Once More with Feeling:

Game Design Patterns for Affective Learning

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Abstract

We are interested in how digital games can be designed for learning in the affective domain. Our studies of how emotions are embedded in games and how games sustain affective learning involve observing game-play and identifying recurring elements that we identify as design patterns. Design patterns help us think about the role of affect in play, what affect in games looks like, and the different ways affective learning might be achieved in educational and serious games. In this paper, we describe and discuss several patterns related to understanding emotions, affective representation, and socio-emotional interactions, which are essential components of affective learning. These patterns provide a language to conceptualize how affective learning might be designed into future game projects. To conclude, we discuss the development of a taxonomy of affective patterns to sustain socio-emotional learning. We thus hope to stimulate the development of more human-oriented educational games in this domain.

Keywords: design pattern, videogames, emotion, affective learning

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Digital games are now ubiquitous, and their value for learning has been substantiated in many areas from university to the workplace. In particular, the value of computer games for cognitive learning has been widely acknowledged, including their positive impact on reasoning skills, problem solving, and decision-making (De Aguilera & Mendiz, 2003). However, there are contexts in which emotions, affect, and attitudes are at the core of learning.

The affective domain includes ways in which we "perceive, experience, and process the emotional aspects of social interaction" (Mahn & John-Steiner, 2002 p.15). It is associated with belief and attitude. The key elements in affective learning are appraising and understanding emotions, learning to manage feelings and moods, and establishing relationships with others (Martin & Reigeluth, 1999). Theories of Social and Emotional Learning propose important affective components such as self-awareness, social awareness, and relationship skills (Payton et al., 2000). Self-awareness includes recognition of one's own emotions, and the promotion of self-confidence. Social awareness is instantiated through empathy, altruistic behaviors, and understanding and respecting diverse viewpoints. Finally, relationship skills include cooperation and collaboration. Affective learning also involves creating a dramatic emotional experience, a route towards developing compelling gameplay experiences. While affective learning is sometimes used to describe the important role of affect in supporting cognitive learning, this paper expressly concerns learning in the affective domain.. Affective learning in games addresses important societal issues such as managing conflicts, caring for the environment, and fighting prejudices and stereotypes. Research has shown that games can influence attitudes and behaviors (Delwiche, 2007). We have found a growing trend of games related to affective

learning in games for health, social games for change, and serious games that support affective competencies in the workplace. For example, *The Curfew* developed for Channel 4 Education (UK) addresses issues of trust, and privacy and control, *Saving Zoé* addresses issues surrounding violence and dating, while *Elude* uses complex landscapes of emotions to raise awareness of issues related to clinical depression.

To sustain the design of affective learning and encourage more games that enroll emotions into their design, this paper identifies game mechanisms that instantiate relevant affective components, namely: understanding and managing emotions, and experiencing socio-emotional interactions. During our investigation of video games, we collected practical design knowledge pertaining to emotions and affective learning which we then formalized into game design patterns. Game design patterns provide a means of capturing existing successful design practices, and sharing and expanding knowledge about game design (Kreimer, 2002). They provide a shared design vocabulary for communication between educators, game designers and developers. This vocabulary is particularly useful in learning contexts as teachers may be unfamiliar with game mechanics and heuristics. Game patterns enable educators and designers to first identify and evaluate patterns for analysis, and, second, to combine and elaborate them for creative game solutions.

Our goal in this paper is to introduce patterns as a way of thinking about how affective learning in games might work. This includes using patterns to operationalize the role affect plays in games, to assess the different ways that affective learning is already achieved, and, ultimately, to create a language of affective game design to think with, thus providing inspiration for the development of new game concepts. Our primary audience is game designers, particularly academics, who are creating games that teach affective skills. However, these patterns may be

useful for anyone looking for general principles on how emotions and affect are currently leveraged in mainstream games.

After briefly introducing emotions in game design, we outline the origins of game patterns and the methodology for deriving the patterns. Then, we discuss each pattern, stating its primary goal, what issue it addresses, and its connection to affective learning. Lastly, we discuss the taxonomy of affective patterns and present issues for future study. By providing conceptual tools that support affective learning, we hope to stimulate both the analysis of existing games, and the future development of novel and powerful educational games.

Background: Emotion and Game Design

The research on affective learning and game design is quite limited. Thus, to guide and inspire our research, we must look to the related fields of game design and emotion, as well as affective gaming. For a review of theoretical models of emotions within a game context the thesis of Järvinen (2007) is very comprehensive. One noteworthy example connected to emotional game design is the concept of Emotioneering, the goal of which is "to move the player through an interlocking sequence of emotional experiences" (Freeman, 2004, p. 7). Most relevant to our context are the concepts of *interesting* or appealing to the player, and *deep*, which indicates the emotional depth and complexity of an object. Making an object *interesting* means coming up with a creative or evocative concept that the players can either relate to or immerse themselves in. Making it *deep*, however, refers to the layering of emotions that can be discovered by a player. Creating an emotional experience, as stated, is an essential element of affective learning, and thus layering emotions with game patterns would have to be carefully crafted into the game in order to support affective learning.

Fullerton et al. (2006) introduce the concept of a "play-centric" design, which includes both formal mechanics for game design and emotional experiences created through premises, character designs, and storytelling. Treating emotions as formal mechanics leads to games that can be tuned to specific play experiences and emotional interactions. Using a play-centric approach, the authors produced the award-winning game *Cloud*. *Cloud* was designed to tap into the "tranquil, relaxing and joyful emotional experience related to everyone's childhood daydream of flying in the sky and creating shapes in the cloud" (Fullerton et al., 2006, p. 55). The developers were successful in designing a game based on a very specific emotional experience. It is an interesting approach, but too narrow for most affective learning problematics.

