Learning Games != Edutainment

Eric Klopfer

MIT Scheller Teacher Education Program (STEP)

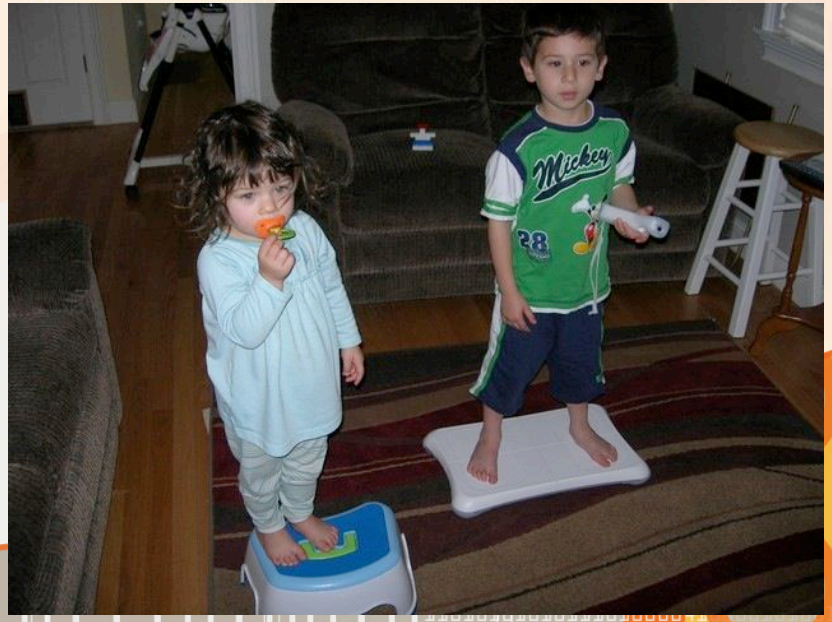
The Education Arcade (TEA)

STEP/TEA Pedagogical Frameworks

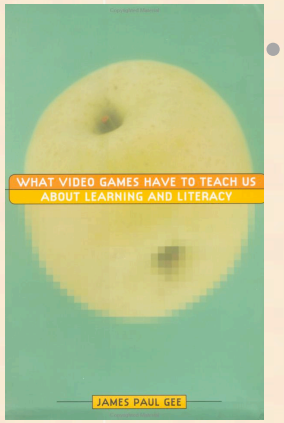
- **What kind of learning environments?**
  - Create highly **engaged**, motivated students
  - Provide **immersive** environments, **relevant** problems
  - Facilitate **collaborative, project-based** learning
  - Game-like, active, "**Hard Fun**"
    - A teacher heard one child using these words to describe the computer work: "It's fun. It's hard…" I have no doubt that this kid called the work fun because it was hard rather than in spite of being hard. [S. Papert, 2002]
  - Applicable to **formal** and **informal** settings, **extending learning** beyond walls of the school, beyond hours of the school-day

Why Games?

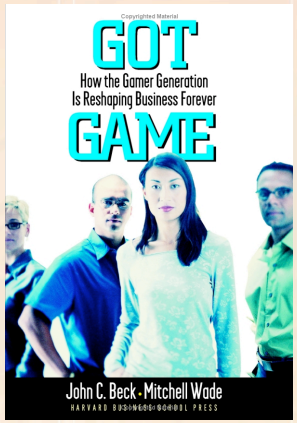
- Games model the way that **“good” learning** happens
- Need new technologies to teach **new ideas**
- The **gamer generation** is growing



Learning From Games



- **What Video Games Have to Teach Us About Learning and Literacy (Gee)**
  - Video games (even violent ones) model good learning

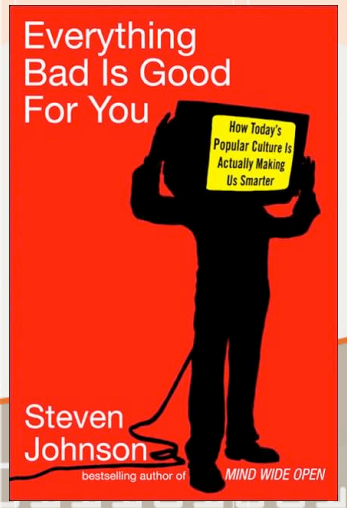


Got Game (Beck and Wade)

- People who grew up playing games are better adapted to the modern workplace

Everything Bad is Good for You (Johnson)

- Games involve critical thinking and problem solving - despite their image as "mindless"



Games? Learning?

Learning from Games

- The ability to **process information** very quickly
- The ability to determine what is and is not of **relevance** to them
- The ability to process information in **parallel**
- Familiarity with exploring information in a **non-linear** fashion
- A tendency to access information first through **imagery** and then use text
- Familiarity with non-geographically bounded **networks** of communication
  - Facer 2003

The Legacy of Math Blaster

- Edutainment
  - Where play is the **reward** for learning

  - Instead learning should be **playful**

The Legacy of Math Blaster

- Edutainment
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The Legacy of Math Blaster

- Edutainment
  - Gets kids to eat broccoli
  - But doesn't promote healthy eating
  - What happens when the chocolate goes away?

The Legacy of Math Blaster

- Instead learning should be **playful**

Making Real Learning Games

- New technologies and pedagogies can create learning opportunities that are simultaneously **fun** and **playful**
- Not just a superficial candy coating, they are linked at the deepest levels
- Games can engage players in learning that is specifically applicable to "**schooling**"

The Four Freedoms of Play

- Freedom to **Experiment**
  - One has some room to maneuver and invent new approaches to whatever task is at hand
- Freedom to **Fail**
  - One is free to do things at play that would look like failure in other contexts.
- Freedom to **Try on Identities**
  - One isn't simply examining the nature of worlds, but is exploring her identity in those worlds
- Freedom of **Effort**
  - One can alternate between intense effort and more relaxed play and reflection

Scot Osterweil

Games for Learning

- A game helps structure an experience, and ideally includes **open-ended play** and **structure and support** for learning

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The Fun of Structure

Structured, goal-oriented, feedback-driven can be fun

In games we willingly submit to arbitrary rules and structures in pursuit of mastery, but only if we can continue to be playful.

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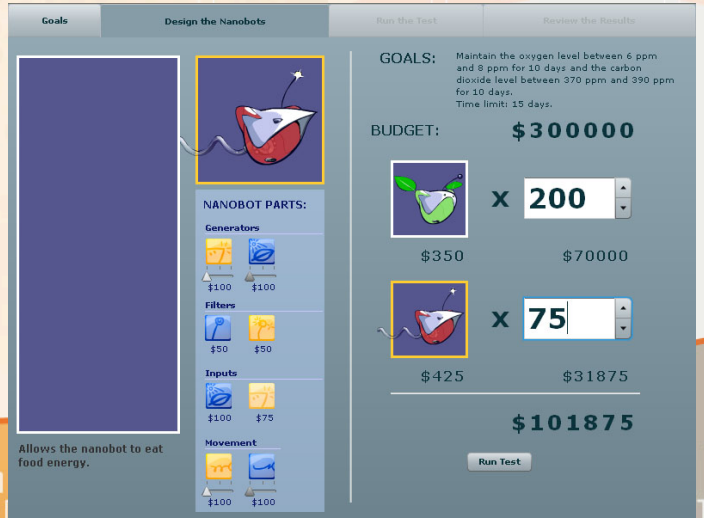
Learning Games!

