Players Imbuing Meaning: Co-creation of Challenges in a prototype MMO

Mirjam Palosaari Eladhari
Faculty of Media and Knowledge Sciences, University of Malta, Malta
mirjame@gmail.com

Abstract

This article discusses how components in a game world can carry meaning relevant to individual players.

The discussion is grounded in work with a massively multi-player online (MMO) prototype where players in guided play-tests created their own opponents that they battled in groups of three. The opponents are called Manifestations, and can be compared to the "boss monsters" that in adventure and role-playing games pose the greatest challenges in terms of tactical game play, or battle. When creating Manifestations players define how these shall behave in play, and what they say under different circumstances. The game play mechanics in the world is centred on emotions and social relations. One of the design goals in the creation of the prototype was to cater for a system where tactical game play can be closely tied to the potential narrative contents.

The Manifestations players created in the play tests were of four main categories; reflections of persons they had complicated relationships with in real life, difficult situations, abstract concepts, or purely fictional entities. In several cases players brought material into the game that had personal meaning to them. These meanings were developed further when players saw how their Manifestation behaved within the rule system of the world. For example, one player created a Manifestation of an anticipated exam, while another made a Manifestation called "Mother". The Mother cast spells called "Focused Aggression" and "Cold Ripple of Fear". It was able to perform acts called "Blame", "Threaten", and "Disagree". The group experimented with tactical choices, while reasoning about the Mother's potential motivations. They managed to overcome the Mother by alternating between giving each other resistance and casting spells, the winning stroke being a rapid series of spells called "Forgive".

Introduction

In games, players' actions have an effect on the game play experience and on the outcome of the game. The degree and nature of the effects of players' action vary from game to game depending on its design – but it there is always some effect. In case the game is a multiplayer game, the player also interacts with other players via the game system, affecting the other players' experience. In massively multiplayer role playing games (MMORPGs) the stories in the game worlds emanate from both what the game developers have put into the world, and from what players do within it. The stories that the game designers have authored and added to the world for the players to experience often suffer from what I call the *many Skywalkers problem*. The story world that is Star Wars contains stories about the character Luke Skywalker' adventures. When the adventures are communicated using the cinematsic form (Lucas, 1977), movie-watchers can identify with Luke, or other protagonists in the story. In an MMORPG, if players would all be the main

protagonist, we would end up with a world with thousands of Luke Skywalkers. In practice, the stories put into the game worlds by the authors are seldom seen as the main source of enjoyment for players. Given the diversity of potential activities in MMORPGs it is different for each player what he or she enjoys the most, though as noted by Bartle (Bartle, 1996) and Yee (Yee, 2005), it is possible to see patterns for these preferences. An important aspect of playing in shared virtual worlds is the social interactions. Players play together, meeting challenges, and get to know each other as they cooperate. These activities become stories in their own right as friendships, enmities, and love relations emerge and change along with group dynamics in guilds and other more permanent grouping of players. So, on one hand we have the authored stories in the world, that players experience in more or less the similar way and where no one gets to be Luke. On the other hand we have the dramas that emerge through the interpersonal relations in the world where each player, through their avatar, most definitely is the main protagonist, and the players around them are co-actors in the ever evolving drama.[1] In this article, this type of emergence of stories is referred to as *avatar-driven story construction*.

Considering these aspects of MMPRPGs I have, in the design of the MMORPG prototype the Pataphysic Institute (PI), aimed to explore avatar-driven story construction, seeing the inter-player interactions as an opportunity. In PI, to be described in more detail in this article, there are functionalities for computationally supporting and tracking how player avatars' interpersonal relationships evolve (Eladhari, 2009). There are also means for players to author their own `boss monsters´, the challenging opponents so strong that players need to cooperate in order to overcome them. In PI, these are called Manifestations. This article focus on the latter, demonstrating how players in guided multi player tests authored Manifestations, and how these in play added meaning relevant to the individual players - not only to the player who created the Manifestation, but also to their co-players. The game design of PI and the entities inhabiting the game world draw upon the semiautonomous agent architecture the Mind Module (Eladhari, 2010), which gives them personalities, moods, emotions, and the capability to associate each other with emotions, depending on what happens in the game world.

An initial stance in this research was to explore avatar-driven story construction by experimenting with ways to, aided by methods used in artificial intelligence (AI), use knowledge and theories from the field of psychology together with role playing game design. In the design of PI the metaphors for affective processes are used in the very game mechanics. Given that the results of the work described in this article are focussed on qualities of the play experience, the analysis- and evaluation approach need to reflect this. *Intentionality* is a central concept in creating games where autonomous entities are governed by computational processes. Intentionality can be said to be a player's observation that an agent is acting rationally, towards internally held goals (Dennet, 1987). When players encounter

---

1 About that no one gets to be Luke: Heroship that is not supported by worlds' background stories emerge when players do extraordinary things. Players' reputations are generally not tied into the official background story of a world, but are effects of what a player has done in the world, using its affordances. A special status, or a hero status, is something that is given by the players in the world.

an AI system in a game, they assign intentionality to that system, "using words whose meanings go beyond the mathematical structures" (Agre, 1997). They create narratives that rationalize the AI's actions and reasoning about the AI's goals (Sengers, 2000). In this article, it is considered that if a player can read intentionality into a system or into components or agents in a system, that is a sign of successful design. The rationale for this is that this attribution indicates that an entity is engaging enough for the player to reason about. It is also an indicator that some measure of believability has been achieved (Bates, 1994). A central attribute of believability is lifelikeness, which is most likely given to an artificial entity by perception when a player attributes intention of its own to it.

Related work

Work related to that described in this article can be divided into at least three categories: work where game prototyping is used as a method of exploration of a design space; work with synthetic humans and intelligent virtual agents; and games that address similar design challenges.

When it comes to experimental game implementations the work with the PI prototype share both the goals of exploring new game design spaces, as well as the methodological stance of iterative prototype development (Fullerton, Swain, & Hoffman, 2004; Hevner, March, Park, & Ram, 2004) with, among others, prototypes such as Prom Week (McCoy et al., 2010), Rathenn (Smith, Gan, Othenin-girard, & Whitehead, 2011) and Mismanor (Sullivan, Mateas, & Wardrip-Fruin, 2011).

A majority of semi-autonomous agent architectures for virtual environments use psychological models that provide agents with a framework that can result in individualized responses. The nature of the psychological models is dependent on the aims of the research and of the success criteria for particular implementations. A common denominator for many projects along with the Mind Module, such as work by (El Jed, Pallamin, Dugdale, & Pavard, 2004; Guoliang, Zhiliang, Guojiang, & Fengjun, 2006; Vinayagamoorthy et al., 2006) is that they are inspired by the OCC model (Ortony, Clore, & Collins, 1988). Another common source of inspiration is (personality) trait theory, pioneered by Allport in the 1930s (Allport, 1961). The Five Factor Model (FFM) is a standard personality trait model in psychology; the clustering of traits via factor analysis into five factors has been empirically validated repeatedly. A prominent assessment test for the FFM is the NEO PI-R questionnaire, which uses 30 traits (McCrae & Costa, 1987). While the FFM was originally developed to describe the personality of individuals in real life, it has been applied to a number of autonomous characters and conversational agents (Egges, Kshirsagar, & Thalmann, 2004; El Jed et al., 2004; Mairesse & Walker, 2007). Like the Mind Module, many of these implementations build upon the FFM, and are inspired by the affect theory (Tomkins, 1962, 1963). In systems where facial expressions are used (Imbert et al. 1999) it is common to select an emotional model based on basic emotions, derived from facial expressions observed in human populations (Ekman, 1994), which also is the case of the Mind Module. The distinguishing feature of the Mind Module is that it is specially designed for use with avatars in virtual game worlds, giving them a

'mental physics,' that can be used to create preferred individual responses for characters depending on immediate circumstances in a game world.

