

WRO 2011 in Abu Dhabi and Robotics in the Emirates



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The Emirates

Το κέντρο της Μέσης Ανατολής,
Του Κόλπου και της Ν. Ασίας

Abu Dhabi & Dubai

Πετρέλαιο, Τουρισμός, Υπηρεσίες

Neutrality, Openness, Prosperity

Fast-Developing & Multicultural





The World Robotics Olympiad

Ένας Παγκόσμιος Διαγωνισμός Ρομποτικής για Νέα Παιδιά

Έλαβε χώρα πρώτη φορά το 2004 στην Σιγκαπούρη

Δημοτικό, Γυμνάσιο και Λύκειο

Lego Mindstorms

Κανονική Κατηγορία: assemble robots that can solve a specific problem.

Ανοιχτή Κατηγορία: designs for robots, based on a given theme

So far:

Mainly East Asia – Centered

1000 Teams from 32 countries

What are the key concepts underlying WRO?

I) Ολυμπιακή Ιδέα

1. Olympism is a philosophy of life, exalting and combining in a balanced whole the qualities of **body, will and mind**. Blending sport with culture and education, Olympism seeks to create a way of life based on the joy of effort, the educational value of good example and respect for universal fundamental ethical principles.
2. The goal of Olympism is to place sport at the service of the **harmonious** development of man, with a view to promoting a **peaceful** society concerned with the preservation of **human dignity**.

II) Παιδεία - Μάθηση: Από τον Σωκράτη στον Papert

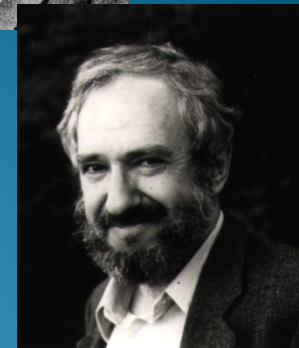
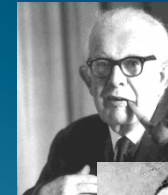
Από την μετάδοση και αποτύπωση της γνώσης,

στην μαιευτική, στον κονστρουκτιβισμό, και στον κονστρουκτιονισμό

III) Ρομποτική: Από τα Αυτόματα και τον Τάλο στα Mindstorms

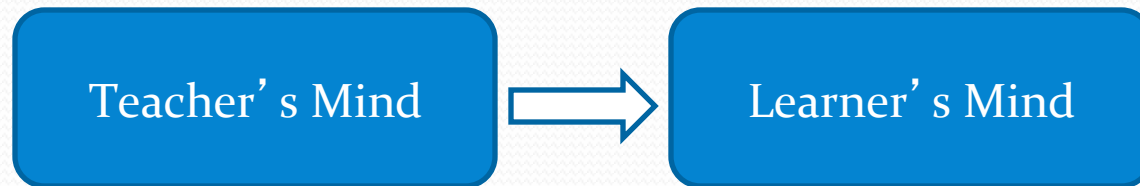
Θεωρίες της Μάθησης

The Middle East,
Transmission Model,
Platonic Recollection,
Constructivism,
Social Constructivism,
Constructionism...



Unfortunately, currently: Main pedagogy in the Middle East

ΑΠΛΗ ΑΠΟΜΝΗΜΟΝΕΥΣΗ!



Words ~ Knowledge Flow

Underlying theory of learning:

The Good Old Transmission Model – “Wax” imprinting on Learner’s Mind...

Resulting Pedagogy: Uni-directional lectures to Passive Learners....

Quite sad, given the ancient traditions of learning in the region!

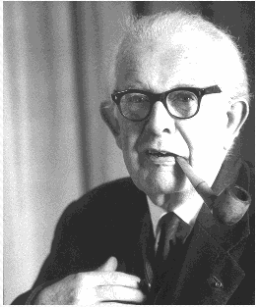
Socrates and the “Midwife Method”, & Platonic Recollection

“His role, he claims, is more properly to be understood as analogous to a **midwife (μαῖα maia)**. Socrates explains that he is himself barren of theories, but **knows how to bring the theories of others to birth** and determine whether they are worthy or mere "wind eggs" (άνεμιαῖον anemiaion). Perhaps significantly, he points out that midwives are barren due to age, and women who have never given birth are unable to become midwives; a truly barren woman would have no experience or knowledge of birth and would be unable to separate the worthy infants from those that should be left on the hillside to be exposed. To judge this, the midwife must have experience and knowledge of what she is judging”

