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Game-based Learning



*We don't stop playing because we grow old – we
grow old because we stop playing.*

(Oliver W. Holmes)

Overview: Day 1

Morning

- ZML-Innovative Learning Scenarios
- Definitions
- Learning theories

Afternoon

- Play
- Principles of learning embeded in games
- Game taxonomies
- Learning outcomes and the role of the educators

Overview: Day 2

Morning

- Play
- Structured reflection of play
- Insights for the design of learning games

Afternoon

- Integration of games in education
- Barriers for the adoption of learning games in education
- Transfer
- Framework for qualifications of the European higher education area



Definitions

- Play
- Game
- Gaming
- Game-Based Learning (GBL)
- Simulation
- Gamification
- Serious Games
- Edutainment
- Learning

Definitions: Play

While playing people, children and adults alike, are exercising freedom along five distinct axes:

1. freedom to **fail**
2. freedom to **experiment**
3. freedom to **fashion identities**
4. freedom of **effort**, and,
5. freedom of **interpretation**

Reference: Klopfer et al (2009, pp. 4.):

http://education.mit.edu/wp-content/uploads/2015/01/MovingLearningGamesForward_EdArcade.pdf



Definitions: Game

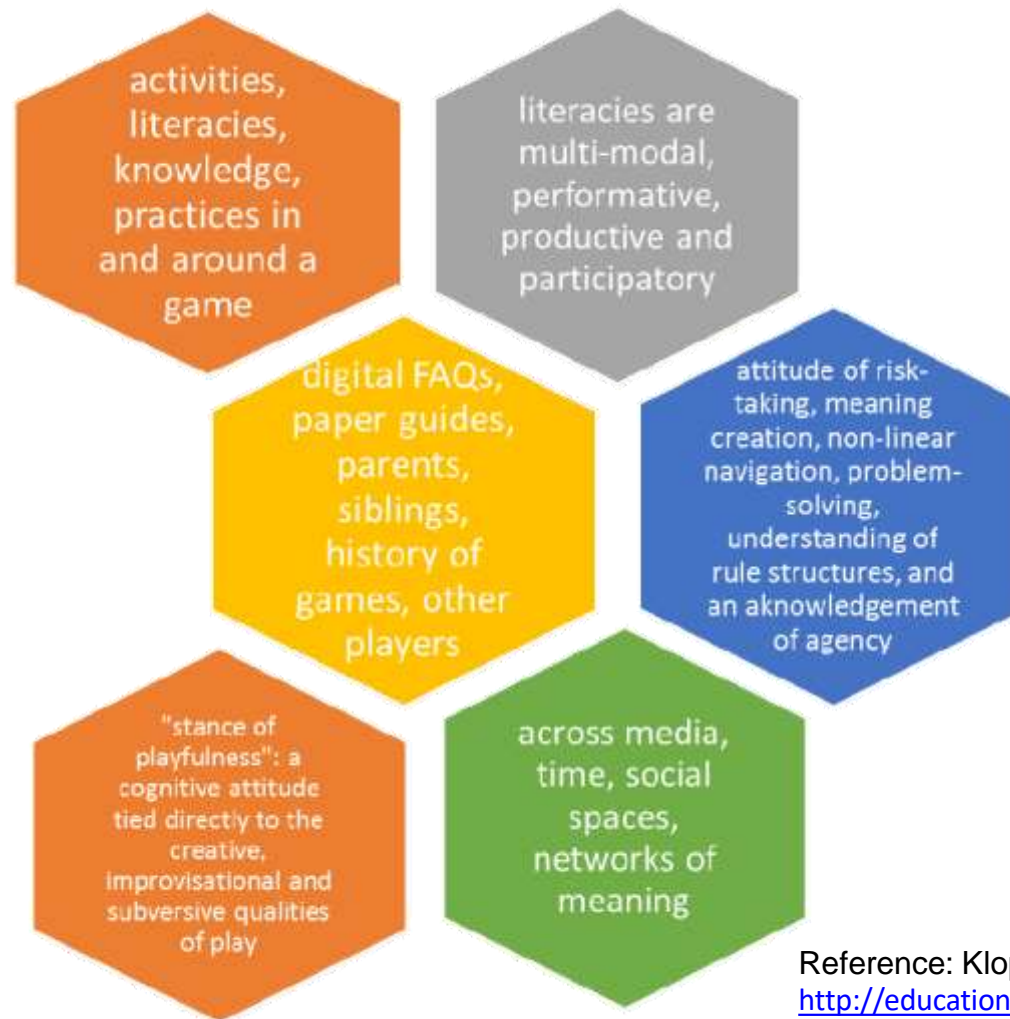
Computer and videogames are potentially the most *engaging experiences*:

1. Games are a form of **fun**. That gives us **enjoyment** and **pleasure**.
2. Games are form of **play**. That gives us intense and passionate **involvement**.
3. Games have **rules**. That gives us **structure**.
4. Games have **goals**. That gives us **motivation**.
5. Games are **interactive**. That gives us **doing**.
6. Games are **adaptive**. That gives us **flow**.
7. Games have **outcomes** and **feedback**. That gives us **learning**.
8. Games have **win states**. That gives us **ego gratification**.
9. Games have **conflict/competition/challenge/opposition**. That gives us **adrenaline**.
10. Games have **problem solving**. That sparks our **creativity**.
11. Games have **interaction**. That gives us **social groups**.
12. Games have **representation** and **story**. That gives us **emotion**.

