What am I playing Now?
"Most of us prefer to walk backward into the future, a posture that may be uncomfortable but which at least allows us to keep on looking at familiar things as long as we can."

~ Charles Handy
Formal education moves at geological speeds, and that’s lucky for us....
because games for learning really aren’t ready for prime time, and it’s not for the first time.
During the ‘Edutainment Era’ of the 1980s and 1990s computer games were proclaimed as the modern solution to all our educational ills.
In order to take advantage of this great technology.....
....all we needed to do was wrap a game around a lesson (or worksheet), ....
.... like so ....
.... and it would magically become fun.
This, of course, is not true, and the resultant fall from grace left many educational game proponents reeling.
We now have a second chance, and we need to make sure we don’t fall into the same trap again.
The game evangelists are valuable to be sure...
but we need to be realistic,
and if we don’t have enough games out there that live up to the hype,
the idea of using games to teach will once again become a pariah,
and the likelihood of a third chance is slim.
So,

how do we make it right this time?
The Plan

- Looking Back [The Edutainment Era]
- Taking Stock [What Have We Learned?]
- New Aims [What Do We Still Need?]
- Reloading [Where Are We Now?]
Step 1: Understand what happened last time.

A brief look at......
The Edutainment Era

Step 1: Understanding what happened last time.
What is Edutainment?

Educators: edutainment = educational games

Game Developers: edutainment = an insult
The 1970s

Definitions & Attitudes

- Digital games in infancy
- Excitement over new medium

Commercial Examples:

- Pac-Man, Tetris, Pong

Educational Examples:

- Math Fun!
- Brain Games
- Math-A-Magic!
- Hangman
Definitions & Attitudes
- Digital games in infancy
- Alessi & Trollip [1985]
- Richard E. Clark [1983]
- Excitement over new medium continues
- Start of EdTech boom
- “tech is cool”

Commercial Examples:
- Super Mario Bros.,
  Legend of Zelda (OoT)

Educational Games
- States and Capitals
- Dragon’s Keep
- PET Nuclear Power Plant
- Mathblaster
- Reader Rabbit

The 1980s
According to Alessi & Trollip

Simulations

Chapter 9
- Increase motivation
- Increase transfer
- Efficiency of transfer
- Uses the full power of the computer
- Often better than the real world
  - Safety
  - Control over aspects of reality – time; frequency of occurrence; distractions; less expensive; etc.
- Offers more instructionality

Games

Chapter 10
- Much like simulations
- Powerful learning tools
- Increase motivation and focus
- Teacher is not the only judge of performance
- Difference: optional input by opponent
- It is not the game (wrapper) that makes it effective – it is the challenge
Definitions & Attitudes

See:
- Alessi & Trollip [1991]
- Robert Kozma [1991]
- Richard Clark [1994]
- Robert Kozma [1994]
- Gredler [1996]

Comemrcial Examples

- Myst, Monkey Island, Street Fighter, Final Fantasy, Mario Kart
- Carmen Sandiego
- Mario is Missing [note]
- Oregon Trail
- Toggle Trouble Math

The 1990s
Simulations

Chapter 4
• Better than tutorials and drills
• PLUS all the stuff they said before

Games

Chapter 5
• May or may not simulate reality
• Provide entertaining challenges
• PLUS everything they said before

According to Alessi & Trollip
Simulation =

- Must be complex & REAL (referred to as fidelity or validity)
- Participants have defined roles
- Data-rich environment, where students can execute range of strategies
- Feedback is in form of changes to situation
- Learning model is educational objective
- Understanding the model is the goal

Game =

- Learning embedded in game, not part of it
- Has rules, winning is important
- Winning should not have random factor
- No distracting bells and whistles
- Include directions in booklets
- Students shouldn’t lose points when wrong
- Games rarely played differently from the way they were intended.
- Winning will take precedence over experimenting
- Games are less efficient learning models than other methodologies
- Educators have negative beliefs about games

According to Gredler


1996
Definitions & Attitudes

See:
- Alessi & Trollip [2001]
- Gredler [2004]