That emotions can profoundly change what someone can do is a prominent theme in fiction. A well known examples is The Incredible Hulk (Lee & Kirby, 1962). In the comic, the main character, the withdrawn Dr. Banner, turns into the large, green, incredibly strong, Hulk whenever he gets too angry, or when is life is in danger. An example for games using mental states in game play is Psychonauts (Schafer & Double Fine Productions, 2005), where the main character Raz's, and the player's, task is to help other characters in the game to overcome their fears of memories in the past. Another mentionable adventure game is Ico (Team Ico, 2001), where there is an emotional connection between the two main characters. In terms of game mechanic structures, the games in the Sims series (Wright, 2000), have many similarities to PI regarding the use of emotional states in the game mechanics and the representation of these. In the Sims players can choose from a selection of actions representing social actions and direct the action from one character towards another character. The domain of representation is that of social interactions between human-like characters. The availability of what social actions the player can choose from depends on the properties of each character, and the relationship between the character who is commanded to perform the action and the one who is the target for the action. The representational strategy for displaying the emotional state is similar between Sims and PI, using colored fields by the heads of the characters and showing status bars representing values that have maximum and minimum borders for properties affecting the affordances of the characters. There is a significant difference in the role of the player; while in Sims the player can settle in the tradition of games of resource handling and single player simulation games, the players in PI are placed in the tradition of multiplayer computer role-playing games. Important aspects of these differences is that the players of Sims have access to complete information about all the characters in the world, while players of PI only have access to full information about their own avatar. The players of Sims have god-like powers over all the characters, while the PI player is but one inhabitant of the game world. Many of these differences echo in other related implementations such as PsychSim (Marsella, Pynadath, & Read, 2004) which also is a multi-agent simulation.

Before continuing I want to make a note regarding the term co-creation. The word has different connotations in different fields. In contexts of research regarding marketing and management where it is discussed as a mechanism for 'added value' (Prahalad & Ramaswamy, 2004). It has been discussed as a method for enhance learning (Kangas, 2010), and sometimes when discussing MMOs it refers to the practice of players creating add-ons for games that changes their user interface (Davidovici-Nora, 2009). In this article the word co-creation is used to denote that players and computational processes each have roles in the creation of in-game objects. In PI players use the affordances given by the authoring tool within the game in order to create entities that they can interact with together with other players.

Co-creation in games is related to the notion of player-created content. A major concern has been how to achieve the right level of editorial control. While many players

enjoy creating things in games, other players do not always appreciate the quality of the work. Regarding editorial control for content in virtual world created by others than the game developers it was common in the text based worlds such as MUD (Bartle & Trubshaw, 1978) of the 1980es and 1990ies that trusted players were given extended authoring rights. A trusted player can be elevated to "wizard" and get rights to design new areas of the world and populate it with objects. The greater rights, the more permanent the objects created could be. In other words, a very trusted player might be given the right to create a permanent building, while a less trusted player might be allowed to create an object that 'lives' for a limited amount of time. In later (early 2000s) graphical game worlds this practice has generally been abandoned, with exception for that some worlds allow players to create their own 'homes' or mansions for their permanent groupings, or guilds, where they can virtual objects that are graphically represented (Lucas Arts, 2003; Square Enix, 2003). In virtual worlds that are more oriented to socializing than game play, such as Second Life (Linden Lab, 2003), the practice of players creating (and scripting) content is an important part of the activity in the worlds. Providing tools for players to co-create in game oriented worlds is more challenging; players' creations need to tie into the existing game mechanics, which adds complexity and potentially introduces bugs and incoherence. For creating own content for play with friends it is more usual with "modding". Modding is to use technology for existing games, such as Neverwinter Nights (Bioware, 2002) or Half-Life (Valve Corporation, 1998), for creating own games and game levels. In mods, the game play mechanics played with and the content created is restricted to that very world, so it is not necessary to make sure it is compatible with everything in an already existing world. An interesting new application is in development, Storybricks (2012), which is labelled as an online storytelling role playing game. Just as PI, it has similarities with modding tools, though in PI and Storybricks the act of creating is interweaved with playing, which is not the case when modding. In PI players can, as will be demonstrated below, use a simple interface with drop-down menus and text-input boxes, while a designated game master or a developer can use the more advanced authoring options. A developer may both use all affordances possible for creating an entity in the game as well make it into a permanent one. As such, PI follows the established paradigms of early text worlds when it comes to roles and rights for creating of content. That is, the greater rights, the more freedom of expression, and the more permanence is given to the created objects.

The Prototype: Pataphysic Institute

Pataphysic Institute (PI) is a prototype game world where the personalities of the inhabitants are the base for the game mechanics. When interacting with other characters the potential emotional reactions depend upon player characters' current mood and personality.

Players are introduced to the back story of PI before they log on, by reading the diary of Katherine, an investigator who was sent in to PI to investigate the consequences of a mysterious event called the Outbreak. In PI, reality has been replaced by the inhabitants' interpretation of reality, and their mental states are manifested physically in the

environment. The head of human resources at PI has taken upon himself the task of understanding the new and unknown world by applying personality theories. He forces everyone in PI to take personality tests, and studies what types of abilities these persons get, abilities he calls Mind Magic Spells. Another inhabitant in PI, Teresa, focuses on the finding that social interactions between people suddenly result in acutely concrete emotional reactions. She calls these Affective Actions (AAs), and tries to understand her changed environment by studying the patterns of these.

Players need to defeat physical Manifestations of negative mental states. In order to do so, they can cast spells on them, but the spells available are constrained by the avatar's personality, current mood, and how far the avatar has progressed in learning new abilities. As such, the rule system in PI uses the general paradigm of a restrictive rule system. That is, at each moment, an entity's possible actions are restrained to a certain individual portion of a larger rule system. This is a more common approach than using a constitutive rule- system where the very context can be used to produce the rules (Rawls, 1955). Furthermore, each avatar has mind energy (mana) and mind resistance (health points). Each spell costs mind energy to use, and attacks reduce mind resistance. The experience of the character defines how large the possible pool of energy and resistance is at a given moment. The regeneration rate of resistance depends on the inner mood, while the regeneration rate of the energy depends on the outer mood.

Players can affect each other's moods by using affective actions, thus controlling the selection of spells available. Affective actions are actively chosen by the players, they are not effects of other social actions. If a player targets another avatar they can choose from a selection of affective actions as shown in Figure 1. For example, the action Comfort can be used on targets that are sad less sad, but only if the one making the action isn't in a too bad mood themselves.

Figure 1. The list in the window to the left displays the affective actions the player can choose.

The core game-play draws upon the Mind Module (Eladhari, 2010), a semiautonomous agent architecture built to be used in a multiplayer environment as a part of the player's avatar. All characters in Pataphysic Institute are equipped with Mind Modules, both playable characters (PCs), non-playable characters (NPCs) and the "mobs"[2] of the game, the Manifestations.

The affective actions mimic the way humans affect each other emotionally through interactions such as encouragements or insults. The mind magic spells are more traditional from a game history perspective where the target of a spell not necessarily needs to have chosen this interaction. From a social interaction perspective a simile could be to use a love potion bought from a witch-doctor, in the belief that emotions can be forced. In PI they can be.

There is a standard set of spells. Mind Magic spells can help or damage (in terms of mental resistance and energy) characters that the spells are used on. Emotion Spells can diminish or increase a specific emotion in the one it is cast on. The emotion spells player characters can learn depend on their personality traits. For example, a neurotic avatar can cast "Accommodate Sorrow" which diminishes sadness in the target.

Figure 2: Display of MM information in the PI client.

