Game based Learning & Gamification in (Higher) Education

2 authors:

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700 PUBLICATIONS **7,306** CITATIONS

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5 PUBLICATIONS **0** CITATIONS

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Some of the authors of this publication are also working on these related projects:

Project Learning Analytics View project

Project Instructional design of online learning View project

Game based Learning & Gamification in (Higher) Education

The slides based on our experiences in this topic :-)

WE ARE Katharina Hohla & Martin Ebner

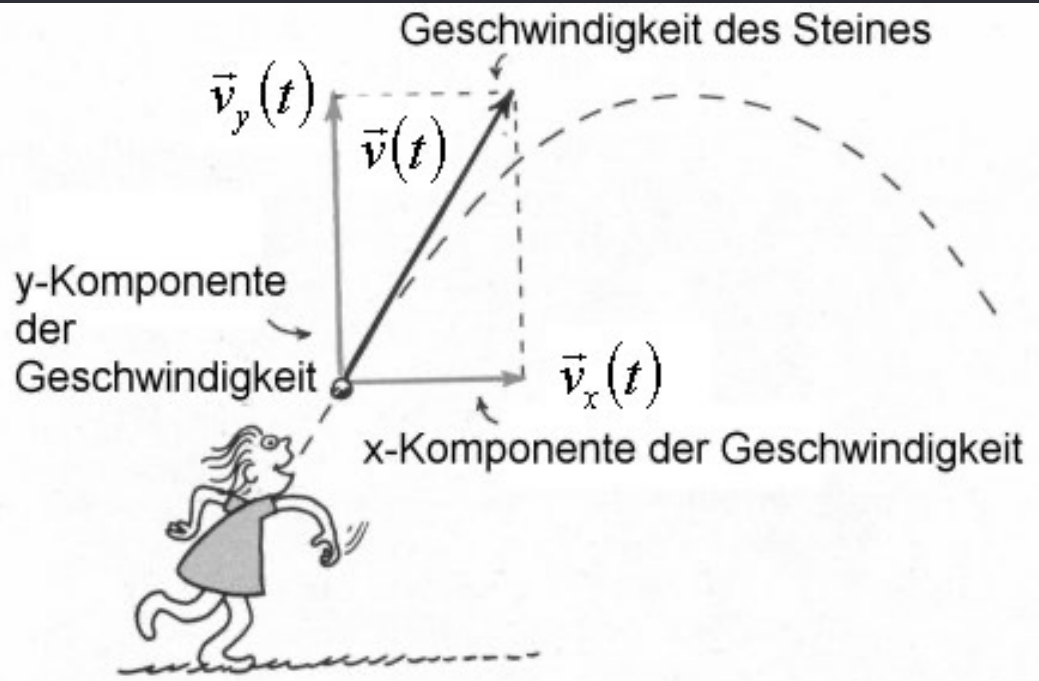„*A good game should be* **easy to learn,** *but* **difficult to master.**"

(Nolan Bushnell, the founder of Atari, Inc)

1 Learning with Games

Do we really learn with games?

