Walking Backwards in to the Future

Ensuring the Success of Games for Learning

https://www.youtube.com/watch?v=X6jprOZ29wY

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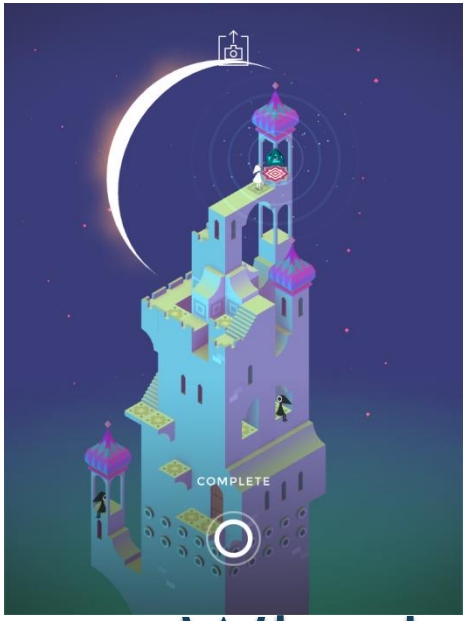
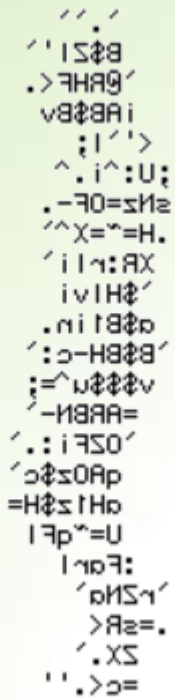
Katrin Becker

Katrin Becker, PhD



What am I playing Now?

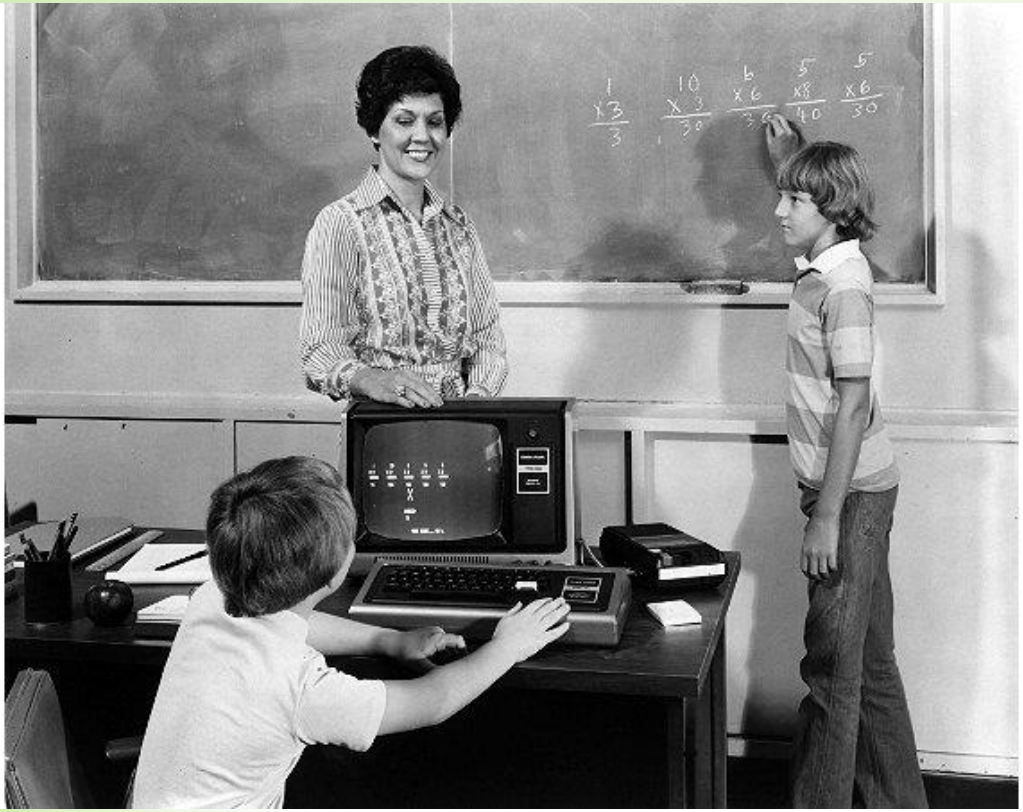


"Most of us prefer to walk backward into the future, a posture that may be uncomfortable but which at least allows us to keep on looking at familiar things as long as we can."

~ Charles Handy

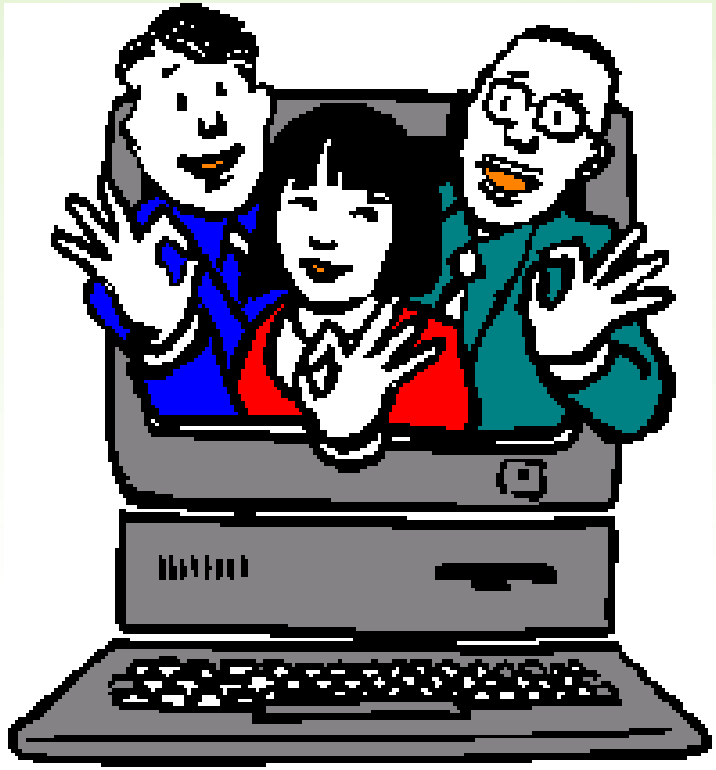
Formal education moves at geological speeds, and that's lucky for us….

because games for learning
really aren't ready for prime time,
and it's not for the first time.

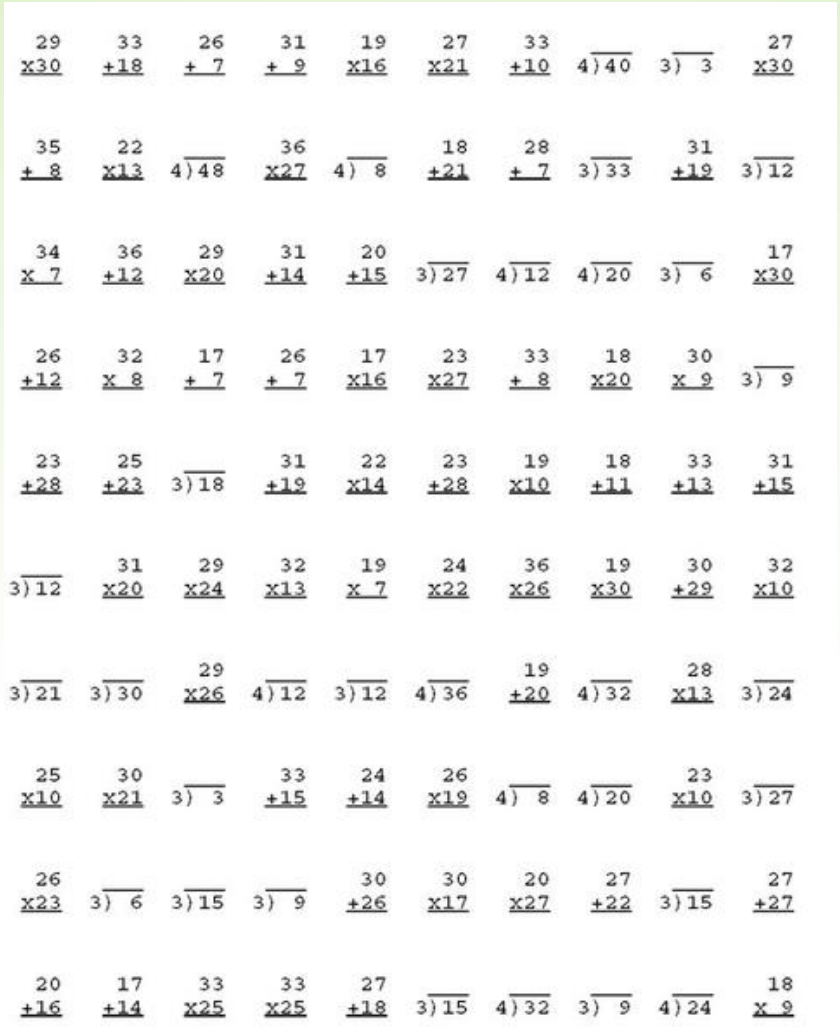


During the ‘Edutainment Era’ of the 1980s and 1990s computer games were proclaimed as the modern solution to all our educational ills.

In order to take advantage of this great technology…..



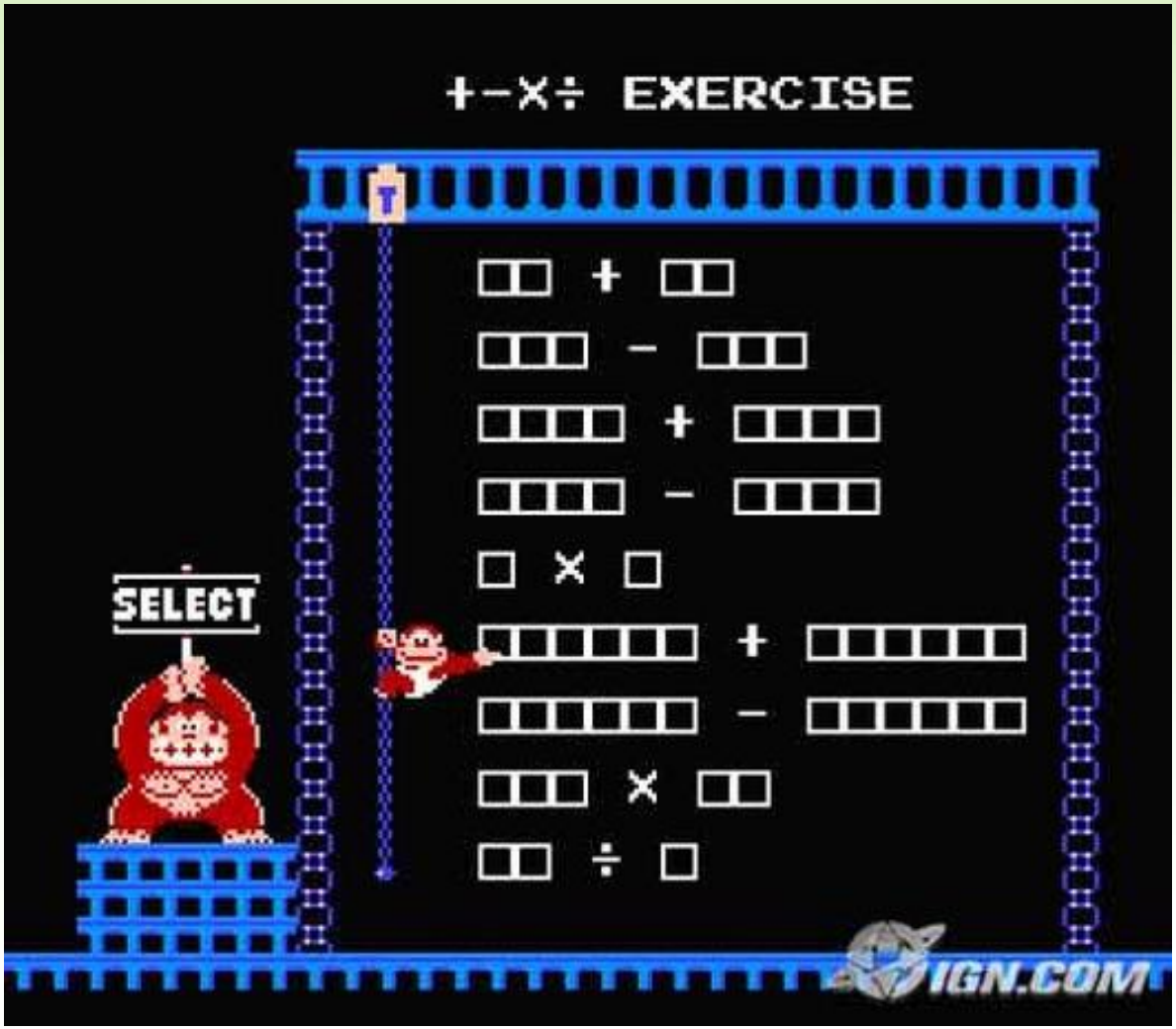
….all we needed to do was wrap a game around a lesson (or worksheet), ….



29 x30	33 +18	26 + 7	31 + 9	19 x16	27 x21	33 +10	4)40	3) 3	27 x30
35 + 8	22 x13	4)48	36 x27	4) 8	18 +21	28 + 7	3)33	31 +19	3)12
34 x 7	36 +12	29 x20	31 +14	20 +15	3)27	4)12	4)20	3) 6	17 x30
26 +12	32 x 8	17 + 7	26 + 7	17 x16	23 x27	33 + 8	18 x20	30 x 9	3) 9
23 +28	25 +23	3)18	31 +19	22 x14	23 +28	19 x10	18 +11	33 +13	31 +15
3)12	31 x20	29 x24	32 x13	19 x 7	24 x22	36 x26	19 x30	30 +29	32 x10
3)21	3)30	29 x26	4)12	3)12	4)36	19 +20	4)32	28 x13	3)24
25 x10	30 x21	3) 3	33 +15	24 +14	26 x19	4) 8	4)20	23 x10	3)27
26 x23	3) 6	3)15	3) 9	30 +26	30 x17	20 x27	27 +22	3)15	27 +27
20 +16	17 +14	33 x25	33 x25	27 +18	3)15	4)32	3) 9	4)24	18 x 9

…. like so ….

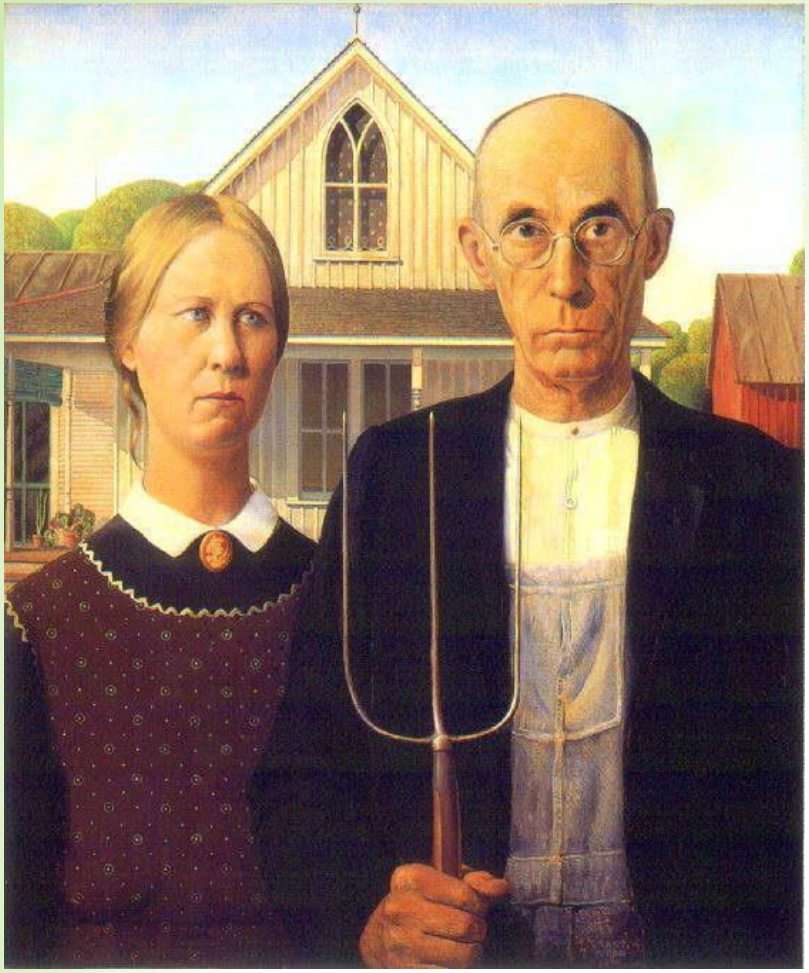
.... and it would magically become fun.



