

GAMES FOR AFFECTIVE LEARNING MAKING PLAY SUPPORT THE EMOTIONAL DOMAIN

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ABSTRACT

The role of computer games in learning is becoming more common, but little research has been dedicated to affective learning, an important aspect of education that can also be addressed through computer games. We first present different perspectives on affective learning and our framework based on activity theory, and we then discuss our approach to the design of affective learning games. To inform design for affective learning, we investigated which affective strategies games already use and how they could be harnessed to suit our context. We present examples related to game representations and game mechanisms and emphasise the bond between player and avatar. Computer games can present a model of affective behaviour to the player through the avatar's actions and reactions, the affective interactions between characters, and the utilisation of affective tools to resolve emotional dilemmas within dramatic situations. By vicariously managing emotional situations and experiencing the emotions of their avatar, the player can learn how to feel and grow along with their avatar. We highlight the limitations of current games in the integration and portrayal of affective behaviour within the game-play and their suitability for player-learners. We then conclude by discussing remaining design issues, and suggest that Kansai Engineering can serve as a bridge in the design of mediation between players and affective learning goals, guiding the design of the game-world and game-play.

Keywords: computer games, affective learning, socio-emotional, activity theory

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1. INTRODUCTION

Research has already shown that computer games can enhance problem solving, decision-making, and critical thinking. Little research has been dedicated to the learning in the affective domain. However, role-playing games have long been recognized as an effective means to achieve affective objectives. Gee [1] connects learning to identity development and self-growth, and he also highlights the values of computer games to reflect about cultural models. Studies about socialisation and social competencies are emerging, mostly in relation to multi-player games [2].

There is a growing trend of computer games situated within real human contexts, aiming at changing behavior and attitudes, thus addressing emotional, social, or cultural issues such as *Pictures for Truth* [3] (on human rights), or *Darfur is Dying* [4] (on ethnic conflict). Such games are otherwise very carefully and successfully designed, but appear oddly cold from an affective point of view; they seem very remote and detached from their human context. It would appear, however, that better understanding of the affective situation would be a goal of the game. For example, *Darfur is Dying*, a game about the ethnic conflict and refugee crisis in western Sudan, emphasizes logistical issues and use of metrics for well-being and health, while the characters do not react to their plight. While we appreciate wanting to avoid stereotyping images, it seems that the lack of depiction of affective aspects, and a reliance on cognitive game-play strategies, might not be the best for affective learning.

There is a need to better understand affective design and how games can support affective learning. In this paper we describe affective learning, outline our design framework based on activity theory, and present the design strategies that emerge. We then discuss a remaining issue, mediating the presentation, and a role we see for adapting Kansei Engineering to address this issue. In this paper we focus on single-player games. We acknowledge that multi-player games may have considerable potential for affective learning, and we will address that potential separately.

2. AFFECTIVE LEARNING

Vygotsky [5] considered emotion as having a central role in mental development and the nature of human life. He suggested that emotion has a role in stimulating thought which should be taken in consideration, in addition to the influence of thought on affect and volition. Emotional experiences lend us the ability to better comprehend and regulate our activities, to understand our motivation and how to fulfill our needs [6]. Emotion plays a central role in such functions such as motivation, planning and action [7]. Emotion influences memory and also plays an important role in decision-making, and especially so if it involves social decision-making.

2.1. Affect to support learning

In one way, affective support can influence any kind of learning. Teachers can create an emotional trajectory that facilitates teaching structure and thus enhances learning. They can also provide emotional support and so help students to manage their emotions and moods by reducing anxiety and stress generated by some learning tasks, by regulating confrontation, or sustaining intimacy and immediacy. Besides, teachers can stimulate emotional involvement

by providing an exciting and engaging learning experience. The joy of learning inspires a persistence to accomplish the desired goals even in the face of difficulty [8]. Despite Bloom's helpful taxonomical distinction between cognitive and affective learning, in truth all learning is imbued with emotional meanings and influences [7].