The types of spells that affect the pools of mental energy and resistance which can be used differ with the mood of the spell-caster. The action potential regarding these spells reflect the mood of the casting character, as illustrated in Figure 3. For example, a character in a furious mood can cast aggressive spells, while a character in a harmonic

2 The word "mob" can be traced back to early text based virtual worlds, MUDs, where expression denoted moving objects (Bartle, 2003).

mood can cast benevolent spells helping her friends. In Figure 2 the mood wheel is visible to the bottom right of the window. The position of white dot in the wheel shows in what mood avatar is in. Here, it is possible to see that the avatar Neurotica is both furious and depressed, but more furious; making the spell Grand focused aggression (reducing resistance in the target) clickable in the mood wheel. The colour of the position of the mood wheel is reflected in the colored cloud around the avatars head. To the bottom of the window in the middle are icons for spells affecting emotions that can be clicked, or accessed via the F-keys of the keyboard.

PI is built in Pixeltamer's framework for web based multiplayer games and it is played in a web browser through a Java applet. The Mind Module consists of a spreading activation network with nodes of four types: traits, emotions, sentiments and moods. The trait nodes define characters' personalities and affect through weighted relationships to the emotion nodes; on how strongly individual characters `feel' about events involving them. The emotion nodes' weightings to the two mood nodes, inner- and outer mood summarizes the characters' states of mind in a mood-coordinate system as displayed in Figure 2. The sentiment nodes couples emotion nodes to entities in the game world and are instantiated for characters as results of events that cause increased values in respective emotion nodes. The activity rate of the nodes diminishes with time. Where the trait nodes are permanent, the emotion nodes diminish within minutes, but leave activity in the mood nodes that are active for hours. This results in that, recent events affecting emotions 'stays' with the characters mood even when the context for the characters changes.
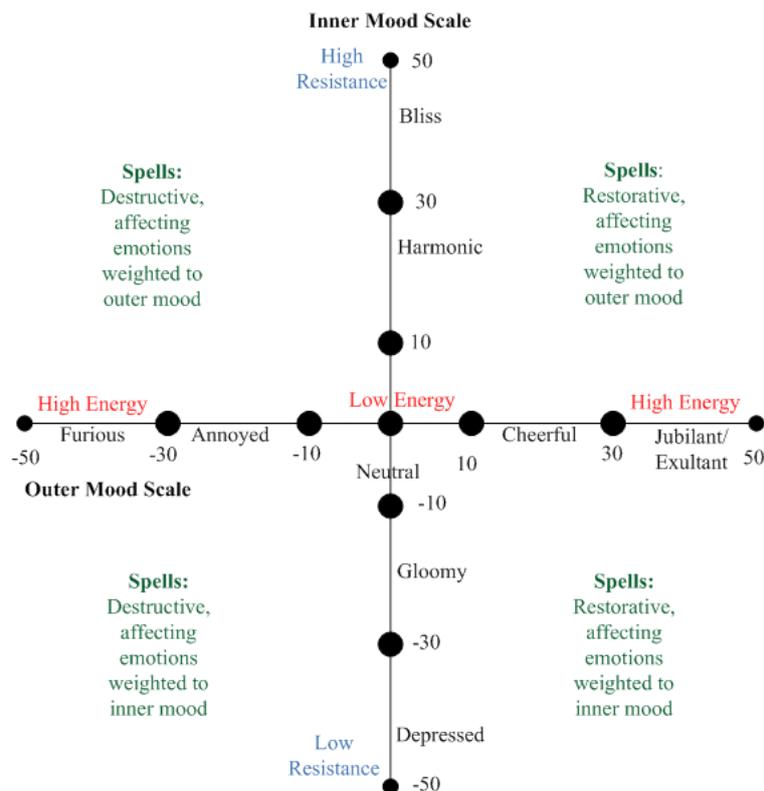

Figure 3. Mood co-ordinate system and usable spell types.

Entityz Types

In PI there are entities of four types; avatars (playable characters), Non-Playable Characters (NPCs), Single Sentiment Manifestations (SSMs), and Compound Manifestations (CMs). In Figure 4 the entity to the top left is a CM called Customs, the Gatekeeper to the bottom left in an NPC, "mirjam" and "Musse" are avatars, and the Colossuses of Confusion are SSMs.

Figure 4. Entity types in the Pataphysic Institute.

The role of the NPCs are to provide information and challenges to the players. This is done via dialogue. SSMs and CMs are entities which can cast benevolent or harmful spells on player characters. CMs can also perform affective actions. The entities in PI are or instantiated in the virtual world in different ways. Avatars are created by players and instantiated whenever a player logs on to the world. The first time players log on they create their avatar by filling in a personality test. The values of the test are then used in the personality trait nodes of the Mind Module. NPCs are created by the world developers, and are in the virtual world permanently. SSMs are also created by the game developers, but most of them are born as results of emotion nodes of other entities (avatars, NPCs and CMs) reaching their maximum value. As such, they are Manifestations of the state of mind of the inhabitants of the world. For example, if an avatar `feels' a Joy intensely the SSM Joy Jumbo is instantiated in proximity to the avatar. An example involving an `amusing' action that potentially can give birth to an SSM is illustrated in Figure 5.

CMs can be created by the developers of the virtual world, but also by players. The players can author a CM if their player character is affected by a sentiment curse or blessing, giving it a strong sentiment. Players can externalize the sentiment of their player characters by creating CMs representing it, as such manifesting emotions of the player character, authored by players. CMs become part of the virtual world as threats or helpers to its inhabitants, in ways that can call for collective action taken by the player characters.
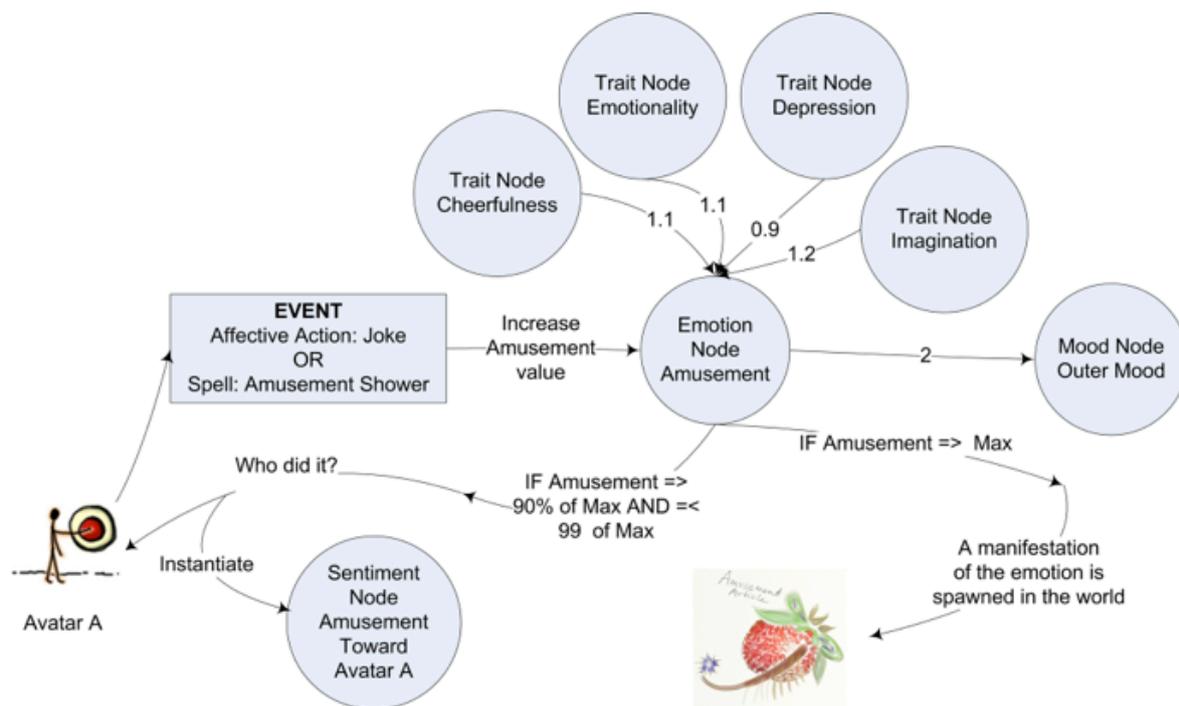
Figure 5. An amusement article is instantiated.

