

<p>Nikolaos Konstantinou Panteion University, Dept. of Psychology</p> <p>Email: nkonstantinou@panteion.gr</p>	<p>Iraklis Varlamis Harokopio University of Athens Dept. of Informatics & Telematics</p> <p>Email: varlamis@hua.gr</p>	<p>Andreas P. Giannakouloupoulos Ionian University Dept. of Audio & Visual Arts</p> <p>Email: agiannak@ionio.gr</p>	<p>Konstantinos Koskinas Panteion University, Dept. of Psychology</p> <p>Email: kkoski@panteion.gr</p>
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This presentation consists of

- ▶ **Introduction in 3D VLEs, peer learning and gamification**
- ▶ **Methodology of the current study**
 - ▶ *Experimental design*
 - ▶ *The design of gamified learning activity*
- ▶ **Evaluation and conclusion**

3D massively Virtual Learning Environment

- ▶ A simulated, immersive, real time virtual environment, in which multiple users, represented by avatars, interact with the environment and other users, aiming at a learning outcome
- ▶ Based on virtual worlds technology (e.g. Second Life, Active Worlds, Quest Atlantis etc.). The content can be created both by admins and users
- ▶ It's not just a software or an innovative technology. 3D VLEs provide a virtual place for creation, exploration, experimentation, marketing, meetings, collaboration and learning.