Parabola of throwing

$$\vec{v}_x(t) = v_o \cdot \cos(\alpha)$$
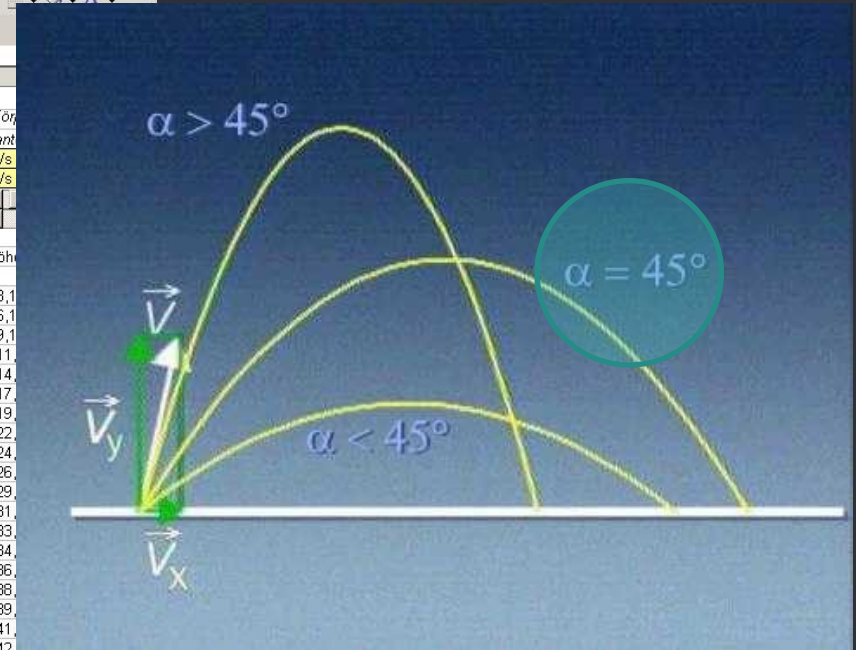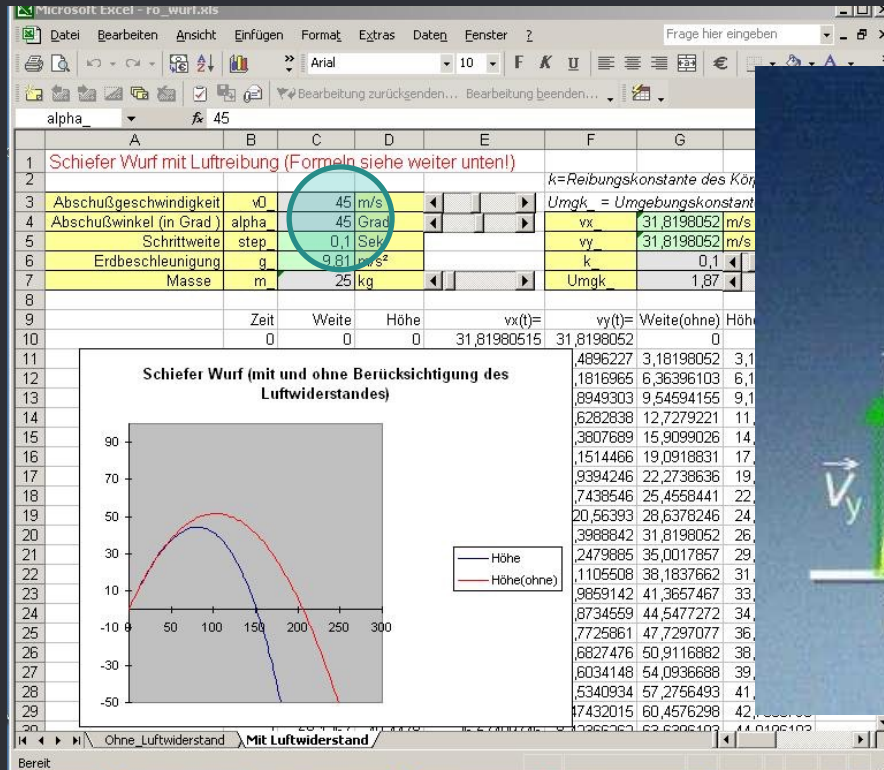