“Socrates' response is to develop his theory of **anamnesis (recollection)**. He suggests that the soul is immortal, and repeatedly incarnated; knowledge is actually in the soul from eternity (86b), but each time the soul is incarnated its **knowledge is forgotten in the shock of birth**. What one perceives to be learning, then, is actually the recovery of what one has forgotten. (Once it has been brought back it is true belief, to be turned into genuine knowledge by understanding.) ...Socrates sees himself, **not as a teacher, but as a midwife, aiding with the birth of knowledge that was already there in the student.**”

Constructivism

Jean Piaget (1896-1980)



Cognitive Development and Stages

Constructivist Learning:

Knowledge as not being something that is to be transmitted; but rather, which is **constructed** within the learner's mind

Pedagogy: the teacher is no more a transmitter of knowledge; but rather, a **facilitator**, enabling educational experiences for knowledge construction within the student's mind by appropriate **scaffolding** – to active learners!

Social Constructivism

Lev Vygotsky (1896-1934)



Shared Knowledge, Cultural Mediation,
Zone of Proximal Development...

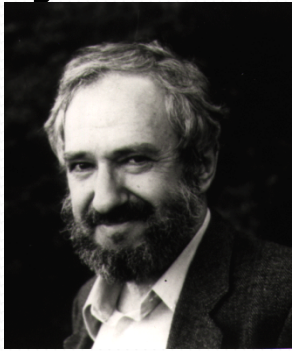
Social Constructivist Learning:

It is within the **group**, and not just the individual mind, where knowledge is constructed.

Pedagogy: creation of small groups, and facilitation of appropriate activities for knowledge construction. Within-group discussion, demonstration and co-facilitation is highly encouraged.

Constructionism

Seymour Papert (1928-) MIT Media Lab

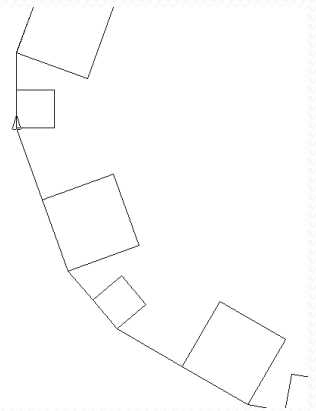


Constructionist Learning:

...Holds that learning can happen most effectively when people are also active in **making tangible objects** in the real world. In this sense, constructionism is connected with experiential learning

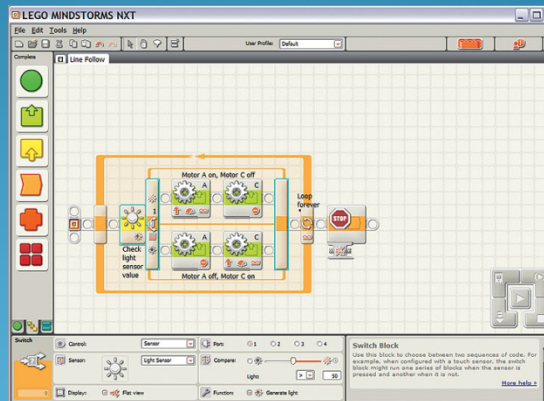
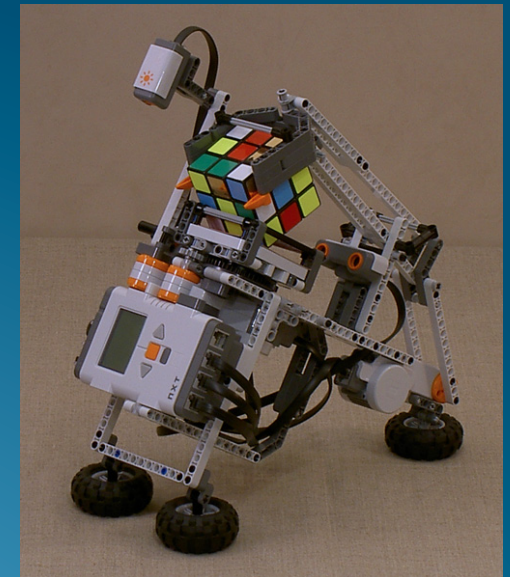
Pedagogy: See for example,

Papert's LOGO, or LEGO Mindstorms!