Reference: Prensky, M. (2001). Digital game- based learning. New York: Mc Graw-Hill, pp 05-01:
<http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Game-Based%20Learning-Ch5.pdf>



Definitions: Gaming



Reference: Klopfer et al (2009, pp. 5.):
http://education.mit.edu/wp-content/uploads/2015/01/MovingLearningGamesForward_EdArcade.pdf



Definitions: Game-Based Learning

Game-Based learning (GBL) is a type of **game** play that has **defined learning** outcomes.

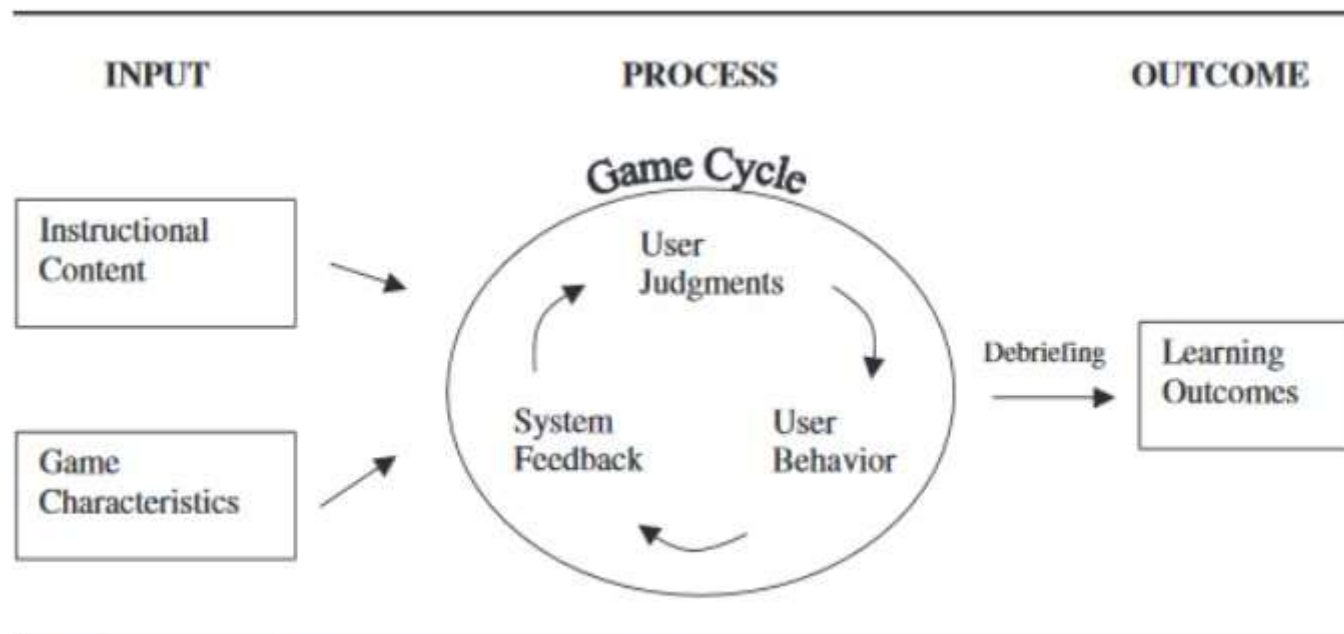


FIGURE 1: Input-Process-Outcome Game Model

Reference: Garris, R., Ahlers, R., & Driskell, J. E. (2002). Games, motivation, and learning: A research and practice model. *Simulation & gaming*, 33(4), 441-467. <http://sag.sagepub.com/content/33/4/441.full.pdf+html>



Definitions: Simulation

Simulation is the imitation of the operation of a real-world process or system over time. The act of simulating something first requires that a model be developed; this model represents the key characteristics or behaviors/functions of the selected physical or abstract system or process.

Reference:

<https://en.wikipedia.org/wiki/Simulation>



Definitions: Gamification

Gamification takes game elements (such as points, badges, leaderboards, competition, achievements) and applies them to a non-game setting. It has the potential to turn routine, mundane tasks into refreshing, motivating experiences.

Reference:

<http://edtechreview.in/dictionary/298-what-is-game-based-learning>

Definitions: Serious Games

The focus of the Serious Games movement is most commonly associated with what may best be described as “**Games for Training**”.

That is, Serious Games were initially conceived as being designed to train people for **tasks in particular jobs**. This might be training army personnel to better identify enemy combatants, or training insurance salesmen how to close a deal. These tasks may be physical or cognitive, or a combination of both. But they are characterized by their specificity and applicability **for particular work-related purposes**.

While Serious Games may appeal to people simply interested in playing fun games, they are typically targeted at a **captive audience**.