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,

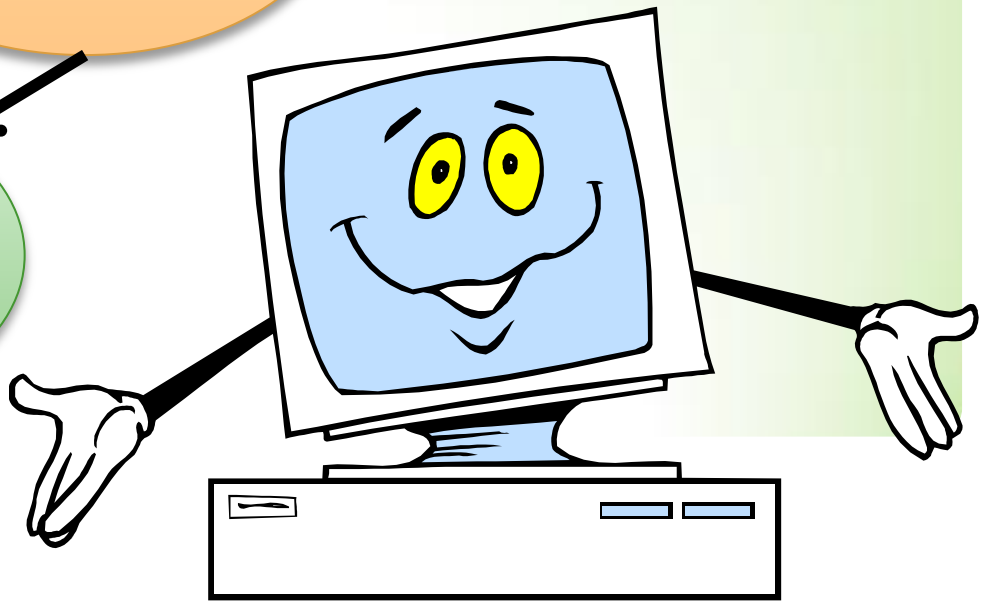
how do we make it right this time?

Looking Back [The Edutainment Era]

Taking Stock [What Have We Learned?]

Reloading [Where Are We Now?]

New Aims [What Do We Still Need?]



The Plan

Step 1: Understand what happened last time.

A brief look at……

Online
Timeline

The Edutainment Era

Step 1: Understanding what happened last time.

skip

What is Edutainment?

Educators:
edutainment = educational games

Game Developers:
edutainment = an insult

Definitions & Attitudes

- Digital games in infancy
- Excitement over new medium

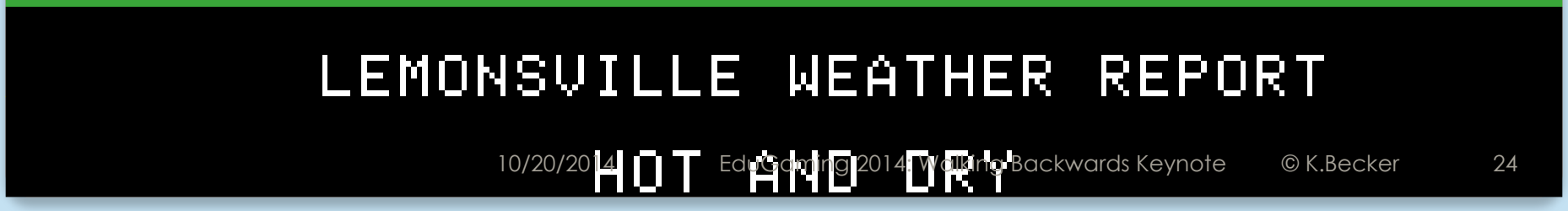
Commercial Examples:

- Pac-Man, Tetris, Pong

Educational Examples:

- Math Fun!
- Brain Games
- Math-A-Magic!
- Hangman

The 1970s



The 1980s

Definitions & Attitudes

- Digital games in infancy
- Alessi & Trollip [1985]
- Richard E. Clark [1983]

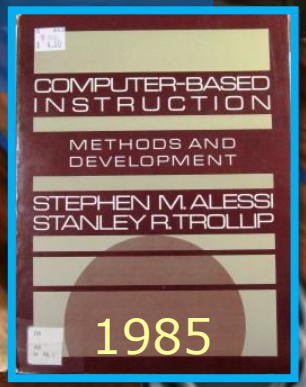
- Excitement over new medium continues
- Start of EdTech boom
- "tech is cool"

Commercial Examples:

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

Educational Games

- States and Capitals
- Dragon's Keep
- PET Nuclear Power Plant
- Mathblaster
- Reader Rabbit



Simulations

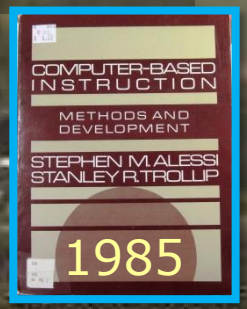
Chapter 9

- 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

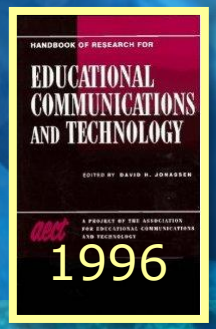


According to Alessi & Trollip

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

Educational Examples

- 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

Myst III: Exile by Presto Studios

Simulation =

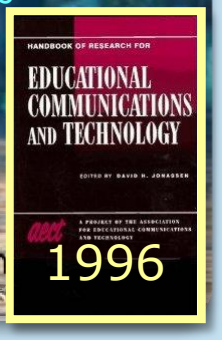
- Must be complex & REAL (referred to as fidelity or validity)
- Participants have defined roles
- Data-rich environment, where students can execute range of strategies
- Feedback is in form of changes to situation

- 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 loose 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

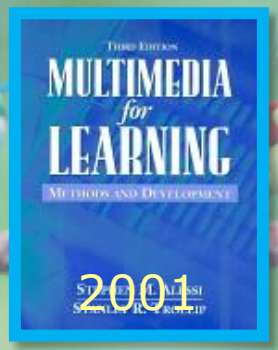


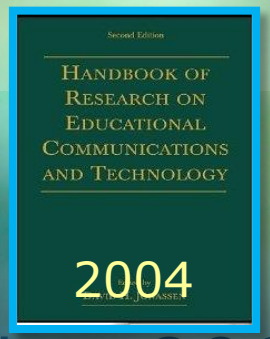
The 2000's (pre-WoW)

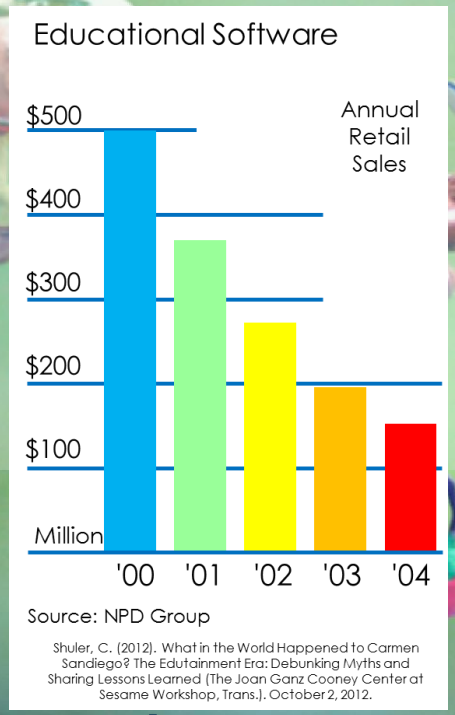
Definitions & Attitudes

See:

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







Shuler, C. (2012). What in the World Happened to Carmen Sandiego? The Edutainment Era: Debunking Myths and Sharing Lessons Learned (The Joan Ganz Cooney Center at Sesame Workshop, Trans.). October 2, 2012.

Commercial Examples

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

Educational Examples

- Zoombinis, Jerusalem, Real Lives, Zoo Tycoon

Simulations

Chapter 7

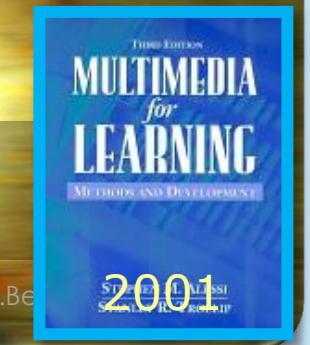
- All they said before
- ***Most challenging of all methodologies to design***
  - Need to know: content; learners; many complexities; sophisticated programming;

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

According to Alessi & Trollip



Definitions & Attitudes

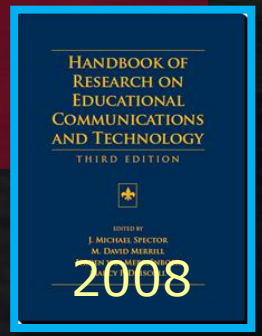
- Richard E. Clark [2007]
- AECT [2008]
  No Games or Sims….
  "Modeling Technologies"
- *"As a parent I object to having my child "play" on the computer when he has completed some piece of work. I want my kids working at school. I can use computer games at home for there (sic.) entertainment. I also 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



The 2000's (post-WoW)

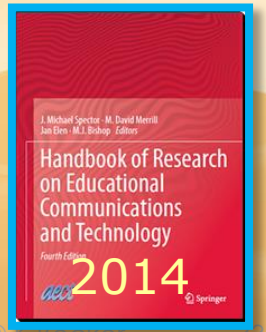
Attitudes

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

Educational Examples

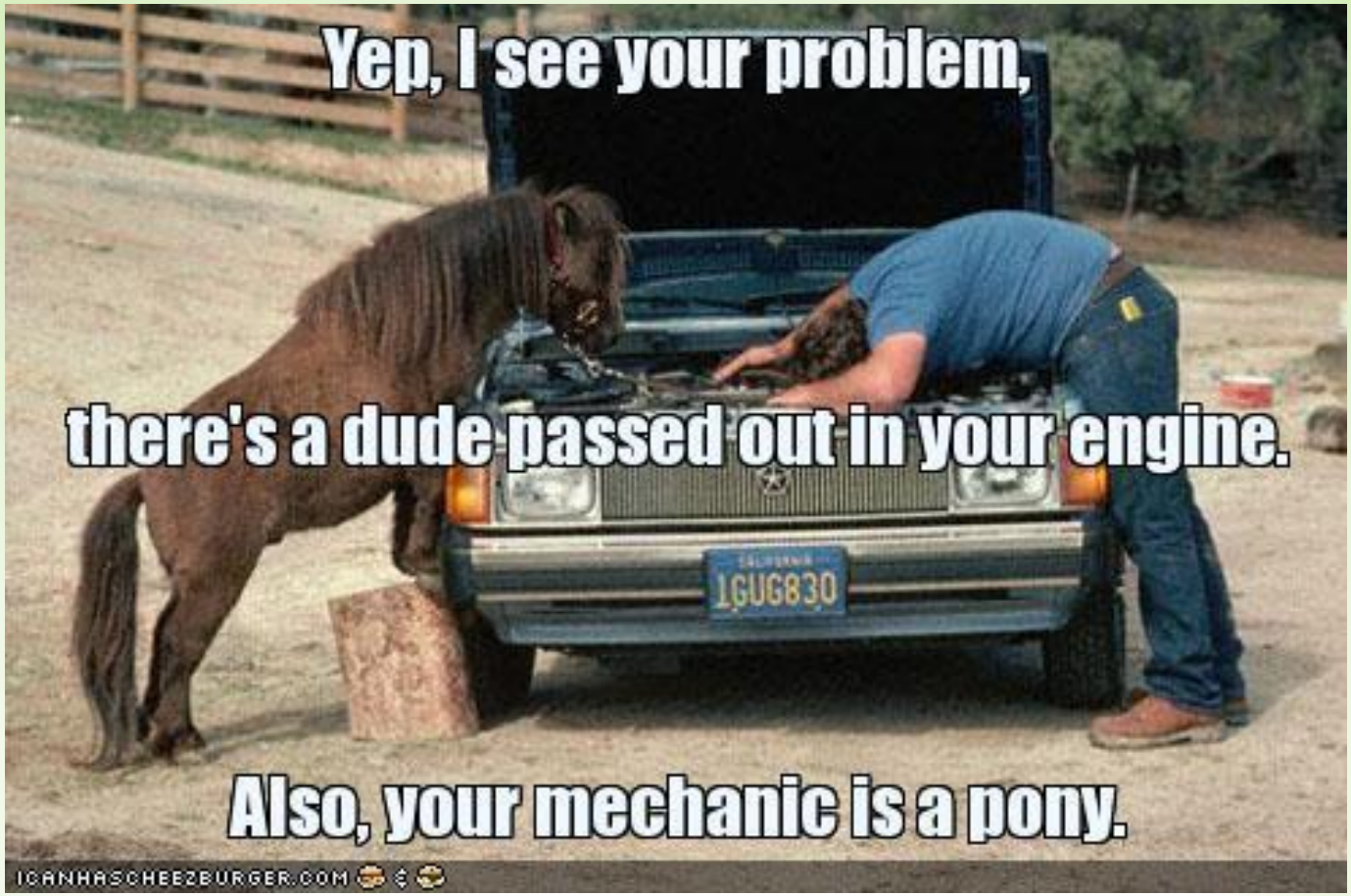
- Sweatshop, Professor Layton, Poverty is Not a Game, Seismic Duck, Spent, Osy Osmosis

2010s (now)



Fast-Forward ….

back



What Have We Learned?

What to Do & What to Avoid

back

Good….

Bad….

- Integration of Learning and Game Goals I ←VS→ • Wrapping a Lesson in a Game

What Have We Learned?

back

Good….

Bad….

- Integration of Learning and Game Goals ←VS→ Wrapping a Lesson in a Game
- Attention to Detail ←VS→ Cheap production

What Have We Learned?

back

Good….

Bad….

• Integration of Learning and Game Goals	←VS→	• Wrapping a Lesson in a Game
• Attention to Detail	←VS→	• Cheap production
• Robust	←VS→	• Glitchy

What Have We Learned?

back

Good….

Bad….

• Integration of Learning and Game Goals	←VS→	• Wrapping a Lesson in a Game
• Attention to Detail	←VS→	• Cheap production
• Robust	←VS→	• Glitchy
• Easy to Use	←VS→	• Demanding (time, resources,…)

What Have We Learned?

back

Good….

Bad….

• Integration of Learning and Game Goals	←VS→	• Wrapping a Lesson in a Game
• Attention to Detail	←VS→	• Cheap production
• Robust	←VS→	• Glitchy
• Easy to Use	←VS→	• Demanding (time, resources,…)
• Clear Goals	←VS→	• Mystery / Random Play

What Have We Learned?

back

Good….

Bad….

