



## "Current studies in cultural-historical psychology and activity theory. Experience of the International Scientific Society ISCAR"

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8th ISCAR Summer University for PhD students  
Cultural-historical psychology: interdisciplinary research perspectives &  
social practices  
8-13 July, 2019

# CHAT and practices

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Plakitsi et al. 2018





## The @fise research group works on...



- the development of a **new methodological framework** for Science Education



- the connection of **CHAT** with **Science Education**



- the transition to the **4th generation of CHAT**, as it was developed from Vygotsky, Leontiev and Engeström



- covering the spectrum of **ISCAR-STEAM Education**, learning and training in formal and informal settings



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**CHAT**

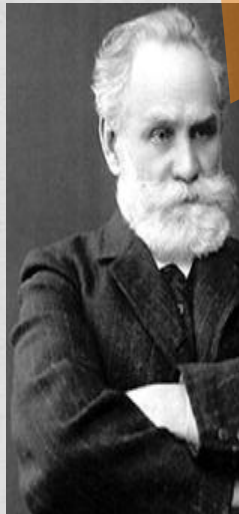
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Once upon a time,

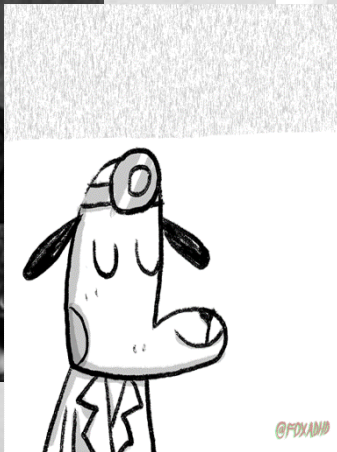
Alexander Luria presented his book "The Nature of Human Conflicts" (1932) to Ivan Pavlov.

A day later, when Dr. Luria met him, the old man's eyes were blazing, and he tore the book in half and threw it to the ground, roaring:

"You call this science! Science proceeds from elementary parts and builds up; here you are describing behaviour as a whole!"



Ivan  
Pavlov



Alexander  
Luria

That was the zeitgeist of the early 20<sup>th</sup> century when...

Lev Vygotsky...



wrote that behavior and cognitive development was affected not only by biological factors but by sociocultural too...

and history begins (again) in Russia...

Besides Vygotsky, this approach was developed from other theoreticians (Aleksei N. Leontiev, S.L. Rubinstein, Michael Cole, Yjro Engeström etc) and the concept of **Cultural - Historical Activity Theory (CHAT)** was created.

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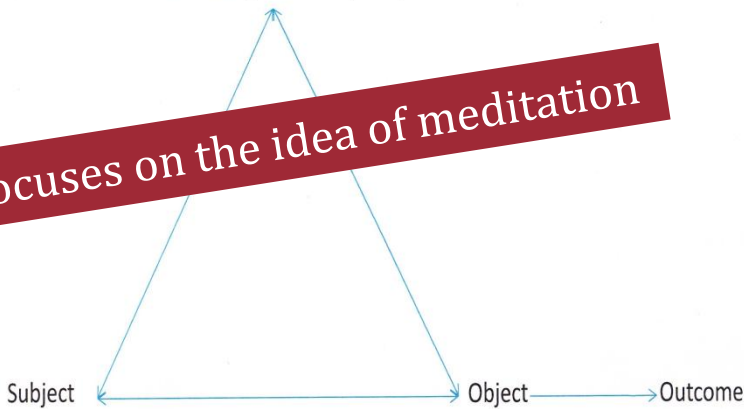
# Activity Theory

- It was originally investigated by S.L. Rubinstein and A.N. Leontiev
- It combines social and historical research
- Unit of analysis is the activity
- People need to be involved in the community
- Interesting on the real material conditions of human activity.
- There is the idea of a hierarchical analysis of humanity
- Activity takes place at different levels and not necessarily in sequence



### First Generation – Vygotsky

Mediating Artefacts (Tools)



**focuses on the idea of meditation**

## The 3 generations of Activity Theory model

develops conceptual tools to understand relationships, multiple perspectives of interactions, as well as networks of interactive systems of activity

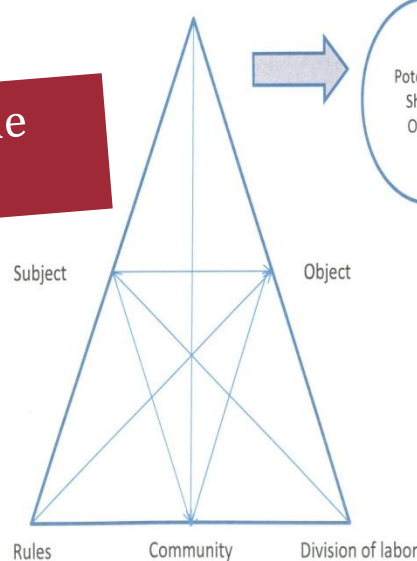
### Second Generation - Leontiev

Tools & Signs



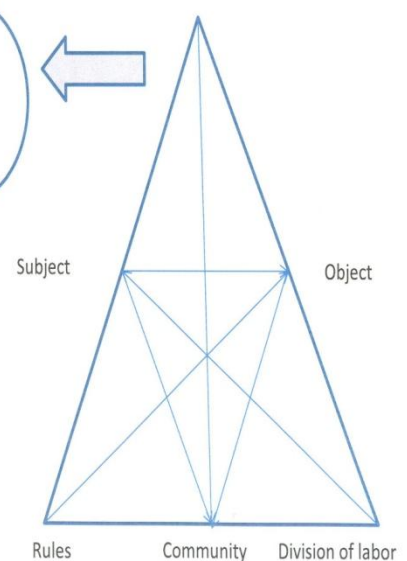
**the sharing of the project highlights the individual act and collective activity**

Instruments

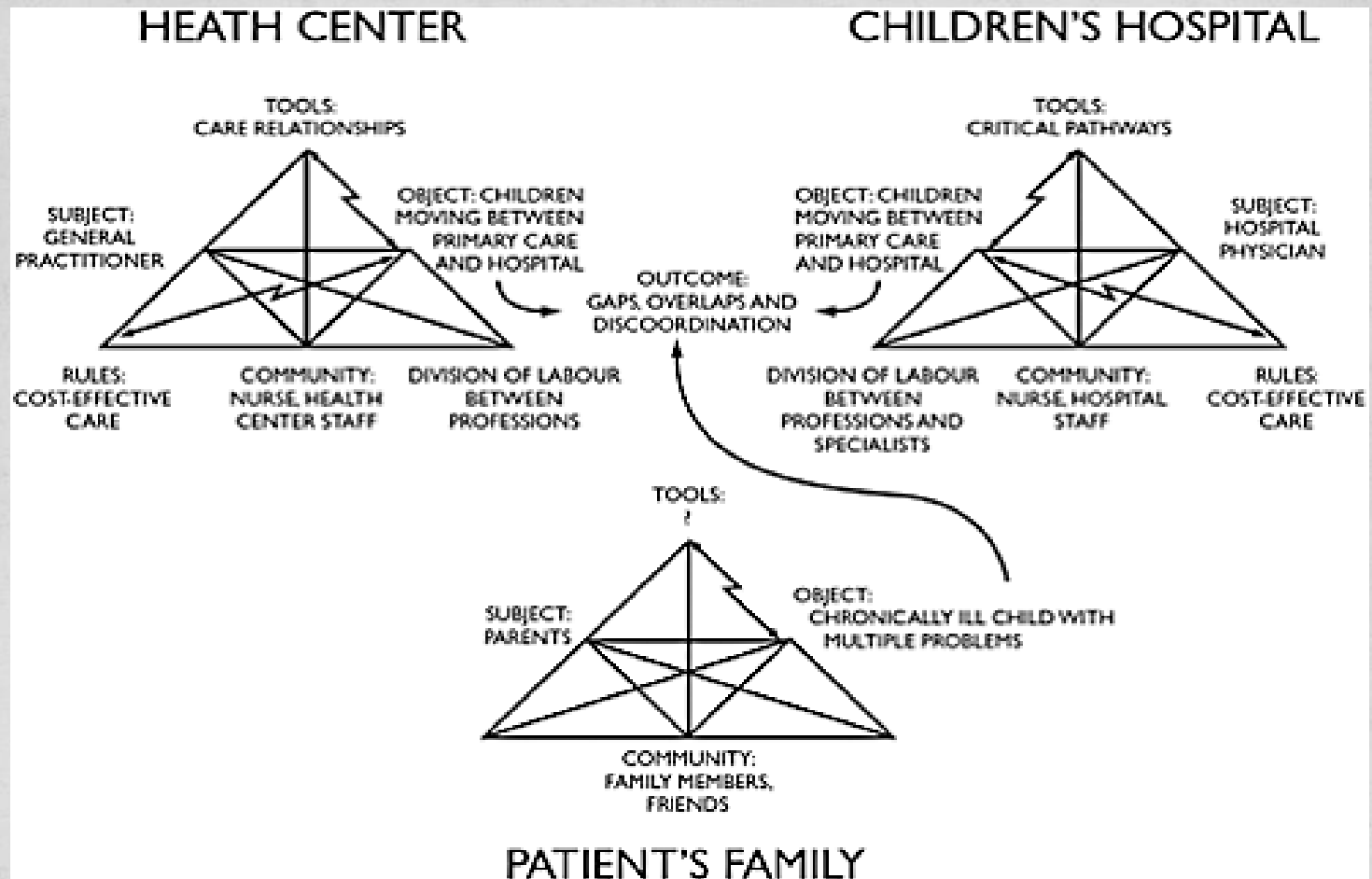


Potentially Shared Object

Instruments

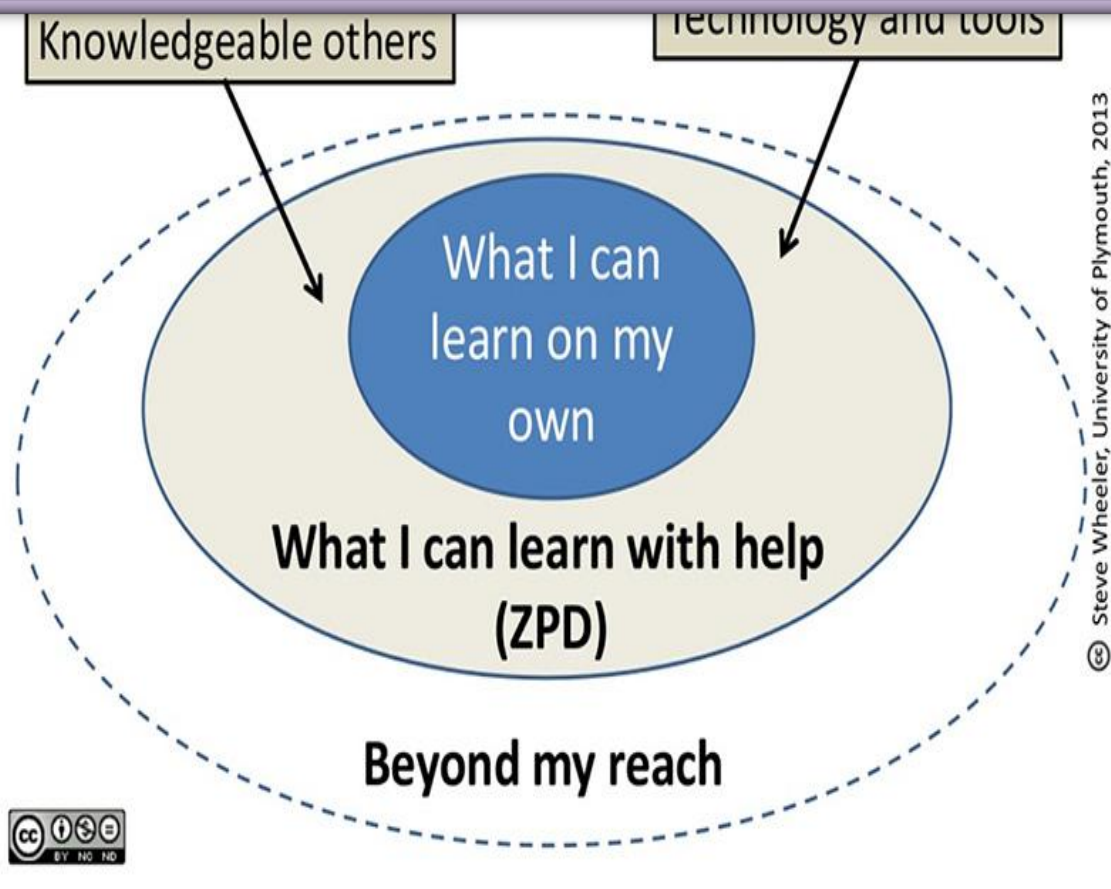


# Heading on to the fourth generation



Engeström, Expansive Learning: Contradictions in children's health care

# Zone of Proximal Development (ZPD)



**International Society  
for Cultural-historical  
Activity Research**

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ISCAR | International Society for Cultural-historical Activity Research

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# Welcome to ISCAR

## The International Society of Cultural-historical Activity Research

The society invites you to browse through all info and connect with ISCAR scholars. Become a member and support the society. See the benefits [here](#)

[Become a member](#)

### View author presentation

How common knowledge is constructed and why it matters in collaboration between professionals and clients

Nick Hopwood, Anne Edwards

International Journal of Educational Research

4 slides, 04:21 min

This presentation has not been peer-reviewed. Copyright © 2017 The Author(s). Published by Elsevier B.V. All rights reserved. 

