**Abstract**

The primary goal of this project is to increase motivation, achievement, and exposure to Science, Technology, Engineering, and Mathematics (STEM) content of students from urban public schools by having them work with scientists and experts using cutting-edge/professional technologies to design and develop educational games that can be utilized by other students and teachers.

**Goals**

- Increase interest and achievement in, and exposure to STEM content for traditionally underrepresented populations
- Increase awareness and interest in STEM-related careers among students and their families

**Objectives**

- Develop an implementation model that emphasizes collaboration and knowledge sharing between high school, middle school students, and STEM experts and professionals.
- Provide access to year-round information technology enrichment experiences and opportunities to explore related education and career pathways.
- Create high-quality learning opportunities, and exposure to high education and industry experts.
- Review, adapt, and design STEM curriculum models and content for use in after school, weekend, and/or summer settings that are relevant and applicable to students' everyday lives.

**Introduction**

The Information Technology Experiences for Students and Teachers (ITEST) program was established by the National Science Foundation in direct response to the concern about shortages of information technology workers in the United States. The ITEST program funds projects that provide opportunities for both school-age children and teachers to build the skills and knowledge needed to advance their study and to function and contribute in a technologically rich society. One project, Game Design Through Mentoring and Collaboration, is a partnership with McKinley Technology High School in Washington, DC and is designed to teach high school students video game design, and in turn, allow mentoring opportunities for these students to teach middle school students. The project incorporates science, technology, engineering and mathematics (STEM) content, with an emphasis on career and educational pathways.

**George Mason University Summit**

**Dr. Bernard Harris Dream Tour Summit**

**STEM Occupations:**

**Students:**

**Project Staff**

Kevin Clark, Ph.D.  
Principal Investigator

Kim Sheridan, Ed.D.  
Co-Principal Investigator

Rick Kelsey  
Site Coordinator

Asia Williams  
Research Assistant

Asia Williams  
Research Assistant

Beth Sabey  
STEM Education Expert

Erin Peters, Ph.D.  
Research Assistant

Neda Khalili  
Research Assistant

**Implementation**

- **Fall Game Design Session**
  - 4 weeks: Saturdays 10:00am – 12:00pm
- **Spring Game Design Session**
  - 10 weeks: Saturdays 10:00am – 12:00pm
- **Mentor Training**
  - Every weekday for 4 weeks, 12:00pm – 3:00pm
- **STEM Summits**
  - Explore STEM careers and opportunities

**Curriculum**

- **Game Maker:** 2D game design software allows students to create their own video games. Students create games from a library of object models and include features such as characters, objects, and actions. These actions are included by choosing elements from menus, representing programming and code.

**Framework**

- **Autonomy:**
  - High school students with strong technological skills work with higher education experts to become mentors to assist students and instructors.

- **Fostering Metacognition:**
  - Extends student learning by putting students in the role of game designers. Students are challenged to describe metacognitive issues about how games function
  - Use of audio, visuals and text to communicate ideas
  - Know what helps users understand a game and what makes a game fun

**Design Studios**

In an engaging “design studio” environment, students learn technical skills that they can apply to projects that have real value in the world (Holland, Weger, Verbera & Sheridan, 2007).

- They collaborate and critique each other’s work
- They reflect on what they have made and envision new possibilities for their projects and their future work

**Evaluation**

- Pre- and post-assessment that capture participant perceptions of their STEM content knowledge, self-efficacy, confidence, self-concept, problem-solving, and collaborative approaches to learning.

- **Assessment Measures/Instruments:**
  - Demographic data
  - Classroom observations
  - Student interviews
  - Individual and collective ITEST session evaluations (feedback)

**Websites:**

[http://iteit.gmu.edu](http://iteit.gmu.edu)
[http://bthegame.com](http://bthegame.com)