Origins,
Hardware,
Software,
Potential for Education

LEGO Mindstorms



Origins of Mindstorms

MIT Media Lab Programmable Brick Robotics Invention System (1998)



Mindstorms NXT (2006)



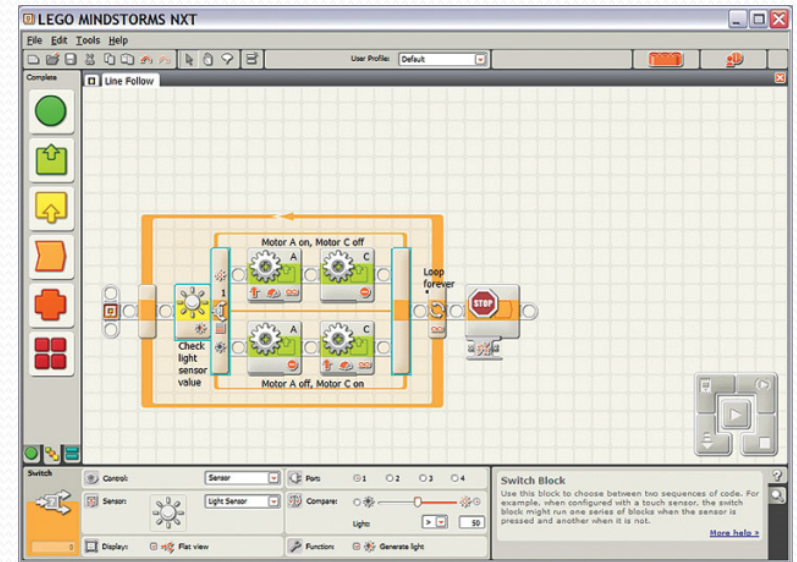
A closer look

Sensors:

Ultrasound, Sound, Light, Touch

Actuators:

Three, with encoders



NXT-G:

Graphical, Blocks-Based Language

Loops, Variables, SuperBlocks...

Great to learn programming!

Compare with Scratch

Great Constructionist Education for:

Not only Programming & Robotics, but:

Existing literature:

**Used to teach: AI, computer engineering, control theory, mechatronics, CS,
all the way to precision agriculture.**

Educational levels: from high-school to graduate,

Locations of course delivery have been reported: US, Japan, Europe...

But much more:

World Robotics Olympiad, First Lego League... Primary to Secondary to Elderly...

**And: Business Simulation Exercises / Project
Mgmt / Leadership... ...all the way down to
Psychology/Philosophy/Arts!**



مجلس أبوظبي للتعليم

Abu Dhabi Education Council



WRO 2011 in Abu Dhabi



Bid presented & won in WRO 2009 Korea (Moscow, Jakarta)

Not just an event, it is a key milestone in Abu Dhabi's long commitment to excellence in education and technology

More than 1000 students from 40 countries expected

Event will take place at ADNEC, a leading exhibition center

Cheap Flight Access & Hotel Capacity

Movement of Epicenter from Far East to the Middle East

Opportunities for Greece and Europe



مجلس أبوظبي للتعليم
Abu Dhabi Education Council



Preparations for WRO 2011



National Olympiad 2009: 31 teams from Emirates

WRO 2009: 15 students and four teachers went to Korea

Introducing Regional WRO Arabia in 2011

More than 2000 Mindstorms Kits to schools

Training for teachers: 7 workshops, 400 trained

Teachers will be training students during their leisure time and integrated classroom activities

Response of students overwhelming!



Robotics in the Emirates

Beginnings: Al Jazzari

Current Efforts / Teams:

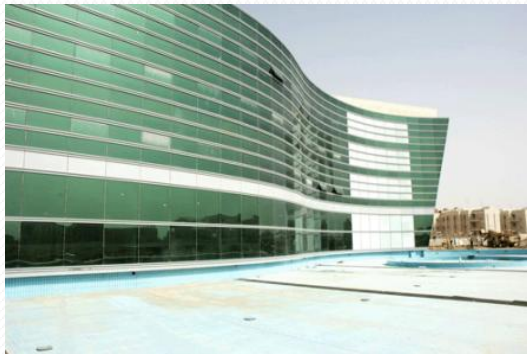
UAEU: Interactive Robots and Media Lab

Kustar: Search & Rescue Robotics, Lakmal

MASDAR: Jake Crandall / Human-Robot Teams

Entrepreneurship

An hours drive from Dubai:
(An important center of ME/SE Asia)



United Arab Emirates University (UAEU)
No.2 in Research in the Arab World

Challenges of Academia in the Middle East
...decided to create the first Interactive Robots Lab in the region!

IRML



Interactive Robots and Media Laboratory

Where Robots, Humans, and Virtual Characters Live Together!



