

Teaching informatics for fun and profit

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- Informatics is fun, but only few discover it in schools!
- Informatics as a science: a formative discipline
- Algomotricity - our proposal for schools
- Some workshops we propose

... but only few discover it in schools!

- informatics == computer/applications literacy
- learn it because it helps you in finding a job
- the fun is normally associated to specific entertaining uses of computers (games, social networks, etc), not the discipline and its challenges

Instead, we know it's fun:

"I think that it's extraordinarily important that we in computer science keep fun in computing. When it started out, it was an awful lot of fun." [Alan Perlis]

How to show it to young people?

Why misperceived?

Main problem: What is the role of computers (and applications) in informatics (computer science)?

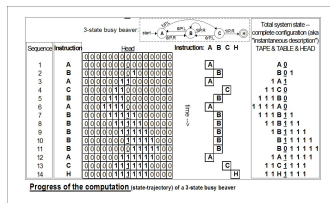
“Computer science is no more about computers than astronomy is about telescopes.” [Dijkstra, 1986]

“The term computer science is as descriptive as the etymology of the word geometry” [Abelson, 1987]

Among experts the answer is rather clear: computer science is not (or not only) the science of computers, but rather the science of computing (for this reason the name Informatics is preferred, at least in Europe).

In fact, **informatics** is a **multi-faceted discipline** seen in three radically different ways when taught in school:

- 1 as a **science**, with its own peculiar approach to problem solving



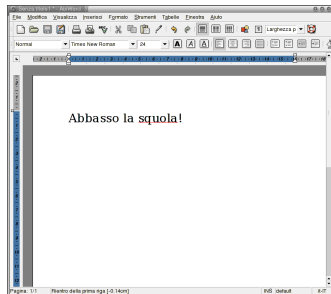
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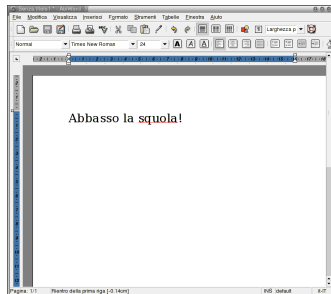
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But the general public has a **reductive perception of informatics as the mere ability to master a set of applications or communication tools!**



By neglecting the 'science and technology' facet we lose the most intellectual fertile part of informatics!

What can be done?

A cultural battle is due

Expose children to...

... computers



... computing



We must show the computational core of informatics to children!

We actually believe informatics is a very formative discipline, not just for a specialist audience.

- abstraction
- algorithmic thinking and structured problem solving
- modularity
- formal languages (unambiguous description of objects and procedures)
- representation of information
- computation with constraints on the resources (time and space)
- learn about how we learn (S. Papert)

Algomotricity - our proposal to schools

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means to perform or implement an informatic process by physical (kynesthetic / tactile) activities using some form of **dramatization**.

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Computers and software tools should be of secondary importance, but the conceptual link with them should be clear.

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Background: allosteric learning

- the direct transmission of knowledge should be kept to a minimum,
- pupils should be lead to reconsider their *mental models* by discovering concepts autonomously.

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The cognitive process:

- 1 the physical activity focus on the informatic process considered
- 2 the process is repeated, generalized and analyzed by pencil and paper
- 3 the relation with computer is clarified by an experimental activity through the use of specifically conceived software.

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1: A first approach
in the lab



2: Dramatization



4: Back in the lab

3: Build mental models
through games

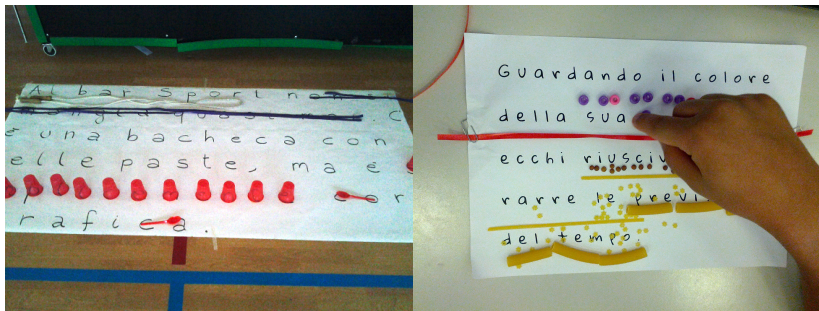


Some workshops we propose

- A set of extra-curricular activities was first proposed to 15-16 year old students in a secondary school.
- The same activity was subsequently carried out autonomously by a math teacher in another school, but with younger pupils (11 year old), with good results.
- This experience fostered the creation of 2-hours workshops which are achieving a good success (about 30 classes involved, 10-16 year old students).

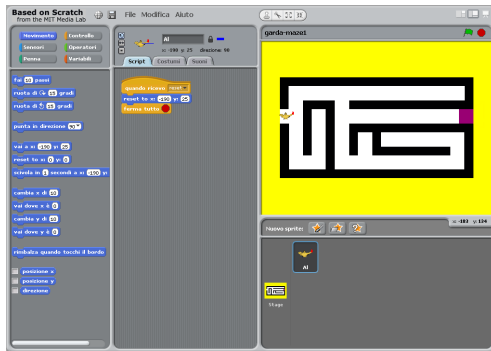
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Wikipasta: on the role of text formatting and how to represent the meta-information it conveys.



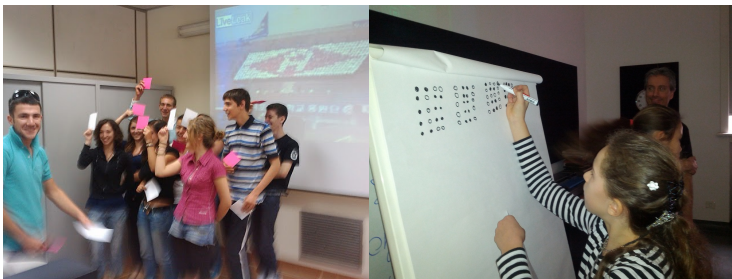
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Mazes: on algorithms.



Some workshops we propose

Human pixels: on the digital representation of images.



To convey a view of informatics as a scientific discipline, as opposed to the current mis-perception of the field, we propose:

- some core aspects of informatics to both pupils and teachers,
- a methodological approach to informatics teachers.