**Designing Interactive Multimedia Learning Environments**
**to Support Cognitive Skills Development**

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Most of us will probably agree that developing cognitive skills is an important goal for education, and is of particular significance for life long learners. It is an area that requires continuous attention and further research. In this speech, I will examine the use of interactive multimedia technology to support cognitive skills development. Specifically, I'm interested in examining how to design interactive multimedia learning environments to provide necessary support for developing higher level cognitive skills. There are many different ways to create interactive multimedia learning environments. Here I will look at two approaches based upon my research and development experience:

1. Engaging learners as multimedia designers using a project-based learning approach. In this environment, students at high, middle, and elementary schools take on the role of a multimedia designer, learn state-of-art multimedia tools, and work in a group to create a multimedia product for others to use. Through the process, they are to acquire design skills and resource management skills as needed in producing a multimedia product.

2. Enhancing problem solving skills through a problem-based multimedia learning environment for middle school science, Alien Rescue. In this environment, sixth graders play the role of young scientists, and are engaged in scientific investigations aimed at finding solutions to complex and meaningful problems. Alien Rescue provides a rich set of cognitive tools for successful use of PBL in 6th-grade classrooms.

I will discuss the design, implementation, and research of each environment. I will share the factors contributed to successful implementations and challenges of designing such multimedia learning environments; and will explain the cognitive support built in each environment. After examining these two approaches and reflecting on our experiences, I believe the following factors are of critical consideration in designing such environments:

- The design of a multimedia learning environment must be solidly grounded in educational theories and research practice.
- Cognitive tools should be built in the environment and they must be included for a purpose.
- High-end cutting edge software tools should be used to create the environment.
- Interactions among the learners, the environment, and the teacher/facilitator must be encouraged and promoted for the environment to be effective.

By sharing our R & D experiences, and learning the audience's experiences (hopefully through the question-and-answer time), I hope we, the multimedia community, will continue to have our dialogs and search for new ways to design effective multimedia learning environments to support cognitive skills development for learners at all ages.