• Integration of Learning and Game Goals	←VS→	• Wrapping a Lesson in a Game
• Attention to Detail	←VS→	• Cheap production
• Robust	←VS→	• Glitchy
• Easy to Use	←VS→	• Demanding (time, resources,…)
• Clear Goals	←VS→	• Mystery / Random Play
• Integration of Learning and Game Goals II	←VS→	• POP-Ups / Too Much Text

What Have We Learned?

back

And Three More:
(Of My Own)

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

What Have We Learned?

back

Promotes:

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

Decorative Media Principle

- VIDEO : all about visual
- Games : about interaction

Linear vs. Interactive Media

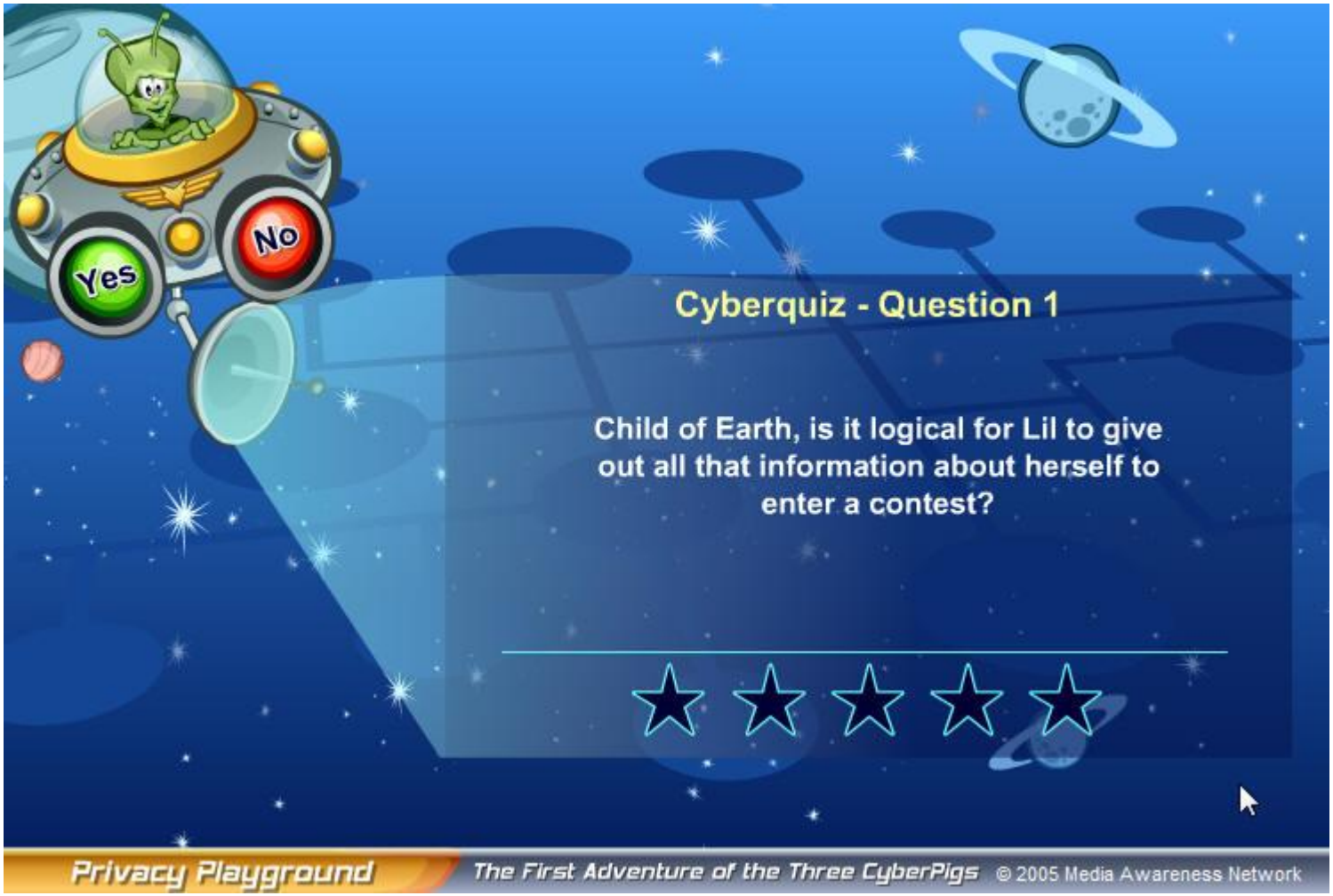
Attractive

=

Good

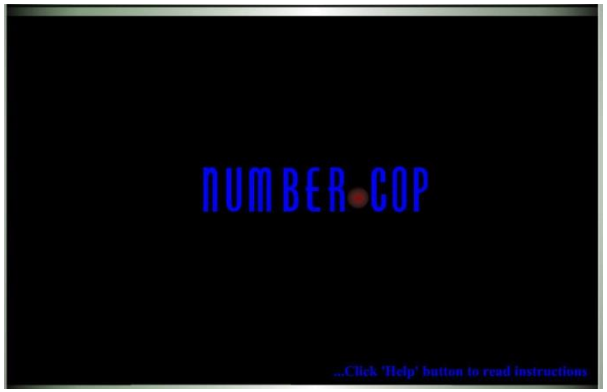
Decorative Media Trap

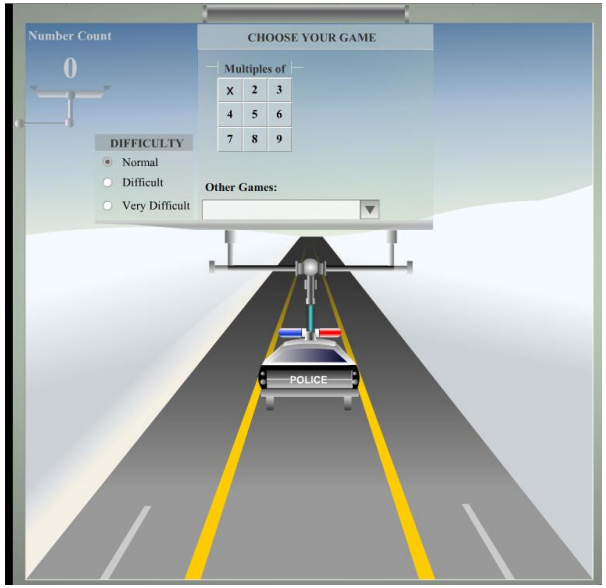
Ok so far..



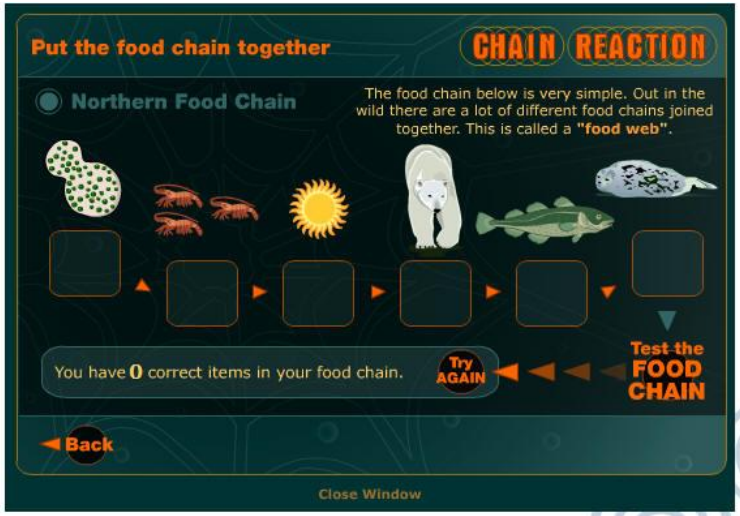
THIS is the game ?!

Decorative Media Trap



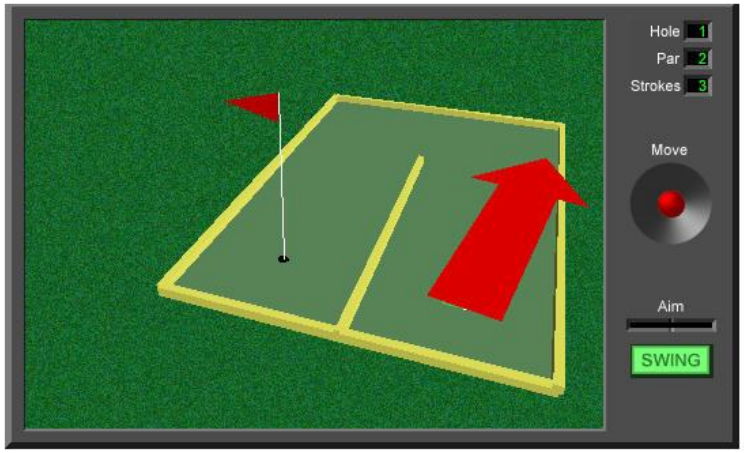


Wrapper



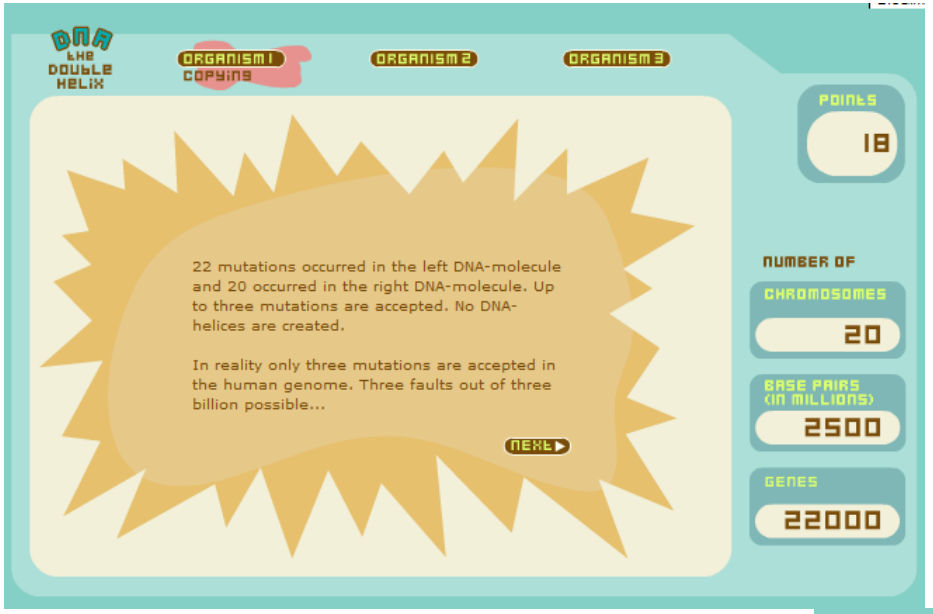
Different Wrapper

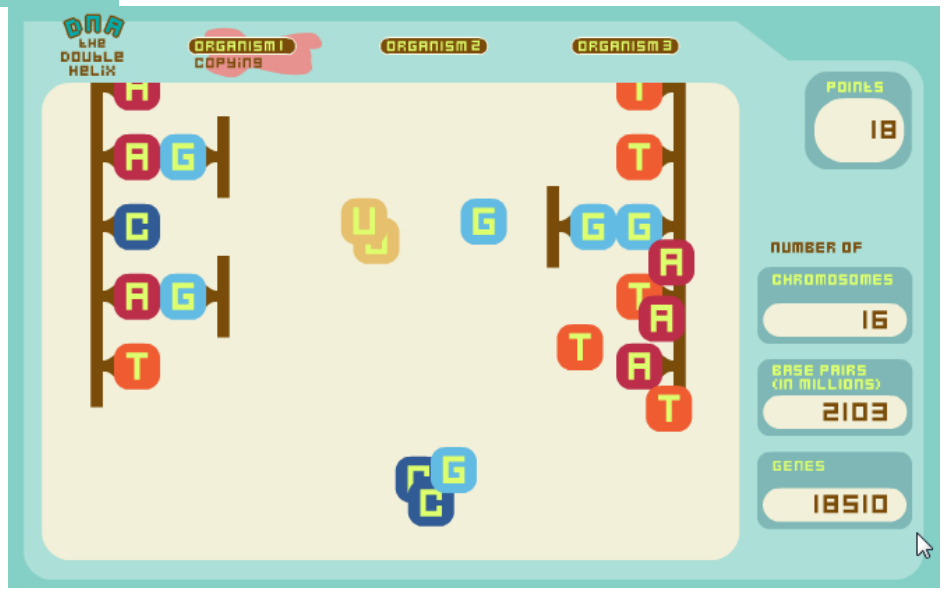
We reviewed each of these games to make sure that they provide students with skill development and critical thinking sequences.