### News

[Job announcement University of](#)

### Events

[Cultural-Historical Approaches to](#)

### Calls

[Cultural-Historical Approaches to](#)

## Cultural-Historical Psychology Journal

- is a quarterly journal published by Moscow State University of Psychology and Education ([www.mgppu.ru](http://www.mgppu.ru)).

- It is recommended by the Higher Attestation Commission of Ministry of Science and Education of the Russian Federation for publishing doctoral research results.



<http://psyjournals.ru/en/kip/>



**Mind,  
Culture, and  
Activity:**  
An International Journal

Volume 10, Number 1 2003

ISSN 1074-9039

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Guest Editor: Michael Cole

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A Psychology Press Book

## Mind, Culture, and Activity (MCA)

- is an international forum for publications that examine the relationships between the human mind, the sociocultural environments they inhabit, and the way that mind and culture are constituted in a wide variety of human activities
- Dialogue among different schools of thought is very important about these relationships, while interdisciplinary and international contributions are both encouraged
- Particular emphasis is placed upon empirical research grounded in theoretical approaches that locate culture and activity so as to understand human experience and research that attends to the methodological problems associated with the analysis of human action in everyday activities.

## Human Arenas

- concerns the interdisciplinary study of higher psychological functions in human goal-oriented liminal phenomena in ordinary and extraordinary life conditions.
- Emphasis is put on topics and arenas of human activity, rather than the traditional boundaries of academic disciplines.
- Historical foundations, methodology, epistemology, and the intersection of disciplines are explored.
- It promotes approaches based on “small data,” that is, the analysis of crucial and meaningful data, rather than the inductive accumulation of large empirical “evidence.”



<https://link.springer.com/journal/42087>





## Learning, Culture and Social Interaction

- publishes research on learning within, and through, social practices. Its particular focus is on understanding how learning and development are embedded in social and cultural activities, and how individuals and collective practices are transformed through learning
- 'Interaction' includes forms of communication which take place through technologies of various kinds (telephone, the Internet, presentation technologies and so on). Interaction between people and artefacts, insofar as they address learning, are also relevant. Thus, the focus is not exclusively on face-to-face interaction
- Issues of collective forms of learning characterizing systematic change, institutional development and communities of practice are central.

<https://www.journals.elsevier.com/learning-culture-and-social-interaction>



## Cultural Studies of Science Education

- examines science education as a cultural, cross-age, cross-class, and cross-disciplinary phenomenon
- It connects science education and social studies of science, public understanding of science, science and human values, and science and literacy
- Furthermore, emphasis is put on the variety of settings in which science education takes place, including schools, museums, zoos, laboratories, parks, aquariums, and community development, maintenance and restoration programs

<https://link.springer.com/journal/11422>

## Science Education: Research and Praxis

- addresses to researchers, teachers, post-graduate students and undergraduate students that are involved in Science teaching at all different grades of education
- The journal is published by the Research Group of the Didactics of Science Education -@fise group- of the School of Education (Department of Pre-school Education) of the University of Ioannina, Greece and is hosted at the webpage of the Library of the University of Ioannina.
- The publication of the journal is electronic with the aim of achieving the widest and fastest diffusion of scientific knowledge.



<http://pc204.lib.uoi.gr/serp/index.php/serp>



# ISCAR Regional Conference

University of Ioannina - Department of Early Childhood Education

University of Crete - Department of Psychology

19 - 24 March 2019

Ioannina, Greece



8th

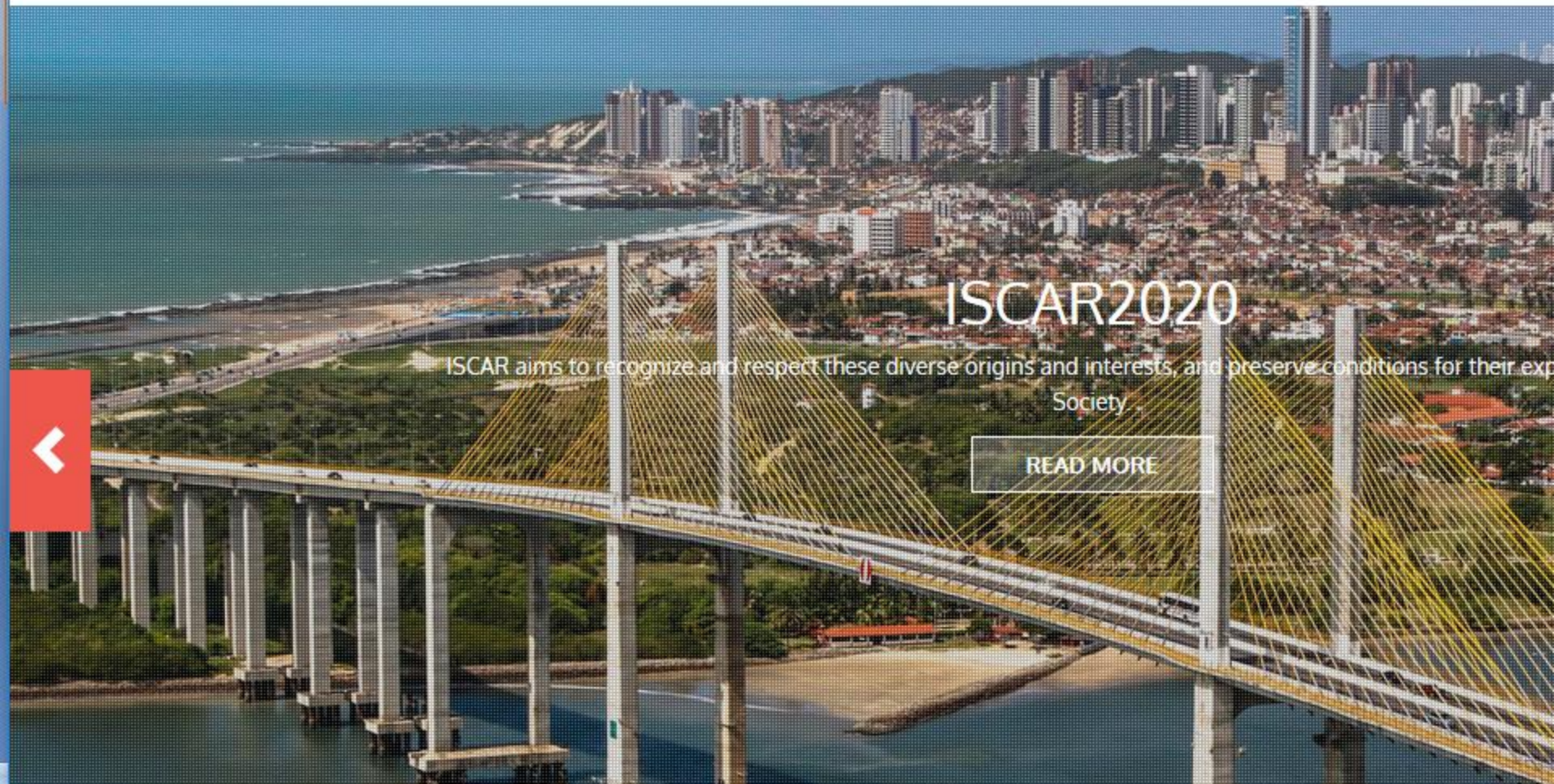
# Nordic ISCAR

Nordic Conference on Cultural and Activity Research

18–20 June 2019, TRONDHEIM, NORWAY



📷 The Nidaros Cathedral, Kristiansten fort and old wharves by Nidelven river Photo: K.T. Nesgaard



# ISCAR2020

ISCAR aims to recognize and respect these diverse origins and interests, and preserve conditions for their expansion of the Society.

[READ MORE](#)



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**Examples of  
CHAT practices  
on  
Science  
Education**

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**Cultural-Historical Activity  
Theory and Science  
Education: A new Dimension  
in STEAM Education  
Series: Socio-cultural  
Dialogues in STEAM  
Education**

**Publication:** Gutenberg



ΚΑΤΕΡΙΝΑ ΠΛΑΚΙΤΣΗ • ΕΥΘΥΜΙΟΣ ΣΤΑΜΟΥΛΗΣ • ΧΑΡΙΚΛΕΙΑ ΘΕΟΔΩΡΑΚΗ  
ΕΛΕΝΗ ΚΟΛΟΚΟΥΡΗ • ΕΥΤΥΧΙΑ ΝΑΝΝΗ • ΑΘΗΝΑ ΚΟΡΝΕΛΑΚΗ

Η Θεωρία  
της δραστηριότητας  
& ΟΙ ΦΥΣΙΚΕΣ  
ΕΠΙΣΤΗΜΕΣ

Μια νέα διάσταση  
στη STEAM εκπαίδευση

GUTENBERG



## **Project 1:**

a web-based teaching program for electromagnetism in a  
CHAT approach

**Efthymios Stamoulis, Primary school teacher, Dr. in Science Education  
University of Ioannina, Greece, [estamoulis@sch.gr](mailto:estamoulis@sch.gr)**

**A**

Our research was conducted at primary schools

**B**

We were most interested in exploring the cooperation among Greek students within the collaborative activities

We used activity systems and expansive learning both:

- as a tool for designing activities for students and
- as tool for analyzing them

Our proposal :

in a science teaching program for primary schools enriched by the using of the History and Philosophy of Science and also of ICT technologies

**in teachers' training**

## Main epistemological contributions from the history of electromagnetism

Summarizing the main epistemological contributions from the history of electromagnetism and the qualitative leaps that led to the formulation of the classical theory of electromagnetism, researchers propose various categorization models (Guisasola, Almudí, & Furió, 2005; Voutsina & Ravanis, 2007).

The following categories have been reorganized for our research:

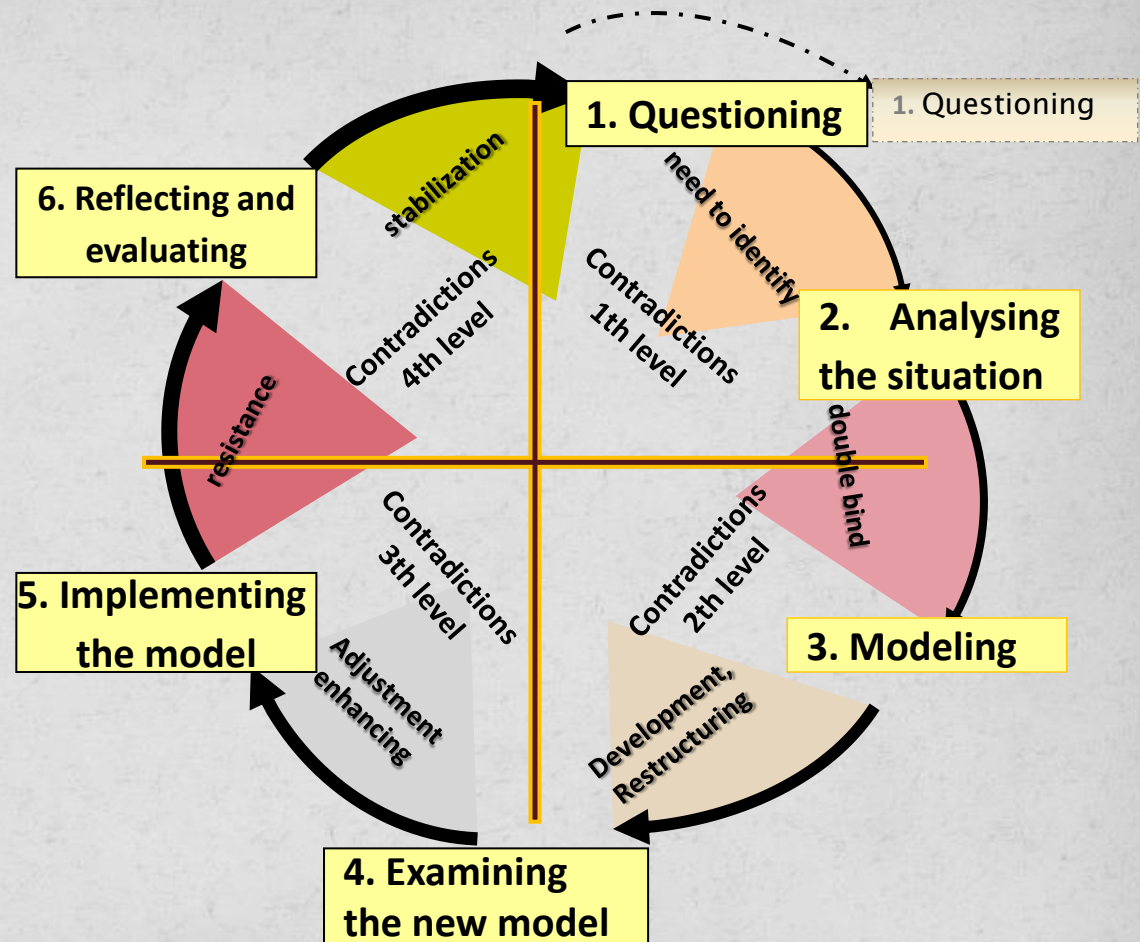
scientists	Model	Lesson
Ancient Greek philosophers <i>until 1600</i>	<b>Vitalist -Animist Model</b>	<b>1. From toys with magnets in magnetic phenomena.</b>
William Gilbert (1544–1603)		<b>2. From the attraction of magnet to the attraction of other bodies</b>
Franz Aepinus (1724–1802) Charles-Augustin de Coulomb (1736–1806) Charles du Fay (1698–1739) Benjamin Franklin (1706–1790) Alessandro Volta (1745–1827) Luigi Galvani (1737–1798)	<b>The Fluid Model</b>	<b>3. From animals' electricity to batteries' construction</b>
Hans Christian Ørsted (1777–1851) André-Marie Ampère (1775–1836)	<b>The “Big Leap Forward”: The Appearance of Electromagnetism in the 19th Century (Ørsted).</b>	<b>4. From electricity to magnetism: Oersted's experiment</b>  <b>5. From electricity to magnetism: Electromagnet.</b>
Michael Faraday (1791–1867) W. Thomson (1824–1907) J. C. Maxwell (1831–1879)	<b>The Field Model</b>	<b>6. Faraday's experiments that change world – electric motor</b>  <b>7. Faraday's experiments that change world - electric generators</b>

# Expansive cycle

## Stages of expansive learning in activity of teaching of electromagnetism

- For the design and analysis of the development of the teaching activities, we are based on Engeström's (1987) conceptual tool of expansive cycles.