Manifestations

In PI, strong emotions of characters' manifest in the world as new entities. As one of the NPCs explains to players, sometimes an emotion can be strong that it is impossible to keep within, and in the PI world they manifest as new creatures. Normally, when building synthetic humans or intelligent virtual characters emotion is expressed through posture, gestures, gaze and other ways we express emotion non-verbally. From a design point of view, the Manifestations-features were a way to experiment with ways to use non-naturalistic expression of emotion.

Single Sentiment Manifestations

Single Sentiment Manifestations (SSMs), are types of Manifestation that have their origin in a single emotion. They have a limited amount of mental resistance and energy. If the value of the emotion they represent equals zero they dissolve. The spells an SSM can cast increase the value of `their' emotion in targeted entity. SSMs are mainly instantiated by scripting at designated points in the geography of the game world (spawn points) or due to emotional threshold values reached in avatars' states of mind. SSMs cast spells on those that come close to them from their individual repertoire. A Sail of Sorrow alters between casting Drain Energy, Aggression and its `own' emotion spell, Wet Net of Tears, which increase the value of the emotion node sadness in the target. SSMs are especially vulnerable to AAs and spells that decreases "their" emotion - if it reaches zero they die. Sails of Sorrows are especially vulnerable to the spell Accommodate Sorrow and to the affective action Comfort. The SSMs of PI exclaim lines of dialogue when their resistance, energy, and the emotion they represent reach threshold values. The text is shown in the

client as speech bubbles. The exclamations are specific for each emotion. For example, a dying Sail of Sorrow exclaims: "Goodbye friend. You thought me to use my sails".

Compound Manifestations

Compound Manifestations (CMs) are unique, that is, there is only one of each. CMs are stronger than SSMs in terms of larger maximum amounts of resistance and energy and are more versatile in their behaviour; they can cast both spells and affective actions. In order to vanquish a CM generally several players need to co-operate.

CMs do not engage in dialogue, as NPCs, but they can have custom-written exclamations that are triggered under specified conditions. For example, exclamation-triggering conditions can be threshold values of the Mind Module or avatars entering the perception range of a CM.

CMs are instantiated in ways which differ depending on the role of the person creating them. Firstly, CMs can be created for instantiation by developers who script them as part of the game world. In the scripting the location of the CM is defined, as well as several other properties. Secondly, CMs can be instantiated by a game master using the administration interface of the PI client, which include real time world editing tools. This is useful in guided play tests. Thirdly, CMs can be instantiated by players through an in-game interface. These CMs can be of different types; Manifestation of Curse, Manifestation of Blessing and Free Form Manifestation. Later in this article I will describe a play-test of the authoring of and interaction with Curse-Manifestations.

Each CM has a unique name and description, written by the creator of the CM. Spells that CMs cast can be given unique names, though picked from the standard set of spells when a CM is created. The creators of the CMs can custom-write the exclamations of the CMs.

Free Form Manifestation of CM

Game masters and players with high-level player characters can instantiate *free form* CMs using an in-game interface.

First, they need to name the CM and give it a short description. Second, they are presented with a drop-down list of spells. These are the existing resistance-energy spells and the emotion spells. When the creator has picked a spell they can give it a custom name, though the effect is that of the chosen spell. Next, the creator is presented with a drop-down list of affective actions. Also these can be renamed by the creator. After this the creator can choose between graphical representations for the CM. Finally the creator may write exclamations for the CM and define under what conditions these are uttered. This last step requires knowledge of the scripting syntax used in PI.

Suppose that a player with a player character named Adam create a free form CM in the location Entrance. The player names the CM as `The bus driver' and describes it as `The evil bus driver hates all passengers. When they are in his bus they talk, and he can't hear his music.' The player chooses the emotion spell Wet net of tears and names it `Drives by'. Among affective actions the player chooses Ignore, but keeps the name

Ignore for the affective action. Finally, the player chooses to not write any exclamations.

When the player has confirmed all choices the free form CM is instantiated. The bus driver emerges at a point close to the player character Adam, but far away enough for Adam to not be within perception range of the CM. A system message is sent to all players online: `The bus driver is in the Entrance, casting Drive by and Ignore!'

Manifestations of Curses and Blessings

Player characters can be affected by the spells Sentiment Curse and Sentiment Blessing. The spell Sentiment Curse gives a player a strong negative sentiment that has a zero decay rate. For example, it can be a curse of Guilt. The way to get rid of this sentiment is to create a Manifestation of the sentiment, a CM. If the CM is vanquished, the sentiment disappears.

Sentiment Blessings are different from curses in the way that the emotion attached to the sentiment is positive; it could for example be Joy. The player might want to keep the blessing or curse instead of `externalizing' it as a CM if it affects the mood of the player character in a way that the player finds desirable. However, if a CM is instantiated it can cast beneficial spells on other players, or can help vanquish other CMs.

Which spells CMs of the curse/blessing type cast on entities in proximity depends on which emotion they represent. CMs cast the emotion spell that increases the emotion they represent. What spells they cast that diminish energy and resistance depend on how the emotion they represent is weighted to the mood nodes.[3]

The interface for creating Curse- and Blessing-CMs is similar to the one for creating Free Form CMs, but is simpler since all choices are limited by spells and affective actions affecting the emotion that the CM represents. Players can name and describe the CM, and are then presented with the emotion spell which increases the emotion the CM is to represent. Players can rename this spell. Then a drop down list of affective actions increasing the emotion is presented from which the player can choose one and rename it. Finally the player can choose to write three or less short texts that the CM can exclaim.

The personality trait values of these CMs are mid-level, that is, the values in the trait nodes are in the middle between their possible minimal and maximal values. Each CM of curse/blessing type has a strong sentiment object of the emotion it is to represent. The sentiment is directed toward objects of type the player character. This means that a CM associated to the emotion Joy `feels' strong joy if an avatar approaches. A CM associated to Guilt would `feel' guilt under the same circumstances. The effect multiplies if several Avatars approach.

Suppose that an avatar named Adam is afflicted by a sentiment curse of guilt. The player does not find the state of mind this results in desirable for Adam and decides to instantiate a Curse CM. While being in the location Entrance he names it `Grandmother'

---

3 Blessing CMs of Amusement and Interest cast Energy Rush, and those representing Satisfaction or Surprise cast Resistance Aid. Blessing CMs representing Joy or Relief cast both Energy Rush and Resistance Aid. Curse CMs representing Anger, Fear or Shame cast Aggression while those representing Confusion, Guilt or Sadness cast Energy Drain and Resistance Drain. Curse CMs representing Distress/Anguish cast Aggression, Resistance Drain and Energy Drain.

and describes it as `Forgives you when you don't deserve it'. The spell `True Sounding Accusation' is renamed to `being so unselfish that you can never repay it'. He picks the affective action `Be martyr' and lets it keep the original name. He writes three custom exclamations: `And I, who loved you so much', `I never expected anyone to thank me' and `I don't want to be a burden'.

When Grandmother is instantiated the following message is sent to all players online: `Grandmother roams in the Entrance, being so unselfish that you can never repay it and being a martyr! Adam needs help to get rid of the trauma!'

