Game-based learning
Development, prototyping, and evaluation

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Games with defined learning objectives

NLM ToxMystery

Uro-Island

NLM: https://toxmystery.nlm.nih.gov/
Uro-Island: Boeker et al., PLOS ONE, 2013
Game-based vs. conventional learning

Game-Based eLearning
- Experiential learning
- Intrinsic motivation
- Low deployment cost
- Progressively lower barriers to entry

Conventional
- Passive learning
- Faster/cheaper development
- Low barrier to entry
Building a game-based learning product
Case Study: Training Research Responders in Emergency Operations
Needs Assessment

• Work with all stakeholders to identify training needs
  • Is there a gap in existing training resources?
  • Is a game-based solution a good fit to address the gap?
Curriculum Development

- Federal, state, and local emergency management practitioners contributed subject-matter expertise
- Deployment scenario based on real-world issues faced by experienced Research Responders

Decision: Go straight to incident or report in?
Prototyping and Testing

• Prototyped in the OpenSim environment (Video)
• Beta tested by disaster research experts and novices to ensure both curriculum quality and teaching effectiveness (total of 9 testers)
• Revised prototype based on training feedback
• Pre-training, post-training, and 3-month assessments, and qualitative feedback to improve usability
Reinforcement Via Continued Engagement

- Just-in-time training
- Online resources
- Spaced Repetition
Deployment

- Think about deployment during needs assessment and curriculum development
- User needs inform deployment strategy
  - Engage trusted and respected partners
  - Mobile apps/VR
  - Doesn’t have to be electronic!
Game-Based Learning Summary

• Take chances, get messy, make (harmless) mistakes!

• Engage stakeholders and SMEs early and often

• Consider the needs of the user throughout the design process

• Can be low or high tech

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SMEs
• Emergency Managers
• Researchers
• Testers