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
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
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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
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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
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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
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 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*.

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**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 off 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](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
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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 \textsc{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 \textsc{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. \textsc{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, \textsc{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.

\textsc{Healing/Nurturing Others} is also present in non-role playing games such as \textit{Left 4 Dead} (L4D) and its sequel. \textit{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 social domains. The value of animal companionship in enhancing social competencies and psychological 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 emotions 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
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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).
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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 DECISION 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 FRAILITY** (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
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,
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

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>Description</th>
<th>Area of Affect</th>
<th>Interactions with other Patterns(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVATAR EMOTIONAL EXPRESSION</td>
<td>Avatars’ facial expressions alter in response to in-game events or through player commands.</td>
<td>Understanding Emotions IMMERSION, AVATARS.</td>
<td></td>
</tr>
<tr>
<td>NPCs WITH EMOTIONAL MASKS</td>
<td>The NPC who uses an emotional mask is a character that displays one kind of emotion when they are secretly feeling another.</td>
<td>Understanding Emotions</td>
<td>MAINTAINING LIES.</td>
</tr>
<tr>
<td>AVATAR DISPLAY OF HUMAN FRAILTY</td>
<td>The inclusion of less than optimal physical and mental traits in an avatar.</td>
<td>Understanding Avatar Emotional</td>
<td></td>
</tr>
<tr>
<td>THE TRAUMATIZED AVATAR</td>
<td>An avatar with emotional trauma allows players to gain a deeper understanding</td>
<td>Understanding</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Many of these interacting patterns are from Bjork and Holopainen’s *Patterns in Game Design* (2005).
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understanding of what drives the avatar and thus empathize with it.

HEALING/NURTURING

Game resources are used to heal damage sustained by teammates and/or NPCs companions. The simulation of a real animal, intended to reproduce the effects of actual pet ownership.

Socio-Emotional Interactions MAINTENANCE, COOPERATION, and RECIPROCITY.

ANIMAL COMPANION SIMS

Socio-Emotional 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.

CONSEQUENCES OF LONG AGO ACTIONS

Reminding players that the current outcome is a consequence of a previously made decision. Supporting Learning in the Affective Domain. IMPORTANT EVENTS, EMOTIONAL DECISION MAKING.
<table>
<thead>
<tr>
<th>Empowerment</th>
<th>Supporting Learning in the Affective Domain</th>
<th>Conflict, Obstacles, Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>Domain</td>
<td>Norm, Emotional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decisions Making, and Social</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintenance.</td>
</tr>
</tbody>
</table>
References


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