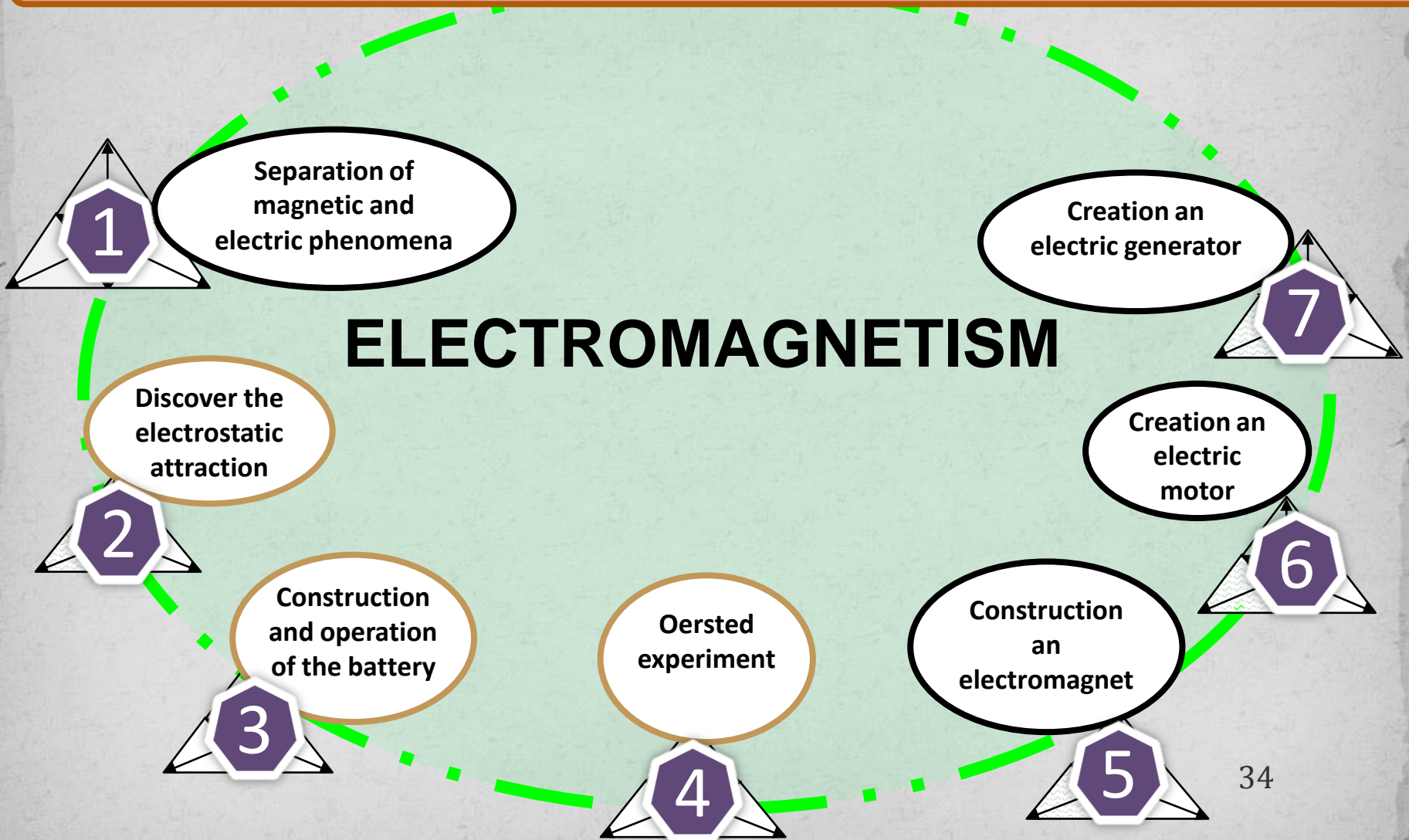
- We use Engeström's descriptions of the "ideal-typical sequence of learning actions" in the following listing (Engeström, 1999).



*Expansive learning* (Engeström, 1987)

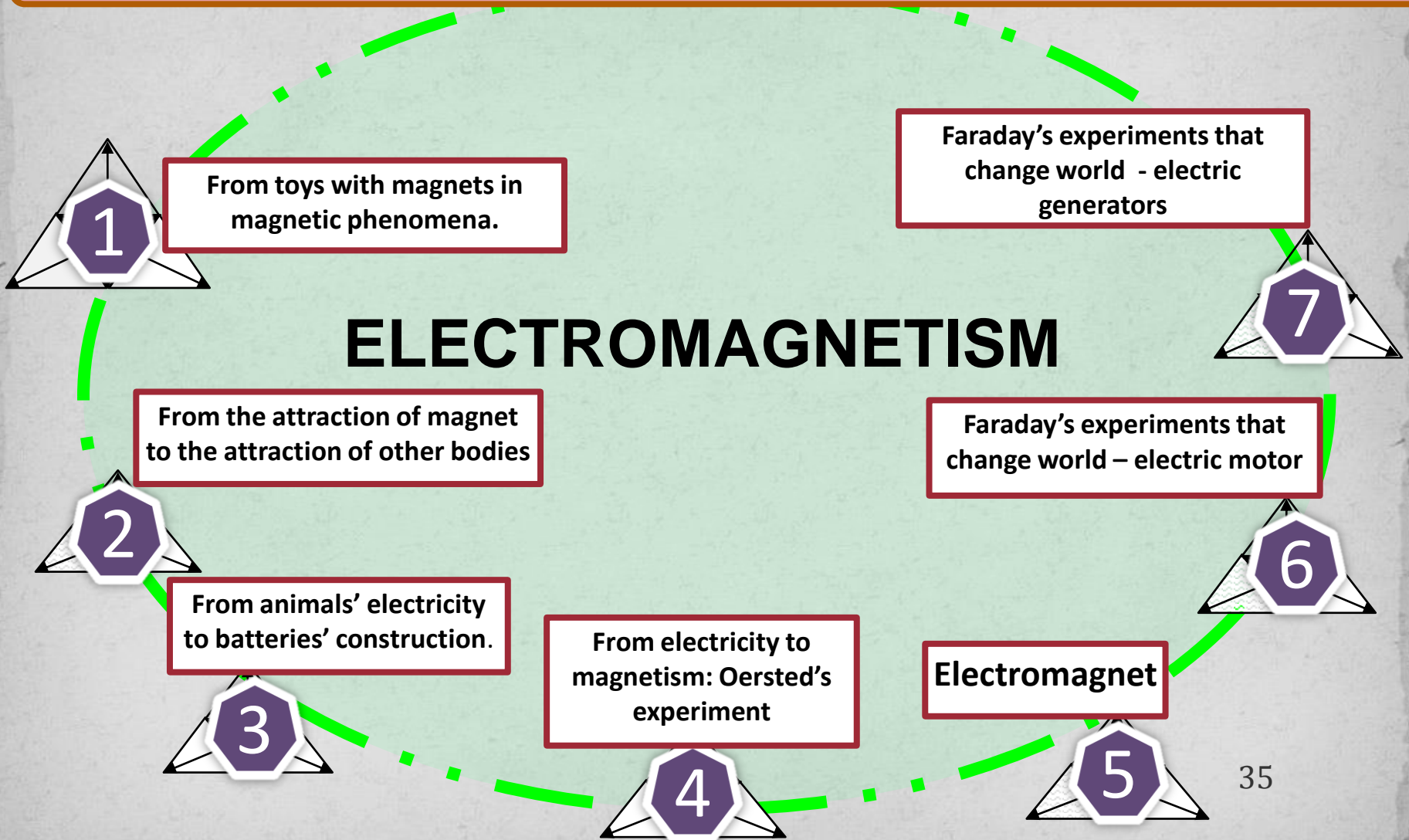
# Seven activities for the teaching of the electromagnetism

## ELECTROMAGNETISM



# Seven activities for the teaching of the electromagnetism

## ELECTROMAGNETISM





*First activity - From toys with magnets in electric and magnetic phenomena*

<b><i>Questioning</i></b>	Introduction of the topic (magnetism in ancient )
<b><i>Analysing the situation</i></b>	Students classify in two different categories various materials: those that are attracted to a magnet and those that do not.
<b><i>Modeling</i></b>	The model of earth as a magnet.
<b><i>Examining the new model</i></b>	Students experiment with the model of the earth as a magnet and know intuitively the dynamic lines.
<b><i>Implementing the model</i></b>	Students know a basic application of magnetism of the earth by creating and experimenting with compass and naming the poles of a magnet.
<b><i>Reflecting and evaluating</i></b>	Students discuss the importance of the compass in the development of traveling and discovering the new world.

# From electricity to magnetism - the electromagnet

18.3

18.3 Ηλεκτρισμός και μαγνητισμός

Το μαγνητικό πεδίο αποτελεί ένα είδος ενέργειας που είναι υπεύθυνη για την αλληλεπίδραση μεταξύ των πόλων. Η δύναμη αυτή είναι μεγαλύτερη σε απόσταση μικρότερη από 2 μέτρα. Η δύναμη αυτή είναι μεγαλύτερη σε απόσταση μικρότερη από 2 μέτρα. Η δύναμη αυτή είναι μεγαλύτερη σε απόσταση μικρότερη από 2 μέτρα.



Εξοπλισμός για την αλληλεπίδραση των πόλων. Το πεδίο που είναι υπεύθυνο για την αλληλεπίδραση των πόλων.

Ορισμός: Η δύναμη που ασκείται σε ένα σώμα που κινείται, ονομάζεται δύναμη. Η δύναμη που ασκείται σε ένα σώμα που κινείται, ονομάζεται δύναμη.

Ερωτήσεις:

1. Τι είναι το μαγνητικό πεδίο;

2. Ποια είναι η δύναμη που ασκείται σε ένα σώμα που κινείται;

18.3

18.3 Ηλεκτρισμός και μαγνητισμός

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Ο Hans Christian Ørsted είναι ο πρώτος που διαπίστωσε ότι ο ηλεκτρισμός και ο μαγνητισμός είναι συνδεδεμένοι. Το 1820, ο Ørsted διαπίστωσε ότι ο ηλεκτρισμός και ο μαγνητισμός είναι συνδεδεμένοι. Το 1820, ο Ørsted διαπίστωσε ότι ο ηλεκτρισμός και ο μαγνητισμός είναι συνδεδεμένοι.

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<http://users.sch.gr/estamoulis/em/ds5/GilbertA.html>

# Stages of expansive learning in activity of teaching of electromagnetism

**Από τα παιχνίδια με μαγνήτες στη μαθητική φωνήαση**

Ήδη από τον 7ο αιώνα π.Χ. οι αρχαίοι Έλληνες γνώριζαν την ύπαρξη του μαγνήτη. Στη Μεσοποταμία της Μesopotamίας ήταν ανακάλυψη που κέρδιζε, τα οποία κέρδη την ανακάλυψη δίδεται να είναι αληθινά ανακάλυψη. Είναι είναι ανακάλυψη ή μάλλον κατά το κριτήριο άμεσα μεταξύ τους. Ο Όθωνας ο Μάγιστος, λοιπόν, γνωρίζοντας τον τότε πρόδρομο κατά το κριτήριο το μαγνήτη μαγνήτη. Είναι από τους Έλληνες να είναι και η ύπαρξη του μαγνήτη μαγνήτη. Ήδη από τον 12ο αιώνα π.Χ. οι Έλληνες χρησιμοποιούσαν μαγνήτες ως κώδη, για να κρυπτογραφούν στα κώδη τους. (Αντωνίου κ.δ., Φυσική Β' γυμνασίου, ΟΕΔΒ, σ.122)

Κάποιος έλασε από τους μαγνήτες και άλλους δεν έλασε. Διαφοροποιήστε με τον μαγνήτη.