Another promising area for affective learning is affective gaming. Gilleade and Dix (2005) provide a short overview of the genre of affective gaming, as it connects to measuring physiological indicators of emotions during gameplay. They develop a possible method of integrating these measures into the gaming experience based on high-level design heuristics, summed up as "assist me, challenge me, and emote me". The game difficulty or level of frustration during gameplay can be measured and then varied to provide an optimum flow. Although affective gaming is a valuable approach for affective learning, it is beyond the scope of this paper as it does not concern the design of emotions *per se*. Hudlicka (2008) discusses the integration of affective computing techniques for affective game design, like the provision of an affective model for players as well as models for Non-Player Characters (NPCs) and the player's avatar. These models include the emotions related to the avatar expressions (see the game pattern below) to the more complex game emotions managed by an artificial intelligence's model. We feel this approach is complementary to ours, as our affective game patterns can be connected to affective models used in a specific game.

In the area of games connected to learning in the affective domain,

Thomas, Cahill, and Santilli (1997) demonstrated that an adventure game could successfully

enhance students' confidence in safe sex negotiations. Delwiche (2007) has shown that games

can influence attitudes and behaviours. Zagal (2009) discusses how games create vicarious

emotional experiences from which we can learn, and spaces in which ethical or moral dilemmas

can be embedded. Hromek (2009) discusses how games facilitate social and emotional learning,

and shows how therapeutic board games can be used with young people. Dormann,Whitson and

Biddle (2011) initially proposed using game patterns to sustain affective learning. In this paper,

we develop affective patterns and discuss their utilisation in this context.

Game Patterns

Design patterns, originating from the work of Alexander (1977) in the context of

architecture, have been applied to software development, user interface design and, more

recently, digital games. A design pattern is often defined as a general reusable solution to a

commonly occurring problem: it stems from a kind of "textual" analysis of practice, and shows

how various forces are constrained and channeled through the design structure to produce

desirable outcomes. Patterns are inductively derived. They are identified by their repeated

application in response to a specific design problem. Through their uses, they become general

principles that are then adapted to the specific context. In game design, patterns have been used

as a problem-solving method and as a way of codifying design knowledge (Bjork & Holopainen,

2005).

The first step in this method consists of creating an initial pattern collection. We

investigated a number of popular digital games (*Ico, Portal, Dragon Age 1, Mass Effect 1&2,and*

Bioshock) through inspection and game-play to identify, examine, and analyze recurring

emotional components that are connected to affective learning. Then we performed a more in-

depth affective walkthrough of a number of these games especially *Dragon Age*, a process

detailed more fully in Dormann, Whitson & Biddle (2011). We selected games based on their

critical reception and their popular association with emotional depth. We made note of in-game

moments and mechanics that cued emotional response and identified recurring trends. The

patterns presented here are not exhaustive, but rather the most salient and oft-repeated. Our

game-play examples for each pattern were chosen from our broader gaming experiences, both

for their explanatory potential and their familiarity to readers.

The patterns that we have collected are divided into three realms which are important

aspects of affective learning: i) understanding emotion, ii) socio-emotional interactions, and, iii)

supporting learning in the affective domain. Following the established pattern template, we first

define the pattern, then state its goal and problem, followed by the solution and examples, and

conclude by discussing the relationship to other patterns and highlighting its relevance for

affective learning. Note that most of the patterns discussed in the "Interactions with Other

Patterns" sections relate to *Patterns in Game Design* from Bjork and Holopainen (2005).

Understanding Emotions

The design patterns in this section relate to understanding one's own feelings and the

feelings of others (AVATAR EMOTIONAL EXPRESSION, NPCS WITH EMOTIONAL MASKS), as well as

learning to manage feelings and emotional values (AVATAR DISPLAY OF HUMAN FRAILTY and THE

TRAUMATIZED AVATAR).

Game Pattern: AVATAR EMOTIONAL EXPRESSION.

Definition. Avatars' facial expressions alter in response to in-game events or through player commands.

Problem/Goal. Avatars are often affectively flat, for example, when emotional in-game events occur, avatar's facial expressions do not change. This flat affect may be intentionally designed to allow the player to project their own personalities onto 'blank slate' characters (Björk & Holopainen, 2005), but the end result is an inhuman character who does not react to the surroundings (cringe in fear, smile in happiness, laugh at humour, etc.). Depicting avatars as afraid, remorseful, conflicted, or joyous creates character depth that goes beyond the prototypical stone-faced FPS killer.

Solution. Allow players to mutually constitute and reinforce their avatar's emotional state. Being able to alter an avatar's expression may be one way to show deeper emotions and encourage EMOTIONAL IMMERSION (being emotionally affected by the events that occur in a game). Two potential methods for achieving effective AVATAR EMOTIONAL EXPRESSION are: i) to program in-game events that trigger appropriate changes in avatar expressions, and/or, ii) to allow the player to manually change their avatar's facial expressions.

Example. In *Little Big Planet*, the player commands AVATAR EMOTIONAL EXPRESSION by toggling the directional buttons on the PlayStation 3 controller: players control whether their avatar is sad, worried, annoyed, or happy, and can increase or decrease the intensity of each expression. AVATAR EMOTIONAL EXPRESSION, as well as avatar customization, helps create a positive link between the avatar and the player.

In a related way, *Sims* players can direct their avatars to make jokes and laugh. However, this is limited in that avatars cannot be made to laugh without first initiating the joke component.

The Sims also cry when unhappy, but this is not totally in the player's control. A few other games

such as the *X-Files* Game, as reported by Wilcox (2010), give the player limited control of their

avatar's emotions for a small range of emotions like "humorous," "indifference," and "paranoia".

More interesting, is her example of an art game for the iPhone, where the player can make their

character mad by shaking the phone, and alternatively calms the character by touching the

iPhone gently, thus influencing the quarrel at heart of the game.

