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CONNECTING AESTHETICS AND ENGAGEMENT IN GAME BASED LEARNING

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Learning with games is perceived as highly motivating and engaging, fostering critical thinking and problem solving skills. Choosing games for classroom use however can be a difficult process. In addition to examining the content, we propose that aesthetics of digital games can indicate important information for evaluating games. Using an example we explain how aesthetics of gaming environments reveal the core learning concepts and provide complexities for deeper engagement. Our paper elucidates ways in which aesthetics provide a socio-cultural context for learners and contribute to motivations and emotions resulting in cognitive engagements.

On the Ground Reporter Darfur (*http://www.radiodabanga.org/darfurgame*) is a game that challenges learners to understand journalism in the course of game play. The player as a journalist experiences the harsh realities of the civil war through depictions of real footage from Darfur. As the game progresses the player assesses and analyzes the prevailing situation in Darfur and presents the data by synthesizing his or her understanding of the information garnered through observation and interviews. Games like *On the Ground Reporter Darfur* provide meaningful and relevant contexts for learning and demonstrating conceptual understanding (Gee, 2005; Gee & Shaffer, 2010; Van Eck, 2006). Games are

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perfect simulated environments for learners to encounter and solve real life problems (Gee, 2005; Royle, 2008) where they are often positioned as heroes who transform a virtual world (Barab, Gresalfi, & Arici, 2009). In the game *On the Ground Reporter Darfur*, the players become journalists trying to make a difference through their reporting. As learning and socialization platforms, games also allow for collaborative and organized actions through a dimension of play common to human cultures (Van Eck, 2006). Teachers use a range of COTS (commercial off-the-shelf) games such as *Sim City* and *Civilization* for classroom use based on the connections to the curriculum or subject matter (Van Eck, 2006). Various authors offer guidance towards using such games in the classrooms. However, choosing games for classroom use require many considerations including the level of engagement of students, alignment of the curriculum outcomes, student motivation, their prior knowledge and so forth. Constructing engaging activities to advance cognitive development is a challenge for teachers for any type of content (Terry, Mishra, Henriksen, Wolf & Kereliuk, 2013). We propose that aesthetic qualities of games be examined in selecting games for classroom use. We suggest that aesthetics of games help learners engage in critical thinking towards production of assessable artifacts such as written reports as in the game *On the Ground Reporter Darfur*. In the following section, we discuss what we mean by aesthetics of games and how teachers could examine aesthetic qualities of games ensuring their curriculum connections as well as motivational aspects of learning.

LITERATURE REVIEW

Kirkland, Ulicsak and Harlington's (2010) research discovered that teachers are often hesitant to use games for teaching even though they are aware that games can be effective means for acquiring certain knowledge and skills. Their study identified the possible challenges as finding proper pedagogical techniques and learning goals for games. As it comes with any new pedagogical approaches, using games for learning requires appropriate assessment and adequate time to complete activities. Similar concerns over assessment were observed by Sandford, Ulicsak, Facer and Rudd (2007) in using non-

educational or COTS games in schools. Van Eck (2006) further argues for an alignment of the curriculum and the game structure to avoid compromising the learning outcomes for entertainment.

Educational games such *as Pirates!*, *Cuckoo Time* and *BioHazard* which incorporate academic knowledge as a tool for achieving game goals (Squire, 2011) are used in classrooms and chosen exclusively based on their content. However the hurdle faced with wider usage of games in classrooms is due to the lack of understanding of the effects of gaming environments on learning and a corresponding lack of theory and practice for their design and implementation (Shute, Rieber & Van Eck, 2012). Based on the available literature, we understand that the selection of games for classroom use is dependent either on the criteria of relevant subject or skill development such as problem solving. We address the lack of theory and practice in game evaluation by analyzing the aesthetics of games and its significance for evaluation purposes.

An aesthetic experience as Gadamer (2011) explains is similar to being pulled out of one's subjectivity and into a web of relations that demand his or her attention. An aesthetic understanding according to Jardine (2006) depends on the notion of play derived through participation in moments of opening or venture. Such moments are crucial for individuals in deciphering the ways of the world (Jardine, 2006). This notion is reiterated by Egenfeldt-Nielsen, Smith and Tosca (2013) from a purely technical point of view when they define aesthetics in games as not how a game sounds or looks but how all its characteristics including audiovisuals, rules, geography, temporal features and number of players work in unison to showcase the experience of "how it plays" (p. 117).

