



Serious Game-based Learning

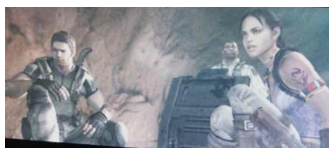
DEVLEARN|11 SM

in School

Best Practice Examples

DevLearn2011, Las Vegas / NV

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I myself - BIO

Hubert Egger

- Teacher Trainer (TT)
- eLearning-Cluster-Vorarlberg + eLC bmukk Austria
- university degrees in Mathematics, Physics and ICT from University Innsbruck /Austria
- Consultant Ministry of Education Austria/EU
- Attendee & designer of many Austrian & EU-projects (EPICT, eLC, eLSA, Intel, eFit, Learnie-Award, UTeacher, ICT Career&Space...)
- tries to foster Science & ICT in education
- curricula development in ICT for schools
- roll out and provision of services in Learning-Content-Management-Systems (LCMS), serious game based learning (GBL) ...

I myself - BIO



Hobbies ...





Education System in Austria / Germany / Switzerland

VS, HS, Gymnasium, vocational schools, PH, University
Teacher Training, In service TT, Initial TT



<http://eeducation.at/>

Austrian Schoolsystem

BMUKK / Ministry of Education

9 departments called
Landes-Schulräte (LSR)

University, Fachhochschulen (FH), Päd. Hochschulen (PH)

x

Time
(years):

5

BHS (HTL, HAK, HLW)
Vocational schools

AHS (Gymnasium)
Secondary academic
school

8

4

Hauptschule/NMS
Secondary school

4

Volksschule – primary school

Age:

14 – 18

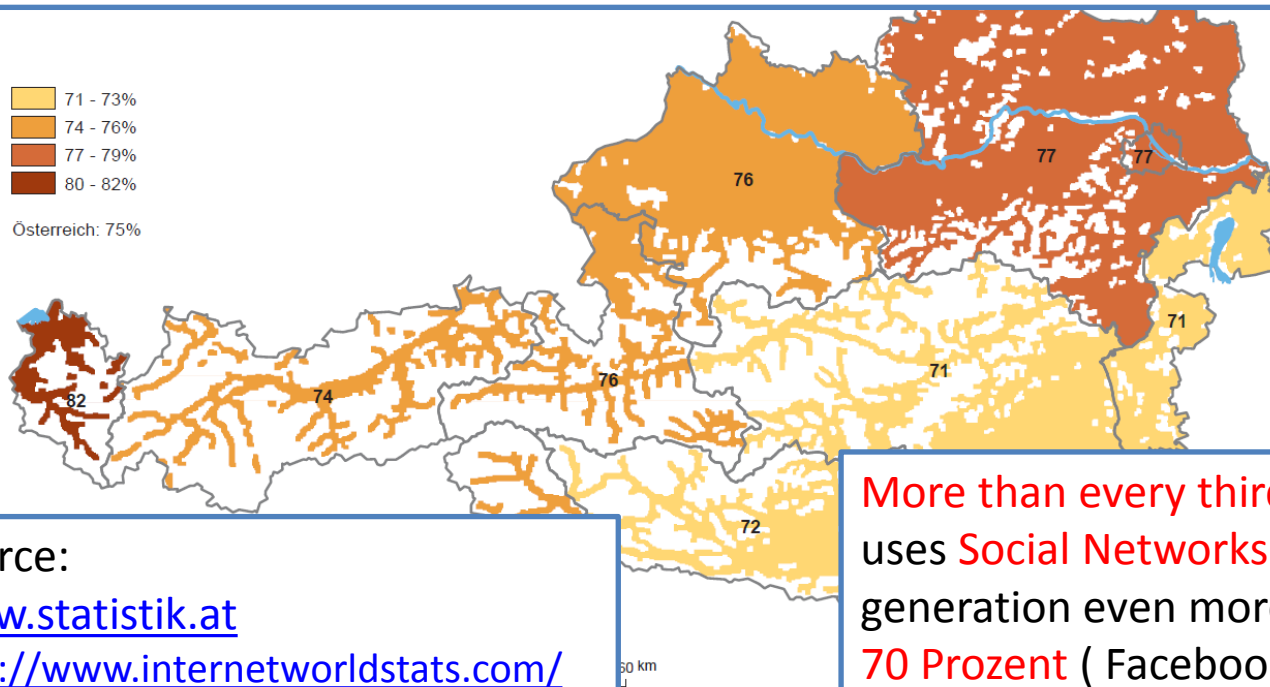
10 – 14

6 – 10

Internet Utilisation in Austria

Internet utilisation:

- about **80 percent of the population** from age 16 ... 75 (USA: ~ 78 percent)
- Households with highspeed Internet: more than **72 percent**



Source:

www.statistik.at

<http://www.internetworldstats.com/>

More than every third Austrian uses **Social Networks** – the younger generation even more than **70 Prozent** (Facebook, Google+).

