

# How serious are Serious Games?

Speculative effects of Computer Games





Kriegsspiel

# History

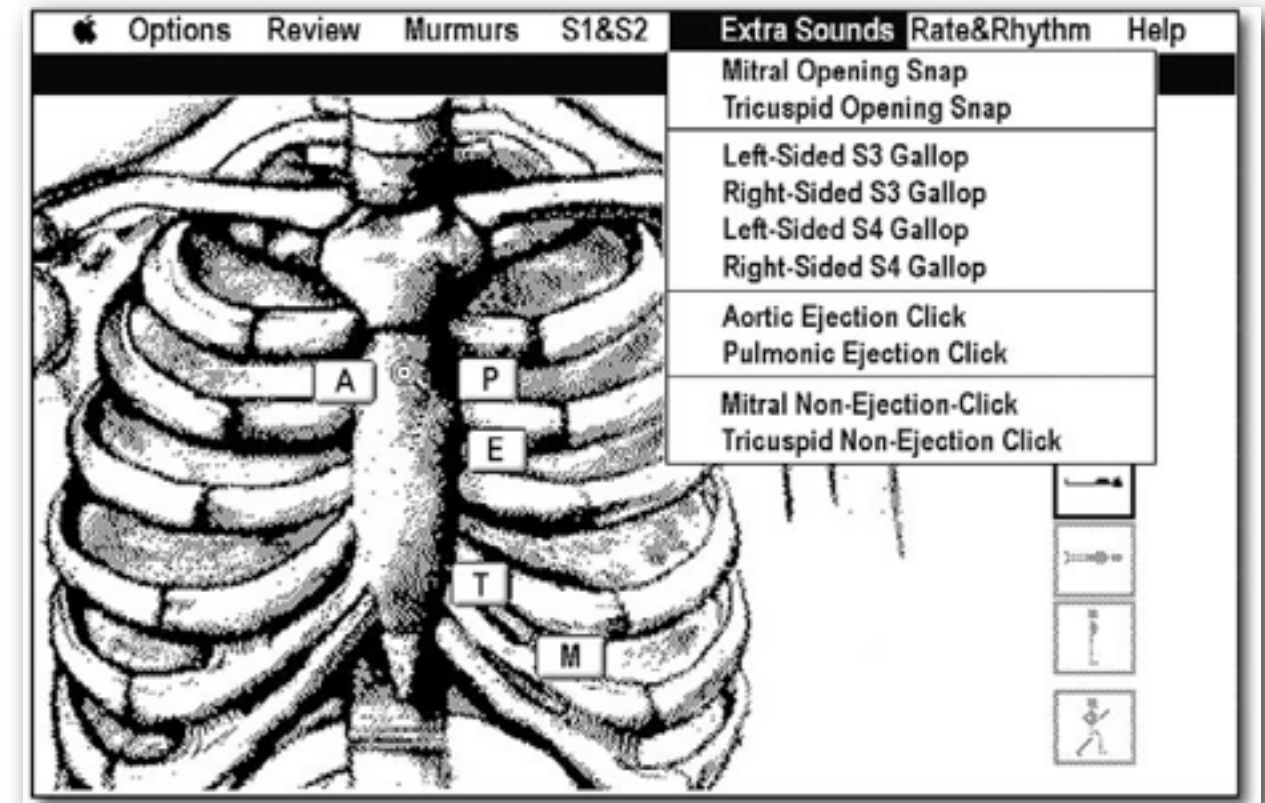
Flight Simulator  
Computer Aided Instruction



ANT-18



Aviation Combined



Heart Lab



# Eduainment



# Serious Games



A Serious Game is a game with an agenda

Serious Games can be fun but don't have to (but they should be engaging)

They strive for competences applicable in contexts outside the game

Bad Example

Serious Content in common (and arbitrary) game mechanics



# Activism Games



Darfur is Dying, 2006



Gezi Jam 2013



# Advergames



Fanta – King of the Park



Froot Loops Games



# Business / Corporate Games



Vision



Blossom Flower





iDance

Exergames



# Government Games

The screenshot shows a top-down view of a factory floor with various workstations and inventory areas. The interface includes several data panels and navigation elements:

- Module 1: The Production Process** (top center)
- Reputation Score**: 0 (top center, with 4 stars)
- Goal: Complete 5 Contracts** (top right)
- Net Worth**: \$7,000.00 (top right)
- Account Balance**: \$5,000.00 (top right)
- Completed Contracts**: 0 (top left)
- Current Bids**: 0 (top left)
- Production Employees**: 5 (top left)
- Average Skill Score**: 4 stars (top left)
- Production Run**: Run 1 (top left)
- Advisor**: A character icon labeled 'advisor' (top right)
- Notifications**: A button (top right)
- end turn**: A button (bottom left)
- stats**: A button (bottom left)
- Kibby & Strand**: Turn 3 of 100, Jan 21st Year 1 Winter (bottom left)
- Current Contracts**: 229, 6 wk (bottom center)
- home**: A button (bottom right)
- Color palette**: A set of colored squares (bottom right)



# Health and Medicine Games



Surge World



Rage Control



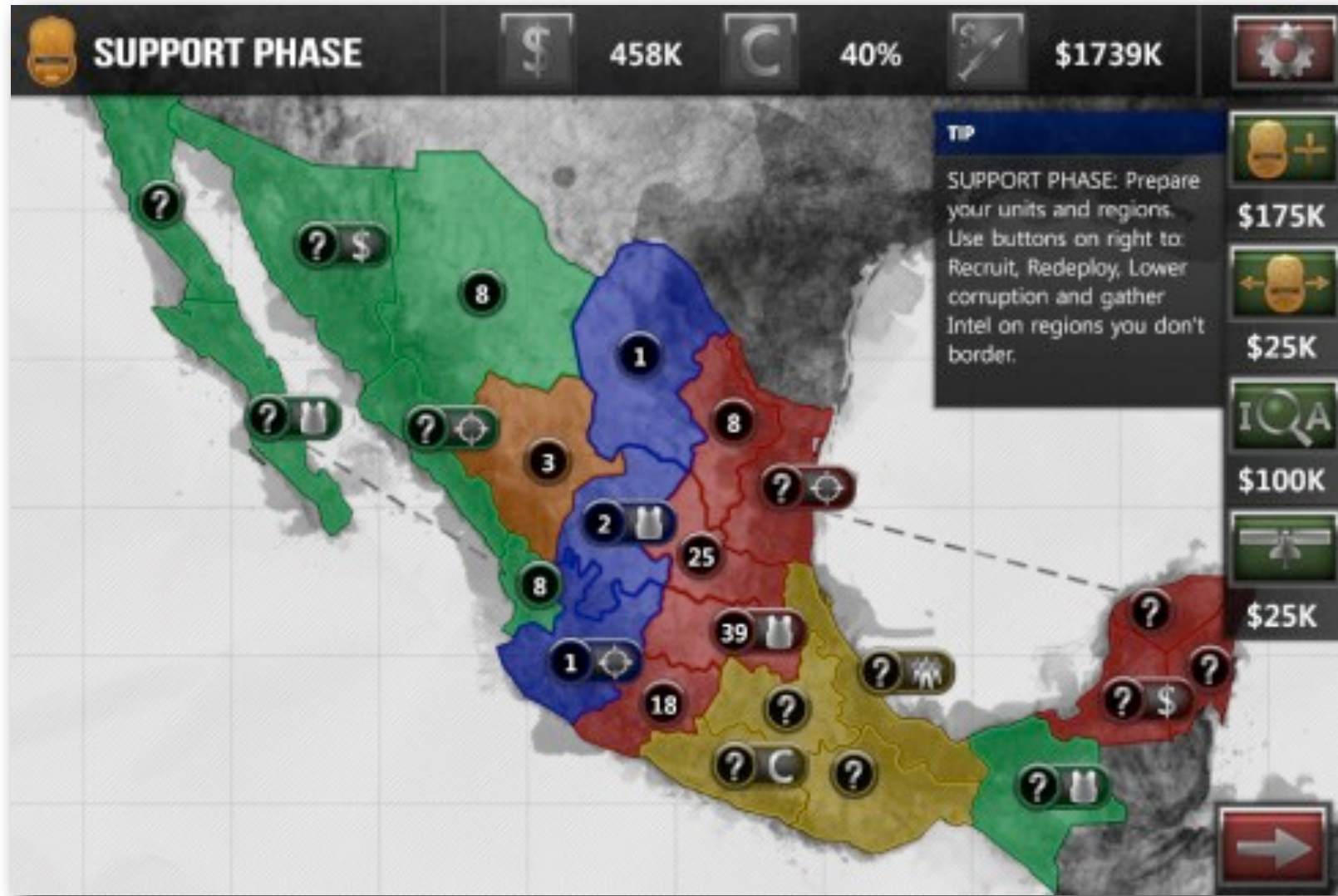
Re-Mission 2

**Augmenting Anger Control Therapy with a Videogame Requiring Emotional Control: A Pilot Study on an Inpatient Psychiatric Unit**  
[http://www.benthamdirect.org/pages/b\\_viewarticle.php?articleID=3182314](http://www.benthamdirect.org/pages/b_viewarticle.php?articleID=3182314)