2.2. Criteria for affective learning

In another way, the learning itself can specifically address the affective domain. Most educational systems are interested in the acquisition of affective competencies and social skills. Cole [9] considers that teachers can contribute to the development of student's cognitive abilities, and so they can also assist the emotional development through guidance and assistance. The affective domain includes ways in which we "perceive, experience, and process the emotional aspects of social interaction" as outlined by Mahn [10]. Thus, in this perspective, affective education relates to socio-emotional development.

According to Martin and Reigeluth [11] emotional development consists of understanding your own and others' feelings and affective evaluations, learning to manage those feelings, and wanting to do so. Social development involves building codes of behavior and rationales for following them, developing pro-social attitudes, often in relation to caring, justice and equality. Caring involves emotion understanding, developing positive regard and value for the environment and for people, and a willingness to act to protect them [12]. Social and Emotional Learning (SEL) proposes three important components: self-awareness, social awareness and relationship skills [13]. Self-awareness can be defined as identification and recognition of one's own emotions, and promoting a sense of self-efficacy and self-confidence. Social awareness is instantiated as empathy, respect for others, and the ability to see different perspectives on the same issue. Relationship skills consist of supporting cooperation, willingness to seek and provide help, and communication. For McCrary [14], affective development helps to develop social and emotional responsible action.

3. AFFECTIVE LEARNING THROUGH GAMES

The role, design, and evaluation of affect in games has been discussed before in a general context where emotional impact of various kinds can support the gameplay [15]. To support affective learning, we take a more specific approach. One of the advantages that computer games have for affective learning is their ability to present activities that resemble the ordinary world, including activities that can carry significant affective relevance. For example, game worlds represent individuals and groups, with common or diverse goals, within some kind of environment. It is possible to depict affective support and care, as well as hostility or negligence. Of course, this is not the case for all games, and more abstract games such as *Tetris* do not support this approach. Such abstract games do permit the *use* of affect, for example through imagery and sound, and the management of engagement and challenge can certainly leverage affective response in the player. But we suggest that affective learning requires a more representational strategy: in particular, Role-Play Games (RPGs) and other character-based games will be more suited to support affective learning.

Our approach to supporting affective learning is based on Vygotsky's Activity Theory, and his concept of the Zone of Proximal Development [5]. Activity theory proposes a

structure for understanding activity. Most importantly, it emphasizes mediation, so that if an individual subject wishes to accomplish an object, they utilize tools to that end. Tools might mean physical tools, from spades to swords, or conceptual tools, from algebra to alliances. Moreover, it suggests that this shapes our view of behaviour and the world, as tactics become reified in such tools (externalization), and the tools then shape our thinking and behaviour (internalization). Later a model identifying more context was developed, where human activity not only involves mediating tools, but is framed by the group, where the individual must behave in accordance with the rules of the group, and the group manages some division of labour. This model supports much of what we see in games depicting human activity, either explicitly with humans, or with anthropomorphic creatures. An individual has a goal, needs tools to accomplish it, belongs to a group, the group has rules, and the individual has a role within the division of labour within the group. This structure is not necessary for a ludic structure that governs winning and losing, but it provides the familiar model of ordinary life to contextualize game-play.

In representing the human (or anthropomorphic) agents within these structures, games can and do represent the affective dimension. Avatars and non-player characters (NPCs) employ affective tools to accomplish affective objects within the game. In individual activity, there is fear and triumph, embarrassment and remorse, and so forth. Where group activity is depicted, there are richer possibilities still. Moreover, contextual affective elements are typically offered: one must overcome obstacles to rescue one's family (*The Getaway* [16]), avenge the death of one's parent (*Grand Theft Auto: San Andreas* [17]), and so on. The game thus presents a model of affective behaviour to the player, including the perspective of the avatar, and also displays the ways in which other NPCs interact and thus influence the avatar. The player is thus able to vicariously experience the affective interaction, exert control, and appreciate the way their avatar behaves accordingly.

Our framework thus begins with the structure suggested by activity theory, individual intent with regard to an object, intent mediated by tools, and within a group context. It then takes a focus on affective aspects of these elements, including the object, the intent, the mediation, and the group interaction. Through activity theory, we can further model specific affective skills and competencies that we wish players to acquire, based on analysis of real-world situations and using the interactions between actors, the tools used to mediate the situation, and their solutions as anchors for the game design.