   Relation to Affective Learning. People are experts at interpreting facial expressions and

body language, thus they are extremely susceptible to emotions of others. The ability to

recognize, understand, manage and express emotions appropriately is thus a fundamental

component of affective learning (Carnwell & Baker, 2007). This pattern is a building block of

many patterns such as AVATAR DISPLAY OF HUMAN FRAILTY, EMOTIONAL DECISION MAKING, and

of complex emotions such as empathy or caring. This pattern challenges the player to think about

the emotions of their avatar, an entity outside of their own self. At the same time they are able to

use the avatar to reflect their own emotional state. This duality provides a greater insight into the

emotions of the self as the player can either choose to treat the avatar as a reflection of their own

emotions, or use them as a conduit for trying out other emotions. By extension, not only should

players be able to control their avatar's expressions but also its gestures (for example, give a hug

for comfort or give a hand for help). Providing tools for players to customize their avatar

emotional expression in a way that is more congruent with their personal experience might prove

beneficial to affective learning.

   Interactions with Other Patterns. Björk and Holopainen argue that avatars are designed

to let the players feel a positive empathic link towards them in order to enhance EMOTIONAL

IMMERSION. AVATARS do not usually have strongly developed personalities because this can

prevent the players from interpreting what they want into the AVATARS' actions. We would

counter that the lack of avatar emotional response and the flat affect of avatars in response to

traumatic in-game events lessens the affective impact of the game, as well as attributes to the

'uncanny valley effect' which works to repel players.

     Game Pattern: NPCS WITH EMOTIONAL MASKS.

     Definition. The NPC who uses an emotional mask is a character that displays one kind of

emotion when they are secretly feeling another.

     Problem/Goal. NPCs are given emotional depth by displaying a feeling or emotion.

However these emotions are often one-dimensional and taken at face value by the player,

detracting from the realism of the character and precluding deeper emotional interaction.

     Solution. One solution to this problem is to allow NPCs to display one emotion and have

the player discover that they were using it to cover up another. A typical example would be to

have an NPC feign friendliness while harbouring contempt and secretly plotting the player's

demise. Crucial to the execution of this pattern is that the player must discover that the NPC had

an ulterior motive and that their emotions were not sincere. This process of discovery happens

usually at a climax in the plot and, consequently, the player has to make a game-changing

decision based on the new information.

     Example. In *Portal,* the all-powerful computer, GLaDOS, encourages the avatar, Chell,

to complete a series of dangerous mazes in order to move through the unknown lab where she

has woken up. Throughout the game, GlaDOS assumes several different emotional masks,

alternating between congratulating Chell on her achievements and threatening her. Chell

confronts GLaDOS in a final battle wherein GLaDOS reveals the plot to kill Chell outright. In

No Ones Lives Forever, the avatar encounters a drunk NPC throughout every level of the game.

The drunk character is always excessively friendly to the female avatar. It is revealed at the end

of the game that this character is the main villain who uses every opportunity to spy on the avatar

and do damage.

   Relation to Affective Learning. Players should become aware that individuals can

manipulate emotions to achieve their ends. This pattern relates to credulity, trust, and authority. It

can be much harder to recognize the emotions and motivations of someone in authority. With this

pattern, players are encouraged to recognize and analyze the emotional and moral actions of

others (and thus their own). The use of dissonance in teaching is a valuable tool that help

students question their own assumptions, and we suggest that it can be used for creating

emotional scenarios for affective learning (Gorski, 2009). It should be used with care and

foresight so as not to overwhelm the players' emotions, while at the same time leaving them

opportunities to resolve their dilemma.

   Interactions with Other Patterns. The pattern relates to MAINTAINING LIES: the player is

lead to believe one thing, while the reality of the situation is completely different.

   Game Pattern: AVATAR DISPLAY OF HUMAN FRAILTY.

   Definition. AVATAR DISPLAY OF HUMAN FRAILTY describes the inclusion of less than

optimal physical traits in an avatar. These traits more closely mirror the reality of human life.

   Problem/Goal. The vast majority of game avatars are imbued with superhuman strength

and the ability to heal all but the most debilitating damage. They also exemplify the current

ideals of both femininity (beauty) and masculinity (strength). This avatar characterization can be

empowering, but it also lacks dimensionality and can prevent growth and confidence building.

Solution. Including less than optimal character traits adds a more realistic dimension to

avatars. The inclusion of frailty and sickness will more accurately mirror the actual human

condition and consequently lead to deeper player identification with the avatar, thus sustaining

deeper emotional experiences. The inclusion of human frailty should not be easily surmountable

but rather an enduring character trait.

Example. AVATAR DISPLAY OF HUMAN FRAILTY is evidenced in *Heavy Rain.* Scott Shelby,

one of the main characters, is an aging private detective. At times –especially at tense moments-

he is afflicted with asthma attacks. When Shelby starts gasping for breath, the player must

quickly fumble in his pockets, locate the inhaler and breathe in the medicine. Human frailty is

even more effectively employed in *Haunting Ground,* where the avatar Fiona is struck with

debilitating fear when she sees enemies. This directly impacts game-play in the form of blurred

vision, difficulty maneuvering, and Fiona's collapse. If the player does not manage to maneuver

Fiona to a hiding place in time, she takes increased damage and dies.

When customizing avatars, some games let the players create less "ideal" characters that

can be overweight or older, although the game mechanics rarely respond to the physical change.

Except for comic relief, they are generally not very helpful for affective learning.

Relation to Affective Learning. This pattern teaches players that physical weaknesses can

be brought on by a variety factors, such as stress, and thus effect the outcome of situations. It

allows a more realistic portrayal of characters that aligns more strongly with the affective

situations that we want the player to experience and reflect on. Rather than experience the all-

powerful indestructible mien of most game characters, players experience what it feels like to be

weak or to be to be afflicted with a disease, ideally developing empathy for those that actually

suffer with disease on a daily basis, or at least developing a better understanding of how

afflictions such as phobias or asthma impact sufferer's lives. According to Bandura (2004),

individuals learn through role models and a stronger sense of personal efficacy can be developed

by observing the behaviors of others. This can be substantiated through media such as television

but also games (Wang & Singhal, 2009). Thus, players can be made to understand that a

weakness does not necessarily lead to failure, and can be overcome or compensated to reach

success. This pattern can be very useful in prevention programs and health games.

