Designing Mobile Games for Engagement and Learning

David Parsons – Massey University, New Zealand
Krassie Petrova – AUT University, New Zealand

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 reality outdoor mobile learning game for 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)

Process

- Move around campus

User's current position

User's next position

- Locations represent parts of the company
- Pick up virtual and physical artifacts
  - Video, 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.
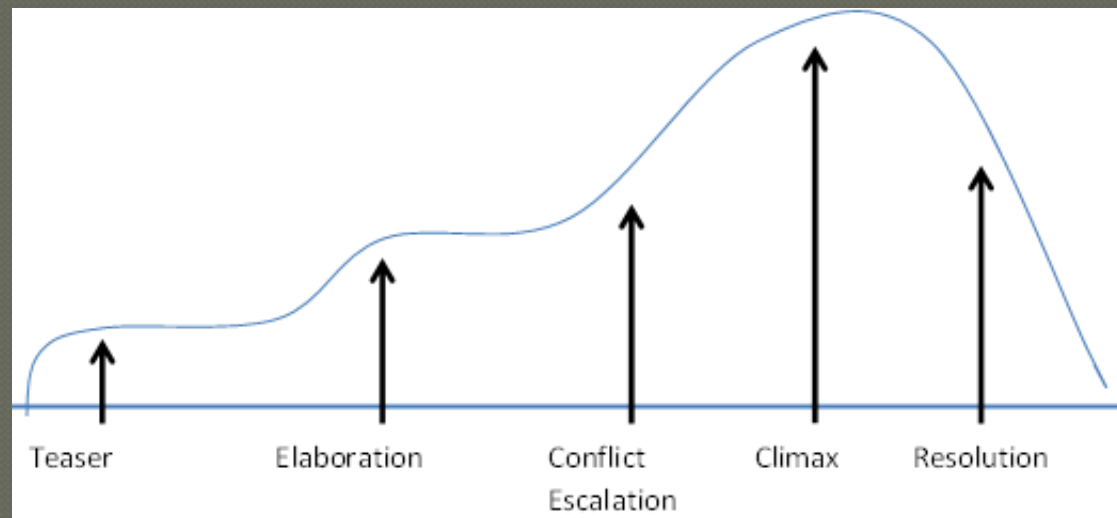 - The strategies chosen by each player determine the outcome of the game
- Associated with each possible outcome of the game is some kind of a payoff
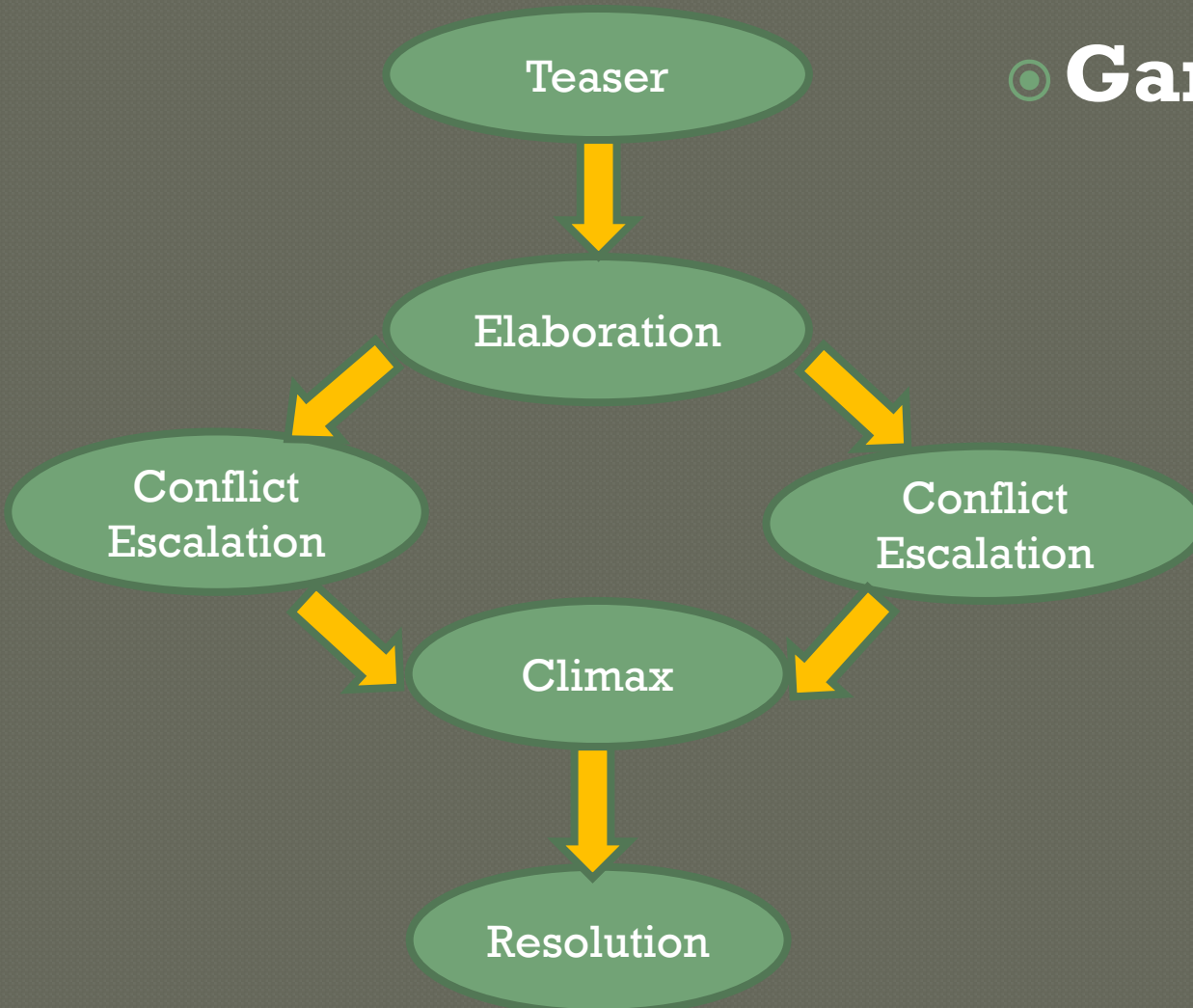
Narrative