- Learning games do not need to be
  - Big Budget 3D First Person Shooters



Learning Games!

- The Role of Narrative in Learning Games

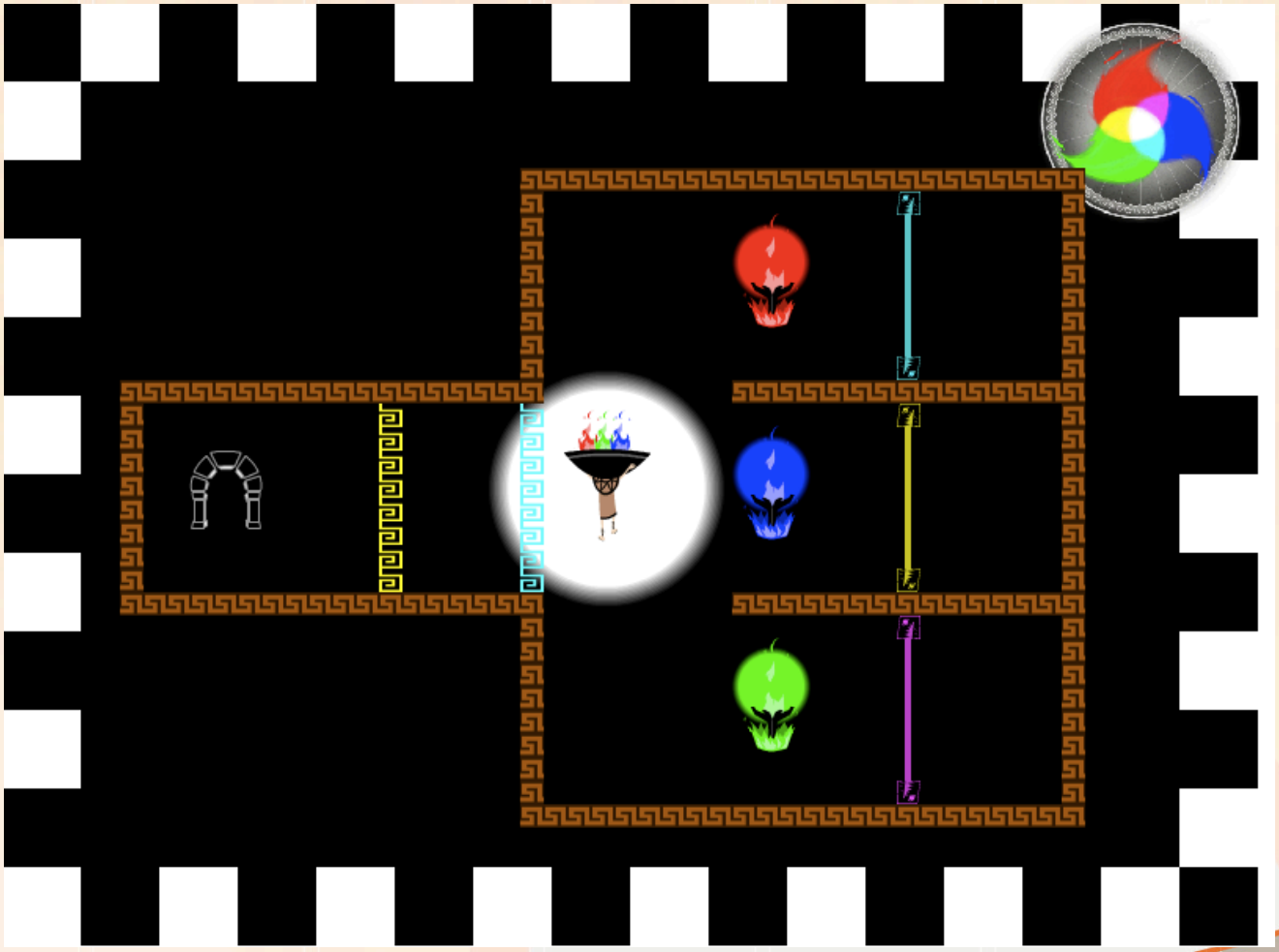
GAMBIT™
SINGAPORE-MIT GAMBIT GAME LAB

INDIE GAME CHALLENGE

Boston Indie Showcase

Learning Games!

- The Role of Narrative in Learning Games



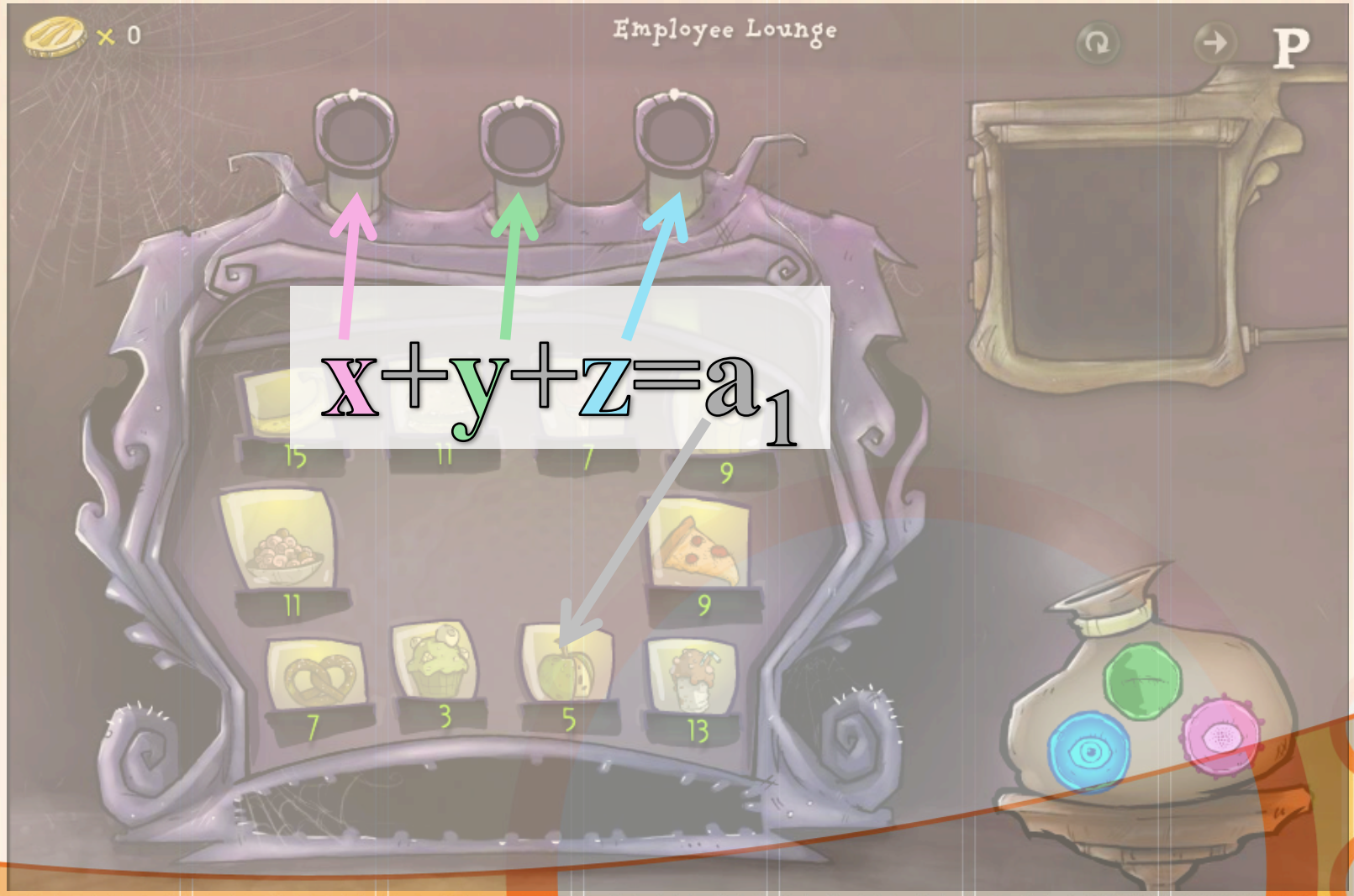
SINGAPORE-MIT GAMBIT GAME LAB

Learning Games!

