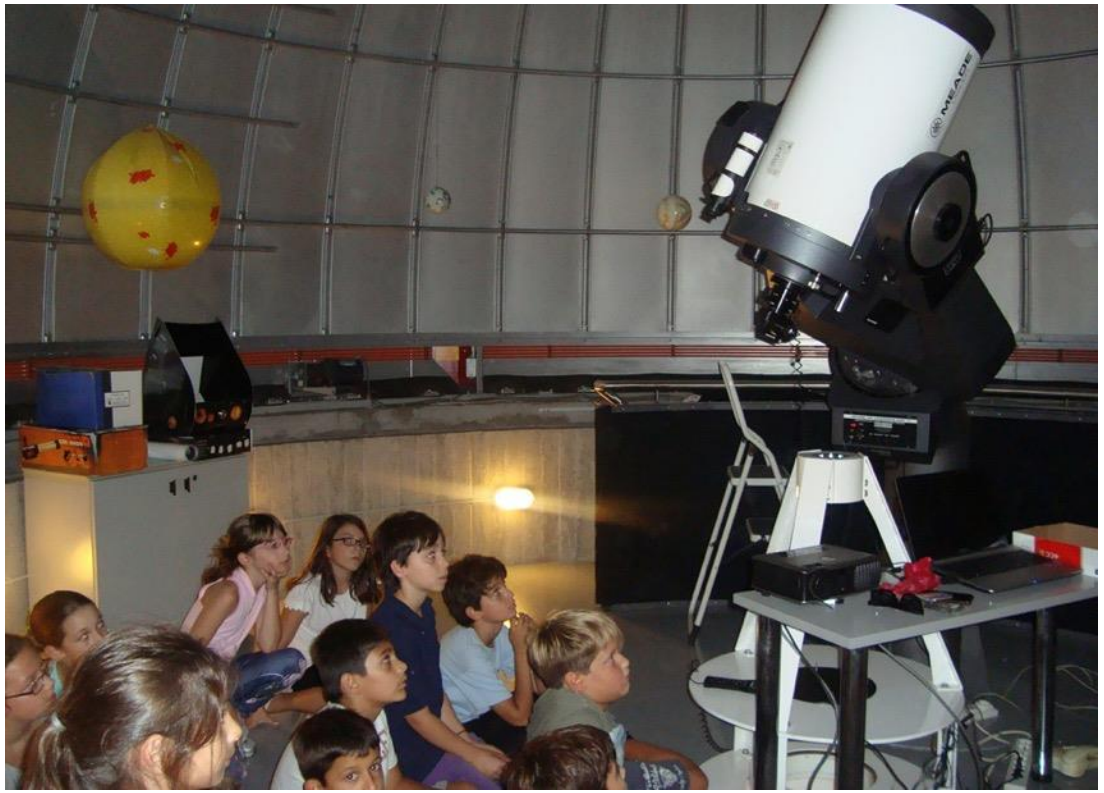
Σχεδιάζοντας το Σχολείο του Αύριο

16ο Ετήσιο Σεμινάριο της Ερμούπολης για την Κοινωνία της Πληροφορίας και την Οικονομία της Γνώσης

16-18 Ιουλίου 2021

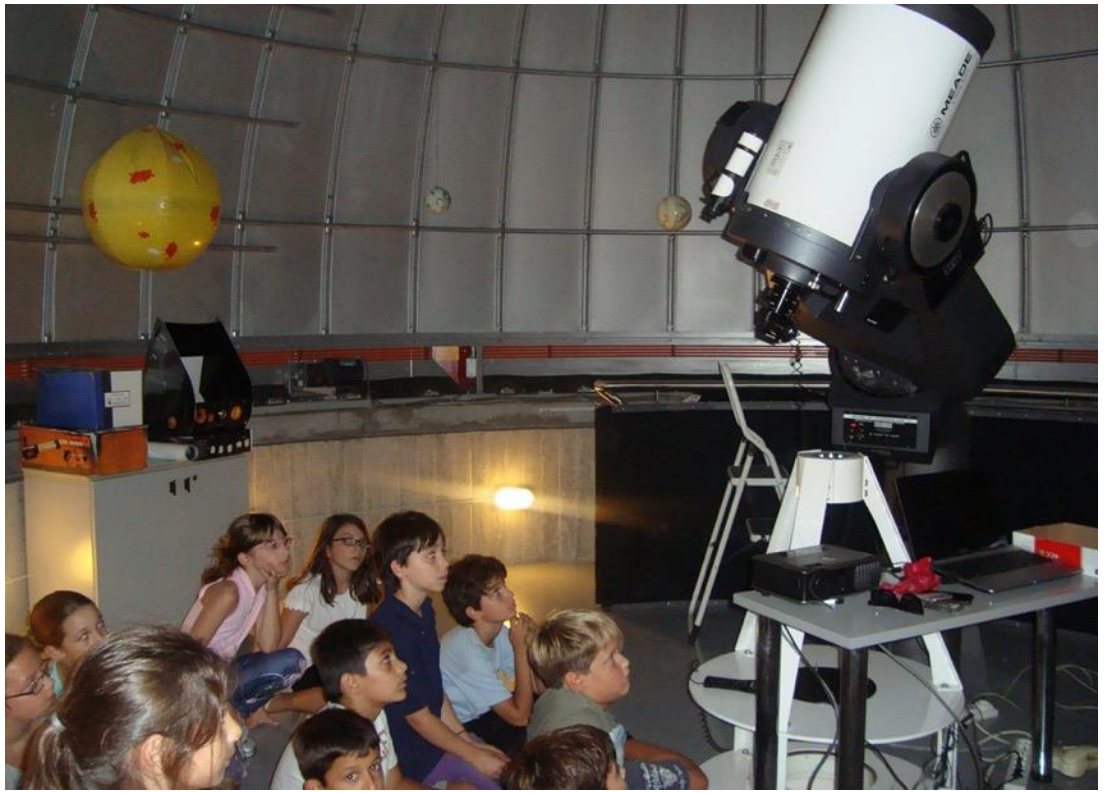
ELLINOGERMANIKI AGOGI

Άγγελος Αλεξόπουλος
Τμήμα Έρευνας & Ανάπτυξης
ΕΛΛΗΝΟΓΕΡΜΑΝΙΚΗ ΑΓΩΓΗ



Ellinogermaniki Agogi
The School

Established in 1961, EA is a multi-unit educational institution with more than 2200 students, 235 teaching staff and 330 administration staff, making an ideal testing ground for innovative methodologies and tools.



Ellinogermaniki Agogi
The R&D Department

The R&D Department was founded in 1994 with the aim of designing advanced educational materials. A key focus has been on the exploitation of state-of-the-art ICTs in the education process to enhance teaching and learning.

HORIZON 2020

ΕΚΤ ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΤΕΚΜΗΡΙΩΣΗΣ & ΗΛΕΚΤΡΟΝΙΚΟΥ ΠΕΡΙΕΧΟΜΕΝΟΥ

ΕΘΝΙΚΟ ΣΗΜΕΙΟ ΕΠΑΦΗΣ ΓΙΑ ΤΟ ΠΡΟΓΡΑΜΜΑ ΟΡΙΖΟΝΤΑΣ 2020

SWAFS
2014 - 2019

ΕΚΤ | Η ελληνική συμμετοχή στο Πρόγραμμα "Science with and for Society"

Ελληνικοί Οργανισμοί
με τη μεγαλύτερη συμμετοχή και χρηματοδότηση (1)

Όνομα οργανισμού	Τύπος	Αριθμός συμμετοχών σε έργα (& αριθμός συντονιστών)	% στο σύνολο της ελληνικών συμμετοχών	Εγκεκριμένη Χρηματοδότηση ΕΕ	% στο σύνολο της χρηματοδότησης ελληνικών οργανισμών
ΕΛΛΗΝΟΓΕΡΜΑΝΙΚΗ ΑΓΩΓΗ ΑΕ	Εταιρεία	5	6,10%	1.126.875,00	8,62%
ΠΟΛΥΤΕΧΝΕΙΟ ΑΘΗΝΑΣ	Πανεπιστήμιο	5	6,10%	952.215,00	7,28%
VILABS OE	Εταιρεία	3	3,66%	943.487,50	7,22%
ΕΘΝΙΚΟ ΚΑΙ ΚΑΠΟΔΙΣΤΡΙΑΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ	Πανεπιστήμιο	4	4,88%	856.255,00	6,55%
ΑΡΙΣΤΟΤΕΛΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΕΣΣΑΛΟΝΙΚΗΣ	Πανεπιστήμιο	6	7,32%	811.783,75	6,21%
ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ	Πανεπιστήμιο	1	1,22%	640.875,00	4,90%
ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΕΡΕΥΝΑΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΚΗΣ ΑΝΑΠΤΥΞΗΣ	Ερευνητικό Κέντρο	5	6,10%	599.225,00	4,58%
INTELSPACE ΤΕΧΝΟΛΟΓΙΕΣ ΚΑΙΝΟΤΟΜΙΑΣ ΑΕ	Εταιρεία	1	1,22%	562.153,00	4,30%
ΙΔΡΥΜΑ ΤΕΧΝΟΛΟΓΙΑΣ ΚΑΙ ΕΡΕΥΝΑΣ	Ερευνητικό Κέντρο	4	4,88%	544.668,75	4,17%
ΚΕΝΤΡΟ ΕΡΕΥΝΩΝ ΝΟΤΙΟΑΝΑΤΟΛΙΚΗΣ ΕΥΡΩΠΗΣ (SEERC)	Ερευνητικό Κέντρο	3	3,66%	472.125,00	3,61%
ΕΛΛΗΝΙΚΗ ΕΝΩΣΗ ΔΗΜΟΣΙΟΓΡΑΦΩΝ, ΣΥΓΓΡΑΦΕΩΝ, ΕΠΙΚΟΙΝΩΝΙΟΛΟΓΩΝ, ΕΠΙΣΤΗΜΗΣ ΑΣΤΙΚΗ ΕΤΑΙΡΕΙΑ	Ερευνητικό Κέντρο	2	2,44%	392.083,34	3,00%
ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ	Πανεπιστήμιο	1	1,22%	384.881,25	2,94%
ΠΑΝΕΠΙΣΤΗΜΙΟ ΜΑΚΕΔΟΝΙΑΣ	Πανεπιστήμιο	1	1,22%	374.468,75	2,86%
EXUS SOFTWARE LTD	Εταιρεία	1	1,22%	353.750,00	2,71%
ΙΝΣΤΙΤΟΥΤΟ ΤΕΧΝΟΛΟΓΙΑΣ ΥΠΟΛΟΓΙΣΤΩΝ ΚΑΙ ΕΚΔΟΣΕΩΝ "ΔΙΟΦΑΝΤΟΣ"	Εταιρεία	1	1,22%	341.375,00	2,61%
ΠΕΡΙΦΕΡΕΙΑ ΚΕΝΤΡΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ	Δημόσιος Φορέας	2	2,44%	315.187,50	2,41%
ΕΡΕΥΝΗΤΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΑΚΟ ΙΝΣΤΙΤΟΥΤΟ ΕΠΙΤΑΧΥΝΤΙΚΩΝ ΣΥΣΤΗΜΑΤΩΝ	Ερευνητικό Κέντρο	2	2,44%	310.625,00	2,38%

Ellinogermaniki Agogi
The R&D Department

The R&D Department is responsible for facilitating and implementing the testing of innovative methodologies and tools through coordinating and participating in more than 200 EU-funded and national projects.

Open Discovery Space (FP7) was the first large-scale, pan-European attempt to engage schools in the use of open educational resources. In this framework the digital maturity of schools was assessed. EA was responsible for implementation and managed to successfully engaged 5000 European schools.

https://portal.opendiscoveryspace.eu

Open Schools for Open Societies (H2020) focused on school openness through STEAM, with students working on projects with an emphasis on social responsibility (RRI). Apart from the digital element, schools were assessed on how open to their local communities were. EA (coordinator) facilitated the meaningful engagement of 1100 schools. https://portal.opendiscoveryspace.eu

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The R&D Department

The R&D Department is responsible for facilitating and implementing the testing of innovative methodologies and tools through coordinating and participating in more than 200 EU-funded and national projects.

Over 200 teachers, educational stakeholders, technology providers, policy makers, researchers, etc. come together from all over Europe and beyond to participate in 5-day training events, as part of many EU-funded initiatives.

ESIA
European School Innovation Academy

Ellinogermaniki Agogi European School Innovation Academy

EA organizes every summer (July) a series of Summer Schools as part of the European School Innovation Academy (ESIA) (https://esia.ea.gr/)

There is a major mismatch between opportunity and action in most education systems today. It revolves around what is meant by "science education," a term that is incorrectly defined in current usage. Rather than learning how to think scientifically, students are generally being told about science and asked to remember facts. This disturbing situation must be corrected if science education is to have any hope of taking its proper place as an essential part of the education of students everywhere.

Redefining Science Education

As students become absorbed with technology-based games, educators grapple with how best to use technology. Immersive simulations represent one way in which new media can enhance traditional learning experiences.

Inquiry-based science education (IBSE) has proved its efficacy at both primary and secondary levels in increasing children's and students' interest and attainments levels while at the same time stimulating teacher motivation. IBSE is effective with all kinds of students from the weakest to the most able and is fully compatible with the ambition of excellence. Moreover IBSE is beneficial to promoting girls' interest and participation in science activities. Finally, IBSE and traditional deductive approaches are not mutually exclusive and they should be combined in any science classroom to accommodate different mindsets and age group preferences.