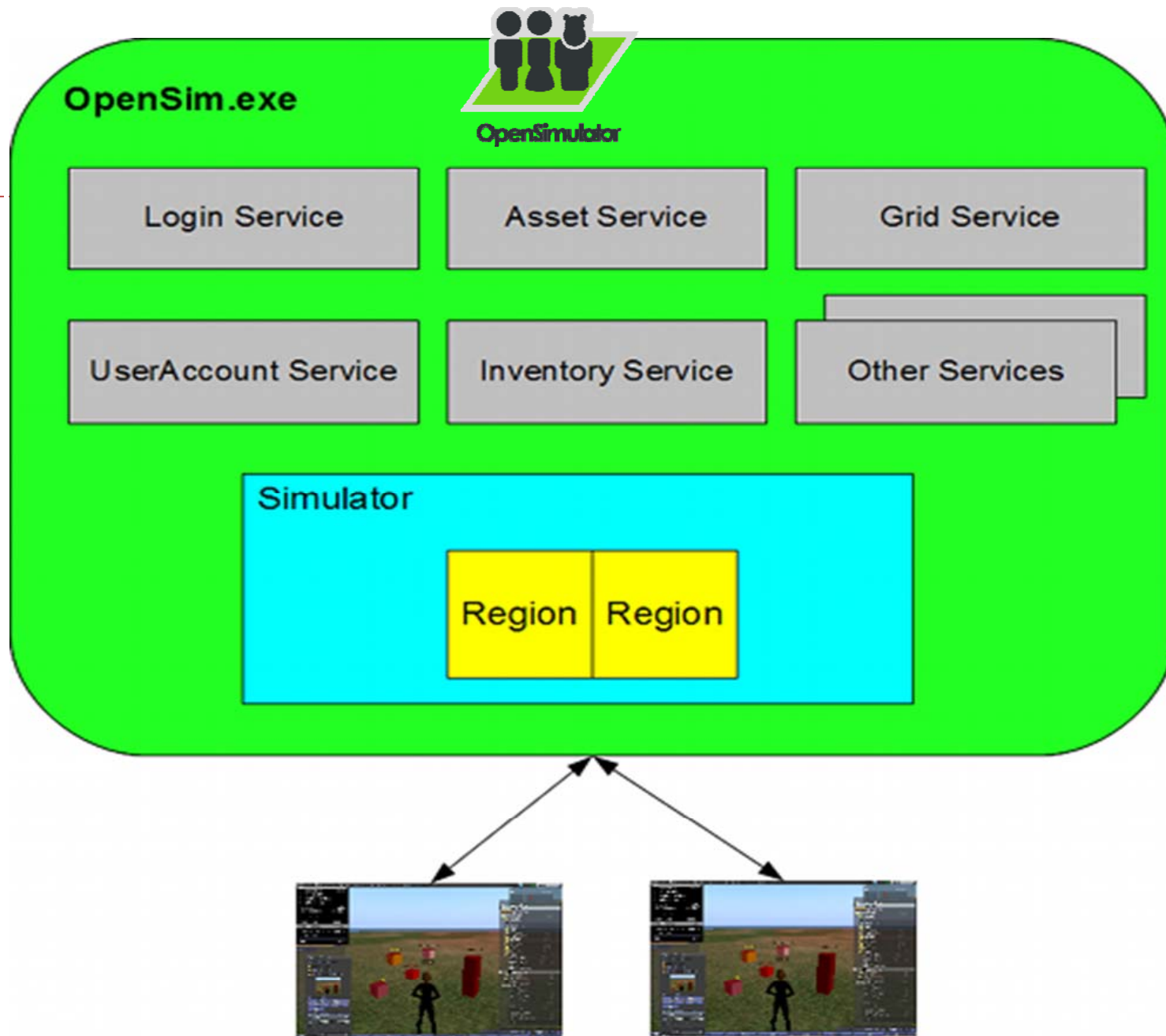


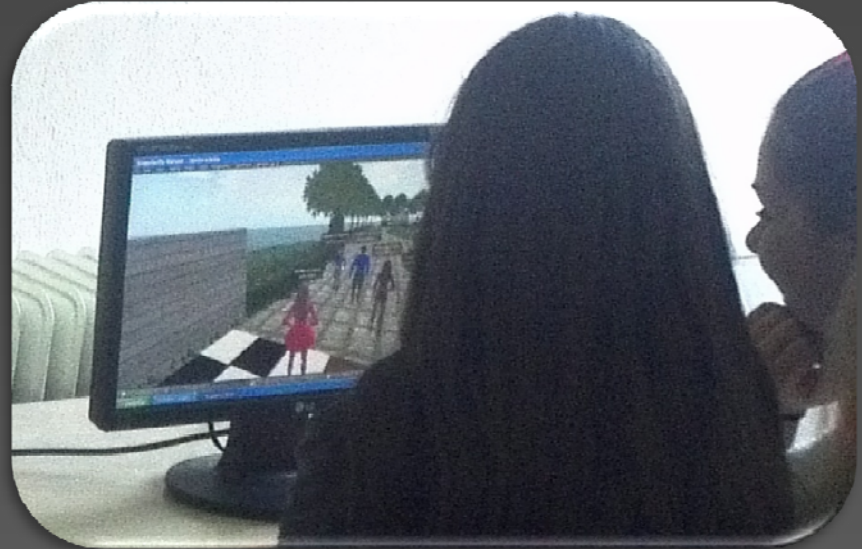
OpenSim

<http://opensimulator.org>



A team meeting in one of IBM's Sametime 3D virtual meeting rooms





A new dynamic way of education

Due to:

- ▶ Realistic representation of actual situations
- ▶ learning abilities through the construction of virtual artifacts
- ▶ Representation of self via personal formed avatars
- ▶ Virtual social gatherings (co-presence)

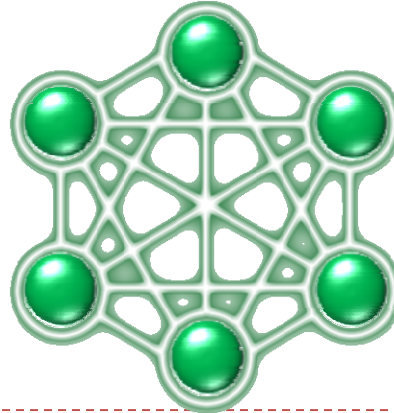
3D VLEs, cooperative, collaborative and peer learning

- Cooperative, collaborative and peer-learning are three forms of learning that can be supported in 3D VLEs.
- The trainees are invited to play an active role and become more learning autonomous so they can join the modern virtual learning communities of MOOCs, peer-to-peer learning or whatever can be in the future.