Interactions with Other Patterns. Other patterns relating to this one includes AVATAR

EMOTIONAL EXPRESSION, OTHER FORTUNE AFFECTS OWN MOOD, as it represents the relationship

between the player and avatar, and EMOTIONAL IMMERSION.

Game Pattern: THE TRAUMATIZED AVATAR.

Definition. An avatar with emotional trauma allows players to gain a deeper

understanding of what drives the avatar and thus empathize with it.

Problem/Goal. Aristotle referred to *hamartia* as a concept of tragedy in which the

audience is presented with a hero who wrestles with his personal tragedy. Aristotle identified it as

a major device for driving plots forward. Tragic situations are often used to set game plots in

motion, but they are not generally an integral part of the characters' behaviour or gameplay. The

player's customisation of their avatar and backstory through game variables can interfere with the

development of hamartia by diminishing its dramatic and emotional qualities.

Solution. Trauma is an integral part of the human psyche and therefore makes a character

more believable and human. The purpose of giving the avatar such a backstory is to allow

players to experience another emotional situation than their own, moving and growing from this.

The trauma can be explained by using flashbacks or discovered through interactions as the avatar

tries to cope and overcome its trauma. The player is confronted with the personal struggles of their avatar and, perhaps, makes links to their own.

Example. In the third person action game *God of War* the avatar Kratos is deeply emotionally scarred after being tricked into killing his family. The game starts with Kratos throwing himself of a cliff and committing suicide. During the gameplay, the player learns the reason for Kratos's suicide and experiences his struggles to overcome his trauma. To free himself of guilt and his nightmares Kratos must kill the God Ares. Although he succeeds in doing so, his nightmare persists. Ultimately, while Kratos is returned to life, he must live with his nightmares. The Traumatized Avatar is a relatively common pattern. In *Batman: Arkham City,* certain events highlight the trauma of Bruce Wayne. If the player wanders into the alley where his parents were murdered when he was a child, evocative music cues to create a moment of silent reflection amidst the hectic game-play. As the following anonymous quote suggests, this is an especially powerful moment:

> Everytime I find myself near Crime Alley, I stop for at least half a minute here to pay my respects. I tear up, and when I rise, I find I have a renewed sense of dedication to Bruce's cause. I then continue the game with this in mind, and I find I am more in tune with being Batman. ^^; Every punch, every takedown thereafter is for those two chalk outlines, and everything becomes more emotional… (from a YouTube user comment on a game-play recording of this moment http://www.youtube.com/watch?v=_8NgzBHTePw&feature=youtu.be&t=18s)

Relation to Affective learning. This game pattern is somewhat similar to AVATAR DISPLAY OF HUMAN FRAILTY in that it adds an emotional layer to the avatar's personality and thus introduces affective components to the gameplay. However, the results and effect can be quite

complex, as the effects of traumas are hard to predict, deal with and overcome. Moreover, a

character might not always be aware of the extent or circumstances of a trauma. It is a valuable

tool for affective learning as it exposes players to complex emotional situations. To succeed in

the game, the players must get a better understanding of their avatar, realizing what drives the

avatar emotionally and what consequences it can have. It can encourage players to think about

their own emotional state, attitudes and motivations. Moreover, as discussed by McCrary(2000),

practicing solving emotionally difficult situations is an important mechanism for affective

learning. In some instances, traumas engendered by violence at home or in the community, such

as with at-risk-youth, could be at the heart of an affective learning game exploring the effects of

trauma and how to overcome it.

   Interactions with Other Patterns. Other patterns relating to this one include: INTERNAL

CONFLICT as pertaining to the avatar, or EMOTIONAL DECISION MAKING as this pattern can

influence the avatar's decision.

Socio-Emotional Interactions

   While the patterns in the previous section related to understanding one's own feelings and

the feelings of others, the patterns in this section are centred on establishing and maintaining

relationships with others, an important elements of affective learning as we mentioned earlier.

These patterns include HEALING/NURTURING OTHERS and ANIMAL COMPANION SIMS.

   Game Pattern: HEALING/NURTURING OTHERS.

   Definition. HEALING/NURTURING OTHERS refers to the use of game resources to heal

damage sustained by teammates and/or NPC companions.

Problem/Goal. Games have often been criticized as overly violent and relying on mechanics such as shooting, brawling, and dominating others. Game characters are commonly depicted as 'one man armies' that destroy everything in their path. To counter-balance this emphasis on destruction, game characters should have the ability to heal/nurture others, thus emphasizing the need for the care of others.

Solution. Build game mechanics that allow for HEALING/NURTURING OTHERS. Rather than relying on power-ups and 'medic-packs' that can be picked up and automatically applied to regenerate one's health, other players or NPCs should initiate health regeneration, thus encouraging cooperation and social interaction. We should also build meaningful consequences into the game: if HEALING/NURTURING OTHERS is ignored, then NPC companions can die. Likewise, players should be handicapped if they do not get or give aid to other players and/or NPCs.

Example. HEALING/NURTURING OTHERS is a game mechanic common to Role Playing Games (RPG) games, especially Massive Multiplayers online games (MMOs). Successful groups require a designated healer: a person who nurtures life rather than taking it. These players do not engage in combat, but rather monitor their teammates, healing them when required, most often by applying potions, spells, and poultices. In this instance, HEALING/NURTURING OTHERS encourages different personalities in terms of multiplayer games, allowing players to experiment with pacifist roles in games whose central dynamic revolves around conflict and battle.

HEALING/NURTURING OTHERS is also present in non-role playing games such as *Left 4 Dead* (L4D) and its sequel. *L4D* follows four survivors of a zombie infestation. The group is composed of players (and NPCs in the event that there are less than 4 players). If a survivor's health is depleted, they become incapacitated unless another survivor notices and heals them,

drawing from a shared resource of health kits. If the survivor is not resuscitated in time, they will

die and re-spawn in a closet, but must wait to be freed by another survivor in order to re-join the

team in that level. This mechanic prioritizes cooperation and caring, ensuring that survivors are

continually aware of and watching over their fellow teammates.