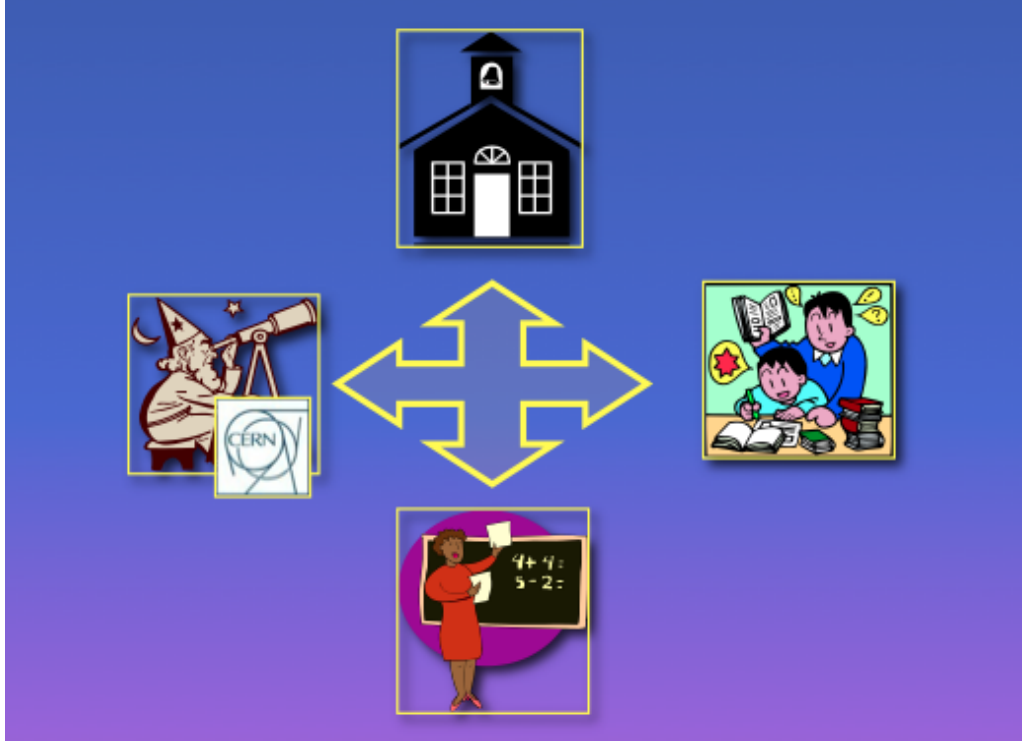
Current Trends in Science Education

A reversal of school science-teaching pedagogy from mainly deductive to inquiry-based methods provides the means to increase interest in science.

The introduction of problem-finding and problem-solving oriented fields of studies instead of more traditional disciplines would attract the interest of more young people.

Current Trends in Science Education

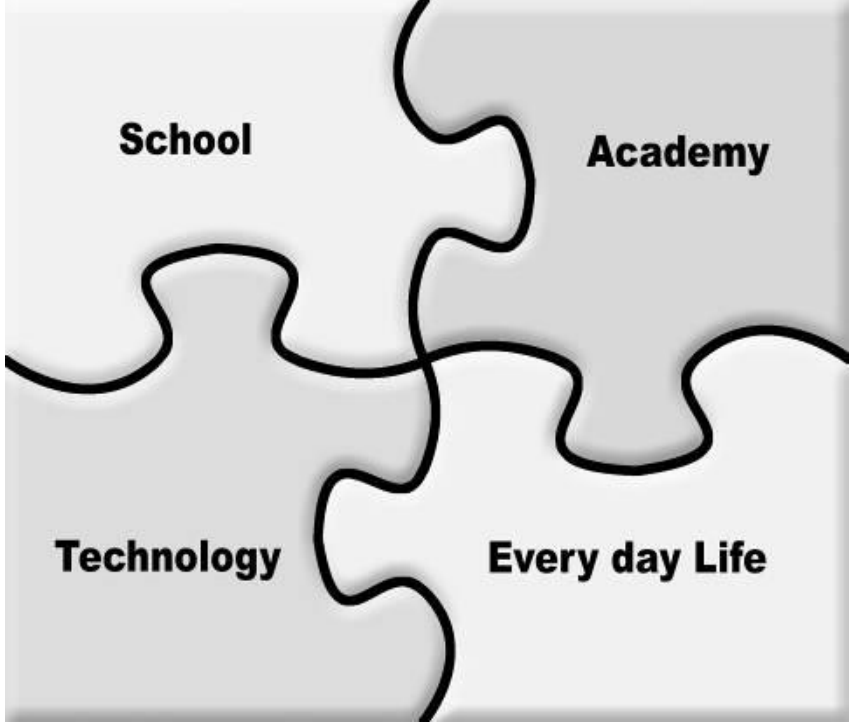
Scientific disciplines in schools have to be enlarged



Networks can be used as an effective component of teachers' professional development, and are complementary to more traditional forms of in-service teacher training by stimulating morale and motivation.

The Role of Teachers

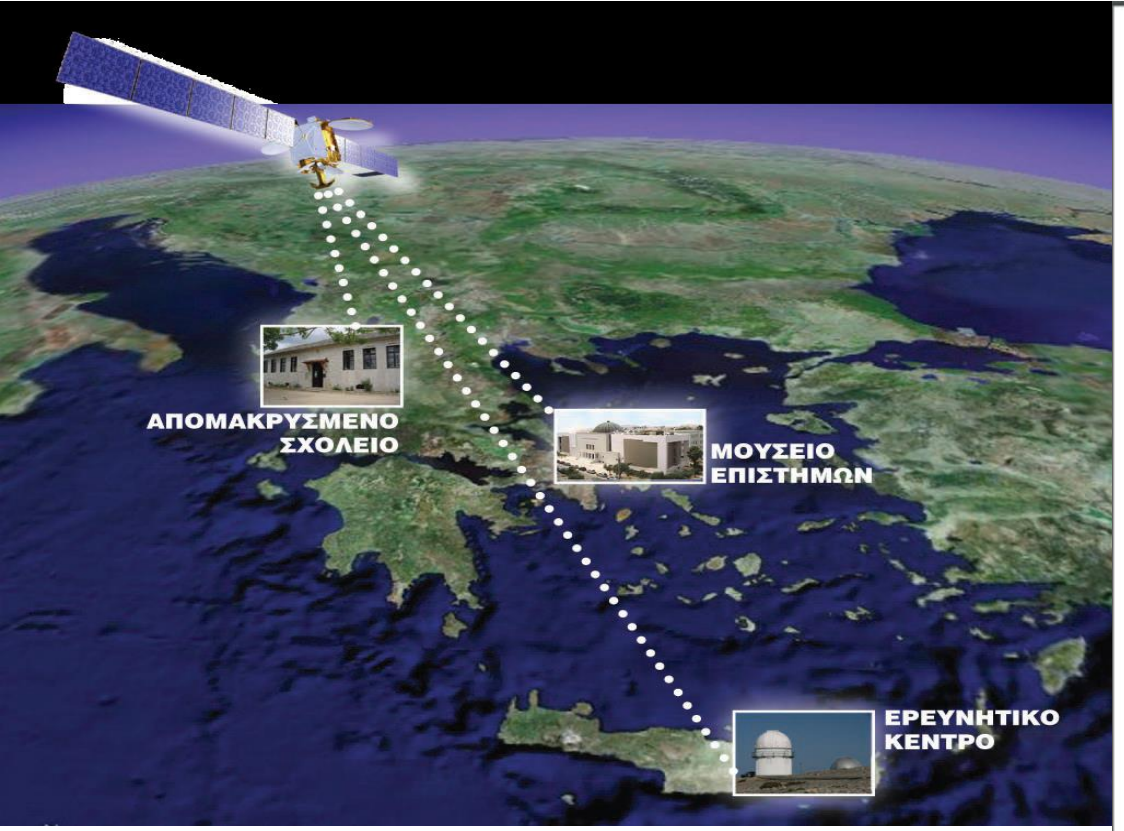
Teachers are key players in the renewal of science education. Among other methods, being part of a network allows them to improve the quality of their teaching and supports their motivation.



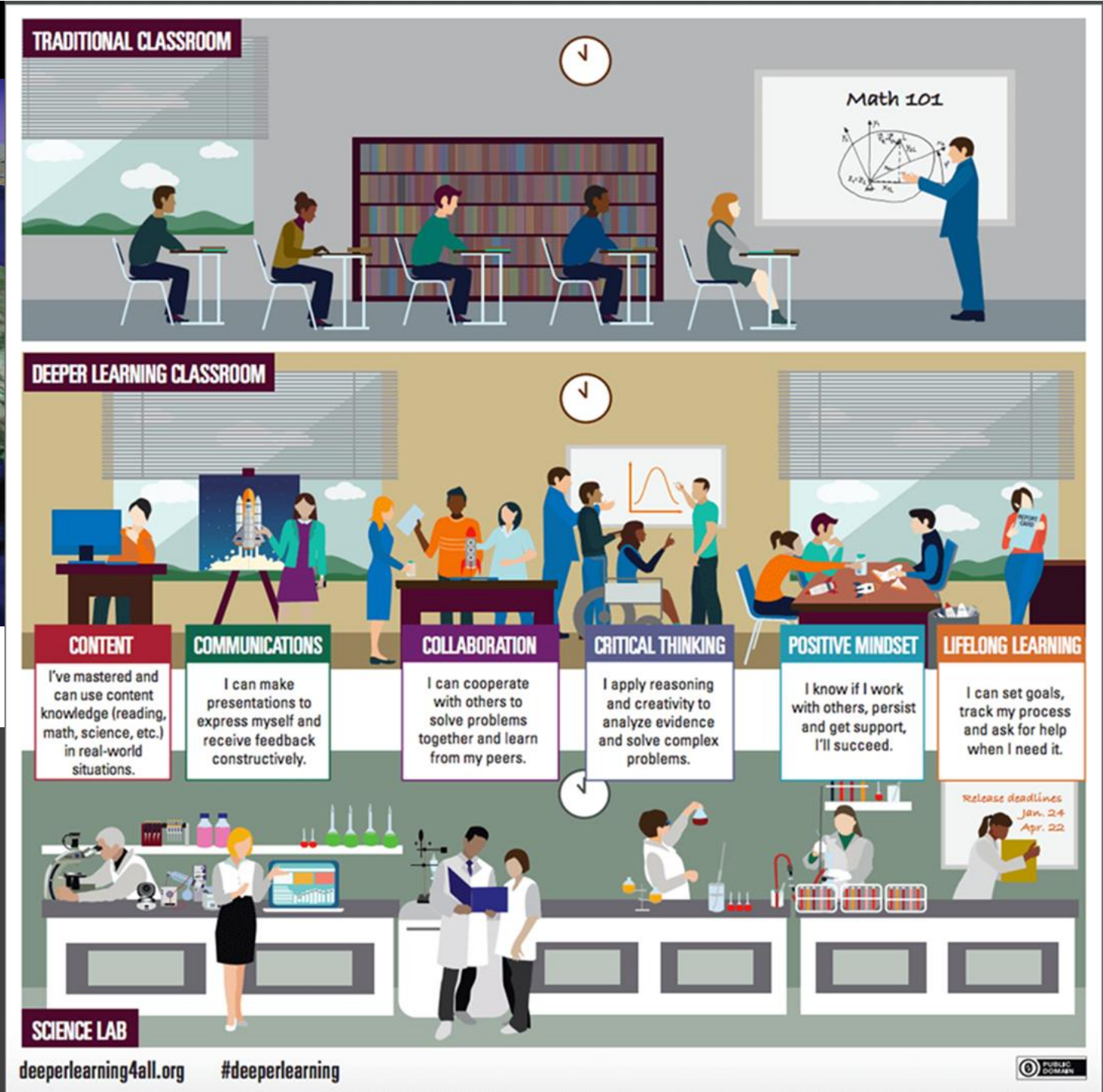
The challenge is to re-imagine science education: to consider how it can fit to the modern world and how it can meet the needs of all students; those who will go on to work in scientific and technical subjects, and those who will not.

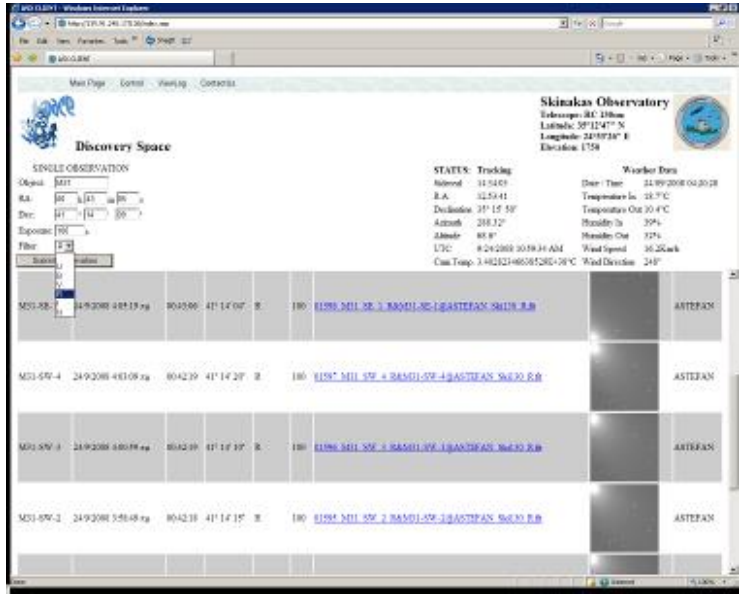
Re-imagining Science Education: The Vision

We should point to a hybrid classroom that builds on the strengths of both formal and informal teaching and learning strategies in ways that support learning of all students.