$$\vec{v}_y(t) = v_o \cdot \sin(\alpha)$$

$$\vec{v}_{Fall}(t) = -g \cdot t$$

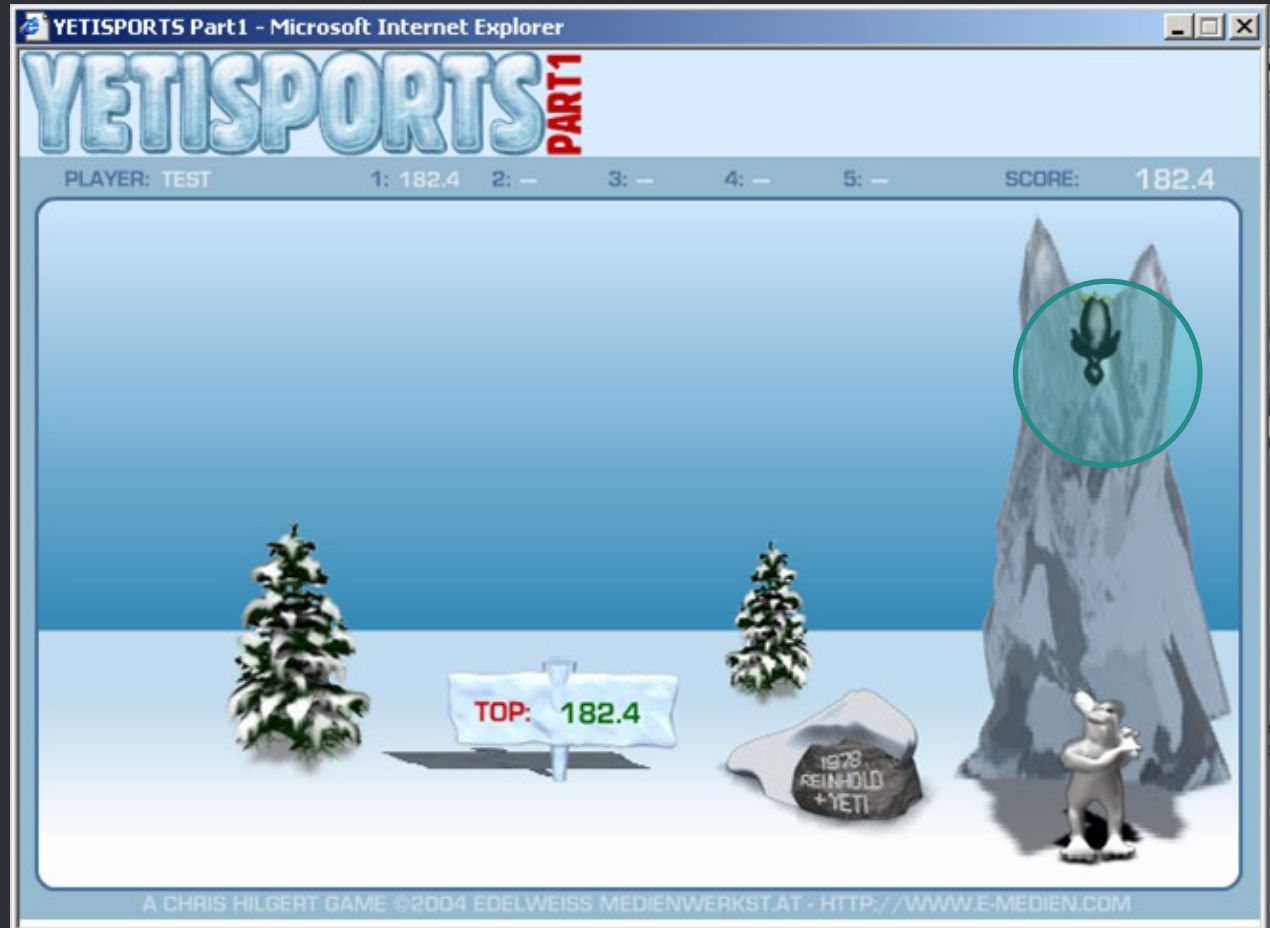Throwing distance:

$$s = \frac{v_0^2 \cdot \sin(2\alpha)}{g}$$

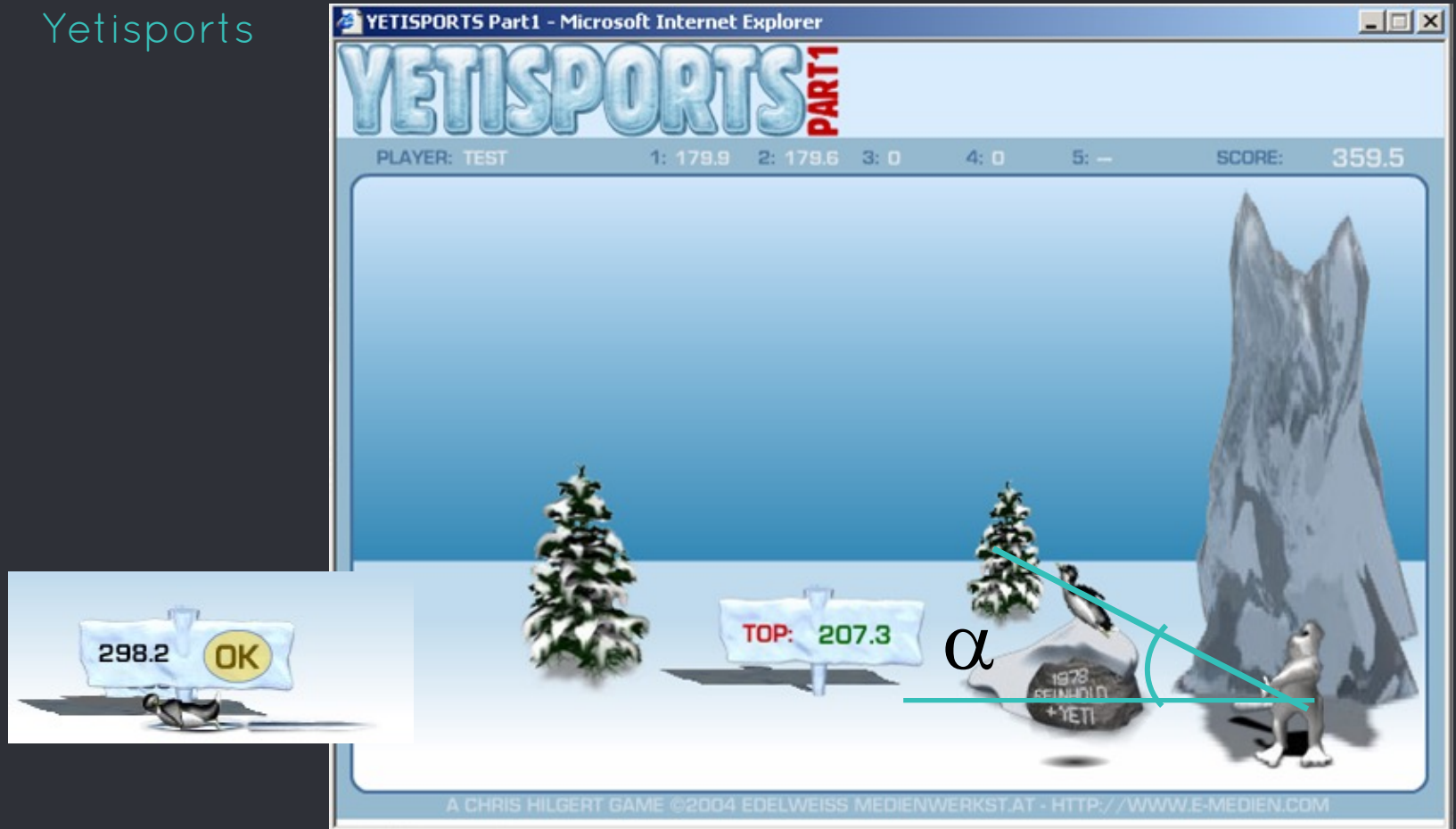# Launch Angel

Yetisports

Yetisports

Learning Games

Motivation

... it is fun because playing is not identified as actual learning

(Holzinger, 2001)

Implicit Learning

... is learning that is not consciously perceived by the learner.

(Holzinger & Maurer, 1999)
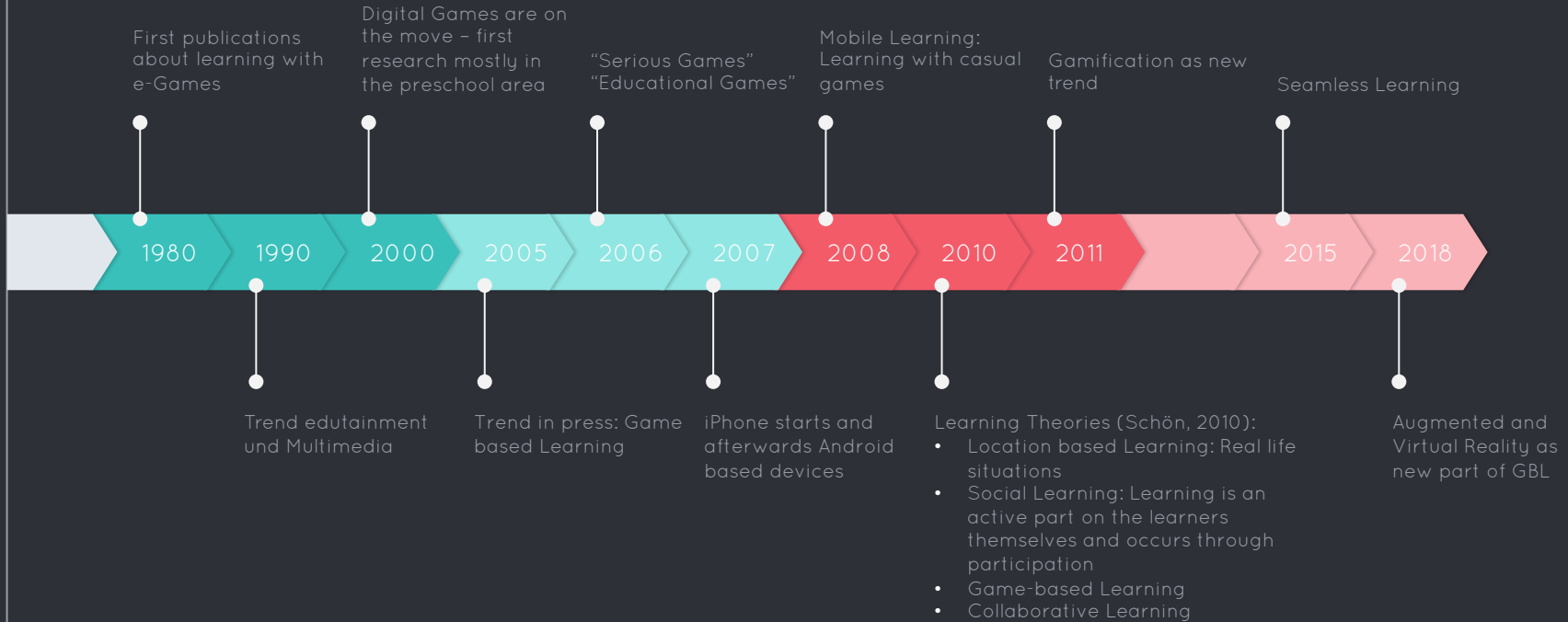
challenge

fantasy

Three factors
(Malone, 1980)