**A Video Game Improves Behavioral Outcomes in Adolescents and Young Adults With Cancer: A Randomized Trial**  
<http://pediatrics.aappublications.org/content/122/2/e305.full>



# News Games



Narco Guerra



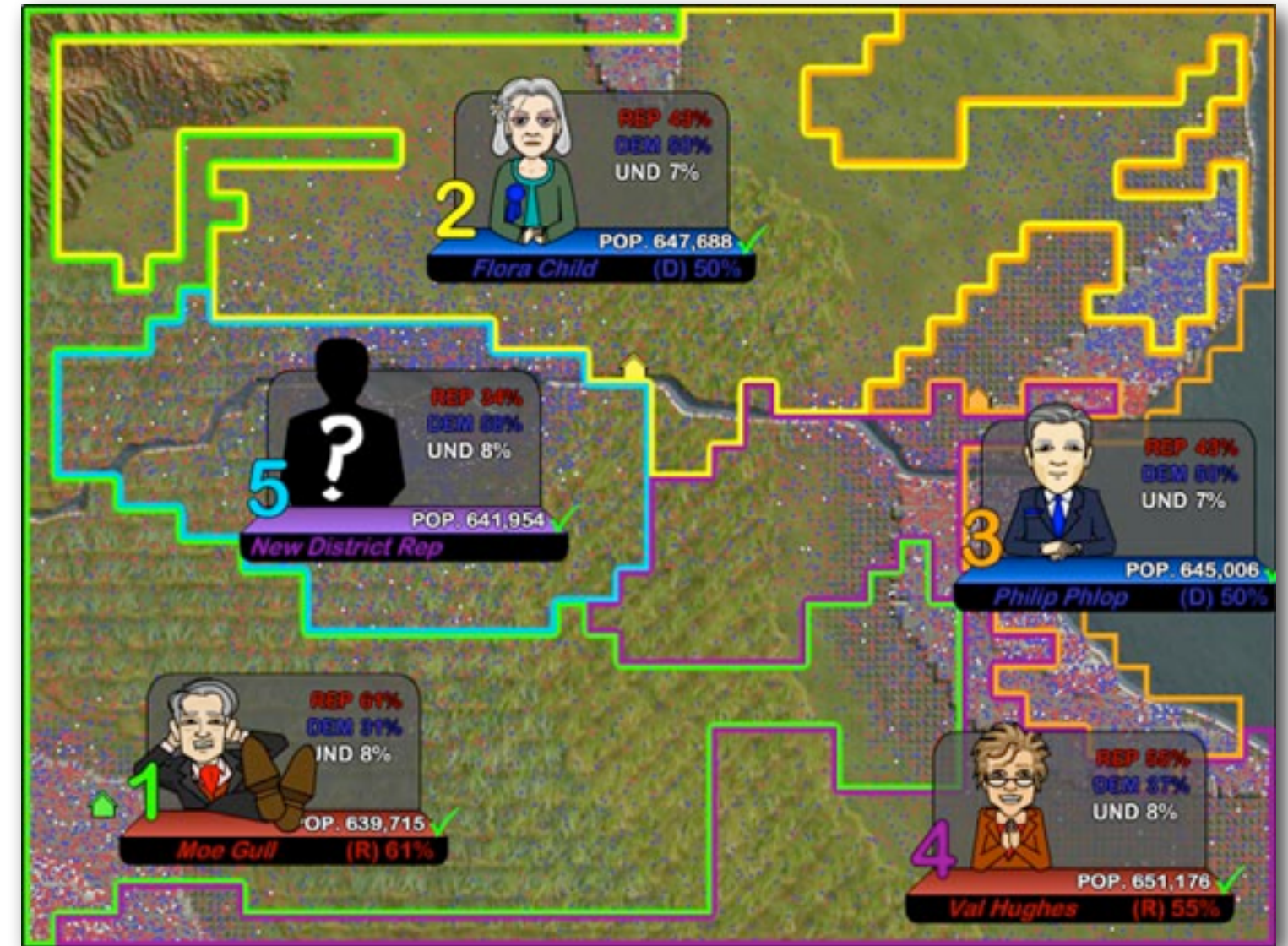
September 12th



# Political Games



Peacemaker



Redistricting Game



# Military Games



Operational Language and Culture Training



Virtual Cultural Awareness Trainer





25
13.11.2011
14:25
8,723,673
0

# Simulations



Farming Giant 2013

<b>FIELD</b>		<b>SOIL PARAMETERS</b>	
Status: Growing (0kg) (0%)	Underground master: 0.00	pH: 6.6	52.02%
Humidity: 58% - 82%	pH: 6.5 - 7.0	35.98%	0 / 0



# Game Based Learning



Rocksmith



# Gamification

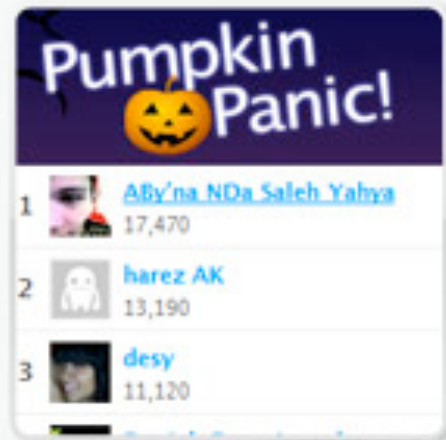
Using game elements in a non-ludic context



## Easy-to-use widgets to gamify your website.

Helping global businesses like yours generate millions of new visits!