Commercial Examples

- Half-Life, Deus Ex, Chrono Cross, Everquest, Pikmin, Metroid Prime, Need for Speed

Educational Examples

- Zoombinis, Jerusalem, Real Lives, Zoo Tycoon

Educational Software

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Retail Sales</th>
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</thead>
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<td>'01</td>
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<td>'02</td>
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<tr>
<td>'03</td>
<td>$200</td>
</tr>
<tr>
<td>'04</td>
<td>$100</td>
</tr>
</tbody>
</table>

Source: NPD Group

Simulations

Chapter 7
- All they said before
- Most challenging of all methodologies to design
  - Need to know: content; learners; many complexities; sophisticated programming;

According to Alessi & Trollip

Games

Chapter 8
- Called ‘edutainment’
- Mostly repetitive practice
- Focus is now on the motivational qualities of games
- Hard to make games
  - Must
    - Have worthwhile learning objectives
    - Be fun
    - Game goals must reinforce learning goals
  - Requires significant effort
Definitions & Attitudes

- Richard E. Clark [2007]
- AECT [2008]
  No Games or Sims….
  “Modeling Technologies”
- “As a parent I object to having my child “play” on the computer when he has completed some piece of work. I want my kids working at school. I can use computer games at home for there (sic.) entertainment. I also think that “edutainment” as a name is attempting to give computer games some degree of educational value. My students come to school to learn not to be entertained. Would you want your university profs. entertaining you?” – teacher, 2005

Commercial Examples

- Nintendogs, Eve, Lineage, Guitar Hero, Call of Duty, Elder Scrolls Oblivion, Spore, Grand Theft Auto, Portal

Educational Examples

- Stalin’s Dilemma, Killer Flu, Textrolpolis, Harpooned, Wii Fit
Attitudes

- AECT [2014]
  - Model-Based Instruction
  - Immersive Simulations
  - Game Based Learning
- Mobile
- Short Form & Mini Games
- Viable Supplement

2010s (now)

Educational Examples

- Sweatshop, Professor Layton, Poverty is Not a Game, Seismic Duck, Spent, Osy Osmosis
Fast-Forward ....
What Have We Learned?

What to Do & What to Avoid
What Have We Learned?

Good....

Bad....

- Integration of Learning
- Wrapping a Lesson in a Game
What Have We Learned?

Good....

- Integration of Learning VS Wrapping a Lesson in a Game
- Attention to Detail VS Cheap production
What Have We Learned?

Good....

- Integration of Learning vs. Wrapping a Lesson in a Game
- Attention to Detail vs. Cheap production
- Robust vs. Glitchy

Bad....
What Have We Learned?

Good...

- Integration of Learning and Game Goals
- Attention to Detail
- Robust
- Easy to Use

Bad...

- Wrapping a Lesson in a Game
- Cheap production
- Glitchy
- Demanding (time, resources,...)
What Have We Learned?

Good....
- Integration of Learning and Game Goals
- Attention to Detail
- Robust
- Easy to Use
- Clear Goals

Bad....
- Wrapping a Lesson in a Game
- Cheap production
- Glitchy
- Demanding (time, resources,...)
- Mystery / Random Play
What Have We Learned?

Good....
- Integration of Learning and Game Goals
- Attention to Detail
- Robust
- Easy to Use
- Clear Goals
- Integration of Learning and Game Goals II

Bad....
- Wrapping a Lesson in a Game
- Cheap production
- Glitchy
- Demanding (time, resources,....)
- Mystery / Random Play
- POP-Ups / Too Much Text
And Three More:
(Of My Own)

1. Decorative Media Principle
2. Becker's Lazy Test
3. Magic Bullet

What Have We Learned?
Promotes:

• Scaffolding
• Interest
• Cues (mnemonics)
• Mental Model Formation

Decorative Media Principle
• VIDEO: all about visual
• Games: about interaction

Linear vs. Interactive Media
Attractive = Good

Decorative Media Trap
Greetings, Earthlings!