Τελειώστε το κείμενο της απάντησής σας καταγράφοντας:


Έλασε:  
Δεν έλασε:

Αλλά ποια είναι είναι φρονιμική τα αποτελέσματα

Που έλασε:  
Που δεν έλασε:

**Και η Γη έλασε το σιμάτο**

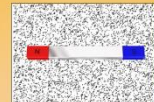
Γύρω στα 1600 μ.Χ. ένας ευρωπαίος ο Gilbert κερματιστικά με τους μαγνήτες και την ιδιότητά τους να έλκουν άλλα σώματα. Διαπίστωσε ότι αφού η κώδη προσανατολίζεται πάντα προς μια κατεύθυνση, η γη συμπεριφέρεται ως ένας μαγνήτης μαγνήτης.



Τίποτα από τα άλλα που έλκονται από τους μαγνήτες.

Τυπώστε με άλλα που έλασε. Γράψτε το βιβλίο μας.

**Προσμορφώστε με μαγνήτες**




Τίποτα από τους μαγνήτες έλκονται τα αντικείμενα από κάτω. Γράψτε τις ανακάλυψές μας.

Ονομάζονται τα όρατα του μαγνήτη. Δίνατε βιβλίο μας σήμερα.

**Διαβάζουμε και απαντάμε**


Γύρω στα 1600 μ.Χ. ένας ευρωπαίος ο Gilbert κερματιστικά με τους μαγνήτες και την ιδιότητά τους να έλκουν άλλα σώματα. Διαπίστωσε ότι αφού η κώδη προσανατολίζεται πάντα προς μια κατεύθυνση, η γη συμπεριφέρεται ως ένας μαγνήτης μαγνήτης.



Πίστευε ότι

Γράψτε για τη σημασία της μαθητικής βελόνης στη δημιουργία κώδων στα ζώα των ανθρώπων.

**Τι βρήκε τον Χ. Κολόμβο να φτάσει στην Αμερική;**



Κατασκευάσαμε και κώδη οδήγησης.

Γράψτε λίγο λόγο για τη σημασία και τους κώδη της μαθητικής βελόνης για τη δημιουργία των κώδων στα ζώα των ανθρώπων.

<http://users.sch.gr/estamoulis/em/ds1/GilbertA.html>

Outcomes of the 1st activity – lesson  
Gilbert

# Data collection

**7 didactical periods. The researcher visited the classes where the data collection program was implemented**

(About 3 weeks in 2 classes)

**video**

**Speech recording**

**Researcher comments**

**Electronic work sheets**

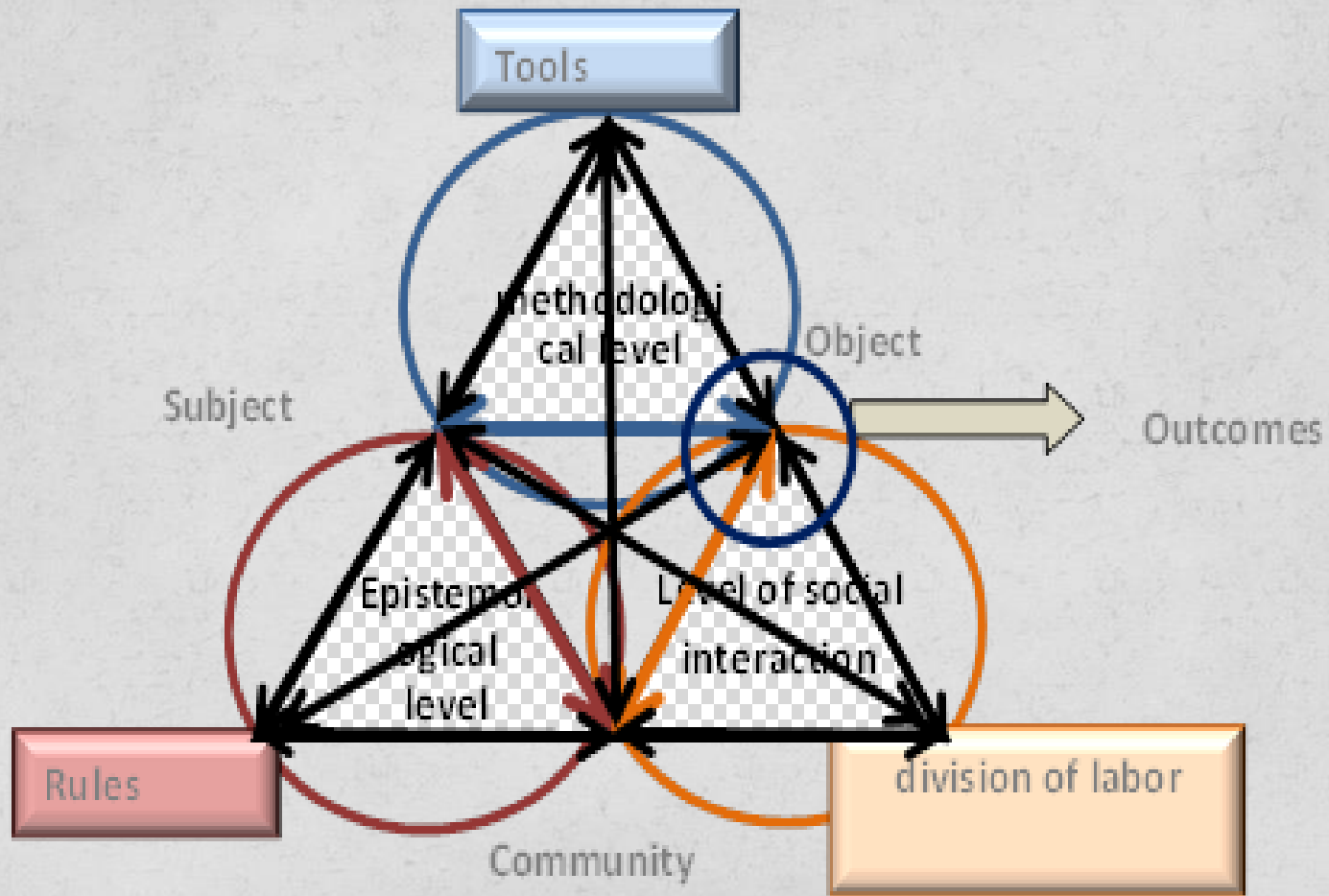
**Work sheets**

# Data

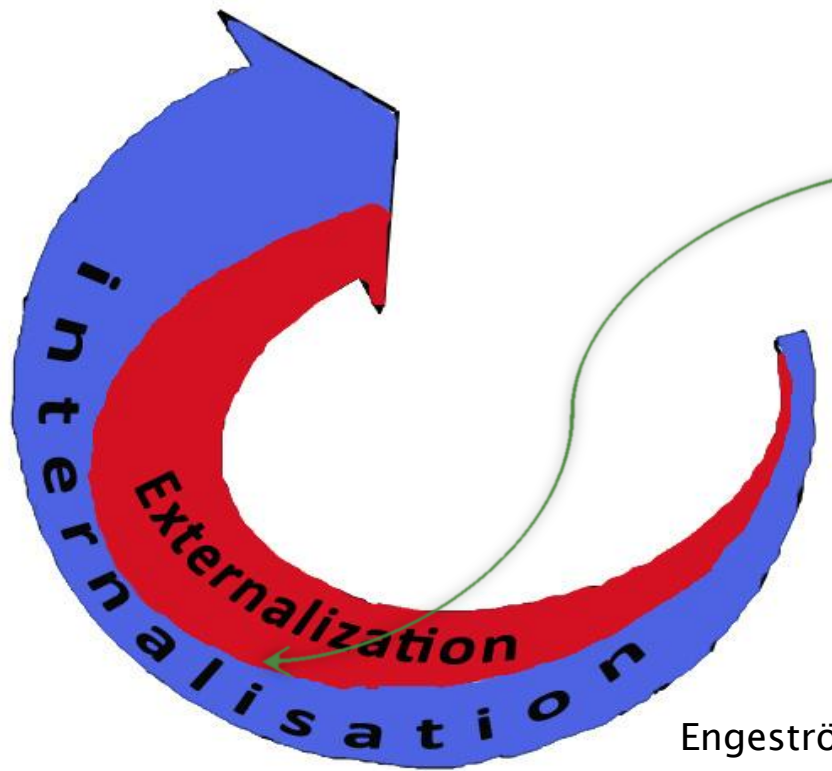
- «log file», were divided in episodes that corresponded to the different phases of the expansive learning

- the teaching was video-recorded and coded, in order to observe the students' acts in every phase of the expansive learning

# Three levels of data analysis



Students are in the process of internalisation - according to Engeström - receive data from the computer to process and discuss among themselves. They discuss the deviation process of the magnetic needle and try to incorporate the phenomenon in their own cognitive structures.



Engeström (1999)

Externalization also shows that interact students with the computer and the with other, where some students ask questions and others respond by trying to explain the function of the needle deviation.

# Conclusions and discussion

- **CHAT** can become a strong methodological tool in teaching Science Education towards the **transformation of the traditional learning environment** and the development of knowledge
- The **contradictions** that occur include the possibility of changing the learners' opinions and consist important issues in the process of the **collective learning**
- The **modern learning environments** constitute **multicultural learning communities**, in which learners are asked to work effectively within different groups – learning communities.

June 27, 2019



## **Project 2:**

Science Education activities for the early grades

**Xarikleia Theodoraki, Pre-primary school teacher, Dr in Science Education  
University of Ioannina, Greece, [xarikleia85@gmail.com](mailto:xarikleia85@gmail.com)**

# The Framework

- ▶ The **modern educational community** tries to integrate and prepare pre-school and primary school children in the community
- ▶ The design and analysis of Science Education activities within the framework of **CHAT**, tries to bridge the gap between **theory and praxis**
- ▶ There is a necessity to **design a guide** for Science Education activities in the early years as a basis for **reflection and further research**

# Research Questions

- Which **interactive systems** are formed in science education?
- What are the **secondary factors** that reshape interactive systems?
- How does the use of **History of Science** work in understanding these issues?
- How does the **role of the teacher** develop in the methodological framework of CHAT?

# Designing Scientific concepts

## Eight Step Model (Mwanza, 2002)

Ταυτοποίηση του:

Step 1	Activity of interest
Step 2	Objective of activity
Step 3	Subject in this activity
Step 4	Tools mediating activity
Step 5	Rules and regulations mediating the activity
Step 6	Division of labor mediating the activity
Step 7	Community in which activity is conducted
Step 8	Outcomes

**Eight Step Model  
of Mwanza**

# Data Analysis

- program **NVivo 9**
- organize and analyze the **qualitative** data
- organize and analyze the **quantitative** data



Nvivo software helps us organize our material, so as to make the *interactive systems visible*

## Themes of Didactic intervention

1. *Grandpa Archimedes and the principle of buoyancy*
2. *Uncle Thales and the magnets*

# Data analysis using Nvivo and results

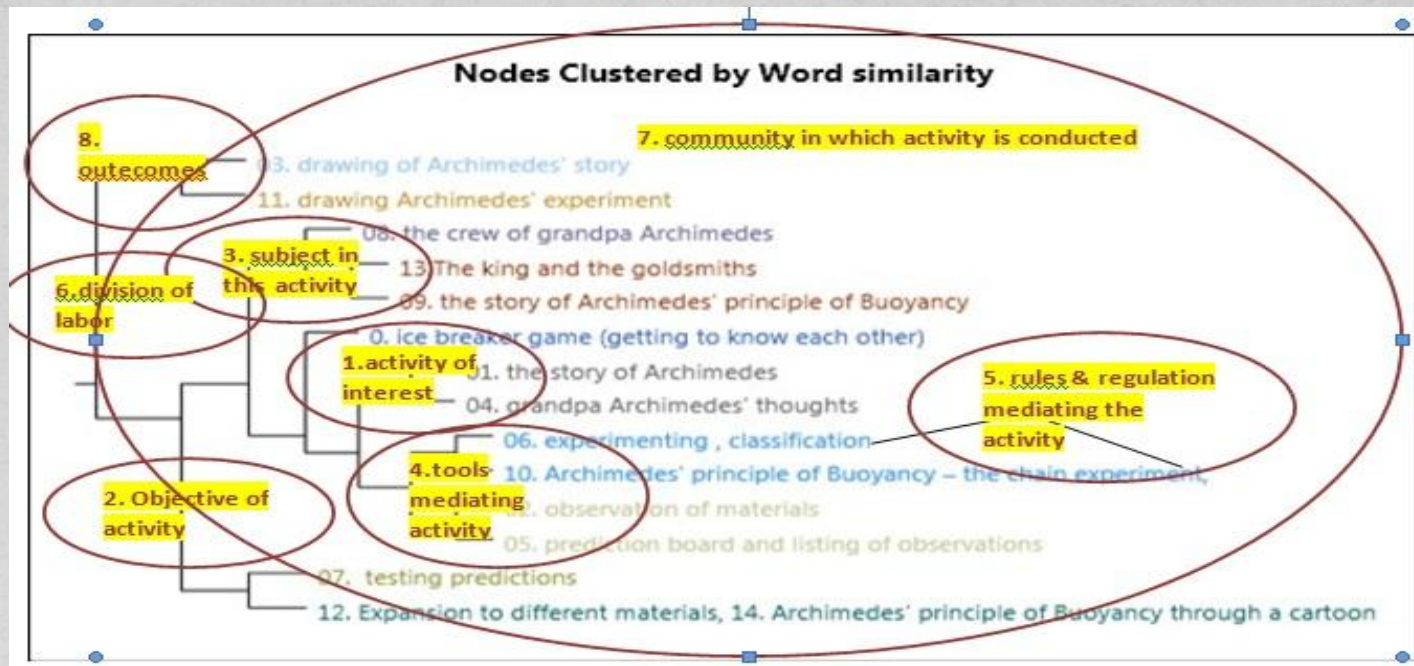


Figure 1: cluster analysis of the activities' nodes

- we organized our data to an NVivo 9 project
- we analyzed 11 hours of video recording
- cluster analysis is directly related with the core nodes (nodes) that we created in the project and by which the coding of the activities was carried out.
- “ grandpa Archimedes and the principle of buoyancy”, is directly linked to the eight step model of Mwanza (eight circles of the Fig. 1).