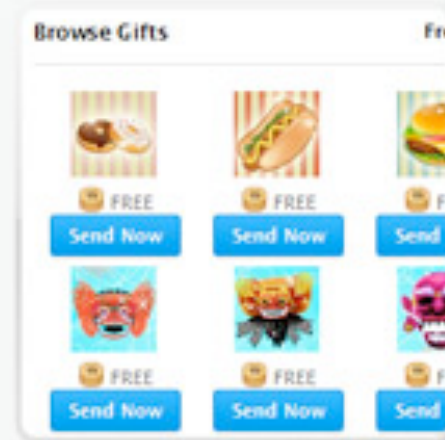
Leaderboard



Achievements



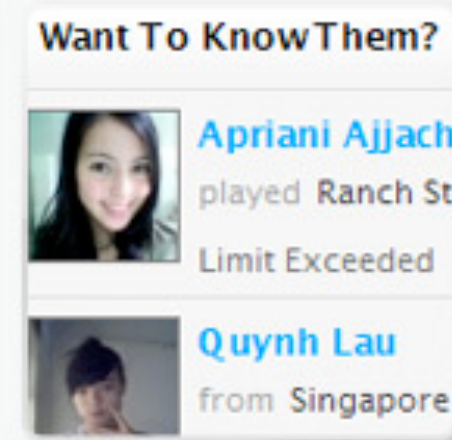
Gifts



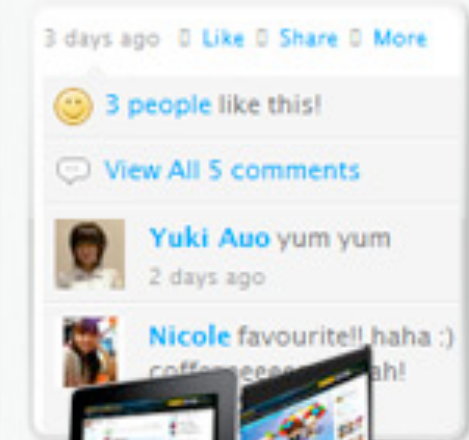
Single Sign-On



Recommended Friends



Like & Share





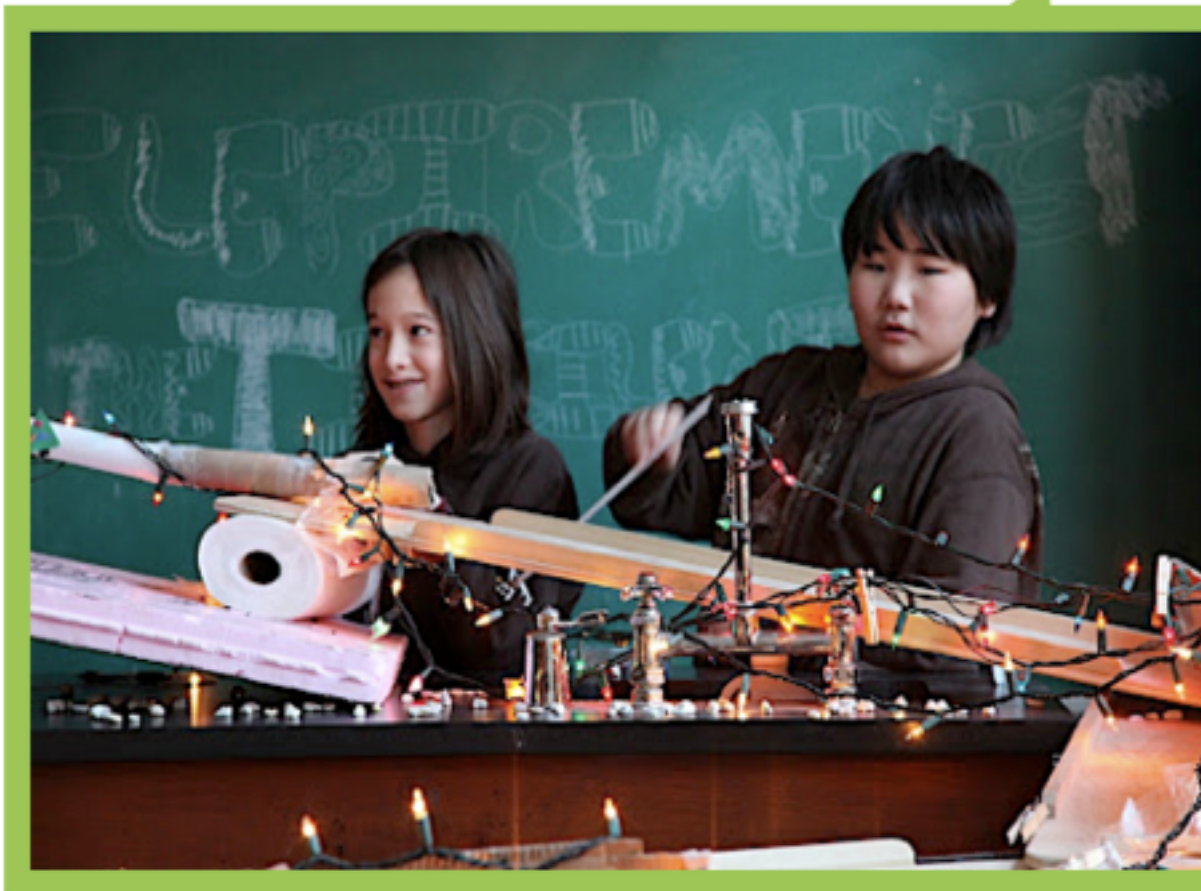
- ▶ About Q2L
- ▶ Our Learning Model
- ▶ Learning in Action
- ▶ Join Us
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- Middle School Enrollment
- Upper School Enrollment

PARENT KIT

MEDIA KIT

CURRICULUM

## GALLERY



## WHAT'S GOING ON?

Quest to Learn is a school for digital kids. It is a community where students learn to see the world as composed of many different kinds of systems. It is a place to play, invent, grow, and explore.

For weekly updates, check out the [Q2L Relay!](#)



»Games work as **rule-based learning systems**, creating worlds in which players actively participate, use strategic thinking to make choices, solve complex problems, seek content knowledge, receive constant feedback, and consider the point of view of others. As is the case with many of the games played by young people today, Quest is designed to enable students to “take on” the identities and behaviors of explorers, mathematicians, historians, writers, and evolutionary biologists as they work through a dynamic, challenge-based curriculum with content-rich questing to learn at its core.«



# Media impact



Catharsis  
Inhibition  
Habitualisation  
Cultivation  
Suggestion  
Arousal transfer  
Stimulation  
Rationalisation  
Escapism  
Learning theory  
Sensibilisation  
Emotionalisation  
Imitation

**Class Media** Nicole Dodson, Dakota Jerome Solbakken and Nadine Clements, students at Quest to Learn, a New York City public school, play a game they designed.



## The Neurology of Gaming

Video games have both positive and negative effects on the human brain. They can be used to educate through repetition and feedback, but they also have some less-positive side effects.

### The parts of the brain impacted by games

Different gaming scenarios and situations affect different areas of the brain by provoking certain reactions.



Game play involves repeated actions that strengthen the brain cell connections underlying memory and learning.



**PREMOTOR & PARIETAL CORTEX**  
Games that require real-time action, like "Space Invader," activate these areas, which control sensory movement.



**PREFRONTAL CORTEX**  
Games that require logical thinking, like "Othello" and "Tetris," activate this area, which controls decision making.



**DOPAMINE**  
Dopamine, which is involved in learning and feelings of reward, is released in the brain's striatum during video game play.

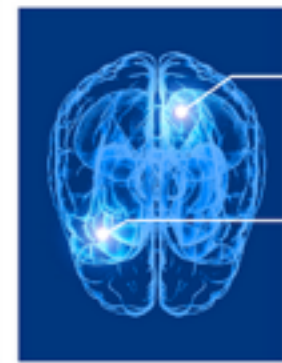


**DORSAL ANTERIOR CINGULATE CORTEX**  
Immediately after firing a weapon in a video game, players show greater activity in this area, which controls cognition and planning.



**ROSTRAL ANTERIOR CINGULATE CORTEX & AMYGDALA**  
Areas that resolve emotional conflict showed less activity while players fired a weapon and soon afterward. Studies say players may suppress their emotional response to cope with their violent actions.

### The effects of violent video games



When gamers play frequently, there's a decrease in prefrontal lobe activity. This can lead to altered moods and aggressive behavior, which can last even after the game is turned off.

One week of violent game play can lead to lower activation of the left inferior frontal lobe during emotional tasks and also in the anterior cingulate cortex during numerical tasks.

Those who play high-aggression games are significantly more anxious than those who don't.

Playing violent games increases aggressive thoughts, feelings and behaviors in the short and long-term.

### The positive and negative effects of video game

Depending on what area of the brain is being tested, studies can produce very different results.

# Media Impact and Learning Theories

## Behaviour

Imitation  
Habitualisation  
Stimulation  
Arousal transfer  
Inhibition

## Cognition

(De-)Sensibilisation  
Suggestion  
Emotionalisation  
Catharsis  
Rationalisation