Reference: Klopfer et al (2009, pp. 20-22.)

http://education.mit.edu/wp-content/uploads/2015/01/MovingLearningGamesForward_EdArcade.pdf



Definition: Serious Games

| | Games for Health | Advergaming | Games for Training | Games for Education | Games for Science and Research | Production | Games as Work |
|----------------------------|--|--|---|--|---------------------------------|--|---|
| Government & NGO | Public Health Education & Mass Casualty Response | Political Games | Employee Training | Inform Public | Data Collection / Planning | Strategic & Policy Planning | Public Diplomacy, Opinion Research |
| Defense | Rehabilitation & Wellness | Recruitment & Propaganda | Soldier/Support Training | School House Education | Wargames / planning | War planning & weapons research | Command & Control |
| Healthcare | Cybertherapy / Exergaming | Public Health Policy & Social Awareness Campaigns | Training Games for Health Professionals | Games for Patient Education and Disease Management | Visualization & Epidemiology | Biotech manufacturing & design | Public Health Response Planning & Logistics |
| Marketing & Communications | Advertising Treatment | Advertising, marketing with games, product placement | Product Use | Product Information | Opinion Research | Machinima | Opinion Research |
| Education | Inform about diseases/risks | Social Issue Games | Train teachers / Train workforce skills | Learning | Computer Science & Recruitment | P2P Learning Constructivism Documentary? | Teaching Distance Learning |
| Corporate | Employee Health Information & Wellness | Customer Education & Awareness | Employee Training | Continuing Education & Certification | Advertising / visualization | Strategic Planning | Command & Control |
| Industry | Occupational Safety | Sales & Recruitment | Employee Training | Workforce Education | Process Optimization Simulation | Nano/Bio-tech Design | Command & Control |

The Taxonomy of Serious Games developed by Ben Sawyer and Peter Smith, cited in Klopfer et al (2009, pp. 21.)
http://education.mit.edu/wp-content/uploads/2015/01/MovingLearningGamesForward_EdArcade.pdf



Definitions: Edutainment

Edutainment is an earlier and more broad term, that refers to any type of content, including video games, television and all other media.

Definitions: Learning

Learning is necessary to distinguish the purpose of games for education rather than for advertising (advergaming), health (games for health), or social change (social impact games).

Learning also captures the **cognitive change process** that results from the interaction of learner, content, and strategies. ([Richard Van Eck, in Print](#))

„*The promise of games is that we can harness the spirit of play to enable players to build new cognitive structures and ideas of substance*“ ([Klopfer et al. 2009, pp.5](#))



Learning Theories: Overview

- Behaviorism
- Cognitivism
- Constructivism
- Situated Learning
- Experiential Learning

Learning Theories: Behaviorism

“Learning is a change in observable behaviour caused by external stimuli in the environment.”

Reinforcement is the key element in Skinner's S-R theory. A reinforcer is anything that strengthens the desired response.

1. Positive reinforcement
2. Negative reinforcement
3. Adversive reinforcement

A reinforcer is anything that strengthens the desired response.

- verbal praise,
- a good grade or
- a feeling of increased accomplishment or satisfaction.

Reference: Carlton Reeve, Play with Learning Blog:

<http://playwithlearning.com/2012/01/06/behaviourism-and-games/>

Instructional Design website: Operant conditioning and further literature

<http://www.instructionaldesign.org/theories/operant-conditioning.html>

Learning theories: Behaviorism

Principles of behaviorism

1. Behavior that is positively reinforced will reoccur; intermittent reinforcement is particularly effective
2. Information should be presented in small amounts so that responses can be reinforced ("shaping")
3. Reinforcements will generalize across similar stimuli ("stimulus generalization") producing secondary conditioning

Instructional Design website: Operant conditioning
<http://www.instructionaldesign.org/theories/operant-conditioning.html>

Learning Theories: Behaviorism

Traditional positive reinforcers in computer games

- Points
- Power-ups
- Bonuses
- Unlocks

Negative (or aversive) reinforcers

- Failure to beat high score
- An increase in obstacles or opponents
- A decline in health

Social reinforcers

- Status
- Leaderboards

Learning Theories: Behaviorism

Examples – Drill and Practice

- Brain Games (PEAK)
- Math Bluster

Critique

- Gamification = a simplistic behaviorist approach
- “The behaviorist approach to games channels inquiry away from the **harder problems** of immersion, cooperation and competition that is so important to creating successful game experiences.”
- “brain training games are no better than even the humble paper and pen for increasing brain ‘power’”
- Learners are seen as passive storer of knowledge

Learning Theories: Cognitivism

“Cognitive psychology proposes that learning comes from mental activity such as **memory, motivation, thinking** and **reflection**. Cognitivists believe that learning is an **internal process** that depends on the learner’s capacity, motivation and determination”

“learning is demonstrated through a change in knowledge and understanding”

Carlton Reeve, Play with Learning Blog, Cognitivism and Games
<http://playwithlearning.com/2012/01/11/cognitivism-and-games/>

Learning Theories: Cognitivism

Cognitivism focuses on the transmission of information from someone who knows (such as an 'expert' as opposed to facilitators) to learners who do not know.