- Learning games do not need to
  - Look like learning

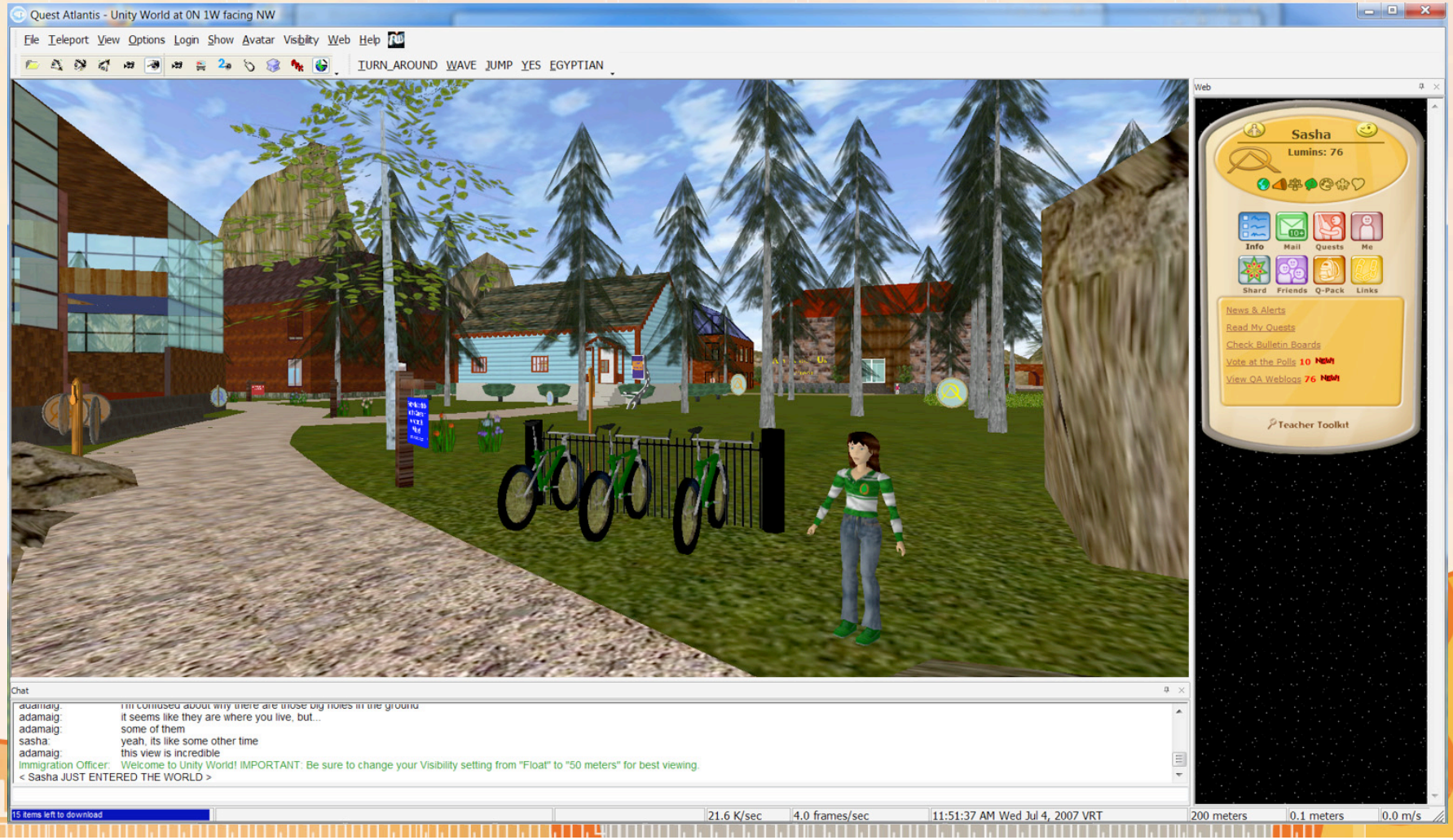
Learning Games!

- Formalizing Learning of Game Play



Learning Games!

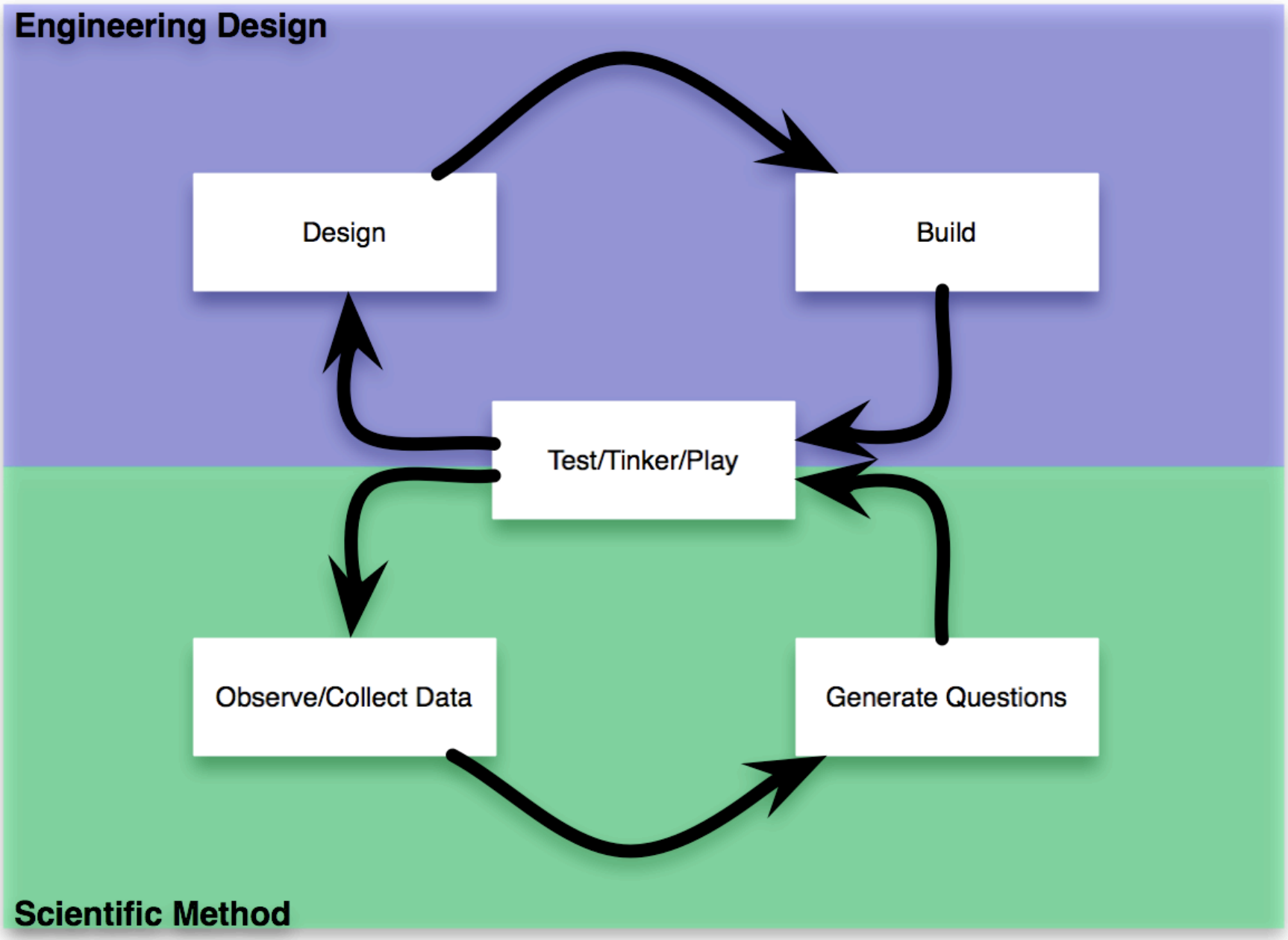
- Learning games do not need to be
  - Solitary pursuits ➔Social
    - *Case: Quest Atlantis (Indiana University)*