In self-driven learning models, such as peer-to-peer learning, learners should:

- ▶ Undertake more active role in the learning process giving them meaningful choices
- ▶ Develop meta-cognitive strategies by “constructing and doing” than watching
- ▶ Acquire responsibility giving them the learning process management
- ▶ Participate as equal partners in the learning process and engage in collaborative activities



Gamification in 3D VLEs

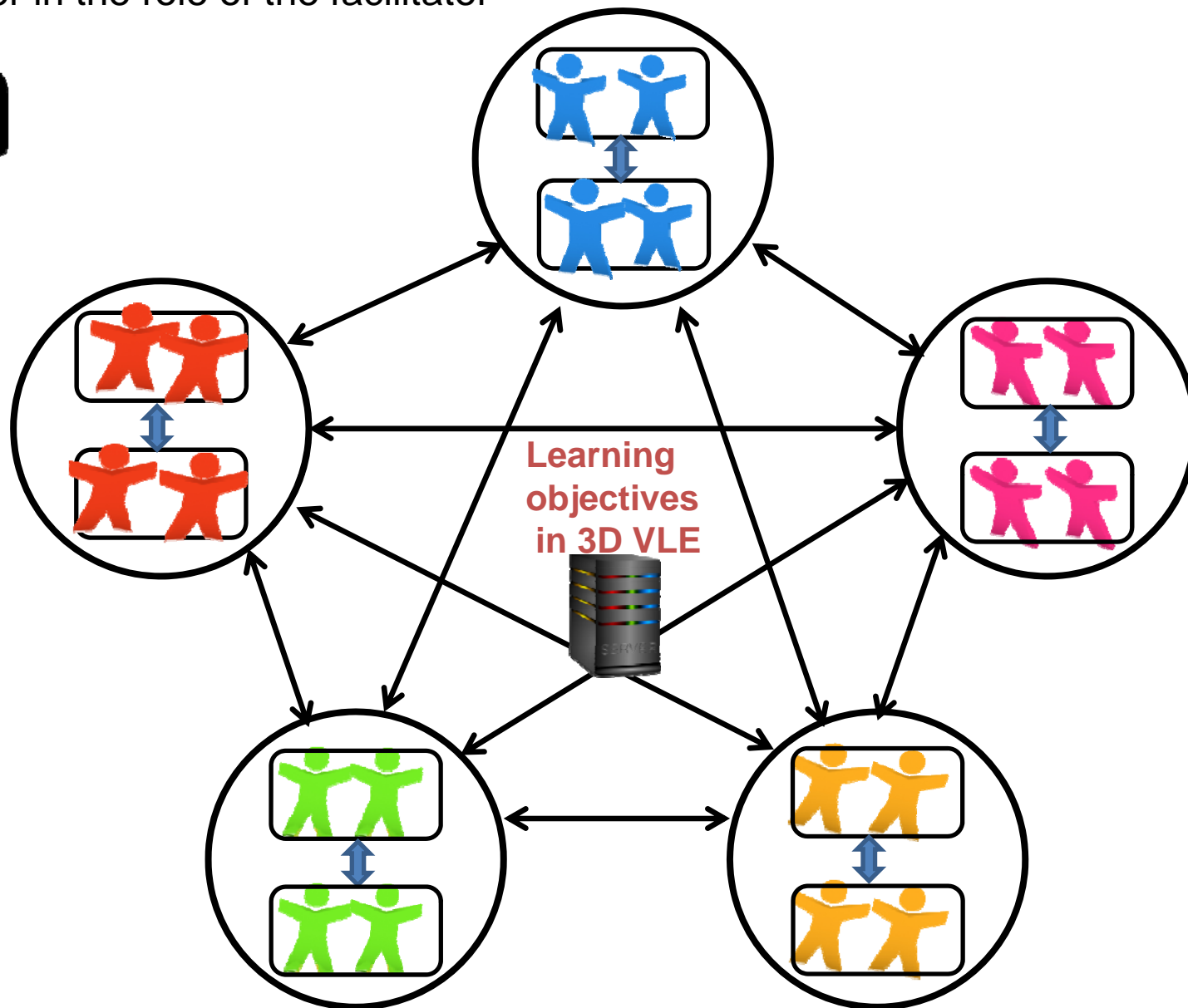
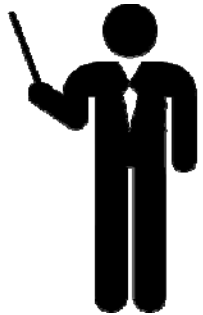
- ▶ Gamification is the use of game elements and digital game design techniques in non-game contexts.
- ▶ In *content gamification* the implementation of game elements and game mechanics changes the content which becomes 'more' playful.
- ▶ According to Self Determination Theory the elements required to enhance the inherent engagement and activation are:
 - ▶ a) the *competence* response to stimuli in the external environment (manufacturing, learning, communication skills, etc.),
 - ▶ b) the *relatedness*, i.e. the innate need for connection and interaction with others and thus the acceptance of social norms and rules,
 - ▶ c) the *autonomy*, the innate need for self-control of life.