Relation to Affective Learning. This is a complex pattern with different aspects that are

useful for affective learning. First, we can refine what can be healed (e.g. in terms of mental

health) or the range of nurturing actions (e.g. giving emotional support). This pattern relates to

caring, a process of active solidarity. It involves developing a positive regard for the environment

and for people, and a willingness to act to protect them (Fien, 1997). Thus, the socio-emotional

aspect of the pattern is primordial, as cooperation or reciprocal action is demanded. It can also be

framed in terms of dependency and help offered. Indeed, altruist help is an interesting component

that stimulates the development of socially responsible behaviors (Izard, 2000). This can be an

important pattern for humanitarian causes and social change games.

Interaction with Other Patterns. HEALING/NURTURING OTHERS may correspond with the

pattern of SOCIAL MAINTENANCE as both are premised on the work players must do to maintain

group cohesion and ensuring COOPERATION and RECIPROCITY between members, be they players

or NPCs.

Game Pattern: ANIMAL COMPANION SIMS.

Definition. An ANIMAL COMPANION SIM is a simulation of a real animal, intended to

reproduce the effects of actual pet ownership.

Problem/Goal. Although this is slowly changing, socio-emotional relationships are not

very rich in most (single player) games, and often limited to alliances for overcoming obstacles

or overpowering the enemy. Caring for an ANIMAL COMPANION SIM necessitates a long-term

commitment to the animal's well-being and may require substantial in-game resources.

Solution. Players assume a degree of responsibility and long-term commitment through

obtaining and caring for an ANIMAL COMPANION. The benefits of maintaining the ANIMAL

COMPANION SIM are largely immaterial as they do not trigger an in-game reward but an emotional

one. For example, players are rewarded with the loyalty displayed by a pet as well as their

companionship. If neglected, the animal should deteriorate, so that they player must ensure the

animal is both physically and emotionally healthy for its continued survival. Watching the

ANIMAL COMPANION SIM thrive in response to caring behaviour can be an end in itself.

Example. Popularized in the 1990's in the form of Tamagotchis, ANIMAL COMPANION

SIMS are popular games aimed at young audiences, such as the *Webkins*, *Neopets*, and *Petz*

franchises. Pet ownership is also a component of *The Sims* franchise. ANIMAL COMPANION SIMS

are now often found in games aimed at mature audiences, although they often take the role of an

optional goal: finding and earning dog companions are side quests in *Fable, Fallout 3* and

Dragon Age: Origins. For example, Pippin Barr (2010) in his blog entry *Man's Best Friend*,

describes the emotional attachment that comes with caring for an ANIMAL COMPANION SIM, as

well as the commitment involved in caring for a weaker NPC:

> I finally got my dog, called Dogmeat, in *Fallout 3* today … It's just a dog, after all,
>
> although the surreality of an animal in the game that doesn't rabidly try to kill you is
>
> novel. Then I warmed to Dogmeat as he followed me around, barked, and to seal the
>
> affectionate deal, said "aroo?" I love that sound. ... Then Dogmeat and I wandered into an
>
> abandoned power plant for kicks. There were some ghouls in there, but I figured it was
>
> no big deal – ghouls are kind of lame, really, go down in one shot. Dogmeat seemed to

agree and went after them whole-heartedly. Then came the message: "Dogmeat has died."

I felt saddened by this and killed all the ghouls in his memory. Then, standing around

their bodies, I realised that I didn't feel I could go on without my dog, so I reloaded to

before his death. (Barr, 2010)

Relation to Affective Learning. Relation to Affective Learning. As shown by Chen et al.

(2005), animal companions can support active self-reflection and learning in the affective and so-

cial domains. The value of animal companionship in enhancing social competencies and psycho-

logical well-being is widely acknowledged. ANIMAL COMPANION SIM inculcates skill building in

the affective domain as it relates to caring and thus a range of emotions and values. For example,

promoting animal-welfare diminishes antisocial behavior and engenders human empathy (Taylor

& Signal, 2005). This pattern also exposes players to affective learning by invoking the idea that

non-human NPCs may not have the same emotional complexity as human NPCs or as the players

themselves. It can be extremely important for players to understand that others can process emo-

tions differently, and that another species might have a complete different emotional make-up of

drives and needs.

Interaction with Other Patterns. ANIMAL COMPANION SIM is related to many other

patterns pertaining to social interaction with NPC. The difference, however, is that an animal

companion should not be judged to be equivalent in terms of emotional complexity and

motivation.

Supporting Learning in the Affective Domain

The previous two sections addressed both understanding emotions, and relationship

building and maintenance. This section highlights patterns that are more directly linked to

affective learning, including the impact of game-play on players' personal values and their lives

outside of the game. Affective learning concerns the area of education that focuses on socio-

emotional development, including mechanisms relating to cognition and emotion such as those

challenging students (EMOTIONAL DECISION MAKING) to sustain learning. EMPOWERMENT

connects learning in games with skills and aptitudes in the real-word.

       Game Pattern: EMOTIONAL DECISION MAKING.

       Definition. Affecting player emotions through decision-making processes.

       Problem/Goal. Fundamental ingredients of any digital game are the economies of choice

that must be made by a player in regard to present and future game situations. Often these

choices are based on uncertain future outcomes and the player must choose how to proceed

based upon a guess or gut feeling. Players may choose an easy solution and gain an advantage

now, or make a more difficult choice and hope for a reward later.

       Solution. A fundamental way to challenge a player in their decision-making is to link the

decision to an ethical or emotional problem that the player must resolve based on their personal

emotions and values. In that moment the player must choose if they are acting as their avatar or

as themselves. The player must decide to resolve the problem in favour of their avatar and to

gain points in a way opposite to their own ethical reasoning, thus creating a cognitive dissonance

between the two. Alternatively, the player can choose to retain an emotional consistency between

themselves and their actions in the game, but this has negative consequences for their gameplay.

