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A Review of Affective Design towards Video Games

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Abstract

Over the past decade, gaming has become a mainstream form of entertainment. It is one of the fastest growing forms of entertainment and has become a big business, easily rivaling the film industry in terms of consumer spending. However, due to the rapid growth of technology and competitiveness in the industry, game designers are increasingly faced with the challenge of making their games attractive and engaging to its intended users. Over the years, practitioners and researchers in the human-computer interaction (HCI) community have placed a lot of effort in developing processes and methods for use in interdisciplinary fields. An effective user-centered gaming interface plays an important role in the gaming industry and provides valuable contribution in the HCI practice. This is because it supports the mental communication and emotional response of its audiences that is the gamers, thus improving the interaction modes between the user and product. Hence, designing games in a manner that provides the same user experience to all players, irrespective of player motivation, experience or skill is becoming the focus of modern game research. This paper will attempt to address and review the literature on affective design elements, principles and methodologies that are suitable for the video games industry.

Keywords: Affective design, user-centered design, game Interface, affective evaluation

1. Introduction

Video games are invading peoples' everyday life and generating substantial revenues. Increase in sales and its globalisation have produced intense competition amongst game developers towards the growth of wealth (Davis et al, 2005). Thus, game developers are searching for ways to improve their games, to stay competitive and to meet the increasing expectations from their intended users. Yuan, Folmer and Harris (2010) explain that games are a form of entertainment engaging its users in intense emotional interactions and experiences. New developments in computing, interfaces, mobility and display technologies are generating various human-computer interaction (HCI) activities, essentially narrowing the gap between human and machine interaction (Hudlicka, 2003). An affective interface in HCI essentially supports the emotional and mental communication between the user and their environment. As video games constitute a genre of software that involves interfaces and user experiences, it makes sense that it should be studied from the perspective of HCI. Gilleade and Allanson (2003) noted the humble beginnings of video games in the 1960s, growing to what is now known as one of the most elaborate forms of HCI. However, some (Gilleade et al, 2003; Johnson and Wiles, 2005; Cai, 2009, Barr et al, 2006) point out that HCI research in the gaming industry is still relatively new. In recent years, video games have been receiving a lot of attention and have been making positive progress in the HCI field. Levels of interaction influences user engagement and its effectiveness in games. As a majority of the games require constant interaction with its users (Cai, 2009), measuring levels of interaction is crucial (Picard and Daily, 2008) to help establish believable interactions.

2. Addressing Affective Design

Bødker, Christensen and Jørgensen (2003) coined their own affective design terminology where affective interfaces and its design are viewed as an aesthetic discipline instilling certain affects on the user. It seems that modernisation is significant in affective design. As an applied activity, designs usually seek to fulfil certain functions. Yet pure functionality may not impress certain individuals via emotional achievement (Bødker et al, 2003). Users may seem to want pleasurable designs for no rational reason. It may be the result of the interaction between present institutional factors and new mentalities of affect and emotion, exceeding the ideals of traditional values. According to Khalid (2006), user populations are becoming more diverse, difficult to identify an ideal user and that the need for affective design differs from an individual to another. Hence, there is a need to have a deeper understanding of what the roles of emotions are, and which processes are affected by emotions. It is also noted that when users feel good about something, they will have the tendency to overlook its design faults (Norman, 2002).

2.1. Role of Affect and User Experience

Norman (2002) highlighted that affect makes human smart because affect always passes judgments, thus presenting humans with immediate information about the world. Humans are known as affective beings, motivated to action by a complex system of emotions. Affect plays a key role in understanding the phenomena around attention, memory and aesthetics. As information technologies inhabit the everyday world, the understanding of affect is needed on multiple levels simultaneously. The role of emotion in a game has been recognised as a key concern (Herbon et al, 2005). Although the concept of emotion appears to be generally understood, Desmet (2003) noted the difficulty in obtaining a distinct definition. Emotion has a tendency to play a biased role in decision-making, logical search, interpreting functionality, or in obtaining relief from the complexity of a task (Lera et al, 2007). Though it is arduous to identify someone's feelings, it is important to draw inferences about emotional states (Boehner et al, 1996) so as to assist researchers and practitioners to understand the user's level of engagement and motivation. In recent years, the design of user experience has increasingly become a goal in developing interactive systems (Mahlke, 2005), such as video games.

