Three Genres of Game Research

By Richard E. Mayer

Educational computer games have promise for improving learning, but we are just beginning to test that potential in scientific research.

Potential and Pitfalls of Educational Computer Games:

Potential

- Game features promote motivation (increasing generative processing).

- Instructional features promote learning (increasing essential processing).

Pitfalls

- Game features diminish learning (increasing extraneous processing).

- Instructional features diminish motivation (decreasing generative processing).
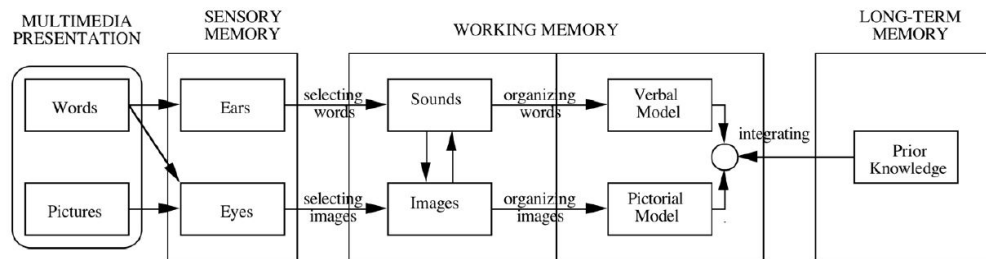
Cognitive Theory of Multimedia Learning:

Illustration 1: Cognitive Theory of Multimedia Learning.

Three Kinds of Cognitive Processes During Learning:

Process	Definition	Effects of games
Extraneous.	Cognitive processing during learning that does not serve the instructional objective.	+ Game features – Instructional features.
Essential.	Cognitive processing during learning required to mentally represent the presented material (e.g., selecting).	+ Game features – Instructional features.
Generative.	Cognitive processing during learning required to make sense of the presented material (e.g., selecting, organizing, integrating).	+ Game features – Instructional features.

Players in Game Research:

Who	What they do	How they view

		games
Visionaries	Inspire	Positive
Developers	Dazzle	Positive
Educators	Connect	Positive
Investigators	Inform	Critical

Problem

- Strong claims based on weak evidence.

Solution

- Develop game research methodologies.

- Produce high-quality evidence base on games for learning.

- Ground game research in cognitive theory.

- Foster collaboration among visionaries, developers, educators, and investigators.

What are games for learning?

Games for learning are games intended to promote learning (i.e., intended to improve performance on target tasks).

Play Game → Improve on measures of learning outcome

What are the characteristics of educational games?

Characteristic	Description
Rule-based	Events occur based on a set of knowable rules.
Responsive	Environment allows for player to act and responds promptly and saliently.
Challenging	Environment provides opportunities for success on difficult tasks.
Cumulative	Current state of the environment reflects player's previous actions and allows for assessment of progress towards goals.

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