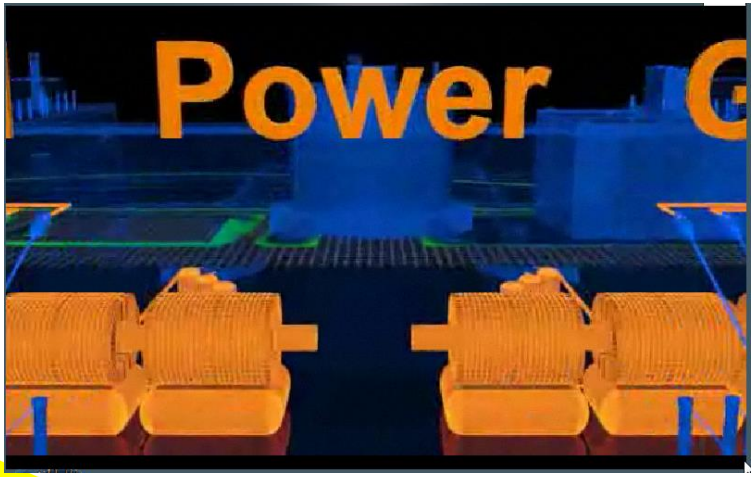
Functionality

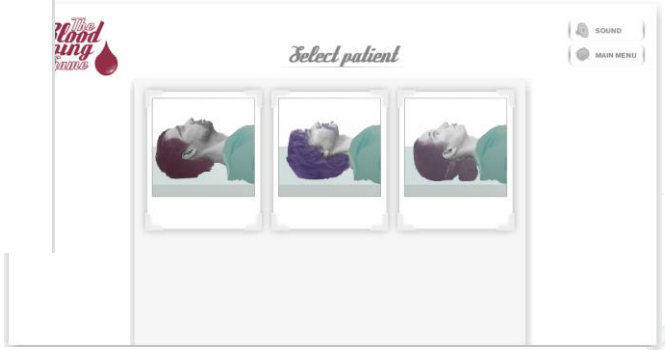
Save the World

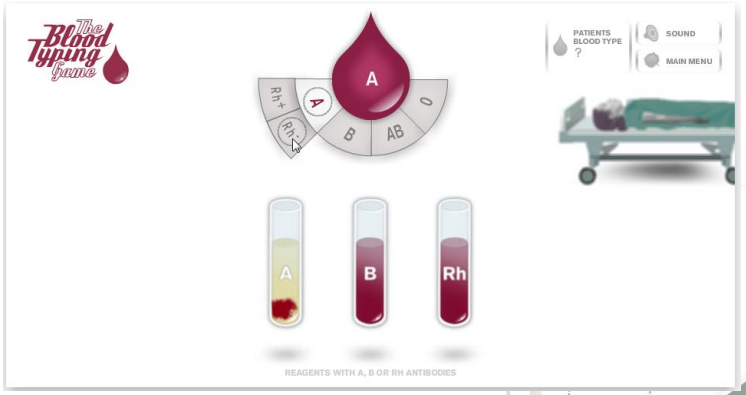


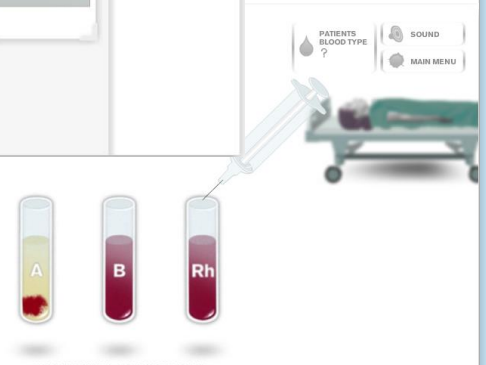


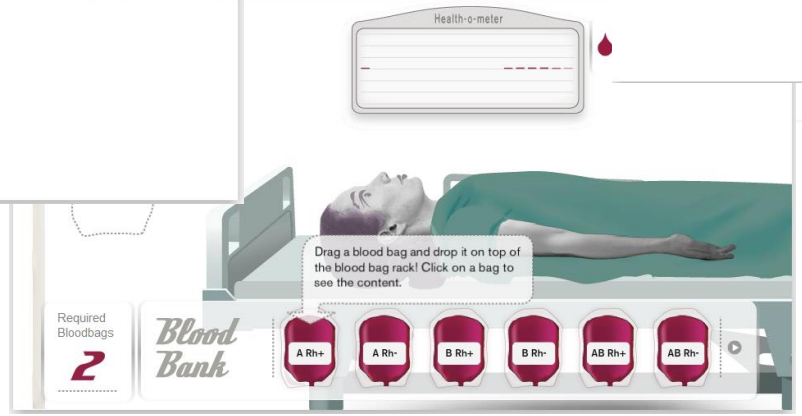
DNA Game

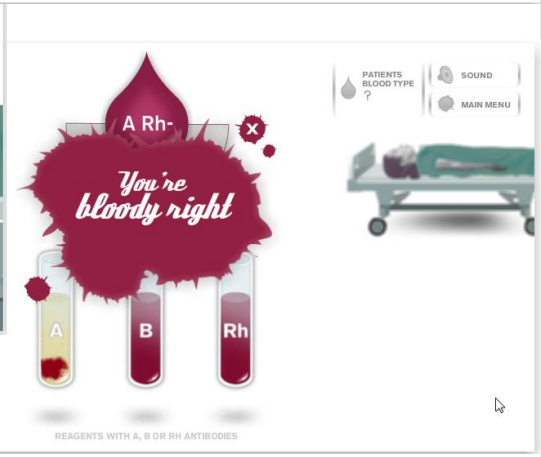




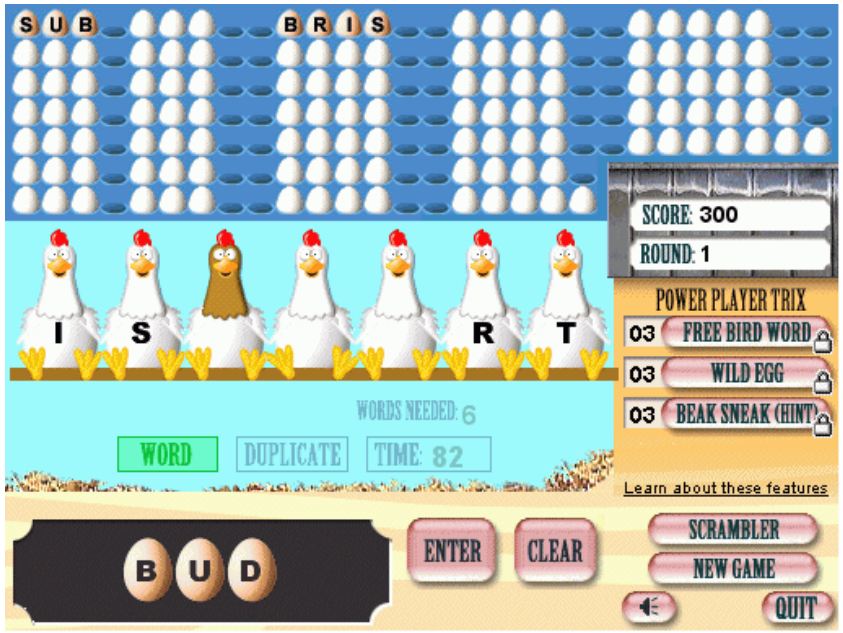


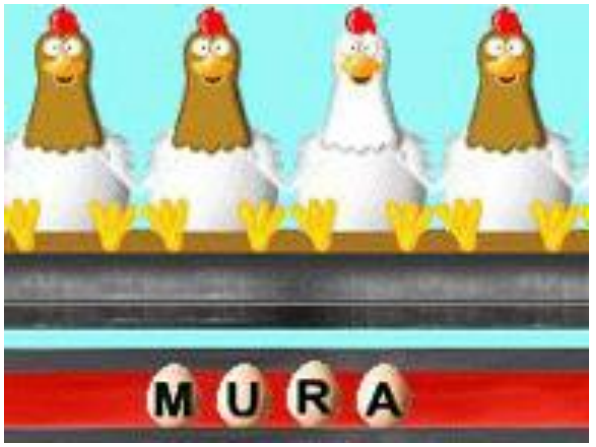


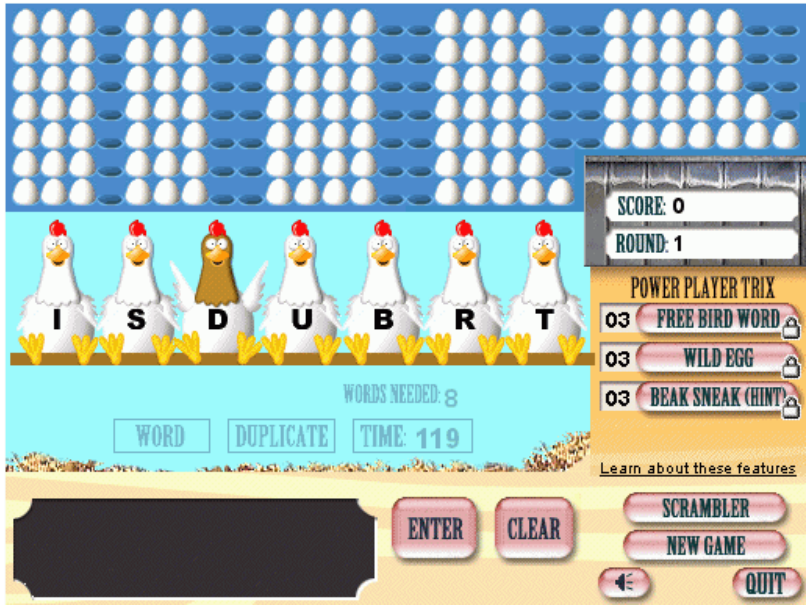




Doing it right…



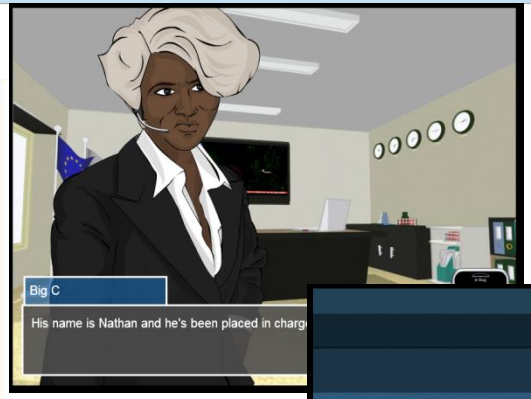


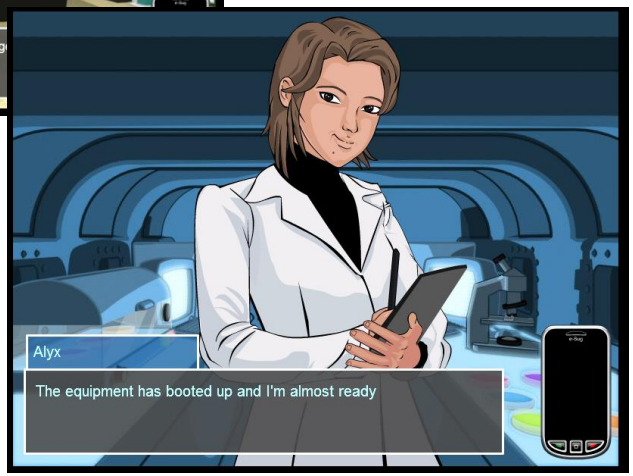


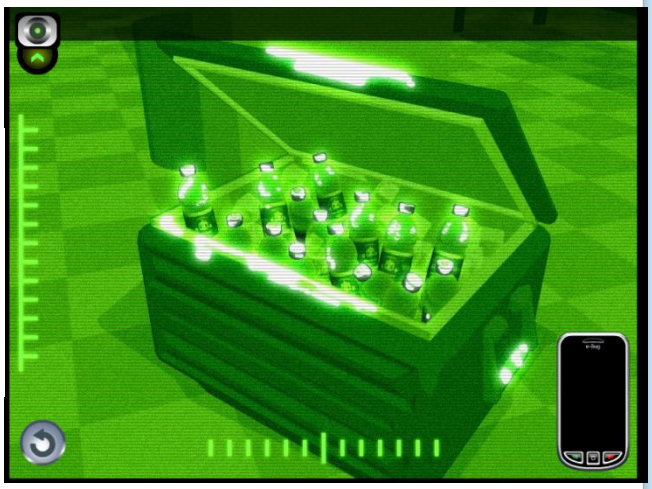
Doing it right…

Becker's Lazy Test (BLT)

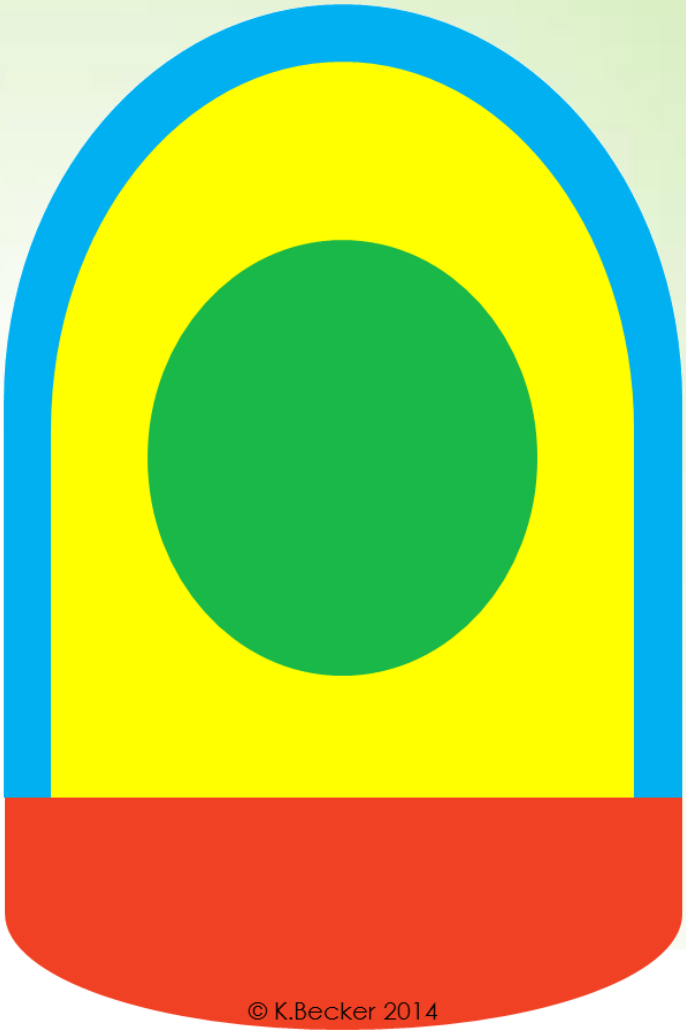
Is it possible to get through the game without learning anything?







Passing the BLT



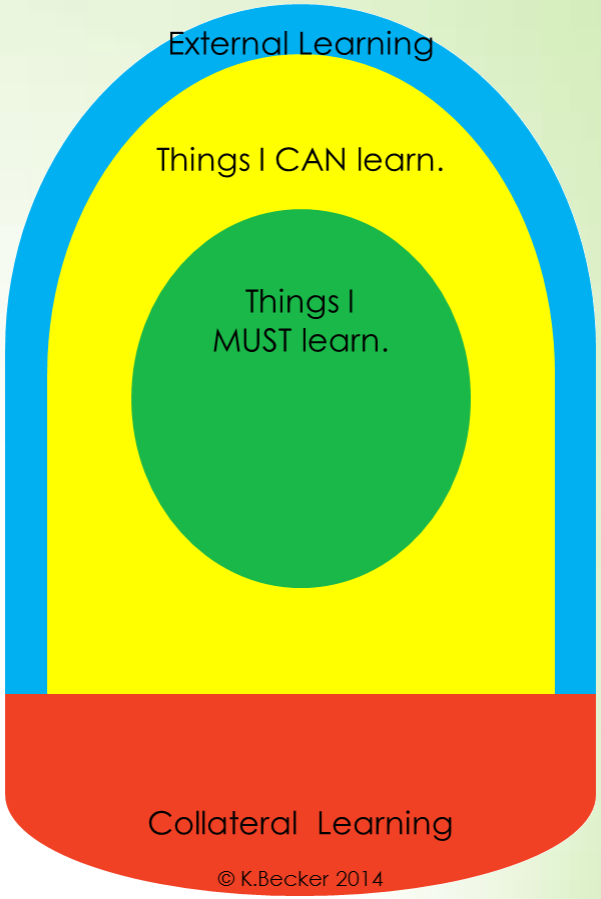
The Magic Bullet

A lens through which to examine learning in a game.

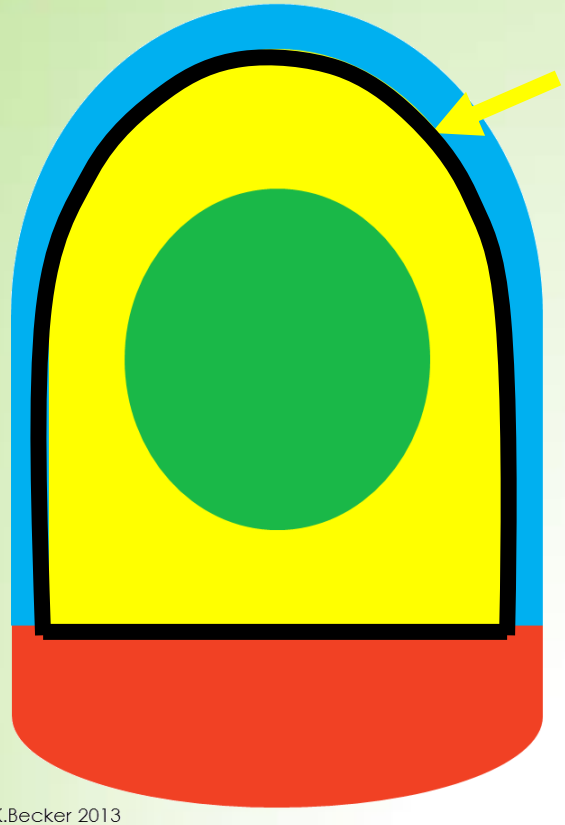
All learning in a game can be classified in one (or more) categories.

Four criteria for assessment in digital games:

1. Things We Can Learn
2. Things We Must Learn
3. Collateral Learning
4. External Learning



The Bullet



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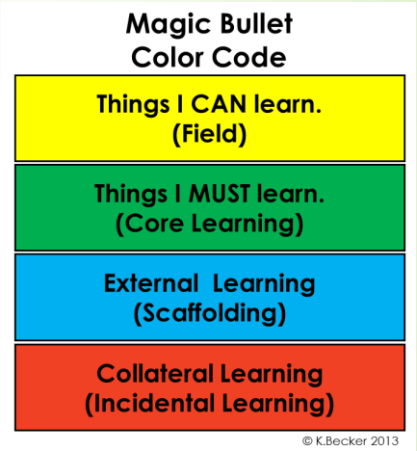
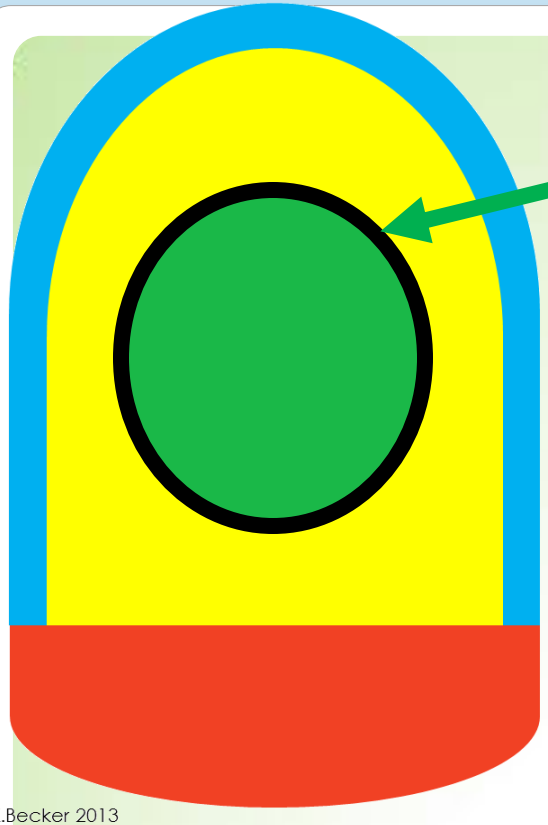
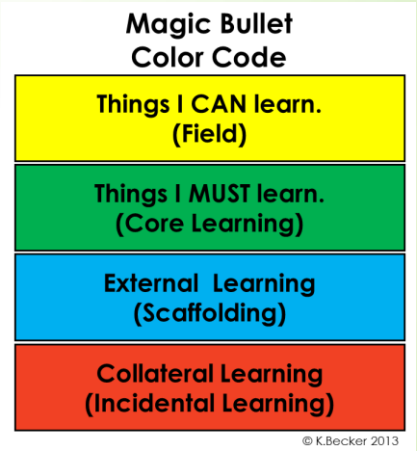
- Deliberately designed by those who created the game
- Includes things designers *hope* people will take up
- Includes game-specific objectives as well as general ones



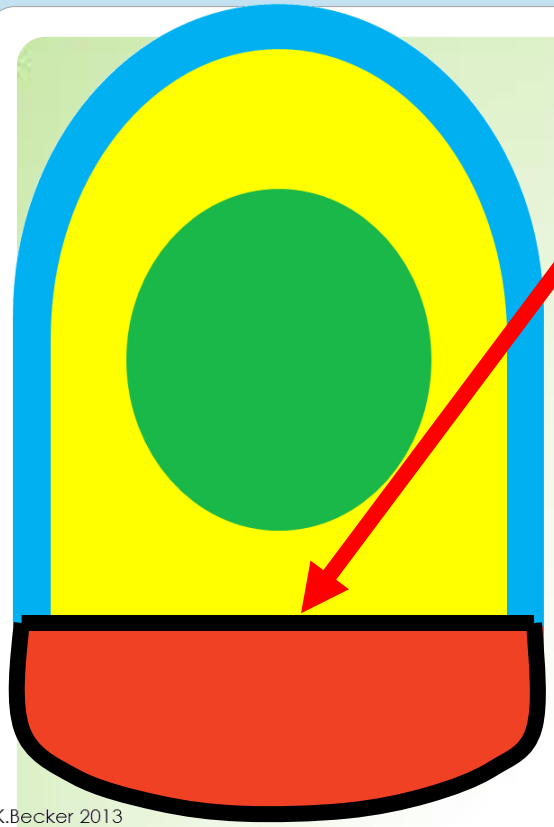
Things I Can Learn



- 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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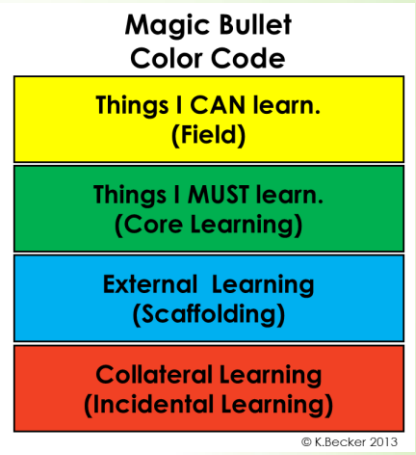
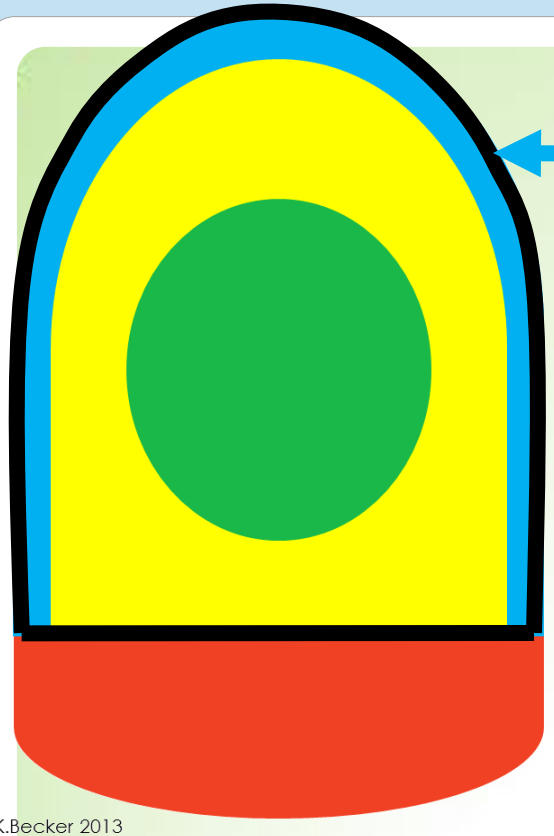
- Other things we can learn
  - these are not necessarily designed into the game, although sometimes designers may hope that players choose to take these up
- Have NO impact on success in the game