Learning Games!

- Learning games do not need to be
  - Created For You

Simulation Cycle



Learning Games Can be Mobile

- Rise of **mobile platforms** for video games
  - Nintendo DS, PSP, iPhone, etc.
  - $12 billion+ industry by 2014
  - 3 billion+ apps sold in the app store
  - >125 million Nintendo DSs sold

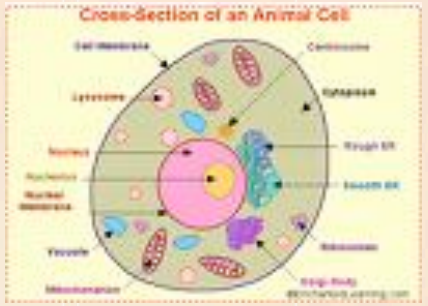
UbiqGames

- Mobile Web
- First Game
  - Pokemon + Weather Prediction
- Maintain creatures and battle creatures
- Impacted by “arena weather”

Weatherlings

UbiqBio

- Two year NIH-funded grant (began late 2009)
- Designed to promote both learning and engagement for high school intro biology students
- Provides a series of four related, but independent games
- Delivers anytime, anywhere learning in Ubiq model….
  - Optimized for mobile browsers, also playable on standard desktop browsers



Getting Learning Games Outside

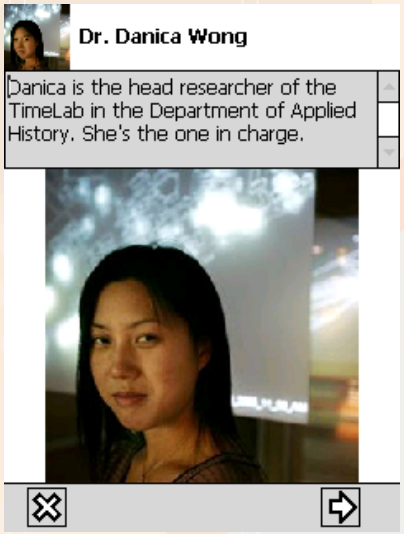
Augmented Reality

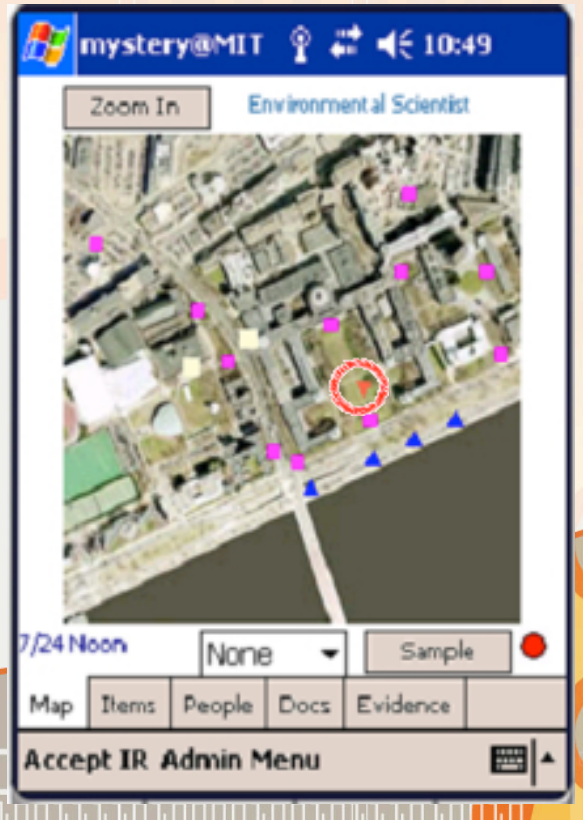
Computer simulation on mobile device triggered by real world context

- Combines physical & virtual world contexts
- Embeds learners in authentic situations
- Engages users in a socially facilitated context

AR Example

- "Environmental Detectives"
  - Players briefed about rash of local **health problems linked to the environment**
  - Need to determine source of pollution by **drilling sampling wells**, **interviewing virtual witnesses**





AR: Environmental Detectives

- **First groups of students (MIT)**
  - Tried to plan strategies for sampling
  - Competed with each other sometimes and collaborated others
  - Evaluated incoming information
  - Wanted to come up with the “best” solution
  - Used previous experience to optimize in the face of constraints
- **Second group of students (HS Field Trip)**
  - Tried to collect as many points as they could
  - Planned route from one point to the next based on proximity
  - Wanted to complete the experience

AR: Environmental Detectives

- Was this a game…
  - for the MIT students?
  - for the HS students?
- Does it matter..
  - for learning through play?
  - for learning by design?
  - for engagement?