## Construction

Cultivation  
Escapism



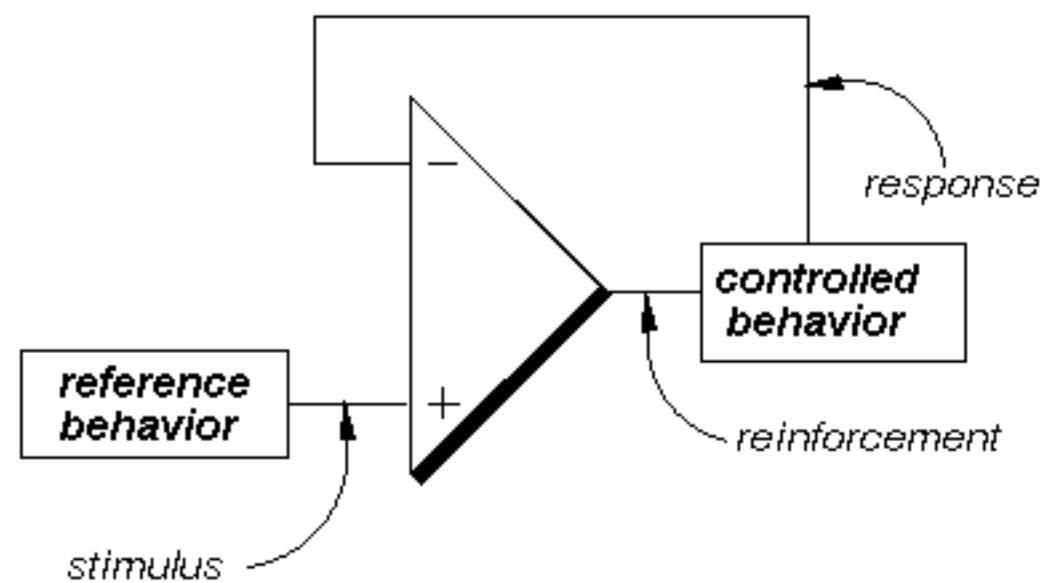
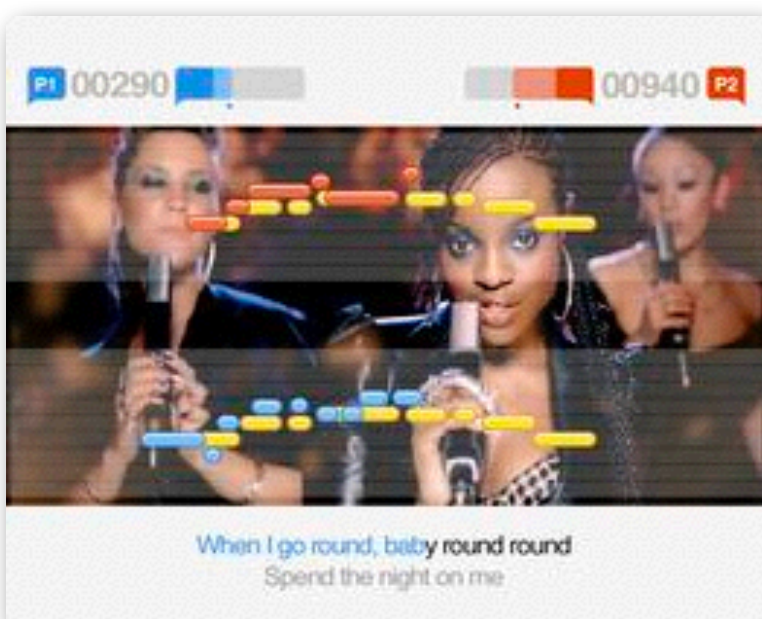


# Behaviorism

Learning is behaviour change

Knowledge is objective

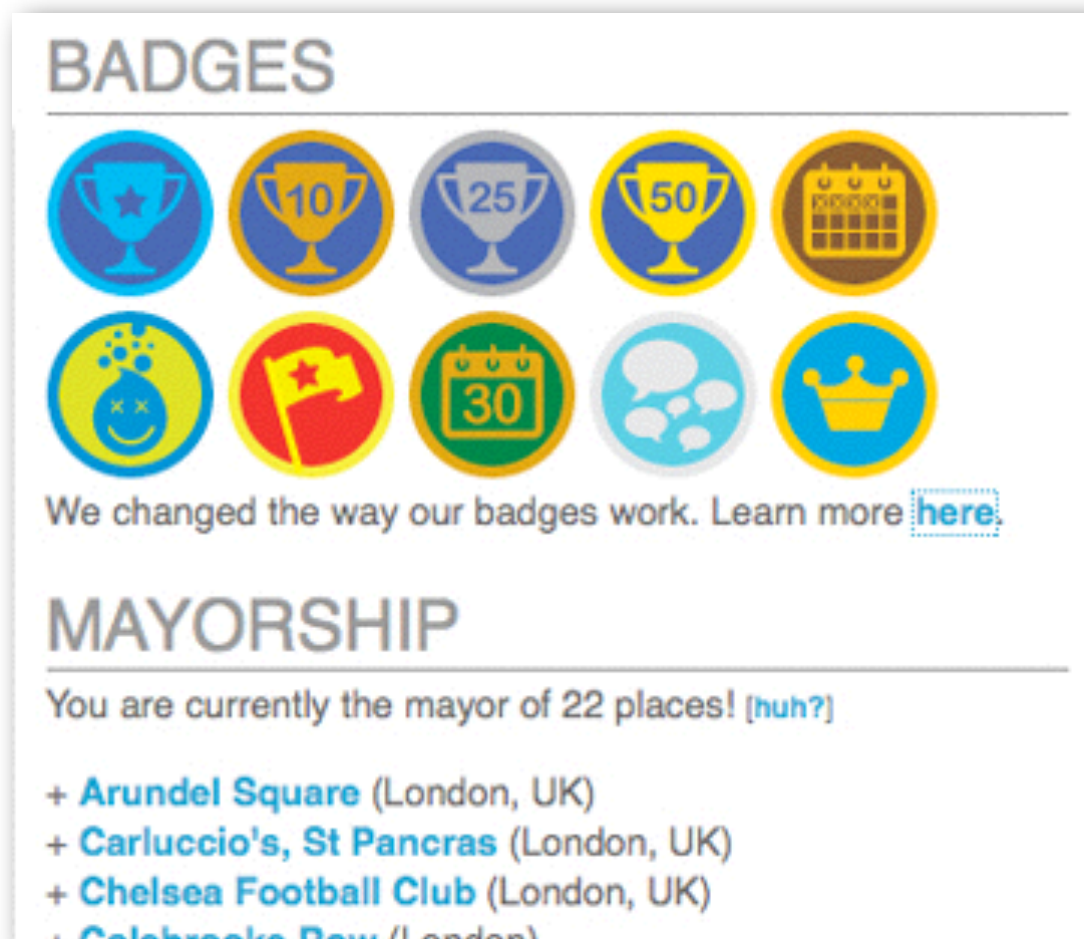
Learning is operant conditioning caused by external stimuli