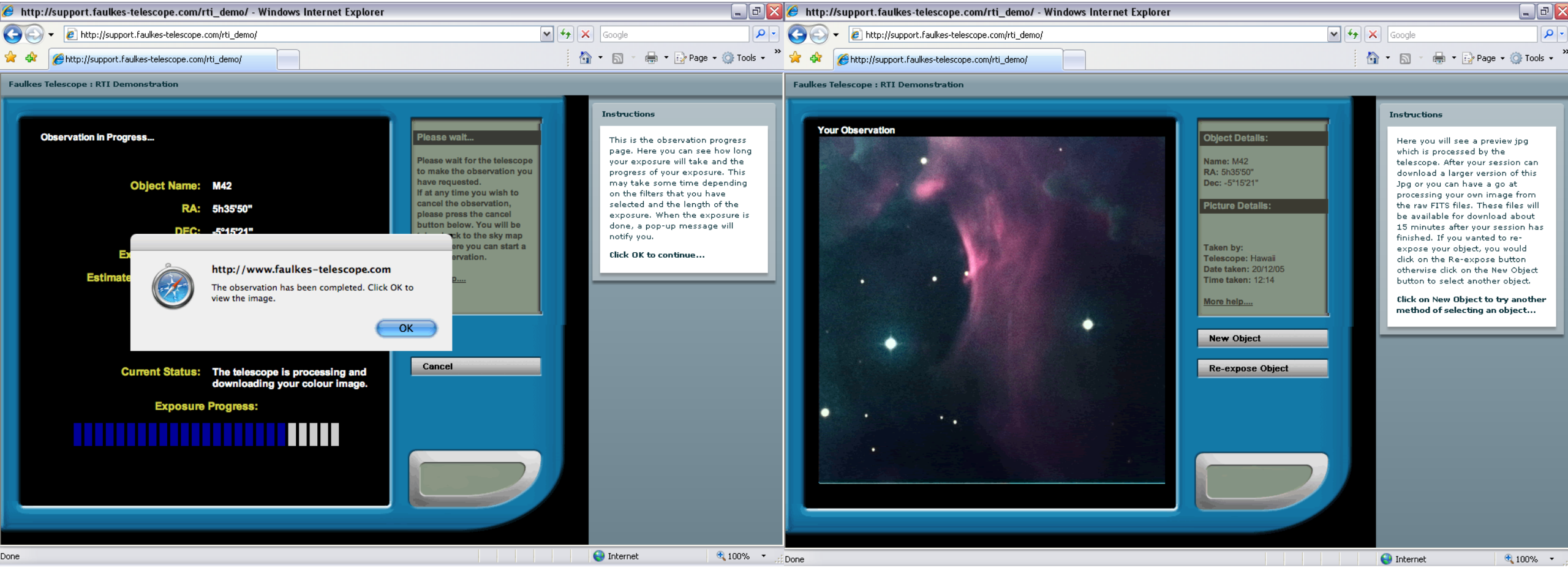
Creating Effective Links between Schools and the Research Community





Providing access to advanced research infrastructures

The Faulkes Telescope Project provides free access to a global network of robotic telescopes for education through our partnership with Las Cumbres Observatory. We also offer free teacher CPD, classroom resources and advice and support on all aspects of using astronomy in your classroom.



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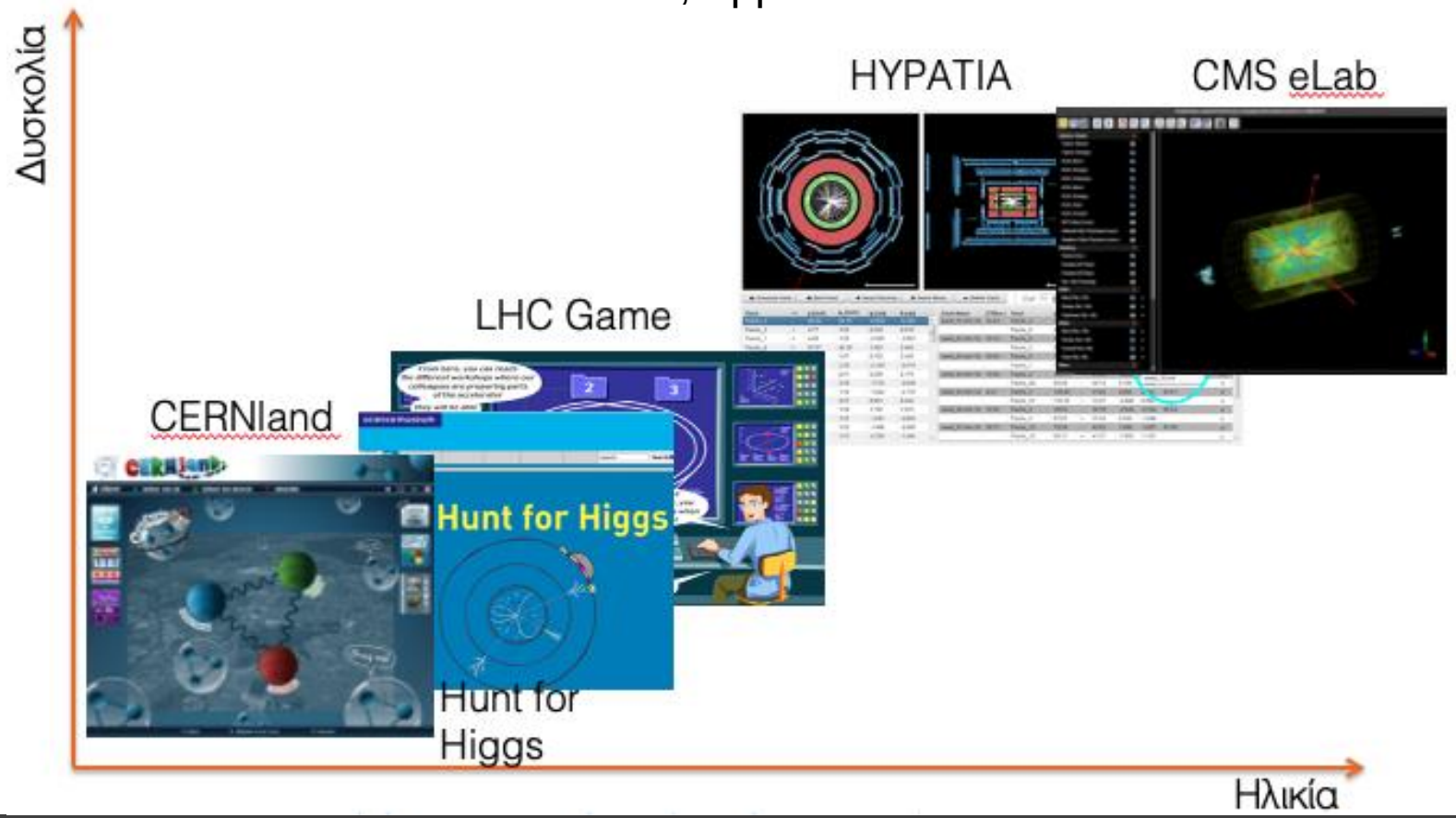
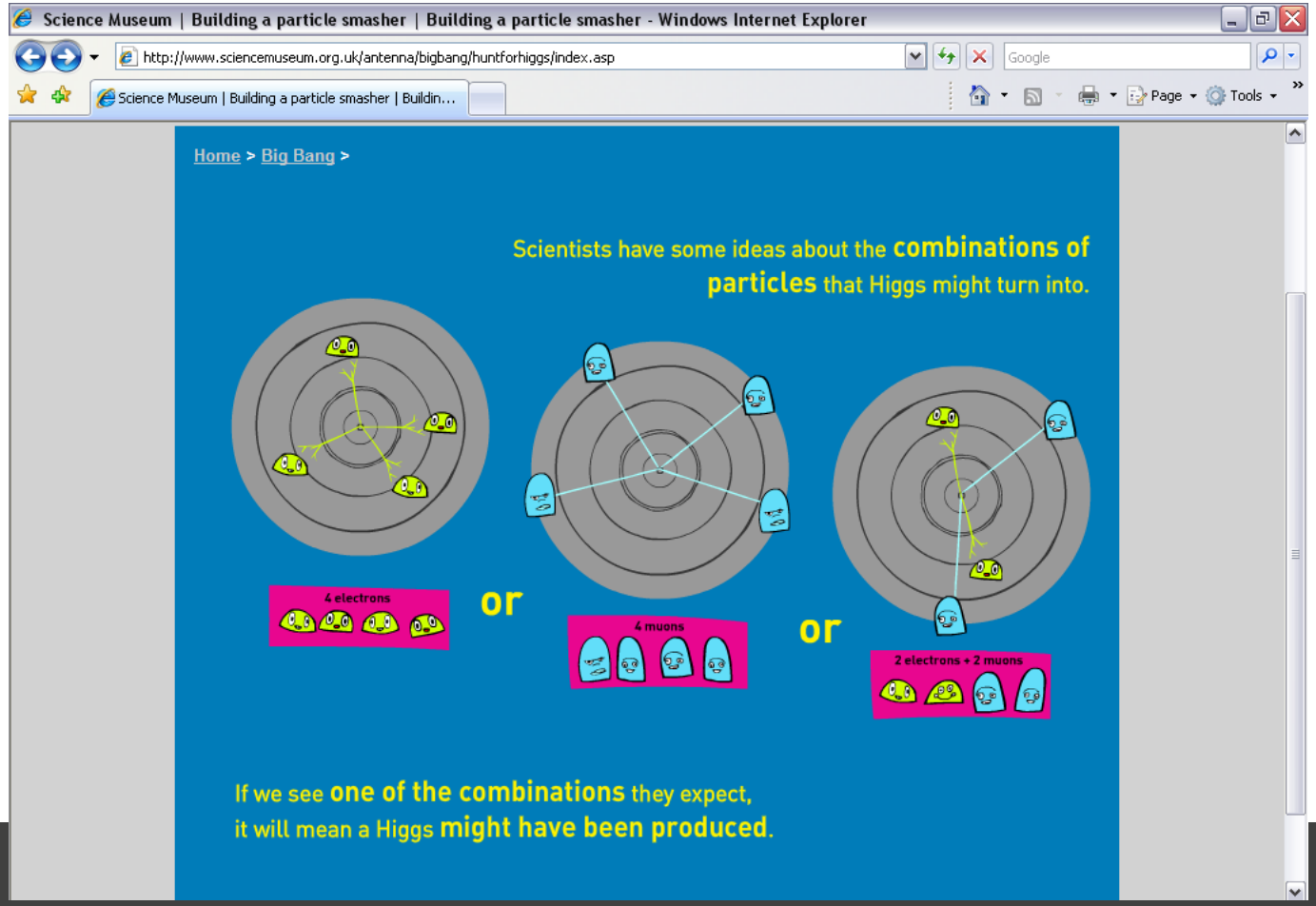
Virtual Labs, Apps and Games



Providing access to advanced research infrastructures

Bringing CERN to your school classroom

For K-6 students



Providing access to advanced research infrastructures

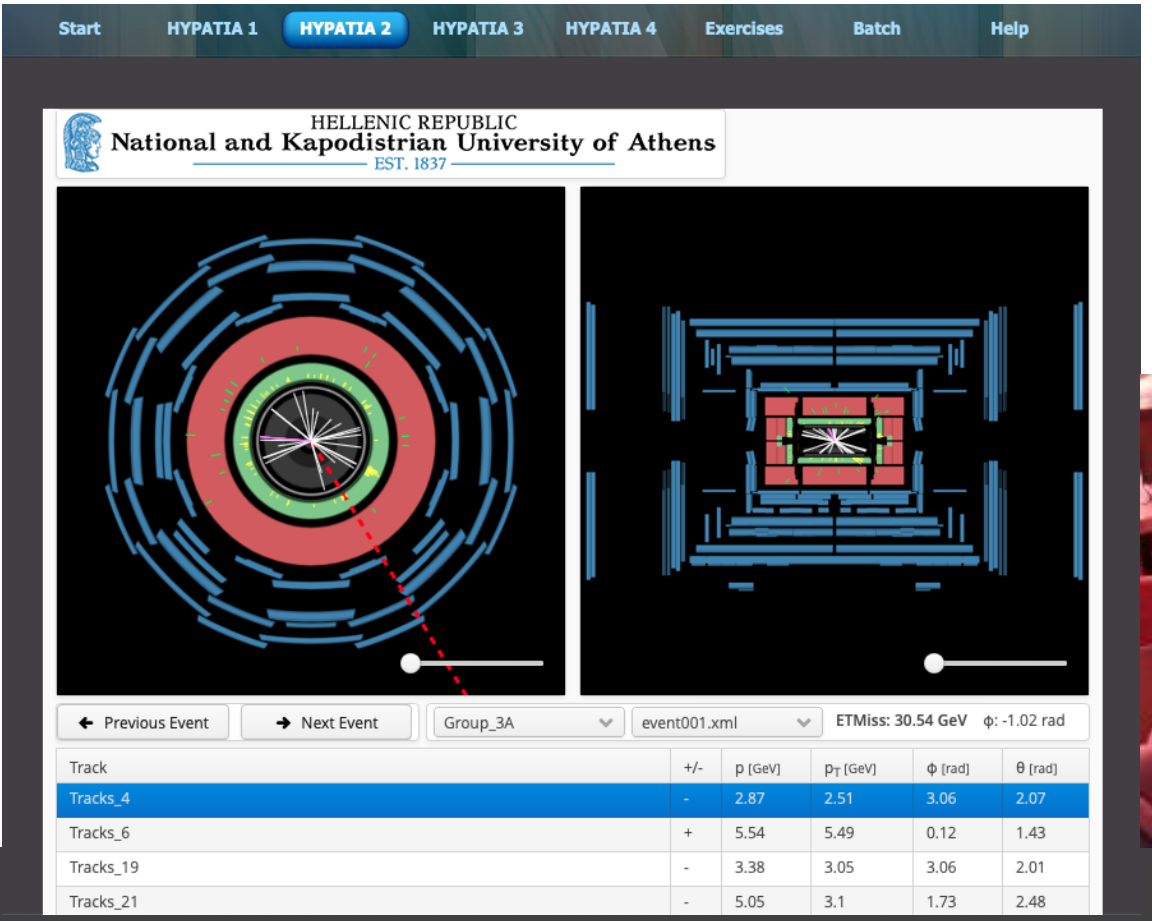
Bringing CERN to your school classroom

For K-6 students

Providing access to advanced research infrastructures

Bringing CERN to your school classroom

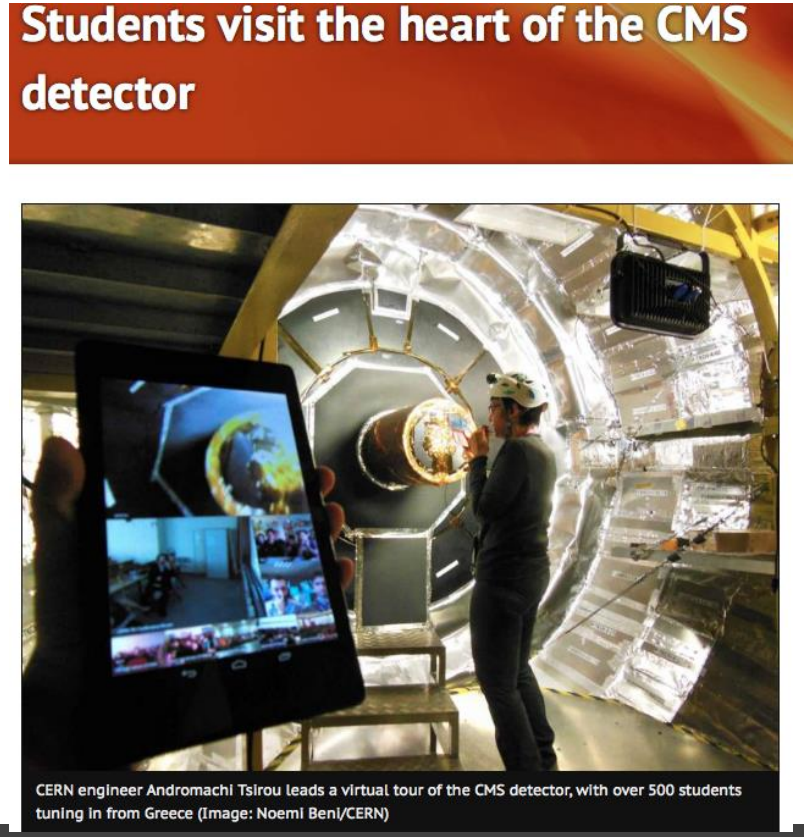
Particle Physics Masterclasses for High-schoolers