### sub-triangles that appear more frequently

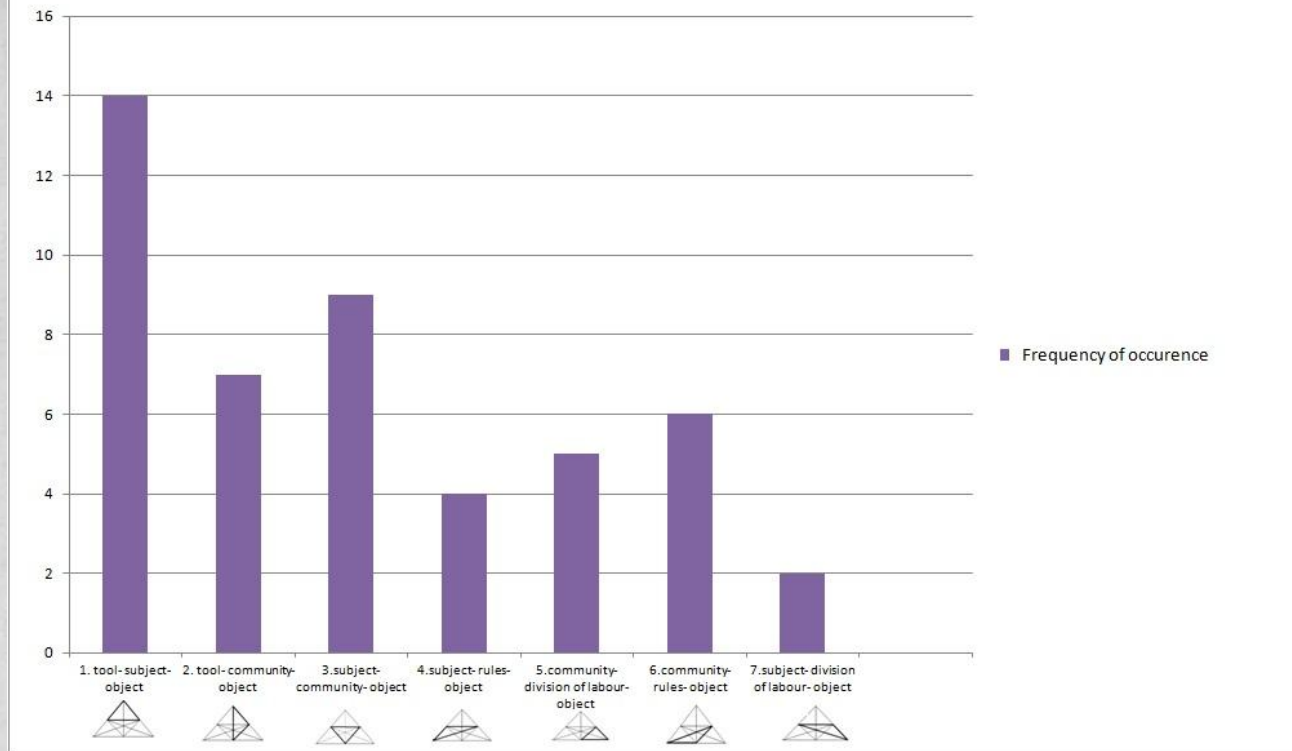


Figure 2: interactive systems

- seven frequent systems are defined (Theodoraki & Plakitsi, 2013).
- sub- triangles that are identified, connect all factors in the triangle that lead to the outcomes of the activity.

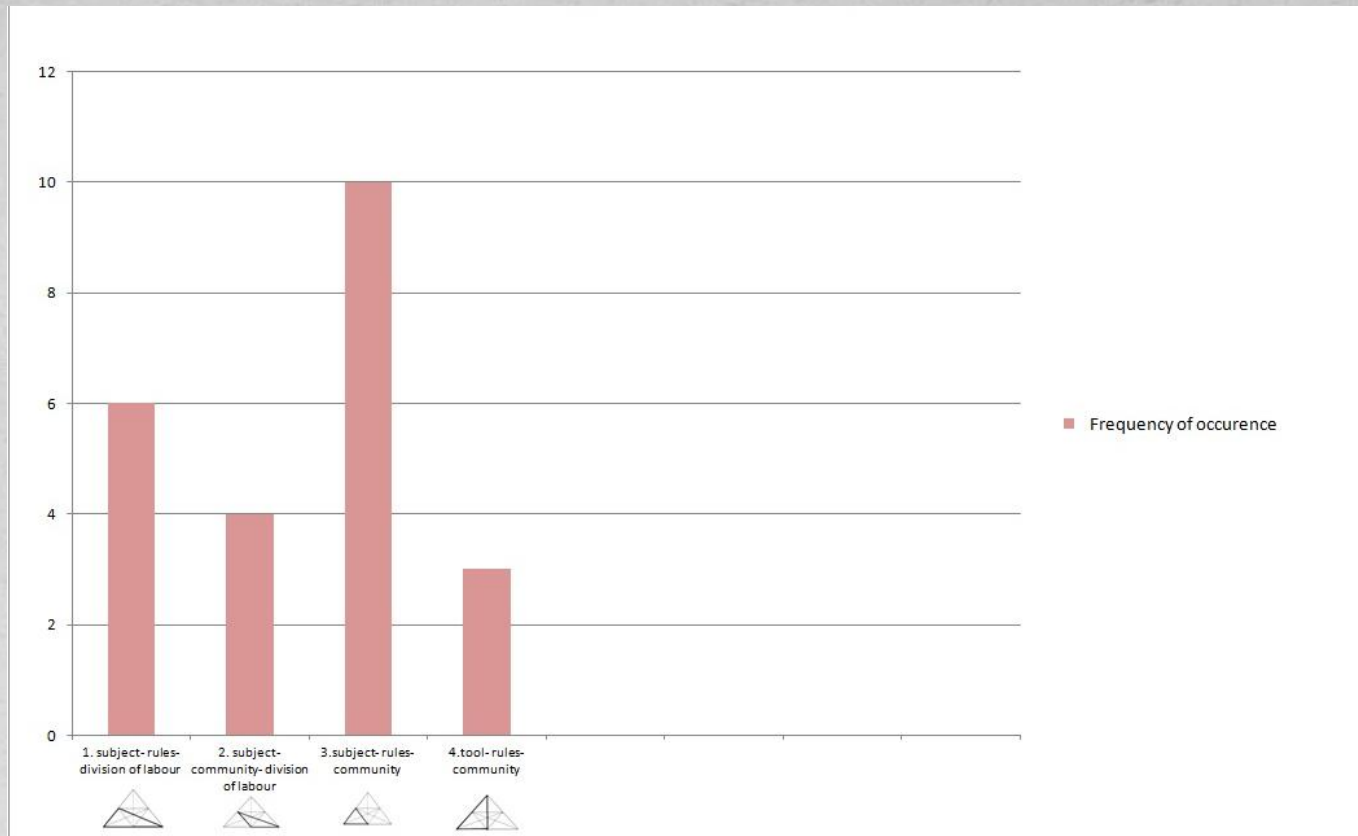


Figure 3: hidden (secondary) sub- triangles- interactive systems

- Through these hidden interactions, we could specify the internal interactions of the community.
- function of the community is very important
- it affects the underlying states of the learning subjects or the use of new tools and also contributes to the formulation of rules.



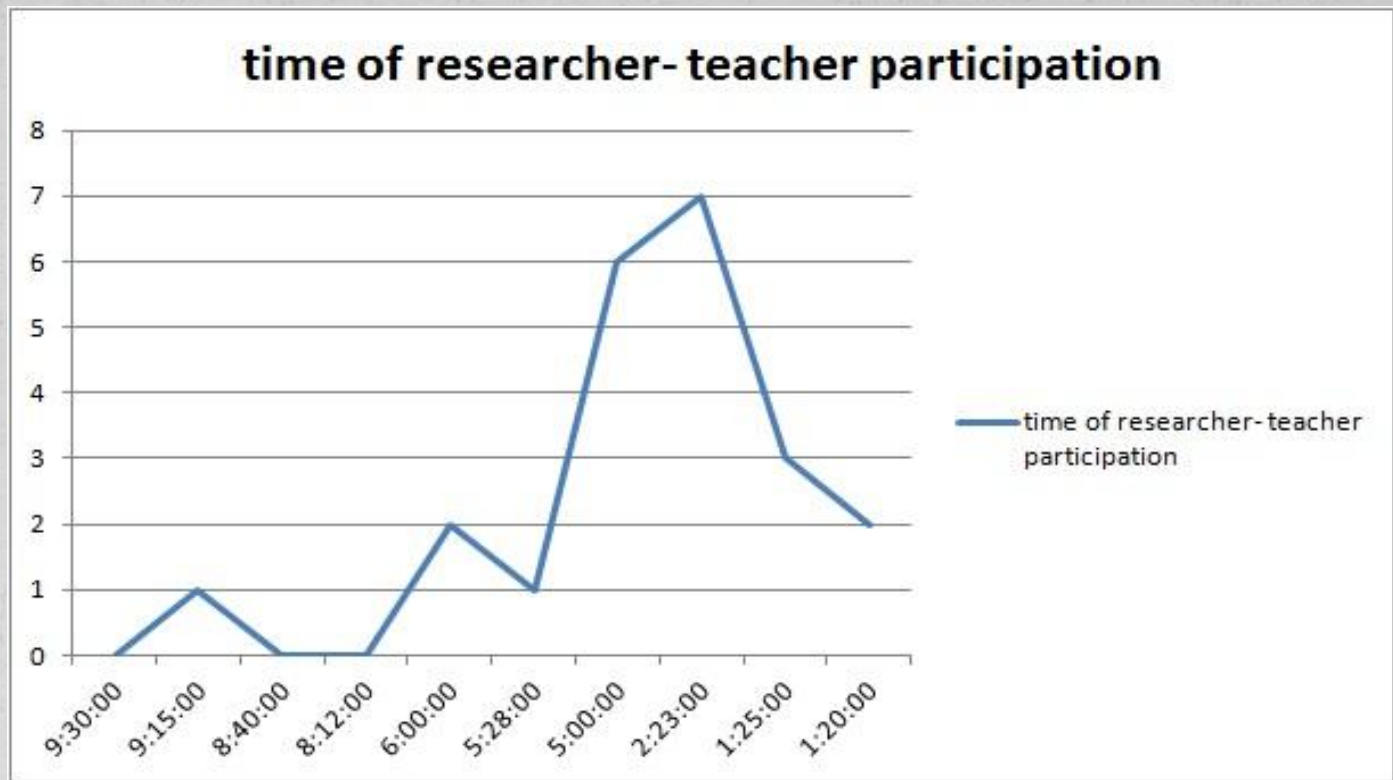


Figure 4: Time of researcher-teacher participation in minutes

- we found for the first part of the sample that the researchers- teachers' intervention was reduced
- the teacher intervened for longer than 9:00 minutes only in a video which is equal to the activity acquaintance with students and takes place during the first day of the intervention
- videos in which the researcher-teacher intervenes with time between 6:00 and 5:28 minutes in activities where storytelling

## The importance of the study

- to explore the **role of Science Education** in the early grades using CHAT
- to organize an **effective teaching environment** for in-service teachers
- to provide an **interactive platform** for researchers working in interdisciplinary fields of cultural studies in Sciences Education
- to establish **a new mentality** where Science Education is part of the society

## Project 3:

a Science Education curriculum using scientific narratives and cartoons



Eleni Kolokouri, Pre-primary school teacher, Dr in Science Education  
University of Ioannina, Greece , [ekolokouri@gmail.com](mailto:ekolokouri@gmail.com)

## Research questions

- Can cartoons be used as a **mediating tool** for teaching scientific concepts in the early grades?
- Which **skills of the scientific method** do pupils practice with the use of cartoons?
- What type of **interactions** take place in the activity systems while teaching?

