Serious Mobile Learning Games

21st century tools for 21st century skills

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Outline

- A mobile serious game designed to foster '21st century' skills
- Augments a physical location to represent a virtual company
  - Players act as business consultants
- Narrative-driven simulation leverages contextual mobile learning
- Configurable open source project

Changing Nature of Learning

- From knowledge production to knowledge configuration
  - Gibbons, 1998
- Relationship between education and productivity
  - Chang, 2010
- Articulation between education and work
  - Altbach & Peterson, 1999
- Smaller entrepreneurial enterprises
  - Vessuri, 1998
- Analyse, evaluate and create
  - Krathwohl, 2002

21st Century Skills

- 3 broad clusters of 21st century skill
  - Cognitive, interpersonal, intrapersonal
- Cognitive skills:
  - Non-routine problem solving
    - diagnosis, reflection, strategy switching
  - Critical thinking
  - Systems thinking
- Interpersonal skills
  - Social skills
  - Teamwork

- National Research Council - Assessing 21st Century Skills (2011)

Mobile Learning Games

- Technical features alone do not make a game either engaging or pedagogical
- Need to embed both effective gaming experiences and worthwhile learning outcomes into the same application

Our Game

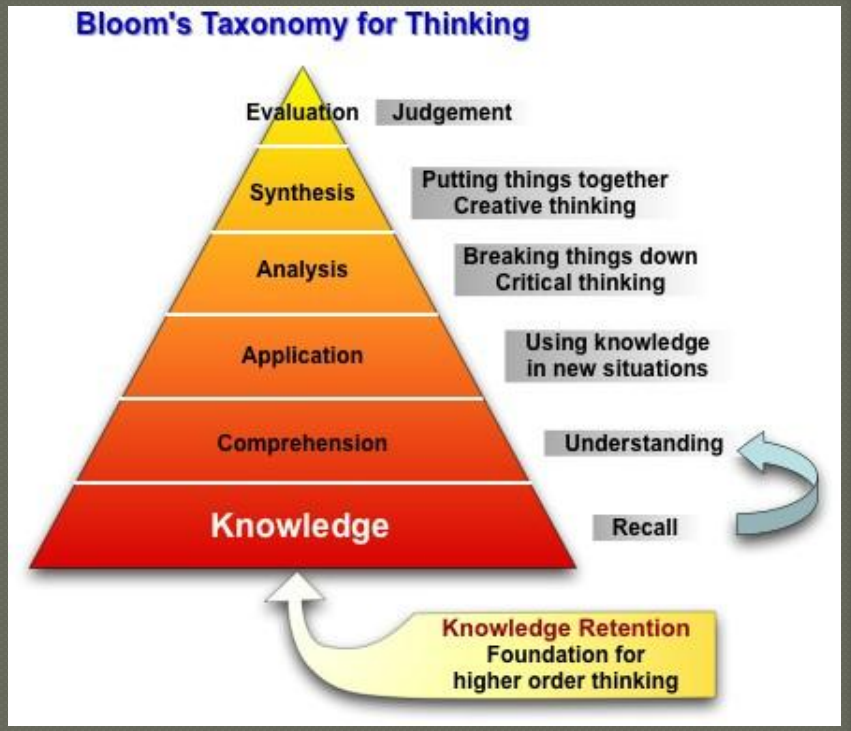
- Augmented/virtual reality outdoor mobile learning game for one or (preferably) two players
- Follows classic linear fiction model
- Narrative path is reflected by a physical path
  - Players navigate to locations and investigate the problem they have to solve

Simulated Business Consulting Project

- Players have to gather, analyze and reflect on various (and sometimes conflicting) pieces of information about a mobile phone manufacturing company that is having some problems
- Aims to teach higher level skills (analysis, synthesis, critical thinking)

Exercising Higher Level Skills

- Analysis
  - What does this tell me?
- Synthesis
  - How do these different sources relate to one another?
- Critical Thinking
  - Why am I getting different stories from different people?