Befragungszeitpunkt: Mai und Juni 2011. - Der Stichprobenfehler beträgt durchschnittlich 1,7%. - Nur Haushalte mit mindestens einem Haushaltsmitglied im Alter von 16 bis 74 Jahren.

Jade has logged in at CHEATING.COM via his UMTS-cellular, sent the URL via BLUETOOTH to Sarah's PDA, who sent the HTML-file via WIRELESS to Jack's wearable display...



Source:
www.heise.de

eLC: since 2001 (www.eLearningCluster.com), vocational and upper secondary schools (14 – 18 years; high schools, colleges)

eLSA: since 2004 (elsa.schule.at), primary and secondary schools (6 – 14 years)

Off from „teacher centered education“ ...

... towards „learner/student centered education“!!

Teach & instruct and learn with new media, web 2.0, LMS, blended learning ...
... as a method mixture within didactical background.

Netbook Project Austria 2010

Benefit:

1. Low weight/mass < 1kg
2. Battery pack > 6 hours
3. Own Internet access via UMTS/HSPA/3G
4. Autonomous from school infrastructure



Netbooks im Unterricht

19. Jänner 2010, Donau Universität Krems

Donau-Universität Krems
Department für Interaktive Medien und Bildungstechnologien

bm:uk Bundesministerium für
Unterricht, Kunst und Kultur



Source:

<http://eeducation.at/netbook.php>

National ICT-steering group

EU-Agenda: 2000, 2007, 2010
Life-Long-Learning (LLL) + digital competence

Setting terms:

Digitale Kompetenz

Digital
competence

Ausgehend von der Wettbewerbsfähigkeit des europäischen Wirtschaftsraumes sind IT- und Medienkompetenz in der Informations- und Wissensgesellschaft tragende Säulen für das Lernen und die Teilhabe an der Gesellschaft (Lissabon Agenda 2000). Die Entwicklung der „Digital Competence“ in den Mitgliedsstaaten ist dabei zentral:

Digital competence involves the confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet.

Schools & classrooms




- Teacher has to rotate into several classrooms (every 50 min, ~ 30 learners)
- Special rooms & equipment (science, physic, chemistry, biology,...)
- ICT rooms (CS- / ICT-lessons, schedules for other subjects / projects)



GBL ideas, intentions & teamwork

- Community of practice and trendscouts
- Do not re-invent every invention (“the wheel”)
- Teacher teamwork within LCMS / blog / facebook
- Teamwork with kids
- Collecting & developing :
tools & games for learners

Home: www.GameBasedLearning.at



Motivation as a core element


Q: How, when and how often do you motivate your students / kids?

Q: What is your core element to motivate your students / kids?

Q: Do you know the hobbies of your students / kids?

Q: What are your intended educational/instructional goals:

- Inquiry based learning
- Mix with teacher lecture (student centered)
- Self organized learning (eg with eLearning)
- Personalized learning (eg with ePortfolios)



Digital natives and digital immigrants


Q: Teachers have to pick up kids where they are at, don't they?

Gap between teacher / instructor and kids

Q: Do you know the hobbies of your kids?

Q: How far are you away from a digital native?

Q: Do you agree with: „ ... lessons & motivation should relate to the pupils/students everyday environment.“ ?



Games as potential factor ...

Q: Do you have kids playing pc-games / online-games?

Q: Do you have an own PS3 / XBox at home?

Q: Do you know, what your kids/students are playing /gaming online ?

Q: Do you sometimes play games (offline/online) with kids/students?

Online games: World Championship 2010

CeBIT 2010+2011
Hannover / Germany



Source: Egger H., www.cebitt.de






Selection of ...

GBL szenarios to implement in classroom

- University study with szenarios of best practice examples
- Social learning with shooter games
- Story-telling : gamebased learning and diagnosis
- Robotic and games
- Business games
- Urban development and simulation
- Flighttraining
- Physics & science games
- Development of own games – GDKs (scratch, gamemaker)



Unsuitable games

- Only jump & run
- Only playing to waste time
- Games without curricula goals

Suitable games:

- Knowledgebase or curricula implementation in games
- Teamwork possibility with rated list for educational purposes
- Adaptive knowledgebase
- Inquiry based learning possibility
(adventure games with knowledgebase)

Some examples for GBL szenarios ...

■ Classtools



Classools.net Arcade Game / Quiz / Flashcard generator!

[TITLE OF QUIZ GOES HERE]

1. Type the title of your quiz in the box above.
2. Input your questions & answers in the box below (or paste from a word processor).
3. Separate each question from its answer with an asterisk: **question*answer**
4. Start each question on a fresh line.

Large text input area for questions and answers.