Collateral Learning



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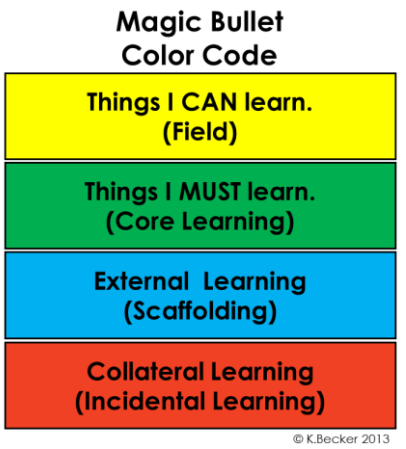
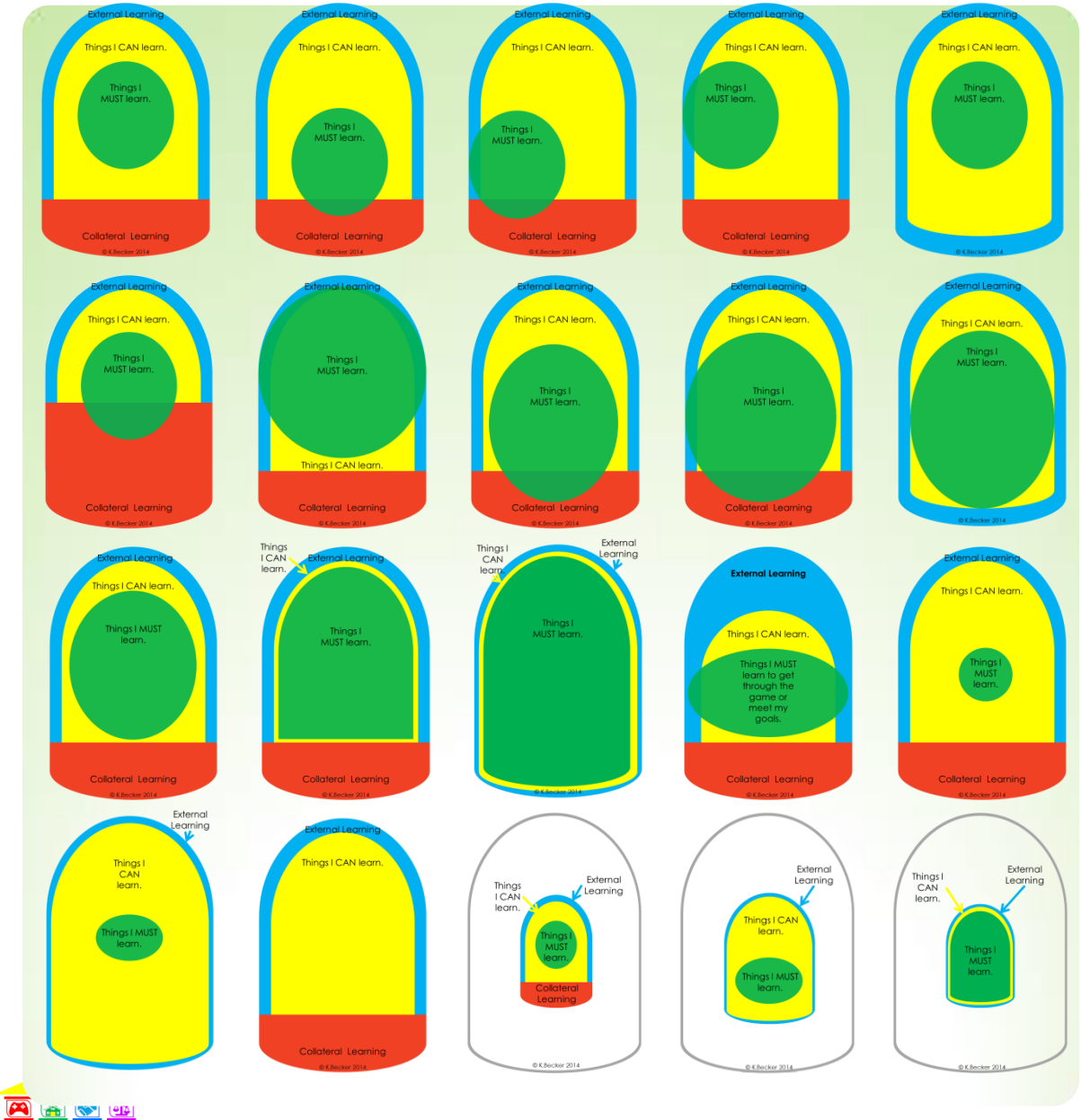
- Not *technically* considered part of the normal gameplay
- CAN impact success in the game
- Includes social learning and outside communities
- Also includes Cheats
  - typically designed into the game for testing purposes
  - often left in the game once it ships
  - deliberate design elements on the part of the designers



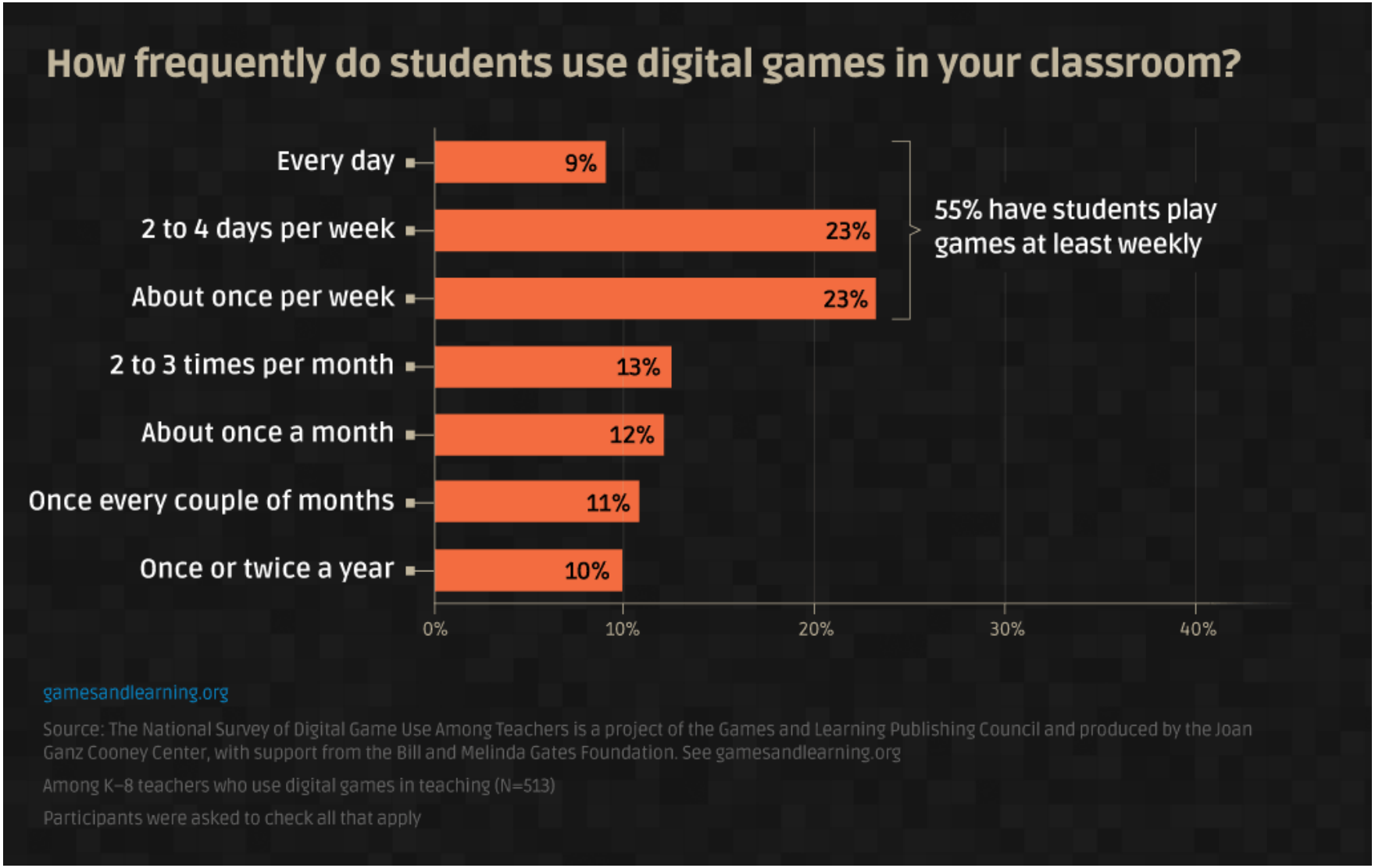
External Learning



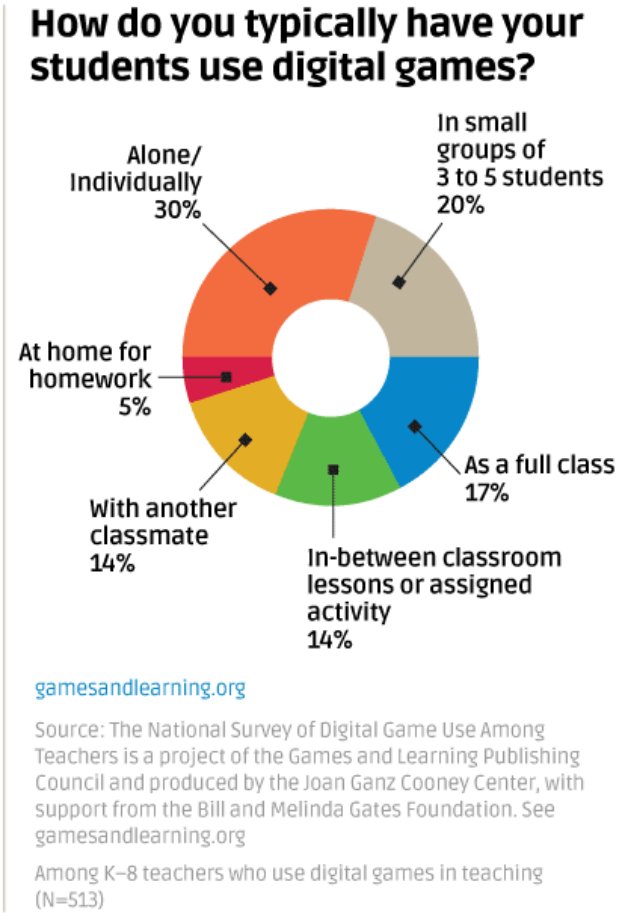
Variations on a Theme.

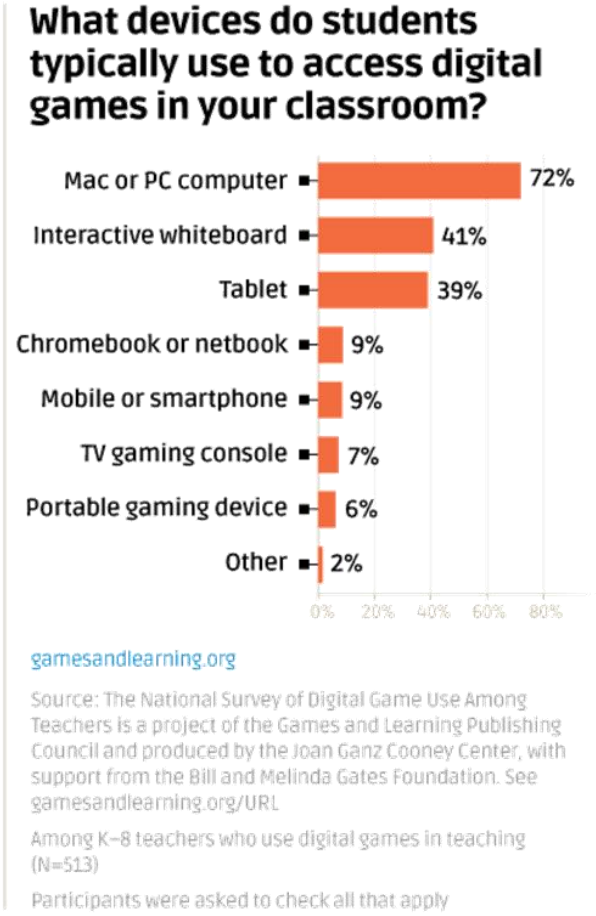
Where We Are Now?