The learners **receive** it, take it on board, **store** it, **relate** it to existing ideas and information that they already have, **index** it (like a filing system) and then **retrieve** it, so that they can find it in their memories later when they need it. In cognitivism, learning is the process of connecting pieces of knowledge in meaningful and memorable ways.



Learning Theories: Cognitivism

Examples:

- Puzzles (e.g. Prof. Layton)
- Strategy games (e.g. Age of Empires)

Learning Theories: Constructivism

In constructivist theory, the learner takes an active role in constructing his own understanding rather than receiving it from someone who knows.

According to constructivists, learners interpret information from the unique personal perspective of their previous experience.

They learn through observation, processing and interpretation: personalising the information into knowledge

Carlton Reeve, Play with Learning Blog, constructivism and games:

<http://playwithlearning.com/2012/01/20/constructivism-and-games/>

Constructivist Theory (Bruner): <http://www.instructionaldesign.org/theories/constructivist.html>

Learning Theories: Constructivism

A theory of instruction should address four major aspects:

- (1) predisposition towards learning,
- (2) the ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner,
- (3) the most effective sequences in which to present material, and
- (4) the nature and pacing of rewards and punishments.

Beothel, M & Dimock, K. V., (2000), *Constructing Knowledge with Technology*, Southwest Educational Development Laboratory, Austin, TX

Learning Theories: Constructivism

Examples

- The game process encourages learners to consider how new ideas, actions they take and experiences make sense of their own mental models
- provide primary sources of information, simple elements and raw data for players to experiment with and manipulate.
- Open-ended God-games where every instance of the game is a unique creation by the player.
- **constructionism**, that is, “learning by making.”

Papert, S. & Harel, I., (1991), *Constructionsim*, Ablex Publishing Corporation, Norwood, New Jersey



Learning Theories: Experiential Learning

People learn from experience.

Learning follows a cycle of stages:

1. Concrete experience
2. Observation and reflection
3. Abstract conceptualisation
4. Testing concepts in new situations

Carlton Reeve, Play with Learning Blog, Experiential Learning and Games:

<http://playwithlearning.com/2012/01/26/experiential-learning-and-games/>

Kolb, D. A., (1984), *Experiential learning: Experience as the source of learning and development*, Englewood Cliffs, Prentice Hall, New Jersey

Learning Theories: Experiential Learning

- Typical experiential games include **task-based simulations** (such as SimCity) or role-play (e.g. The Sims) where players have a given or a chosen goal and must act consistently “in character” to achieve it. The beauty of these “open-ended sandboxes” is that players can experiment and “**fail softly.**”
- The simulation describes environmental processes through graphics, animations and other dynamic media, portraying **complex abstract relationships in a more recognisable and intuitive way.**
- And that is where simulations offer most education value, not product but process: the **articulation of rules and relationships** – the basis of experiential learning.



Learning Theories: Situated Learning

- Lave argues that learning as it normally occurs is a function of the **activity, context** and **culture** in which it occurs (i.e., it is situated).
- Social interaction is a critical component of situated learning -- learners become involved in a "**community of practice**" which embodies certain beliefs and behaviors to be acquired.
- Situated learning is usually **unintentional** rather than deliberate.

Instructional Design website: Situated Learning (j. Lave)
<http://www.instructionaldesign.org/theories/situated-learning.html>



Learning Theories: Situated Learning

Examples

- Games in which players activity takes place in an **authentic** context.
- Games in which progress requires **social interaction and collaboration**.



Learning Principles in Videogames

James Paul Gee says:

- ... schools, workplaces, families, and academic researchers have a lot to learn about learning from good computer and video games
 - games incorporate a whole set of fundamentally sound learning principles
 - the learning principles that good games incorporate are all strongly supported by contemporary research in cognitive science
-
- Bereiter, C. & Scardamalia, M. *Surpassing Ourselves: An Inquiry Into the Nature and Implications of Expertise*. Chicago: Open Court, 1993.
 - diSessa, A. A. *Changing Minds: Computers, Learning, and Literacy*. Cambridge, Mass.: MIT Press, 2000.
 - Gee, J. P. *What Video Games Have to Teach Us About Learning and Literacy*. New York: Palgrave/Macmillan, 2003.
 - Gee, J. P. *Good videogames and good learning*.
http://www.academiccolab.org/resources/documents/Good_Learning.pdf
 - Gee, J. P. *What Video Games Have to Teach Us About Learning and Literacy*. *ACM Computers in Entertainment*, Vol. 1, No. 1, October 2003, BOOK01 <https://people.ok.ubc.ca/bowenhui/game/readings/Gee-learnfromgames.pdf>

Learning Principles in Videogames

Identity

- no deep learning takes place unless learners make an extended commitment of self for the long haul
- take on a new identity: to make a commitment

Interaction

- books were passive games do talk back
- nothing happens until a player acts and makes decisions

Production

- Players are producers, not just consumers - “writers” not just “readers”
- players co-design games by the actions they take and the decisions they make

Learning Principles in Videogames

Risk taking

- in a game, failure is a good thing – players can start again
- Players are encouraged to take risks, explore, and try new things

Customization

- Players can customize a game to fit with their learning and playing styles
- games allow players to solve problems in different ways

Agency

- players feel a real sense of agency and control because of the last 5 principles
- They have a real sense of ownership over what they are doing.