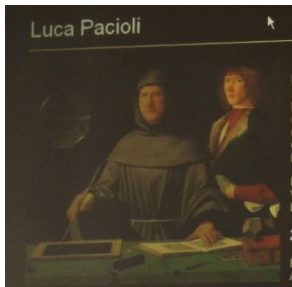
Bottom section:

- Left: Password to stop players editing this screen (leave blank if not required)
- Center: Game to direct players to automatically (only works if password set): 
- Right:

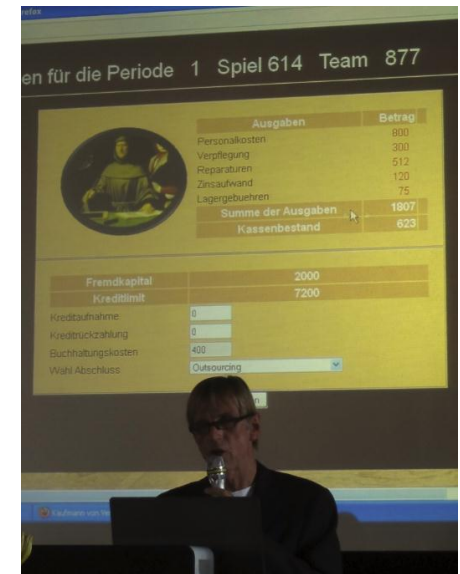
Quizz-game
generator

Source: <http://classtools.net/>

■ Business games: The Merchant of Venice



Source: <http://mov.gamebasedlearning.at> ,
Winner of Austrian Learnie-Award 2011.
Suitable for vocational business schools.





■ Business games: The Merchant of Venice

The online game "The Merchant of Venice" is suitable for use in economic subjects.

Students are playing in the 15th century and learning economic contexts in order to understand and apply their knowledge.

Students learn about some basic economic concepts. They can simulate & experience the impact of their decisions in real-time.

Some economic issues:

- How should I invest my capital / assets for its best?
- Why are there falling / rising prices for goods in different regions?
- Is it better to pay off loans or to invest more?
- What are the basic concepts of balancing / accounting?

■ Story Tec



STORYTECST

StoryTec has been conceptualized as rapid prototyping environment to facilitate the authoring process of interactive applications.

Examples include, but are not limited to Story-based city and museum guides, classical Web-based training courses, game-based learning appliances for kids, students and families as well as process-oriented, individual and collaborative simulation and training environments for trainees and employees or personalized exergames to increase the motivation for a sportive and healthy life.

Source: <http://www.storytec.de/>

■ Story Tec

Overview

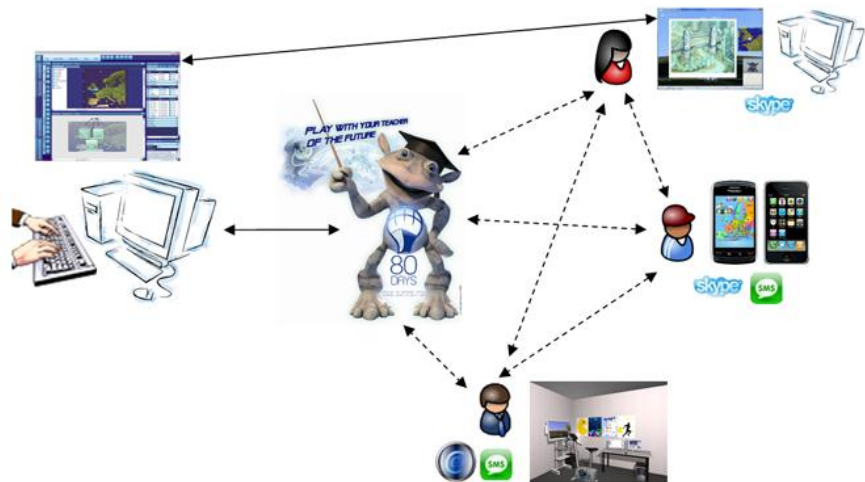
RTD issues

StoryTec Framework

Usability & User Experience

Research

The origin of StoryTec is settled in the applied research arena. Underlying methods and concepts have been elaborated and evaluated within the context of different, in big parts interdisciplinary – and mainly public funded – research and development projects in the research and application areas Interactive Digital Storytelling, Cultural Heritage, Technology-enhanced Learning and Serious Gaming.



From an application oriented perspective, StoryTec addresses a broad range of application scenarios and target user groups: At first, StoryTec aims to support authors to create Story-based, process-oriented, interactive applications. At the moment, - within the first StoryTec release - this happens in an offline mode. Further StoryTec versions will allow web-based and collaborative authoring. Furthermore, methods and concepts are developed to support teachers/moderators as well as learners/players within collaborative and mobile learn and game settings.

Relevant publications from the research group Serious Games in that multi-faceted application spectrum and and research field are accessible via the [database of publications at Multimedia Communication Lab](#).