In the next section we suggest key ways in which we can leverage this framework yielding game design strategies for affective learning. Afterward we identify a gap in our approach that we speculate could be addressed by adapting techniques from Kansei Engineering.

4. AFFECTIVE STRATEGIES IN GAMES

To explore how games can support socio-emotional learning as described in section 2, we are investigating strategies within current games that provide and mediate affective experiences, such as *Ico* [18], and *The Sims* [19]. Within our approach centred on human activity, we focused specifically on characters and their relationships within the game, and on how the character interactions are empowered within an appropriate context in the game world. This is the kind of structure that we suggest can be leveraged to result in affective

learning. We identify and discuss some of our findings from these games as examples to show how they relate to affective learning in the real world.

4.1. Representations for socio-emotional learning

The first component necessary for affective learning is support for understanding of feelings, and management of those feelings. Human beings are experts at interpreting facial expressions and body language, and they are profoundly susceptible to emotions, moods and actions of others [20]. Characters in games can and do communicate emotions, mostly through posture, gestures, and body movements. Such gestures can be quite powerful: in *Ico*, the boy reaching out for the girl Yorda is a powerful image of the nature of the game. In that game, the protagonist *Ico* moves around not like a man, but more appropriately like a young boy, with rough and tumble moves and with yelps and yells [21]. In *The Sims 2*, a shy Sim will fear having parties and often become nervous before engaging socially. In general for affective learning, the emotional character design and the character behaviour exposition should be congruent. A character, especially the player's avatar, should display emotional responses that are recognizable and with which players can identify.

Socio-emotional patterns, including social emotions such as sympathy as well as social rituals for sharing and bonding practices, along with their associated rhetoric, are another important design element of affective learning [22]. *The Sims* is one of the few computer games where characters laugh and can make jokes. Laughter can increase the believability of game characters, and it can establish powerful emotional interactions between players and characters, making the game more lifelike, and more socially, as well as emotionally, engaging.

Thus we suggest that to support affective learning, NPCs should be able to express friendship toward their own team mates, react positively to offers of help, greetings, small talk and humour, and negatively to anger and challenges. Moreover, depicting such character personalities and motivations is particularly relevant, because as well as creating human depth, they can facilitate understanding of how reactions and decisions come about. They allow the designer to create, and the player to interpret, a narrative of affective cause and effect.

4.2. Game mechanisms for socio-emotional learning

The second component we suggest as necessary support for affective learning in games is a strong connection between the affective learning desired and the ludic framework that governs success or failure in game-play. The design goal should be that the affective learning is not just incidental, but is necessary for the player to advance towards success.

Consider the emotional assistance offered by partners working in collaboration, and the emotional dimension that comes with development of shared meaning. In careful game-play design, we could construct a kind of emotional scaffolding that includes the creation of a safe affective zone, which stimulates the acquisition of socio-emotional skills. *The Sims* assists the player controlling an avatar to take emotional risks, by portraying very bad emotional events humorously so that they become acceptable [23]. There is a special kind of NPC sometimes called a "henchman" that normally helps and assists players to progress within the game. A henchman thus can be designed to provide emotional assistance to enable players to solve an emotional difficult situation within a safe affective zone, much as a friend might do.

In *Ico* there is a particularly strong element pertaining to emotional development related to friendship and caring. The game entails the player, as the avatar Ico, caring for a frail ghost-like girl, Yorda, and protecting her from evil spirits. If she is captured by the spirits, she will not be able to help Ico to solve his quests, and so the player cannot complete the game. Actions of friendship established earlier in the game-play lead to help or disclosure of information that enable quest resolution. This suggests a kind of template for reuse: we can design quests in such a way that some tasks require asking for and obtaining collaboration from an NPC.

Conflict is also an essential element of drama and an important didactic tool, and reflexivity and dissonance can create compelling learning opportunities. In games, conflicts between characters having the same goal are common. Resolutions of conflicts are illustrated by making competing characters, but later requiring that they cooperate against a common threat. Avatars, like Ico, struggle between achieving goals and respecting values, like being forced to make a sacrifice. All kinds of relationships and emotions can be mediated through conflicts, allowing for exploration of motivations and implications.