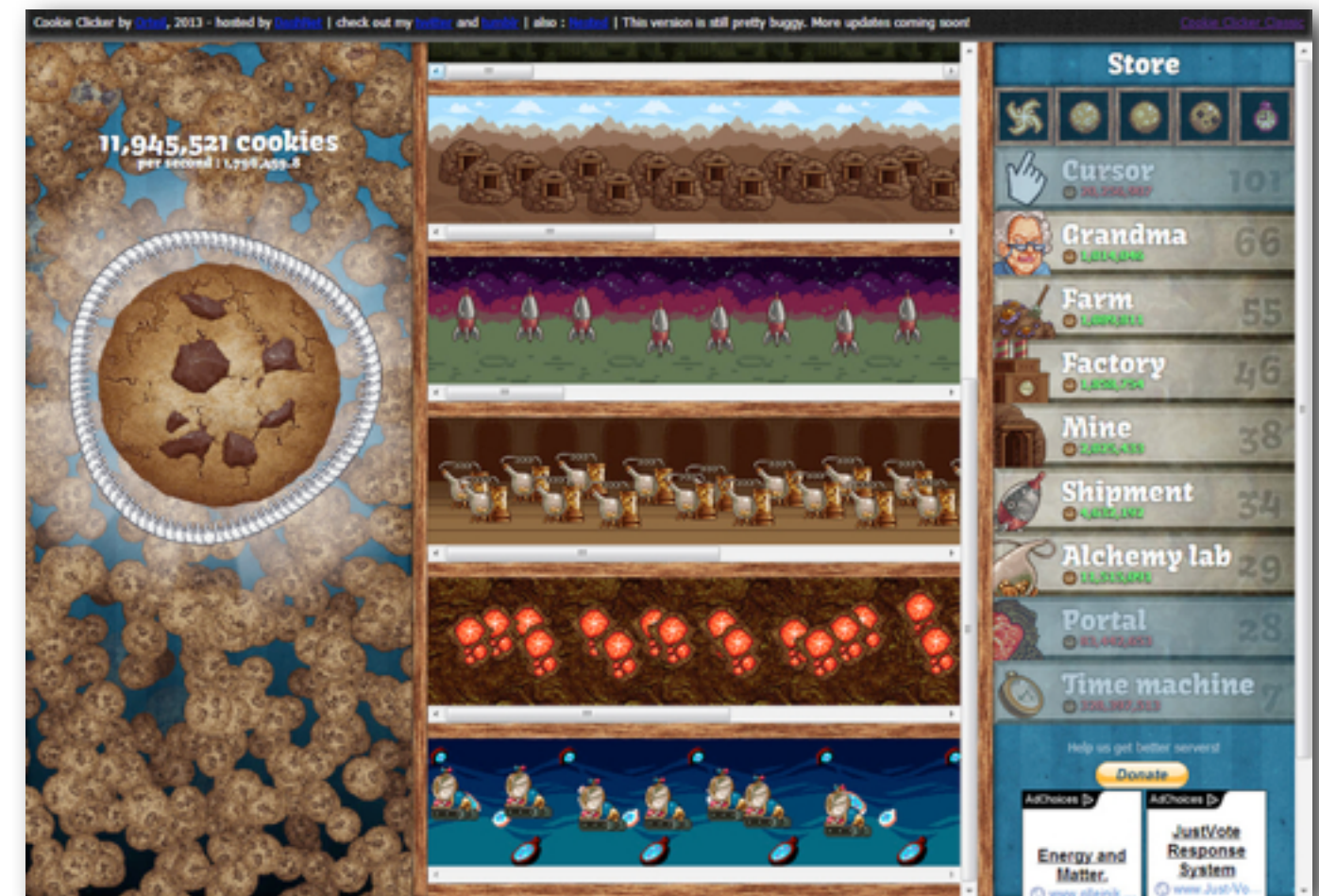


# Behavioristic Impact Model

Behaviour is reinforced by rewards



Foursquare



Cookie Clicker



# Desirable Behaviour



City Car Driving



AN OFFICIAL U.S. ARMY GAME™  
**AMERICA'S AA ARMY**  
TRUE SOLDIERS™

# Undesirable Behaviour



49 Targets

38:13

ARMY STRONG.™



„Mit derartiger Tötungstrainingssoftware, die zum Beispiel von der US-Army zur Vorbereitung von Soldaten auf Kampfeinsätze verwendet wird, dürfen in Deutschland keine Geschäfte mehr gemacht werden. [...] Damit sind derartige Spiele eine der Ursachen für die erschreckende Jugendgewalt und auch für Amokläufe, in den Szenen aus Killerspielen in die Realität übertragen werden.“

J. Hermann

2

030 06





**200-goal heroo!**  
Wayne notches up record tally as Man Utd and Man City ease to Euro victories



PLUS Great Champions League pullout INSIDE

**Why I'd rather wear a veil than nipple tassels**  
READ ALISON PHILLIPS' BRILLIANT COLUMN

**US NAVY BASE MASSACRE**

**DRIVEN TO KILL BY CALL OF DUTY?**



By CHRISTOPHER BUCKTON  
US Editor in Washington  
**AARON Alexis** went on his gun rampage after becoming addicted to violent video games.  
The maniac, who killed 12 at a US navy base, spent 18 hours a day at his laptop with his fingers stuck on Call of Duty. A girl said: "It pushed him over."

**FULL STORY: PAGES 4&5**



**Maniac spent 18 hours a day playing violent video games**

# Construction of Impact

**ZENSOR TACITUS** VON TIKWA [WWW.SPACE-RAT.DE](http://WWW.SPACE-RAT.DE)



NA, KLEINER? NIMM DOCH MAL FÜR DAS FOTO DIE KNARRE IN DIE HAND UND ZIELE AUF DEINE FREUNDE UND MITSCHÜLER!

WAS SOLL DAS DENN?

MAMI!

PRESE IM BLUTRAUSCH!

LAN PARTY

WANTED! DEAD OR NOT ALIVE

06

[www.gamer-gegen-gewalt.de](http://www.gamer-gegen-gewalt.de)



# AGSHP

Ausbildungsgerät Schießsimulator Handwaffen/Panzerabwehrhandwaffen.

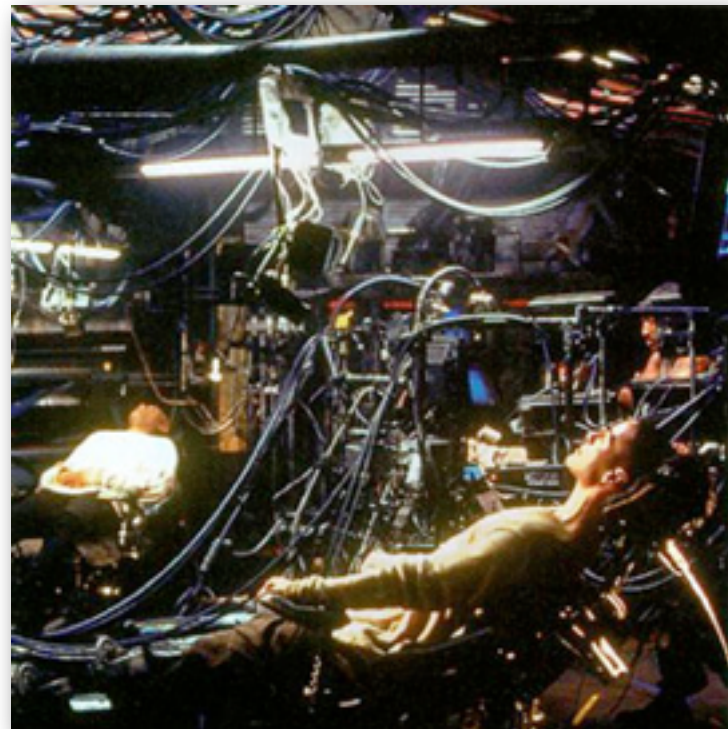
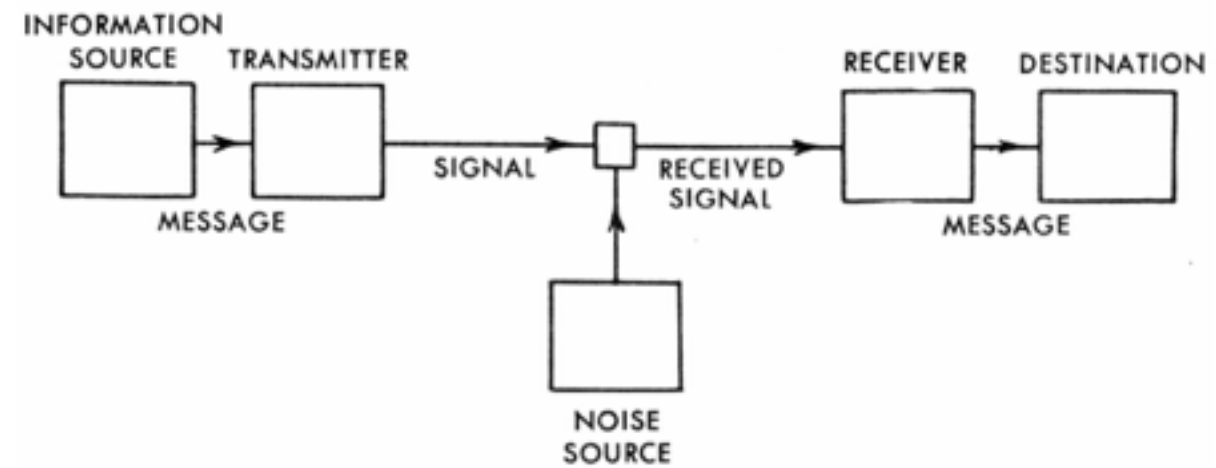


“better than PlayStation”