- 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 Team Game Narrative

Teaser

↓

Elaboration

↙   ↘

Conflict Escalation   Conflict Escalation

↘   ↙

Climax

↓

Resolution

◉ **Game tree**

The Teaser

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

The Daily 𝕭

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.

The Elaboration

- "moaning developers … keep talking about fragmentation this and fragmentation that"

Conflict Escalation 1 - Marketing

Total number of Smart Phone Handsets released per year
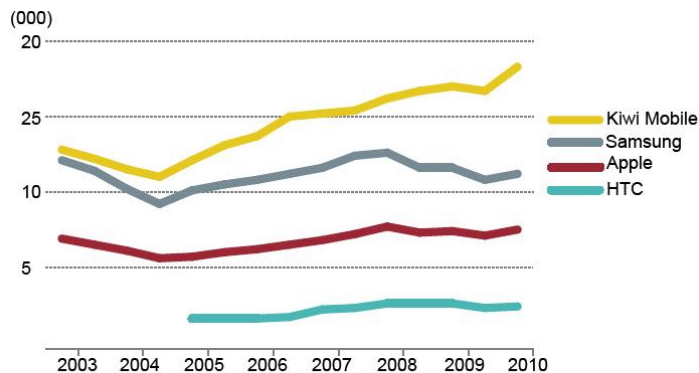
"So what if some of our products get returned or malfunction, look how many of them are released that are okay!"