I am Zorf Spudnik, cyberspace Patroller. My friends, the three CyberPigs, are about to head off into cyberspace for an afternoon of online fun and games. Come along and help them learn how to protect their privacy in cyberspace – and see how many Privacy Stars they collect along the way.

Ok so far..
Cyberquiz - Question 1

Child of Earth, is it logical for Lil to give out all that information about herself to enter a contest?

Privacy Playground
The First Adventure of the Three CyberPigs © 2005 Media Awareness Network

THIS is the game ?!
SOMEONE PUT EMPTY CANDY WRAPPERS
BACK IN THE BAG

Decorative Media Trap
Wrapper
Different Wrapper
We reviewed each of these games to make sure that they provide students with skill development and critical thinking sequences.
Save the World
22 mutations occurred in the left DNA-molecule and 20 occurred in the right DNA-molecule. Up to three mutations are accepted. No DNA helices are created.

In reality only three mutations are accepted in the human genome. Three faults out of three billion possible...
Hi and welcome to the emergency department at this hospital.

Your challenge is to save three patients who have been in a car accident and need blood transfusions. It is your job to blood type each patient and give them the correct blood. Each patient has a "health meter" displayed that monitors their condition during blood transfusion. Try to avoid making mistakes or the patient’s condition will deteriorate! If you make no mistakes you will get all five out of five blood drops in the end.

→ Proceed

Doing it right...
Doing it right…
Becker's Lazy Test (BLT)

Is it possible to get through the game without learning anything?
Passing the BLT
The Magic Bullet

A lens through which to examine learning in a game.
All learning in a game can be classified in one (or more) categories.

Four criteria for assessment in digital games:
1. Things We Can Learn
2. Things We Must Learn
3. Collateral Learning
4. External Learning
Deliberately designed by those who created the game
Includes things designers *hope* people will take up
Includes game-specific objectives as well as general ones

Things I Can Learn

<table>
<thead>
<tr>
<th>Magic Bullet Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Things I CAN learn. (Field)</td>
</tr>
<tr>
<td>Things I MUST learn. (Core Learning)</td>
</tr>
<tr>
<td>External Learning (Scaffolding)</td>
</tr>
<tr>
<td>Collateral Learning (Incidental Learning)</td>
</tr>
</tbody>
</table>

© K.Becker 2013
Should (normally) be a subset of the first category

Required in order to achieve a specific goal or to win

Includes strategy

Things I MUST Learn

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<td>External Learning (Scaffolding)</td>
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<tr>
<td>Collateral Learning (Incidental Learning)</td>
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</tbody>
</table>
Other things we can learn

these are not necessarily designed into the game, although sometimes designers may hope that players choose to take these up

Have NO impact on success in the game

Collateral Learning
Not technically considered part of the normal gameplay CAN impact success in the game. Includes social learning and outside communities. Also includes Cheats:

- typically designed into the game for testing purposes
- often left in the game once it ships
- deliberate design elements on the part of the designers

External Learning
Variations on a Theme.
Where We Are Now?

Step 2: Taking Stock
How frequently do students use digital games in your classroom?

- **Every day**: 9%
- **2 to 4 days per week**: 23%
- **About once per week**: 23%
- **2 to 3 times per month**: 13%
- **About once a month**: 12%
- **Once every couple of months**: 11%
- **Once or twice a year**: 10%

55% have students play games at least weekly

gamesandlearning.org

Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See gamesandlearning.org

Among K–8 teachers who use digital games in teaching (N=513)
Participants were asked to check all that apply
**How do you typically have your students use digital games?**

- Alone/Individually: 30%
- In small groups of 3 to 5 students: 20%
- At home for homework: 5%
- As a full class lesson or assigned activity: 14%
- With another classmate: 14%

*Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See gamesandlearning.org*  

**What devices do students typically use to access digital games in your classroom?**

- Mac or PC computer: 72%
- Interactive whiteboard: 41%
- Tablet: 39%
- Chromebook or netbook: 9%
- Mobile or smartphone: 9%
- TV gaming console: 7%
- Portable gaming device: 6%
- Other: 2%

*Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See gamesandlearning.org*  

**1/3 Solo ; ½ Group; Mostly PCs**
When you select games to use with your students, what influences your decision?

- What other teachers say about the game: 48%
- The game includes assessment, tracking, and/or other classroom management features: 43%
- Your experience using or preference for the game: 42%
- Research claims/evidence of the game’s educational impact: 37%
- What your students say about the game: 31%
- How much the game costs: 24%
- The game’s rating (E, T, or M): 17%
- A review of the game (from a newspaper, blog post, or review site): 15%
- Other: 3%

Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See gamesandlearning.org

Among K-8 teachers who use digital games in teaching (N=513)

Participants were asked to check all that apply
Which students have you seen benefit most from instruction involving digital games?

- Low-performing students: 47%
- All students seem to benefit about equally: 30%
- Students with emotional/behavioral issues: 28%
- Students with cognitive or developmental issues: 24%
- Average-performing students: 23%
- English-language learners: 21%
- High-performing students: 15%
- Students with physical impairments: 7%
- None of my students seem to benefit: 1%

Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See gamesandlearning.org

Among K–8 teachers who use digital games in teaching (N=513)
Participants were asked to check all that apply
What are the greatest barriers teachers face in using digital games in the classroom?

- Insufficient Time: 45%
- Cost: 44%
- Lack of tech resources: 35%
- Hard to find games that fit curriculum: 34%
- Emphasis on standardized test scores: 29%
- Not sure where to find quality games: 27%
- Not sure how to integrate games into instruction: 23%
- Unfamiliar with technology: 17%
- Lack of administrative support: 14%
- Lack of parental support: 9%
- No barriers: 7%
- Other reason: 4%

Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See gamesandlearning.org for URL.

Among K-8 teachers who completed survey (N=694), Participants were asked to check all that apply.
Based on your experience using games in your teaching, do you agree with these statements?

- I wish it were easier to find digital games that align to curriculum standards: 80%
- Commercial games not created for educational purposes can also be used to teach core curriculum: 45%
- There are a sufficient variety of digital games that align to curriculum standards: 39%

What qualities of games do you find most valuable?

- Motivates low performing/special ed students: 55%
- Facilitates teaching mixed ability groups: 24%
- Students use games independently: 23%
- Allows personalization of instruction: 21%
- Promotes collaboration between students: 21%
- Delivers content without direct instruction: 17%
- Aligns with Common Core Standards: 13%
- Effective way to assess students: 10%
- Efficient way to assess students: 8%
- Some other quality: 2%

Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See gamesandlearning.org/URL.

Among K-8 teachers who use digital games in teaching (N=513)
Participants were asked to check all that apply.

Games Need to Align to Curricula

Main Value is Motivational
The Good....
The Bad....
Recipes For Success

Step 3. Putting it all Together
What Makes These Games Good?
What are the greatest barriers teachers face in using digital games in the classroom?

- Insufficient Time: 45%
- Cost: 44%
- Lack of tech resources: 35%
- Hard to find games that fit curriculum: 34%
- Emphasis on standardized test scores: 29%
- Not sure where to find quality games: 27%
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Source: The National Survey of Digital Game Use Among Teachers is a project of the Games and Learning Publishing Council and produced by the Joan Ganz Cooney Center, with support from the Bill and Melinda Gates Foundation. See gamesandlearning.org for URL.

Among K–8 teachers who completed survey (N=694)
Participants were asked to check all that apply.
A Solution
A Framework for Design & Analysis

4PEG
The Four Pillars of Educational Games

- Gameplay & Aesthetics
- Educational Content
- Teacher Support
- Magic Bullet Rating
4PEG Framework

http://minkhollow.ca/MagicBullet/
How is it as a game? Is it fun? Is it interesting? How does it measure up esthetically?

<table>
<thead>
<tr>
<th></th>
<th>&lt;GAME&gt; Game Overview</th>
<th>OK [3]</th>
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<td>2.8</td>
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<td>5.0</td>
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</table>

Gameplay & Aesthetics
Are there one or more recognizable educational objectives, discernible either from the game itself or from the accompanying support materials.