These three elements are related to intrinsic motivation and self-regulation learning and they were taken into account when we designed gamified learning activities for this study.

Current study

- ▶ Experimental design was quasi-experimental because the participants joined in the experimental groups voluntarily and not randomly
- ▶ The difference between the conventional learning and gamified learning was investigate for both subjects of Biology and Computer Science. A total of 51 students of the Secondary School were divided into two experimental groups and one control group:
 - ▶ Control Group (CG, N = 10).
 - ▶ Conventional Class (CC, N = 22 in Biology, N = 19 in Computer Science)
 - ▶ Virtual Class (VC, N = 19)
- ▶ The main hypothesis that this study tests is the following:
Do VCs improve the learning performance through the digital game within the virtual environment compared to CC

The teacher in the role of the facilitator



Complementarity and interdependence of the groups

Collaborative and peer learning in current study

Var (1:Strongly disagree – 5:Strongly agree)	N	Min	Max	Mean	Std. Dev
Your experience in 3D VLE was collaborative	19	2	5	4,10	0,80

Var (1:Strongly disagree – 5:Strongly agree)	N	Min	Max	Mean	Std. Dev
The presence of the teacher was required	19	2	5	3,47	1,02

The learning activities were designed with peer learning and self-regulation learning in mind. However the presence of a facilitator was required in order to support and help students with the complexity of the environment. A longer students' familiarization with the environment would have allowed a larger degree of learning autonomy.