## According to Blunden... (2013)

- ‘Marx and Engels saw the production of **tools as central to the evolution of the human species**, and many have held the use of symbols to be the **essential human trait**’.
- ‘It is **human activity** which invests an artefact with meaning and while the material properties of the artefact may provide the substrate for the ideal properties, **those ideal properties themselves are products of the use of the artefact in activity**, not the physical or chemical properties as such’.
- ‘**Psychological tools** have profound significance for the development of the mind because: “By being included in the process of behavior, the psychological tool **modifies the entire course and structure of mental functions**.” (LSVCW, v. 3, pp. 85-90)’.
- “Every object made by man – from a hand tool to the modern electronic computer – embodies **mankind’s historical experience** and at the same time also embodies the mental aptitudes moulded in this experience. This point comes out even more clearly perhaps in **language, science, and works of art. ...**”

# The Science Education program

**Floating and sinking  
Spongebob  
Squarepants**

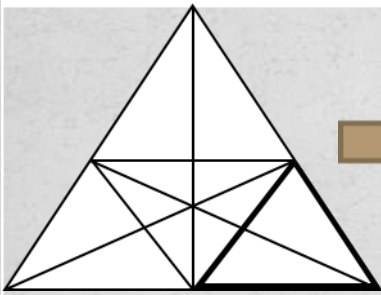


**Color visions from the past**



# Evolution within an activity system

**Method**  
(CHAT second generation: Activity system as unit of analysis)



**Mediative tool**  
(cartoon)



**Community**  
(connection of past knowledge and experience with new knowledge: outcome within the sociocultural background of the learner)

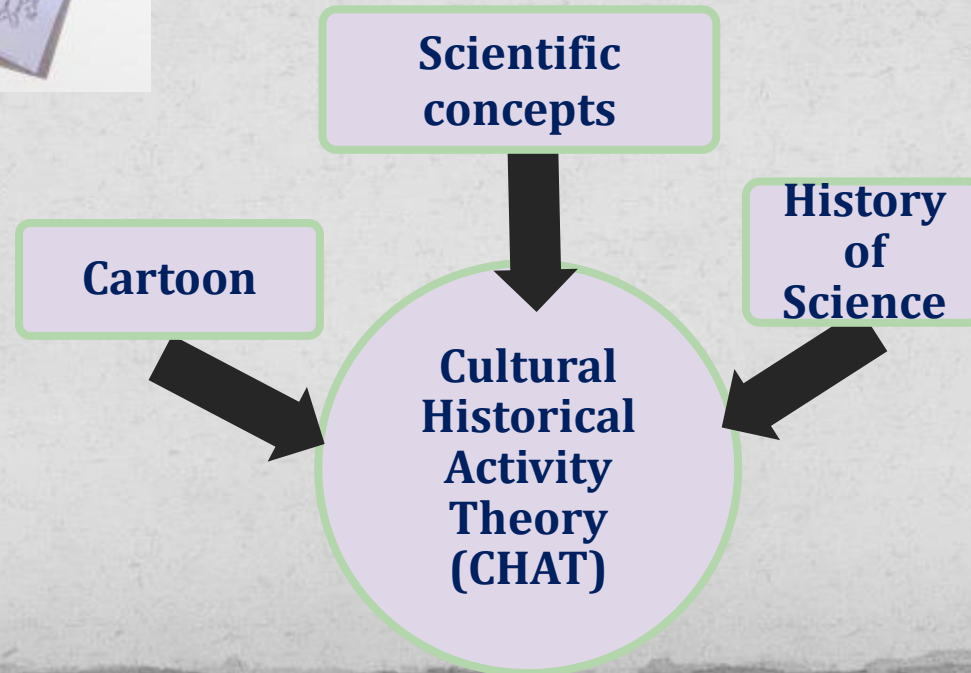


# The Science Education program

**Floating and sinking  
Spongebob  
Squarepants**



**Color visions from the past**





## Part 1

# Floating and sinking concepts with Spongebob Squarepants



**Case III-- Development of an Innovative Science Curriculum for the early grades in order to introduce teaching scientific concepts by using cartoons.**

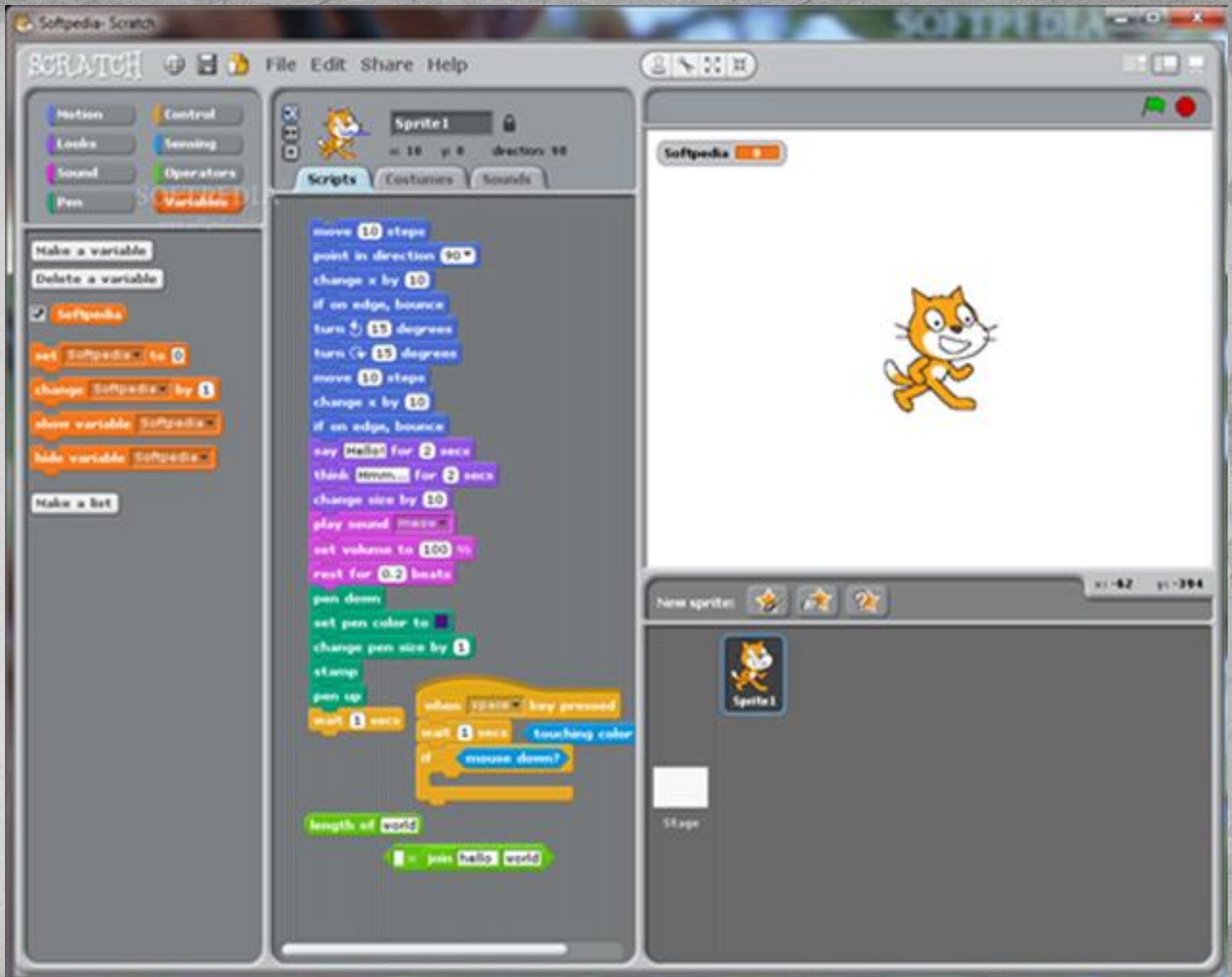


## Part 2

# Color visions from the past



Case III-- Development of an Innovative Science Curriculum for the early grades in order to introduce teaching scientific concepts by using cartoons.



# The program in practice...

<b>Sample</b>	<b>4 pre-primary school classrooms</b>
<b>Lessons</b>	<b>20 in each classroom for 30-55 min.</b>
<b>Implementation</b>	<b>10 weeks</b>
<b>Videos</b>	<b>236 AVCHD</b>
<b>Drawings of pupils</b>	<b>179 PDF</b>
<b>Photos</b>	<b>195 JPEG</b>

# Data analysis

The screenshot displays the NVIVO software interface. The top menu bar includes File, Home, Create, External Data, Analyze, Query, Explore, Layout, View, and Picture. The ribbon below contains various tool groups: Workspace, Item, Clipboard, Format, Paragraph, Styles, Editing, and Proofing. On the left, a 'Sources' pane shows a tree view with folders like Internals, Area and Township, Interviews, News Articles, Project Administration, Survey, Externals, Memos, and Framework Matrices. The main window shows a search for 'Competing water uses' in the 'Area and Township' source. A table lists search results with columns for Name, Nodes, References, Created On, Created By, Modified On, and Modified By. Below this, a 'Click to edit' section shows a photo of a boat in a harbor and a table with three rows of data.

Name	Nodes	References	Created On	Created By	Modified On	Modified By
Area and Township Information	12	22	22/06/2010 2:14 PM	WWS	22/07/2010 5:48 AM	WWS
Competing water uses	5	12	17/04/2010 1:03 PM	WWS	25/06/2010 6:48 AM	WWS
Marsh	3	7	17/04/2010 1:03 PM	WWS	26/07/2010 12:44 PM	WWS
Marshallberg harbor	1	2	17/04/2010 1:03 PM	WWS	27/06/2010 11:03 PM	EDR

	Region	Content
1	740,240 - 1200,520	Large waterfront homes. These are not indicative of typical homes of those who engage in commercial fishing, but more indicative of second or vacation homes.
2	150,80 - 800,530	Commercial fishing boats. These are likely shrimp trawlers. Note that they have large "booms" that can be lowered laterally from the boat to hold the trawling net behind the boat as it travels.
3	810,350 - 1200,490	Recreational fishing boats

Word Frequency dialogue:  
the most frequently used while analyzing are of high importance

interaction "are discovering" development  
object matches "light beam" creation creating mood dialogue ascertain  
formality extraction then  
communication level attainment argument  
tools story "are doing" cards student small can "of the  
team" groups children "of the  
children" observation "are experimenting"  
experimentations course "are trying"  
face conclusions about classification "of the materials"  
hypothesis subjects "flash light"  
bright light "of the light" "are lightening" use "are using" using

# Connection of meanings

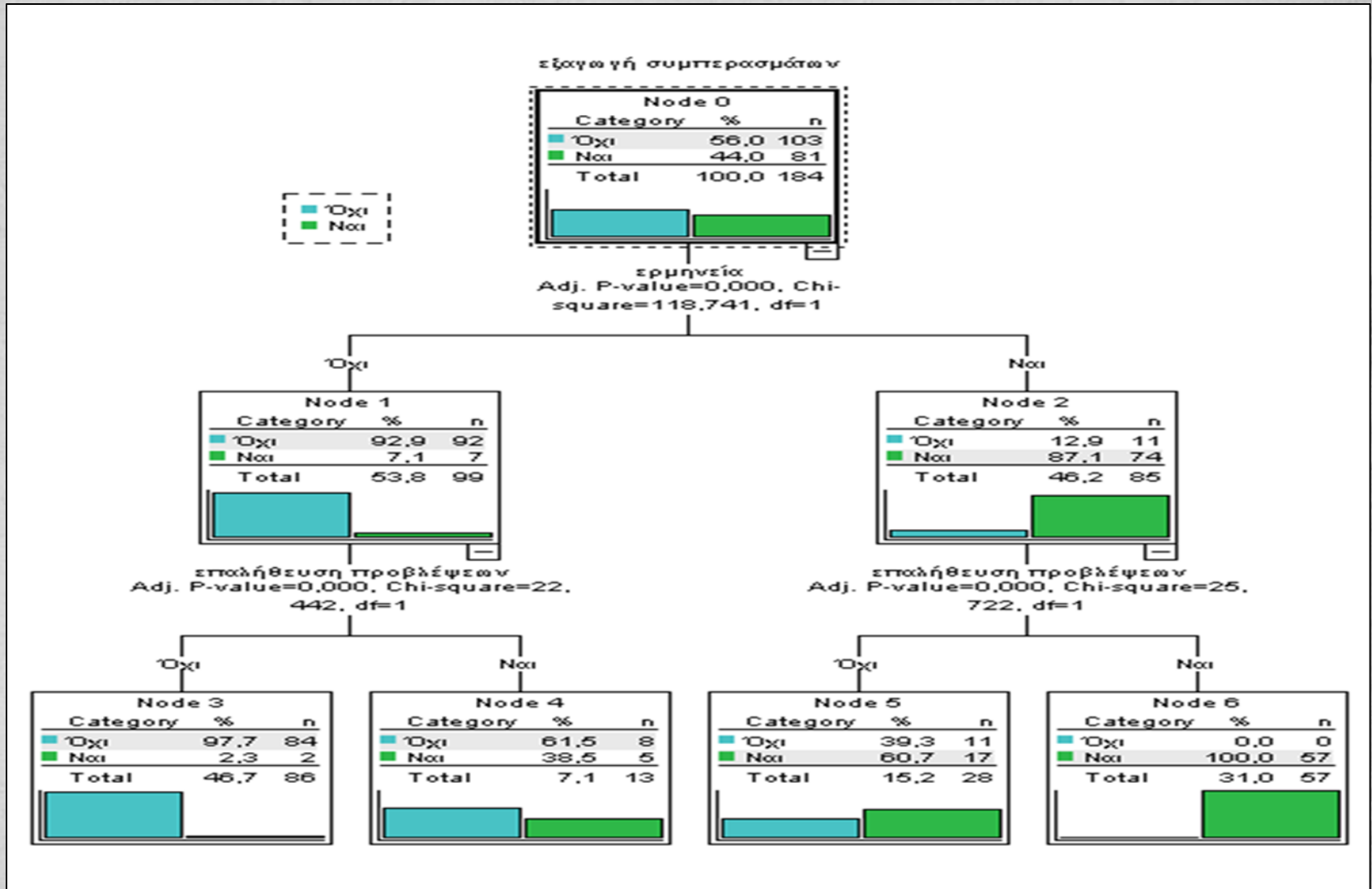
children	interaction	of the team	face	subjects	attainment	groups	Are lightening		dialogue	
							object	level	bright	Light beam
			tools		development	of the materials			argument	are trying
	of the object	course		are using			Flash light	story	student	small
communication			conclusions		then	are doing	about	use	creating	are discovering
	of the children	cards		of the light						mood

Case III-- Development of an Innovative Science Curriculum for the early grades in order to introduce teaching scientific concepts by using cartoons.