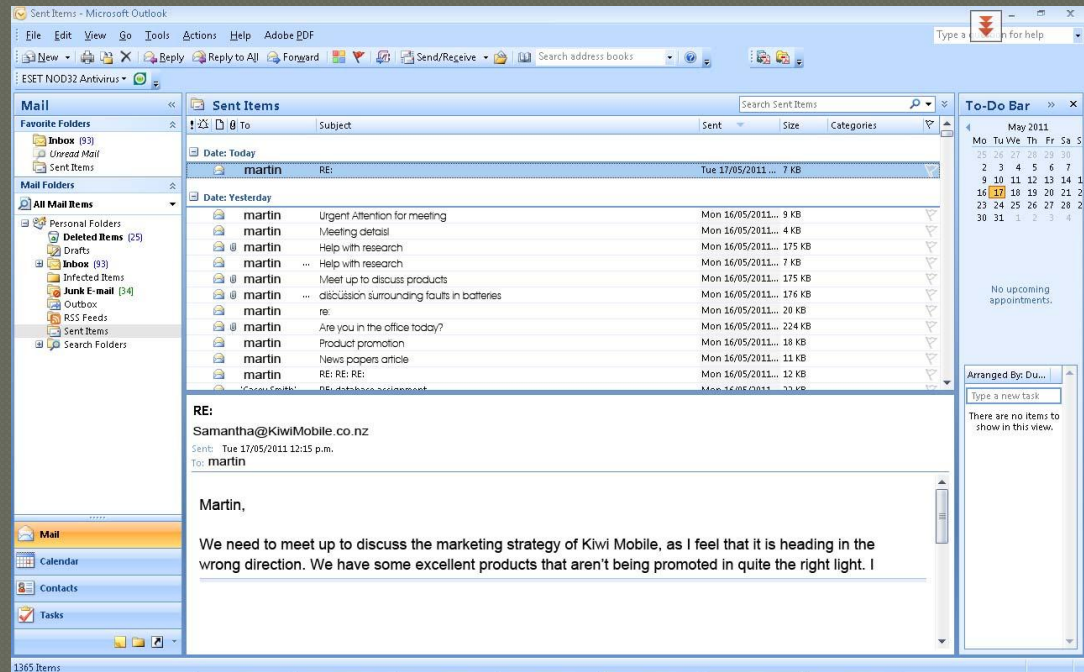"A potato is still a potato any way you dress it up, Samantha over at R&D has a lot to answer for!"

Conflict Escalation 2 – R&D

- "I was pushed out by Martin …I leave phone messages and emails constantly but he never gets back to me…the man is impossible."

Climax

"Jimmy dropped a pallet of batteries…"

Small Office

Main Office

Stock

Storage

Loading Bay

Red zones on the map indicate where battery stock has been dropped or accidents have occurred involving the storage of batteries. Reasons for accidents include lack of space in the warehouse, clutter of stock, and unorganised procedures and policies surrounding handling of stock.
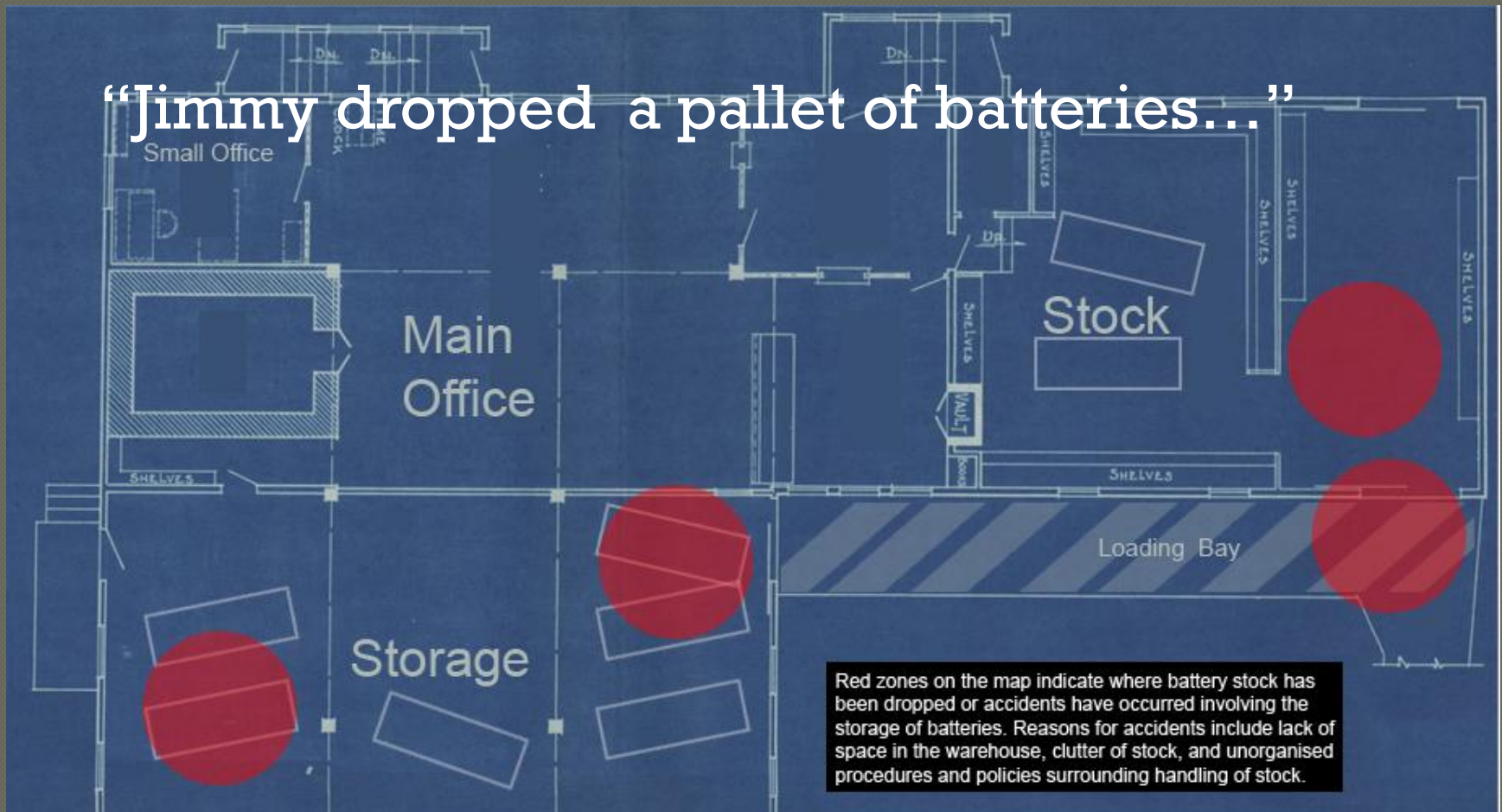
Conclusion