BIOLOGY

COMPUTER SCIENCE



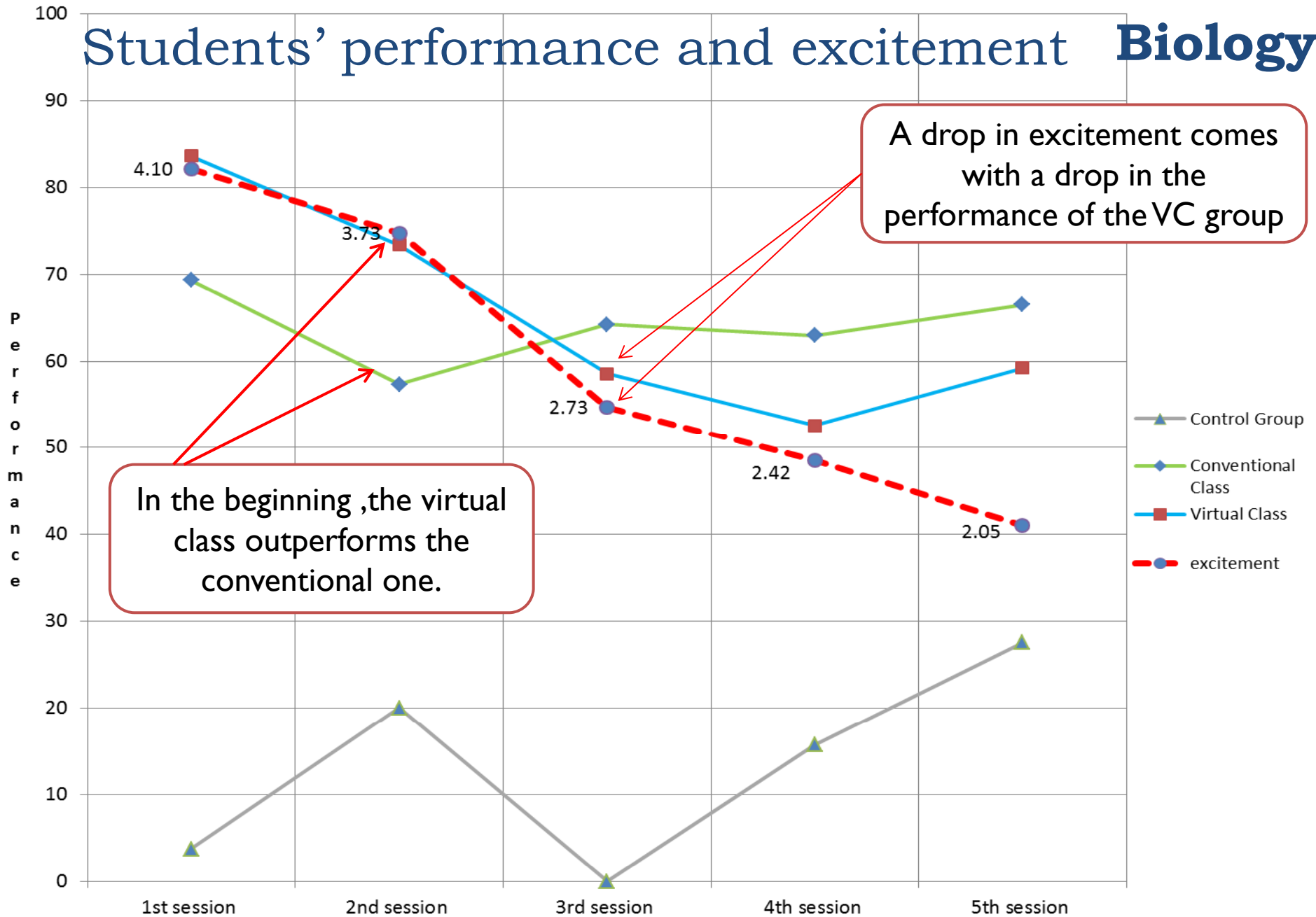
COMMON ISLAND



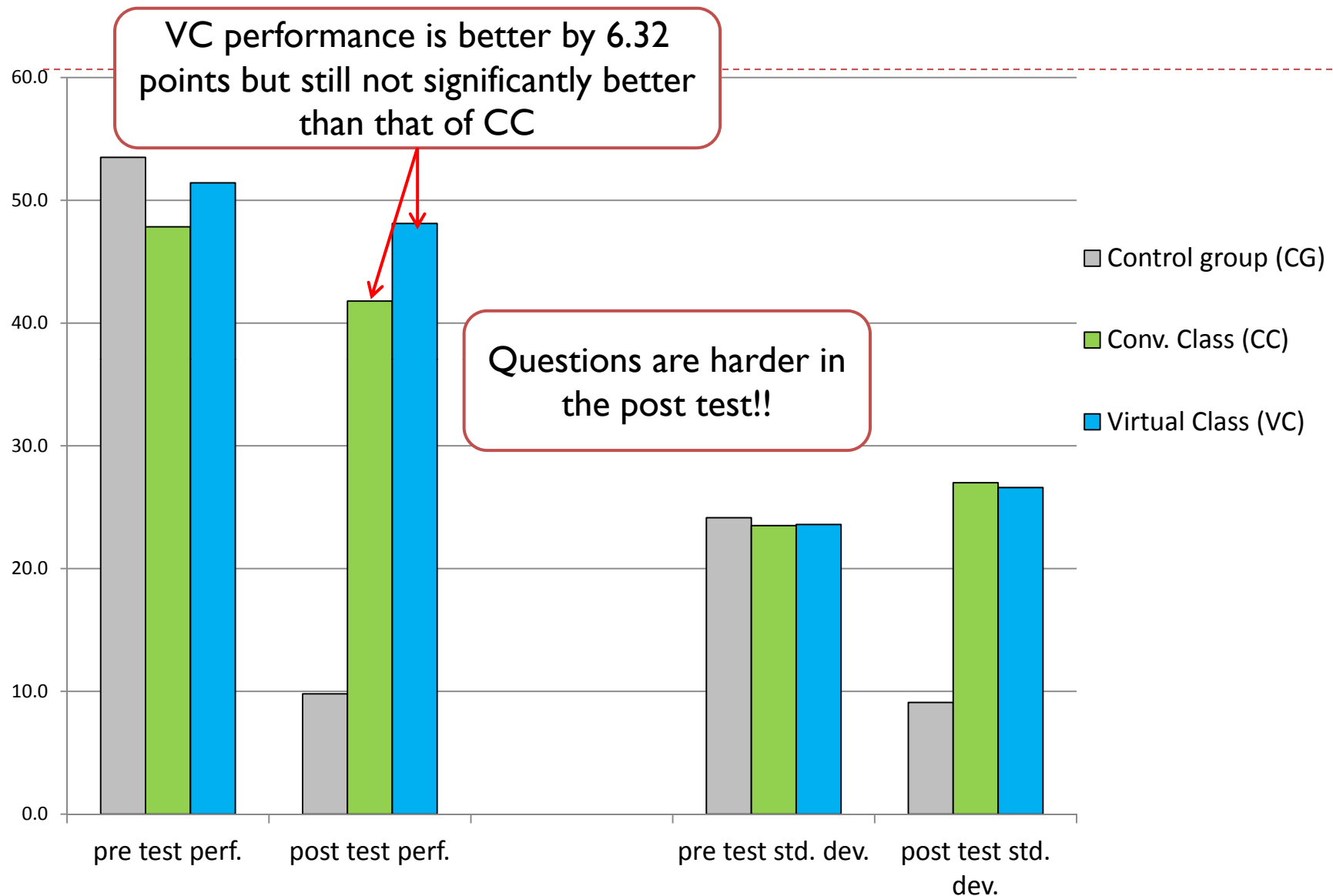
Evaluation in the course of Biology



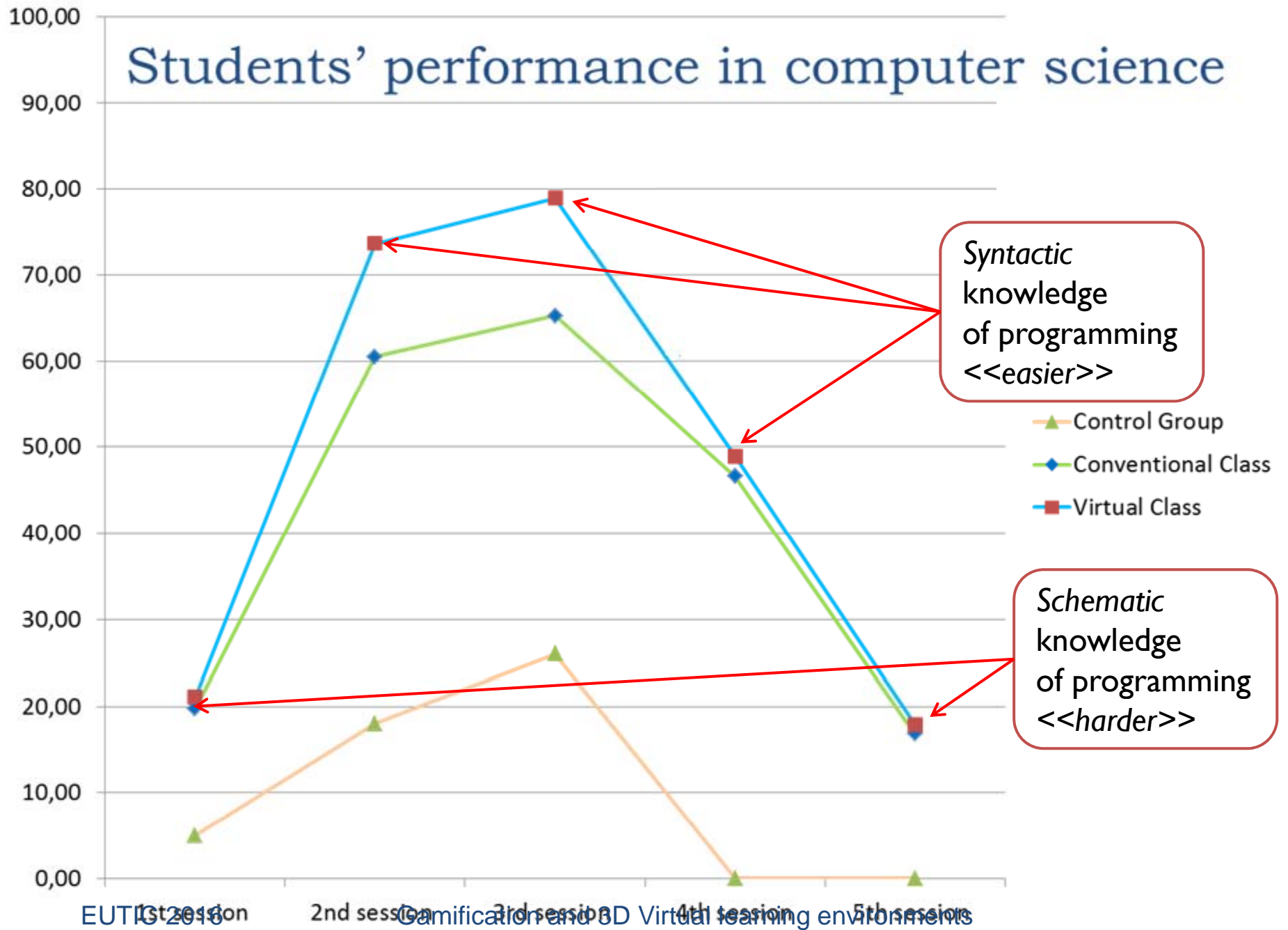
Students' performance and excitement **Biology**



Evaluation in Computer Science



Students' performance in computer science



Conclusions

- ▶ The gamified activity in the 3D VLE
 - ▶ temporarily increases excitement and student engagement.
 - ▶ Increases competitiveness and the interest to answer correctly, but also to collaborate and support other teams in order to move forward with the mission.
- ▶ The aim of the gamified learning process was not only knowledge per se, but also to motivate participants to search for knowledge in multiple sources, in content provided by the tutor, on the internet or even in their class mates.
- ▶ This model of learning can support the intrinsic curiosity of students for anything new and help them remain active and always evolving learners.

Thank you,

Any questions?

varlamis@hua.gr

agiannak@ionio.gr

nkonstantinou@panteion.gr

kkoski@panteion.gr