Source: <http://www.storytec.de/>

■ Ludwig Adventures



Source: <http://www.playludwig.com/>



■ Ludwig Adventures

The development of Ludwig is accompanied by a research project funded by sparkling science:

Research on motivational aspects and knowledge transfer in digital educational games for children aged 10 to 14 years

Current research on serious games allows only little inference about the optimization of knowledge transfer. To fill this gap we develop a research scenario to study motivation and knowledge transfer factors in educational games for children from 10 to 14. Our game “Ludwig” is an interactive learning game built around a serious topic: renewable energy. It is developed within an iterative didactic design approach developed by Wagner (2009). The development process is following three primary principles of game play: freedom to learn from errors, freedom to experiment, and freedom to make an effort (Osterweil, 2007).

Source: <http://www.playludwig.com/>

■ Ludwig Adventures



Learning is boring – Conquering knowledge is captivating

Knowledge is the basis of every civilization and playing is everybody's favourite activity. Ludwig will constitute a new category of *knowledge conquest*.

Game-based learning describes a fairly simple principle: as humans, we are incessantly learning as long as we are allowed to discover new things in a playful way. The game Ludwig turns this principle upside down: playing the game is the main aim and knowledge is the currency you need to collect to win.

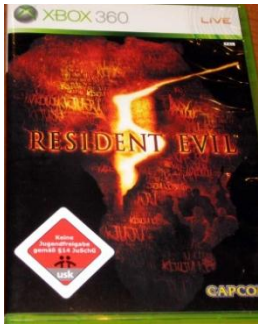
Source: <http://www.playludwig.com/>

- Social competence with ego-shooter games

eL-project eLC-Austria 2009/10, Egger H.

Social competence &

„violent – games“ practicing gamebased learning



Austrian secondary schools: BG+BRG Feldkirch, BRG+BORG Feldkirch,
BG+BRG Bludenz, & GYM-Lichtenstein Vaduz



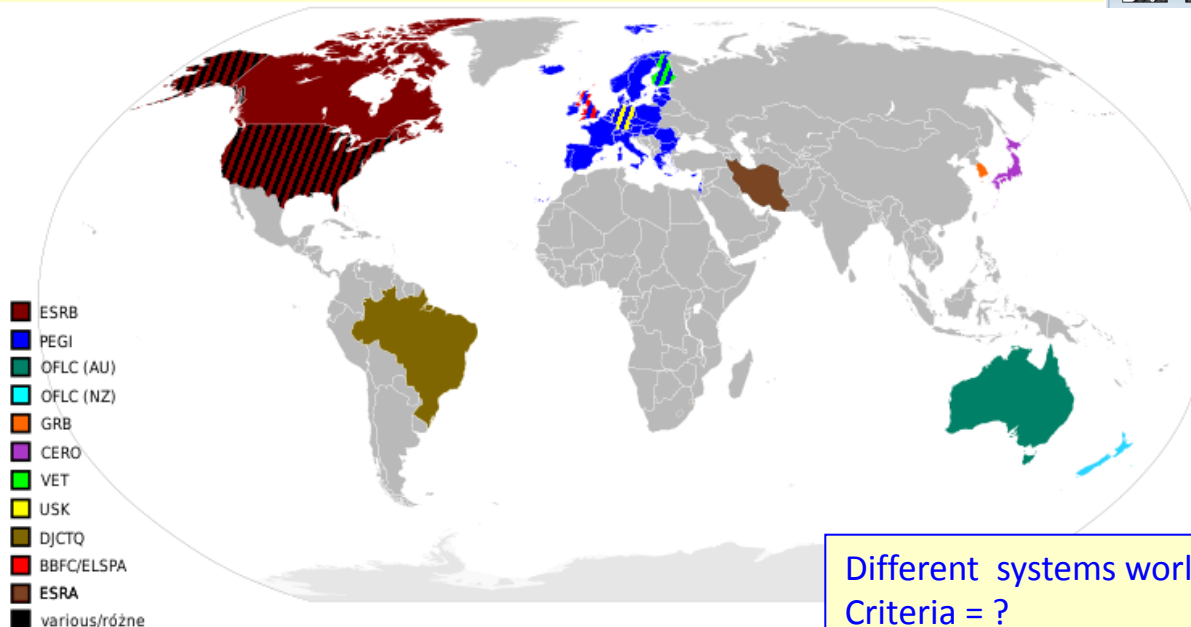
Legal regulation or age-suggestion?

USK: In Germany responsible for classification of computergames
(§ JuSchG 2003: compulsory, age and content rating)



PEGI: Pan European Game Information

ESRB: Entertainment Software Rating Board

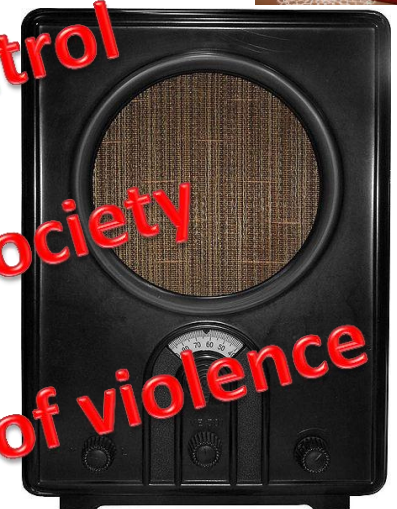
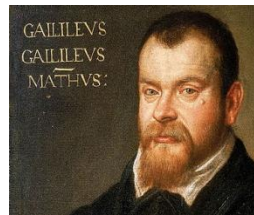


Different systems worldwide. None for online-games...
Criteria = ?