Within learning environments aesthetic experiences make the learning immersive, meaningful, coherent, complete and transformative (Parrish, 2009). We therefore suggest that learning depends on the aesthetic qualities of an environment and that aesthetics in games will play a crucial role towards understanding what the game is all about. Further Parrish (2009) notes that aesthetic qualities help to establish the theme of learning if the problems or issues arising from the subject are part of the event or

situation. Problems presented through games can be easily understood through the aesthetic qualities of the game. Elements such as rules or geography for example can establish the theme of learning. Aesthetic qualities like patterns routines or motifs help to see the connections or the changes thus supplying an anchor for new learning (Parrish, 2009). Aesthetic elements of a game provide patterns, routines or motifs, which holistically reveal the changes and connections as the game progresses. Visual representations in particular are critical for making sense of a game, as they communicate educational concepts and enable players to see patterns in the gaming process (Squire, 2011). Each aesthetic element of the game not only helps to understand the process but also shapes and reshapes various game elements depending on the player's choices (Egenfeldt-Nielsen, Smith & Tosca, 2013).

Aesthetic learning experiences also involve tension and anticipation in the course of clarifying a problem, making it challenging and engaging for learners (Parrish, 2009). Hence we claim that aesthetic tension or anticipation arising out of the game elements can motivate the player impacting his or her critical thinking skills and emotions towards solving the problem.

The learner visualizes and starts making sense of a problem from a perspective drawn from aesthetic elements. Drawing from Klein, Moon and Hoffman's (2006) concept of sense making, learners create their own frames, which define and shape what count as information. Sense making occurs when the frame is elaborated through addition of details, questioning of its structure, and investigation of the explanations (Klein, Moon & Hoffman, 2006). The aesthetic qualities of the gaming environment thus specify, depict and convey visual representations to the learners. Characters, contexts, events or even objects within game based learning environments, therefore, may serve as emotional anchors of learning depending on their aesthetic capacity (Kim & Kim, 2010). The learners process and undergo the sense making experience of interpreting all of the received information.

PROPOSED FRAMEWORK FOR EVALUATING GAMES

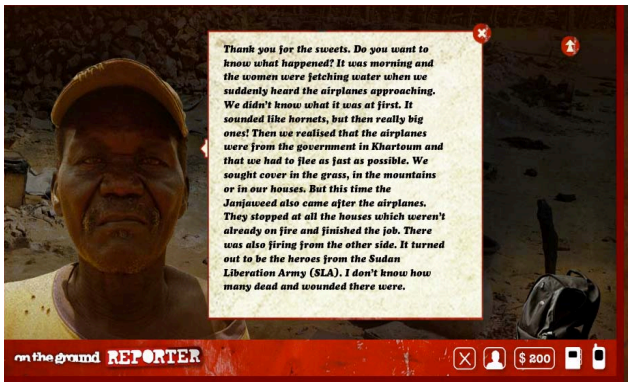
In this section we analyze each aesthetic element of an educational game using *On the Ground Reporter Darfur*. We discuss the contribution of each aesthetic element within the game from a perspective of aesthetic principles for learning design.

Rules Determine Progression and Success

The rules of a game help us to understand its purpose (Egenfeldt-Nielsen, Smith & Tosca, 2013). Rules in general refer to the liberties and constraints for the players within a game. Rules also lay down the path to progress. In *On the Ground Reporter Darfur* the rules are discovered as the player progresses through the game. It starts with a briefing to the players about an ongoing civil war in Darfur and their play is bound by several rules (e.g., travel restrictions) throughout the game. These rules clarify how they need to be inconspicuous as journalists or how entering Darfur from certain areas may provide easier access to information. As the players visualize a context (Figure 1a) and make the necessary moves their progress becomes visible to them through emerging information and their actions thereof become part of the narrative. Some rules become routines or patterns providing a basis for new understanding of the same context through a change of the situation, such as a bombing of the area in Figure 1a. Such patterns help to sustain the engagement of the players.

Figure 1: Screenshots from *On the Ground Reporter Darfur*

a) A scene depicting the streets of Kornoy



b) A villager providing details of the bombing

The initial and discoverable rules create aesthetic tension and anticipation for the players in the game as there are periods of struggle and expectation. The player gets injured at the site on account of the bombing and has to seek first aid. He or she retraces the route back to the temporary medical centre set up in Kornoy. Once the player finds his way back and gets first aid, he finds his interpreter and moves forward in the game. Such sources of tension and anticipation clarify the key objectives of the game. These rules also exemplify conditions during a civil war. Progressive rules such as requiring an interpreter allow the players to understand the local norms and culture. Thus the rules in the game, *On the Ground Reporter Darfur*, reflect learning by showing us progression, clarifying the subject of the game and helping to sustain the engagement of the players. Even though there are no obvious rewards in the game, the levels reflect their knowledge about the problem and development of strategic thinking.