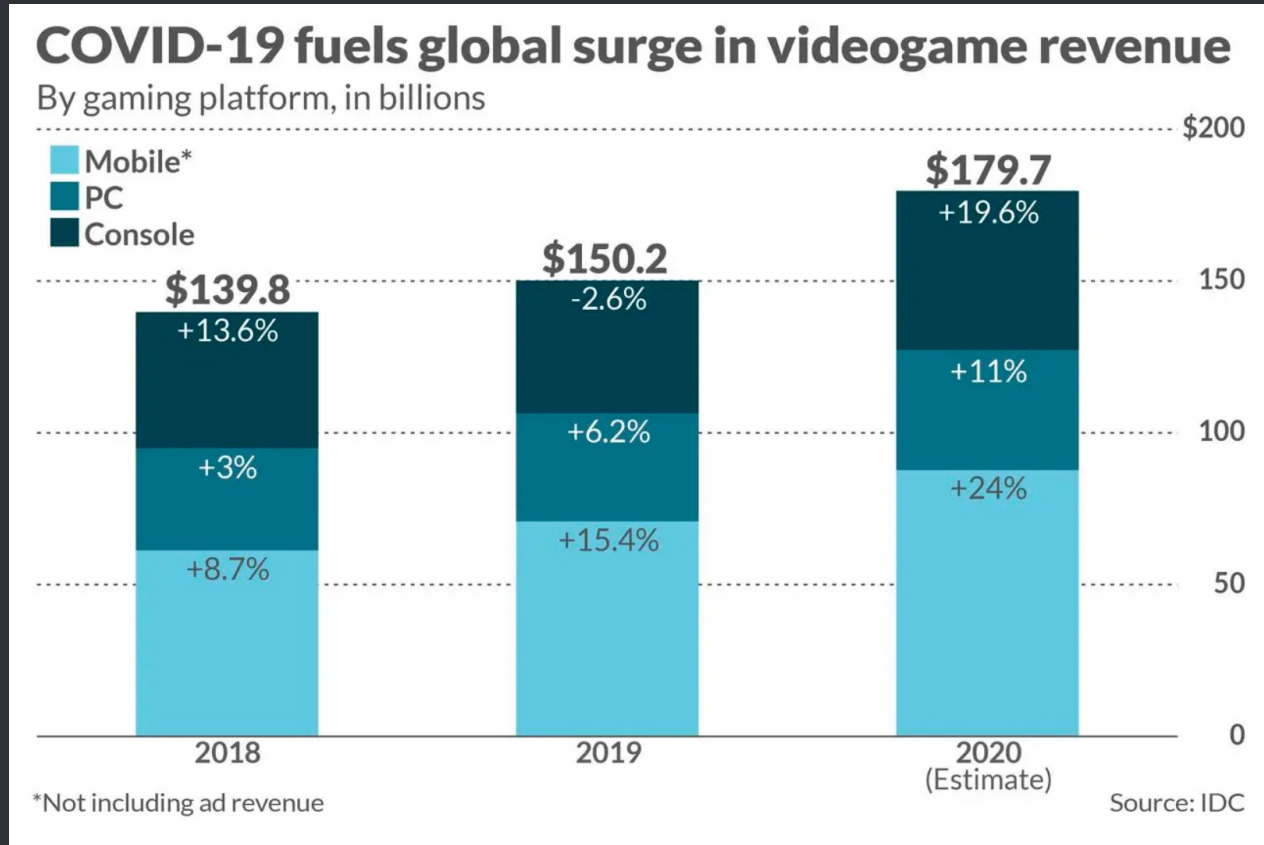curiosity

2 Game Based Learning

... seems to be a growing field

History

First publications about learning with e-Games

Digital Games are on the move – first research mostly in the preschool area

"Serious Games" "Educational Games"

Mobile Learning: Learning with casual games

Gamification as new trend

Seamless Learning

| 1980 | 1990 | 2000 | 2005 | 2006 | 2007 | 2008 | 2010 | 2011 | 2015 | 2018 |

Trend edutainment und Multimedia

Trend in press: Game based Learning

iPhone starts and afterwards Android based devices

Learning Theories (Schön, 2010):
- Location based Learning: Real life situations
- Social Learning: Learning is an active part on the learners themselves and occurs through participation
- Game-based Learning
- Collaborative Learning

Augmented and Virtual Reality as new part of GBL

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Sales 2020 - Video games are bigger than movies and sports combined!

"Digital games are a rule-based, interactive medium that emotionally binds players and takes place within a space delimited from objective reality and whose underlying interaction technology is purely digital in nature."