Since 2008

Major Projects:

“FaceBots” Microsoft seed fund award HRI CFP

“IbnSina” Arabic-Spk Humanoid & Interactive Theater



Student Projects, Summer Schools (!), UAE Cognitive Science Society...

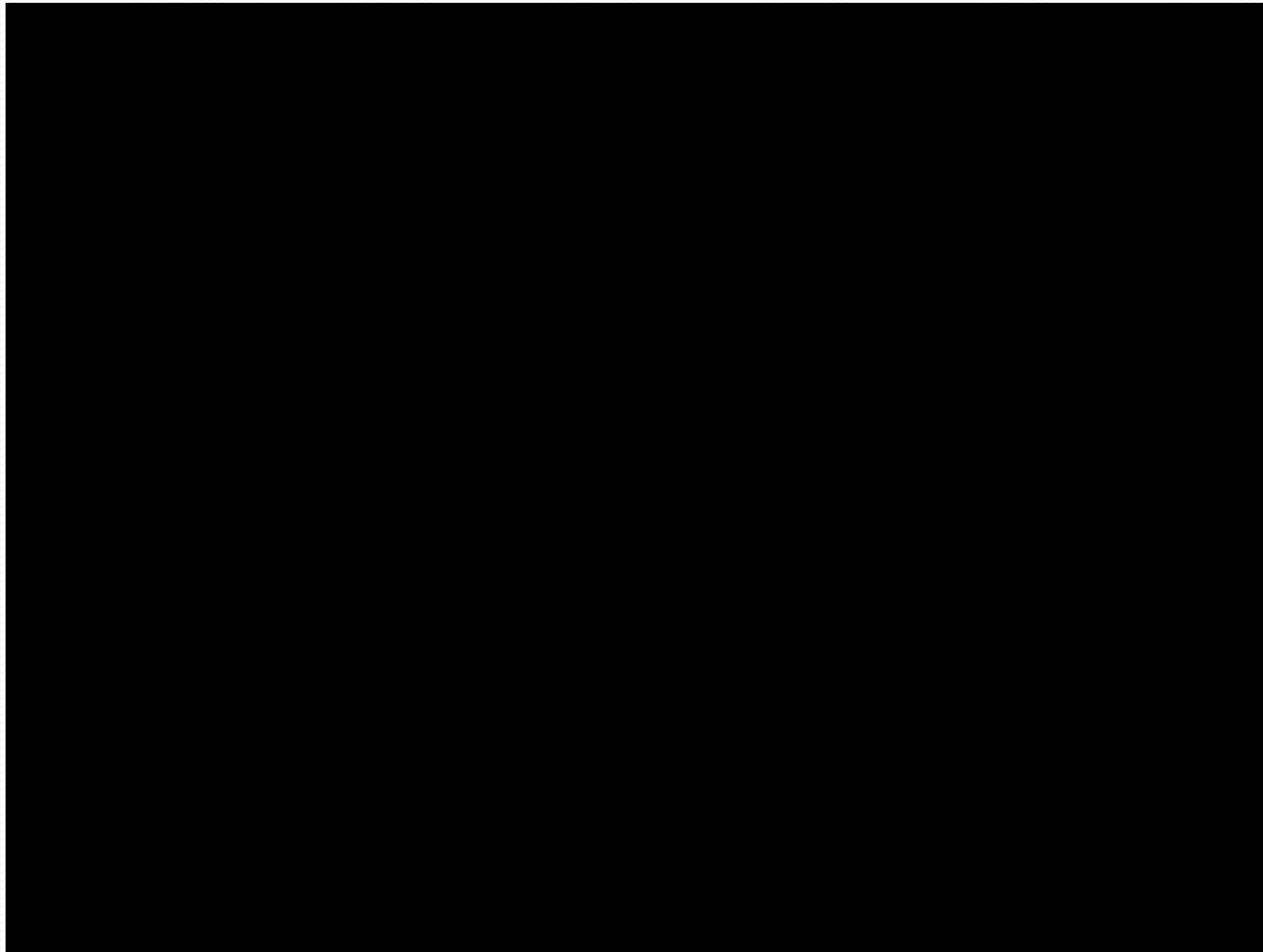


FACEBOTS:
SOCIAL ROBOTS UTILIZING FACEBOOK

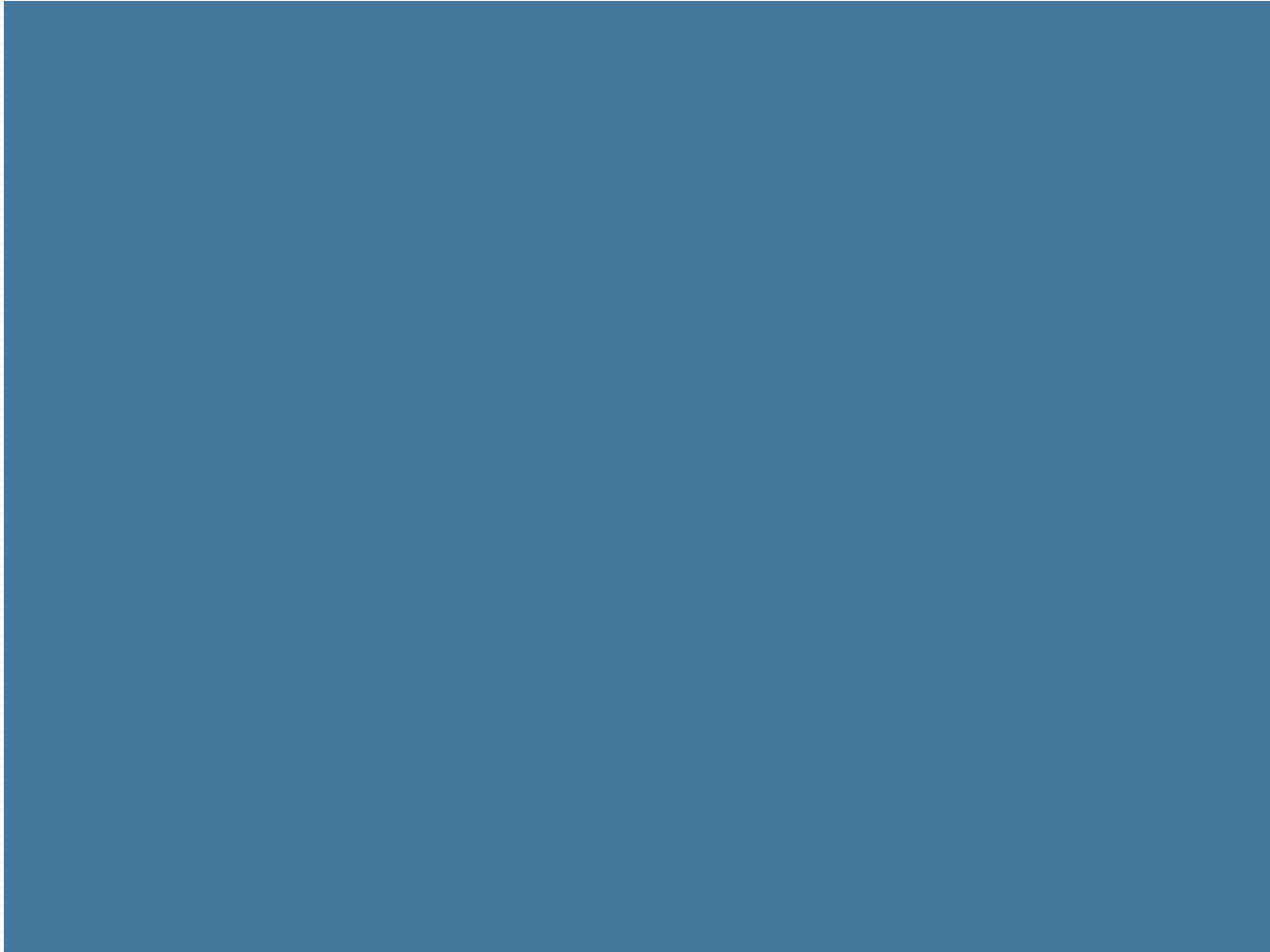
Nikolaos Mavridis, Shervin Emami, Chandan Datta, et. al.

Interactive Robots and Media Lab
United Arab Emirates University

IbnSina on TV around the world



IRML's Robotic Teleoperation



In Conclusion

We have talked about:

The Emirates

Οι βασικές ιδέες που οδηγούν στο WRO

Θεωρίες της Μάθησης και Κονστρακτιονισμός

Media Lab και Lego Mindstorms

WRO₂₀₁₁ in Abu Dhabi – Preparations

Robotics in the Emirates

In short:

A wonderful opportunity for Greece! WRO πιο κοντά στην χώρα μας – Μεγαλύτερη Συμμετοχή κ Δυνατότητες Συνεργασίας!

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