Serious Gaming for Flood Risk Awareness

Hunter Merritt, Water Resources Planner
U.S. Army Corps of Engineers, Sacramento District

Floodplain Management Association Conference
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How do we communicate “flood risk”?
Systems are complex
Posters and pamphlets are not enough...
YOU HAVE DIED OF DYSENTERY
WE are the Gamers!

California Reduces Flood Risk Through Education

The U.S. Army Corps of Engineers Sacramento District is working with the State of California Department of Water Resources (DWR) to reach out to California communities and reduce their flood risk using one of the most powerful flood-fighting tools: education.

The California Educator Project, an interagency nonstructural flood risk management pilot project, was developed in 2014 to meet the goal of increased public awareness of flood risk, especially among children, to enable them to prepare for and take action in case of a flood emergency.

What emerged from the early discussions with educators and partner agencies was the need for tools to help teachers reach students with real-world contexts on relevant science topics. The Simulated Water Management Model, or SWMM, was developed, and is currently being field tested by teachers state-wide. Free, open-source software was used to develop the water management computer models and “simulation games” that can be played by middle and high school students in Science, Technology, Engineering, and Math (STEM) fields. The interactive computer models promote the use of critical thinking and systems thinking, which are among the goals in the Next Generation Science Standards.

"By helping teachers understand flood risk and providing them with classroom tools, children, parents and teachers become aware of flood risk," says Hunter Merritt, water resources planner in the Corps’ Sacramento District and one of the project team members. “This project is about understanding complex systems, such as water management, so the next generation of informed citizens can be better stewards of resources in the future.”

Merritt is scheduled to provide a workshop on the SWMM project at the California STEM Symposium in Anaheim, Calif., in late October. Outreach will continue throughout 2015 and into 2016, using California Silver Jackets funding to promote the use of the educational tools.

In addition to the Corps and DWR, several agencies, organizations, and educators were involved in the project, including the National Oceanic and Atmospheric Administration/National Weather Service, the Corps’ Institute for Water Resources, Project WET (Water Education for Teachers), several school districts and STEM educators from across the state. The Corps and DWR also produced a children’s flood preparedness activity book for younger kids. All of the pilot project files are available for free on a Corps website: http://www.sok.usace.army.mil/Missions/FloodRiskAwareness/EducationResources.aspx

More on Next Generation Science Standards can be found at www.nextgenscience.org
Why & How Do We Use Models?

Computer Models:
- Hydraulic Models (e.g. TuFlow)
- Reservoir Simulation (e.g. ResSim)
- Economic Models (FDA)
2015 CA Educator: Simulated Water Management Model

http://www.spk.usace.army.mil/Missions/Flood-Risk-Awareness/Education-Resources/
Gamification of Flood Risk?
Disclaimer

The locations and events in this game are not fully representative of their real life counterparts.
Nevada Floods, Are you prepared?

Our goal is to create flood resilient communities in Nevada that encourage protection of life, property, water quality, environmental values and the preservation of natural floodplain functions.

SANDBAG INFORMATION

Carrara City  Washoe County  Douglas County

Try our NEW video game! Flood Fighter: Nevada

Click on each of the three steps below to prepare yourself for the next flood event in Nevada:

STEP 1  STEP 2  STEP 3

Know your risk  Take action  Nevada Flood History & Library

Download here: www.nevadafloods.org

Watch the tutorial video https://youtu.be/GgoYBNhNHzY
What could be Next?

**UI & Graphical Improvements:**
Improvement of Flood Fighter user interface as well as graphical enhancements.

**Virtual Reality:**
Development of Flood Fighter for Virtual Reality simulation on the Oculus Rift platform.

**Additional Scenarios (including multi-player):**
Development of new levels/scenarios for single or multi-player.

**Mobile Game:**
Development of Flood Fighter on iOS and Android smart phones. Once developed, mobile app would be available for download on iOS and Android stores.
Ten years later, a girl in rural Maharashtra is studying aeronautical engineering following her encounter with the computer in the wall. A village boy who became a genetic engineer in one of India’s premier laboratories found the subject by reading the New Scientist at his hole in the wall.

- Sugata Mitra

Case Study: San Antonio, TX - Bexar County / Southern Counties - Wilson, Karnes & Goliad

San Antonio Multi-Hazard Tournament
(x2: Bexar County & Southern Counties)
Overview: Multi-Hazard Tournament

What is a Multi-Hazard Tournament (MHT)?

- A condensed, accelerated version of Shared Vision Planning that couples serious gaming with collaborative decision-making for planning for multiple hazards (e.g. flood, drought, water quality, sea level rise, etc.)
- Involves participants from wide variety of fields
- Assists regulators, planning authorities, and communities with developing effective hazard plans using stakeholder input

Results from the 2016 MHT in Cedar Rapids

**Likelihood of using MHT experience to inform future decisions**

- **Unlikely 10%**
- **Neutral 19%**
- **Likely 71%**

62% of respondents said they had considered changes to policies or decision-making processes related to water quality, flood, or drought.

What objectives can the MHT achieve?

- Identifying (and educating participants on) the costs and tradeoffs among various strategies for solving problems – and the values that inform those tradeoffs.
- Identifying (and educating participants on) strengths and weaknesses in various strategies to reduce risk.
- Creating new collaborations to address common problems
- Improving communication among stakeholders

Relationship Building – Social Learning – Planning – Decision Making
Thank you!

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