Wagner, 2008

Type of (learning) games

- Action games

- Adventure Games

- Casual Games

- Role Playing Games

- Simulation games

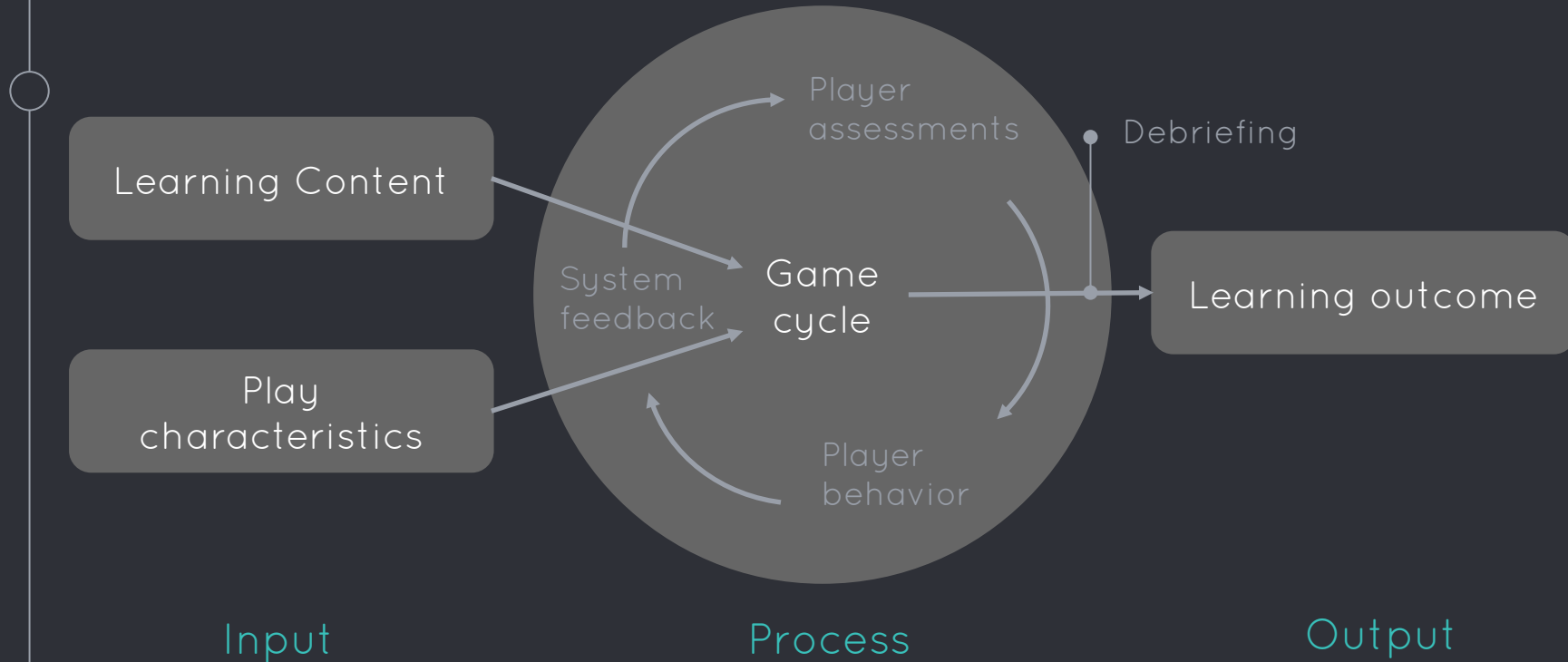- Sports games

- Strategy games

Basic reflections (1/2)

- Player's ability to learn (e. g pre-knowledge)
- Learning by playing as a **cycle of play** consisting of game behavior, feedback, assessment of the game feedback and own behavior
- Success leads to positive reinforcement

- Failure should lead to arouses ambition (motivation)
- Trial-and-error principle
- Learning-by-doing
- Predominantly implicit learning

Learning Game cylce

Input-Process-Output model for GBL (Garris & Driskell, 2002)

Learning Content

Play characteristics

System feedback

Game cycle

Player assessments

Player behavior

Debriefing

Learning outcome

Input

Process

Output

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Learning theories

- ◦ active learning
- ◦ constructive learning
- ◦ self-directed learning
- ◦ social learning
- ◦ emotional learning
- ◦ situated learning

Potential of GBL

- High level of intrinsic motivation

- Strategic thinking in context

- Acquisition of generic and metacognitive skills

- increase of general self-confidence

- Is not perceived as a learning activity ("stealth learning"; implicit learning)

- Games according to game theorists purpose-free and voluntary

- Explicit learning can disturb the flow of the game

- Didactically meaningful integration of learning content and game mechanics

- Budget

- Ambivalent expectations of educational games (open framework vs. fixed curriculum; complex enough and lots of learning content vs. low cost; motivate and captivate for a long time vs. other learning content)