Game Evolution

- Original Nokia Version (2010)
  - Functional but dull

- Enhanced Nokia Version (2011)
  - Narrative flow

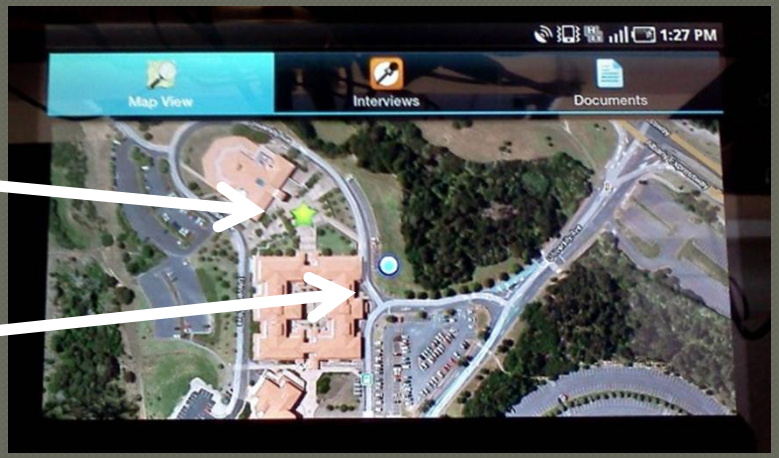
- Android Version (2012)
  - Enhanced game experience

Process

- Move around a physical virtual location

Player's next waypoint

Player's current position



- Locations represent parts of the company
- Find virtual and physical artifacts
  - Videos, questions, documents
- Resources unfold problems

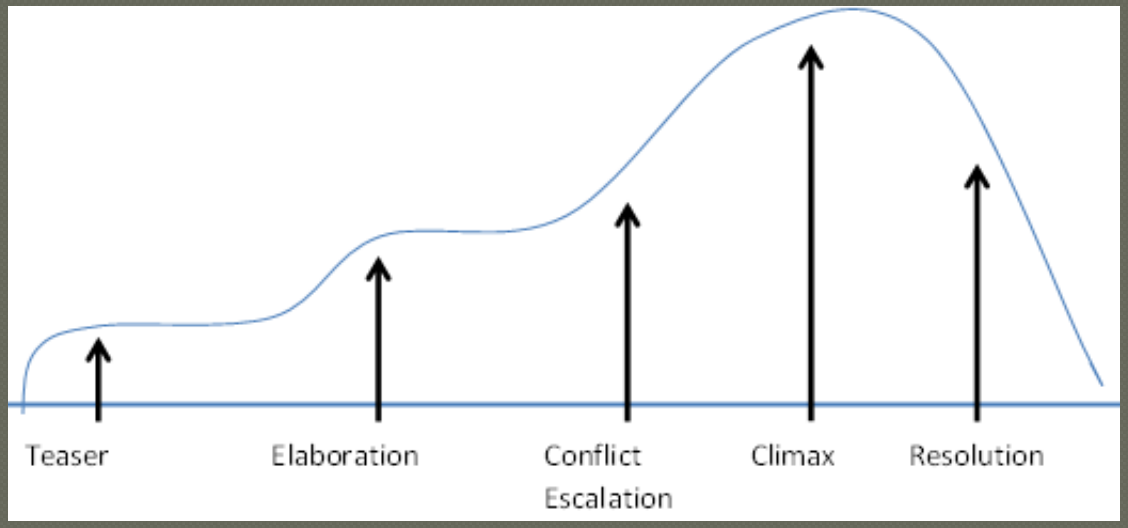
Two-Person, Non-Zero-Sum Game

- Non-zero-sum game
  - One player does not win at the expense of the other
  - Both players 'win' together.
  - The strategies chosen by each player determine the outcome of the game
- Associated with each possible outcome of the game is some kind of a payoff