In order to vanquish Grandmother player characters would either need to get her resistance or the value of her emotion node guilt to zero. If Adam chose the strategy to reduce Grandmothers guilt value he would need to cast the emotion spell `Forgive' on her, which reduces guilt. If he is unable to cast Forgive he would need to find a player character that can. Suppose that the player character Christine has a personality allowing her to cast Forgive, and that she comes to help. Christine, being the caster, would be targeted by Grandmother. Grandmother would cast the spells and affective actions specified by Adam on Christine, as well as energy drain and resistance drain spells. Adam and other player characters coming to assist would want to make sure to give Christine both resistance and energy to ensure her ability to cast and for her to not suffer a mental break-down. In order to give Christine energy and resistance the other player characters would need to be in positive mood spaces on the mood co-ordinate system allowing them to cast spells of energy rush and resistance aid. In order to balance their minds to be in the positive mood spaces allowing them to do this they could perform positive affective actions toward each other. If player characters helping out have relations of friendship among them this would increase their mood through an increase of Belonging in each others' proximity, and would be able to use the especially effective affective action `group hug'.

If Adam instead chose to vanquish Grandmother by reducing her resistance to zero he would need to make sure to either himself be or, have a group of assisting player characters who could be, in a depressed or furious space of the mood co-ordinate system. A player character in a furious state can cast Grand Focused Aggression while regenerating energy quickly. A player character in the furious mood space might need assistance from entities that can aid in giving resistance in the case the conflict takes long time. A player character in the depressed mood space can cast Grand Focused Resistance Drain as well as Grand Focused Energy Drain. Since a player character in the depressed mood state do not generate resistance and energy over time the player character would need to steal the energy and resistance from the opponent.

In assembling a group of player characters for reducing Grandmother's resistance Adam might want to make sure to include members who because of their personalities deviate toward depressed states of mind, that is, player characters who have dominant neurotic facets.

Play Test

The play-tests of the software prototype that were conducted consisted of game mastered play sessions. A game master guided three players through a number of scenarios, while a test leader observed the process. In the prototype, the game play mechanics were fully implemented, but the content was limited to a starting area where players could be acquainted with the basic game play and the game interface by interacting with two NPCs and performing the task given to them by these NPCs. Because of this, the classical approach of using the Wizard of Oz (Kelley, 1983) method to simulate the system was not necessary, but game-mastering was, in order to create the content for the sessions, namely to provide a guiding through, and interaction in, the scenarios of the test.

Participants

In the play-test of the software prototype 25 players participated, the majority of them being undergraduate students at the Gotland University in Sweden. Their mean age was 23.4 with a standard deviation of 4.4. Fifteen participants were male and ten were female. All participants were residents of Gotland, Sweden. The majority of the participants had experience of playing MMORPGs.

Procedure

Nine sessions were conducted (illustrated in Figure 6). In cases where two players needed to cancel, the play-session was cancelled. In cases where one player of three had to cancel their participation a master's student working on the project acted as a stand-in player. The data gathered from the stand-in player is not part of the data analyzed after the test. Each session took between one and two hours. The video materials gathered constists approximately of 20 hours of video capturing players since two cameras were used, and approximately 30 hours of video capturing avatars on screen using the software Camtasia (Techsmith, 2011). The Camtasia recordings also include a recording of players' faces captured by web cameras mounted on the screens. Players' utterances were recorded via the headsets each player was equipped with. The log-files of the play sessions are also part of the test data, one log for each player and session. The logs capture each action performed in game by the player in text format.

Players filled in two surveys. Before the test they answered questions about demographics and prior play experience. Immediately after the test players filled in a survey with questions about the play experience they just had.

Prior to the tests, players were asked to enter the virtual world, create their avatar and play for a while. This was done in order to save time during the actual test, so that more focus could be set on the game play rather than on understanding the graphical interface of the game world client.
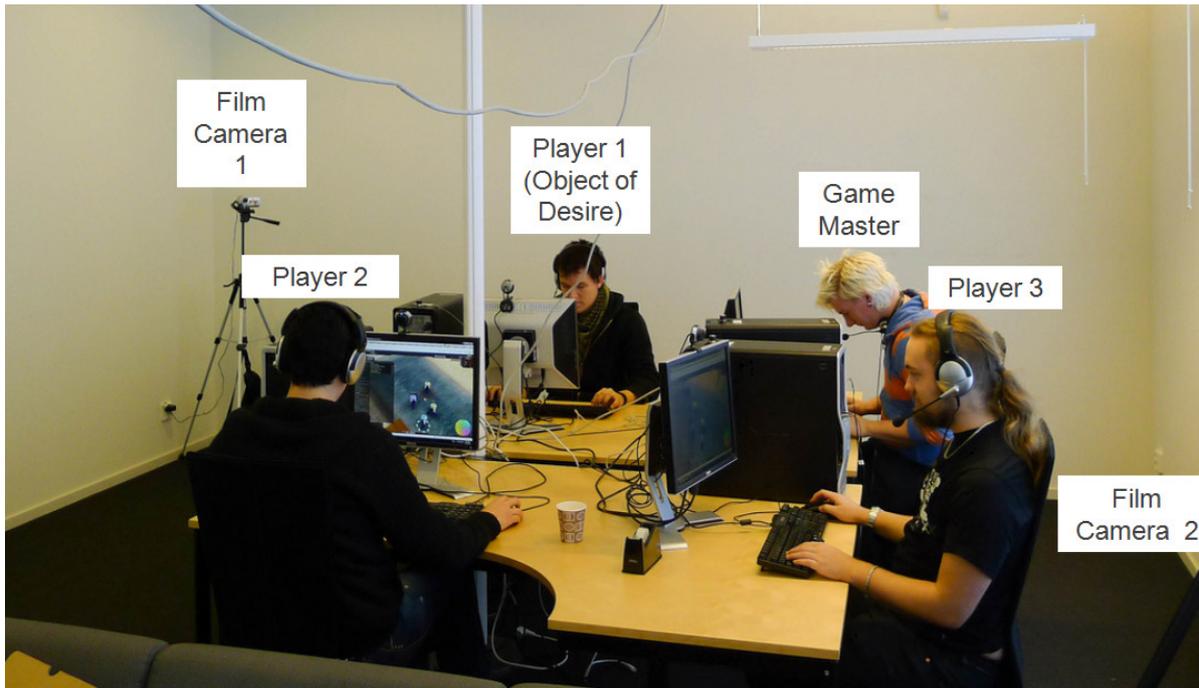
Figure 6. Play test.

Scenario 1: Two avatars competing for the affections of the third

The first scenario was initiated by informing the players that their avatars were scripted for purposes of the test session. The players were asked to picture a situation where two of them (Player 2 and 3) had played together for a while, and that one player (Player 1) was new to them, and that they were competing for the attention of, and affection from this new player. Players had pre-set "sentiment nodes", resulting in that their avatars had emotional biases towards each other as illustrated in Figure 7. The purpose of the preset sentiments was to illustrate these relationships in the game. Figure 7 shows the values used in the test.
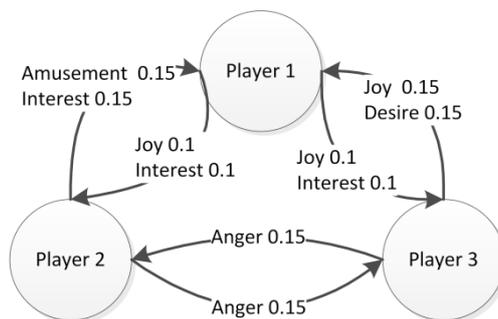
Figure 7. Preset Sentiments for players' avatars.

Players could choose among a selection of affective actions as displayed in Table 1, but they were only successful, that is, gave any effect in their target, if their prerequisites were fulfilled. The actions in the `counter' column in the target were only successful if given in response to certain actions.