Abstract: prejudices and stereotypes in society since ...

Always similar arguments in connection with new media:

- Books in ancient times
- Radio casts in 1920s
- TV casts
- TV- / DVD-lending
- games on DVD/BlueRay
- Online-games



Harming young people
No content control
Endangering our society
Cause of violence



Transfer to real everyday life?

For example:

Love-scenes in movies

„Reality is more complicated and not as colored ...“

Action movies

„There is no RESET-Button,
action is only 1x, unreal happenings,...“

**Emotional
transfer
to reality?**

„Killer-game/Egosooter“ study:

Outcome of a neuro-study with CRT is calming down:

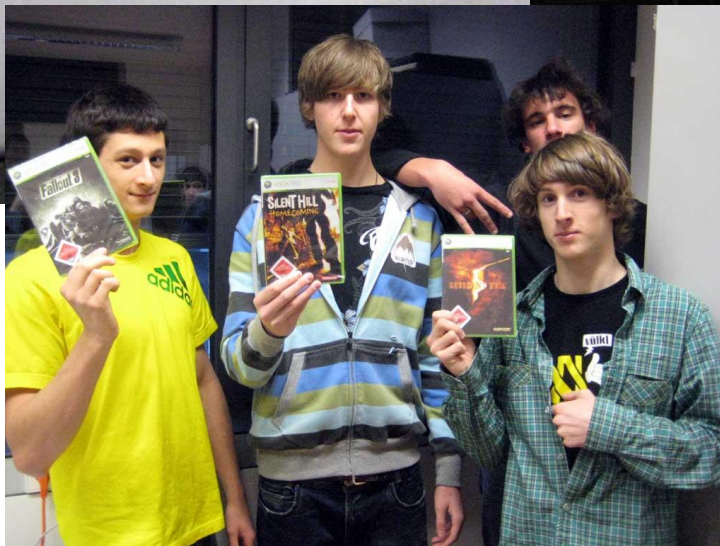
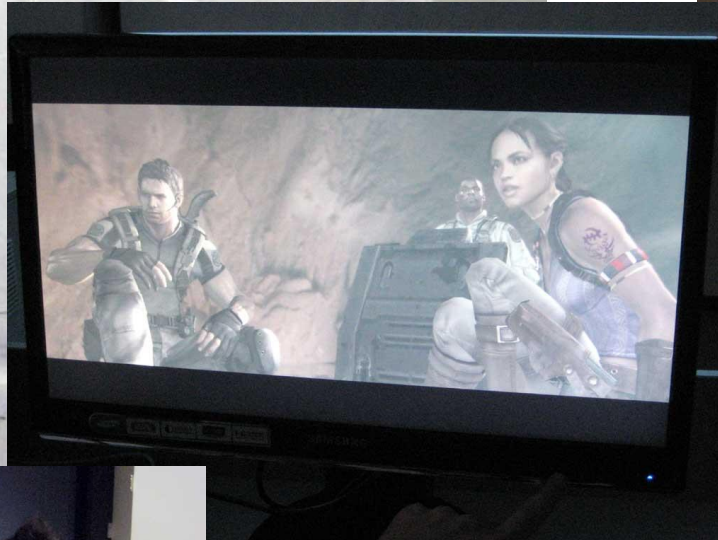
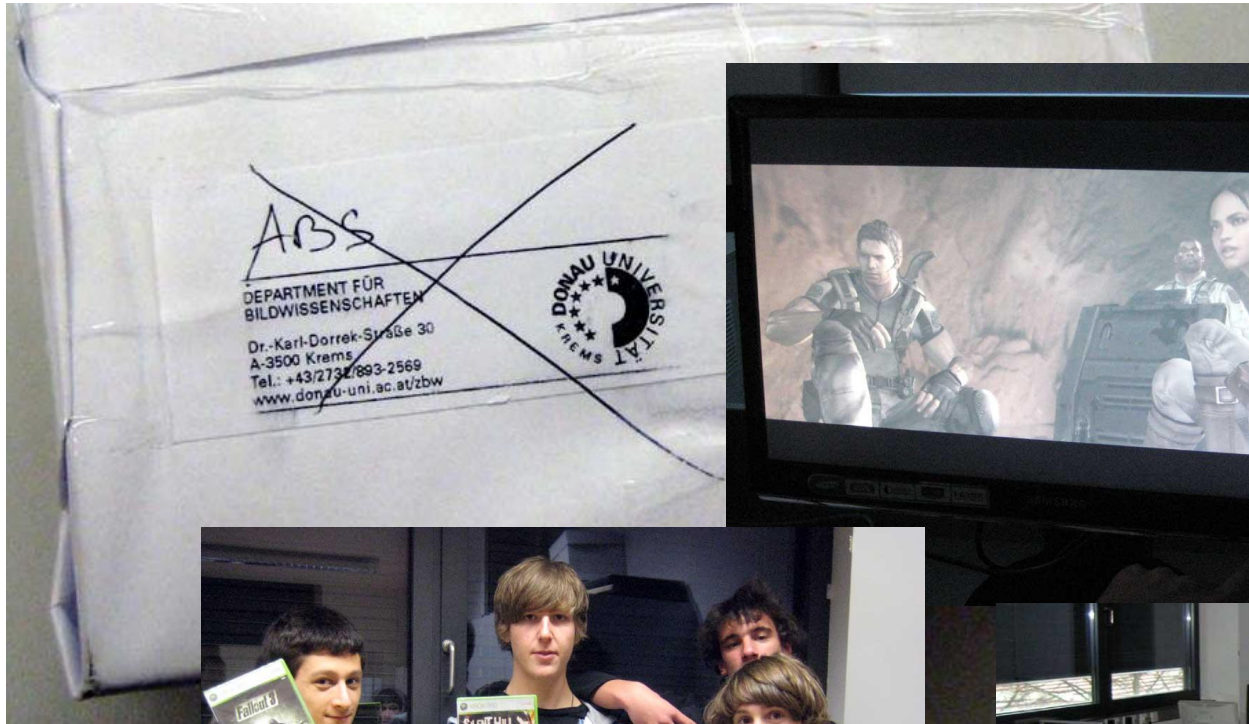
**„Intense user/consumer of violent games / ego-shooter have a healthy & well
relationship to real violence in society!“**