Learning Principles in Videogames

Well-Order Problems

- Problems in video games are ordered (different levels, etc)
- players form hypotheses that work well for later, harder problems

Challenge and Consolidation

- Learners develop skills to solve problems in a level, then the game throws a new class of problem at the players
- “Cycle of Expertise” (Bereiter & Scardamalia 1993)

“Just in Time” and “On Demand”

- Games give verbal information either “just in time” or “on demand”

Learning Principles in Videogames

Situated meanings

- Games situate the meanings of words in terms of the actions, images, and dialogues they relate to
- They show how they vary across different actions, images and dialogues

Pleasantly Frustrating

- good games stay within, but at the outer edge, of the player's "regime of competence" (diSessa 2000)
- This is a highly motivating state for learners

System thinking

- Games encourage players to think about relationships, not isolated events, facts, and skills

Learning Principles in Videogames

Explore, Think Laterally, Rethink Goals

- Not moving as fast and efficiently to your goal as possible
- But: Games encourage players to explore thoroughly before moving on too fast
- And: to think laterally and not just linearly
- And: to use such exploration and lateral thinking to reconceive one's goals from time to time

Smart Tools and Distributed Knowledge

- The characters and other aspects of the game world one manipulates in a game are “smart tools”
- In a multi-player game the knowledge needed to play the game is distributed among a set of real people and their smart virtual characters

Learning Principles in Videogames

Cross-Functional Teams

- in multi-player games people play in teams in which each player has a different set of skills
- people are affiliated by their commitment to a common endeavor

Performance Before Competence

- Players can perform before they are competent, supported by the design of the game
- They are supported by the “smart tools” and/or other, more advanced players

To sum up

GBL can be effective, but not as a means for making learning “**fun**” or for “**tricking**” students into learning;

“GBL can be effective because it supports powerful learning strategies such as situated learning, authentic environments, and optimized challenge and support (scaffolding).” (R.N. Van Eck, 2015, pp.2)

Available from: [Richard Van Eck](https://www.researchgate.net/publication/284178854_Digital_game-based_learning_Still_restless_after_all_these_years), Dec 15, 2015
https://www.researchgate.net/publication/284178854_Digital_game-based_learning_Still_restless_after_all_these_years

Game Taxonomies

We differ 3 main groups of games

- Games of exercise (0 – 2)
- Symbolic Games (2 – 7)
- Games with rules (from 7 on)

Claudio Dondi, Behnn Edvinsson, Michela Moretti – Games Classification, Papst Science Publishers, Germany cited in
In Maja Pivec, Anni Koubek, Claudio Dondi (Eds). (2004) Guidelines for Game-Based Learning

Game Taxonomies

Groups of videogames

– Arcade

- Shooting games

- Platform games

– Simulations

- Flight Simulators

- Sim City

– Adaptions

- Once real games adapted into video games

Game Taxonomies

Categories of games by Marc Presnky (2001)

- Action games
- Adventure games
- Fighting games
- Puzzler games
- Role-playing games
- Simulation games
- Sports games
- Strategic games

Classification from a **content** perspective

- **Facts**
- **Skills**
- **Judgement**
- **Behaviours**
- **Theories**
- **Reasoning**
- **Process**
- **Procedures**
- **Creativity**
- **Language**
- **Systems**
- **Observations**
- **Communication**



Learning Outcomes while playing Videogames

Video games support the acquisition and practice of skills needed in a high-risk global **VUCA** world:

Volatile

Uncertain

Complex

Ambiguous

Johansen, B. (2007). Get there early: sensing the future to compete in the present. San Francisco, CA: Berrett-Koehler Publishers, cited in In James Paul Gee', Video Games: What Are They Good For? Unpublished ms., Arizona State University, 2014

<http://jamespaulgee.com/geeimg/pdfs/What%20Are%20Video%20Games%20Good%20For.pdf>



Learning Outcomes while playing videogames

21 century Skills

- critical thinking,
- problem solving,
- collaboration,
- effective communication,
- motivation,
- persistence,
- learning to learn

Other skills

- systems thinking,
- collective intelligence,
- participation,
- storytelling,
- analysis,
- leadership

In Klopfer et al (2015, appendix A): http://education.mit.edu/wp-content/uploads/2015/01/MovingLearningGamesForward_EdArcade.pdf

In James Paul Gee', Video Games: What Are They Good For? Unpublished ms., Arizona State University, 2014
<http://jamespaulgee.com/geeing/pdfs/What%20Are%20Video%20Games%20Good%20For.pdf>

Role of educators

- Facilitation is about creating and providing space for learners to
 - try out something new,
 - reflect on their experiences,
 - arrive at new conclusions and
 - think about how they would apply these conclusions in their work and life.
- In this view people **learn for themselves** with a bit of help and assistance, rather than have it done to or for them.

