Game and Learn:
An Introduction to Educational Gaming
5. Games and Education

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Who Plays Games?

Some Facts About Game Players

- The average videogame player is 35 years old
- 40% of all videogame players are women
- 69% of heads of households play videogames
- Among teens ages 12-17:
  - 97% play videogames (99% boys, 94% girls)
  - 80% play five or more different game types; 40% eight or more
  - 76% play games as a social activity:
    - 65% play with others in the same room; 27% online
  - Same-room game play relates positively to civic outcomes
  - Game-related social interaction relates positively to civic outcomes

The Educational Research

Effectiveness of Games in Education I (Randel, Morris, Wetzel, and Whitehill)

- Meta-study of 68 studies from 1963-1991
  - Social sciences; mathematics; language arts; logic; physics; biology
- Most effective: language arts and mathematics
  - 12 out of 14 studies showed positive results
- Next most effective: social sciences
  - 13 out of 46 showed positive results
  - 33 out of 46 were as effective as traditional methods
- Game learning overall showed better retention than traditional learning
- Students showed greater interest in topics taught via games or simulations

Effectiveness of Games in Education II (Fletcher and Tobias)

- Review of research from 1992-2005
  - 42 papers directly related to use of games in instructional settings
- Topics:
  - Transfer to Real-Life Tasks: 5 positive, 1 neutral, 1 mixed
  - Facilitating Performance, Learning, and Transfer: 4 positive
  - Transfer to Related Tasks or Domains: 8 positive, 1 neutral
  - Effects on Different Variables: 5 positive
  - Effects on Cognitive Processes: 9 positive
  - Team Characteristics of Game Players: 1 positive, 2 mixed
  - Motivational Effects: 3 positive, 2 mixed

Effectiveness of Games in Education III (Mayo)

Table 1. Learning outcomes of several games compared to lecture on same material.

Game	Topic	Audience	N (study size)	Learning outcome over lecture	Reference
Dimenxian/ Evolver	Algebra	High school	193	7.2%	(*37–39*)
Geography Explorer	Geography	College	273	15 to 40%	(*40*)
NIU Torcs	Numerical methods	College	86	2× more time spent on homework, much more detailed concept maps	(*10–11*)
River City	Ecology/ biology	Middle/high school	≈2000	15 to 18%, on average	(*13*)
Supercharged!	Electrostatics	Middle school	90	+8%	(*41*)
Virtual Cell	Cell biology	College	238	40%, on average	(*40*)

Two Examples

SAMR Substitution/Augmentation:
Dimenxian Evolver

SAMR Modification/Redefinition:
River City

Redefinition
Tech allows for the creation of new tasks, previously inconceivable

Modification
Tech allows for significant task redesign

Transformation

Enhancement

Augmentation
Tech acts as a direct tool substitute, with functional improvement

Substitution
Tech acts as a direct tool substitute, with no functional change

Resources Cited

- **Who Plays Games:**
  - Entertainment Software Association – Online at: http://www.theesa.com/facts/index.asp
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- **The Educational Research:**
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  - Fletcher, J.D. and S. Tobias. "Using Computer Games and Simulations for Instruction: A Research Review." *Proceedings of the Society for Advanced Learning Technology Meeting*. (February 2006)
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- **The SAMR Model:**
  - Puentedura, R.R. *As We May Teach: Educational Technology, From Theory Into Practice*. (2009)
    On *iTunes U* at:
    http://deimos3.apple.com/WebObjects/Core.woa/Browse/education-maine.gov.1835411146
- **Game Sources:**
  - *Dimenxian Evolver*: http://www.dimensionm.com/
  - *River City*: http://muve.gse.harvard.edu/rivercityproject/

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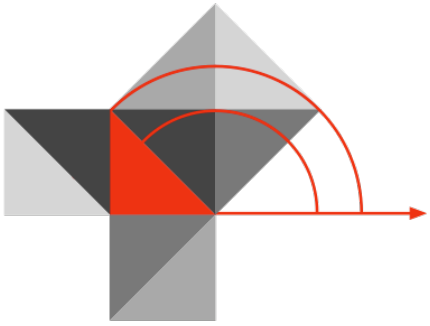

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