Source: Neuropsychologie UNI Bremen, Killerspiel-Studie Thorsten Fehr and NTV-Dokumentation 2008
<http://www.neuropsychologie.uni-bremen.de/> and <http://bit.ly/urz1Kz>

Szenario for the project

- Workout of own [review / evaluation criteria](#) for picturing violence in games / movies
- Compare with existing [PEGI- / USK- / ESRB-](#) criteria
- Collect articles in connectivity to ego-shooter (TV, newspapers, Websites) [PROs and CONs](#)
- [Online-survey](#) with subject violent games / ego-shooter
- [Science based articles](#)
- [Mindmaps](#)
- [Teamwork](#) online in a WIKI -tool
- Steps in [game testing](#) (lessons in school and gaming at home)





Project outcome

- Website with information for journalists, parents, teachers, students
- Short paper „Games and violence“
- Online survey and interviews
- Papers for teachers



■ Online game development: kids for kids


- Students/kids create their own online-game with adaptable knowledgebase.
- Playing & sharing online in teams on the gameserver
- Implementation in LCMS (Moodle, Fronter, Atutor,...) and team-highscore-list.





Source: <http://www.gamelabs.at>


■ Online game development: kids for kids


[Newest games](#) | [Most popular games](#) | [All games](#)


 **The super-brain game**
★★★★★


 **children learn with computers**
★★★★★

 **Bubu for Kids**
★★★★☆

 **Tim4Kids**
★★★★★

 **Squirrel...**
★★★★★

 **Identify the components**
★★★★★

 **Into the Forest (Warrior Cats)**
★★★★★

Source: <http://www.gamelabs.at>

■ Game Development Kits (GDK)