Gaminess

- What features are important to **structure** games?
  - Interesting **decisions** (*Sid Meier*)
  - **Consequences** to decisions (*+/- value*)
  - Clearly defined **goals** (*rules/constraints*)
  - Visible measurable **feedback** (*quantifiable outcome*)
  - Underlying **model**/system (*coherent system of rules*)

Gaminess

- For the MIT students…
  - Interesting **decisions** ☑
  - **Consequences** to decisions (+/-) ☑
  - Clearly defined **goals** ☑
  - Visible measurable **feedback** ☒
  - Underlying **model**/system ☒

Gaminess

- For the HS students…
  - Interesting **decisions** ☑
  - **Consequences** to decisions (+/-) ☒
  - Clearly defined **goals** ☒
  - Visible measurable **feedback** ☒
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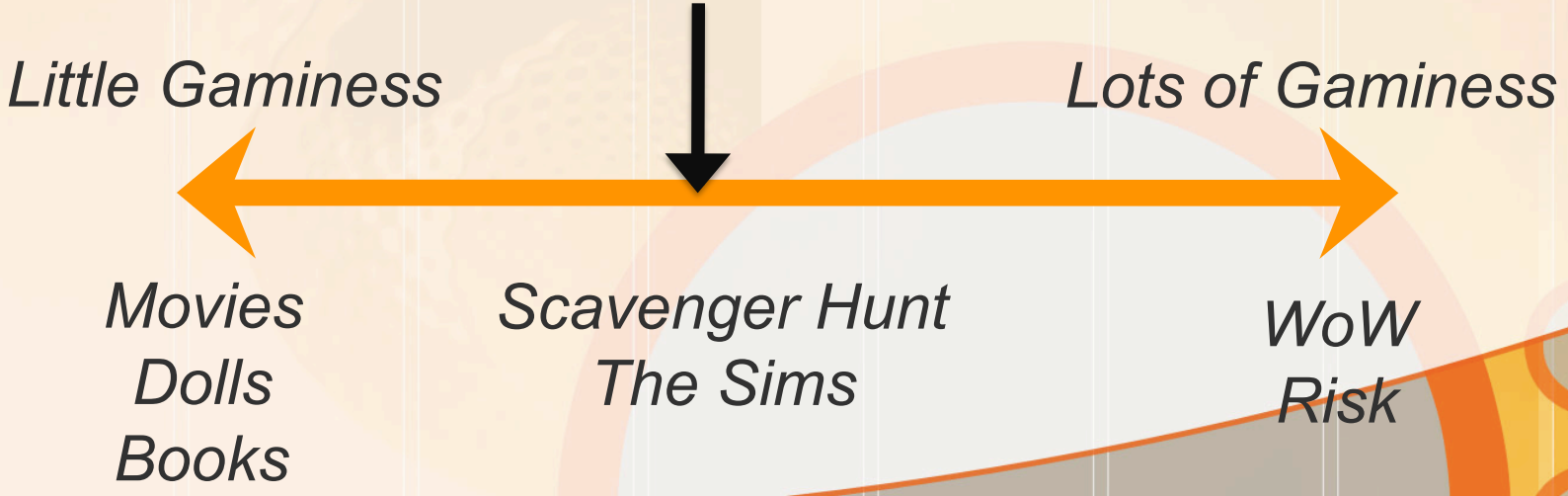


Games for Learning

- A library ***can*** be a great place to learn
- There are many choices and a lot of knowledge

Games for Learning

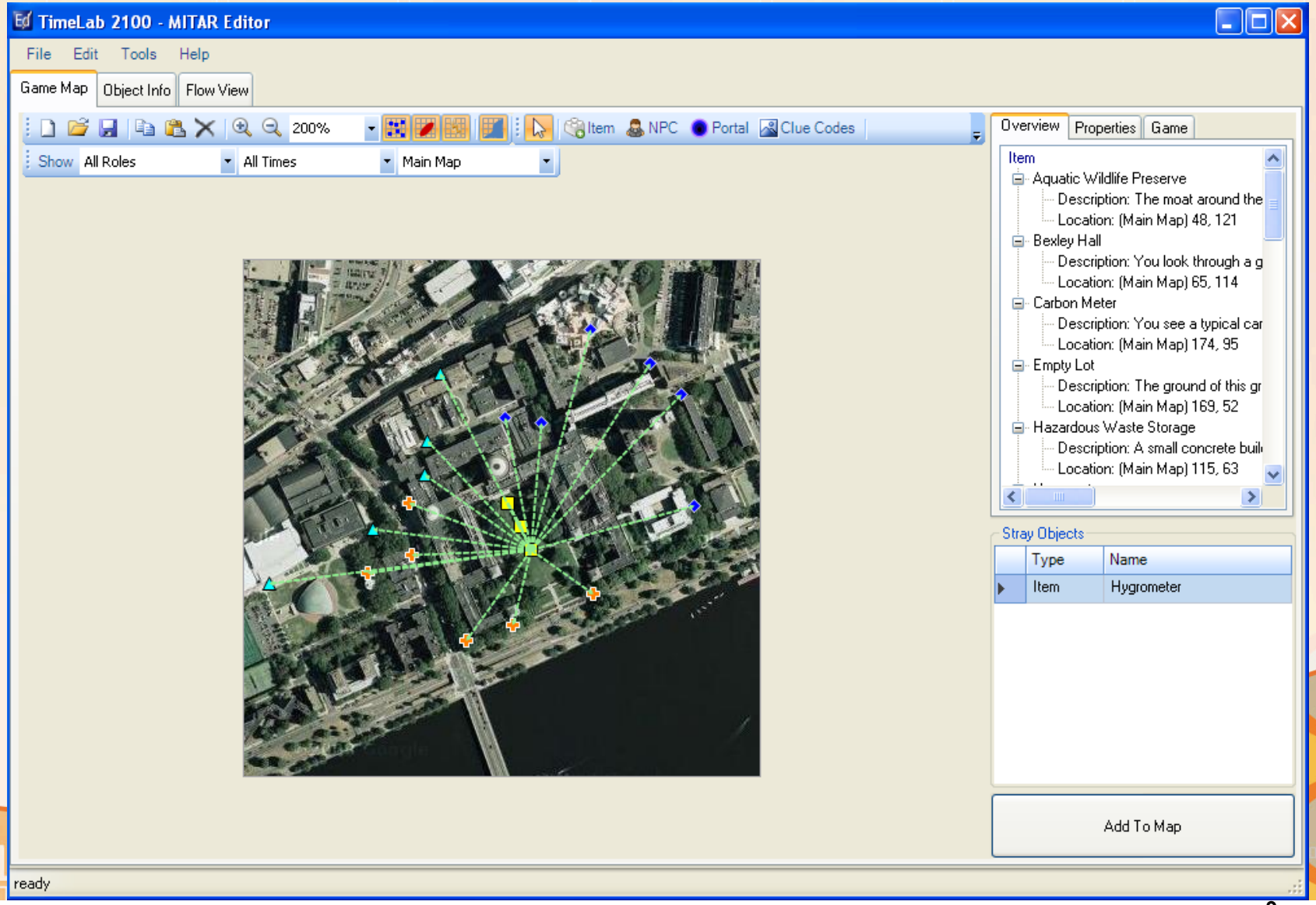
- For some kids/learners that is enough
  - E.g. Ok class – go learn something…

Games for Learning

- For others, without some structure (goals) they won't know where to begin
  - E.g. Research how your favorite 20th c. author started writing.

Enhancing Games and Learning

- Design and construct games with more complex decisions and tradeoffs.