# Cognitivism



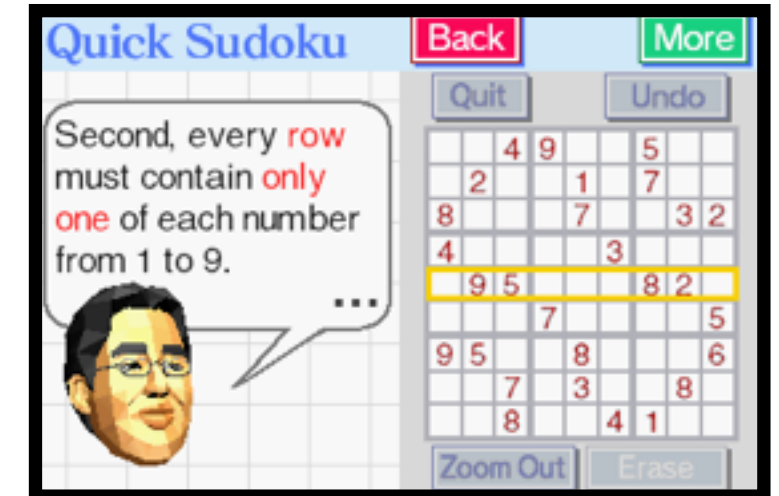
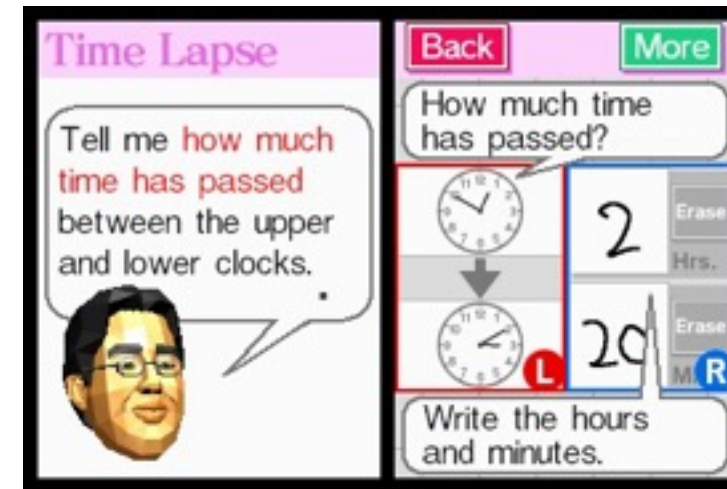
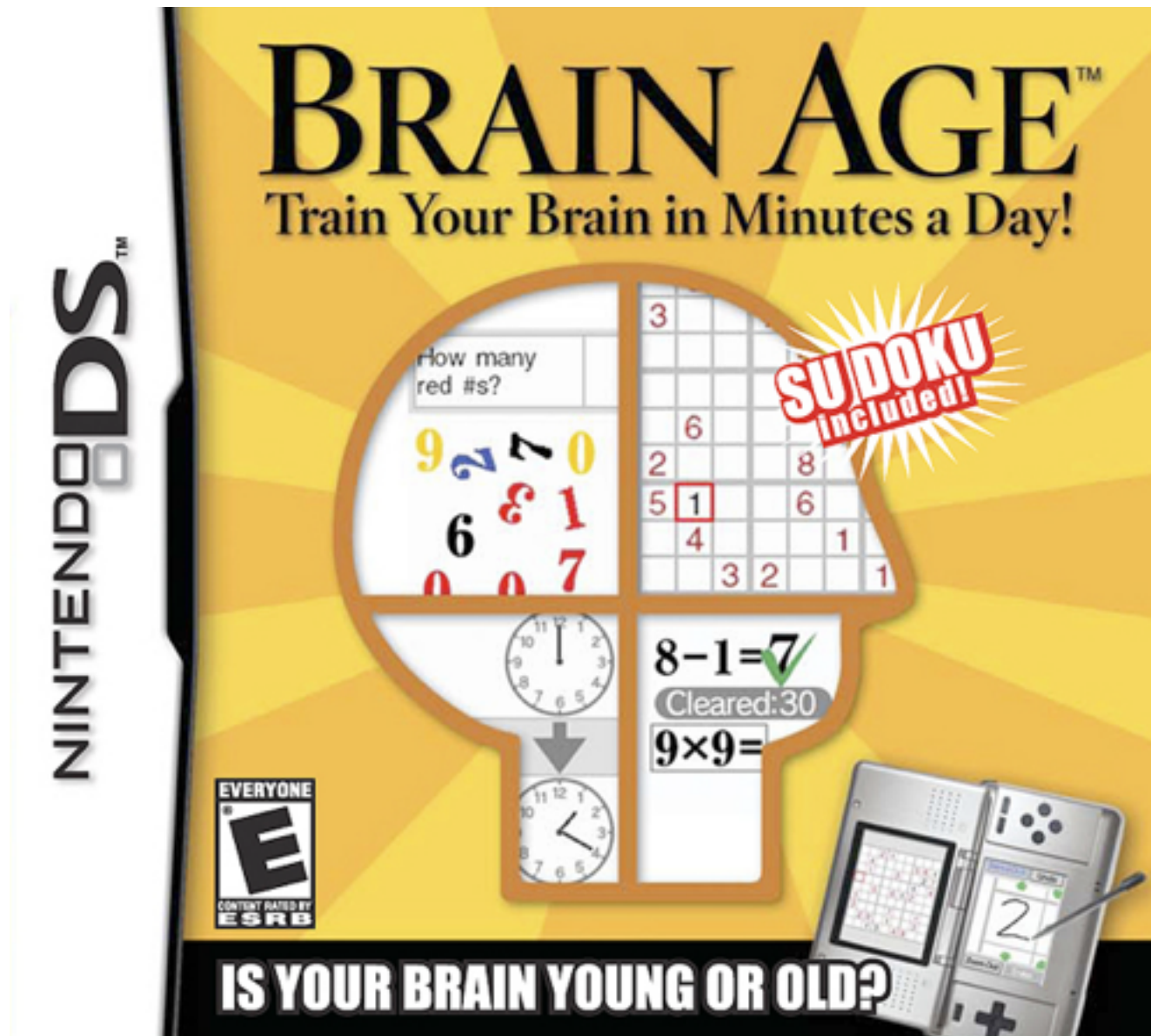
## Learning

Learning creates complex mental models representing knowledge structures

Cognitive processes comprise perception, recognition, thinking, interpretation.



# Brain Age

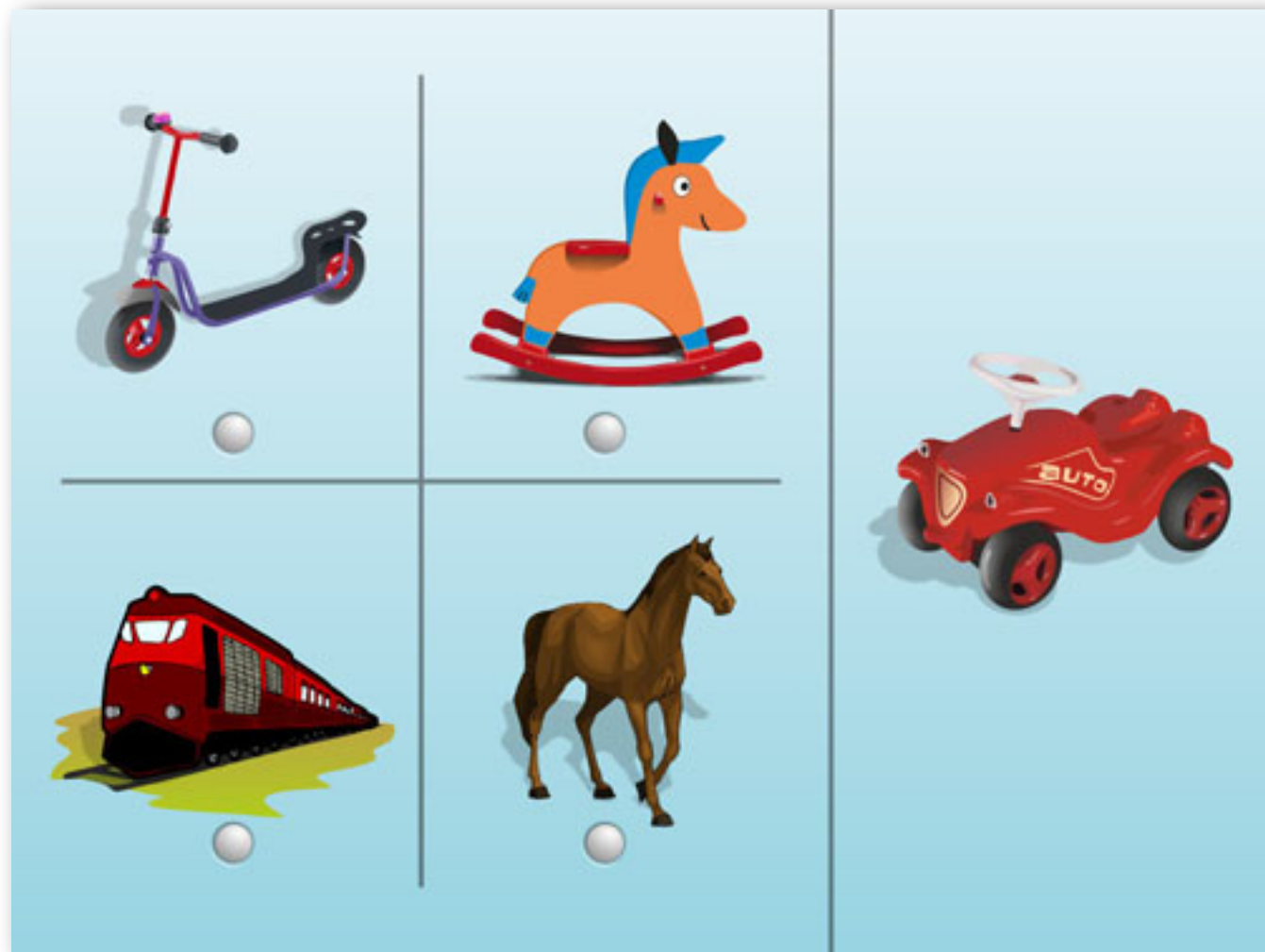


By performing daily exercises just minutes a day over weeks and months, the better you will get at the exercises and the lower your DS Brain Age will become. We all know as we grow older our bodies change and it becomes important to regularly exercise to maintain health and fitness. Our brain is no different. "Use it or lose it," as the adage goes.