2.2. User-Centered Design

Designs that address human needs and desires can help pursue genuine and real user values. User-Centered Design (UCD) (Keinonen, 2008) is a broad term used to describe design processes in which end-users are involved in the development process. The term 'user-centered design' was first coined by Norman (2002) in the 1980s and he stressed the need to fully explore users' needs and desires together with the intended use of the product. Norman suggests to "make easy to determine what actions are possible at any moment, make things visible, make easy to evaluate the current state of the system, and follow natural mappings between intention and the required action". These recommendations place the user at the center of the design activity (Abras et al, 2004) and the role of the designer is to facilitate the ease and efficient use of it. HCI often focuses on how designers develop systems that convey a single, specific, clear interpretation of what they are for and how they should be used and experienced (Sengers and Gaver, 2005). The need to involve real users during the design process is necessary and it provides a natural evolution in the field of user-centred design to elevate the product's usability (Abras et al, 2004; Wong and Khong, 2010). Some may prefer something because it makes them feel good, or they like the looks of it, or it inspires them a state that feels better than the one they are currently in.

2.3. Affective Design in Video Games

Video games are an exciting new development of entertainment and an extremely influential form of computer software activity (Barr et al, 2006). It helps improve user experience because players reflexively surrender to the

gaming experience for its enjoyment. The game industry can improve drastically if it projects various types of appeal to the audiences and to as many players as possible (Gilleade and Dix, 2004). One of the main goals in video game design is to entertain and engage its users, thus involving several aspects of design such as game story, score, pacing, challenge level, and game mechanics. Failure to design good game interfaces can interfere with the overall goal of creating a compelling experience, and will have devastating effects on the overall quality and success of a game (Pinelle et al, 2008). Game designers and HCI researchers must take into consideration the numerous differences in culture, age group, social, and national requirements. Presently, the HCI field in gaming is still short in theoretical systems (Cai, 2009) thus, requiring some principles to guide the design of game interaction activities.

2.4. Important Factors in Video Games

Games and software applications share some similar development traits such as improving user experience, and to ease users' tasks. However, games are fundamentally a form of entertainment, to be enjoyed and to encompass pleasurable gameplay to stimulate thinking and feelings. Although the definition of fun may differ for every person, it is important for games to provide a variety of experiences so that players would not be easily bored (Pagulayan et al, 2002). Good video games are assumed to have easy-to-use interfaces but provide challenging gameplays. As Nolan Bushnell, the founder of Atari, Inc. quoted as saying, "*A good game should be easy to learn, but difficult to master*" (Malone, 1982). A game with poorly-designed interface is difficult to comprehend and can easily frustrate players. Game developers can adopt good HCI principles to reduce cognitive complications on gamers (Cai, 2009). Another significant factor to game enjoyment is challenge. The level of challenge in a game must steadily increase in order to maintain the interest of the player, at least not to be too predictable or linearly. Challenge-level decisions that are created correctly will allow gamers to overcome game obstacles in a positive manner (Pagulayan et al, 2002). Gameplay is considered to be core activity of the game that is accessed through an interface. If affect is not conveyed properly during gameplay, it may hinder the gaming experience (Gilleade et al, 2005). Some games are designed not to purely accomplish something through an activity but to provide an activity that is pleasurable in itself as well as for optimum experience (Juul et al, 2009). It is not only about reaching a destination, but also about enjoying the journey.

