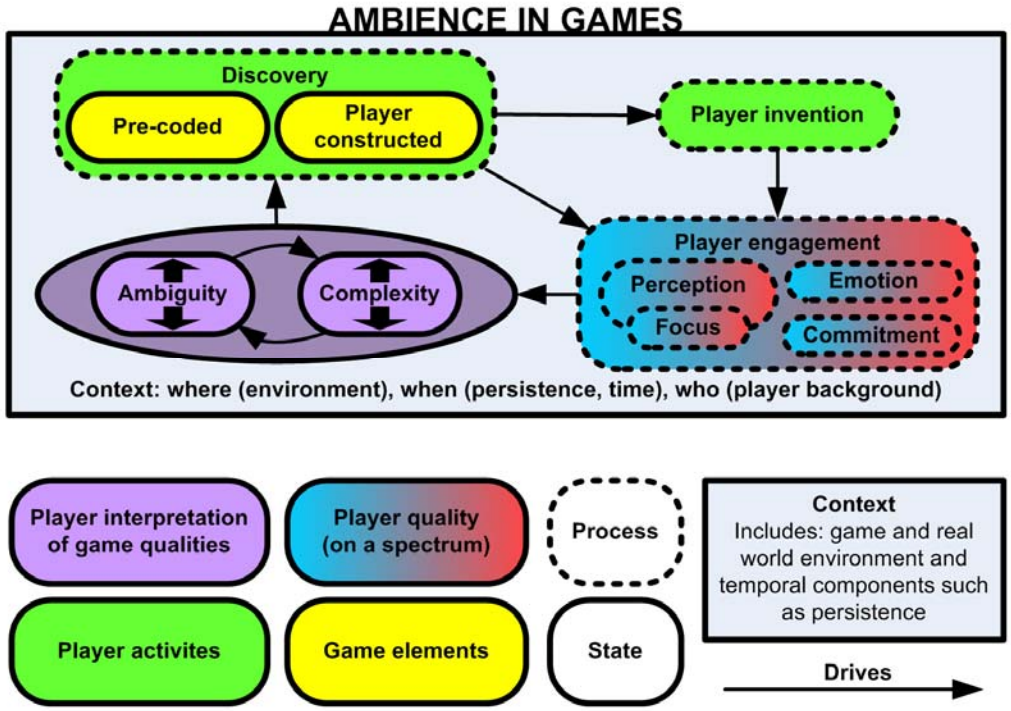

Figure 2: Ambience in games schema derived from first, second and third studies

Processes and states

This schema comprises a number of different processes and states.

All the processes are things that the player is doing: engaging, discovering and inventing.

The states are both related to the game and to the player: ambiguity, complexity, context, precoded discoveries and player constructed discoveries. These states are player perceived and can change.

The states and processes are linked by 'drives' arrows:

- Discovery 'drives' player invention.

- Discovery also ‘drives’ player engagement.
- Player invention ‘drives’ player engagement.
- Player engagement ‘drives’ discovery, through the ambiguity/complexity modifier states.
- Ambiguity and complexity drive each other up and down (unpredictably).

The use of the verb ‘drives’ is intended to suggest a causal link between the different elements.

Context

Context is important in considering the player experience of any game. Not only do different players have varying experiences of games, but also where and when the game is played also affects the experience.

Player emotions, intellect and experience all affect their experience of any game.

The location becomes even more significant when considering locative games, such as the Ambient Quest experimental games.

Not only does the time at which the game is played have an effect on player experience, but also the way that time is portrayed in the game. Within many games time stops when players stop playing them. However, other games treat time differently and game time continues, or persists, even when the player has stopped playing. This persistence of the game world is a major feature of massively multiplayer online games.

A prominent feature of highly ambient games is that players can join and leave them at any time. They are persistent (see the earlier axioms proposed for ambience).

Player engagement

The idea of ‘engagement’ has previously been described.

Player engagement varies form player to player as well as from game to game, platform to platform and so on. Player engagement parameters in the ambience in games schema diagram all vary not only from game to game, but also from time to time, affected by the player’s mood as they experience the game.