Positive	Counter	Negative
Joke with someone	Laugh at joke	
Tell a small secret	Refuse to Laugh at Joke	Uncontrolled Wrath
Hug	Be hugged	
Agree	Shrink Away	
Angry discussion abt. mutual nuisance	Agree enthusiastically	Misunderstand on purpose
Cheer up		Insult
Calm Down		Reproach
Radiate Bliss		Deep Lament
Exultant Jubilation Dance		Look to with dismay
Respect		Ignore
Praise		Disagree
Squeeze hand		
Group Hug		
Funny Walk		
Compliment		
Be attentive		
Stunned Silence		
Small Talk		
Thank		

Table 1: Affective actions available at level 15.

Nine players in total had the role of Player 1, to be the new one, the object of desire. Generally, these chose to perform actions labelled as positive towards the other avatars. The players in the roles of competing for the new one's affections chose negative actions more frequently. These were, in this first scenario generally used between player 2 and 3.

Scenario 2: Single Sentiment Manifestations

In the second scenario, the group was guided to an area with negative single sentiment Manifestations – entities that represent an emotion. Players cooperated, using the special spells to which they had access individually (given their avatars' personality traits), in order to defeat a number of these entities. The game master made sure that the players knew their special strengths before moving on to the third scenario. During this scenario, players also had the opportunity to observe how their avatars' moods and emotions fluctuated in the proximity of each other, and what effects these fluctuations had on their action potential.

Scenario 3: Player-authored foes

In the third scenario, one of the players was asked to cast a curse on one of the other players. The curse was chosen by the player in the test, and could be a curse of confusion, guilt, sadness, distress, shame, anger or fear. The player with the cursed avatar would then author a Compound Manifestation – a powerful foe representing the emotion of the

curse. Players got very loose instructions on authoring – they were asked to create something from real-life or fantasy, abstract or concrete. Figure 8 shows a player's authoring of a Manifestation of anger. Players could name them, describe them, specify a message to all players online upon its instantiation (spawn message), specify what the Manifestation says, rename the spells that Manifestation casts (spells increasing the emotion it represents in its targets), and pick affective actions. In this authoring interface, players could choose freely from the complete range of 48 affective actions.
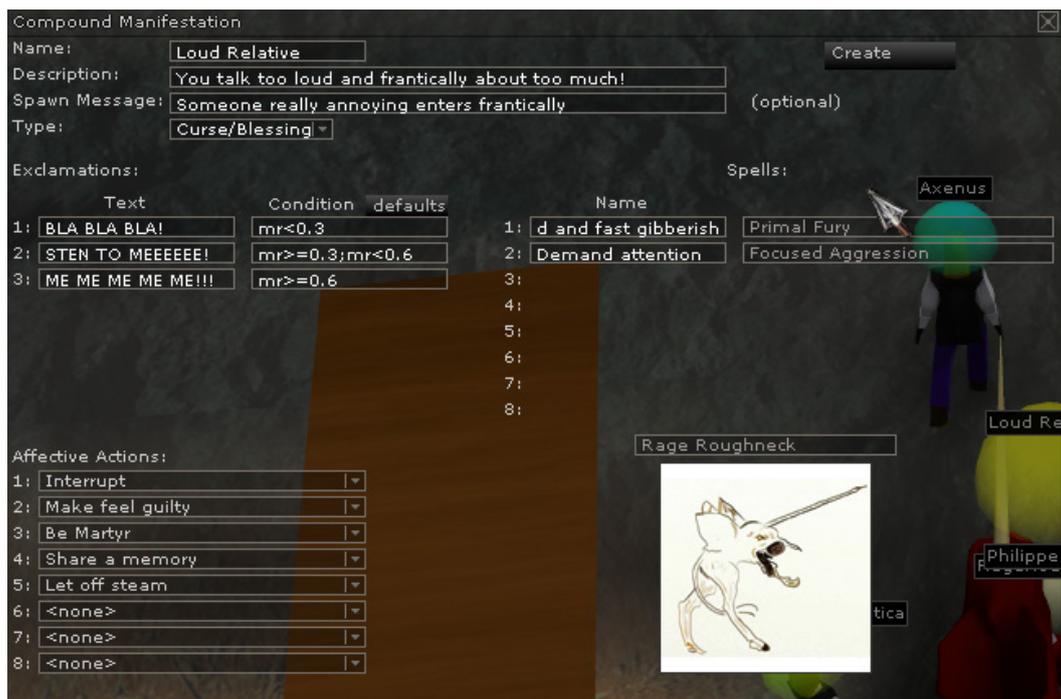
Figure 8: Window for authoring Manifestations.

Once the Manifestation was instantiated, the group's task was to figure out how to neutralize it by using spells and affective actions – both on the Manifestation and on each other's avatars. If time allowed, each player in the test created a Compound Manifestation that the group then cooperatively dealt with. In total, 22 Manifestations were made. The players neutralized the majority of these, but in a few cases, they were forced to give up since the time ran out for the test, and in one case, the players did not agree about neutralizing the Manifestation in the first place.

Player-created Manifestations

As mentioned, in the play test the test leader and the game master was purposefully vague about what type of what kind of Manifestation could be authored, in order to see how players would use the system. Players were typically only given the instruction that it should represent, or externalize, the emotion that the player's avatar was cursed with, be it fantasy or real-life, abstract or concrete. The Manifestations players created in the play tests tended to be persons, named according to the role they could have towards the player ("mother", "grandmother", "bully", "teacher") difficult situations ("an exam",

"alone in the darkness"), abstract concepts ("blue", "the reason for dispute") or fantasy objects ("The Goblin of Doom", "Teletubby").

Figures 9 to 12 show examples of authoring input made by players of the four types mentioned above. The images are extracted from the Camtasia recordings.

Figure 9 shows the input for the CM "Forgotten Grandma", whose main emotion is guilt. The player has chosen one affective action to be executed over and over again: to misunderstand on purpose.

Figure 9. Compound Manifestation Forgotten Grandma.

Figure 10 shows an example of a situation of fear by a Manifestation named "Alone in the Darkness", while Figure 11 displays a CM that is a more abstract representation of guilt; "The reason for dispute". In play with the latter Manifestation, the group was not fighting a representation of a person, but instead with actual reason for the dispute, here abstracted to an entity of its own.

The display in Figure 12 shows the authoring of the CM "Teletubby", an object of fantasy with humorous authoring. Its spells were named in Swedish, giving the song of pain the name of "Love Hug", and Focused Resistance drain was "Rainbow cakes". While casting these spells it alternated between its affective actions, which were an ambiguous mixture, a Group Hug, Threaten, and Make Feel guilty, while making exclamations such as "Let's go eat ice cream". When interacting with this Manifestation the players laughed a lot.

Figure 10. Compound Manifestation Alone in darkness.

Figure. 11. Compound Manifestation The reason for disputes

Figure 12. Compound Manifestation Teletubby

In-game interactions with the Manifestations

When interacting with the Curse-Manifestations the players, having just played the second scenario learning about the emotion spells, they, in many cases, asked each other if anyone in the group had the counter emotion to the Manifestation in question. In cases when they did, they managed to vanquish the Manifestations rather quickly. A such, it was seen in the test that the design may need to be improved by decreasing the efficiency of the emotion spells in order to not allow it to be a so called King Maker (a strategy or action-pattern in a game that is so efficient, that once discovered there is no more challenge in playing the game). In sessions where players either did not use the special emotion spell, or did not have it, the combat was more versatile. In those cases players experimented with using affective actions that they thought could have an effect on the CM's emotions. They also made extensive use of spells that reduced mental energy and resistance in the CM. In order to have certain spells active in the mood-wheel they manipulated each others' moods by casting affective actions, but also by placing themselves in each other's proximity. In this, they used the sentiments they had towards each other. A Player 2 could ask Player 3 "Come stand next to me, I need to be angry." In doing so players were using the relationship where they were competing for the affections of Player 1.