- Achievement of learning objectives cannot be guaranteed

- Teachers are indispensable as learning process facilitators
- Critical reflection (debriefing)
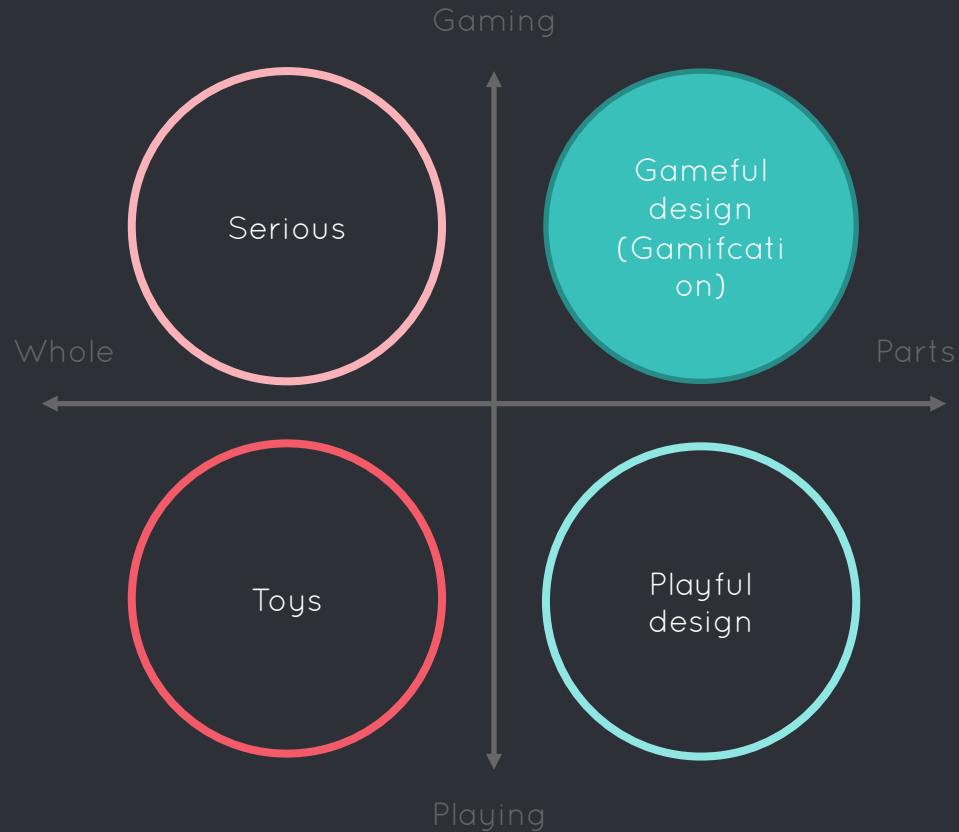
3 Gamification

... or how serious interfaces become more motivating

"Gamification is the use of game design elements in non-game contexts."

Deternig et al, 2011

Difference serious game and gamifcation

Example "the fun theory" (1/2)

The Fun Theory 1 – Piano Staircase Initiative | Volkswagen

7,505,001 views • 26 Oct 2009

👍 214K   👎 2.1K   ➦ SHARE   SAVE   •••

Examples (2/2)

TripAdvisor: Collect badges with increasing difficulty

Starbucks: Great Reward App makes you want (and thirst) for more

Microsoft: Learn Microsoft Office easier with Ribbon Hero

Reddit: Karma points through up-votes

SAP: Play golf when transferring orders

Gamification elements (1/4)

- Achievements (defined objectives)
- Avatars (visual representation of a player character)
- Badges (visual representations of achievements)
- Battles with final enemies (special challenges at the climax)

- Collections (collecting sets of items or badges)

- Combat (a defined battle., usually short-lived)

- Unlocking content (aspects that are only achieved when players complete objectives)

- Gifting (ways to share resources with others)

Gamification elements (3/4)

- ○ Leaderboards (visual display of player progress and achievements)

- ○ Levels (defined areas in player progress)

- ○ Points (numerical representation of game progress)