Providing access to advanced research infrastructures

Bringing CERN to your school classroom

Virtual Visits to the LHC Experiments at CERN



Providing access to advanced research infrastructures

Bringing CERN to your school classroom

…And Some Success Stories

Η ΚΑΘΗΜΕΡΙΝΗ

Ημερήσια Πολιτική και Οικονομική Εφημερίδα

Έτος 95ο ■ Αρ. φύλλου 28.687 ■ Ιδρυτής: Γ. Α. Βλάχος ΑΘΗΝΑ, ΠΑΡΑΣΚΕΥΗ 4 ΙΟΥΛΙΟΥ 2014 www.kathimerini.gr ■ € 1,00

ΣΗΜΕΡΑ

ΠΡΩΤΕΣ ΔΙΑΚΟΠΕΣ ΡΕΥΜΑΤΟΣ

Αμεση επίταξη στη ΔΕΗ εφόσον κηρυχθεί παράνομη η απεργία

ΕΠΙΚΟΥΡΙΚΟ ΙΟΝΙΚΗΣ - ΛΑΪΚΗΣ

Λουκέτο σε Ταμείο με απόφαση ασφαλισμένων

ΑΛΛΑΓΕΣ ΣΤΟ ΝΟΜΟΣΧΕΔΙΟ

Φυλακή υψίστης ασφαλείας κατ' όνομα

Ανοδος βάσεων σε περιζήτητες σχολές

Διπλασιάστηκε σε σχέση με πέρυσι το ποσοστό αριστούχων με γενικό βαθμό άνω του 18

Διεθνής διάκριση για το Βαρβάκειο στο CERN

Ξεκλείδωσε η δόση του 1 δισ.

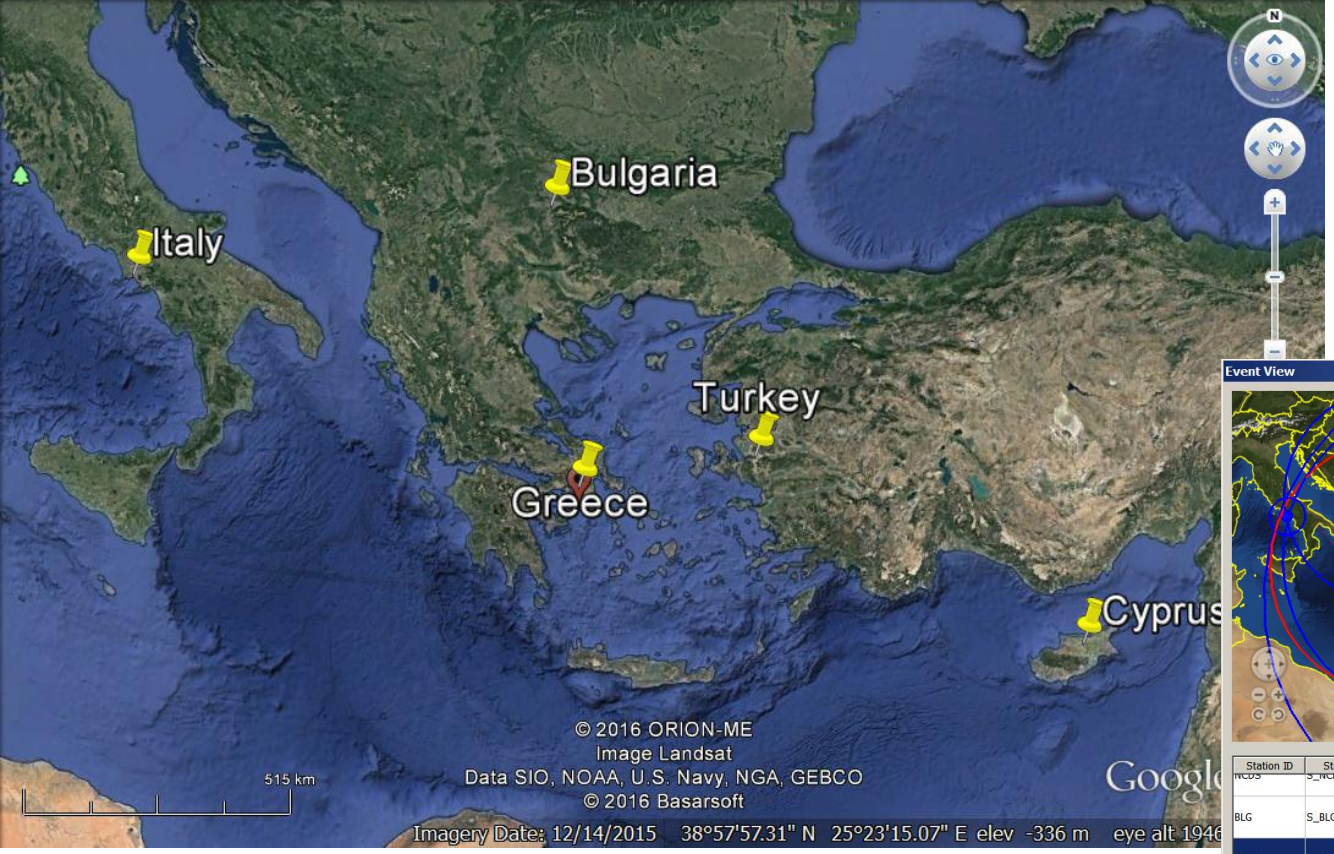
Μετά τα προαπαιτούμενα

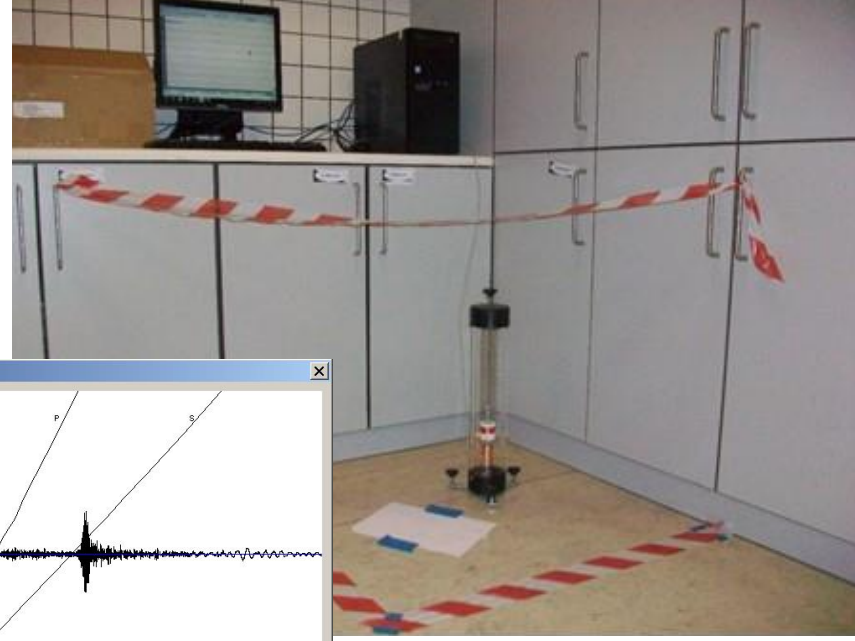
Αύξηση 41% στις πωλήσεις οχημάτων Ι.Χ.

