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Project Proposal

At the Serious Games Summit (www.seriousgamesummit.com) last week, many of the researchers and game developers discussed their educational games. To describe these games, they used terms like "immersive," "engaging," and "deeply engaging." The researchers alluded to a connection between learning and deep engagement, and one researcher even proposed that they were inversely related. None of the researchers, however, defined or described specifically what deep engagement is, or showed how they assessed and measured the user's deep engagement in the game.

I propose to examine deep engagement in educational games and consider ways we might measure it. I want to think about ways to describe and assess users' (physiological, mental, and emotional) participation in a game environment. Further, I want to reflect on the implications of a users' involvement in a game on their learning of complex ideas. What exactly is the relationship between deep engagement and deep learning?

In particular, I am interested in looking at augmented reality and handheld games. There has been extensive research on physiological states and video games and 3-D environments. Less research of this kind has been focused on handheld games, which are games that use a real, physical environment to create a virtual game space through the use of a handheld. The handheld provides information about specific locations in the physical space. Thus, your school building or museum could suddenly become a game board; your statues or doors could become clues or portals.

Handhelds are becoming popular tools for gaming and education because of their portability and low cost. The games can often be played anywhere and at various times, but appeal to our kinesthetic and spatial senses. I feel that the mix of real and virtual information has implications for understanding deep engagement. I especially consider the study of a video game where the highest physiological reaction occurred when the user was trying to get the gaming equipment to work. While the game itself did affect the users' physiological states, the greatest effect was the physical environment surrounding the game. I am interested in looking at the landscape of physiological responses of a game that constantly mixes the physical with the virtual.

Also, I am interested in looking at educational games because of the lack of specific research into the connection between engagement and learning. The assessment of such learning will, it seems, need to be more complex than a straightforward test. By specifically looking at the engagement of a user, and thinking about the complexity of their involvement, are there any implications for the way we might assess learning or think about the role of educational games?

I propose to focus on one of the following educational handheld games, both of which were developed by a team at MIT: Environmental Detectives or Charles River City. In both games, participants work in teams to gather data on an environmental or biological problem, draw conclusions, and make recommendations based on real-world constraints. I would like to equip a group of participants with Professor Picard's Bluetooth-enabled galvactivators and measure their skin conductivity while playing the game, as well as their reflections on the game afterward. I want to use this data to match to their activities in the game. Simultaneously, I would also like to create a "thick description" of the game and the reflection period, by qualitatively observing each of the participants (e.g., gestures, posture, verbal interaction with other participants). I want to compare the results of the galvactivator and qualitative observations to explore the issues of deep engagement and learning that I have described in this proposal. I also want to use the result to guide design choices in the creation of a handheld game or activity.