Nintendo DS, 2005



# Desirable cognitive models



„A large improvement of logical thinking skills.“



# Brain Training

<http://news.bbc.co.uk/2/hi/health/8630588.stm>



If you play a lot of Tetris, you get better at Tetris – nothing more.

<http://www.tagesspiegel.de/wissen/studie-fragwuerdiges-gehirnjogging/1805458.html>

## Putting brain training to the test

Adrian Owen vom Medical Research Council in Cambridge

<http://www.nature.com/nature/journal/v465/n7299/pdf/nature09042.pdf>



# Undesirable Cognitive Models



River Raid controls emotions and increases aggression. It provokes physical cramps, anger, aggression, lack of concentration, headaches etc. [...]  
Player learn aggressive behaviours.

<http://www.simulationsraum.de/blog/2011/03/31/river-raid-rage/>



# Good Impact, Bad Impact

## **The Dilemma:**

Assuming that ,good' content is learnind with video games, one must also assume the same for ,bad' content.

Assuming no impact for ,bad content' one must assume the same for ,good content'



# Constructivism



Learning is the construction of knowledge by solving problems.





# Learning learning

„The content of video games, when they are played actively and critically, is something like this: They situate meaning in a multimodal space through embodied experiences to solve problems and reflect on the intricacies of the design of imagined worlds and the design of both real and imagined social relationships and identities in the modern world. That’ s not at all that bad—and people get wildly entertained to boot. No wonder it is hard for today’ s schools to compete.“

James P. Gee,





# Desirable Structures



Super Mario 64

**Playing Super Mario induces structural brain plasticity: gray matter changes resulting from training with a commercial video game**

<http://www.nature.com/mp/journal/vaop/ncurrent/abs/mp2013120a.html>

Video game training augments GM in brain areas crucial for spatial navigation, strategic planning, working memory and motor performance going along with evidence for behavioral changes of navigation strategy. The presented video game training could therefore be used to counteract known risk factors for mental disease such as smaller hippocampus and prefrontal cortex volume in, for example, post-traumatic stress disorder, schizophrenia and neurodegenerative disease.




# Undesirable Structures

„Killer games are reducing the inhibition level for violence. This is evident to me, even if scientific proof is still disputed.“  
(G. Beckstein)





# Synthesis 1: Rhetorical Games

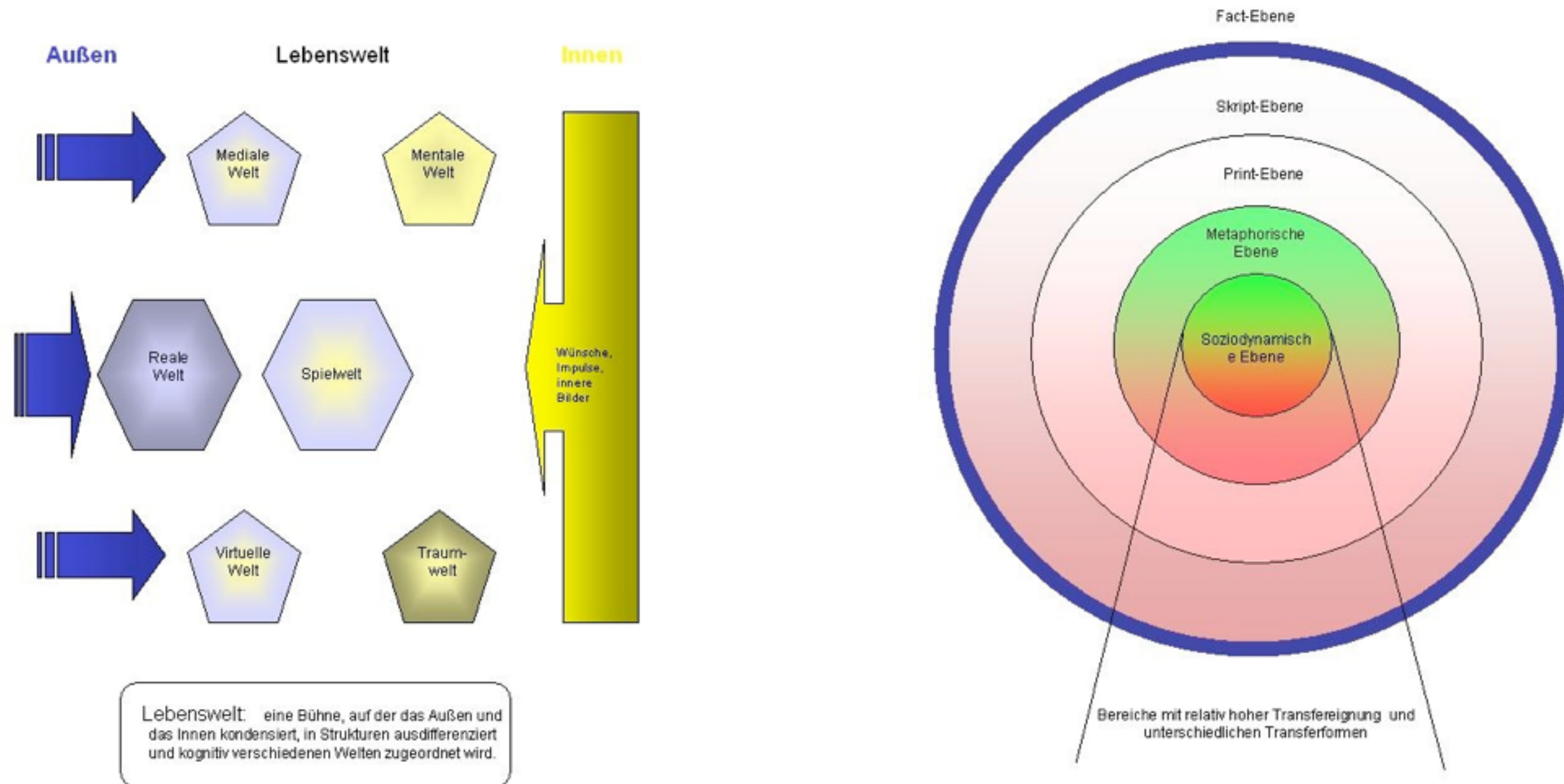
An aerial view of a city simulation game, showing a dense urban environment with various buildings, roads, and green spaces. The city is built on a grid system with several major roads and highways. The buildings are diverse in style and color, ranging from modern high-rises to older, more traditional structures. There are many trees and parks scattered throughout the city, providing a mix of greenery and urban development. The overall scene is vibrant and detailed, typical of a modern city-building game.

