Slide 1: Why are These Such Good Teachers?

When looking at how the different forms of modern media have been used for educative purposes and which particular instances have been chosen, one notion stands out – the majority of the most remarkable and effective “lessons” taught to us have been created by extraordinarily talented writers, directors, and producers together with their teams. They have, by and large, not been created by professional educators or instructional designers.

Far from trying to sell educators and instructional designers short, we should recognize the opportunities afforded us in studying these outstanding examples of “educational” objects, and try to learn why they have the impact they do.

By “studying the masters”, we can progress towards understanding the essential elements of ‘good’ games and begin to discuss the implications this holds for the deliberate design of educational games.

Credits:


West Wing [TV drama] 1999- [image: http://www.nbc.com/The_West_Wing/]

Schindler's List [movie], 1993, Steven Spielberg [image: imdb.com]

Aesop’s Fables [stories], ~600 BC [image: Arlene Graston ]


Slide 2: Are Games Good Teachers Too?

- Games are so engaging precisely because they tap into some of the most effective approaches for learning. Successful games teach us to play in the manner we learn best.
- Play and Learning are Linked
- Piaget (1951) and Bruner (1962) have said that play is important for deep learning, so perhaps they might (have) agree(d) with the assertion that players are also learners.

Credits:


Slide 3: How Do Games Teach? – Learning Theories

The next slides are just a few examples of how games can be shown to implement known learning theories and styles.

Gagné’s Nine Events Applied to Games:

1. **Gaining Attention (Reception)** "attract mode" (what one sees when a game appears to be playing by itself) the set-up. Also, trailers.

2. **Informing Learners of the Objective (Expectancy)** back-story and description of the victory condition - trailer, advertising, and at start of the game. In sequels, basic premise usually is similar to the previous game. In licensed games, the back story is pre-determined. A game based on Spiderman should involve fighting crime, and the main character would look, and act in a particular way and have particular abilities as well as weaknesses.

3. **Stimulating Recall of Prior Learning (Retrieval)** back-story: sequels and new levels refer back to things learned, achieved, or discovered in previous levels/versions. At the start of a game, the opening sequence describes something that players are expected to know. Some games provide both subtle (a glow around an object) and not-so-subtle clues (a voice actually tells you).
4. **Presenting the Stimulus (Selective Perception)** If a player can not easily determine what she needs to do in a given situation, she will become frustrated and eventually give up. If I wander aimlessly about in *Pikmin*, I will eventually get a reminder of my ultimate goal, and a hint – where to look, something to do or examine.

5. **Providing Learning Guidance (Semantic Encoding)** Games must be self-contained; players do not use manuals. Learning how to play is accomplished within the game itself. In effect, games act as the tutor – use a multitude of sophisticated "just-in-time" approaches to providing help. Verbal or written hints, items that glow briefly as they come into view, NPC’s that tell you something or offer help. Real world fan communities.

6. **Eliciting Performance (Responding)** This is, of course, an essential component of interactivity – without this, there really is no game. While the physical interface for most games is limited and tends to remain the same from game to game and console to console, how one actually plays the game can vary.

7. **Providing Feedback (Reinforcement)** – provided in many ways, including scores; displays (the head up display, or HUD being a common approach); queries; and verbal feedback. Characters within games typically have various attributes that the player can monitor throughout the game: strength, magic, health, etc.

8. **Assessing Performance (Retrieval)** – Achieving a favourable assessment is what the game is about. Even in a game like *Dance Dance Revolution* where there are no opponents to fight, no treasure to find, and no puzzle to solve, a running ‘score’ of how closely the players’ moves approximate perfection is essential.

9. **Enhancing Retention and Transfer (Generalization)** – moving through levels within a single game requires players to remember skills, knowledge and strategies learned in the previous level and use them to overcome obstacles and solve problems in the next. On a larger scale, skills and strategies learned in one game are often applicable to sequels, other games and even entire genres.

**Credits:**


Reeves, Thomas C., [GAGNÉ’S NINE EVENTS TEMPLATE](http://www.indiana.edu/~idtheory/home.html) Instructional Technology, College of Education, The University of Georgia

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**Slide 4: How Do Games Teach? – Learning Theories**

Reigeluth’s Elaboration Theory

Elaboration theory proposes seven major strategy components, and when they are applied to the design of good games we find:

1. **An Elaborative Sequence.** Good games follow a well-paced sequence progressing from simple (and easy) to complex (and hard). A Game explains its own context (theoretical), requirements to operate (procedural), and goals for play (conceptual).

2. **Learning Prerequisite Sequences.** Tutorial mode - involves some simplifications as well as suggestions. Boss-battles, death-spirals. Story-mode.

3. **Summary.** Almost all games provide some form of “stats” (HUD – score, health, strength, maps, assets, etc.)

4. **Synthesis** Levels of play - building on knowledge gained from the previous one. Often players are defeated many times before finishing a game. Each time they try again, they do so having gained some knowledge or understanding that they will apply correctly this time in order to progress a little further.

5. **Analogies.** Players very quickly learn to look for approaches or tactics that are similar to some other game they have played, and will try to apply these in any new context that looks like it might favour this approach.