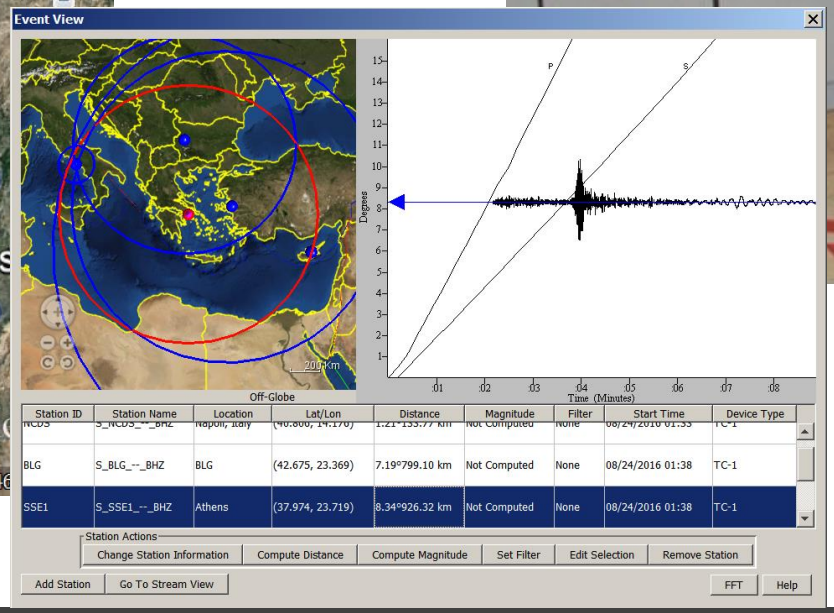
Κατά τον μήνα Ιούνιο

Providing access to advanced research infrastructures

Bringing CERN to your school classroom





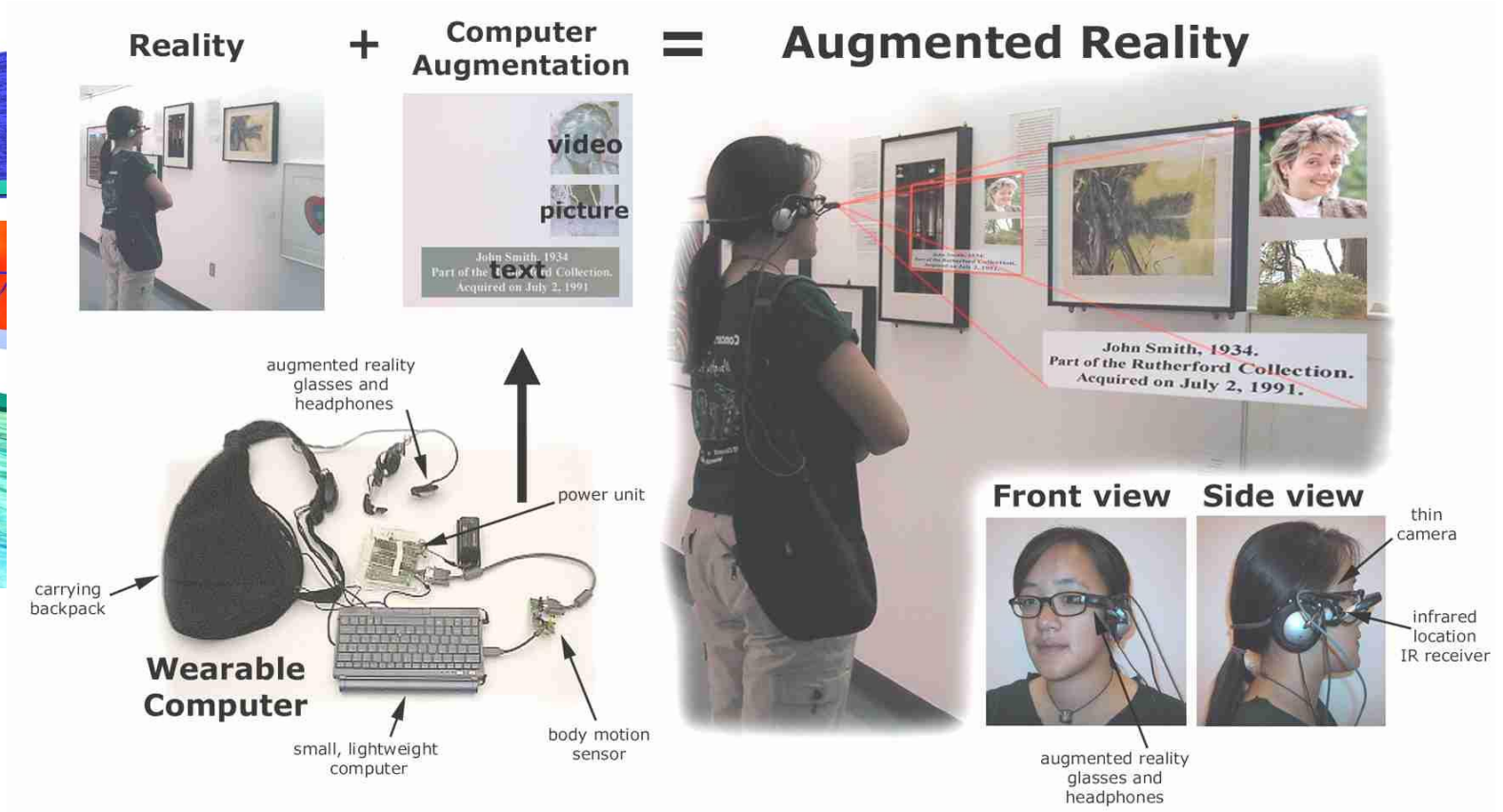


Schools as Research Labs

School Network of Seismometers

Schools as Research Labs

School Network of Seismometers

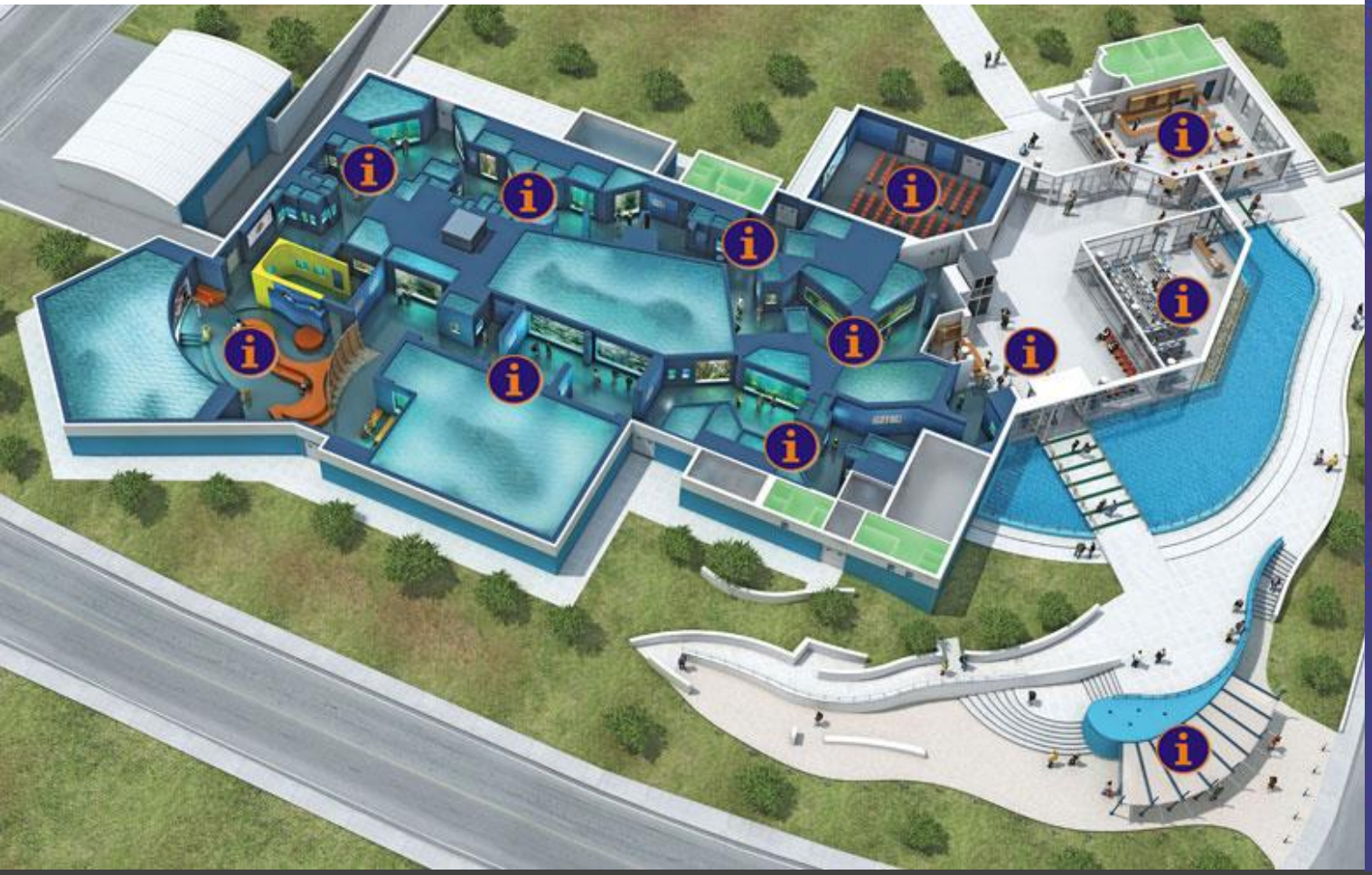


Informal Learning Experiences

Virtual visits and field trips to museums and science centres

Informal Learning Experiences

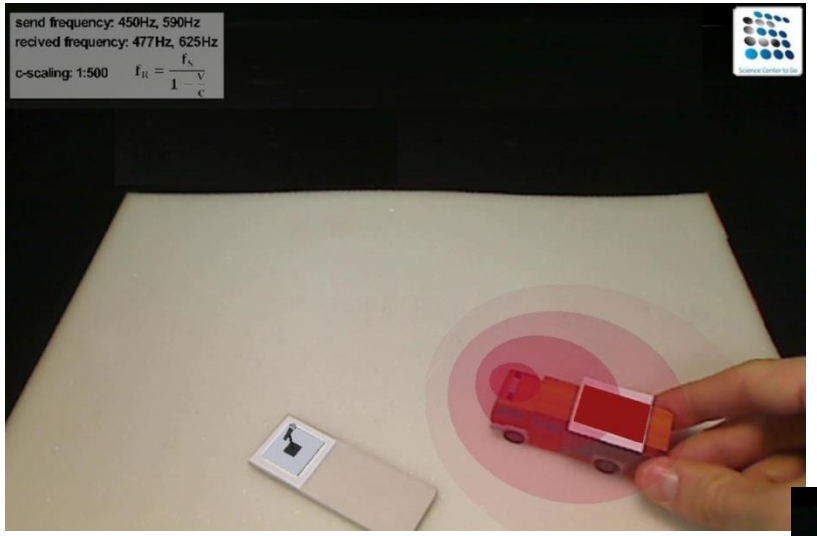
Virtual visits and field trips to museums and science centres

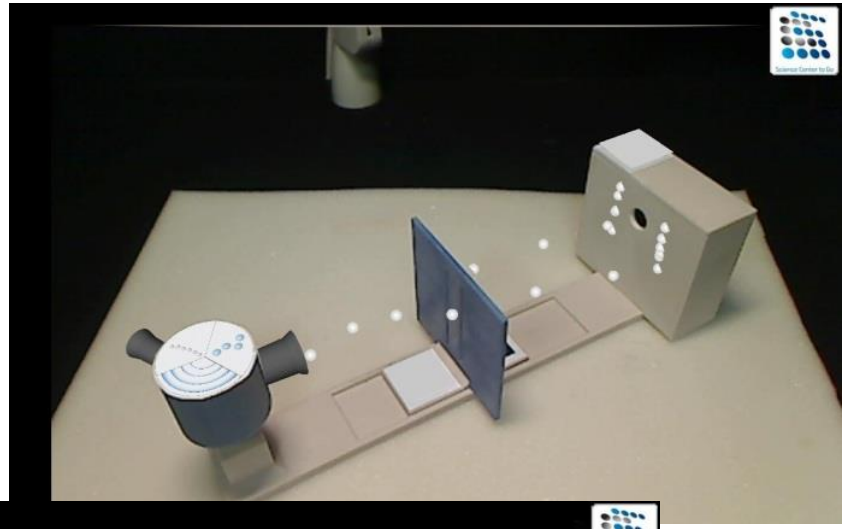


Informal Learning Experiences

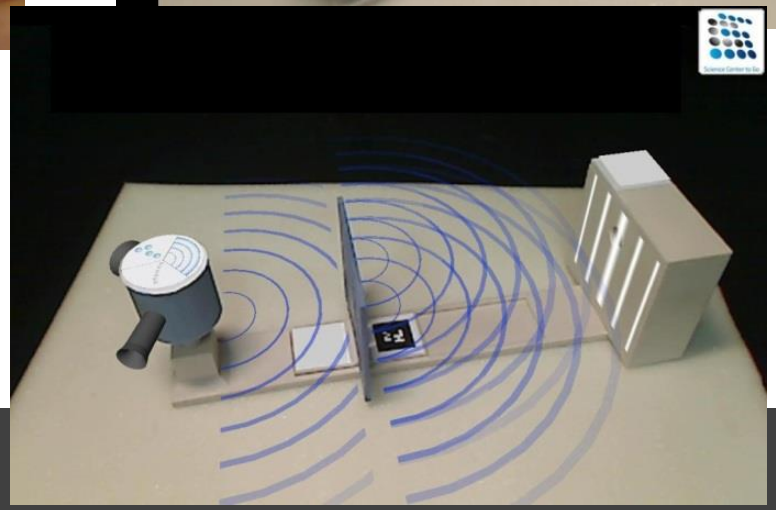
Virtual visits and field trips to museums and science centres

Wave propagation- *Doppler Effect*



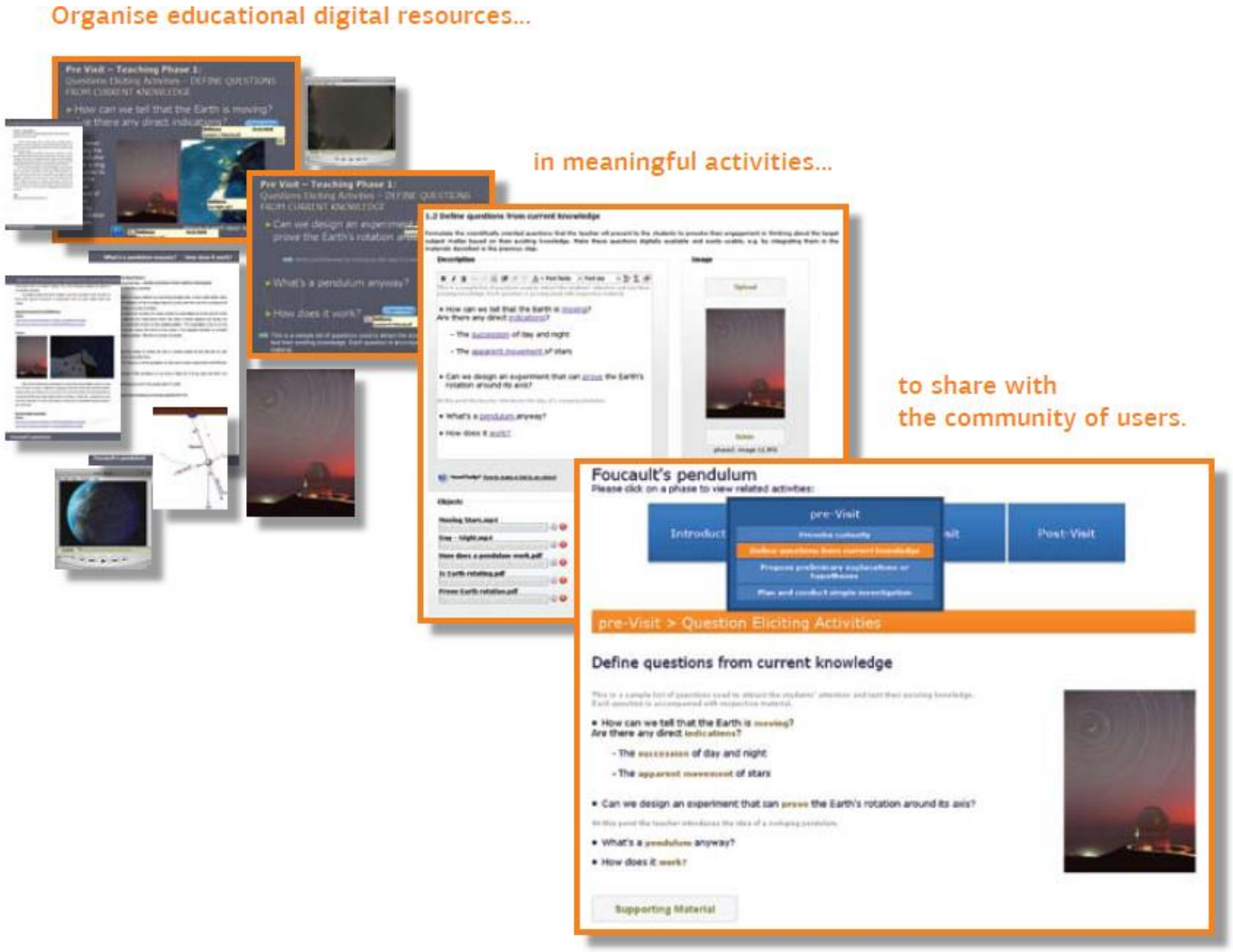


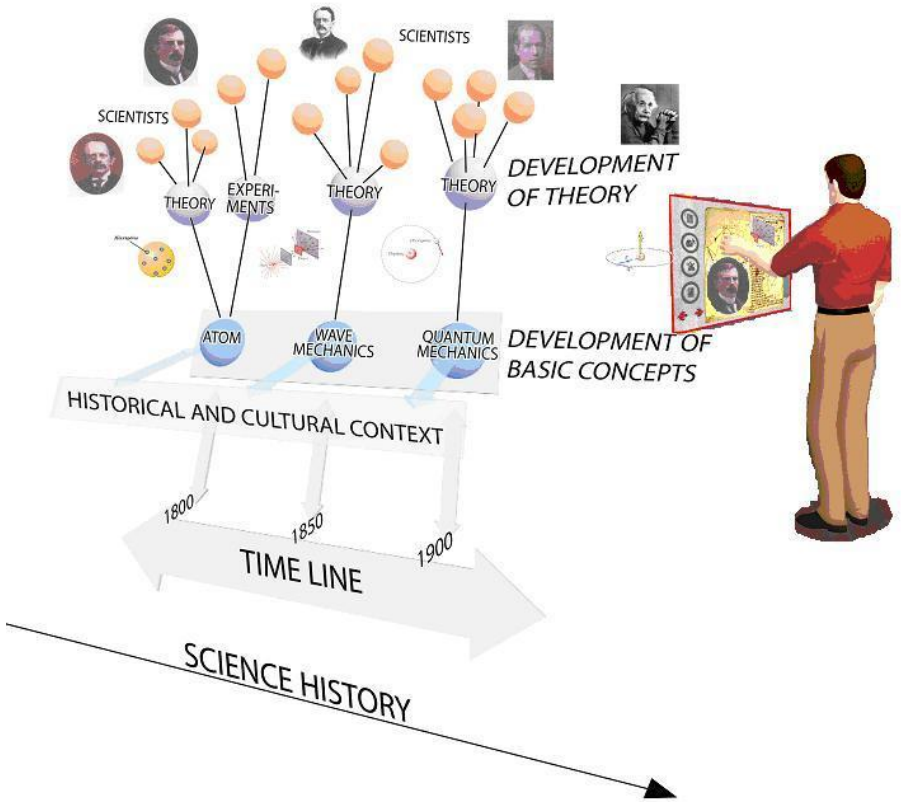
Quantum Physics –
Young's Double Slit Experiment