Step 2: Taking Stock

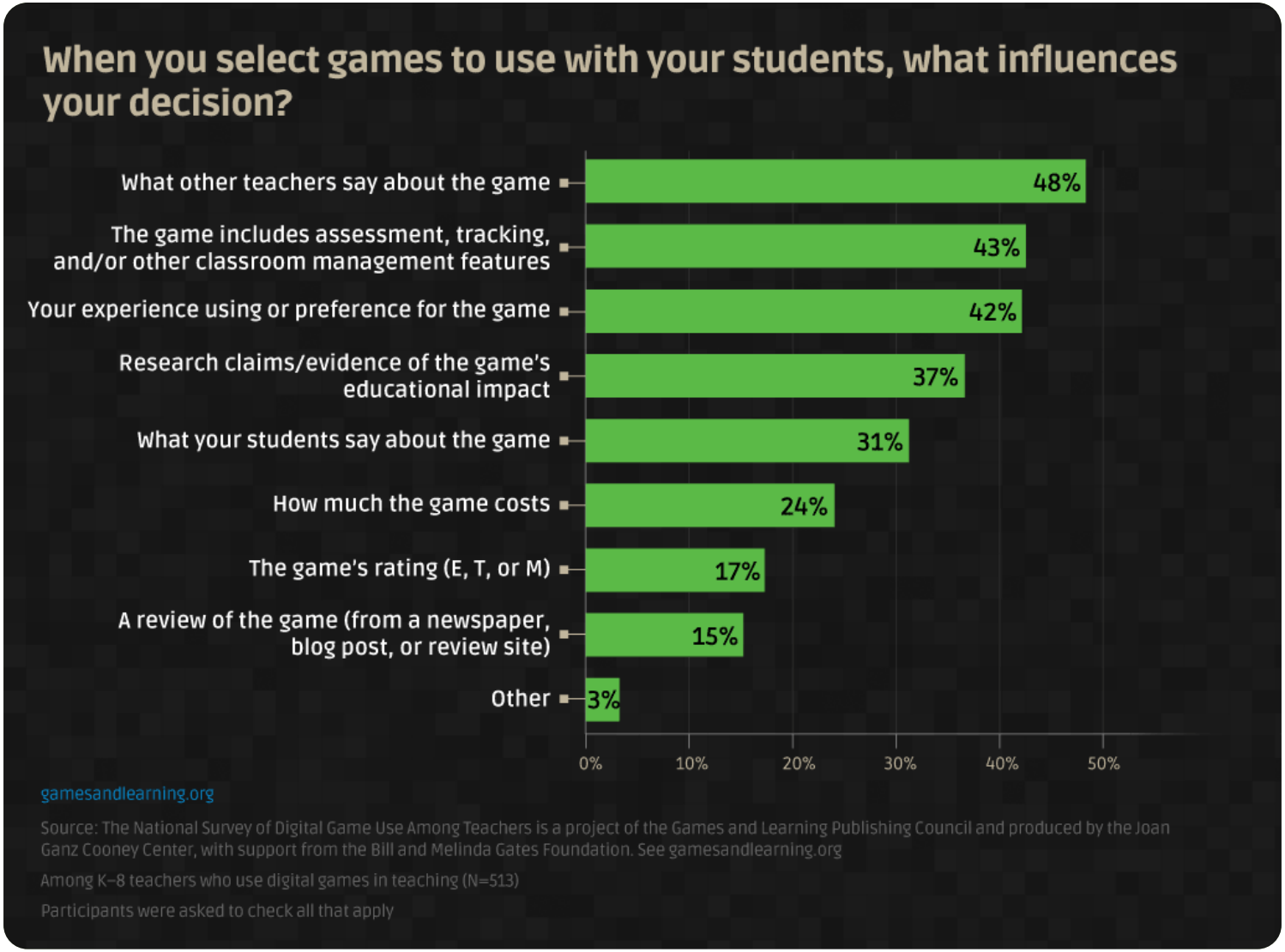


Games are Being Used in Schools

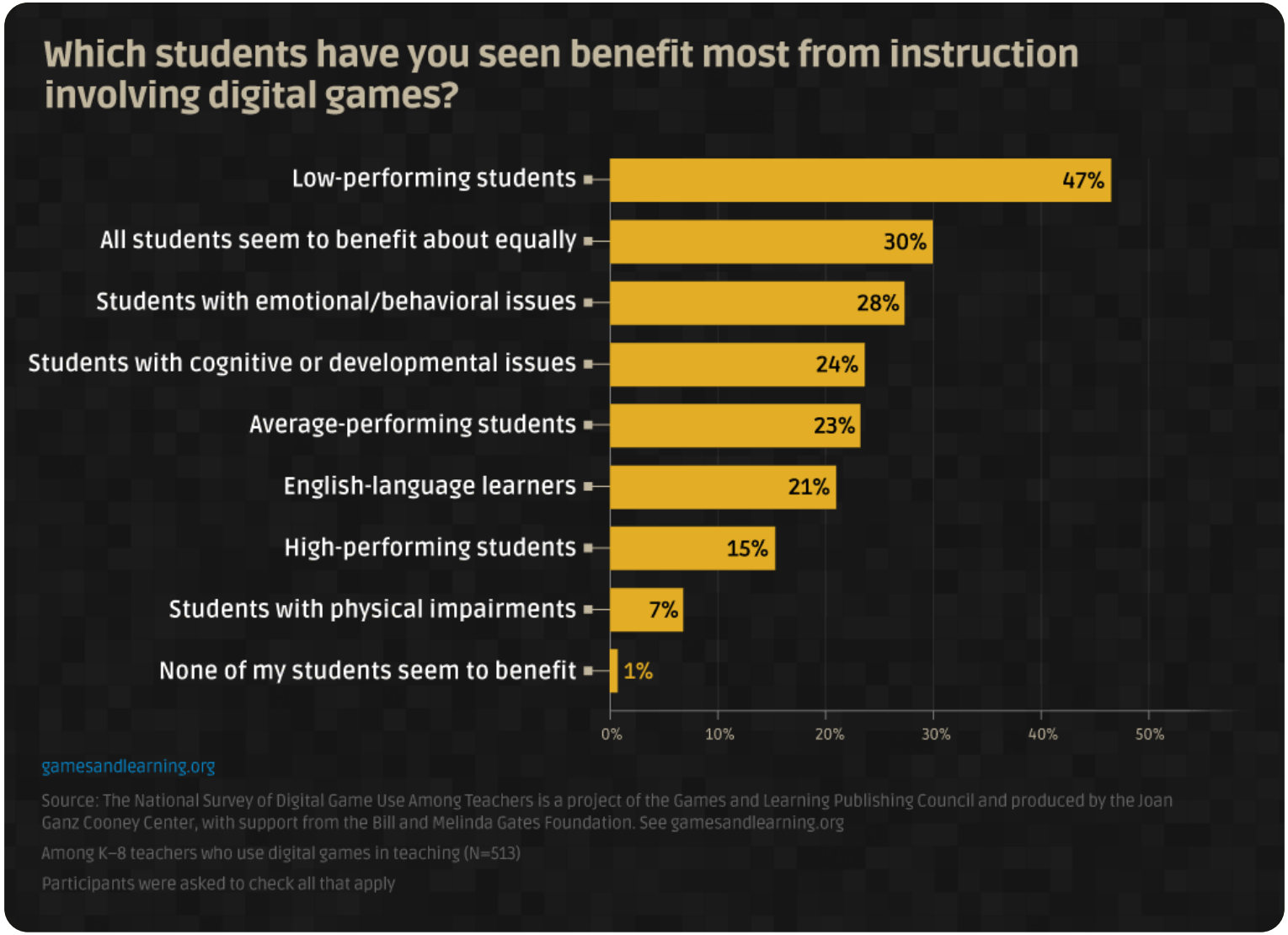




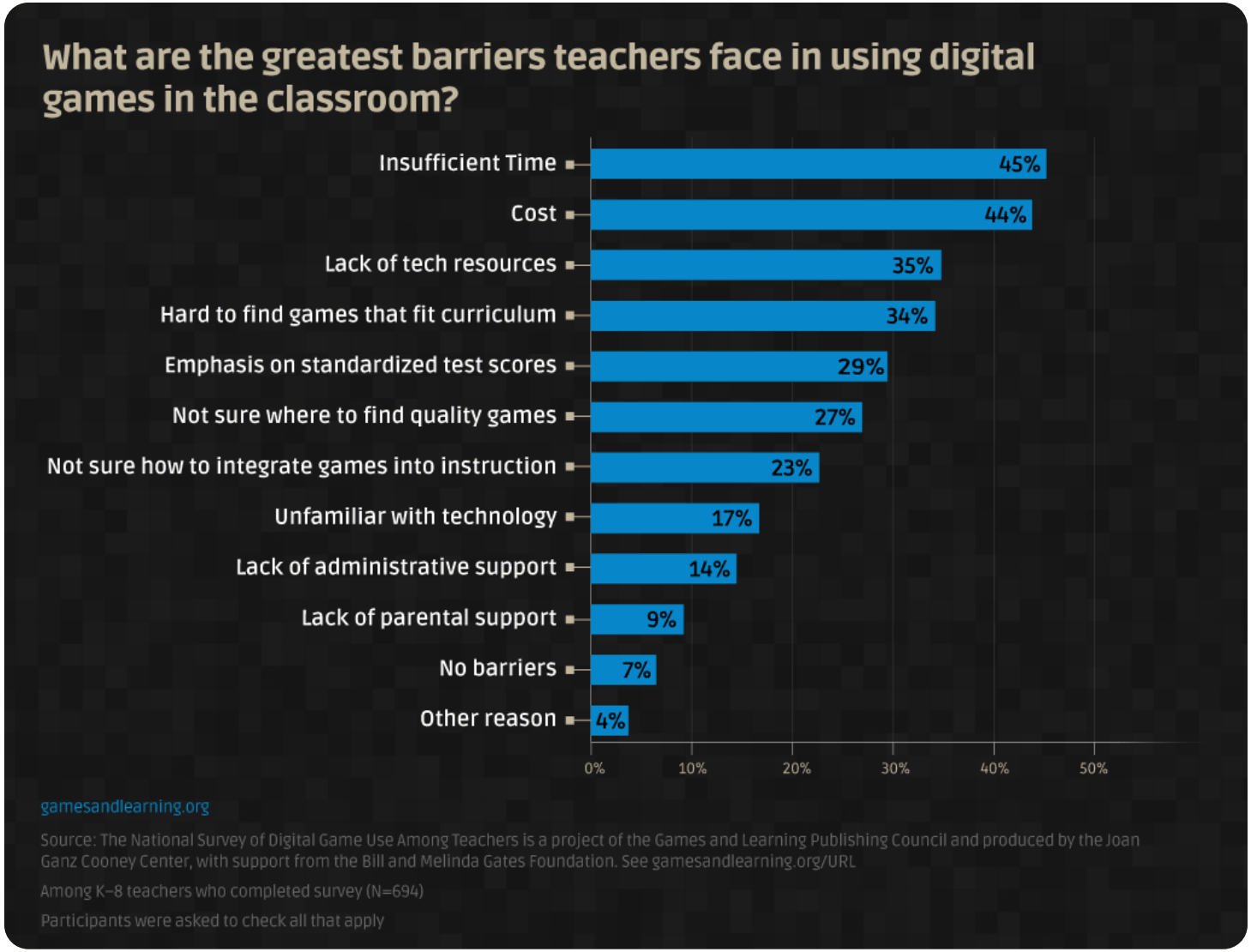
1/3 Solo ; ½ Group; Mostly PCs



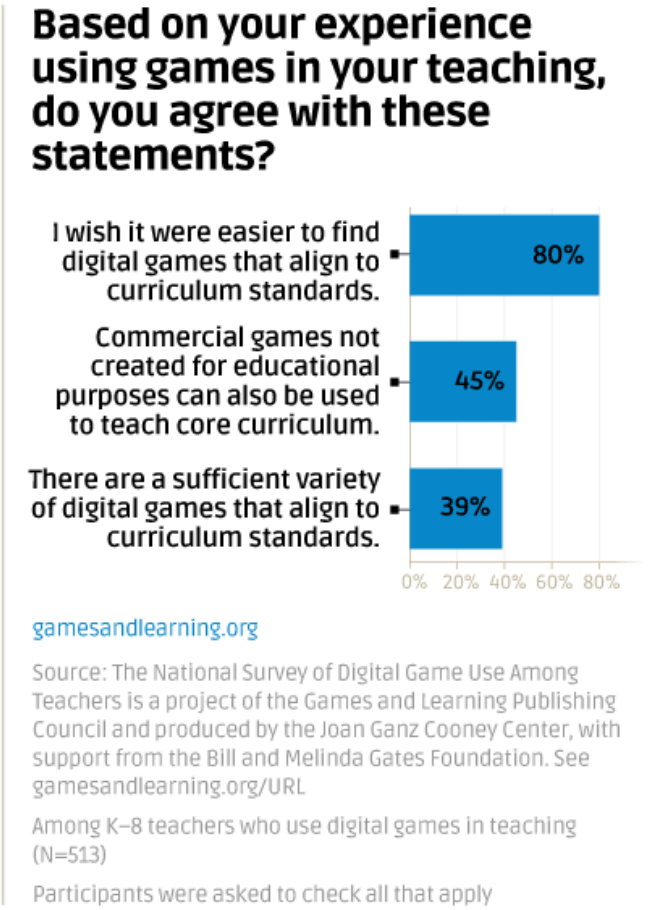
How Do Teachers Decide?

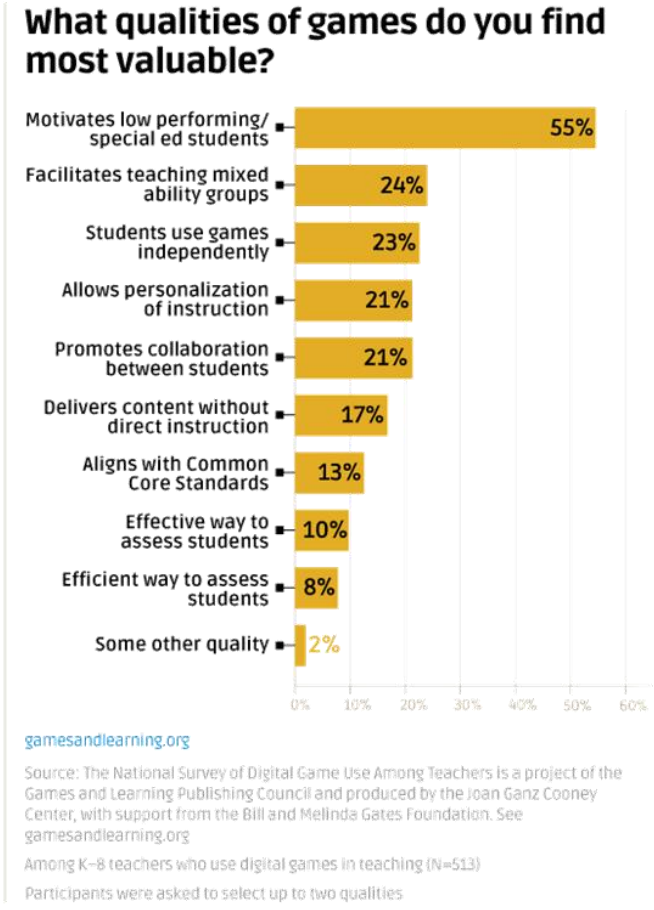


Who Benefits the Most?



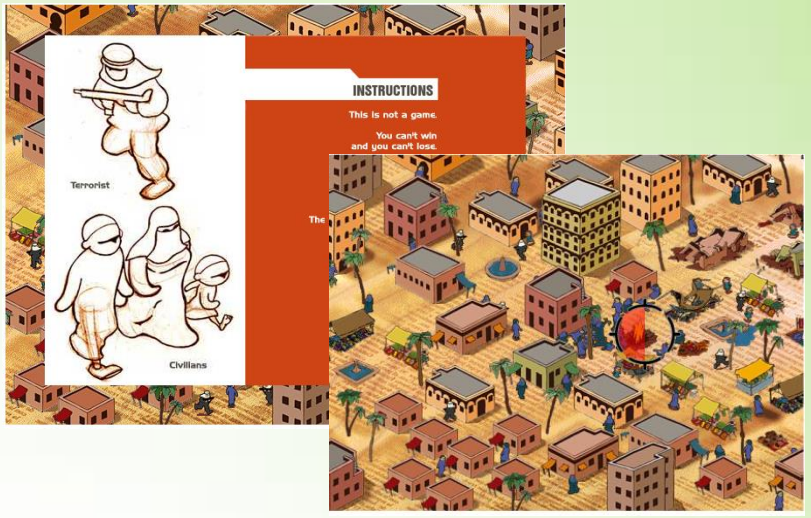
Barriers

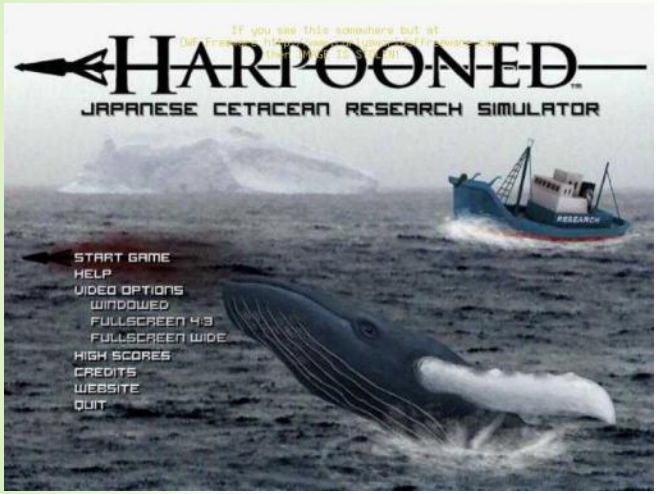




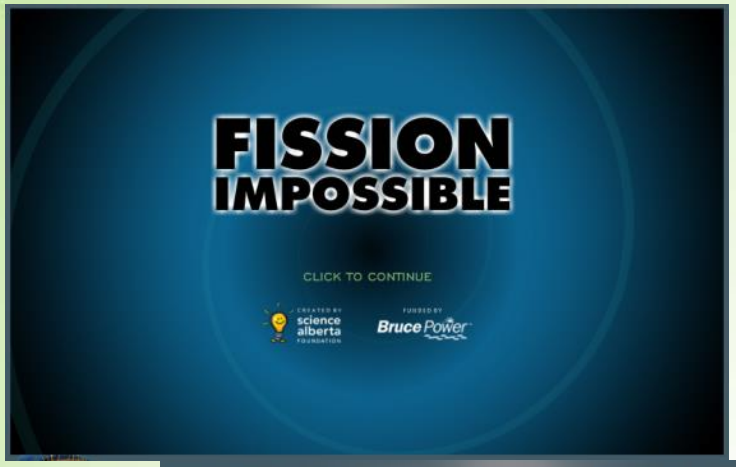
Games Need to Align to Curricula

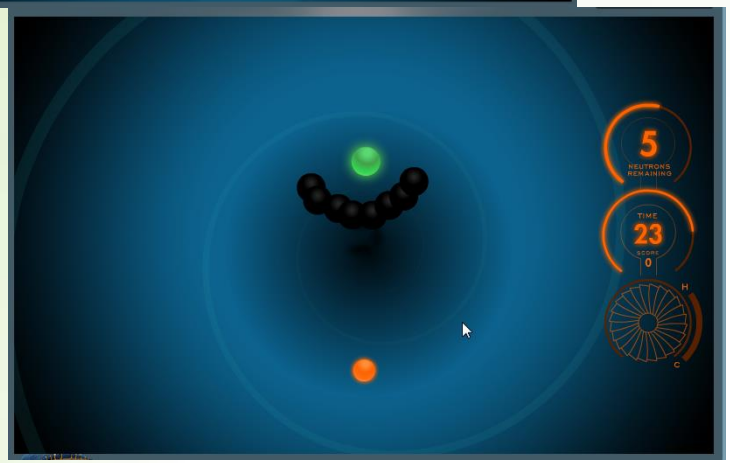
Main Value is Motivational

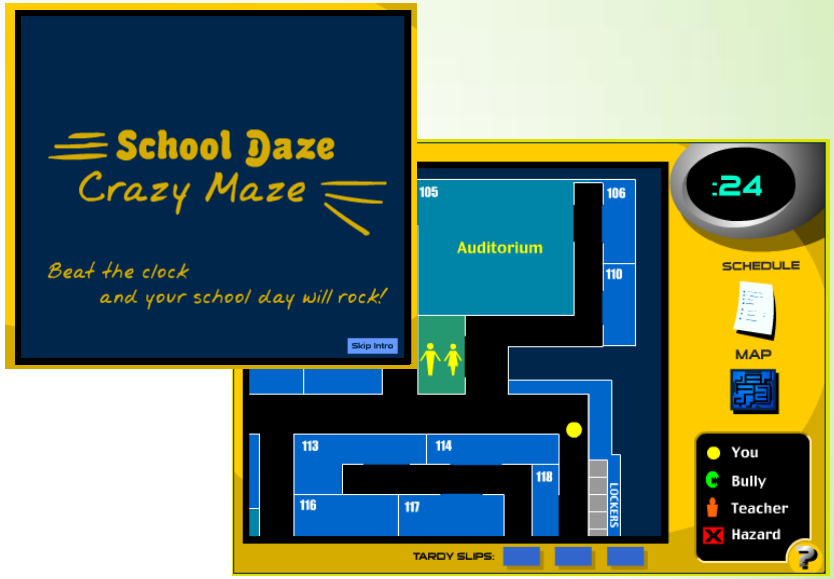




The Good....