Emotion is a crucial part of engagement. By feeling something about the game the player may be encouraged to continue playing; or discouraged and stop playing. When engaging emotionally players may assign the game some significance and experience emotions tied to their game playing and also possibly the game’s story and characters. When talking about Ambient Quest: Pirate Moods players said:

> *'it's really fun' (Player 10)*
>
> *'finding out about how the game works is joyful' (Player 11)*
>
> *'sad because you never get to a point where you can say 'OK [I] achieved this and that'' (Player 11)*

Commitment is another property connected to engagement. In order to play a game, players have to dedicate some time and effort to the game. This commitment property of player engagement varies over a game. For some games (especially those with high levels of ambience) commitment can reduce to zero, or increase to a maximum value. Complete withdrawal of attention is possible at the 'not engaging' end of the engagement spectrum and attention is essential at the 'very engaging' end.

For example, in the game 'Farmville' (Zynga, 2009) players can think about the game, make some moves and then may stop actively playing the game (they are not doing anything to the game or even observing it) and do something else while the game continues in their absence. In this case players are fully engaging with the game while making their moves and then ceasing to think about the game when away from the computer.

In addition to an emotional involvement in the game and a commitment of time and effort players also need to perceive what is happening in the game. Once again their perception of the game can vary from intensely focused to unaware (they have forgotten they are playing).

When talking about the Ambient Quest: Pedometer game player 3 showed great commitment and attention:

> *'got a little but OCD on that, trying all the possible different routes'*

Whereas player 2 showed less commitment when they said:

> *'I forget more and more frequently and it would get to a point when I'd almost completely forgotten'*

This range of player engagement allows games to offer a wide variety of experiences and drives game playing. All games investigated, both original research games and commercial titles, had a property of engagement and this property varied to lesser or greater degrees. Indeed 'engagement' seems to be an axiomatic property of all games.

At any moment a player has a level of engagement, but engagement is not a fixed property or state, it is a varying process that players execute over time. Similarly perception, focus, emotion and commitment, which also all have a range of values, are also all processes.

Ambiguity and complexity in games

Ambiguity and ambience were two important properties that emerged from the data during the studies and seem to both be fundamental properties of ambience. Ambiguity and complexity are not things that the player does. They are properties, of games, that may be observed by the player.

The perception of the player is crucial in suggesting the levels of ambiguity and complexity in any particular game at any particular time. The act of observing and playing the game allows the player to determine these levels. Observed levels of ambiguity and complexity vary from player to player and are dependent in part on who the player is; their experiences, intellect, emotions and so on.

Ambiguity is the 'capability of being understood in two or more ways' (Oxford English Dictionary Online: Second Edition, 1989). Ambiguity is an important player determined property of games. Any game will lie somewhere on a spectrum of ambiguity, varying from not ambiguous

at one end to very ambiguous at the other. The precise location on this spectrum of ambiguity varies from player to player, though for some games there may be broad agreement.

The study games were found to be ambiguous. The games' rules were perceived as ambiguous so players started interpreting game events according to their own ideas, creating their own version of the game rules.

For example, when talking about Ambient Quest: Pirate Moods player 14 revealed that they had not realised that they could have played with more pirates, they created their own 'one pirate' rule:

> *'just assumed that was what you had to do; didn't realise you could have more than one [pirate card]'*

In this way it was possible for each player to be playing their own personalised version of a highly ambient game, according to their particular interpretation of the rules. The highly ambient research games may both be perceived as having very clear victory conditions and also to be completely open ended. In the case of the Ambient Quest: Pirate Moods game some players reached a very definite end point when they were satisfied they had completed the game, others thought it would just carry on indefinitely:

> *'It actually felt like end game' [when all the kraken were defeated] (Player 5)*

> *'I still had a, sort of, desire to keep everything in the middle and see if I could make them [the pirates] even happier' [after defeating the Kraken at the end of the game] (Player 15)*

Complexity is 'involved nature or structure, intricacy', it is the state of being complex: 'consisting of parts or elements not simply co-ordinated, but some of them involved in various degrees of subordination; complicated, involved, intricate; not easily analysed or disentangled' (Oxford English Dictionary Online: Draft Revision, 2007). Games often contain elements that are 'complicated, involved' (ibid.). When playing a game the player can make a judgement about whether they find the game complex. Complexity and difficulty levels are related, but do not necessarily have a direct correlation. A game with a low level of complexity can be difficult to play and a player may not consider the game 'complicated' or 'involved'.

Games can also be considered as complex systems in which their complexity relates to how predictable they are. Games have some degree of unpredictability, lying between periodic systems (predictable, repetitive) and chaotic systems (unpredictable, random) (Salen & Zimmerman, 2004). Even with this systemic approach to gauging complexity events in games they sometimes appear to players as predictable and at other times as surprising and unpredictable. The degree of predictability, and hence complexity, varies from player to player. Any individual game may appear complex to some players, novices, for example, and not others, experienced players, for example.