Gamemaker

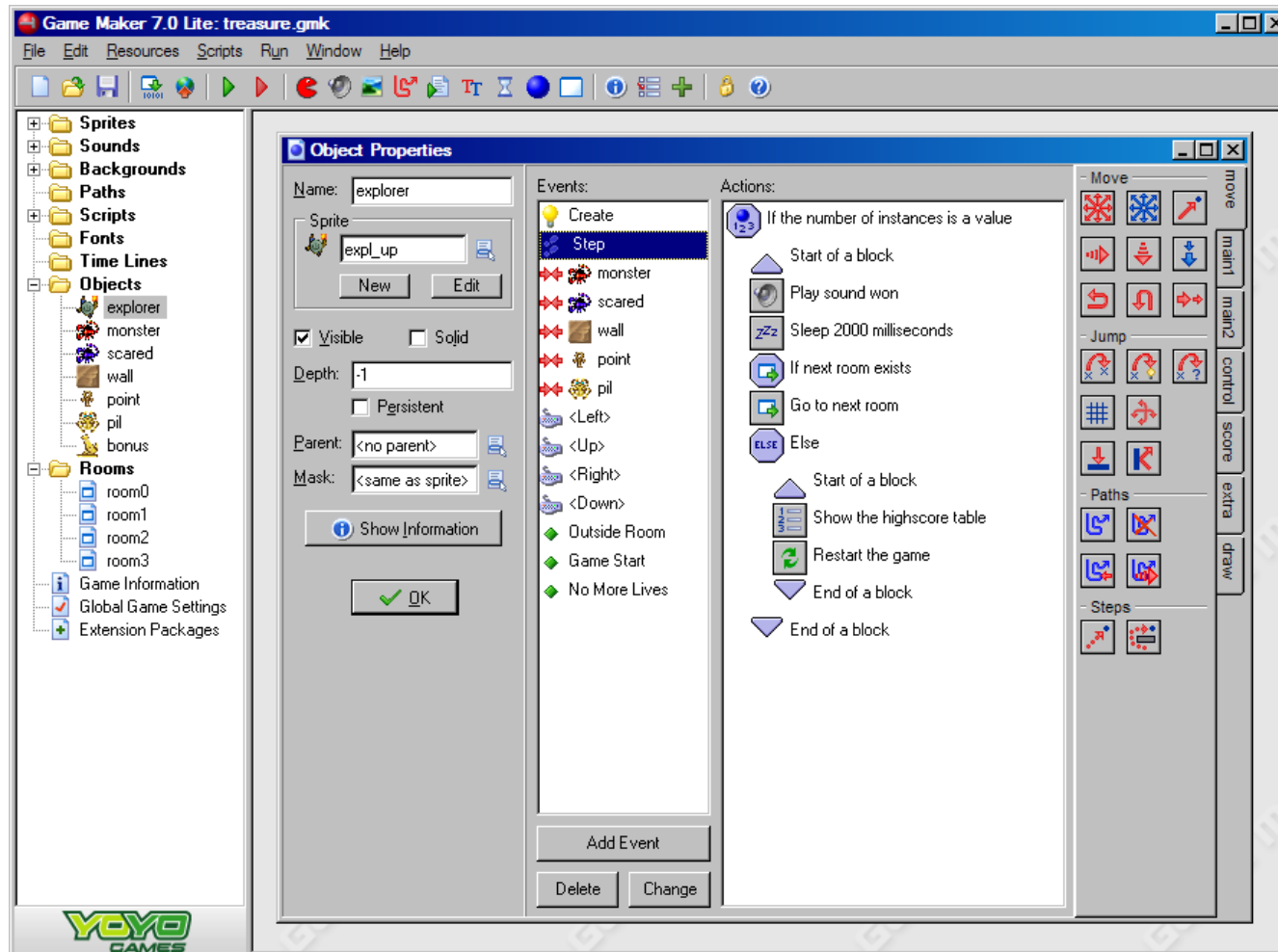
GDK for multiple OS &
HTML-5



Source: <http://yoyogames.com/news/41>
<http://gmk.gamebasedlearning.at>

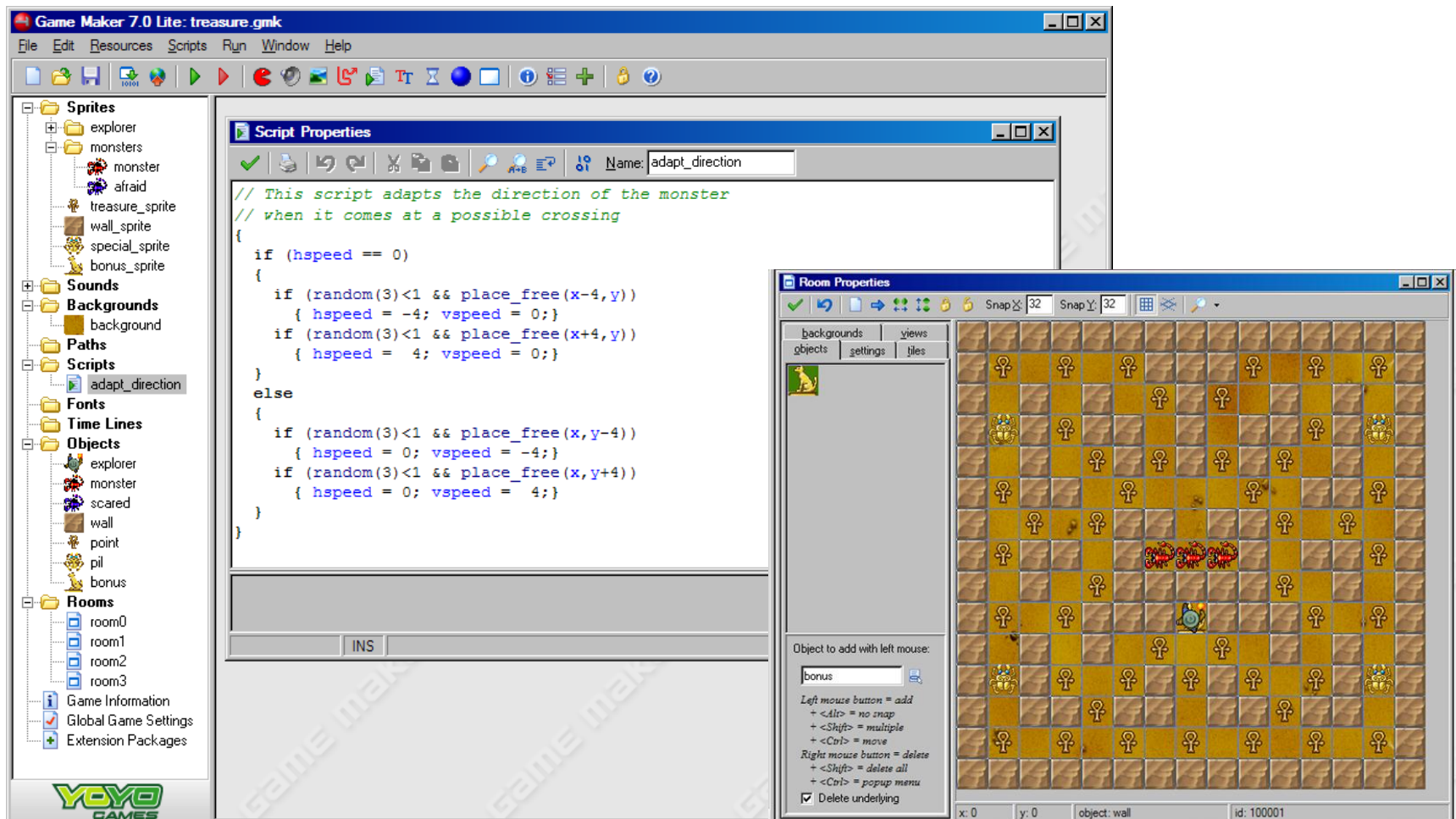
Programming by drag & drop

Gamemaker



Additional possibilities (if needed) with C:

Gamemaker



■ Game Development Kits (GDK)

Scratch

GDK for multiple OS &
Input possibility from
external sensors



Source: <http://scratch.mit.edu/>
<http://scratch.gamebasedlearning.at>



SCRATCH 1.4 INTERFACE



■ Game Development Kits (GDK)

Scratch in pSkills-project 2011

E.g.: scientific simulation of a rotary engine (Wankel-engine) with Scratch



*Life-long Learning Programme Comenius
Multilateral Project
502843-2009-LLP-GR-COMENIUS-CMP*

pSkills


*Programming Skills Development in Secondary Education
by means of Modern Educational Programming Languages*

Source:

http://www.gamebasedlearning.at/pSkills_EU_project_Egger.pdf

<http://scratch.mit.edu/users/pSkills>

<http://pSkills.gamebasedlearning.at>



Perfect design & type of educational game

- Adventure games
- Knowledgebase & curricula implementation in games
- Adaptive knowledgebase
- Artificial-Intelligence (AI) and adventure games
- Appropriate online games
- Online game development with kids
- Game implementation in LCMS / social networks
- Game-Development-Kits (age-adequate development)




Some of our kids / students challenges ...

- Reality versus virtual reality
- TV-productions / series / news & experience in everyday life