- ○ Tasks (defined challenges with objectives and rewards)
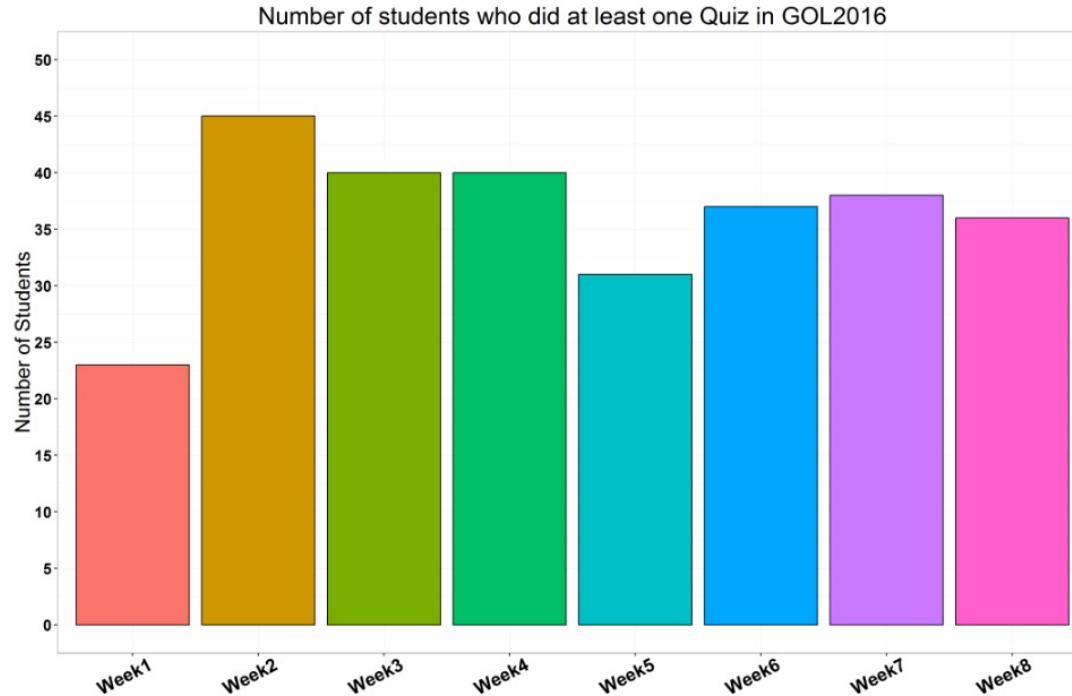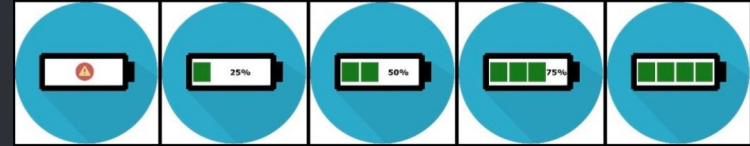
Gamification elements (4/4)

- Social graphs (representation of the players' social network within the game)

- Teams (defined groups working together for a common goal)

- Virtual goods (game assets with perceived or real monetary value)

4 Some few examples

... in Higher Education

Just a small battery ...

Number of students who did at least one Quiz in GOL2016

Khalil, M., Wong, J., de Koning, B. B., Ebner, M., & Paas, F. (2018). Gamification in MOOCs: A Review of the State of the Art. In proceedings of the 2018 IEEE Global Engineering Education Conference (pp. 1635-1644). Santa Cruz de Tenerife, Canary Islands, Spain

Just earn some badges...

Participation badges are motivating, but only for a smaller sub-group. The case study pointed out that only a smaller sub-group of the learners is generating the issued badges. That sub-group has also a significant lower drop out rate. Consequently, this leads to following conclusion: If a voluntarily learner generates a badge in the first week it is much more likely that he/she will finish the course in comparison to a none-generating-learner.

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Learning Analytics ...

Planner

☑ Quiz ☑ Aufgabe
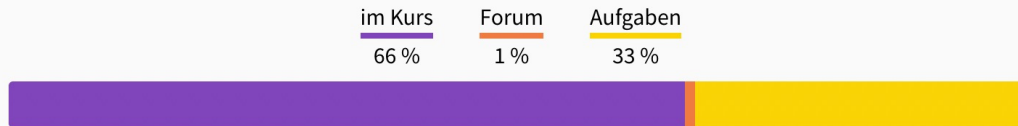
Neues Ereignis   Einstellungen

Q*   A*   A*   A*   A*

| Oct 2021 | Nov 2021 | Dec 2021 | Jan 2022 | Feb 2022 | Mar 2022 |

Q 1 Quiz   A 4 Aufgabe

verpflichtende Ereignisse haben eine schwarze Kontur, **benotete** Ereignisse sind mit ***** markiert

Zeitüberblick

So viel Zeit verbringen Teilnehmer:innen im Schnitt mit den verschiedenen Aktivitäten.

im Kurs	Forum	Aufgaben
66 %	1 %	33 %

Virtual Reality, Augmented Reality are on the move ...

Kommetter, C. & Ebner, M. (2019). A Pedagogical Framework for Mixed Reality in Classrooms based on a Literature Review. In J. Theo Bastiaens (Ed.), Proceedings of EdMedia + Innovate Learning (pp. 901-911). Amsterdam, Netherlands: Association for the Advancement of Computing in Education (AACE).

„GBL and Gamification can work as game changer in a serious learning environment"

Thanks for the attention!

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