Informal Learning Experiences

Visualizing the invisible: Science Centre to Go



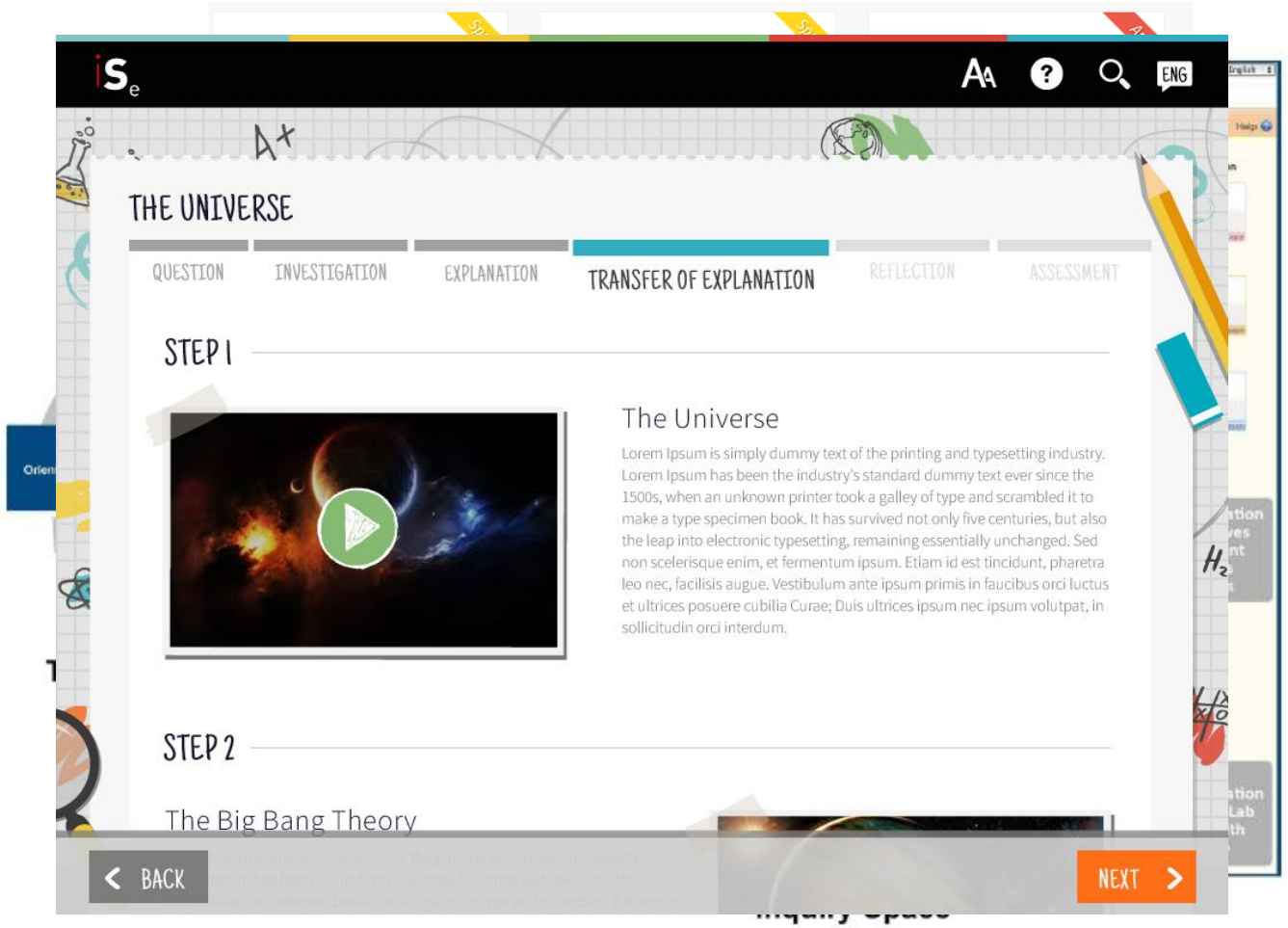


Educational Pathway Authoring Tools

Teachers as Content Creators and Sharers

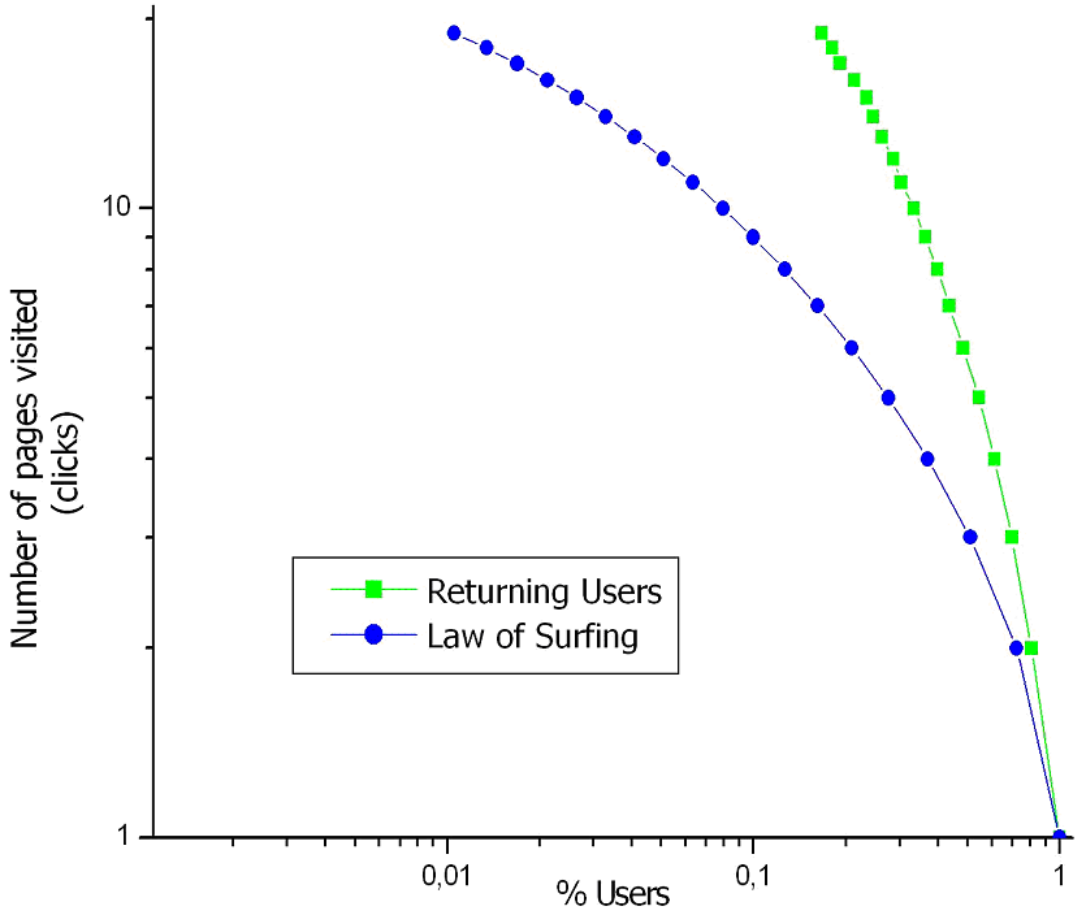
Authoring – Access – Deliver - Assess

- ***Des*** …s and ther…
- ***Deli***
- Coll… …sed on F…



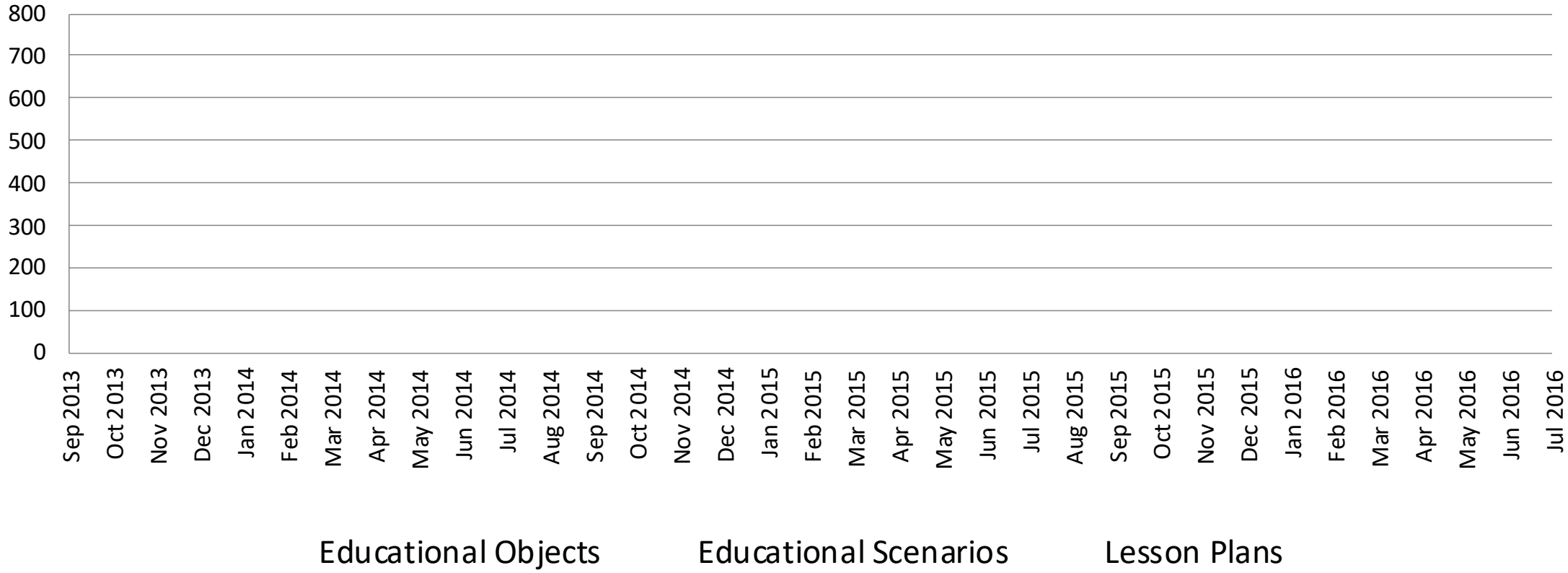
The COSMOS Portal contains user-generated resources (that are uploaded by its users). It has been designed to support a science teacher's search, retrieval and access to both, scientific and educational resources.

(Sotiriou, Bogner & Neofotistos, 2011)