       Example. In the first person shooter *BioShock*, the avatar is confronted with a world

modelled after the philosopher Ayn Rand's concepts of objectivism, libertarianism, and egoism

in which the individual's needs and desires trump the needs of all others. An integral part of the

gameplay is to make a repeated choice between sacrificing or saving the lives of young girls

(known as Little Sisters) who have been mutated by the main villain of the game. Sacrificing

Little Sisters provides the player with an immediate bonus for gameplay, making early levels

easier, while saving the Little Sisters only provides a minor advantage in the very long run.

While the Little Sisters are portrayed as warped, they retain an aura of innocence that moves the

question of sacrifice from a purely logical to an emotional one. This creates a conflict between

the objectivist world of *BioShock*, the moral nature of the avatar depicted as good, and the

ethically aware world of the player.

A similar example from Dormann et al., (2011) given in relation to SACRIFICIAL ACTION,

is found at the end of *Dragon Age* where the player must choose between sacrificing the life of

their avatar, allowing one of their companions to die, or permitting a dark spirit to enter an

innocent baby. Sacrificing the life of its avatar can be very tricky when you spend a large amount

of time developing your avatar.

Relation to Affective Learning. This pattern teaches players that in-game decisions can

be based on emotions rather than rational decision-making. In these two instances, players have

to balance others' interests and welfare with their own, ensuring their own moral integrity.

According to Izard (2002), practicing emotional perspective-taking and the sharing of emotional

experiences vicariously supports affective learning. Thus, use of this pattern can create cognitive

and emotional dissonance. Cognitive dissonance is a discomfort caused by holding conflicting

beliefs, values, and emotions at the same time. Emotional dissonance arises when anyone has to

refrain from expressing their real emotions (often in job situations) thus threatening the

individual's integrity. Reflexivity and dissonance create powerful affective learning opportunities

for players as they struggle with diverse values and emotions (Pedretti, 2004).

Interactions with Other Patterns. Other patterns relating to this one include: AVATAR

EMOTIONAL EXPRESSION, SOCIAL NORM and CONTEXT DEPENDENT REACTION because they are

tied to the player's response to an in-game situation and external factors such as the player's

emotional state or mindset. SACRIFICIAL ACTION can be a factor of EMOTIONAL DECISION

MAKING.

Game Pattern: CONSEQUENCES OF LONG AGO ACTIONS.

Definition. CONSEQUENCES OF LONG AGO ACTIONS reminds players that the current

outcome is a consequence of a previously made decision.

Problem/Goal. Players often lack FREEDOM OF CHOICE or any decision-making capacity

that could alter future events and storylines of the game. In RPGs, players may impact events and

storylines, however, the vast number and intricacy of decision trees and the length of time

separating decision X from the consequence Y may inhibit the realization that decision X *led* to

outcome Y, and thus prevent players from learning about (and experimenting) with complex

cause and effect situations. Players may not be clear on how their present situation was a direct

result of their past choices and they may not be able to pinpoint which choice resulted in the

current event. In order for learning (both cognitive and affective) to occur, links must be made

between actions and consequences.

Solution. Players are provided with a notification that their current situation was a result

of a past choice. This notification may remind the player of their original decision in the form of

flashbacks, or NPC dialogues. This pattern supports scaffolded learning, especially where

players can learn from past mistakes. Players may be allowed to misstep in the decision-making

process, to see the consequences of their decisions, and perhaps even shown how things might

have ended differently. Seeing the consequences of decisions contributes to meaningful play,

where every action results in a change affecting the overall system of a game (Salen &

Zimmerman, 2004).

 Example. Examples of CONSEQUENCES OF LONG AGO ACTIONS are largely nascent, and

even problematic. In a number of games, including the *Fable* and *inFAMOUS*, early player

choices ultimately affect character growth, the reaction of NPCs, and other gameplay and story

elements. In particular, if the player repeatedly performs morally positive actions, their avatar

looks "good" and bright. If they perform immoral acts, then the appearance of the avatar reflects

this, becoming increasingly dark and "evil". An issue with this mechanic is that it dichotomizes

complex moral decisions into "good" *vs* "bad", operates at a broad level of granularity (i.e. does

not link to *specific* decisions and consequences), and implies that superficial physical traits can

indicate the deeper moral worth of a person.

 More complexity is demonstrated in RPGs with branching narratives. *Dragon Age,* like

most RPGs, does not explicitly remind players that current events are a consequence of past

actions, although there are some hints in NPC dialogue that serve as reminders. For short cause-

and-effect sequences, players can reload previously saved games and make alternative decisions,

but given that many effects in *Dragon Age* occur after hours of gameplay, this method is overly

time-consuming. Walkthroughs of the game are often available to look up decisions and their

consequences, but that can defeat the purpose of the game and the pleasure of playing. A more

direct way to show cause and effect over long periods of time would be to explicitly build

reminders and flashbacks into the gameplay, reminding the player of the original decision that

initiated the chain of events.

 Relation to Affective Learning. Although not strictly speaking an affective pattern, this

pattern creates depth and is an important component of affective learning. It allows players to explore complex emotional motivations behind NPC's actions and their own. Long term emotional responses such as revenge, lasting gratefulness, and devotion are all rooted in emotions carried forth from actions long past. Using this pattern, players can be shown that emotions can heavily influence the actions and choices made by characters over a long period of time. In terms of scaffolded learning, during the debriefing process, complete walkthroughs of the game that show and measure the consequences of each player's decision - allowing them to trace and discuss their own progress, as well as learn about alternative paths and outcomes – is an important process for affective learning (Petranek, 2000).

Interactions with Other Patterns. This pattern is related to MEMORY OF IMPORTANT EVENTS, wherein a NPC keeps track of events that have impacted it and influence its behaviour. For example, an NPC that the player mistreats earlier in the game will remember this mistreatment and side against the player further on in the game. It can also be a feature of EMOTIONAL DECISION MAKING.