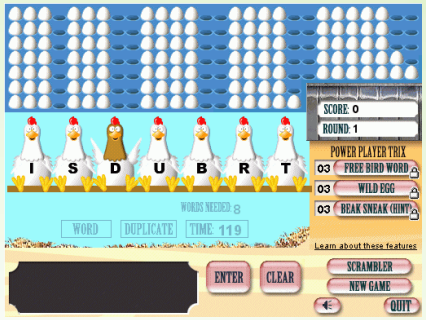


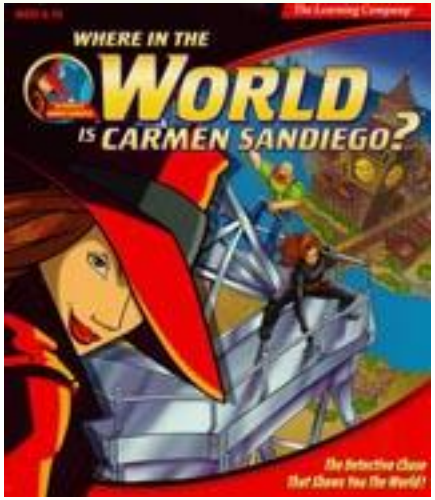


The Bad....

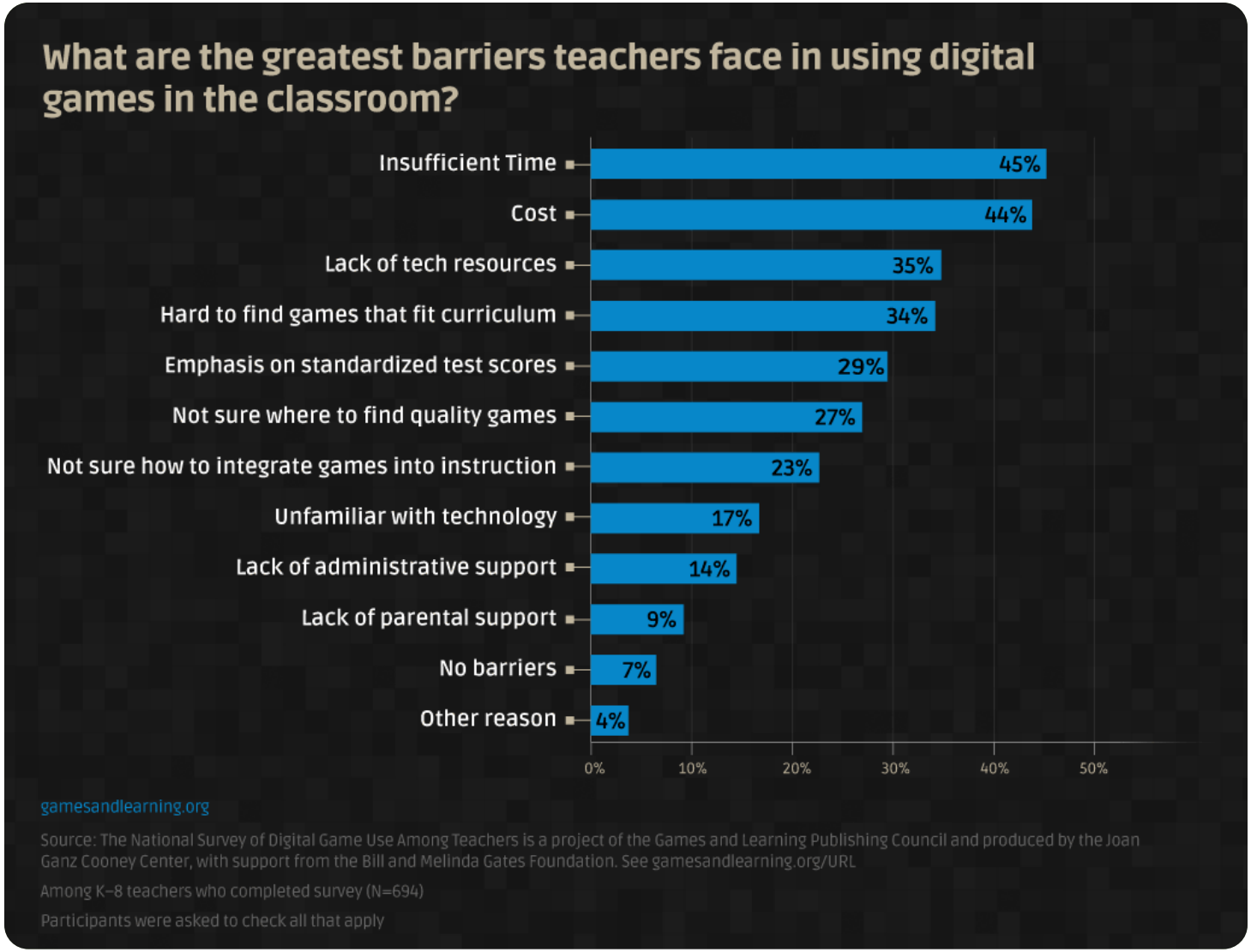
Recipes For Success

Step 3. Putting it all Together

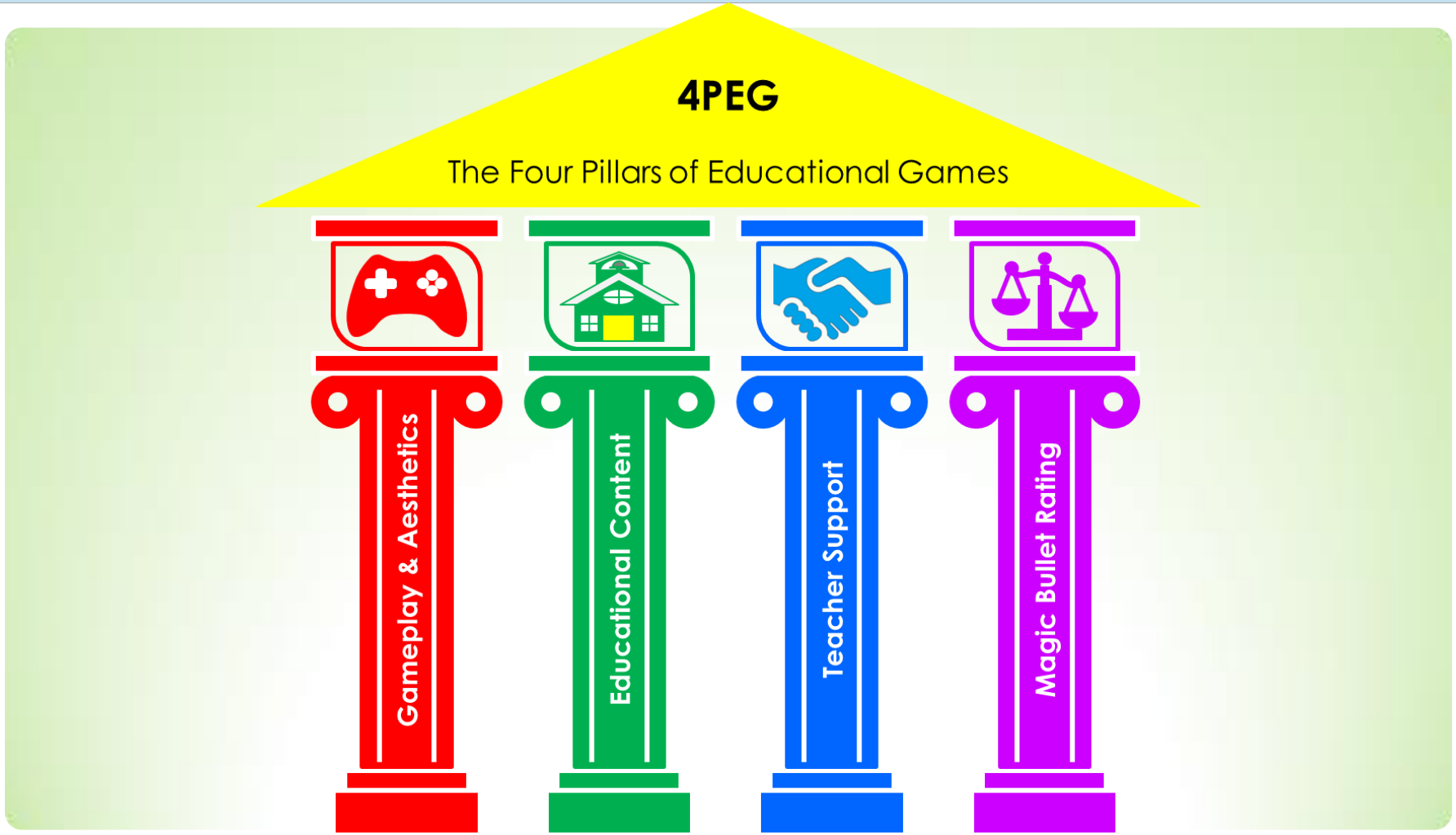




What Makes These Games Good?

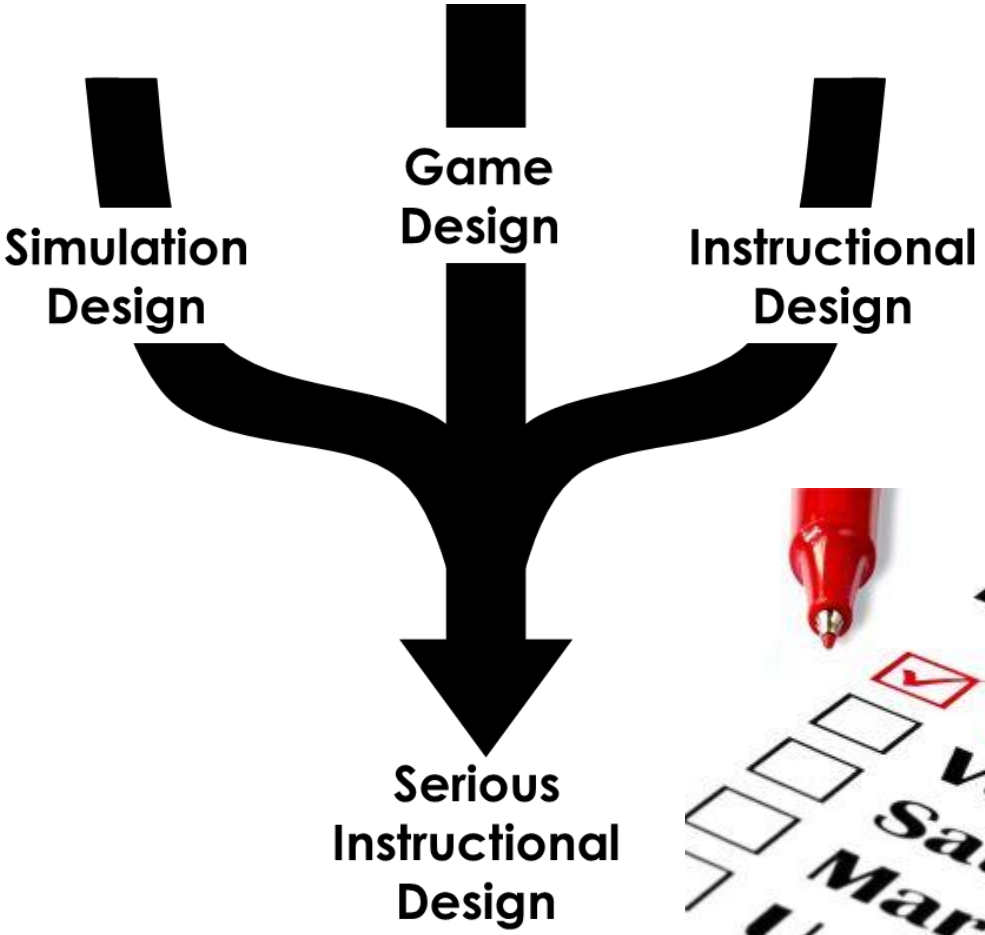


Remember the Barriers?