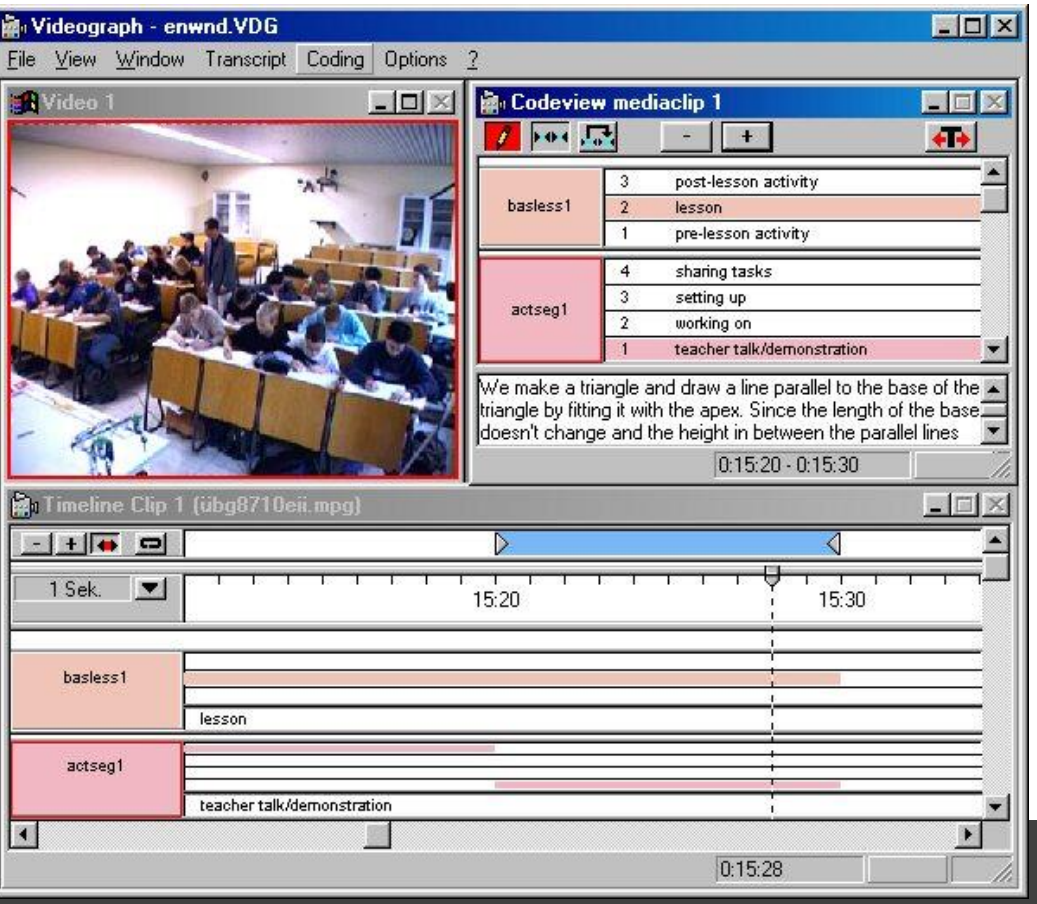
Impact Assessment

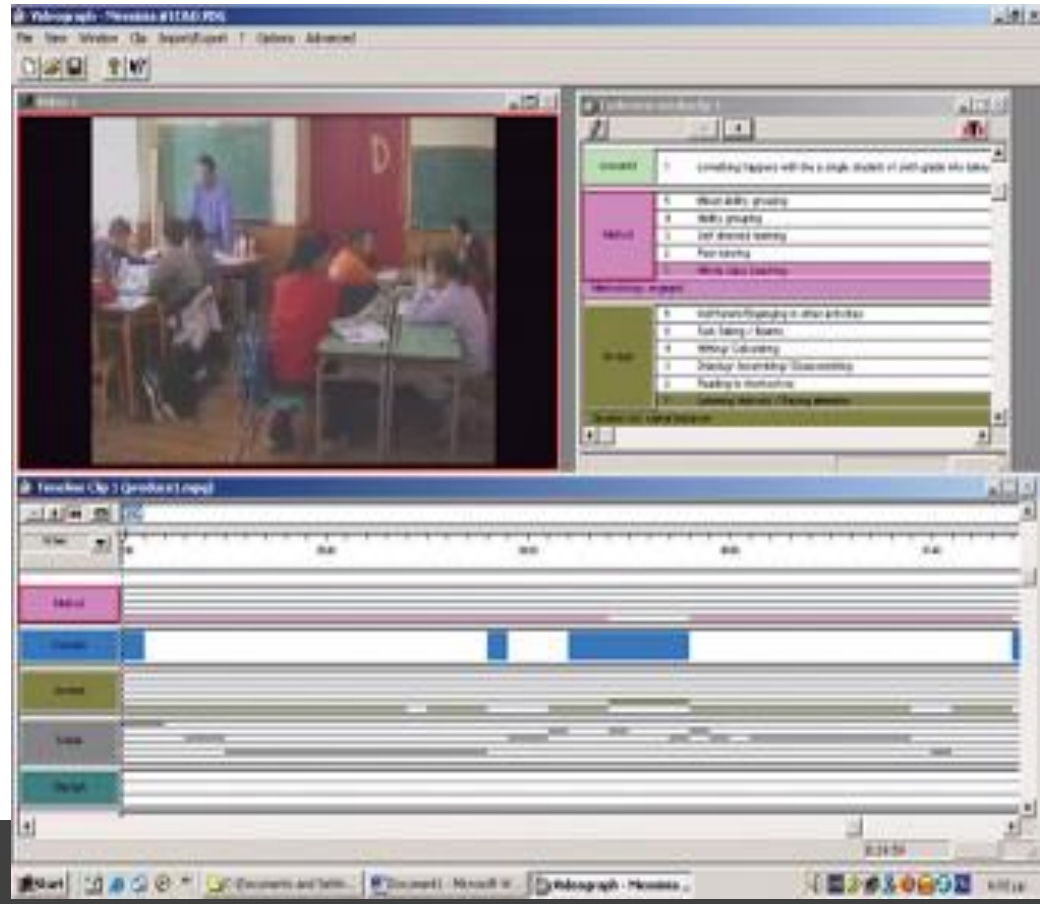
The Case of the COSMOS Portal



Impact Assessment

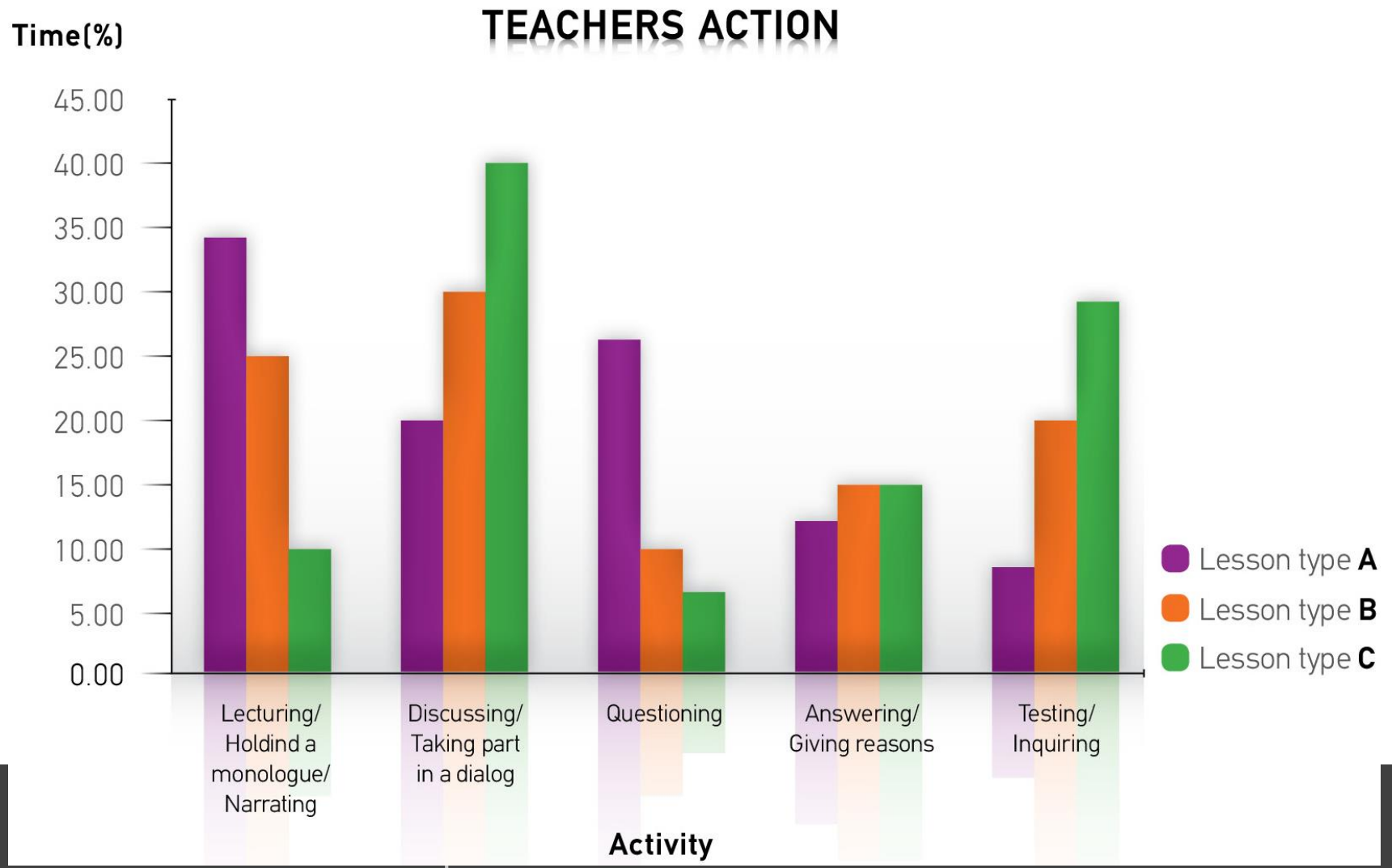
The Case of the ISE Community Portal





Impact Assessment

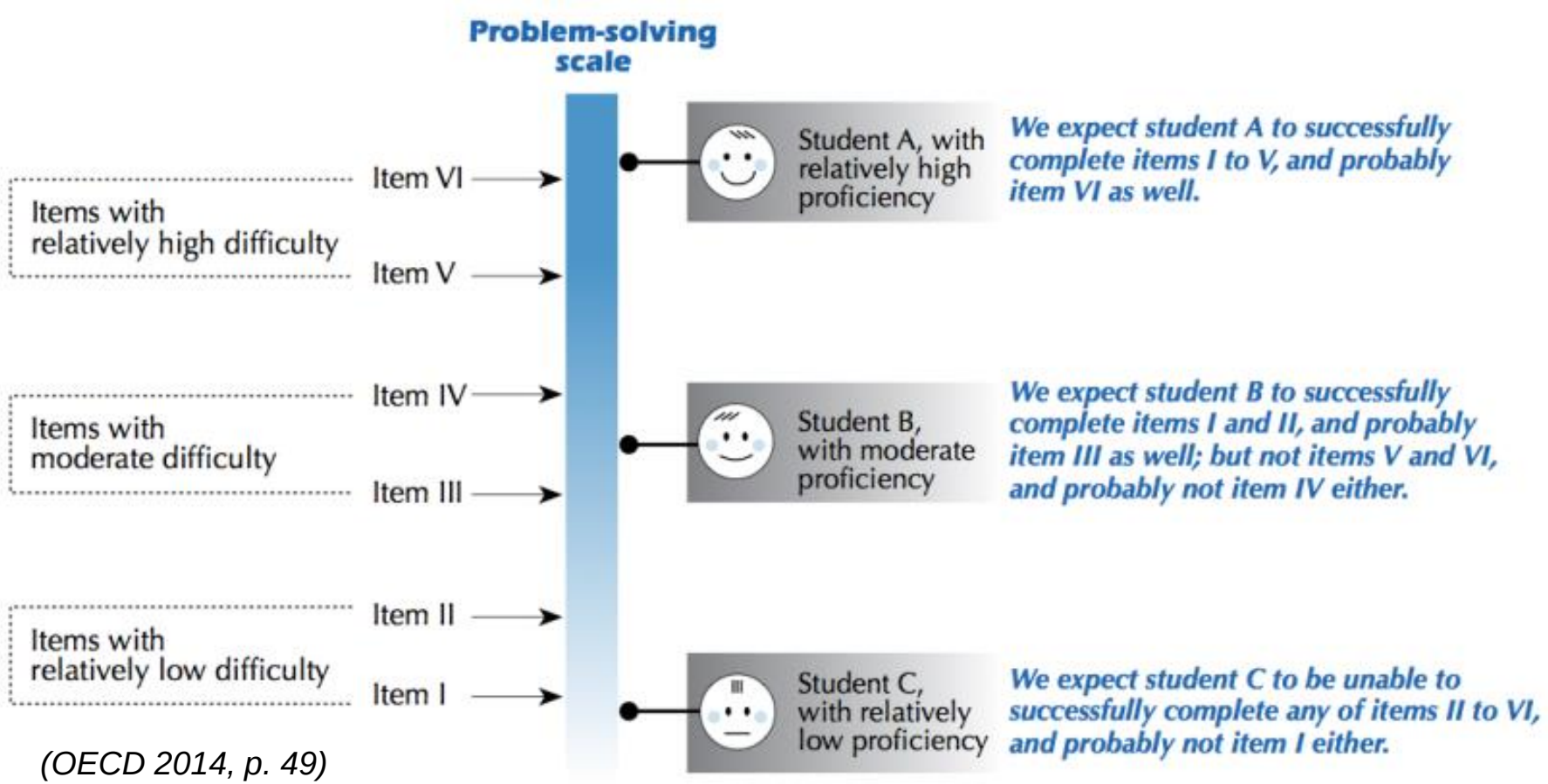
IBSE in Teaching Practice: The Case of the Pathway Project



Impact Assessment

IBSE in Teaching Practice: The Case of the Pathway Project

PISA Problem Solving Framework



(OECD 2014, p. 49)

Impact Assessment

Inquiry-based learning and e-learning: Evidence for improving students' problem-solving competences

Setting:

- 668 implementations in 453 schools across Europe within one school year with the participation of 12,550 students (mean age: 14.5y, gender balanced)
- Teachers were given access to innovative e-learning tools (e.g. virtual labs & games, simulations, AR applications)
- Teachers could use a platform with digital resources tools and were encouraged to adopt the five phases of the inquiry cycle: orientation, hypothesizing, planning, analysis, and conclusion
- An integrated interface for lesson implementation tracked each student's problem-solving competence culminating in about 12,000 datasets
- Every user generated an average of 22 digital inquiry-based digital scenarios, each of which required approximately 50.14 min for completion.