The degree of predictability, and hence complexity, also varies over time for an individual player. A game may at first encounter seem to have a low level of complexity, but as the player becomes more involved much deeper levels of complexity might be revealed, perhaps as the rules are learned. For example, when first starting a role playing game a player may not have to consider underlying attribute and skill systems – they may just be running around fighting monsters and so on. However, as they play for longer and start to gain experience points they may start to engage

with the game's underlying attribute and skills systems. In this example the game seems simple at first and more complex as the player progresses. The perceived complexity of the game varies over time.

Alternatively a game may at first appear very complex as a new player struggles to figure out how to play. Then as the player becomes more familiar with the game they may perceive it as being less complex than they first thought.

Complexity is a fundamental design consideration of all games. Too much perceived complexity is a barrier to player involvement; too little and the game may fail to attract or maintain engagement.

Games need to reach a threshold level of complexity to attract and maintain engagement, this level varying between different games.

> *'It was fun, but to want to play it for any length of time it would need to have a bit more complexity' (Player 4 talking about Ambient Quest: Pirate Moods)*

For games with high levels of ambience the perceived complexity should allow different levels of engagement, including the ability to have a very low level of engagement. One consequence of giving players the possibility of engaging at a low level means that it should be possible to perceive the game as having a low level of complexity and hence easily engage with it.

When playing a game an observed increase in complexity may drive perception of ambiguity up or down. Similarly an observed increase in ambiguity may drive the perception of complexity up or down. When talking about the perceived complexity of Ambient Quest: Pirate Moods player 14 was clearly influenced by the ambiguous nature of the game's location (posters on notice boards that did not actually directly affect gameplay):

> *'all the information that was there made me think, initially think that this is more complicated and I did assume it was a much more complicated game'*

As a player deciphers the complexity and ambiguity of a game they discover things (rules, game world and so on) about the game. When reflecting on playing Ambient Quest: Pirate Moods player 15 made a comment that seems to indicate a degree of ambiguity that opens possibilities for more complexity and the creation of more player created rules:

> *'now I think of it, there were many ways to play the game'*

The game may also become more predictable, or its unpredictability may be better understood by the player (this also seems to be implicit in player 15's comment).

Note that it is possible for a player to perceive a game as being complex, but still find it easy to play and perceive the game having roughly the same degree of complexity even as their understanding of the game increases. Complexity does not have a direct correlation to difficulty or to how well the game's rules and gameplay mechanisms are understood.

Considering Mihaly Csikszentmihalyi's flow diagram (1992, 2002, p. 74) and how the 'Challenges' axis might be replaced by a 'Complexity' axis might provide an interesting future line of enquiry.

Discovery

Discovery is something the player does while playing a game. They find out how to play the game; uncovering clues, exploring the game world, learning player character controls and so on. Discovery is an ongoing process during play.

The things that are discovered may have been coded into the game by the developer. For example, game environments can be explored. Other things the player discovers may not have been intended by the developer, but rather are emergent play that is perceived and constructed by the player. For example, in Quake III Arena players discovered that if they fired a rocket down while jumping they could do extra high 'rocket jumps'(Juul, 2005, p. 81).

Although the act of discovery is a player action and a process, the descriptions of things discovered are fixed. For example, a description of how to rocket jump ('fire your rocket down when you jump and ride the shockwave') is not a process, even though the act of jumping is a process. The process of experimenting with rockets and jumping which led to a discovery of emergent gameplay is a process of 'player invention' which is dealt with next. The emergent property of 'rocket jumping' is a player constructed gameplay mechanism.

In this way the process of discovery allows the player to find both developer pre-coded things and player constructed (and emergent) things.

'Player invention' is closely linked to 'Discovery'. Discovery allows the player to find out things that can then be used in an act of invention to create new gameplay.

Invention

Invention is 'the action of devising, contriving, or making up; contrivance, fabrication.' (Oxford English Dictionary Online: Draft Revision, 2007).

As players discover things in a game they not only become more proficient at the developer coded activities in the game but also they start to create their own activities. They start to invent things that may or may not have been intended by the developers. Player invention then drives commitment, emotional responses and perceptions as the player focuses on what they are doing.

