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 *nobleman of the Middle Ages learned strategies of war.*
• Backgammon
• Nine Men's Morris
• Alquerques - *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 Etairieia
Athens, Greece
StarStorm

the game

of Galaxy Domination

from 10 years old
The Galaxy is at war, due to the ecological destruction that 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 competion with their classmates.. where politics, strategy, negotiation, knowledge, and luck matters!

.. enter educational process!!!
Game questionnaire

- 30 gymnasium grader 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*..

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