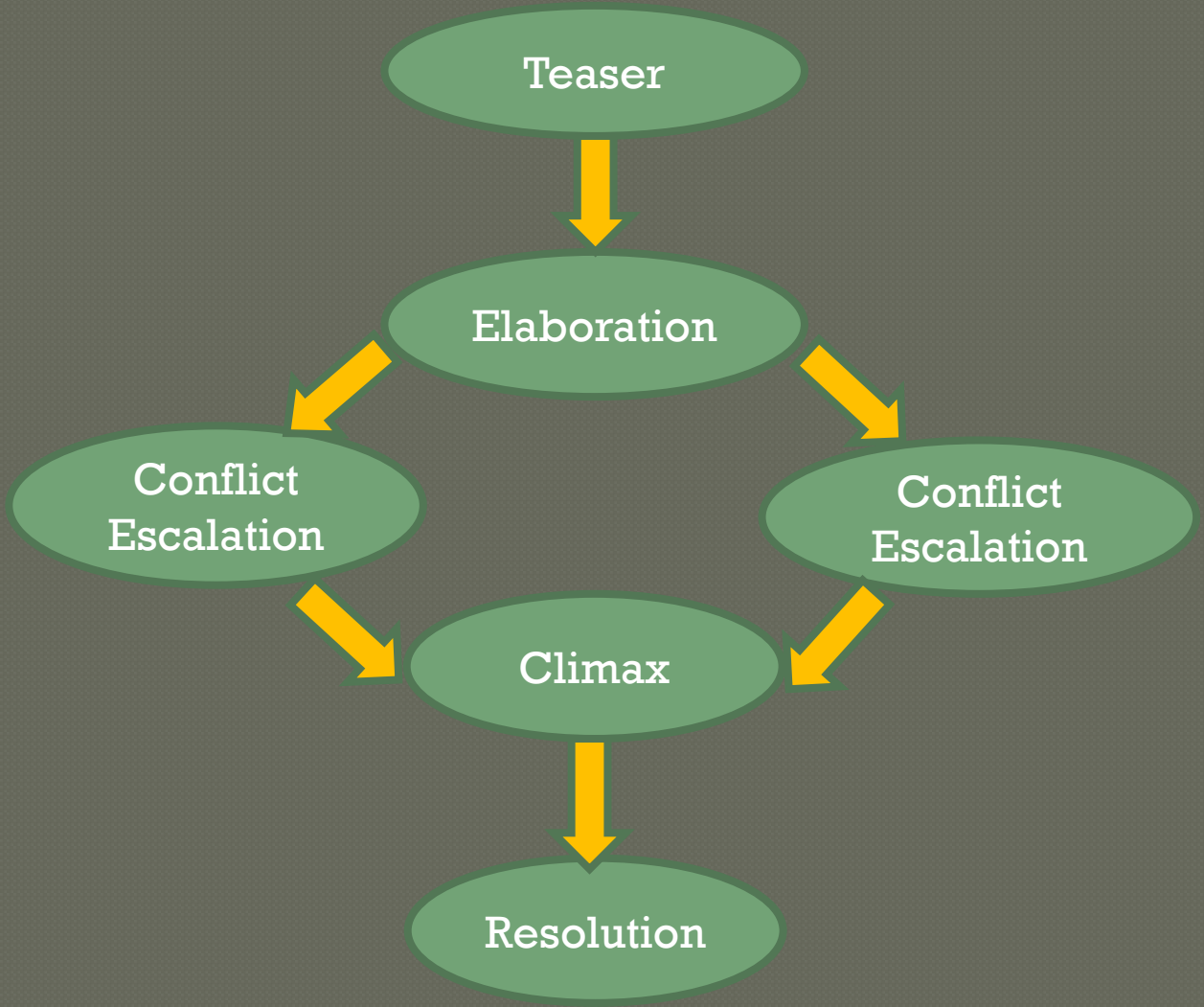
The Role of Narrative

- Model of classic linear fiction
  - "Such a structuring of events may even…be a standard model of human perception …From a position of ignorance the interactor is taken through a learning process that ends in a climax."

The Road not Taken - The Hows and Whys of Interactive Fiction
Jonas Heide Smith



The Game Tree



The Teaser

"the bad press I have been getting from the daily rag"

The Daily W

Sunday February 12, 2011

Cell Phone Battery Explosion

Mel Kardishan was at home sleeping when her daughter's cell phone exploded, spraying red-hot battery fragments onto a nearby doll and setting it aflame.