Educational Content

<table>
<thead>
<tr>
<th>Instructional Strategies</th>
<th>Instructional Design</th>
<th>Objectives</th>
<th>Integration</th>
<th>Accuracy</th>
<th>Assessment</th>
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<td>1.0</td>
<td>2.0</td>
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<td>4.0</td>
</tr>
</tbody>
</table>

2.5 /30

<GAME> Educational Content

Fair [2]
Is there adequate teacher support to make viable for use in a formal setting?

Teacher Support

When you select games to use with your students, what influences your decision?

- What other teachers say about the game: 48%
- The game includes assessment, tracking, and/or other classroom management features: 43%
- Your experience using or preference for the game: 42%
- Research claims/evidence of the game's educational impact: 37%
This section examines the game through the lens of the Magic Bullet model to see how well the various learning elements are balanced.

<table>
<thead>
<tr>
<th>Overall Balance</th>
<th>Can Learn vs Must Learn</th>
<th>Operational vs Educational Learning</th>
<th>Educational vs Discretionary Learning</th>
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</thead>
<tbody>
<tr>
<td>2.5</td>
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</tbody>
</table>

<GAME> Magic Bullet Rating

OK [3]
## Game Review V5

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<tbody>
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<td>Overall Rating</td>
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<td>49 / 100</td>
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</tbody>
</table>

### Summaries

#### Game Overview

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<tr>
<th>Component</th>
<th>Rating</th>
<th>Score / Max</th>
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</thead>
<tbody>
<tr>
<td>Gameplay</td>
<td>2.0</td>
<td>6 / 15</td>
</tr>
<tr>
<td>Art &amp; Audio</td>
<td>4.0</td>
<td>8 / 15</td>
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</tbody>
</table>

#### Educational Overview

<table>
<thead>
<tr>
<th>Component</th>
<th>Rating</th>
<th>Score / Max</th>
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<tbody>
<tr>
<td>Teacher Support</td>
<td>2.5</td>
<td>10 / 20</td>
</tr>
<tr>
<td>Educational Content</td>
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<td>15 / 30</td>
</tr>
<tr>
<td>Magic Bullet Rating</td>
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<td>10 / 20</td>
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</table>

#### Educational Content

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<th>Subcomponent</th>
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<td>Assessment</td>
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<td>5 / 5</td>
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#### Teacher Support

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<td>Community</td>
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<td>4 / 5</td>
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</table>

#### Magic Bullet Rating

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<td>Can Learn vs Must Learn</td>
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</tbody>
</table>

**NOTE:** Items marked -1 (na) are not counted.
Questions?
Your Turn
“Most of us prefer to walk backward into the future, a posture that may be uncomfortable but which at least allows us to keep on looking at familiar things as long as we can.” ~ Charles Handy

Formal education moves at geological speeds, and that’s lucky for us, because games for learning really aren’t ready for prime time, and it’s not for the first time. During the ‘Edutainment Era’ of the late 1980’s and early 1990’s computer games were proclaimed as the modern solution to all our educational ills. In order to take advantage of this great technology, all we needed to do was wrap a game around a lesson, and it would magically become fun. This, of course, is not true, and the resultant fall from grace left many educational game proponents reeling.

We now have a second chance, and we need to make sure we don’t fall into the same trap again. The game evangelists are valuable to be sure, but we need to be realistic, and if we don’t have enough games out there that live up to the hype, the idea of using games to teach will once again become a pariah, and the likelihood of a third chance is slim.

This keynote will look at what went wrong last time around, where we are now, and what we need in design, research, and support to make sure that we have it right this time so we are ready when formal education catches up with us.
Ascii Man, Walking:
http://www.janpieter.com/content/046_walking_man_ascii.cfm#content
Reversed: GifMaker http://gifmaker.me/

Images, etc.
Edutainment


Videogame timeline: [http://www.onlineeducation.net/videogame_timeline](http://www.onlineeducation.net/videogame_timeline)