# Skills of the scientific method

Case III-- Development of an Innovative Science Curriculum for the early grades in order to introduce teaching scientific concepts by using cartoons.



# Conclusions

- ▶ **cartoons** are used as **cultural tools** and are connected with **history of science** in order to engage learners in exploring a variety of scientific concepts
- ▶ **scientific learning** becomes a result of **social interactions** connected with exploring in authentic environments
- ▶ under the prism of **CHAT** learners participate in **meaningful cultural activities** and **receive scaffolding** for improving of actions towards an inspiring object into the whole activity system

**Project 4:**  
a teachers' training Biology course  
designed in a moodle platform

Eftychia Nanni, Primary school teacher, Dr in Science Education  
University of Ioannina, Greece, [e.nanni@hotmail.com](mailto:e.nanni@hotmail.com)

# The four pillars of the project in science teacher training

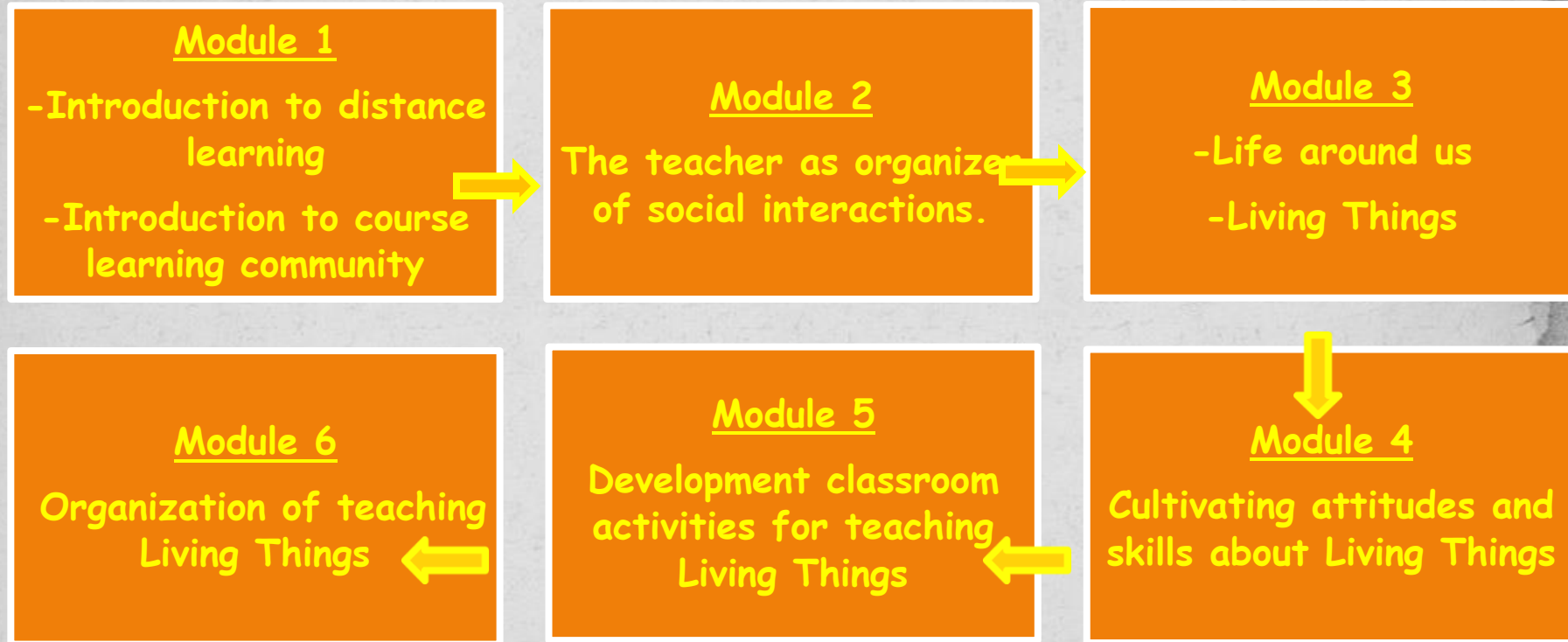
- Current trends and challenges in Science Education
- Cultural Historical Activity Theory as a theoretical framework for the analysis
- Current approaches to Biology Education
- Current models and approaches to in-service teacher education

## Course aims and objectives

- ✓ Teachers interact in a learning community
- ✓ Underline the importance of teaching Living Things
- ✓ Build new curriculum knowledge in the subject of Living Things
- ✓ Build new teaching skills for Living Things subject
- ✓ Develop effective teaching organized into meaningful activities

# Course description

The e-learning course consists of six modules:



# Course description

## ΠΛΟΗΓΗΣΗ

### Αρχή

- Η αρχική μου
- ▶ Σελίδες ιστοτόπου
- ▼ Τρέχον μάθημα
  - Διδασκαλία θεμάτων των Φυσικών Επιστημών - Οι ζωντ...
  - ▶ Συμμετέχοντες
  - ▶ Γενικά
  - ▶ Καλώς ήρθατε!
  - ▶ Εισαγωγή
  - ▶ Ο εκπαιδευτικός ως οργανωτής κοινωνικών αλληλεπιδρ...
  - ▶ Η ζωή γύρω μας
  - ▶ Καλλιεργώντας στάσεις και δεξιότητες για τη ζωή γύ...
  - ▶ Εξέλιξη των δραστηριοτήτων για τη διδασκαλία ενότη...
  - ▶ Οργάνωση της διδασκαλίας ενότητων της έμβιας ύλης
- ▶ Τα μαθήματά μου

## ΔΡΑΣΤΗΡΙΟΤΗΤΕΣ

- Ομάδες Συζητήσεων
- Πόροι
- Συζητήσεις

## ΣΥΜΜΕΤΕΧΟΝΤΕΣ

- Τελευταία Νέα
- Βοήθεια-Υποστήριξη
- Πρόσθετο Υλικό

Καλώς ήρθατε!



ΕΠΙΜΟΡΦΩΤΙΚΟ ΣΕΜΙΝΑΡΙΟ ΕΞ ΑΠΟΣΤΑΣΕΩΣ  
ΕΚΠΑΙΔΕΥΣΗΣ

## ΤΕΛΕΥΤΑΙΑ ΝΕΑ

Προσθήκη νέου θέματος...

ΤΟ ΤΕΛΟΣ ΜΙΑ ΝΕΑ ΑΡΧΗ

17 Δεκ, 23:53 Katerina Plakitsi

3η και 4η εργασία

9 Δεκ, 16:03 Ευτυχία Νάννη

ΚΑΛΗ ΣΥΝΕΧΕΙΑ!!

5 Δεκ, 02:05 Katerina Plakitsi

ΣΥΓΧΑΡΗΤΗΡΙΑ!

29 Νοέ, 23:47 Ευτυχία Νάννη

ΔΙΕΥΚΡΙΝΙΣΕΙΣ ΓΙΑ ΤΗ 2η ΕΡΓΑΣΙΑ

24 Νοέ, 21:22 Ευτυχία Νάννη

Παλαιότερα θέματα ...

## ΠΡΟΣΦΑΤΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ

Δραστηριότητα από Τετάρτη, 6 Απρίλιος 2016,  
12:21 μμ

Πλήρης αναφορά για την πρόσφατη  
δραστηριότητα...

Τίποτα νέο από την τελευταία σύνδεσή σας

## ΕΠΙΚΕΙΜΕΝΑ ΓΕΓΟΝΟΤΑ

Δεν υπάρχουν επικείμενα γεγονότα

Μετάβαση στο ημερολόγιο...

Νέο γεγονός...

# Data

- **30 online discussion forums.**
- **1,486 messages between the course participants**
- **24,495 course logs (Reports telling which resources and activities in the course have been accessed, when, and by whom)**

- **18 group works**
- **56 individual works**
- **130 classroom activities for teaching Living Things**

## Research question

- **What were the contradictions that emerged within an activity system of an online teacher training course facilitated by Moodle?**



# Four levels of Internal Contradictions in Activity Systems

Contradiction level	Engeström's Definition (1987)
<b>Level 1 Primary Contradiction</b>	The primary contradiction of activities lives as the inner conflict between exchange value and use value within each corner of the triangle of activity.
<b>Level 2 Secondary Contradiction</b>	The secondary contradictions are those appearing between the constituents of the central activity.
<b>Level 3 Tertiary Contradiction</b>	The tertiary contradiction appears between the object/motive of the dominant form of the central activity and the object/motive of a culturally more advanced form of the central activity.
<b>Level 4 Quaternary Contradiction</b>	The quaternary contradictions require that we take into consideration the essential 'neighbour activities' linked with the central activity which is the original object of our study.

# Four levels of Internal Contradictions observed in our study

Contradiction level	Observations from our Activity System Analysis
<b>Level 1 Primary Contradiction</b>	Individuals teachers, instructors and teachers' groups do not share a common value system on how to teach science and to design science teaching and learning materials.
<b>Level 2 Secondary Contradiction</b>	Conflicts between the rules of the course and the subjects of each group relate to the different composition and participation of each group. These conflicts require a flexible learning environment that reflects the complexity of the community
<b>Level 3 Tertiary Contradiction</b>	New teaching methods and suggested science teaching ideas and classroom activities do not necessarily fit into teachers' daily classroom practices.
<b>Level 4 Quaternary Contradiction</b>	Teachers' daily classroom practices interact with other 'neighbour activities' and therefore the implementation of these practices requires more changes.