Game pattern: EMPOWERMENT.

Definition. Björk and Holopainen (2005) describe EMPOWERMENT in terms of players feeling that they can affect the events and the final outcome of a game. This revised pattern extends the original pattern, which results from success in gameplay, outwards to include the impact this empowerment has on players' lives outside the confines of the game.

Problem/Goal. Basically, the model for EMPOWERMENT is that the player's character starts small and weak and develops their skills throughout the game by overcoming CONFLICT and OBSTACLES. EMPOWERMENT, accordingly, is limited to the temporal and spatial constraints

of the game. But, we would argue that EMPOWERMENT has much to say about the player's own

skill building and confidence growth and should not be exclusively focused on a character

becoming more powerful over time. The initial game concept of EMPOWERMENT is too limited

because it is restricted to what happens in the game world. It does not take into account the real

empowering effects (e.g. learning and skill acquisition, as well as increased confidence and

emotional development) that persist once the game is over.

Solution. Extending EMPOWERMENT to also include cognitive and affective development

that persists beyond the limits of the game and spill over into players' everyday lives.

Example. Leadership is an important component of affective learning and can be defined

simply as a process of social influence, wherein someone enrols the support of others to

accomplish a common goal. Taking leadership roles and learning to manage groups of people to

overcome challenges in MMOs such as *World of Warcraft* can empower players to apply the

team maintenance, friendship building, and social management practices from the guild to their

non-game life. Leadership is not just restricted to MMOs. For example, *Peacemaker*, which

addresses the Israeli-Palestinian crisis, challenges players to take a leadership role on either side

of the conflict for a peaceful solution. Social change games such as this aspire to increase

awareness and change players' attitudes and behaviours. By motivating them through the game to

take real-world action, social change games evidence EMPOWERMENT on a scale that extends far

beyond the game.

EMPOWERMENT can also relate to the promotion of gender and sexual equality, such as

the inclusion and effect of female characters (Chong, 2010). From the first incarnation of a

woman avatar Samus in the *Metroid* series released in 1986, there are now more strong (and fully

clothed) female characters, such as Alyx Vance in *Half Life 2* or Chell in *Portal*. Powerful female

characters might empower women to play and take stronger roles in game communities or elsewhere. More generally, advancing and changing the characterization of women in popular culture might help promote social change in this area.

Relation to affective learning. This pattern encourages social awareness and self-reflection on the player's part, which can lead to increased self-respect. This pattern deals with knowledge transfer and the relation between games and the outside world. The foundation of EMPOWERMENT supports change outside of the game-space. Through game-play, players learn that problems can be overcome by making positive choices and acting upon them. Players can then take positive actions toward promoting social justice or protecting the environment and becoming engaged citizens. Affective objectives can be evaluated by assessing how learners/players respond to, commit, and engage in the affective behaviour (Krathwohl, Bloom, & Masia,1964).

Interactions with Other Patterns. Patterns related to this one are CONFLICT and OBSTACLES, SOCIAL NORM, EMOTIONAL DECISIONS MAKING, and SOCIAL MAINTENANCE (described as performing actions to redefine and refine the relationships of an individual with others and within a group).

Discussion

During our analysis of digital games we have identified a number of emotional patterns such as: AVATAR DISPLAY OF HUMAN FRAILTY (inclusion of flaws in an avatar), NPCS WITH EMOTIONAL MASKS (hiding real emotion), EMOTIONAL DECISION MAKING (affect in decision-making processes) and EMPOWERMENT. Each of these patterns illustrates a particular socio-emotional problem and provides a solution in terms of a game-play mechanism or strategy. An overview of each of the patterns, their area of affect, and a list of some interactions with other

patterns is found in Table 1, below.

(insert Table 1 here)

There are some limitations to this paper, especially in terms of the number of affective

patterns that can be identified and presented in a single article. Besides continuing to refine our

patterns, we are collecting new patterns in areas such as emotional aesthetics (e.g. sound).

Aesthetic experiences are rich in emotions and create complex, involving atmospheres that draw

participants in - an important component of affective learning (Girod, Rau & Schepige, 2003).

We are also cataloguing patterns found elsewhere that connect to socio-emotional interactions,

like those from Lankoski & Björk such as SOCIAL MAINTENANCE (2007) and, Bjork &

Holopainen (2005). Another promising set are game patterns proposed by Seif El-Nasr et al.

(2010) for cooperative digital games, as in our framework cooperation is an important

component of relationships and, by extension, affective learning. We have then to adapt and

refine each of these patterns for our context, as we have done for EMPOWERMENT.

To develop our collection of game patterns, we have focused so far on positive emotions

and socio-emotional relations, but we need to look at negative emotions such as anger, guilt and

shame and find out how they are instantiated in digital games. Guilt and shame are important

aspects of affective learning. They steer the individual toward pro-social and cooperative

behaviours: when people feel guilty they will try to make amend and rectify some of the harm

that have caused (de Hoogge, Zeelenberg & Breugelmans, 2007). Indeed, in order to address a

socio-affective problem like bullying, we need to depict and utilise a range of positive emotions

and values, such as sympathy and caring but also portray negative emotions such as shame, guilt,

and even hate.

To develop a taxonomy of affective patterns, we have to define the meta-categories as well as map out the relationship between patterns. We can group together and map out patterns related to SYMPATHY FOR VICTIM, EMPATHY, CARING (HEALING/ NURTURING OTHERS) and altruism (SACRIFICIAL ACTION). For now, we have divided our patterns according to very broad dimensions of affective learning: understanding emotions (including affective representations) as well as socio-emotional relationships. As our collection continues to grow, we will have to refine and add categories. For example, we can distinguish between different types of social relationships, from interpersonal relationships to social networks, and moral emotions (those that relate to the interests or welfare of society as a whole).