Emotion theories suggest that, in challenging situations, one might need to practice emotion perspective-taking and the sharing of emotional experiences, so learning how to feel by proxy. Roleplay games create the opportunity to act out and experiment with different roles, thus supporting affective learning in a specific way: they allow easy exploration of different perspectives, patterns of behaviour, and resulting consequences. In *Black and White 2* [24] the player controls a deity, can listen to villager issues, and then either resolve them benevolently, or take violent actions to subjugate the villagers through fear. The player can therefore experiment with behaviour and consequences of their actions (which the game suggests can “be good or evil”).

In our context, one strategy would be for the player to first take the perspective of the aggressor, and then of a victim. This is a didactic technique that activates emotions involved in empathy, which in turn should mediate subsequent socio-emotional behaviour that can be crafted in accordance with the context. *FearNot* is a digital drama constructed through synthetic characters to address bullying, and uses partly that strategy through an empathic relation between player and victim [25]. By role-playing characters with diverse motivations and emotions, players can experience emotions and attitudes related, for example, to the perception of differences and prejudices. In this way, the game design could thus encourage reflection and facilitate development of better skills for society, foster an appreciation of efforts for the preservation of the environment, or support other affective engagement.

Through game play, players can interact and “discuss” issues with NPCs that populate the game world. Language is also an important mediating tool for affective learning, and characters can express their emotions and how they feel about a situation, consider who to believe, and decide with which position to side. Moreover, emotional clues can be given on how to solve “quests”, as well as strengthen relationships. Emotional language within game-worlds is not always easy, though the *The Sims 2* features a rich repertoire which includes symbols in speech bubbles together with emotionally rich speech sounds in the *Simlish* fictional language.

By creating an emotional drama, issues are not presented as neutral observations of events and objects in the world, but instead as ones that draw us in and stimulate emotions. In

presenting them in this way, the game design assists players to learn incidentally about emotional practices. Players are thus guided to recognize feelings regarding dilemmas, as well as being exposed to ways of resolving emotionally difficult situations. As we have stated, intense dialogue and emotional assistance stimulate the cooperative construction of understanding. Affective learning results from the participation of a player, as they themselves become, through their avatar, involved in the drama.

4.3. Emotional Identification

The nature of roleplay means that game-world activities are experienced by the player from the perspective of their avatar. This roleplay bond is thus a very important aspect of the game, as the mediating structure between the game and the player, between the activity systems within the game-world, and in the activity systems in the real world of the player.

The bond between player and avatar allows players to consider the avatar's identity as a possibility for themselves. Gee [1] discusses this when he distinguishes the real from the virtual identity, and then introduces the idea of a "projective" identity for the nature of the player-avatar bond. More broadly, a game may present a reality that leads to sympathetic identification, even where there is no triumph. In *Shadow of the Colossus* [26] for example, the player-as-avatar begins the heroic task of defeating fearsome giant beasts, but the game-play experience is designed in such a way as to make the player sympathetic with the beasts, despite the only possibility for advancing the game being killing them. In other words, the player is led to a surprising sympathy, and an appreciation of responsibility for one's actions. This suggests the range of affect that games might attempt, and that should be explored further in the context of learning.

By vicariously experiencing the emotions of their avatar, sharing success and failure, managing anger and frustration, the players can learn how to feel and grow along with their avatar [27]. Moreover, by becoming absorbed in the world of the character, the player's empathy with their avatar increases, enhancing their effectiveness in making value judgements [28]. By undergoing a personal journey with their characters, players grow with their characters thus sustaining a particular kind of affective development. Thus emotional identification with the main character of a game could be one of the most powerful tools for affective learning.

5. DISCUSSION

We have presented our model for support of affecting learning in games, where the general framework comes from activity theory, relying on games being able to depict a world of human-like activity that can serve as a simulacrum for affective drama and interaction. Key components in game design that we have discussed are then the emotional congruence of character design and representation of emotions, depiction of social relationships and emotional scaffolding through emotional dilemma and conflict, the representation of caring, and lastly through emotional identification.

