



GAME-based
learning in
MAtematics

National and Kapodistrian University of Athens (NKUA), School of Philosophy Dept. of Educational Studies

GAMMA: Project No. 2020-1-HR01-KA201-077794

Co-funded by the
Erasmus+ Programme
of the European Union





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National and Kapodistrian University of Athens (NKUA), School of Philosophy
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Educational Technology Lab

Infusing Constructionism in Educational Design and Practice, 1993-2016

- URL:
 - <http://etl.eds.uoa.gr>
- Face book:
 - <https://www.facebook.com/educationaltechnologylab>
- YouTube:
 - <https://www.youtube.com/channel/Uct-uswKQ1fnWT2PKBlvM9zg>

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NKUA/ETL

- This University is the most Historical in the country,
- Ranks 26th in Webometris - Google Scholar Citations list worldwide.
- 8 Schools, 33 Faculties, 183 Masters' programs and maintains 224 Research Labs.
- 1605 Academic members of Staff, serves over 40000 undergraduate students, over 14000 Masters' students and close to 9000 PhD students.
- The GAMMA project will be carried out by the Department of Educational Studies (former Philosophy, Education ad Psychology Dept.) at the School of Philosophy.
- This is the largest University School of Greece and consists of 13 Departments.
- The Educational Studies Dept provides Pedagogy courses to students from a range of Depts such as the Science, Mathematics, Geology, Biology, Informatics Depts.

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ETL and Digital Media in education

• Courses

- MSc in Mathematics Education
- MSc in Digital Transformation in Educational Practice
- 15 completed PhD studies in education with digital media (Mathematics, El. Mechanics, Geography, Language, Comp. Science)

• Projects

- Responsible for two longitudinal large scale initiatives of the Ministry of Education
 - Wide-scale in-service education – Mathematics (35% of Mathematics Teachers in Greece)
 - Digital Infrastructure – Mathematics (1500 microexperiments, 1200 in GeoGebra)
- 15 European Multi-organisational R&D projects

• Digital tools

- Currently 2 widely available authoring systems for STEAM
 - MaLT2, Mathematics and programming (Pr/ing, 3D, DM, TG)
 - ChoiCo, Game designer for Wicked Problems (multidisciplinary socio-scientific issues)

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The ETL Team

ETL collaborators

- Dr. Nikoletta Yiannoutsou
- Dr. Katerina Makri
- Dr. Stefanos Keisoglou
- Dr. Kostas Gavrilis
- Dr. Marianthi Grizioti
- Dr. Maria Latsi
- Dimitris Diamantidis
- Marios Xenos
- Eurikleia Panagiotou
- Christina Greka
- Myrto Karavakou
- Vangelis Fakoudis

The GAMMA team

- **Dr. Marianthi Grizioti** (digital games, computational thinking)
- **Dimitris Diamantidis** (Math teacher, designer and teacher educator, plus PhD student)
- **Myrto Karavakou** (math designer, MSc in Math Ed., PhD student)
- **Christina Greka** (math designer, digital media, PhD Student)

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Projects

- Kaleidoscope TELMA (IJCML - 2008)
 - <http://itd.cnr.it/telma>
- ReMath (ESM – 2014)
 - <http://remath.cti.gr>
- METAFORA (IEEE Transactions in Education – 2012)
 - <http://www.metafora-project.org/>
- M C Squared (Constructivist Foundations 2015)
 - <http://mc2-project.eu>
- ER4STEM (IDC 2017 – RobIn paper)
 - <http://er4stem.acin.tuwien.ac.at/>

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Large Scale Initiatives

- The Greek National Operational Programme "Education and Lifelong Learning" of the Greek National Strategic Reference Framework (NSRF), that is co-financed by the European Union (ESF) and National funds in the context of and is being implemented by CTI "Diophantus".
- project "**Digital School Platform, Interactive Books, and Learning Object Repository**"
- project "**In-Service Training of Teachers for the utilisation and application of ICT in the teaching practice**"





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MaLT2

Machine Lab Turtlesphere

powerful ideas in the foreground

- Integrated affordances
 - Text based programmable mathematics with dynamic manipulation
 - 3D space and camera perusal with avatar geometry
- To imagine mathematical objects (twisted rectangle)
- To access mathematical ideas and properties with this new representation (the animation of variability in formal mathematical expressions)

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ChoiCo

Choices with Consequences

powerful ideas in the background

- Integrated affordances
 - Geo-coded information and semantics
 - Relational database, records, fields, diverse kinds of values
 - Blockley based programming of rules, comments and 'red lines'
- To grapple with complex messy debatable issues such as urban sustainability
- To consider problems in a post-normal science paradigm that recognise uncertainty, value-laden agency and context-specificity

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MaLT2

<http://etl.ppp.uoa.gr/malt2>

ChoiCo

<http://etl.ppp.uoa.gr/choico>

The Digital School

<http://dschool.edu.gr/>

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