Overview: Day 2

Morning

- Play
- Structured reflection of play
- Insights for the design of learning games

Afternoon

- Integration of games in education
- Barriers for the adoption of learning games in education
- Transfer
- Framework for qualifications of the European higher education area

Balanced Design

- Learning design approach
- based on fundamental structures of Evidence-Centered Design (ECD)
 - focuses on measurable evidence of student's learning
 - offers a methodology for collecting and analyzing evidence from tasks performed by students
- helping game designers to better align the learning goals with the game mechanics (Jennifer Groff et al)

Groff, Jennifer, Clarke-Midura, Jody, Owen, V. Elisabeth, Rosenheck, Louisa and Beall, Michael (2015): Better Learning in Games. A Balanced Design Lens for a New Generation of Learning Games, Learning Games Network, MIT Education Arcade.

<http://education.mit.edu/wp-content/uploads/2015/07/BalancedDesignGuide2015.pdf>



Need of Balanced Design

to understand

- what a game is targeting
- how that situates into learning
- how we know what was learned from the game



Part of the Evidence Centred Design (ECD) Framework

- Content Model (Student Model): defines knowledge/skills/abilities targeted
- Evidence Model: describes potential observations and behaviors of students that would give evidence of their ability
- Task Model: describes aspects of situations that are likely to evoke and provide such evidence



Balanced Design: A Design Lens for learning with games

- Content: What knowledge, skills, abilities will players improve in playing the game?
- Evidence: How do I know that players mastered that content?
- Task: What tasks do players do to engage with that content in the game and elicit the evidence we need?



Integration of digital games in education

Like all technologies, video games can be good, bad, or indifferent: It all depends on how they are used (Gee 2007, 2014; Shaffer 2007)

In James Paul Gee', Video Games: What Are They Good For? Unpublished ms., Arizona State University, 2014
<http://jamespaulgee.com/geeing/pdfs/What%20Are%20Video%20Games%20Good%20For.pdf>



Games are highly educational when...

... integrated with

- a) other tools and technologies,
- b) forms of participation and social interaction,
- c) and various curricular activities

In James Paul Gee', Video Games: What Are They Good For? Unpublished ms., Arizona State University, 2014
<http://jamespaulgee.com/geeimg/pdfs/What%20Are%20Video%20Games%20Good%20For.pdf>

Integration of digital games in education

- Use an existing **Commercial Out of The Shelf (COTS)** game or learning game
- Let students design their own game
- Design your own game for your students

COTS: **Commercial Out of The Shelf** games



Integration of Games: COTS

- Find a learning game that suits your educational aims and objectives
 - E.g. on the project site “Play the learning game” you can find games that have been evaluated and marked as educational.
- Play and evaluate it for use in the classroom.
- Integrate it in the learning process
- Plan reflection and feedback session

Project PlayIT: www.learninggame.org/



Integration of Games: COTS

- "Teachers should be encouraged to **take training from their students**. The students who are playing the games will be expert at the rules and content of those games. By encouraging students to educate their teachers, they have opportunities to demonstrate expertise to themselves, their classmates and their teachers." (Klopfer et al, 2009, pp.50)

Teaching with Games: Using commercial off-the-shelf computer games in formal education Richard Sandford, Mary Ulicsak, Keri Facer and Tim Rudd Research Report, January 2006 [last accessed 05.01.2016]:
<https://www.nfer.ac.uk/publications/FUTL49/FUTL49.pdf>