While many games borrow representations and conventions of the real world, it is common to include only a superficial affective dimension, or ignore the possibilities completely. For example, games can feature characters engaged together in activity, but have little or no conceptual coverage of care or distress. Even where there is some treatment, this aspect of

activity is rarely featured in the ludic framework of rules that governs success or failure in game-play. Our position is that to support affective learning, a game should present a world of activity such as we know and understand, depict affect, and involve affective issues in the game-play, to the extent that successful management of the issues is part of the ludic structure. In essence, we suggest that the player experiencing affective understanding and learning should be necessary for progression and success in the game.

A key issue that remains, however, is the relationship between the depicted world of the game, and the real world of the play. The aim of affective learning is of course that the learner will acquire new skills and understanding for their world, but we do *not* suggest here that the depicted world must resemble the real world of the player. For example, we do not suggest that a game about bullying for teenagers must depict a school with bullying. Instead, we are aware of the pedagogical nature of mediation in the connection between the game-world and the player. One reason for such mediation is that affective topics must often be addressed with great care. Some issues can be disturbing or embarrassing, and thus can cause players to disengage from both playing and learning. One way of mediating this interaction can be through the use of humour [29].

As well the need for caution with difficult topics, there are other issues relating to aspiration, motivation, and engagement that need to be addressed. We need to design the game such that the attitudes or behaviour we mean to encourage align with the player's idea about what is desirable and what is attainable. Although the idea is normally used in relation to cognitive learning, the pattern is similar to that of the Zone of Proximal Development (ZPD): to support learning we must determine and address the place where we can make a difference, and then design our learning activity to fit that place. In essence, the nature of the world depicted in the game becomes a kind of affective scaffolding, a kind of mediation that facilitates the player engaging with the affective lesson. The design of the game-world is therefore a key aspect of our strategy, and must relate to the particular audience for which we intend the game: it must pique interest, must support the affective lesson, but not lead to rejection through fear, embarrassment, or alienation. For an audience of learners, we need to identify how they need to feel in order to engage, and determine what kind of game-world may lead to that experience.

Kansei Engineering [30] provides a method for linking desirable emotional characteristics with product design. In particular, the process bridges the determination of desirable characteristics, the design of features to represent those characteristics, and the verification that the design features have the desired interpretation. We suggest that this method can serve as a bridge in the design of mediation between players and affective learning goals, guiding the design of the game-world and game-play. As is typical in Kansei Engineering, there are two sets to connect: the emotional world of the player, and the functional nature of the product. In game design for affective learning, we wish to help learners in their affective development, and we need to study the emotional landscape of the player in order to make the game-world and game-play successful. For example, a game about bullying might be addressed to children interested in nature, and thus the game-world might be situated not in a school setting, but in a jungle. The challenge is to understand the emotional perspective, and identify design that will leverage that perspective for success. We thus suggest that an adaptation of Kansei Engineering should be explored to address the need for mediation in game-world design for affective learning.

6. CONCLUSION AND FUTURE WORK

To complement existing research on cognitive development and games, we are addressing how computer games can support affective learning. In this paper we first outlined the nature of affective learning, with our focus being on socio-emotional learning, and then outlined a design framework based on activity theory. We then presented game design strategies that we have identified using our framework, and finally discussed the need for mediation in the design of the game-world, suggesting a place for Kansei Engineering to determine the appropriate design for the mediation.

A focus on affective learning complements previous work on cognitive development in games, and has the potential both to open up a new area of study, and to drive forward the design of computer games as a versatile and useful communication medium. There is a need, however, for further research in several areas. In this paper, we have discussed only a limited number of affective strategies. These might not work well with some sub-genres of games, such as first-person shooter games. Even so, the game *Re-Mission* [31] aims at supporting young cancer patients and successfully employs a mixture of traditional game and affective learning strategies, like the use of Smitty, a “henchman” companion, to empower patients.

The next step in our own work is to harness design work in existing games by identifying patterns that support affective learning, and documenting them to facilitate evaluation, refinement, and reuse. We also regard it very important to develop a better understanding of how to design game-worlds for affective learning for specific audiences, and we suggest that an adaptation of Kansei Engineering has potential for this kind of design, perhaps leading identification of successfully validated strategies for key audiences, and leading to reusable design strategies indexed by personas representing the audience characteristics.

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