2.5. Flow in Games

Csikszentmihalyi's (1992) stated that games are successful when they are designed to generate positive affect and facilitating the concept of flow. Flow (Johnson and Wiles, 2005; Norman, 2004; Khalid, 2006) is a state of concentration, deep enjoyment, and total absorption in an activity. Based on Csikszentmihalyi's (1992) theory of flow, Jones (1998) describes the components of flow in video games as follows: task that can be completed with clear goals, the ability to focus on the task deeply, task provides immediate feedback, mastering the control system, concern for self-disappear during flow, and sense of duration of game time is altered meaning as long as many gamers report devoting entire nights or weekends to playing games without consciously deciding to do so. Video games with positive user experiences and emotions are more important to the player than gaining productivity and effectiveness. There is no reason for users to play a game if it does not evoke positive emotions. Gameplay with intuitive and adaptable controls can impact flow and provide positive emotions of fun, enjoyment and satisfaction in a game (Khalid, 2006). Conversely, a poorly designed game with complex interfaces and controls will only evoke negative emotions such as a desire to quit, moodiness, verbal abuses and profanities, or even physical outbursts. Breaking positive game flows and contravention of HCI principles in control systems are weak affective designs in game development (Johnson and Wiles, 2005).

2.6. Affective Gaming

HCI in affective gaming has been gaining ground as more game developers and the HCI community recognize the importance of emotion in games. Hudlicka (2008) stated that 'affective gaming' means adapting to the player's

emotions, to minimize frustration while ensuring a challenging and an enjoyable experience. Currently, affective gaming seems to focus on sensing and recognizing player's emotions, as well as tailoring game responses to reduce frustration and inducing pleasurable game challenges. In order to understand its importance and the impact of emotions, individual emotional differences must be taken into account to assist in predicting user preferences by determining the type of affective applications (Dormann, 2002). Juul and Norton (2009) stated that interfaces include software and hardware tools that players utilise to understand and affect the game state. User interfaces help users to avoid making mistakes and to know gaming possibilities. However, Gilleade and Dix (2004) stated that creating an adaptive game is not easy as users' motivation, experience, skills and its effective detection must be considered. Methods deployed in affective computing provide some tools necessary to take affective gaming to the next level. Gilleade and Allanson (2003) tried to adapt techniques used in the field of affective computing to resolve stagnation in the video games market and increase its overall life span. Affective computing can also help systems not only to search which content is interesting but also determined what emotions might be stirred (Picard 2000).

3. Methods applied to evaluate affective design in video games

According to Dormann (2002), the methods for measuring emotion should first be defined to establish the necessary methodologies for the development of affective applications. Evaluating and interpreting measures presents a challenge because many ambiguities relate to its definition, communication and interpretation (Picard and Daily, 2008). Design and evaluation methods that place the users at the core of its activity will help achieve the design goals of affective applications and improve gaming experience (Hook 2004; Pagulayan 2002). It is important for tools to develop the ability to be adaptive and sensitive towards shifting tasks, interests, communication as well as affect and emotions (Bødker et. al, 2003). There are a variety of options for recognizing emotions. Heuristics evaluation has a potential to be a valuable evaluation tool as it does not make assumptions about tasks and about the purpose of an application (Pinelle et al, 2008) but to establish important classes of problems that are not always determined via user testing. Playtest methods are implemented for gathering consumer perceptions of a game can be used to aid in the iterative development of games, obtaining feedback from consumers about their experiences with a specific game in a systematic manner using scientific methods (Davis et al, 2005). While theory is an important component of any approach to video game development in HCI, researchers must play the video games in order to properly understand them. It is one thing to draw the occasional example from a popular game and another to understand its gameplay more comprehensively (Barr et al, 2006).

4. Summary

This paper provides a review of the existing literature in affective design towards the development of video games. Affective design is a critical aspect in video game design to evoke its users' emotional response, experiences and interactions. Issues, elements, principles and methodologies in affective design were discussed in this paper. As the design of user experiences become increasingly important in video game designs, there is a need to have a deeper understanding of what the roles of emotions are, and which processes are affected by emotions. User's involvement during the development and evaluation process is an advantage to achieve significant level of affect. Despite progress being made in assessment methods and tools, we foresee future works in affective design employing more mixed-methodologies and multi-disciplinary approaches.

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