

Connecting Aesthetics and Critical Thinking In Game Based Learning

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Abstract: This paper presents a brief account of my dissertation proposal on establishing connections between the aesthetics of game based learning environments and the critical thinking abilities of learners. It commences with an introduction of my personal interest in the subject followed by a detailed review of literature on digital game based learning, learning theories on aesthetics and critical thinking establishing the research gap. Based on a theoretical framework of visualization and using an ethnographic research program the proposal is further explained concluding with the significance and contribution in the field of educational technology.

Keywords: Aesthetics, game based learning environments, critical thinking, engagement

1. Introduction

My doctoral research seeks to investigate the role of aesthetics in game based learning environments and in particular to what extent specific aesthetic designs can help foster critical thinking and problem solving skills in learners. My interest in the subject emerged primarily on account of my students, when I was a teacher, prior to joining the program. My students were into gaming and wanted games to be a part of the curriculum based study that is followed in the classrooms. I was also intrigued to find that whenever my students played educational games (Boggle for example) they were motivated and made a concerted effort to think through their solutions by increasing their vocabulary. The value of aesthetics in game based learning environments has been a subject of great interest for me simply because of the evolution of designs of games, both educational (*Cuckoo Time*, *Supercharged*, *Bioshock*) and commercial (*Civilization*, *Assassin's Creed*, *Full Spectrum Warrior*, *Okami*) and the recent trend towards acknowledging the importance of aesthetics in educational games (Squire, 2011). Besides my passion towards learning various dance forms and choreography made me wonder about the aesthetic process of designing games.

2. Rationale and Review of Literature

The present definitions of game based learning environments (NMC Horizon Report, 2014, 2012) state how games have emerged as systematic data driven pedagogies that enforce critical thinking and problem solving skills. The history of development (Malone, 1980; Bowman, 1982; Heinich, Molenda, Russell & Smoldino, 1996; Cordova & Lepper, 1996; Squire, 2003, 2011, 2012) of game based learning environments reveal the evolution from simple interactive environments to rich digital worlds and designed cultures with performative dimensions. Beyond the complex learning that occurs with commercial games in classrooms, this decade has witnessed the emergence of game spaces that are designed to specifically support academic content as valued in schools (Barab, 2012). Recent research also shows that there have been efforts to review cognitive processing, transfer from computer games to external tasks, use of games for evaluation as well as game design to determine how video games can be effectively used in classrooms (Tobias, Fletcher & Wind, 2014). In addition, there has been a broader shift towards aesthetic considerations or audiovisual representations of the gaming worlds. The importance of games as forms of play that motivate and engage students through rich visual and spatial aesthetics (Poole, 2000) has since been considered for design of educational games but getting the ideal mix of academic and gaming content has sometimes been difficult for game designers (Kim, Park & Baek, 2009). The value of entertainment through aesthetics surfaces again in research (Barab, Pettyjohn, Gresalfi & Solomou, 2012; Kafai & Peppler, 2012) which emphasize how game designs have to be unique in order to engage youth in transformative learning experiences. Squire (2011) in fact argues that it is the moral imperative of educators to study games as aesthetically enlivening

experiences because in a digital participatory age such learning experiences awaken the intellectual curiosity of the children and empower them to pursue a basic education.

Although there has been considerable research with games as motivational tools (Gee, 2005; Hoffman & Nadelson, 2010; Petkov & Rogers, 2011), empowering tools (Hernandez, 2009; Pitaru, 2008), new literacies (Steinkuehler, 2010; Black & Steinkuehler, 2009; Ching, 2012), possibilities for impacting the world (Barab, Gresalfi & Ingram-Noble, 2010; Barab, Pettyjohn, Gresalfi & Solomou, 2012) and for problem solving (Gee, 2008; McGonigal, 2008, 2011), there seem to be a research gap from the angle of mobilization of cognitive powers brought about by aesthetic experiences, as understood through the Kantian notion and Dewey's pragmatist approach towards aesthetics (Jay, 2005). Gadamer's definition of aesthetic understanding is the notion of play derived through the participation in moments of opening and venture, crucial for individuals in deciphering ways of the world (Jardine, 2006). Egenfeldt-Nielsen, Smith & Tosca (2013) from a purely technical point of view, define aesthetics in games as not how a game sounds or looks but how its characteristics such as audiovisuals, rules, geography, temporal features, and number of players work in unison to show case the experience of "how it plays" (p.117). Researchers (Squire, 2011) have also claimed that art in games or aspects of aesthetics can be utilized to communicate educational concepts because aesthetics motivates players to see patterns in the process. Further aesthetic qualities of a learning environment promote higher levels of comprehension by clarifying the subject matter through patterns, motifs or routines as well as through sources of aesthetic tension and consummation arising from the content or subject matter (Parish, 2009). Within this vein, my study will bring about a connection among these perspectives by exploring aesthetics in game based learning environments and the effect on critical thinking (Scriven & Paul, 2007; Snyder & Snyder, 2008; Stanton, Wong, Gore, Sevdalis & Strub, 2011) and problem solving abilities (Scriven & Paul, 2007; Snyder & Snyder, 2008) of learners.