Lazoudis, Sotiriou & Bogner, 2020

Impact Assessment

Inquiry-based learning and e-learning: Evidence for improving students' problem-solving competences

Profile of problem-solving competence for all implementations

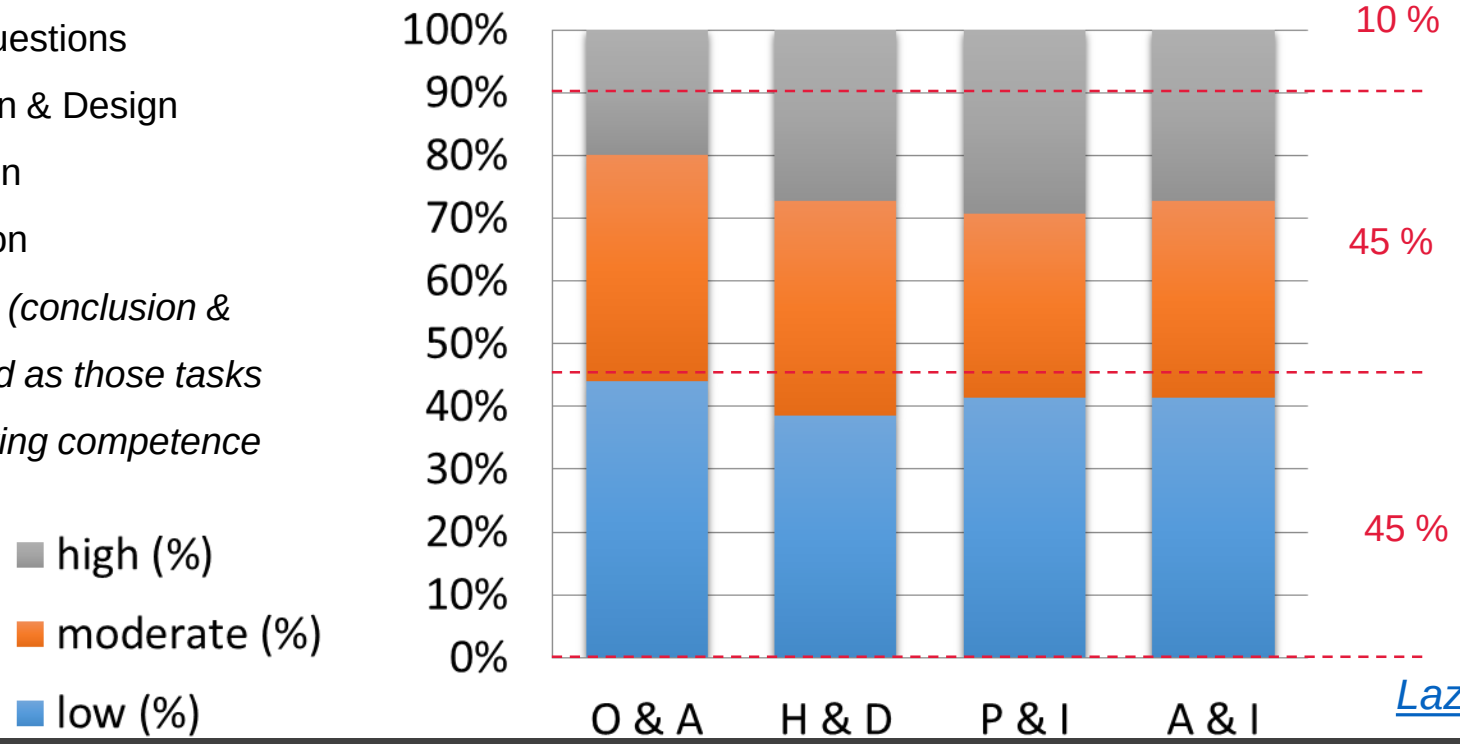
O&A: Orienting & Asking Questions

H&D: Hypothesis Generation & Design

P&I: Planning & Investigation

A&I: Analysis & Interpretation

Note: The last lesson phase (conclusion & interpretation) is not included as those tasks did not involve problem-solving competence



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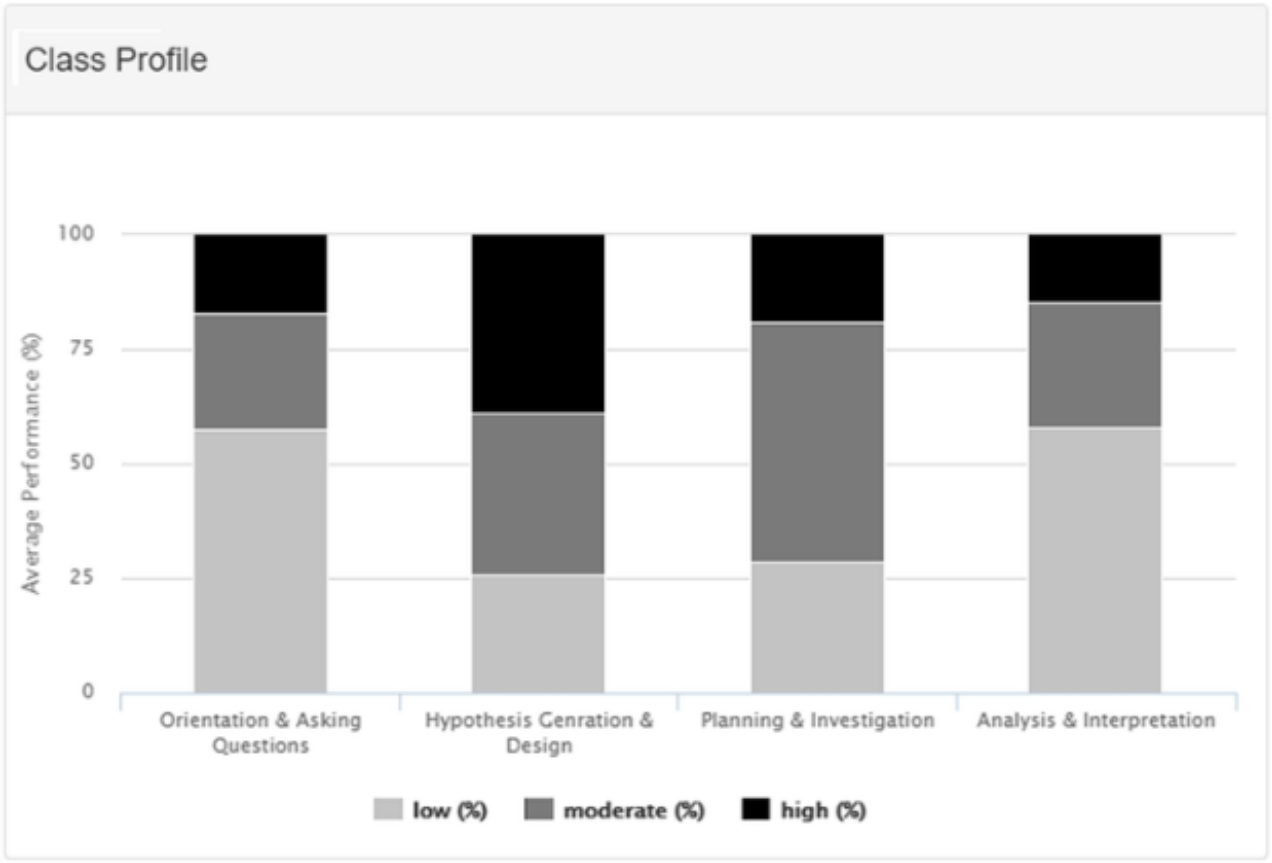

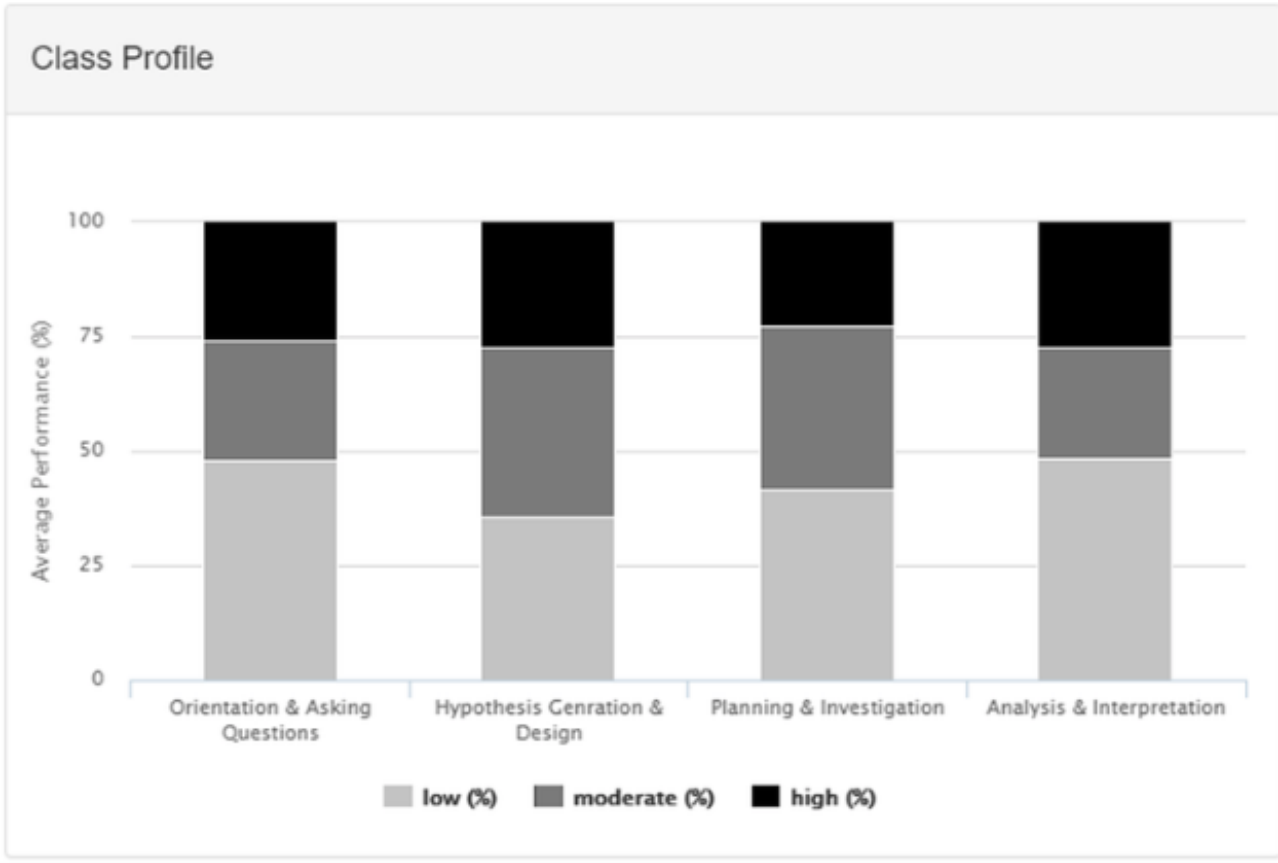

The partial ability achievement rating for different labs demonstrates the sensitivity of the approach on the complexity of the tasks. The students' scores (510 students involved) per phase are presented for a demanding experimental activity (left graph) with high-energy physics (students groups show difficulty in the areas of orientation and analysis, achieving higher scores if involved in the experimental phase) and the comparably simpler recapitulation of the Eratosthenes Experiment (right graph) to estimate Earth's circumference. There, we achieved a more balanced distribution of the students' scores (902 students involved)

Lazoudis, Sotiriou & Bogner, 2020

Impact Assessment

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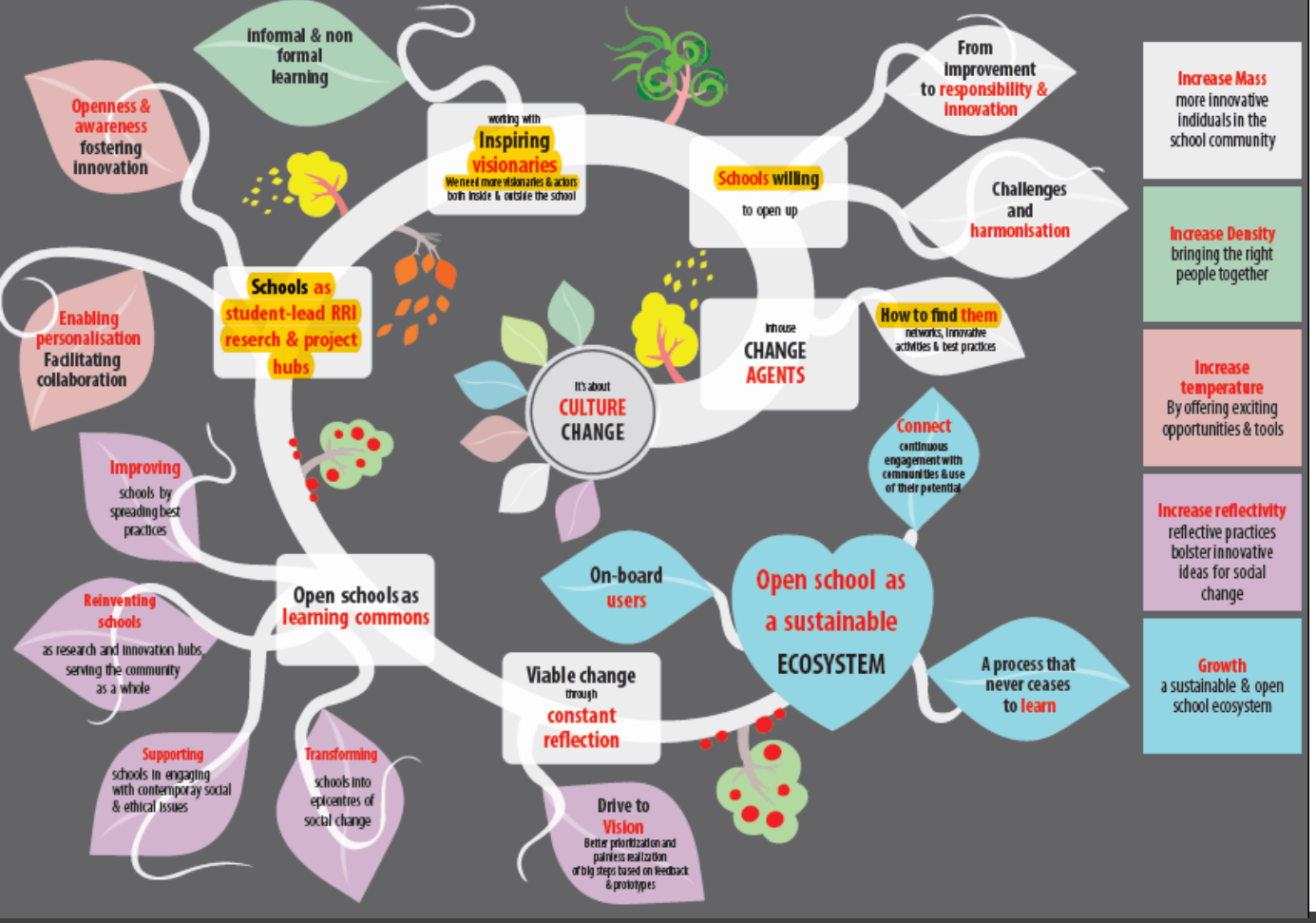

An open school is a more engaging environment for learning and makes a vital contribution to the community:

- Student projects meet real needs in the community outside school and draw upon local expertise and experience.
- Learning in and together with the real world creates more meaning and more motivation for learners and teachers.
- The school environment will foster collaboration, mentoring, and will provide opportunities for learners to understand and interrogate their place in the world.

Open Schools for Open Societies

The Open School Model provides school leaders with a powerful framework that can help them with transformation to an open school.

Σχεδιάζοντας το Σχολείο του Αύριο

16ο Ετήσιο Σεμινάριο της Ερμούπολης για την Κοινωνία της Πληροφορίας και την Οικονομία της Γνώσης
16-18 Ιουλίου 2021

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Thank you!

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