# Conclusions

- Activity systems analysis brings the CHAT framework into clear practical focus and provides **new tools and approaches for analyzing collective activity**, interactions within a community of practice and structural change and development.
- The **distant learning course** for teacher training in science education is fruitful and optimistic for teaching the topic of Living Things.
- The contradictions and conflicts emerged within the development of the activity system of the course were a **source of change and development.**

# Project 5:

A **science educational program**, developed in an **archaeological museum** which examines the interaction between formal and non-formal education in designing and organizing educational programs



**ΤΟ ΚΥΝΗΓΙ ΤΟΥ ΧΑΜΕΝΟΥ ΚΕΡΑΥΝΟΥ**  
Εκπαιδευτικό Πρόγραμμα για παιδιά 5 – 9 ετών

Αρχαιολογικό Μουσείο  
Ιωαννίνων  
Αρχαιολόγοι  
Ιουλία Κατσαδήμα  
Ελένη Βασιλείου  
Βασιλική Γιαννάκη

Πανεπιστήμιο Ιωαννίνων  
Σχολή Επιστημών Αγωγής  
Παιδαγωγικό  
Τμήμα Νηπιαγωγών  
Ερευνητική Ομάδα  
**@fise group**  
Καθηγήτρια  
**Κατερίνα Πλακίτση**  
Υποψ. Διδάκτορας  
**Αθηνά Κορνελάκη**

**Αρχαιολογικό Μουσείο Ιωαννίνων**

Το εκπαιδευτικό πρόγραμμα θα συνεχίσει να προσφέρεται σε σχολεία Σαββατοκύριακα του Νοεμβρίου και του Δεκέμβρη μετά από συνεννόηση με τους υπεύθυνους του Αρχαιολογικού Μουσείου

Επιχειρησιακό Πρόγραμμα  
Ανάπτυξη Ανθρώπινου Δυναμικού,  
Εκπαίδευση και Διά Βίου Μάθηση  
ΠΡΟΓΡΑΜΜΑ ΕΣΠΑ 2014-2020

ΕΣΠΑ  
2014-2020

IKY

**Athina Kornelaki, Pre-primary school teacher, Dr in Science Education**  
**University of Ioannina, Greece, [athinako91@yahoo.com](mailto:athinako91@yahoo.com)**

# Methodology

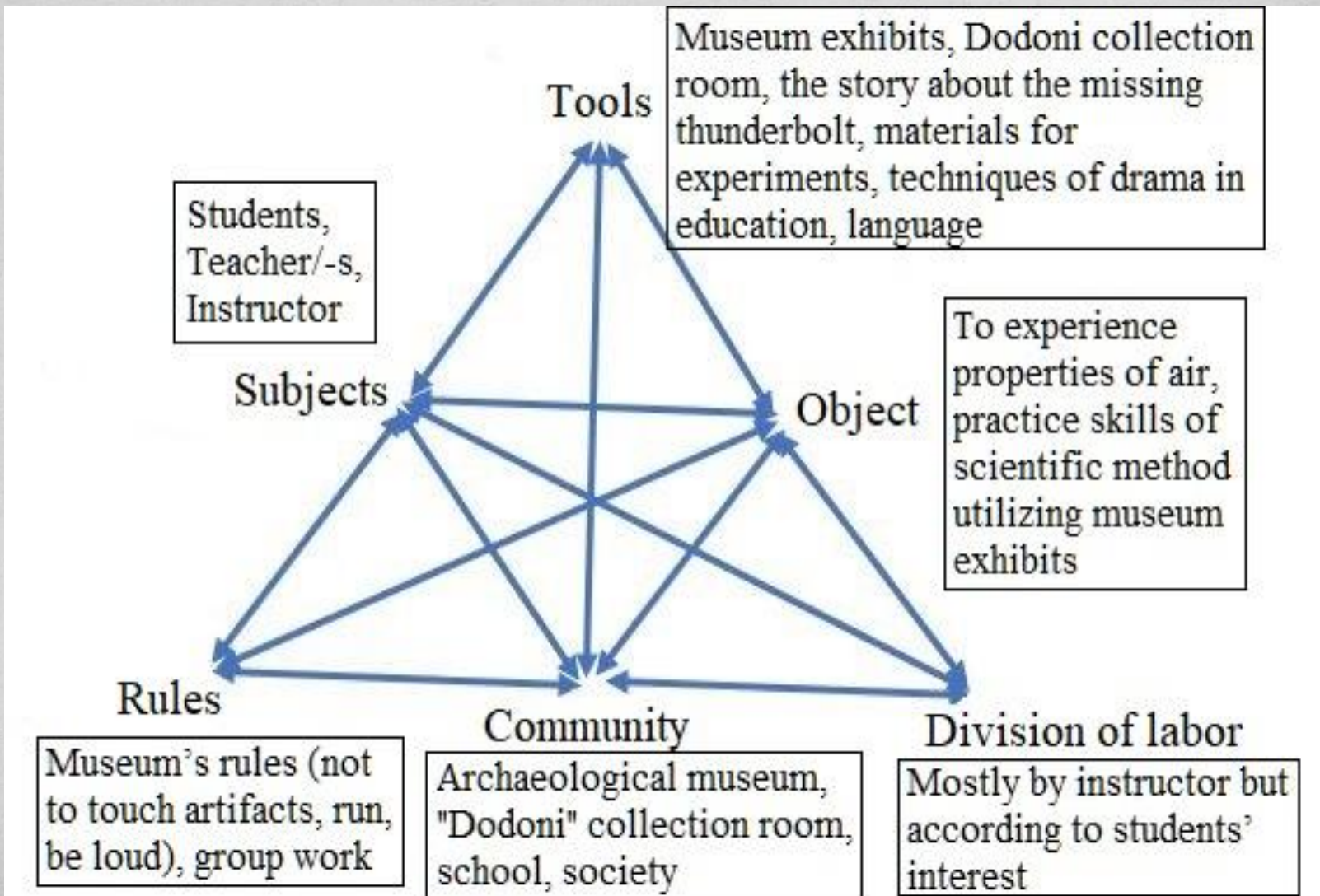


Expansive Learning Cycle (Engestrom, 2003)



Activity System (Engestrom, 2005)

# The activity system



# Interaction of Formal with Informal Education

## Formal




- Science Education Curriculum
- Scientific Method Skills

## Informal

- Cultural Heritage → Cultural Tools
- Learning Community

**Science  
Education in  
Cultural Venues**

**The exhibits** of the Archaeological Museum of Ioannina which were used in the Educational Program **“Thunderbolt Hunt”**

Α/Α	Περιγραφή	Έκθεμα
1.	Τελαμών διακοσμημένος με ανάγλυφο πτερωτό κεραυνό, τέλος 3 <sup>ου</sup> αι. π.Χ. (ΑΜΙ 1384).	
2.	Ανθεμωτός ηγεμόνας καλυπτήρας με παράσταση αετού που πατά σε κεραυνό, 3 <sup>ος</sup> αι. π.Χ. (ΑΜΙ 9148).	
3.	Λαβή ομοιώματος ξίφους με πάνθηρα και εγχάρακτο πτερωτό κεραυνό (τέλος 3 <sup>ου</sup> αι. π.Χ.) (ΑΜΙ 1352).	



# The activities of the Educational Program “Thunderbolt Hunt”

*Action 1: Group formation and discussion about museum exhibits*

*Action 2: Search for museum exhibits – The common element*

*Action 3: How was the thunderbolt lost? – Narrative*

*Action 4: Experiments on air*

*Action 5: Role on the wall*

*Action 6: Zeus’ winged thunderbolt*

*Action 7: Aeolus’ sack*





# Research Data

## Data collected

**Video recordings**

Students'  
drawings/texts

Photographs

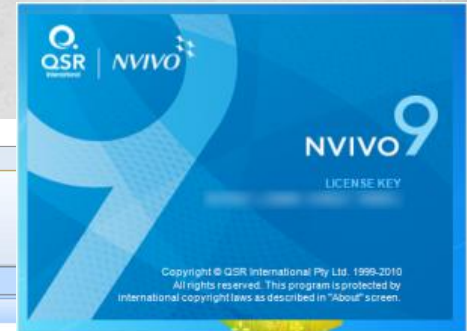
Field notes

**12.73 hours**

136

39

# Tool for Qualitative Data Analysis



Media

File Home Create External Data Analyze Explore Layout View Media

Transcript Video Size Video Player Fit To Player Waveform 100% Split Panes Playback

Start Selection Finish Selection Play Transcript Media Select Media from Transcript Assign Timespan to Rows Assign Frame as Thumbnail

Sources

Look for: Search In Δημοτικό Μπάρα Find Now Clear Advanced Find

Δημοτικό Μπάρας\_β' Δημοτικού

Name	Nodes	References	Created On	Created By	Modified On
Δραστηριότητα 1 - χωριατός ομάδων	9	57	04-Jan-18 7:16 PM	KP	01-May-18 12:27 AM
Δραστηριότητα 2 - αναζήτηση εκθεμάτων-αυτίηση	27	591	04-Jan-18 7:21 PM	KP	01-May-18 12:29 AM
Δραστηριότητα 3 - ιστορία-κονό στοχείο	22	284	04-Jan-18 7:21 PM	KP	01-May-18 12:32 AM
Δραστηριότητα 4 - πειράματα-αυτίηση-συμπεράσματα	25	309	04-Jan-18 7:21 PM	KP	01-May-18 12:36 AM
Δραστηριότητα 5 - Ζωγραφική	11	19	23-Mar-18 2:36 PM	KP	01-May-18 12:36 AM
Δραστηριότητα 5 - ο μίτος της σκέψης του Αιόλου - ζωγραφική	8	11	04-Jan-18 7:21 PM	KP	01-May-18 12:36 AM
Δραστηριότητα 6 - Παλ	15	116	23-Mar-18 2:50 PM	KP	01-May-18 12:37 AM
Δραστηριότητα 7 - Άνεμοι στον ασκό	10	54	23-Mar-18 2:48 PM	KP	01-May-18 12:38 AM

Δραστηριότητα 7 - Άνεμοι στον ασκό

0:00.0 0:40.0 1:20.0 2:00.0 2:40.0 3:20.0 4:00.0 4:40.0 5:20.0 6:00.0 6:40.0

Timespan	Content	Ομιλητής	Διάλογος	Διαδικασίες
1 0:00.5 - 0:13.0	Θα σας πω τι άλλο προέκυψε, ο Αίολος, μπορεί να μου έφερε τα κομμάτια για να βρούμε τον χαμένο κερανού αλλά μου είπε ότι τώρα πρέπει να βάλουμε εμείς τους ανέμους μέσα στο σάκο του...	Εμμωκιάτρια		
2 0:13.0 - 0:14.0	Ωχ	Γιώργος		
3 0:13.8 - 0:20.7	... μέσα στο τσουβάλι και πρέπει να μαζέψουμε τους ανέμους και να τους	Εμμωκιάτρια		

In Nodes Code At

KP 8 Items Nodes: 10 References: 54 Editable Unfiltered 0:00.5:6:43.8 6:43.8 5:58 PM 02-May-18

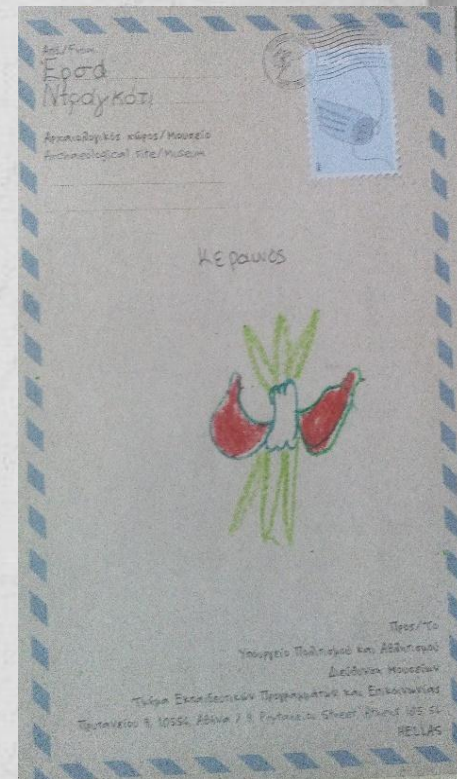
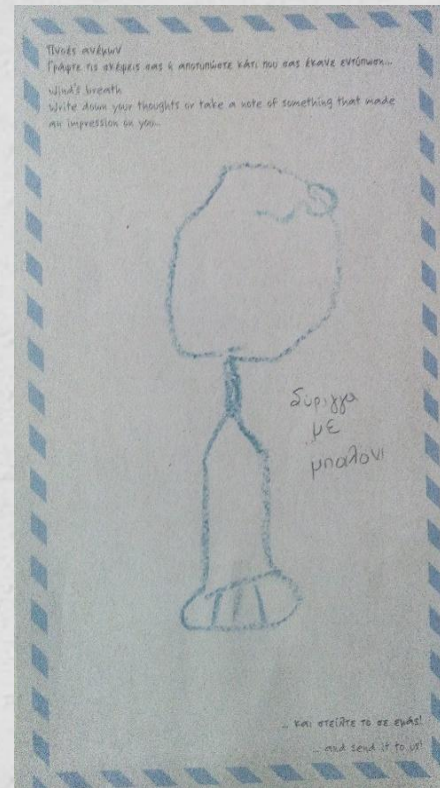


## Tree map of the Activity Theory's components in relation with the coded references

Nodes compared by number of items coded



# Student's drawings





# Contribution

- The **collaborative work** as a whole, prepares the ground upon which a new field in Science education will allow us to capture the **complexity of science teaching and learning** in formal and informal settings
- **STEAM Education** is proposed as a basis in order to foster inquiring minds, transformative thought and logical reasoning within a multidimensional context
- **Public engagement in Science Education** is a crucial point as discourse and exchange of ideas and scientific knowledge among members of society lead to immediate action and global change

# Discussion

- Science Education is a social and an individual process at the same time and prepares the ground upon which a new field will allow us to capture the complexity of science teaching and transformative learning in formal and informal settings
- Changes through time in peoples' lives all over the world cause transformative effects through an ongoing historicity
- Teaching and learning by using artefacts as cultural mediators becomes a unity and creates zones of proximal development that connect the past, present, and future

# Discussion

## **CHAT changes our understanding of the meaning of scientific investigation**

- Adopting CHAT, our epistemologies influence the way we conduct our scientific work
- Emphasis on how a CHAT perspective can impact on the way theories frame the meaning of data collected as well as the way data collected instantiates the meaning of the theory we adopt

## **Questions:**

- Does working in a cultural-historical perspective lead us to ask new or different questions than existing traditions within science education research?
- Are there significant epistemological differences in how research is pursued in a cultural-historical perspective)?
- Are there unique or special characteristics in cultural-historical approaches that should be highlighted and further developed?



Благодарю вас за внимание!  
Thank you for your attention!  
Ευχαριστώ για την προσοχή σας!