The last dimension of this research relates to the validation of our game patterns and hence the production of game concepts. Validating patterns is a complex question that has not been much researched, especially within the context of game patterns. However, there are two main ways of doing this: either by expert review through heuristics (e.g. assessing patterns according to their perceived understandability and effectiveness) or, more commonly, by testing patterns through repeated use (Wurhofer, Obrist, Beck & Tscheligi, 2010). Although we have not validated the patterns formally, we have discussed and evaluated them informally with different stakeholders and are continuing to do so as our collection grows. Most recently, we conducted a focus group with six academics and game designers to verify our patterns. Along with providing initial validation of each pattern and many supporting examples, the participants recommended future research directions, such as examining indie and serious games for patterns that may differ from mainstream games, and looking at how the context of use and the audience of players may modify a pattern's intended effect. We intend to test these patterns through our own practices,

and also by organizing future workshops to brainstorm game concepts in this area. The last goal

of our pattern collection is thus to leverage these patterns in the conceptualization and paper-

prototyping stages of our future games, including board games as well as digital games.

We can briefly outline here how one can use these patterns in game development. For the

purpose of this example, we will focus on bullying, a well-known problem which is well

documented for a simple kind of role-play game. Thus, AVATAR DISPLAY OF HUMAN FRAILTY

could inspire the initial design of the victim: she/he stereotypically has a weight problem that

must be overcome. NPCS WITH EMOTIONAL MASKS can be used to influence the design of the

bully, as he/she should appear helpful and trustworthy to persons in authority. NURTURING

OTHERS can be combined with SYMPATHY FOR THE VICTIM as a distant acquaintance (the player

character) decides to help the victim. Of course, that person will be at first reluctant to get

involved, but because of EMOTIONAL DECISION MAKING they may then decide to align with the

victim. As this example shows, emotional game patterns can be combined and layered to design

a more emotionally engaging game. More sophisticated scenarios supported by a wider range of

game patterns can be created involving role-playing each of the three characters in subsequent

levels and creating cognitive dissonances that the players should resolve and reflect upon.

Accordingly, using the game patterns to conceptualize and operationalize the role of affective

learning in games helps us to refine our problematic, define scenarios, and map out the important

game components that relate to affective learning. Thus, we intend to more fully develop game

concepts for bullying and address the relatively complex question of evaluating these prototypes

in the affective domain (Buissink-Smith, Mann & Shephard, 2011).

Conclusion

We believe that game patterns can bridge the gap between theories and high-level

affective principles to their representation or actualization through games. Thus, an affective

pattern language could prove an important device for understanding affective learning, to design

educational games in this context, or to inspire novel game concepts that better take into account

a realm of human experiences.

Developing this collection of game patterns has proved invaluable for gaining insight into

the design of affective learning in games. They raise a number of issues that we should take in

consideration. For example, we need to investigate negative emotions more thoroughly and

include them in our collection of affective patterns (an area seldom discussed in affective

learning frameworks). These patterns also highlight some conceptual differences in the design of

avatars for affective learning, specifically regarding their socio-emotional expressiveness. A

further avenue for study in this area might be looking at avatar design, and the player-avatar

relationship, using an affective learning lens.

In this paper, we introduced affective learning as an important area for educational

games. We proposed using game patterns as a conceptual tool to initiate discussions about the

role of affect in games, and to support the design of games situated in the affective domain. We

presented a sample of affective game patterns that we formalized to support affective learning.

We then described issues that need to be addressed in order to develop a pattern language in this

area, with regard to collection development, taxonomy, and utilization for game design. We hope

to have contributed to an expanding area of educational game design and to the growing

collection of game patterns for affective learning.

Table 1: Affective Game Design Patterns

Pattern Name	Description	Area of Affect	Interactions with other Patterns[1]
AVATAR EMOTIONAL EXPRESSION	Avatars' facial expressions alter in response to in-game events or through player commands.	Understanding Emotions	EMOTIONAL IMMERSION, AVATARS.
NPCS WITH EMOTIONAL MASKS	The NPC who uses an emotional mask is a character that displays one kind of emotion when they are secretly feeling another.	Understanding Emotions	MAINTAINING LIES.
AVATAR DISPLAY OF HUMAN FRAILTY	The inclusion of less than optimal physical and mental traits in an avatar.	Understanding Emotions	AVATAR EMOTIONAL EXPRESSION, OTHER FORTUNE AFFECTS OWN MOOD, EMOTIONAL IMMERSION.
THE TRAUMATIZED AVATAR	An avatar with emotional trauma allows players to gain a deeper	Understanding Emotions	AVATAR DISPLAY OF HUMAN FRAILTY, INTERNAL CONFLICT, EMOTIONAL DECISION

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1 Many of these interacting patterns are from Bjork and Holopainen's *Patterns in Game Design* (2005).

	understanding of what drives the avatar and thus empathize with it.		MAKING.
HEALING/NURTURING OTHERS	Game resources are used to heal damage sustained by teammates and/or NPC companions.	Socio-Emotional Interactions	SOCIAL MAINTENANCE, COOPERATION, and RECIPROCITY.
ANIMAL COMPANION SIMS	The simulation of a real animal, intended to reproduce the effects of actual pet ownership.	Socio-Emotional Interactions	HEALING/NURTURING OTHERS.
EMOTIONAL DECISION MAKING	Affecting player emotions through decision-making processes.	Supporting Learning in the Affective Domain	SACRIFICIAL ACTION, AVATAR EMOTIONAL EXPRESSION, SOCIAL NORM, and CONTEXT DEPENDENT REACTION.
CONSEQUENCES OF LONG AGO ACTIONS	Reminding players that the current outcome is a consequence of a previously made	Supporting Learning in the Affective Domain	MEMORY OF IMPORTANT EVENTS, and EMOTIONAL DECISION MAKING.

	decision.		
EMPOWERMENT	Players feel they can affect the events and the final outcome of a game. Success in gameplay effects players' lives outside the confines of the game.	Supporting Learning in the Affective Domain	CONFLICT, OBSTACLES, SOCIAL NORM, EMOTIONAL DECISIONS MAKING, and SOCIAL MAINTENANCE.

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