- Internet research & quality of information

Solution & conclusion:

- More excursions to “fact-places”
- More (scientific or tryal & error) experiments
- More demonstrations of the difference between VR & Reality



Dynamic Systems as basics for simulation & games

- We are only capable of thinking in “linear dimensions”
- We have no sensor for complex and dynamic systems.
- We are able to learn & understand in adequate simulation-games

A **dynamical system** is a concept in mathematics where a fixed rule describes the time dependence of a point in a geometrical space.

Small changes in the state of the system create small changes in the numbers. The *evolution rule* of the dynamical system is a fixed rule that describes what future states follow from the current state. The rule is deterministic; in other words, for a given time interval only one future state follows from the current state

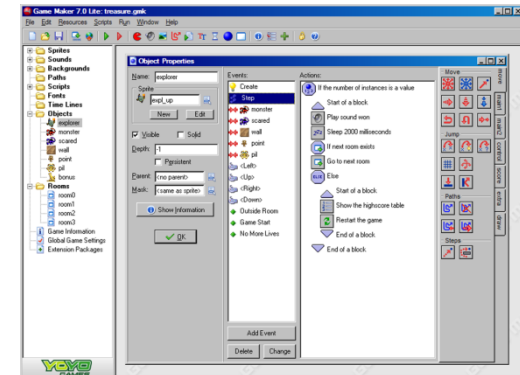
Examples: **Frederic Vester** Simulations, **SimCity**, animal populations, **SimAnt** (life simulation),...


Source: http://en.wikipedia.org/wiki/Dynamical_system
<http://en.wikipedia.org/wiki/SimAnt> ; <http://en.wikipedia.org/wiki/SimCity>

Where to get didactical szenarios for GBL ...

Full handouts, workarounds and all information given during the concurrent session 209 at DevLearn2011 are available for download afterwards at:

www.GameBasedLearning.at





If you want to know more...

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