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?
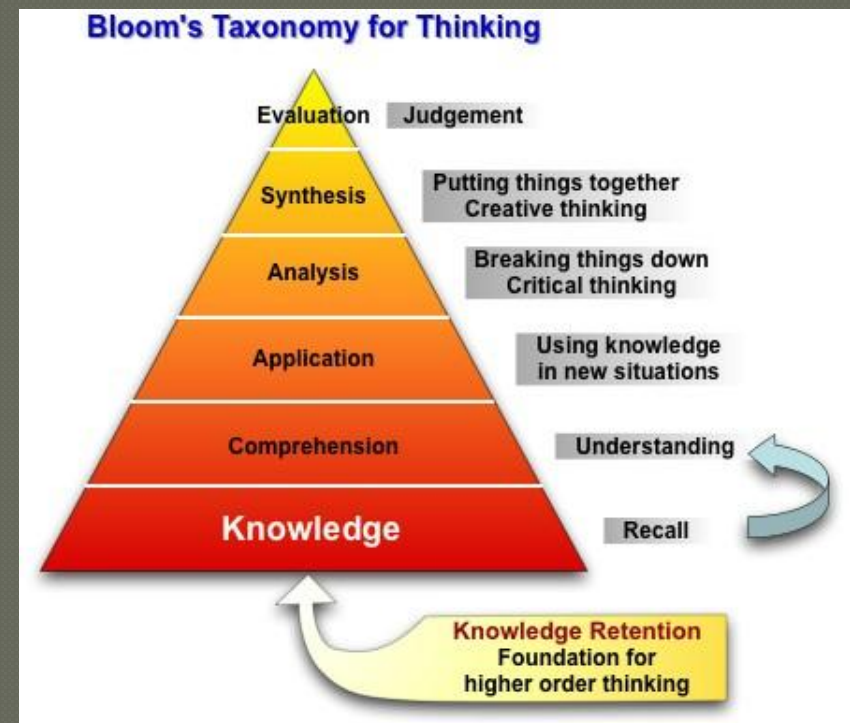
Higher level skills

- 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?

Bloom's Taxonomy for Thinking

Evaluation	Judgement
Synthesis	Putting things together / Creative thinking
Analysis	Breaking things down / Critical thinking
Application	Using knowledge in new situations
Comprehension	Understanding
Knowledge	Recall

Knowledge Retention Foundation for higher order thinking

Some Results

- Sample of 14 players of the game
- 7 point Likert scale
  - 'I found the game provided an enjoyable way to learn' (average 6.04)
  - 'I felt engaged in the activity of playing the game' (average 5.57).
- Interview comments:
  - "...good game ...playing it was awesome...The idea was wonderful..."
  - "...I liked it because it was a different way to go about solving problems."

Full Paper

- In proceedings of ICITA 2011

Current & Future Work

- Migrate application from Java ME to Android
- Build a configuration tool that can be used to customize the application
- Perform a a larger evaluation
- Create an open source project