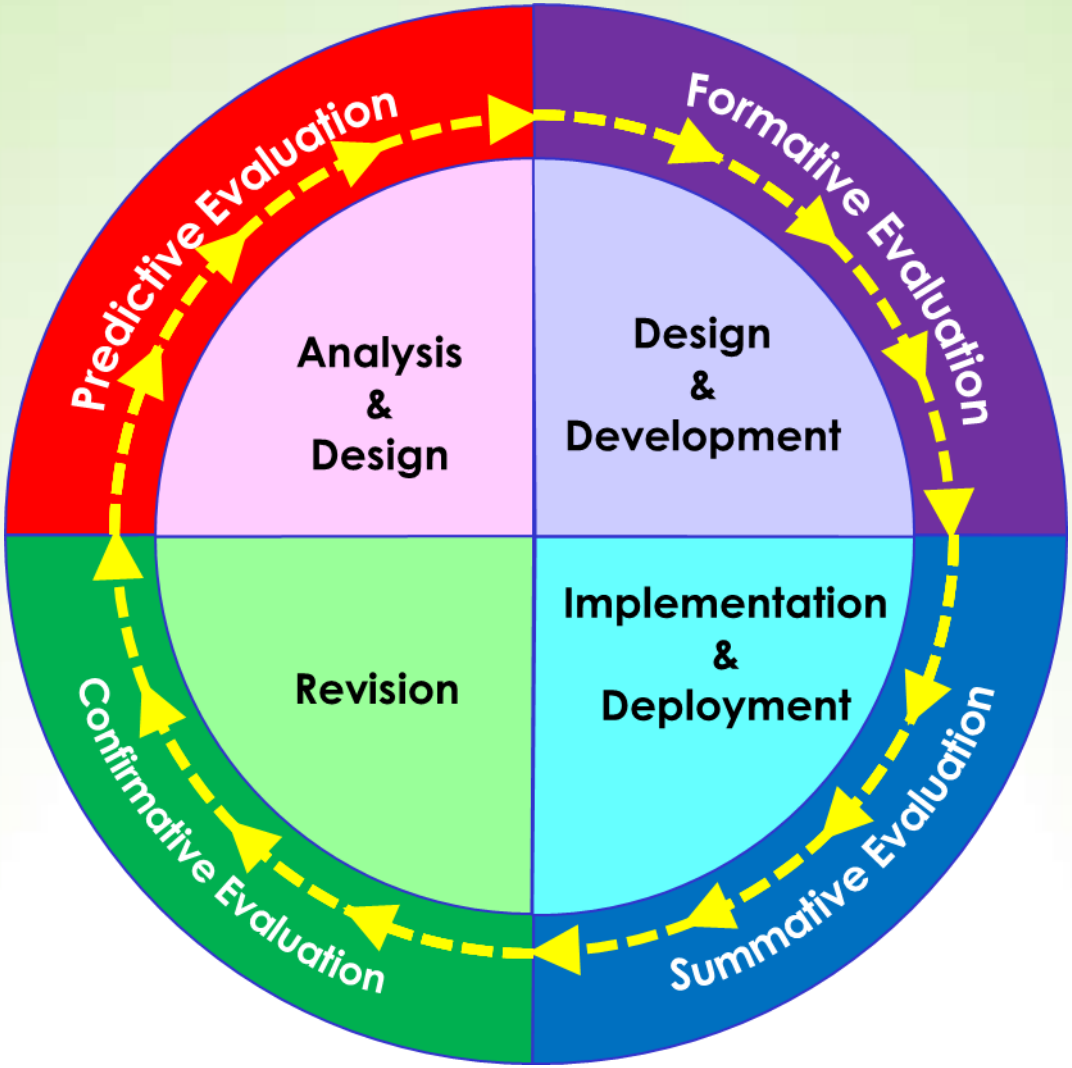
A Solution

A Framework for Design & Analysis



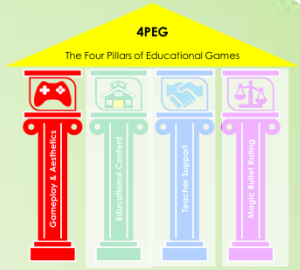
4PEG Framework

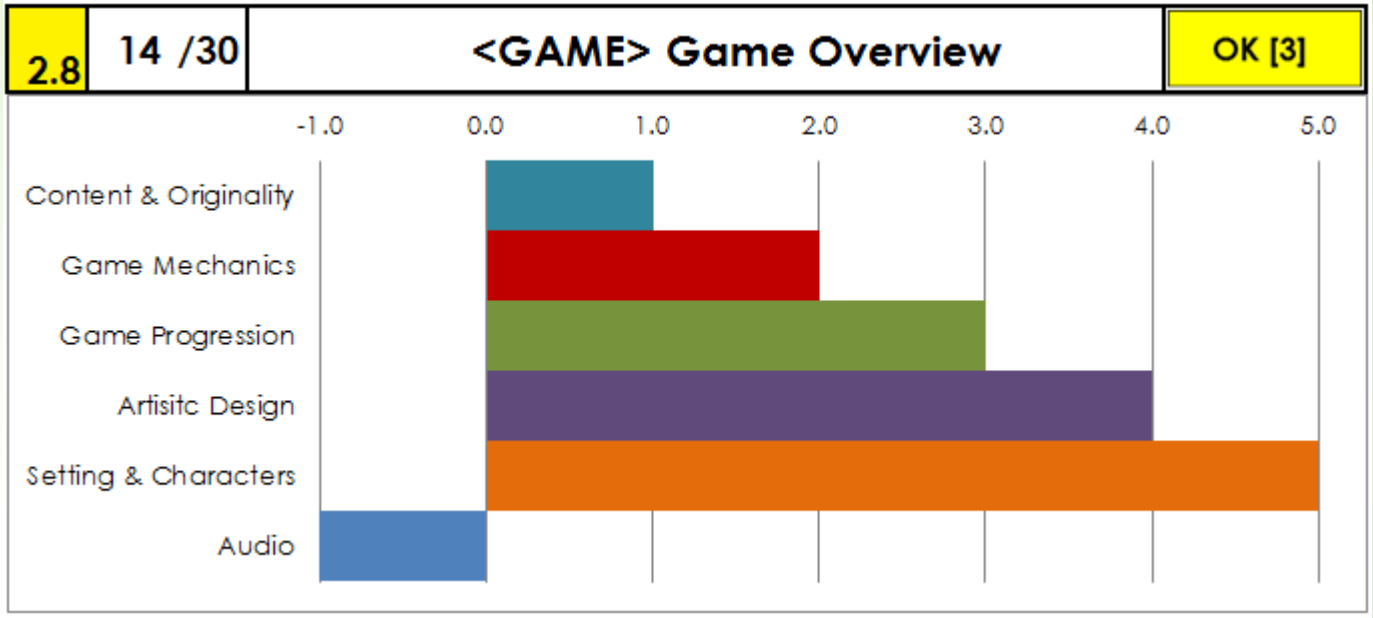
http://minkhollow.ca/MagicBullet/



Predictive Evaluation

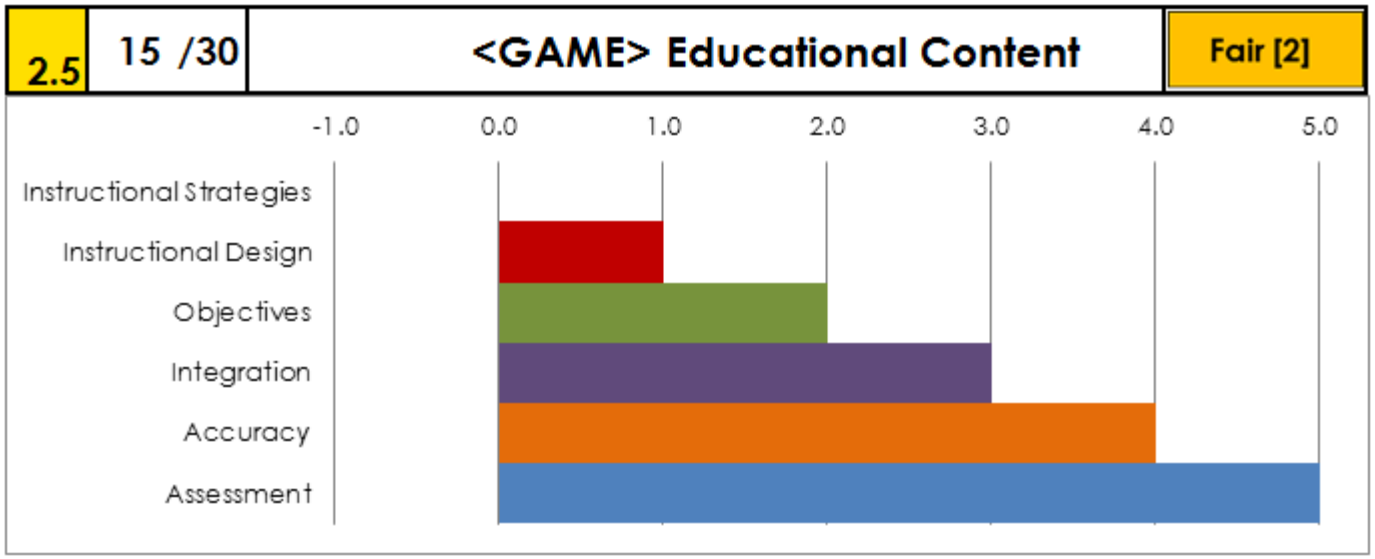
How is it as a game? Is it fun? Is it Interesting? How does it measure up esthetically?



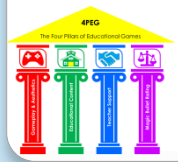


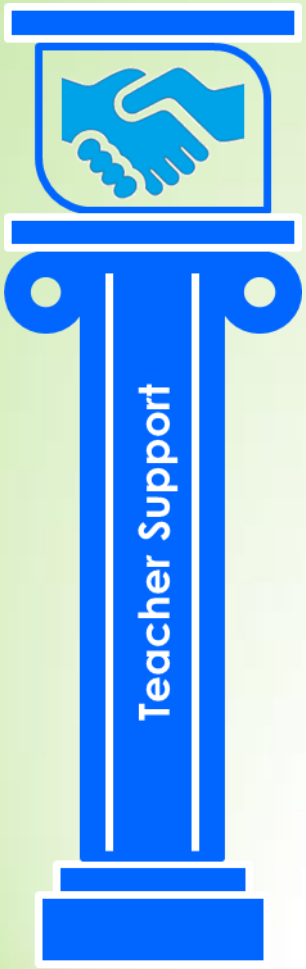
Gameplay & Aesthetics

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

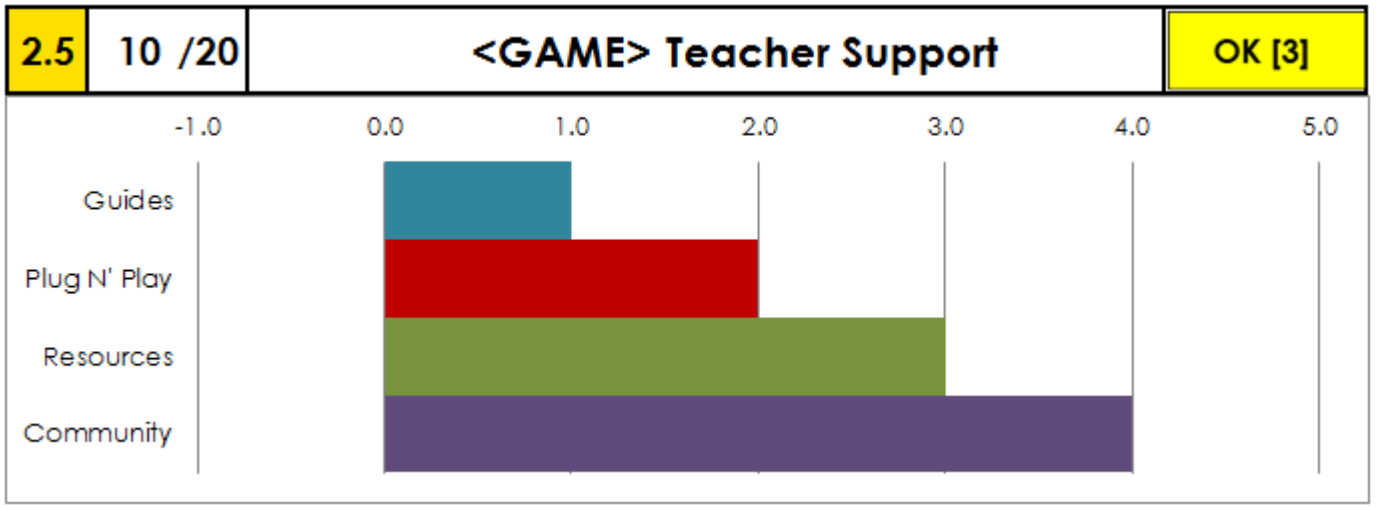


Educational Content

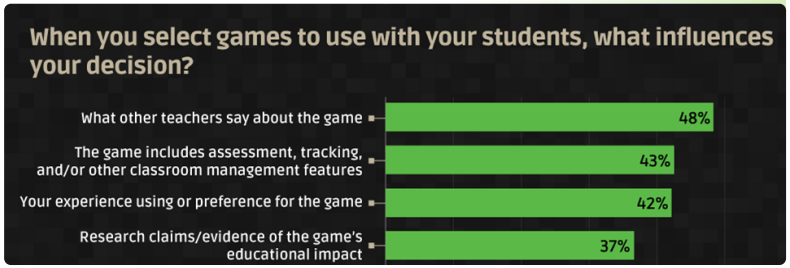


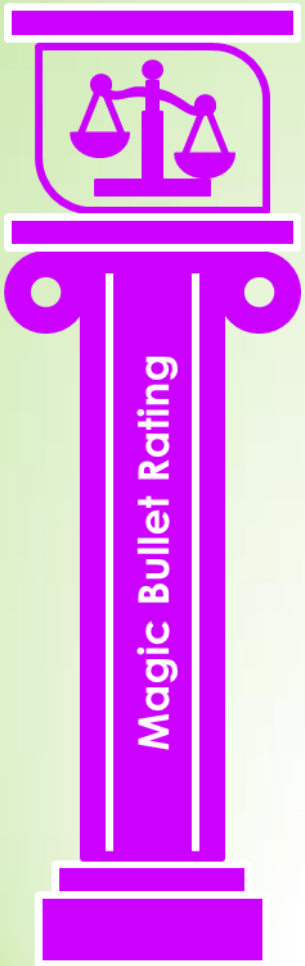


Is there adequate teacher support to make viable for use in a formal setting?

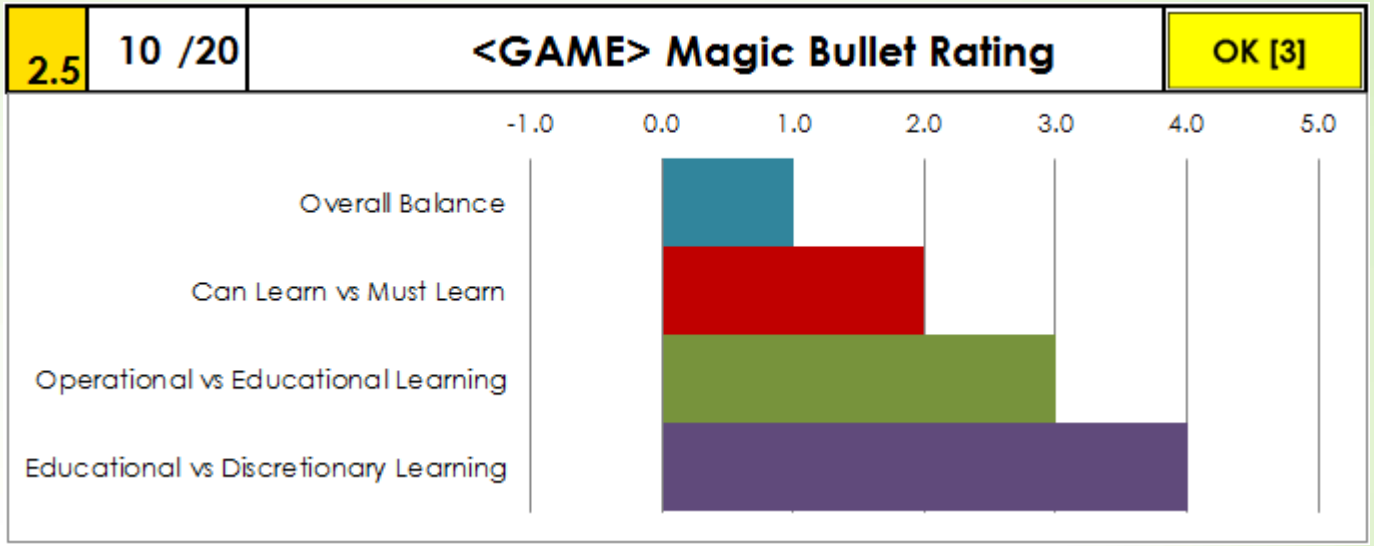


Teacher Support





This section examines the game through the lens of the Magic Bullet model to see how well the various learning elements are balanced.



Magic Bullet Rating

Game Review V5
<GAME>

Fair [2] | OK [3]

Overall Rating	2.5	49	/100

Summaries

Game Overview	2.8	14	/30
Gameplay	2.0	6	/15
Art & Audio	4.0	8	/15

Educational Overview	2.5	35	/70
Teacher Support	2.5	10	/20
Educational Content	2.5	15	/30
Magic Bullet Rating	2.5	10	/20

Game Overview	2.8	14	/30
Content & Originality	1		/5
Game Mechanics	2		/5
Game Progression	3		/5
Artisitic Design	4		/5
Setting & Characters	5		/5
Audio	-1		/5

Educational Content	2.5	15	/30
Instructional Strategies	0		/5
Instructional Design	1		/5
Objectives	2		/5
Integration	3		/5
Accuracy	4		/5
Assessment	5		/5

Teacher Support	3	10	/20
Guides	1		/5
Plug N' Play	2		/5
Resources	3		/5
Community	4		/5

Magic Bullet Rating	2.5	10	/20
Overall Balance	1		/5
Can Learn vs Must Learn	2		/5
Operational vs Educational Learning	3		/5
Educational vs Discretionary Learning	4		/5

NOTE: Items marked -1 (na) are not counted

Questions?

Your Turn

Walking Backwards in to the Future: Ensuring the Success of Games for Learning

"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.

Abstract

Ascii Man, Walking: http://www.janpieter.com/content/046_walking_man_ascii.cfm#content

Reversed: GifMaker http://gifmaker.me/

Images, etc.

Edutainment

Shuler, C. (2012). What in the World Happened to Carmen Sandiego? The Edutainment Era: Debunking Myths and Sharing Lessons Learned, The Joan Ganz Cooney Center at Sesame Workshop. October 2, 2012.

Gredler, M. E. (1996). Educational games and simulations: A technology in search of a research paradigm. In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology (pp. 521–540). New York: Simon & Schuster Macmillan.*

Gredler, M. E. (2004). Games and Simulations and Their Relationships to Learning. In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology (2nd ed.). Mahwah, N.J.: Association for Educational Communications and Technology., Lawrence Erlbaum.*

Gredler, M. E. (2008). Educational Games and Simulations: A Technology In Search Of a (Research) Paradigm. In J. M. Spector, M. D. Merrill, J. V. Merrienboer & M. P. Driscoll (Eds.), *Handbook of research on educational communications and technology (3rd ed., pp. xxxi, 894 p.). New York: Lawrence Erlbaum Associates.*

Alessi, S. M., & Trollip, S. R. (1985). *Computer-based instruction : methods and development. Englewood Cliffs, N.J.: Prentice-Hall.*

Alessi, S. M., & Trollip, S. R. (1991). *Computer-based instruction : methods and development (2nd ed.). Englewood Cliffs, N.J.: Prentice Hall.*

Alessi, S. M., & Trollip, S. R. (2001). *Multimedia for learning : methods and development (3rd ed.). Boston: Allyn and Bacon.*

Videogame timeline: http://www.onlineeducation.net/videogame_timeline
Wikipedia history: http://en.wikipedia.org/wiki/History_of_video_games

Spector, J. M. (2014). *Handbook of research on educational communications and technology* (Fourth edition. ed.). New York: Springer.

Handbook of Research For Educational Communications and Technology, Third edition (2007). 928 pages. 978-0-415-96338-1 edited by J. Micheal Spector, M. David Merrill, Jeroen Van Merrienboer, and Marcy P. Driscoll
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Handbook of Research for Educational Communications and Technology, Second Edition (2004) Edited by David H. Jonassen

Handbook of Research for Educational Communications and Technology, First Edition (1996) Edited by David H. Jonassen