»playing video games is [a] kind of literacy ...  
not one that helps us read but ... that helps us  
make or critique the systems we live in«  
Ian Bogost



# Synthesis 2: Transfer Model

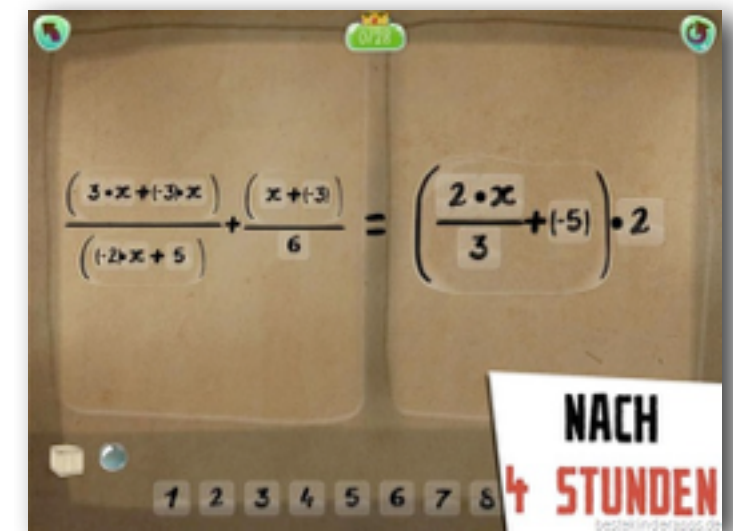
Jürgen Fritz





# Transfer

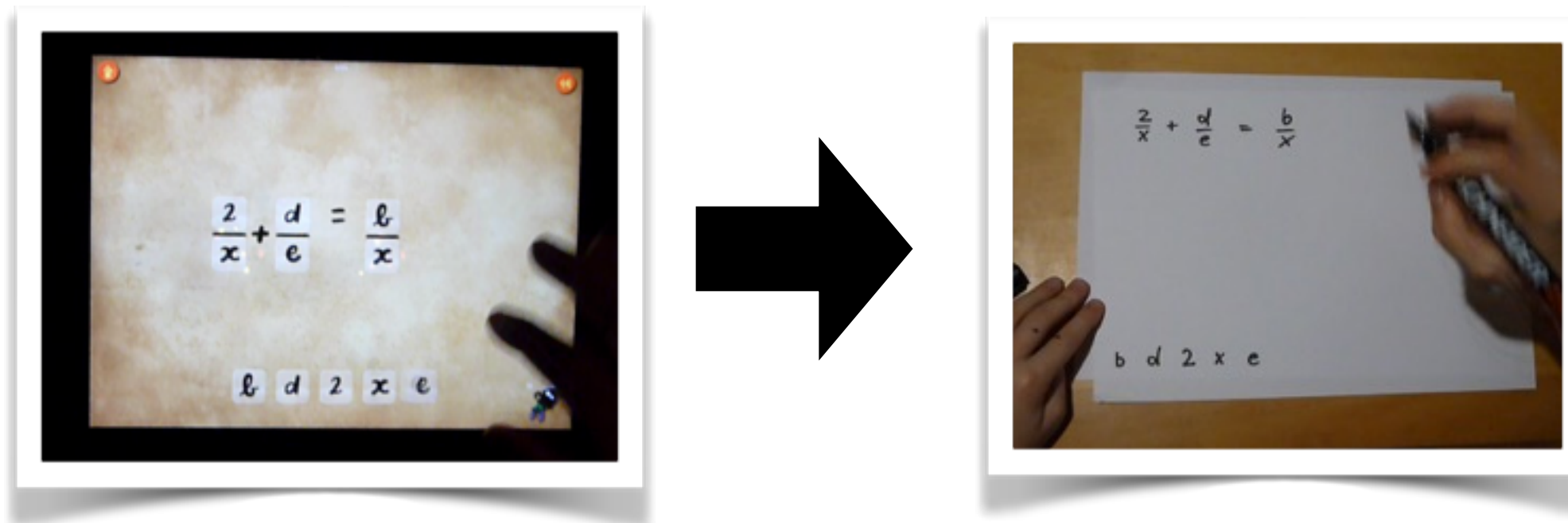
Transfers arrive neither automatically nor frictionless



WeWantToKnow: Dragonbox+



# Transfer competence



DragonBox does a fantastic job at reducing what would normally take years to learn down to a couple of hours.

That said, while children will get a real sense and mastery of what algebra is about, they will miss an important part that needs to be explained:

- To transfer to pencil and paper the knowledge acquired in the game, children must be explained how to rewrite equations line by line (equivalence).
- It is also important to link what they learn in the game with arithmetic, by explaining at the end of the game that they divided, added numbers. In house preliminary tests indicate a very high level of transfer to pencil and paper. But don't take our words for it, test it yourself and your children!

As parents we know that children already spend enough time in front of a screen that's why we wouldn't create a game that doesn't work.




# Goal design and Game design



Plague Inc.

Spend DNA points to change what your disease gives people!

Increase core disease stats and other special effects. Evolve low level symptoms to get lethal ones.

 DNA 27

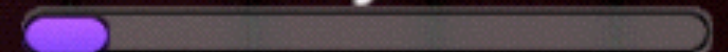
infectivity



severity

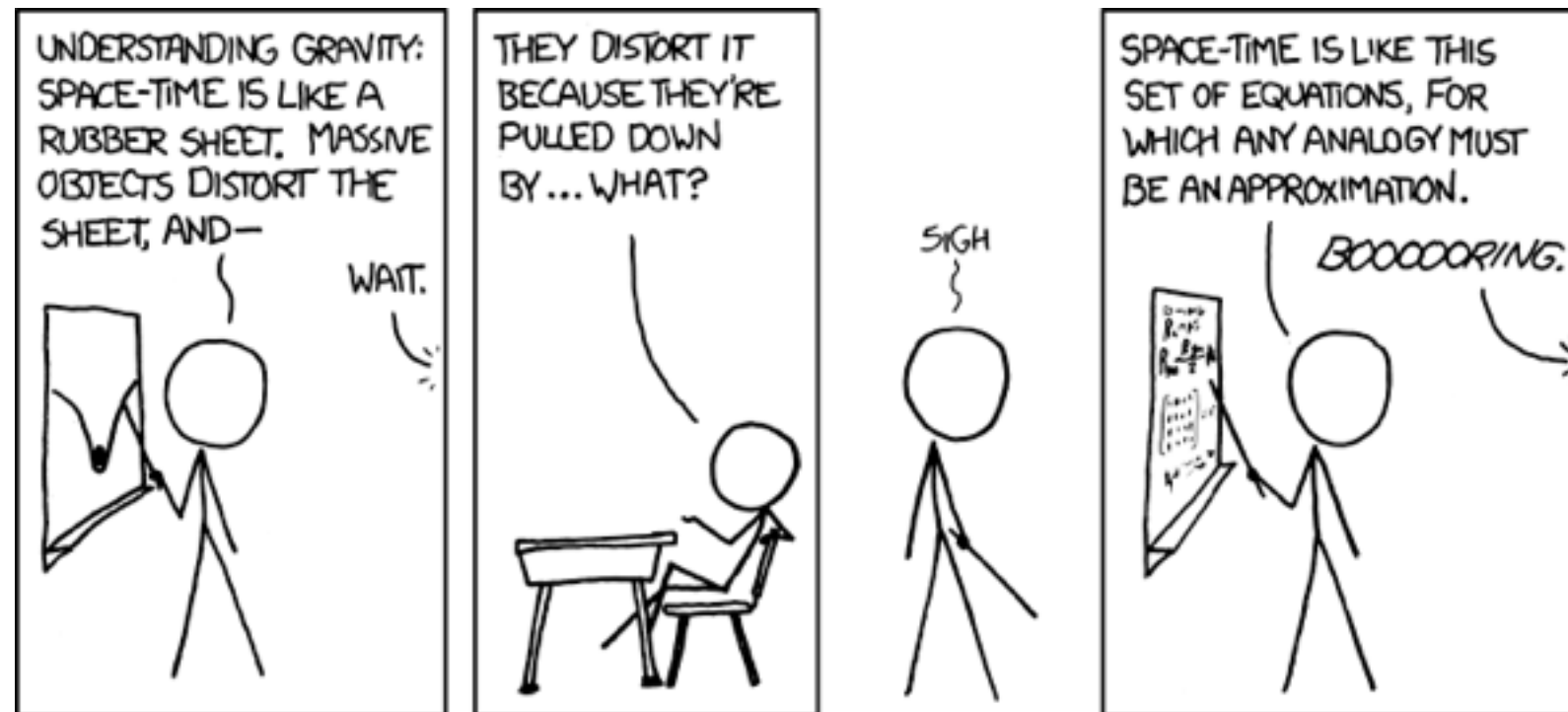


lethality





# Didactical Reduction



## Constructive alignment



Didactical considerations (‘booooring’) may lead to alternative presentations, e.g. with metaphors, visualisations or games

But metaphors are only a decent approximation, and so are game mechanics.



Thank You

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