

**Games and Gamification
to learn astronomy.
An innovation approach
two study cases.**

Margarita Metaxa

Philekpaideutiki Etaireia

National Observatory of Athens

IAU Commission on Education

marmetaxa@gmail.com

Games

- are an integral part of all cultures
- are one of the oldest forms of human social interaction.

Gamification

is the application of game-design elements and game principles in non-game contexts.

History of games - prehistoric times

- in Egypt

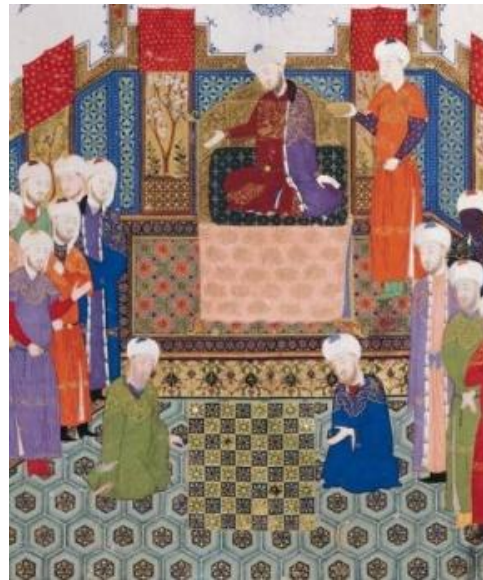
Senet found in [First Dynasty](#) burials.



- In India

Chauper as a dice game.

[Shatranj](#) and [Wéiqí](#).



History of games – ancient Greece

Both Plato and Homer mention board games called 'petteia'



Board game with inlays of ivory, rock crystal and glass paste, covered with gold and silver leaf, on a wooden base ([Knossos, New Palace period](#) 1600–1500 BCE, [Heraklion](#) Archaeological Museum, Crete)

Games – medieval times

- ChessTables *noblemen of the Middle Ages learned strategies of war.*
- Backgammon
- Nine Men's Morris
- Alquerque - *A classic period strategy game, an ancestor of Checkers*
- Fox & Geese - *a game of strategy*
- The Philosophers Game - *a game of strategy and numbers*
- Shovelboard - the ancestor of shuffleboard
- Knucklebones – Early game of dice
- Hazard - an ancestor of Craps

Games - early 19th century

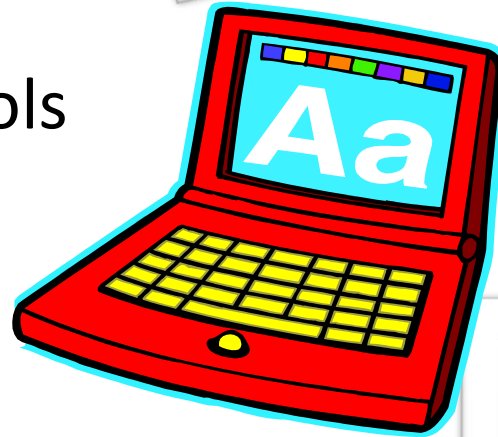
- During the Civil War, volunteers from Rhode Island played American Kriegsspiel, which had originally been created in 1812 **for training Prussian officers-of-war.** [\[4\]](#)
- Then, in the early 19th century, came the creation of Kindergarten by Friedrich Fröbel, which was based on learning through play with, **simple educational toys such as blocks, sewing kits, clay, and weaving materials.** [\[5\]](#)

Educational Games

are games that have been specifically designed to teach people about a certain subject,

This includes board, card and video games.

where



Educational games are being used in :

- Schools mainly pre-schools
- Universities
- Military
- Business

Study case I: board game



StarStorm

The game of Galaxy Domination

Created by

Dr. Margarita Metaxa
and her team of 8 students

Philekpaideutiki Etaireia

Athens, Greece

StarStorm



from 10 years old

the game
of Galaxy Domination

2.600 B.C. Cape Kanaveral Kennedy Space Centre



The Galaxy is at war, due to the ecological destruction that the mankind and 3 other civilizations caused to their home-planets, because of their recklessness.

the Humans
The Manasaputra
the Sirius
the Centaurus

The battle is inevitable..



.. while playing and enjoying this long
travel of humanity
to the Constellations and the Universe

through the wormholes!!

students

.. learn..

..within a tense competition with their
classmates.. **where politics, strategy,
negotiation, knowledge, and luck matters!**

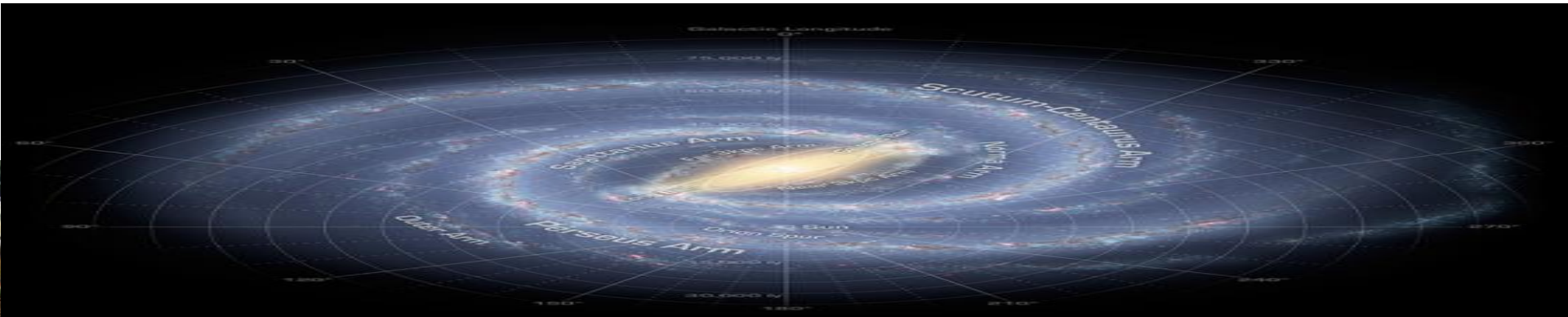
.. enter educational process!!!

Game questionnaire

- 30 **gymnasium** graders found that game was more motivating than pencil and paper activities when learning astronomy (Motivation and conceptual learning increased)
- 20 **lyceum** grade students found that using the board game **learning** resulted in significantly better way (of the constellations etc) than formal learning
- students **didn't need** guidance
- students **didn't need** to be challenged
- students **didn't need** time to reflect

Study case II: gamification

Learning about the Galaxy by constructing a Galactic Garden





**..and then walking around
this Galactic Garden..**

2011.06.09

**..Students and their classmates
(and future ones)
can discuss and answer the following ..**

2011.06.09



Through this
gamification activity we can
provide our students with

- **Hands-On**

- **Minds-On**

and

- **Authentic Learning Experiences
in Science**

**“I hear and I forget.
I see and I understand.
I do and I remember.”**

Confucius

THANK YOU!