The steps of co-creation

The process of co-creation in the test was coupled with how players created meaning. The process had four main steps:

1. Player used authoring interface for creating a CM ("Mother").

2. Player observed, in play, the behaviour of the CM. (The spells, such as "Focused Aggression" and affective actions "Blame" the Mother casts, and what it says ("*Get out of here*".)

3. Player interacts with other players, forming a strategy for how to interact with the CM, communicating among each other ("*Forgive her! I'm holding her hand*"). Players did not only theorize about the CMs

weaknesses, they also used the emotions their avatars felt towards each other. Sometimes players who had created a CM explained its behaviour to their co-players.

4. Player filled in a survey immediately after the play session, where among other things; they described the CMs they had created. (*"I created a 'mother' that casted blame, threatened, and other depressing spells".*)

From a design point of view the act of authoring needs to fit in as part of the activities in playing the game. In the play-testing of PI the authoring of a Curse-Manifestation took between three and ten minutes. Since the players were cooperating in groups of three, four with the game master, this was not a problem because players found other things to do, such as chatting and casting affective actions. However, had it been a group of only two players, it might have been tedious for the non-authoring player to wait, and as such putting a time pressure on the one authoring. It is anticipated that when using the more versatile interface for creating Free Form Manifestations, the game master would do so in preparation of a game session.

Discussion: Intentionality and Meaning

It was especially interesting to, as an observer, listen to players' dialog as they were reasoning about the CMs.[4] Often, the player who had authored the CM commented on its actions. For example, a player who had made an instantiation of this math teacher from 5th grade said "Look how he ignores you! He made me feel useless." Another player, having made a CM called "Mother" said, repeatedly while playing, "Forgive!", and "I will forgive you into oblivion". The play sessions were in many cases very intense, players being acutely focused on the interaction. When talking in play they used the names of the affective actions, and of the emotions they were dealing with, and setting them in relation to CM that was presently instantiated, such as in the case with the math teacher CM. When players referred to their own CMs, they looked at how it behaved not only towards themselves but also towards the other players. They tried to explain that behaviour to the other players, as if the CMs had intentions of their own, arising from the combination of their authoring and how the game system worked.

In the introduction to this article I described the many Skywalkers problem as when no player gets to be the main protagonist of the underlying story in a massively multiplayer game. However, all players *are* the main protagonists in so that their avatar is (naturally, given by the genre) the centre point of the play experience, the very entity that is the vehicle for play, having its own history, properties, skills, and relations to other avatars. It is latter, avatar-driven, framework for story construction that has been explored in the work described here. An early question in this work was how it might be possible to use knowledge and theory from the field of psychology together with role playing game design in order to create a more interesting game playing experience. By using the Mind Module as a central part of the game play in PI, representations for affective processes were tied into the game mechanics. Previous play tests of the Mind Module (Eladhari & Mateas, 2008) had indicated that users were able to construct functioning mental models of how the Mind

---

4 As the test leader I withdrew to an observational role after having welcomed the players and explained the procedure.

Module worked. That is, the Mind Module and the game play designed for PI seemed to make sense to players, and they quickly understood how to use it.

Another concept addressed in the introduction was that of co-creation and player created content. Main risks of letting players create content for game worlds are that the content created is not enjoyable for other players, and that the content introduces bugs in the game or inconsistencies in the fiction of the world. A major reward of allowing players to co-author in virtual worlds is that the content has individual meaning to players. The aim of letting players create their own challenging boss-monster was to give more indvidual significance to the in-game challenges. Another aim was to, with the help of the players, populate the world and give it more content.

Manifestations that players created in the play-test described in this article were mainly of four different types; persons, situations, abstract concepts and pure fantasy creations. In terms of co-creation and player created content it was notable that the majority of the Manifestations created were inspired by things in the participants real lives. This indicates that players were inclined to bring elements of 'realness' to the fictional world, in order to play with them. Another indication towards this is that none of the 25 participants chose to not create a fictional character to role play when they filled in the personality test to create their avatar. 23 of participants indicated that they filled in the personality test when creating their avatar 'as themselves'. The remaining two indicated that they filled in the test as a mixture of themselves and a character to role play. That the Manifestations created were inspired by players' real lives was possible to decide both from players' description of them in the post test survey, and from how players described them to their co-players when they were playing.

When players created persons as Manifestations they either created Manifestations of specific persons, like "my math teacher from 5th grade" or persons as roles, such as "bully". When players created specific persons, they often explained their Manifestations' behaviour to their co-players. In the test, it seemed that these explanations made the experience more interesting to the other players. When players created persons that were described as roles rather than individuals less explanations were given. Instead, the group together related to, for example, how a "bully" would behave, and what they would do to neutralise it.

When playing, players used two very different mental models (Puerta-Melguizo, Chisalita, & Van der Veer, 2002). Firstly, they were deciphering the Mind Module, drawing upon their own knowledge of how emotions, moods and personality work, and using that knowledge when both creating Manifestations, and in tactical game play. Secondly, they were using the mental model of general tactical game play in MMORPGs, especially for task division, successfully combining the two mental models. In the third scenario, when the game play was focussed on defeating the Manifestation, the metaphors for the affective processes were used in play in the way that players believed to be the most efficient way in order to neutralise the Manifestation. Players would not role-play by trying to act in accordance with their character. For example, they would use the emotions they got from the sentiments set between their characters in order to get in the right mood

to cast certain spells. As a metaphor for combat, this can be compared to how people in real life conflict situations 'play with emotions', or behaves in ways that is perceived as manipulative - that is, that they do not act according to their true emotions, but use them as assets in a quarrel.

The concept of intentionality was introduced an indicator to whether the design of a computational process or AI has been successful in a game design containing fictional elements. If a player can attribute intentions to an artificial entity, this indicates a successful design. When attributing intentions to an AI players suspend their knowledge that computational processes do not have any intentions of their own. When participants in the play test described here explained the behaviour of `their´ Manifestations to their co-players they were attributing the Manifestations with intentionality. The fact that players did so despite that they had authored the Manifestations themselves indicate that the design of the authoring interface together with how the instantiated Manifestations behaved (their autonomy) in the game system was successful. Therefore, this feature will be further elaborated upon in future experimental prototypes. Also, the particular method for co-creation described here is promising for future work, for example for design projects that may explore stories and experiences from players own lives. For instance, a player creating a Manifestation of their math teacher does so remembering himself was at that time, and how the teacher was acting. In discussion with other players the memory can get challenged. The question why the match teacher behaves like he did becomes interesting to answer instrumentally because it can help find ways to defeat the Manifestation (provided that the Manifestations behaves in the way players' mental models of it predicts). Potentially the needs of problem solving in the instrumental game play situation might lead to new perspectives and understanding of situations in players' real lives.

Conclusion

In this article I have described how groups of players in a play test create and interact with their own 'boss-monsters', or Manifestations, in the virtual game world prototype the Pataphysic Institute. When creating the Manifestations, players used an in game authoring interface, resulting in entities that were partly created by the player, partly by the game system. Players created Manifestations of mainly four types: persons, situations, abstract concepts, or fantasy objects. When players interacted with the Manifestations in groups of three they first observed the behaviour of their creations. Then they tried to interpret this behaviour, and explain it to their co-players, in order to find ways to overcome the challenge of tactical game play that Manifestation posed to the group. While doing this, they in play and dialog displayed that they were attributing intentionality to the Manifestation, and that they were using two very different mental models when reasoning about how to act, that of how human mood and emotion work, and the genre conventions of tactical game play in massively multiplayer games. The inspiration for what Manifestations to create was in many cases taken from the real world, and when that was communicated to the co-players the actions taken in the game became immediately relevant, or meaningful, to the individuals in the group.