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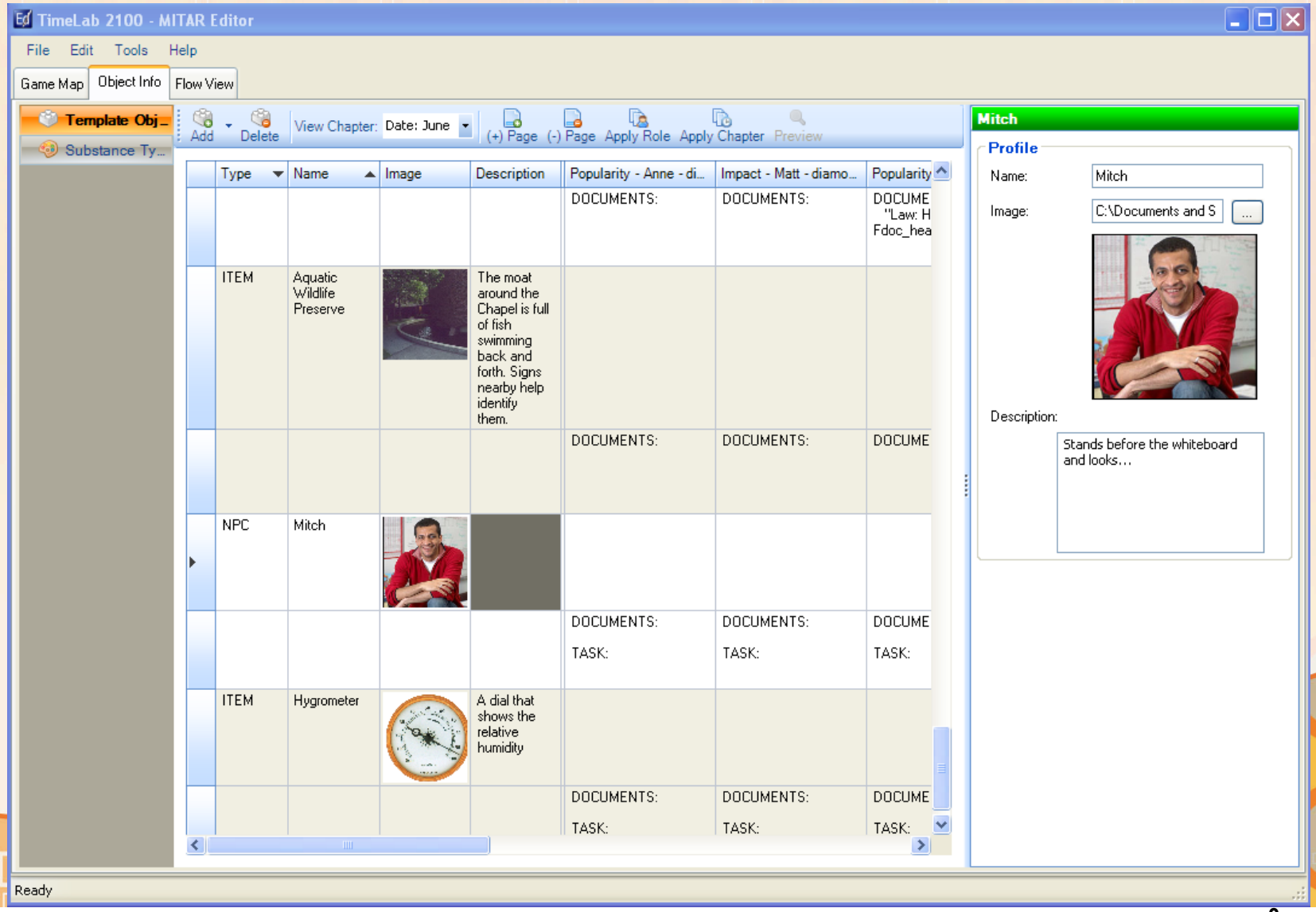

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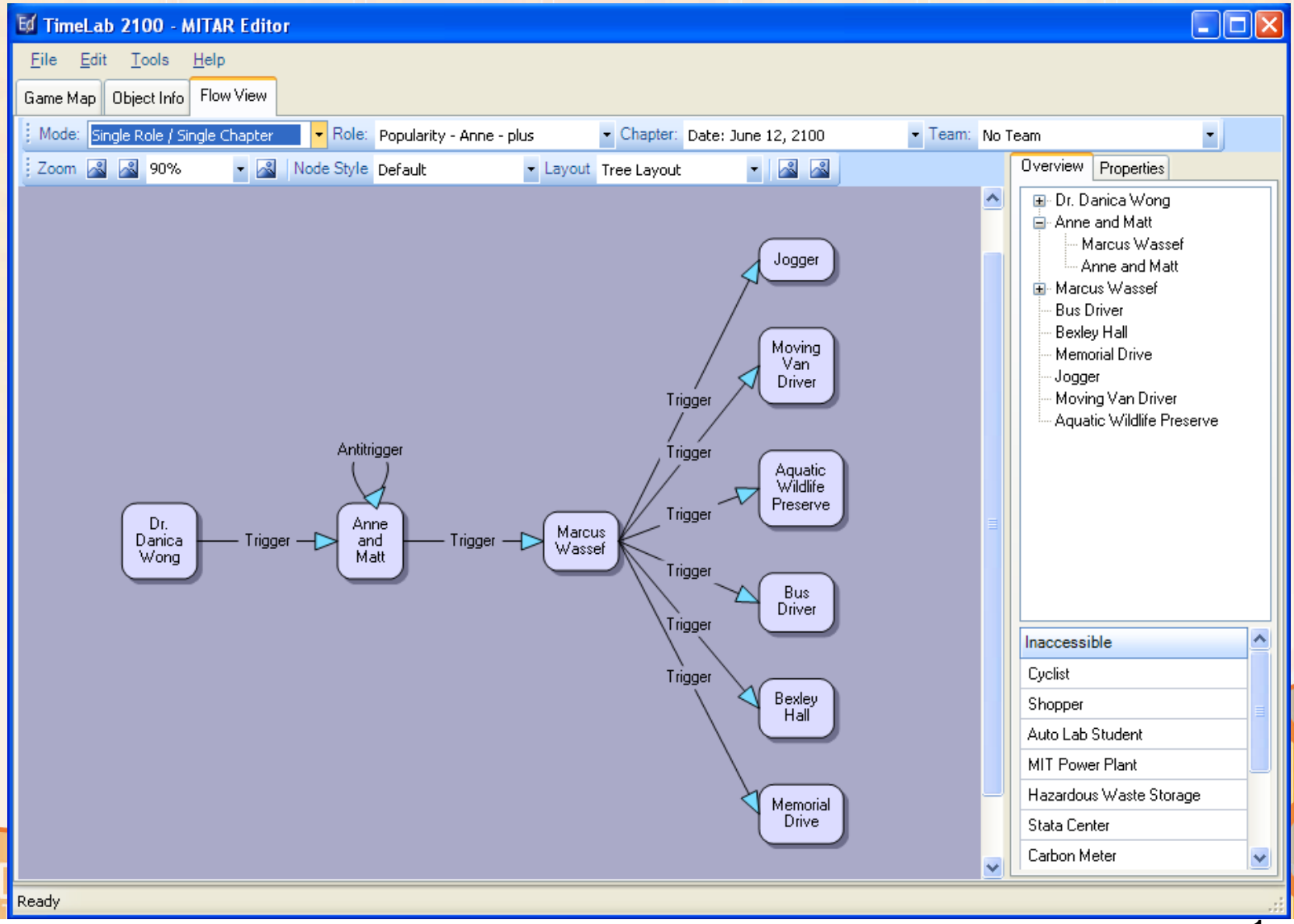
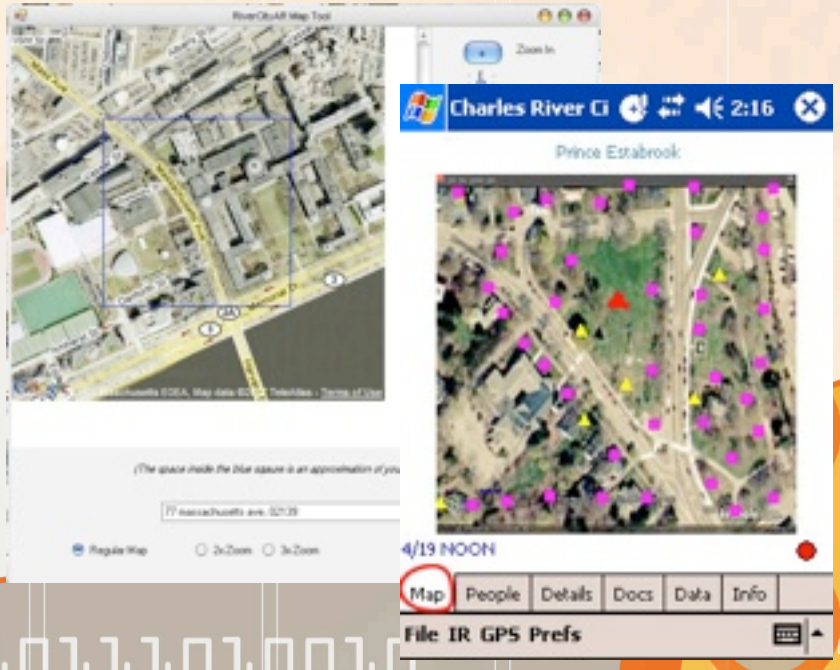