Integration of Games: COTS

Games are seen as a catalysator for learning

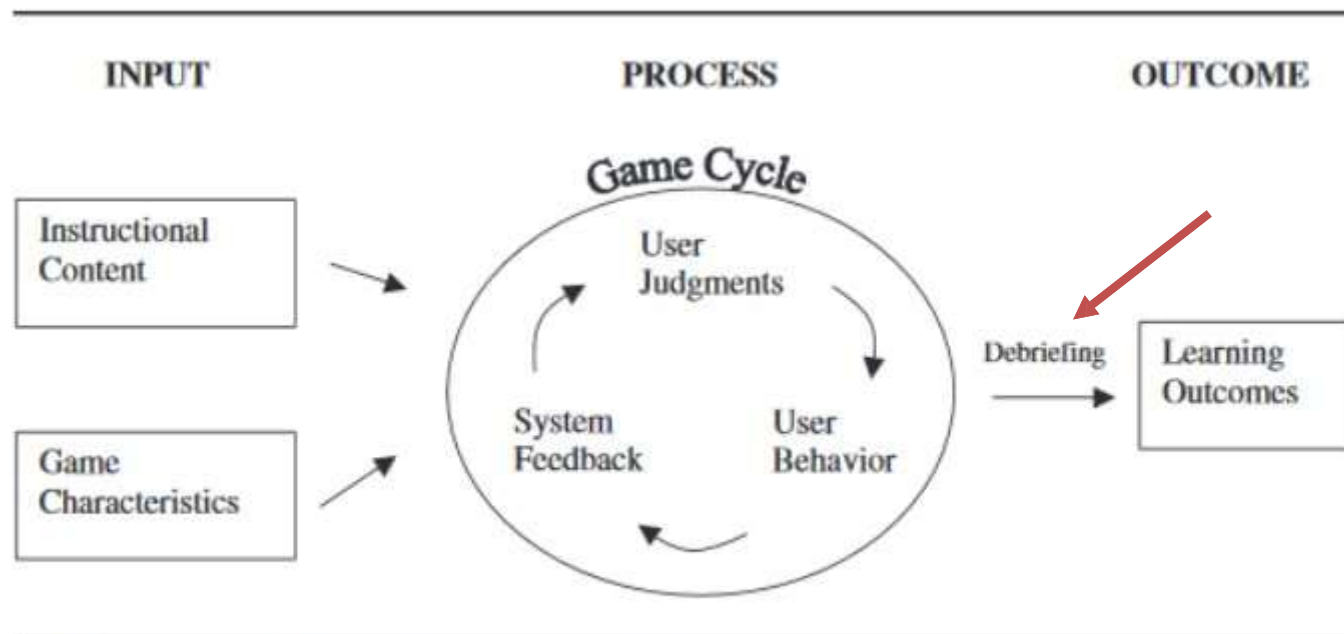


FIGURE 1: Input-Process-Outcome Game Model

Integration of Games: Let your students design a game

Mostly recommended for those with interest in programming or those teaching programming.

A sophiophilosophical movement supports this approach called the "**maker movement**", which has a lot in common with **Problem Based Learning** (PBL), is very popular especially in science.

Students learn to create products in a process that requires learning related skills.

Integration of Games: Let your students design a game

Process

- students are grouped and tasks are allocated according to interests and competences.
- Students
 - support each other with programming,
 - write the narratives and instructions,
 - design logos and artwork,
 - perform mathematical calculations and
 - collaborate in the whole creation process,
 - while learning the educational content of the game in order to embed it in the game.

Integration of Games: Let your students design a game

Tools for game design

[Scratch](#), [Game Maker](#), [Gamestar Mechanic](#), [Alice](#), [Adventure Maker](#)

3D worlds: [Second Life](#), [Active Worlds](#), [MinecraftEdu](#)

Also for young ages: [Tynker](#) and [Pixel Press](#).

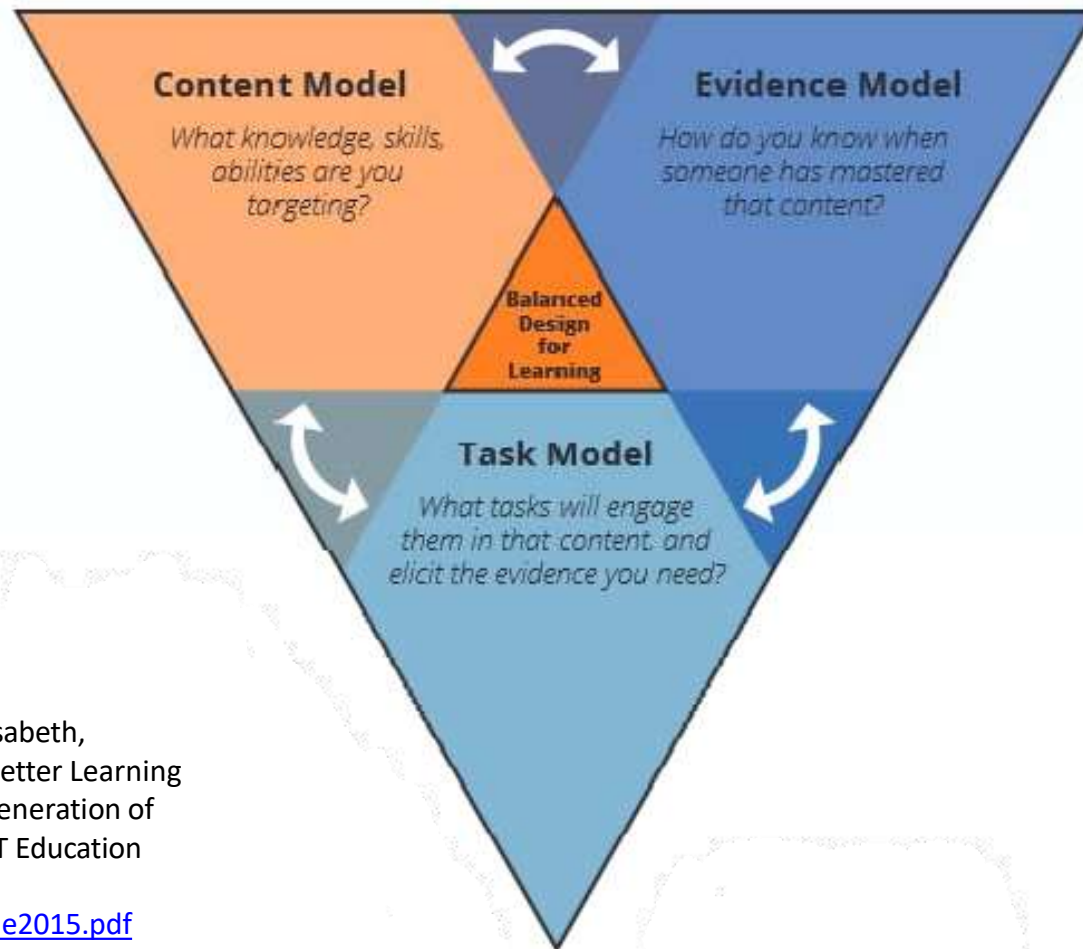
Example of students designing and building a game for learning chemistry using the software MinecraftEdu:

<http://services.minecraftedu.com/worlds/node/164>

[Vladimir Propp's](#) characters might be helpful to start spark creativity of the students in defining the story



Integration of Games: Design your own Game



Groff, Jennifer, Clarke-Midura, Jody, Owen, V. Elisabeth, Rosenheck, Louisa and Beall, Michael (2015): Better Learning in Games. A Balanced Design Lens for a New Generation of Learning Games, Learning Games Network, MIT Education Arcade, pp. 7. <http://education.mit.edu/wp-content/uploads/2015/07/BalancedDesignGuide2015.pdf>



Barriers to the adoption of learning games

- Attitudes of parents and Kids
 - Parents: violence in videogames
 - Kids: Chocolate-broccoli problem
- Logistics: 45min classes
- Support for teachers lacking experience in integrating games
- Frameworks for assessment of higher order skills
 - Understanding
 - Analysis
 - Evaluation
 - Creation

Klopfer et al (2009, pp. 21.)

http://education.mit.edu/wp-content/uploads/2015/01/MovingLearningGamesForward_EdArcade.pdf



Barriers to the adoption of learning games

- Evidence for effective learning through games
- Use of games: examples of how games can be integrated into curriculum
- Limited view: of the variety of games available, which narrows expectations of the viability of games to engage students
- Social and cultural structures: around education, school, learning and play



Barriers to design and development

- High development costs: creation and maintainace
- Development process: involve learning scientists and teachers
- Playtesting at schools: often difficult
- Sources of funding: past experiences of loosing investments



Barriers to sustainability

- Shelf-life of a game:
 - replayability factor
 - preference of gamers
- Speed of technology change
- Maintenance and support: especially for networked games

Barriers to innovation

- Limited data: reporting on educational game play
- Limited pedagogical paradigms: educational institutions need to rethink their pedagogies and the role of teachers
- Limited research:
 - Games as learning environments
 - Effective play patterns
 - Combination of play patterns with kinds of learning
- Limited ambition of funded projects



Framework for Qualifications of the European Higher Education Area

- The Framework's aim is to organise national higher education qualifications into an overarching European-wide qualifications framework.
- Within this Framework, qualifications are defined according to levels of complexity and difficulty.

Why is this interesting?

- http://ecahe.eu/w/index.php/Framework_for_Qualifications_of_the_European_Higher_Education_Area#First_cycle_-_Bachelor.27s_level
- http://ecahe.eu/w/images/7/76/A_Framework_for_Qualifications_for_the_European_Higher_Education_Area.pdf

Structure of Framework

The framework is structured in three cycles:

1. First cycle - Bachelor's level
2. Second cycle - Master's level
3. Third cycle - PhD

And in 5 categories of learning objectives

1. Knowledge and understanding
2. Application of knowledge and understanding
3. Ability to make judgements
4. Ability to communicate
5. Learning skills

knowledge and understanding ..

- 1st cycle.. *[that is] supported by advanced text books
[with] some aspects informed by knowledge at
the forefront of their field of study ..*
- 2nd cycle .. *provides a basis or opportunity for originality
in developing or applying ideas.. often in a
research context ..*
- Doctorates *.. [includes] a systematic understanding of their
field of study and mastery of the methods of
research* associated with that field ..*

application of knowledge and understanding ..

1st cycle .. *[through] devising and sustaining arguments*

2nd cycle .. *[through] problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts ..*

Doctorates.. *[through the] ability to conceive, design, implement and adapt a substantial process of research* with scholarly integrity ..*

[that has] made a contribution that extends the frontier of knowledge by developing a substantial body of work some of which merits national or international peer-reviewed publication .

ability to make judgements ..

1st cycle .. *[through] gathering and interpreting relevant data ..*

2nd cycle .. *the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete data ..*

Doctorates.. *[through] critical analysis, evaluation and synthesis of new and complex ideas..*

ability to communicate ..

1st cycle .. *information, ideas, problems and solutions ..*

2nd cycle .. *their conclusions and the underpinning knowledge and rationale to specialist and nonspecialist audiences ..*

Doctorates.. *with their peers, the larger scholarly community and with society in general about their areas of expertise ..*

learning skills ..

1st cycle .. *needed to study further with a high level of autonomy ..*

2nd cycle .. *to study in a manner that may be largely selfdirected or autonomous..*

Doctorates.. *expected to be able to promote, within academic and professional contexts, technological, social or cultural advancement ..*

Reflection / отражение

Take a look at the agenda - взглянуть на повестку дня
and reflect the 2 days - и отражают 2 дня

- What was new? - Что было нового ?
- What was fun? - Что было интересно ?
- What was difficult? - Что было трудно ?

Discuss your experiences - Обсудите свои переживания
And collect them on cards - И собрать их на карточках