I described the many Skywalkers problem as when no one can be the main protagonist if the background story of a virtual world. I pointed at the opportunity of avatar-driven story construction in having players inhabiting the world in what that means of them creating drama by their actions and social relations. Player-created content has been seen as a possible solution to this, but with the complication that this content is seldom of such quality that it is entertaining for other players. I do not, by any means, propose to have solved these problems, or used the opportunities in full. However, I could see that once a Manifestation that had meaning to one player, often derived from their real lives, was explained to the other players, the actions taken in tactical game play gained additional meaning. It became *relevant* to hold the hand of the friend's math teacher from 5^(th) grade, send mental energy to that friend's avatar, and figure out how to put such a Manifestation to rest. ✎

REFERENCES

Agre, P. E. (1997). *Computation and Human Experience (Learning in Doing: Social, Cognitive and Computational Perspectives)*. Cambridge University Press.

Allport, G. W. (1961). *Pattern and Growth in Personality*. Harcourt College Publishers.

Bartle, R. (1996). Hearts, Clubs, Diamonds, Spades: Players Who Suit MUDs. *Journal of MUD Research*.

Bartle, R. (2003). *Designing Virtual Worlds*. New Riders.

Bartle, R., & Trubshaw, R. (1978). *MUD – Multi User Dungeon*. [Computer Game - Text-based Virtual Game World].

Bates, J. (1994). The Role of Emotion in Believable Agents. *Communications of the ACM*, (April).

Bioware. (2002). *Neverwinter Nights*. Infogrames/Atari MacSoft [Computer Game- Role Playing Game].

Davidovici-Nora, M. (2009). The Dynamics of Co-Creation in the Video Game Industry: The Case of World of Warcraft. *Communications & Strategies, No. 73, p. 43, 1st Quarter 2009*. SSRN. doi:10.2139/ssrn.1427235

Dennet, D. (1987). *The Intentional Stance*. MIT Press.

Egges, A., Kshirsagar, S., & Thalmann, N. M. (2004). Generic personality and emotion simulation for conversational agents. *Computer Animation and Virtual Worlds*, *15*(1), 1–14.

Ekman, P. (1994). All Emotions Are Basic. *The Nature of Emotion*. Oxford University Press.

El Jed, M., Pallamin, N., Dugdale, J., & Pavard, B. (2004). Modelling character emotion in an interactive virtual environment. *Proceedings of AISB 2004 Symposium: Motion, Emotion and Cognition*. Leeds.

Eladhari, M P, & Mateas, M. (2008). Semi-Autonomous Avatars in World of Minds - A Case Study of AI-based Game Design. Yokohama, Japan.

Eladhari, M P, & Sellers, M. (2009). Good Moods - Outlook, Affect and Mood in Dynemotion and the Mind Module. *Loading...*, *3*(5).

Eladhari, Mirjam Palosaari. (2009). Emotional Attachments for Story Construction in Virtual Game Worlds - Sentiments of the Mind Module. *DIGRA09 Breaking New Ground: Innovation in Games, Play, Practice and Theory*. Brunel.

Eladhari, Mirjam Palosaari. (2010, September). *Characterising Action Potential in Virtual Game Worlds applied with the Mind Module*. Teesside University. Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:hgo :diva-368

Fullerton, T., Swain, C., & Hoffman, S. (2004). *Game Design Workshop: Designing, Prototyping, and Playtesting Games*. CMP Books.

Guoliang, Y., Zhiliang, W., Guojiang, W., & Fengjun, C. (2006). Affective Computing Model Based on Emotional Psychology. *Advances in Natural Computation*, 251–260. doi:10.1007/11881070_37

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly*, *28*(1), 75–105.

Imbert, R., de Antonio, A., Segovia, J., & Segura, M. (1999). A Fuzzy Internal Model for Intelligent Avatars.

Kangas, M. (2010). Creative and playful learning: Learning through game co-creation and games in a playful learning environment. *Thinking Skills and Creativity*, *5*(1), 1–15. doi:10.1016/j.tsc.2009.11.001

Kelley, J. F. (1983). An empirical methodology for writing user-friendly natural language computer applications. *Proceedings of the SIGCHI conference on Human Factors in Computing Systems* (pp. 193–196). New York, NY, USA: ACM. doi:10.1145/800045.801609

Lee, S., & Kirby, J. (1962). *The Incredible Hulk #1*. Marvel Comics.

Linden Lab. (2003). *Second Life*. Linden Research, Inc [Virtual Social World].

Lucas, G. (1977). *Star Wars*. 20th Century Fox.

Mairesse, F., & Walker, M. (2007). Personage: Personality generation for dialogue. *Proceedings of the 45th Annual Meeting of the Association for Computational Linguistics* (pp. 496–503).

Marsella, S. C., Pynadath, D. V., & Read, S. J. (2004). PsychSim: Agent-based modeling of social interactions and influence. *International Conference on Cognitive Modeling*.

McCoy, J., Treanor, M., Samuel, B., Tearse, B., Mateas, M., & Wardrip-Fruin, N. (2010). Authoring Game-based Interactive Narrative using Social Games and Comme il Faut. *Proceedings of the 4th International Conference & Festival of the Electronic Literature Organization: Archive & Innovate (ELO 2010)*. Providence, Rhode Island, USA.

McCrae, R. R., & Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, *52*, 81–90.

Namaste. (2012). Storybricks. Namaste [Computer Game]. Retrieved from http://www.storybricks.com/

Ortony, A., Clore, G. L., & Collins, A. (1988). *The Cognitive Structure of Emotions*. Cambridge University Press.

Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, *18*(3), 5–14. doi:10.1002/dir.20015

Puerta-Melguizo, M. C., Chisalita, C., & Van der Veer, G. C. (2002). Assessing users mental models in designing complex systems. *2002 IEEE International Conference on Systems, Man and Cybernetics*.

Rawls, J. (1955). Two Concepts of Rules. *The Philosophical Review*, *64*(1), 3–32.

Schafer, T., & Double Fine Productions. (2005). *Psychonauts*. Majesco [Computer Game].

Sengers, P. (2000). Narrative Intelligence. In K. Dautenhahn (Ed.), *Human Cognition and Social Agent Technology*. John Benjamins Publishing Company.

Smith, G., Gan, E., Othenin-girard, A., & Whitehead, J. (2011). PCG-based game design: enabling new play experiences through procedural content generation. *Star*, 5–8. doi:10.1145/2000919.2000926

Sony Online Entertainment. (2003). *Star Wars Galaxies: An Empire Divided*. Lucas Arts [Computer Game - Virtual Game World].

Square Enix. (2003). *Final Fantasy XI Online*. [Virtual Game World].

Sullivan, A., Mateas, M., & Wardrip-Fruin, N. (2011). Making Quests Playable: Choices, CRPGs, and the Grail Framework. *Leonardo Electronic Almanac*, *17*(2).

Team Ico. (2001). *Ico*. Sony Computer Entertainment [Computer Game].

Techsmith. (2011). Camtasia Studio 7 Tutorials. *Techsmith*. Retrieved from http://www.techsmith.com/tutorial-camtasia-current.html

Tomkins, S. (1962). *Affect/imagery/consciousness. Vol. 1: The positive affects.* (Vol. 1). Springer.

Tomkins, S. (1963). *Affect/imagery/consciousness. Vol. 2: The negative affects.* (Vol. 2). Springer.

Valve Corporation. (1998). *Half-Life*. Sierra Entertainment [Computer Game].

Vinayagamoorthy, V., Gillies, M., Steed, A., Tanguy, E., Pan, X., Loscos, C., & Slater, M. (2006). Building Expression into Virtual Characters.

Wright, W. (2000). *The Sims*. Electronic Arts [Computer Game].

Yee, N. (2005). Motivations of Play in MMORPGs. *Proceedings of DiGRA 2005 Conference: Changing Views: Worlds in Play*.