AR Games Diversity

- **Across wide range of subjects…**
  - **Public Health/Disease Outbreak** (Charles RiverCity & Avian Bird Flu)
  - **Forensics** (Mad City Murder)
  - **Historical Exploration** (Battle of Lexington)
  - **Mathematics** (Alien Contact)
  - **Economics** (Hip-Hop Tycoon)
- **…across locations**
  - Local Communities (e.g., geographical tours)
  - Schools
  - Museums
  - Science Centers
  - Zoos/Nature Conserves
- **…and across time**
  - Beyond normal “class time”
  - Over extended period of time

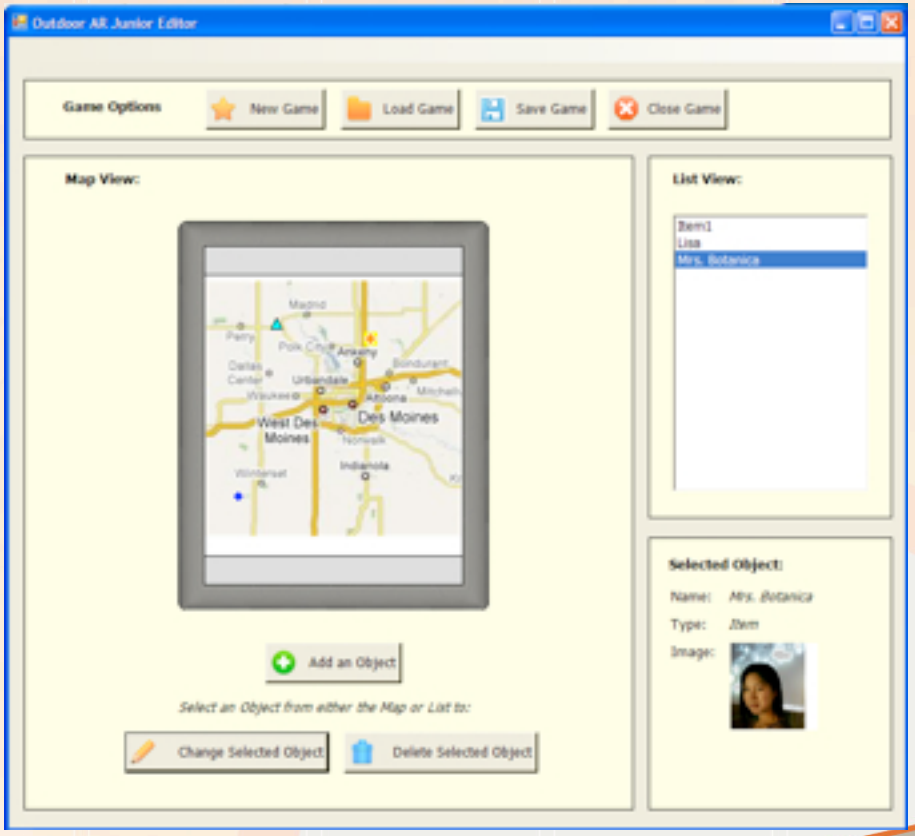


Enabling Kids to Create Games

- Desire to open up game building to broader audience for anchored scalability and learning
  - Educators
  - Designers
  - Kids
- Need to reduce
  - Complexity
  - Time
  - Cognitive load
- Need to keep
  - Critical thinking, planning, connection to community