6. **Cognitive Strategies.** Progressions, repertoires, etc. exist by the very design of games and is one of their great achievements: the ability to force the player to use strategies invented by the designers in order to achieve their goals. A significant part of the challenge, enjoyment, and attraction of games is the desire to uncover the requisite strategies that allow the player to reach the ‘victory condition’ in a game.

7. **Learner Control.** Player (learner) control is an obvious requirement of all games: without this it stops being categorized as a game.

**Credits:**


Indiana University’s [Instructional Design Theories Home Page](http://www.indiana.edu/~idtheory/home.html)

Kearsley, Greg, [Explorations in Learning & Instruction: The Theory Into Practice Database](http://tip.psychology.org/reigelut.html)
**Slide 5: How Do Games Teach? – Learning Styles**

Keirsey (based on Myers-Briggs)

**Artisans** value freedom and spontaneity. They tend to be impulsive, playful and creative.

**Guardians** value belonging to a group or community. They tend to be traditional, responsible and conservative.

**Idealists** value personal growth, authenticity, and integrity. They tend to try and encourage these traits in others. This group includes people they define as "teachers".

**Rationals** value competence and intelligence. They strive for knowledge, predictability, and control.

**Kolb’s Learning Style & Characteristic Description**

**Converger:**
- Practical application of ideas
- Focus on hypo-deductive reasoning on specific problems
- Unemotional
- Narrow interests

**Diverger:**
- Imaginative ability
- Generates ideas and sees things from different perspectives
- Interested in people
- Broad cultural interests

**Assimilator:**
- Can create theoretical models
- Excels in inductive reasoning
- Abstract concepts rather than people.

**Accommodator:**
- Doing
- Risk taker
- Can react to immediate circumstances
- Solves problems intuitively

**Credits:**


**Slide 6: How Do Games Teach? – Learning Styles**

**Felder’s Index of Learning Styles**

<table>
<thead>
<tr>
<th>Index of Learning Styles</th>
<th>Reflective (thinking) Black &amp; White, Syberia, Myst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active (doing) Medal of Honor, Star Wars, Super Mario Kart</td>
<td>Reflective (thinking) Black &amp; White, Syberia, Myst</td>
</tr>
<tr>
<td>Sensing (facts, processes) Civ III, SIMs, Age of Empires</td>
<td>Intuitive (concepts, relationships) Pikmin, Katamary Damacy, Harvest Moon</td>
</tr>
<tr>
<td>Visual (seeing, picturing) Super Mario Kart, Super MonkeyBall</td>
<td>Verbal (hearing, reading, saying) Electroplankton, Karaoke Revolution</td>
</tr>
<tr>
<td>Sequential (step-wise) Roller Coaster Tycoon, Myst</td>
<td>Global (leaps, random) Psychonauts, Grim Fandango</td>
</tr>
</tbody>
</table>

**Credits:**

Fedler, R.M., and Soloway, B., University of North Carolina, *INDEX OF LEARNING STYLES (ILS)*

**Slide 7: How Do Games Teach? – Learning Styles**

**Gregorc System of Learning**

<table>
<thead>
<tr>
<th>Gregorc’s Learning Styles</th>
<th>Linear and sequential.</th>
<th>Super MonkeyBall, Pikmin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete-Sequential</td>
<td>Linear and sequential.</td>
<td>Super MonkeyBall, Pikmin</td>
</tr>
<tr>
<td>Concrete-Random</td>
<td>Concrete and intuitive</td>
<td>Syberia, Myst</td>
</tr>
<tr>
<td>Thrives on problem-solving.</td>
<td>Concrete and intuitive</td>
<td>Syberia, Myst</td>
</tr>
<tr>
<td>Abstract-Sequential</td>
<td>Abstract and analytical</td>
<td>Myst, Syberia</td>
</tr>
<tr>
<td>Thrives on a mentally challenging</td>
<td>Abstract and analytical</td>
<td>Myst, Syberia</td>
</tr>
<tr>
<td>but ordered learning environment.</td>
<td></td>
<td>Myst, Syberia</td>
</tr>
<tr>
<td>Abstract-Random</td>
<td>Emotional and imaginative,</td>
<td>Katamari Damacy, Electroplankton</td>
</tr>
<tr>
<td>Prefers an active, interesting, and informal learning environment.</td>
<td></td>
<td>Katamari Damacy, Electroplankton</td>
</tr>
</tbody>
</table>
Credits:

Dennis W. Mills, Ph.D. (2002) *Applying What We Know Student Learning Styles* 
http://www.csrnet.org/csrnet/articles/student-learning-styles.html

Slide 7: Next Steps
• Is there a balance in games today?
• Are games preferentially “training” to certain styles?
• Are certain types/genres of games preferred by certain styles of learners?
• Do gamers have similar styles?
• How might we leverage this for education?

Credits:

Further Resources:
1. Becker, Katrin, *Games and Learning Styles* Presented at the Special Session on Computer Games for Learning and Teaching, at The IASTED International Conference on Education and Technology ~ICET 2005~ July 4-6, 2005 Calgary, Alberta, Canada