Videoed observations of players playing Ambient Quest: Pirate Moods provided many examples of players making up their own rules. For example during a play session between players 4, 5 and 6 the following events show:

> *'Player decides to only play with one card' (2m 37s)*
>
> *Waving card back and forth towards aerial to gain commodities. (4m 16s)*

After another play session player 10 said:

> *'I kind of like to make my own game; and so like I'm racing each other, which one [pirate] the faster [at firing canon]'*

Player 13 made very explicit comments about the possibility of players creating their own version of the game:

> *'something you pick up and stuff, rather than having set game rules and everything'*

'I was stealing his [other player] rum' [by placing their RFID card in a better position]

Invention may occur during interactions with the game, while the game is running. However, players may also construct inventions while away from the game. These inventions may result in extensions to the game world and greater engagement outside the game. For example Player 3 talking about the Ambient Quest: Pedometer game found that the game had started them thinking about finding distances between locations:

'it was useful for, um, just like, finding the shortest route to places'

The way in which players interacted with all the experimental games, in particular by inventing their own rules and ways of playing, suggests that invention is an important component of ambience in games.

To a lesser or greater degree invention has been found to be present in not only the experimental games, but in all games investigated. Games with a high degree of ambience seem to facilitate player invention. This may be due to the high levels of ambiguity that seem to be associated with highly ambient games. Players are able to engage shallowly with the games, engaging with only a small part of the rules. This perhaps gives them the space to start inventing their own rules and gameplay mechanisms.

Feedback loops and ambience

All gameplay hinges on feedback loops. Games respond to things the player does. Additionally these feedback loops may be of different lengths and are often hierarchically nested (see the previous comments on temporal granularity). (Cousens, 2005; Salen & Zimmerman, 2004, p. 228; Schell, 2008)

Players can stop playing (move their attention elsewhere) without interrupting the flow of the game in games with high degrees of ambience. They can leave and rejoin feedback loops at will. For example, in Farmville the player can leave their farm at any point and the game continues. There is no penalty for leaving the game, as is true with many casual games that have been designed to be played briefly in between other activities. The game continues when the player is not present, outside the play session.

In games with low degrees of ambience there are significant consequences if player attention is moved away during a feedback loop, or at any time. For example, while playing a first person shooter the player is required to maintain attention on the game at all times. Failure to do this will normally lead to the 'death' of their player character.

CONCLUSION

The ambience in games schema delivers a new way of viewing games, offering powerful yet subtle opportunities for both game design and game analysis. Different game properties are given prominence by employing the ambience schema than would have been shown using a more conventional approach, such as investigating the game rules or looking at the game's cultural context. For example, approaches to investigating games might involve investigating game rules, the cultural context of the game or the interaction between players and the game (Salen & Zimmerman, 2004, p. 102). The ambience schema sits across these areas offering a unique insight into the functioning of games.

A start has been made in analysing existing games using the ambience in games schema and this has begun to reveal heretofore unexpected properties. In particular the schema has made explicit

the relationship between ambiguity and complexity and the way in which these are linked to the player action of discovery. Emerging from the process of discovery the prevalence of player invention in gameplay also offers an important element that exists within many games.

Designing games incorporating the mechanisms and properties revealed in the schema gives the game designer greater control over player experience. In particular the ambience of games may be increased by using the schema to inform game design.

Ambience in games enables them to more fully blend with real life, so that the boundary between games and the real world blurs. A game featuring high levels of ambience may more effectively colour player experience of the real world, may be better embedded in the real world. The embedding of games in the real world has a resonance with ideas of the 'gamification' (Campbell, 2011; Schell, 2010) of many products and services. As games and playfulness become ever more part of everyday living the ability to understand ways in which they achieve particular experiences is extremely important.

The ambience in games schema is also of use when testing games to determine their quality and utility. The schema offers a well defined and pragmatic framework for assessing existing games in order to determine the sort of experience they offer players. Further this assessment can be used to inform alterations that may be made in order to increase the ambient qualities of a game to more deeply embed it in the real world and the player's life.

There is still much to explore in ambience in games and the next steps have begun with more in depth investigations into ambience in existing, commercial games. A low level schema, close to the game, is starting to emerge from these investigations. Future research will involve reconciling the high level ambience in games schema presented in this paper and the currently emerging low level schema.

ACKNOWLEDGMENTS

Special thanks to Roger Eglin and Brett Stevens at the University of Portsmouth for input on the research. Special thanks to Neil Dansey, Ruiying Wang, Andy Bain and Mike Rawlings for the development of the Ambient Quest research games.

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