ALaDDIn @ Unimi

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ALaDDIn: Who we are

Since 2008 a multi-brain group...without any ‘head’: we like to see Aladdin as a true collective enterprise. People involved in the labs with schools:

- Carlo Bellettini
- Violetta Lonati
- Dario Malchiodi
- Mattia Monga
- Anna Morpurgo
- Massimo Santini

But we are indeed a galaxy of people inside our Computer Science Department (one of the biggest in Italy). These deserve an explicit mention:

- Paolo Boldi
- Alfio Ferrara
- Mauro Torelli
So many friends to thank...

- Angelo Lissoni, who set us off...
- Fabrizio Carimati, Lorenzo Repetto, Antonio Dini, our main “external” collaborators;
- the many Bachelor, Master, and PhD students participating to our projects;
- the Department of Computer Science, for its support;
- ...
Once upon a time... 

Angelo Lissoni, Kangourou Italia: a contest to popularize math (started in 1991), \(\approx 50K\) participants in Italy, 6M in the world.

- In 2007 he started the Kangourou of English (as a second language)
- Proposed to our department to organize a Kangourou of... ECDL!!! (European Computer Driving Licence)
- In fact, in those years some departments (even in scientific areas) of our University wanted to quit informatics courses, substituting them with ECDL!
- An opportunity: Start a Kangourou of informatics to popularize that informatics \(\neq\) ECDL
**ALaDDIn: Laboratory for Dissemination and Didactics of INformatics**

- Popularization of informatics as a science
- Teaching of informatics (not computer skills!) in K-12
We organized 7 editions of the Kangourou of Informatics (two rounds, residential final game paid by participation fees), but in 2015 we decided to fully adopt the Bebras model (no participation fees).

- ‘Kangourou of Informatics’ had ≈2700 participants
- 2015: 3269 teams, ≈13K pupils from 4th grade to 13th
- 2016: registration closes Nov 1, already 14580 registered
- Italian peculiarity: participation is by teams of four, since we believe team work is a key skill, useful also to spread informatics to less attracted people
General audience popularization

- A radio broadcasting, with podcasts (still available) http://digitoergosum.unimi.it/
- INFOCULT, a workshop aimed at gathering together researchers and teachers interested in changing the way informatics is presented in schools, Gargnano, 2011
- Lectures at the Museo Nazionale della Scienza e della Tecnologia, Milano, 2015, 2016
- A book on ‘Turing’ distributed with one of the major Italian newspapers (Corriere della Sera, in press)
Informatics in non-vocational schools

Soon our main effort shifted on changing how informatics is presented in K-12 schools.

- We didn’t want to rely on traditional lectures: we started studying Papert, Ben-Ari, Computer Science Unplugged,… ⇝ Experiential Learning Theory and Problem based learning
- Very important for us: shift from a device/application centered computer literacy to “informatics as a science” ⇝ algomotricity
- We started workshops for schools: ≈ 3000 pupils, 2011-2016
Algomotricity

Pupils are exposed to an informatic concept/process by playful activities, which imply a mix of tangible and abstract object manipulations: they can investigate it firsthand, make hypotheses that can then be tested in a guided context during the activity, and eventually construct viable mental models.

Role of computers and apps

The computer is never a starting point, but all activities end with a computer-based phase in which participants use specific software tools that we have developed.

Context is key

Problem based learning: no aspirine without headache!
Informatics as ‘Automated Processing of Information’

Informatics as a **science**, focus on **automated processing of information**.

**information**  What is information? How can symbols/numbers be used to represent it?

**processing**  How can information be manipulated/changed in order to produce new knowledge?

**automation**  Which manipulations can be performed by a *mechanical* interpreter? How can this be done?
Information

Bitmaps, sampling, resolution, information compression...
(Meta)-Information

From marking text with objects to mark-up languages
Wikipasta

(Meta)-Information

From marking text with objects to mark-up languages
(Meta)-Information

From marking text with objects to mark-up languages
Automated processing (programming)

Introducing sequence, selection, and iteration: from guiding a blindfold classmate to programming with scratch
Greedy informatics

Processing (algorithms)

What do the problem of giving change and that of scheduling events have in common?
Recursion

Blind-delegation, self-similarity, base-case: it’s recursion!
Teacher training

Given the success of the workshops, we started to disseminate them to teachers.

- Workshops for teachers
- Formal pre-service training (known as TFA in Italy): three editions since 2012.
- Since 2014 we teach one of the few courses about “Teaching of informatics” in a university curriculum (master level)
- ‘#Digit-iscol@’ Sardinian project for training local teachers (all school levels) about extra-curricular programming activities
Thank you for your attention!

http://aladdin.di.unimi.it