

Education and Engagement

Overview and Problem Statement

Members of the TCIPG Education team work with teachers and students, informal educators, industry, and other TCIPG researchers to develop a wide variety of educational opportunities. Our activities are designed to engage learners of all ages. TCIPG Education offers a variety of workshops, seminars, and other learning opportunities for power and cyber professionals. We develop curriculum materials that involve young people in virtual power system simulations. We have produced an interactive app for younger children using the iPad and other touch tablet devices. Our materials and hands-on activities provide information about the science of electricity and the importance and workings of current and future electricity generation and delivery systems. They are also designed to engage students who may pursue careers in related industries and to provide for an informed citizenry. TCIPG Education curriculum materials are featured in several curriculum projects in various parts of the U.S. and Canada. TCIPG engages in public outreach through participation in the annual Illinois Public Engagement Symposium and in various other conferences, exhibits, and symposiums.

Objectives

- Link researchers, educators, consumers, and students in efforts to transition to a more modern, secure, and resilient electrical system.
- Illustrate issues necessary for consumer acceptance and use of smart grid technologies.
- Create interest in related STEM careers and provide an engaging interactive curriculum.
- Create interest in further learning.
- Connect with schools, national curriculum endeavors, and informal educators.
- **Smart Grid Applications:**
 - Reach the wider audience of educated citizenry necessary for the successful implementation of smart grid technologies.
 - Educate consumers to use new technologies that allow them to actively manage their energy use and costs.
 - Offer learning opportunities for power and cyber professionals.

Solution Approach

- Create literacy-enhanced, hands-on learning opportunities.
- Correlate hands-on explorations with virtual simulations.
- Create a TCIPG Minecraft World of Power that invites users to build a virtual neighborhood, and then explore grid connection and a variety of generation sources to electrify their world.

<http://tcipg.mste.illinois.edu/minecraft>



- Incorporate the science of electricity and the historical and economic development of the electric grid into a “quest” type video game.
- Develop and disseminate curriculum materials that require learners to communicate their strategies, develop convincing arguments, create models, conduct simulations, and learn in ways not possible prior to the digital revolution.

- Participate in campus and community outreach events.

Results and Benefits

- Curriculum materials, websites, Java applets, apps for tablets, and hands-on activities.
- Partnerships and external interactions:
 - National 4-H SET Initiative.
 - KidWind and WindWise Education.
 - Project Lead the Way pre-engineering curriculum.
 - National Science Teachers Association (NSTA).
 - International Society for Technoloty in Education (ISTE)
 - ASEE.
 - Questar-Bridges project with MESO (Mesoscale Environmental Simulations and Operations, Inc.).
 - Southern Regional Education Board Advanced Career Energy and Power curriculum.
 - Girls' Adventures in Mathematics, Engineering, and Science (GAMES) Camp.
 - Girls Engaged in Math and Science (GEMS) Camp.
 - USA STEM Festival.



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