No one was injured in the Oct. 4 mishap at the family's North Shore home. But the Kardishans say the kiwi mobile device was to blame for a blaze that might easily have been much worse. "We were fortunate," Paige Kardishan said.

"We were able to contain the fire just to that area of the room.

Bad batteries have made 2011 a year of living dangerously with cell phones. Watchdog groups devoted to the safety of consumer products say they've fielded dozens of reports this year of kiwi mobile cell phone meltdowns that have resulted in injury and property damage.

Conclusion

you two have already taken up enough time … What issues have you found with the business and how do you think I can get this place back on top?

Demo

Evaluation Approaches

- Surveys
- Interviews
- Observations
- Log file analysis
- Classroom discussion
- Experiment (single player v. teamwork)

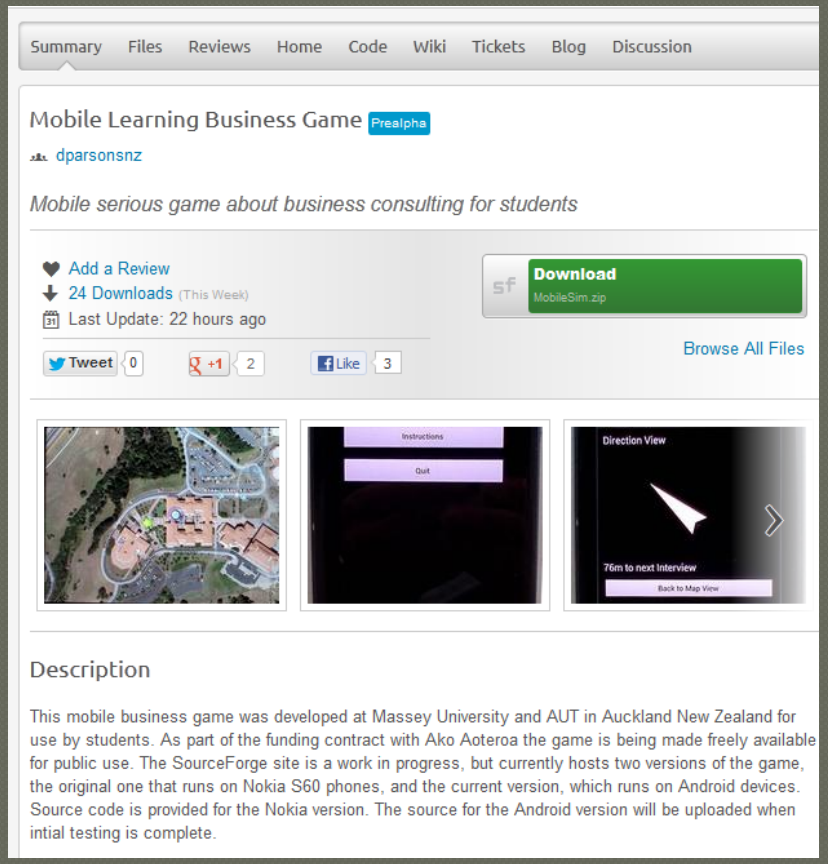
Current Status and Future Work

- Current:
  - Android version being refined and improved as on ongoing process
  - Game available via SourceForge open source project
- Future:
  - Build a configuration tool that can be used to more easily customize the application
  - Improve learning, assessment, monitoring features

SourceForge Site

- http://sourceforge.net/projects/mlearngame/

- Hosts old Nokia version and current Android version
- Android version runs on 2.2 or above



Related Publications

- Puja, J., & Parsons, D. (2011). A Location-Based Mobile Game for Business Education. In *Proceedings of 11th IEEE ICALT*, 141-144
- Parsons. D., Petrova, K., & Ryu, H. (2011). Designing Mobile Games for Engagement and Learning. *ICITA Journal of Information Technology and Applications*, 41-46
- Parsons, D., Petrova, K., & Ryu, H. (2012). Mobile Gaming - A Serious Business! In *Proceedings of 7th IEEE WMUTE*, 17-24