Geography and Representation Support Understanding of the Problem

The geography encapsulates the physical world of the game, which allows and limits the players' actions (Egenfeldt-Nielsen, Smith & Tosca, 2013). In other words it reflects the different landscapes of the gaming environment. The landscape of *On the Ground Reporter Darfur* can be visualized from a number of geographical perspectives such as the political, economic, human, as well as the physical. In the Figure 1a scene, for example, the player is exposed to the auditory and visual queues on the human, economic and physical landscape, which enables him or her to understand the prevailing situation in Darfur. If the game is extended to incorporate classroom discussions the players will continue to construct and build upon the information through their own perception of the situation. By instilling tension and embedding the problem of civil war through a realistic portrayal of the situation, the aesthetic quality of the game succeeds in enticing and immersing the learner in the subject.

Representations denote the appearance of a game (Egenfeldt-Nielsen, Smith & Tosca, 2013). *On the Ground Reporter Darfur* is a photorealistic game that mimics the aesthetics of cinema and television.

Photorealism is visually powerful and the accompanying auditory information becomes meaningful for the learners in a number of ways. Music for example adds to the atmosphere, which provides visceral link to emotion to evoke feelings and immerses the player in the game. Patterns such as repetition of the music when the players are travelling across the country creates a holistic effect and acts as a measurement for comprehending progress through the change or the connections within the game. Sound effects such as street noise or blast in Figure 1a add to the realism of the narrative. Thus a mix of complexities of both the aural and visual representations presents the theme and prepares the learner for the changes in perspective.

Each interaction in the game with people from the villages or with objects such as cannons or sociocultural contexts such as live bombing of a village street (Figure 1a) may evoke different emotions in the players. This will not only affect the information gathering simply because there may be plenty of human interest stories but create meaningful experiences and relational meanings to draw upon. In the game *On the Ground Reporter Darfur*, the geography and representation help with sense making of the theme compelling the players to act in certain ways (in terms of consequential decisions) depending upon their emotions.

Time Embodies Theme and Player's Action

Time as experienced by the player in a game is an aesthetic aspect from the angle of the narrative or the discourse as it unfolds through his or her actions (Egenfeldt-Nielsen, Smith & Tosca, 2013). *On the ground Reporter Darfur* happens in real time where the player or the learners understands the narrative through his or her response to what is happening in the game at that point in time. A change of environment for example through the bombing of a certain part of Kornoy (Figure 1a) or conflicting information from different sources of power in the country helps to sustain the suspense or tension by building up the complication. Such aesthetic moments help to configure the consequences of the player's actions in the game by clarifying the theme of civil war in Darfur. The temporal characteristics

of the game therefore add to the immersion of the player, which reflect his or her motivation while playing apart from furthering the real time strategizing skills of the player.

Number of Players Matter for Learning Interactions

On the Ground Reporter Darfur is a single player game. Being a single player game it is often procedural and required artificial intelligence (AI) responding to the game progress. The represented people in Darfur are AI with sets of discourses (Figure 1b). However the narrative builds up through the AI as all the represented people turn into actors within the game. The narrative also helps to establish the theme of learning. Although the social context of multiplayer games is absent in *On the Ground Reporter Darfur* and the player is directed to defined but flexible paths in the game, he or she has to synthesize the information to present the situation logically and meaningfully as a reporter. Class discussions on the topic after the game play will tie in the collaborative angle to problem solving. The players will have shared understanding of the game's narrative, but formed their own opinions, which will add to the critical analysis of each other's reports with different reporting styles and interest. In On the Ground Reporter Darfur, characters in the game (players and AI) establish the theme. Teachers can create opportunities for learners to engage in critical thinking with a single player game.

CONCLUSION

Our primary goal for this article has been to emphasize how aesthetical considerations of game based learning environments help learners understand the content or subject matter by playing the game. We have used an example to show how various aesthetic qualities of game may immerse them in the game play which in turn helps them to progress with the game and to relate to the environment and incidents of game as the narrative unfolds. We have also clarified how aesthetical qualities of a game compel the learner to critically think through the problem for solutions. Our approach draws heavily from some the basic tenets of aesthetical considerations for learning design, which are derived from learning theories. However aesthetics in games is an emerging subject of interest and further research in this area will add

to what is defined as aesthetics of games and how it may help learners further their knowledge using personalized learning environments such as gaming. We feel that teachers stand to benefit from understanding the aesthetic of games as they can evaluate games better for classrooms use based on some of the criteria mentioned in this article. We believe that understanding game based environments from an aesthetic perspective will open up new areas of research.

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