Abstract:

This session will describe and demonstrate the technology used in the Handheld Augmented Reality Project (HARP). Using GPS-enabled handheld computers, this project attempts to teach math and language arts content to middle and high school students. As students walk around a physical environment, they are tracked by an avatar on their handheld computer moving around a map of the students’ location. This avatar triggers characters and objects as the student moves around. This session will define Augmented reality, demonstrate the HARP technology, describe the HARP curricula development process, and describe preliminary results from testing the HARP augmented reality process using a pre-test/post-test control group evaluation design.

Proposal:

This session will demonstrate the technology and curricula utilized through the Handheld Augmented Reality Project (HARP). Augmented reality is the use of technology to supplement or augment the physical environment. This is distinct from virtual reality in that augmented reality involves the physical world, while virtual reality attempts to take the place of the physical world.

In HARP, students utilize GPS-enabled handheld computers to learn math and language arts content. As a student moves around the physical environment he or she is “tracked” by an avatar moving around a map on their handheld computer. As the student moves, the avatar triggers characters and object on the handheld computer. Each of these characters or objects provides the student clues or information that is used to progress through a scenario-based project.

Currently, there are two curricula for the HARP project. The first, *Alien Contact!*, is based on the scenario that an alien craft has crash landed in a field near the school. The students, working in groups of four, must determine and support a hypothesis as to why the aliens have visited earth. The second curriculum, *Gray Anatomy*, is based on a scenario where a gray whale has beached itself. Working in group of two or three, students must determine why the whale has beached.

As students work within groups they are assigned specific roles that determine what information that they receive as they progress through the scenario. Each student in the group receives role-specific information that they must share with their group-mates in order to successfully progress through the simulation. For example, during the *Alien Contact!* curriculum, students will take on the role of Chemist, Cryptologist, Computer Hacker or FBI Agent. Each of these roles receives information that must be shared
effectively, or groups will not be able to progress through locked virtual gates to gather objects.

The purpose of the Handheld Augmented Reality Project is to rigorously test the potential of this technology to teach academic and non-academic content and skills. In order to do so, a pre-test/post-test control group design has been implemented. Students in the control group play a board game version of the augmented reality game.

Preliminary results from formative evaluations indicate that the technology increases student engagement, however, much of the success of the instruction depends on effective management of the technology. As the technology is still in early stages of development, the technical support necessary to effectively support the implementations is substantial. In addition, the design of the curriculum is extremely important as students demonstrated “cognitive overload” based on overly complex early versions of the scenarios.

This session will demonstrate the technology that has been used in the Handheld Augmented Reality Project, will present the process through which augmented reality curricula is designed, and will discuss results of data analysis from implementations of the HARP technology.