3. Research Plan

My proposed research plan is driven by the following questions: How do gamers interpret and interact with aesthetics in games? How do aesthetic interactions within a game promote critical thinking and problem solving?

My research uses the theoretical framework of visualization (Brodie et al., 2005), "a process that extracts meaningful information from the data and constructs a visual representation of the information" (p. 219) for cognitive processing. Connecting the notion of emotions to game based learning environments (Kim & Kim, 2010) my research will utilize a macro-cognitive model of sense making (Klein, Moon and Hoffman, 2006) as a data frame symbiosis to assess critical thinking (Scriven & Paul, 2007; Snyder & Snyder, 2008). Using the above theoretical constructs my research will establish how aesthetics of games can evoke emotions and motivation to generate understanding of the underlying theme of the game.

I will use an ethnographic research program (Madden, 2010; Williams, 2005) which will commence with data collection at two schools in Calgary (Canada) and these schools will be chosen based on the use of game based learning at the senior high level. Games with different aesthetic qualities as used in two specific classes by the teacher and a set of recommended games (such as *Civilization*, *On the Ground Reporter*, *Darfur* and other games from www.gamesforchange.org/play, *Modern Prometheus* etc) will be used to address the learning of language and humanities. I will observe the proceedings and gather information through field notes. I will also conduct audio and video recordings of purposefully selected students in groups while at play. Artifacts produced by learners or recorded discussions with teachers on the subject will be used to help reaffirm the line of thought of the students. The video recordings are meant to capture the emotions displayed through facial expressions, movements of mouse and touch pads. Information will also be gathered through data mining for a comparative analysis with the video recordings. Data mining will serve towards classification and clustering of the data through a qualitative analysis of the codes to determine the observations towards problem solving in the game. Screen captures along with captured screen content and input will be utilized and assessed to match information from data mining and audio and video recordings for triangulation. I will finally conduct semi-structured interviews with teachers and purposefully selected students based on their performance to determine the role of aesthetics in their interactivity towards the problem presented. The interviews will help understand students' experiences as players and their ideas on the aesthetics of the games, which will further help to determine their level of engagement. In

analyzing the data based on the classified themes I will use an interpretive lens to answer how aesthetics stimulates critical thinking skills leading to deeper engagement.

4. Significance

The expected outcomes of the research include an in-depth understanding of aesthetics in games and to what extent it can facilitate learning. One of the significant contributions of the study will be towards providing design and assessment principles for supporting critical thinking. It will further establish that aesthetics of digital games can indicate core learning concepts and enable deeper engagement with the content. These criteria can be used by teachers for evaluating games for classroom use. Educational games are often deemed uninteresting by youngsters. Rethinking educational game design through aesthetic qualities will lend a new perspective on engaging learners.

5. Presentation of Preliminary Ideas (Co- written with Dr B Kim)

5.1 Ideas 2014 Rising to the Challenge Conference, Calgary, Canada

Concurrent Sessions Proposal on Connecting Engagement and Aesthetics in Game Based Learning: IDEAS 2014 Rising to the Challenge Conference, Calgary, Canada (May, 2014) and subsequent contribution to the Proceedings.

5.2 AECT International Convention on Learning, Design and Technology, 2014, Jacksonville, U.S.A

Acceptance towards Concurrent Proposal on Interpreting Aesthetics of Games and Evaluating its Effect on Problem Solving using Visualization Theory and subsequent contribution to the Proceedings at the 2014 AECT International Convention on Learning, Design & Technology, Jacksonville, U.S.A.

5.3 ICCE 2014: The 22nd International Conference on Computers in Education

Acceptance towards Short Paper Presentation and contribution towards Proceedings on Aesthetic Design for Learning with Games at The 22nd International Conference on Computers in Education (ICCE 2014) at Nara, Japan.

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