Game Builder

- Reduce complexity (constrain choices)
  - Make a particular type of game



Gaminess

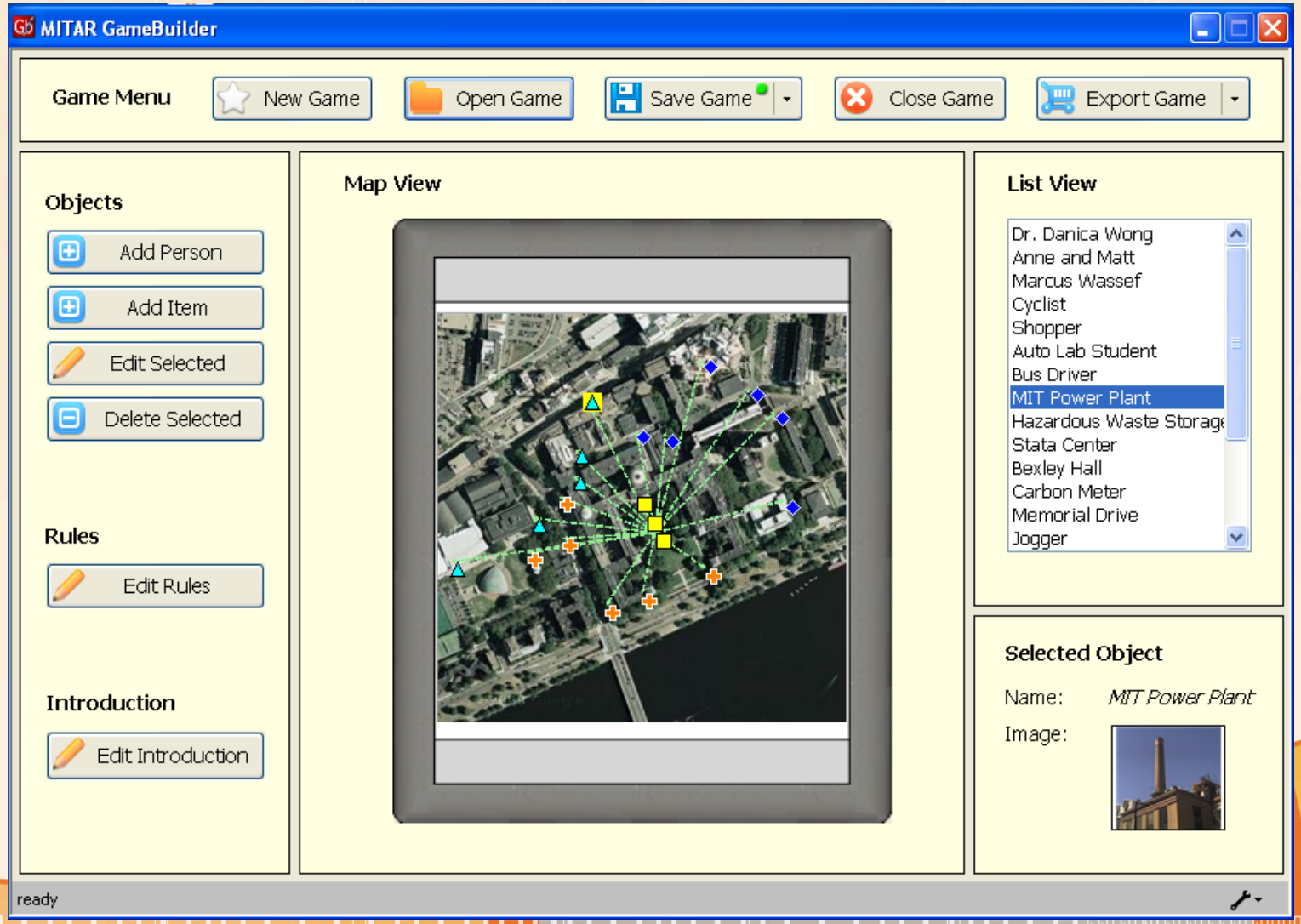
designing

- What features are important in games?
  - **Creating** interesting decisions
  - **Considering** consequences to decisions (+/-)
  - **Providing** clearly defined goals
  - **Illustrating** visible measurable feedback
  - **Modeling** the underlying system

Little Gaminess ⟷ *Lots of Gaminess*

Enabling Game Creation

- Rules allow triggering of events



Gaminess

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Little Gaminess ⟷ *Lots of Gaminess*

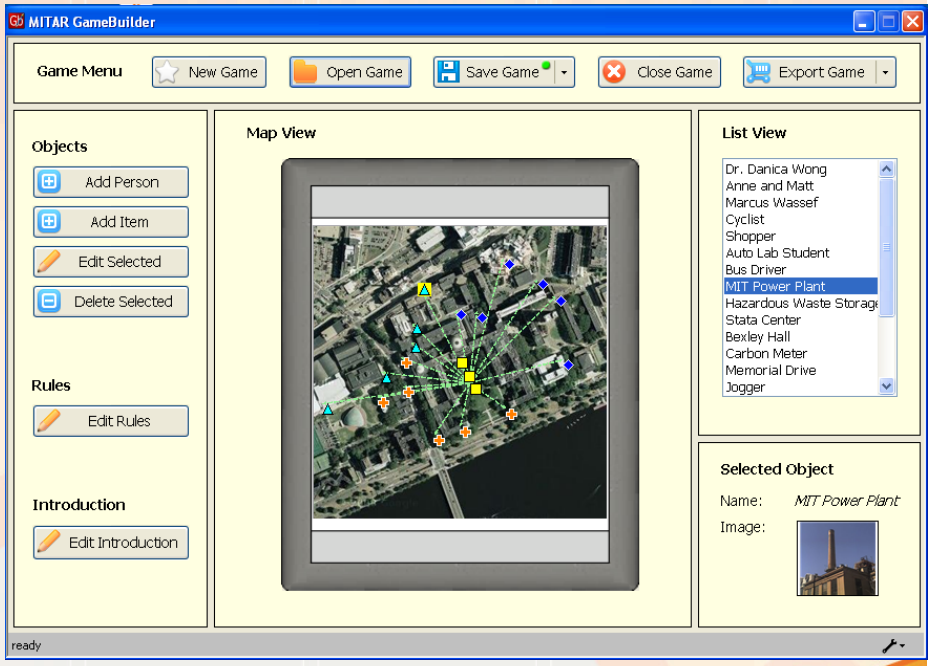
CSI

Do you like video games and technology?

Do you want to make a real difference in your neighborhood?

Either way, Community Science Investigators (CSI) is for you. You'll learn about what's happening in your neighborhood through a new kind of game, and then use computer tools to go deeper. Before long, you'll be an expert, working on projects that make a difference, and making your own computer games to teach other people what you learned.

CSI is looking for middle school students who like technology and the idea of using technology to make a difference. This free program consists of weekly after-school sessions and an intensive summer program in 2010. To register, fill out the registration form on the back of this flyer and return it to the contact named below.



CSI Community Science Investigators

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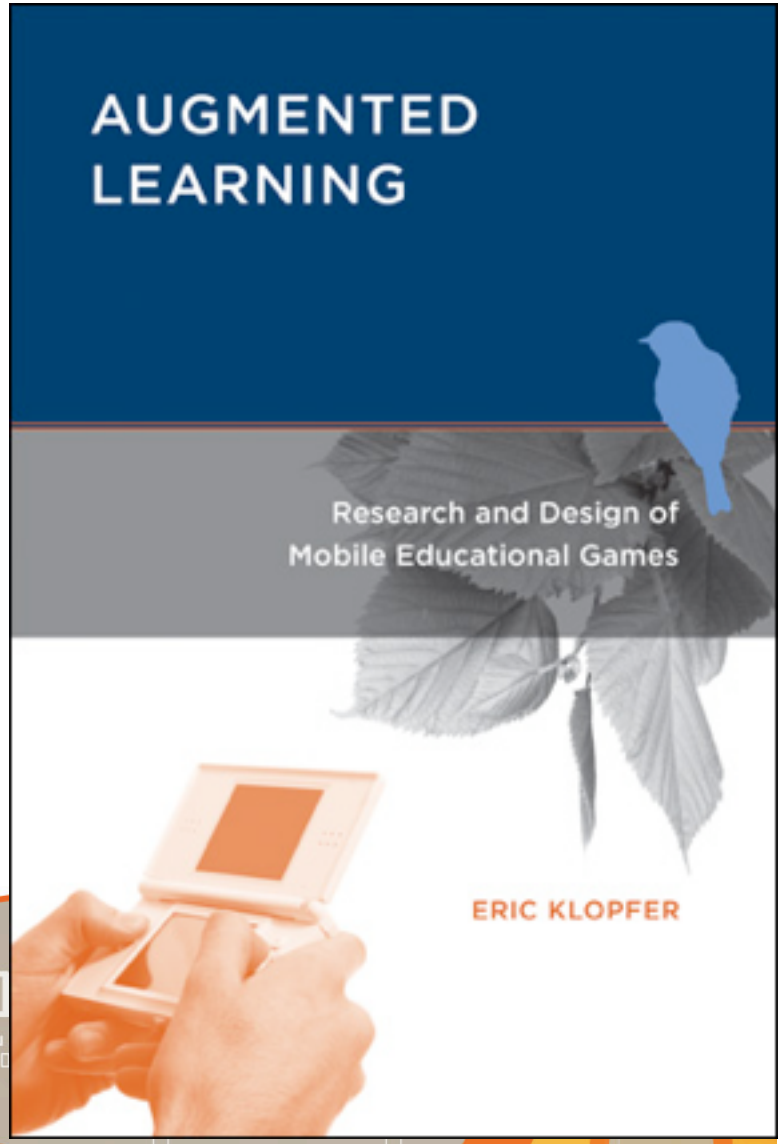

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