Scratch: ambiente per l'introduzione dell' informatica nelle scuole

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We are in a *transition time* as for Informatics in schools
→ in all countries big changes:
- new mandatory curricula in UK beginning September 2014 → see CAS initiatives
- ……..
- Programma il futuro: optional, an example in Italy

Transition → means
❑ still under definition what a good curriculum is for the different levels and types of schools
❑ a (fast) evolving situation thus we must face the need of several and possibly also fast changes of approaches

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- Need to agree on terminology

Informatics education:
Europe cannot afford to miss the boat

Joint Report Informatics Europe & ACM Europe

*on Informatics Education   -   **April 2013***

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- Need to agree on terminology

Activities boosted by :

For Informatics Europe: **Walter Gander (chair), ETH Zurich, CH**

ACM Europe and Informatics Europe liaison:

- **Carlo Ghezzi, Politecnico di Milano, Switzerland**

- **Bertrand Meyer, ETH Zurich-CH, ITMO-Russia, and Eiffel Sw - USA**

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http://www.informatics-europe.org/

- Need to agree on terminology

- **All of Europe's citizens have to be educated in both**
  - ➢ *digital literacy* **and**
  - ➢ *informatics*

- *Digital literacy* ***covers fluency with computer tools and the Internet.***

- *Informatics* **covers the science behind information technology having its own concepts, methods, body of knowledge and open issues.**
  It has emerged, in a role similar to that of mathematics, as a cross-discipline field

From Joint Report, page 3

- Need to agree on terminology

Informatics education:
Europe cannot afford to miss the boat

- Informatics education, unlike digital literacy education, is **sorely lacking in most European countries**

- Unless Europe takes resolute steps to change that situation, it will turn into a **mere consumer of information technology and miss its goal of being a major player.**

Recommendations :

1. *All students should benefit from education in digital literacy, starting from an early age and mastering the basic concepts by age 12.*

2. *All students should benefit from education in informatics as an independent scientific subject, studied both for its intrinsic intellectual and educational value and for its applications to other disciplines.*

3. *A large-scale teacher training program should urgently be started. To bootstrap the process in the short term, creative solutions should be developed involving school teachers paired with experts from academia and industry.*

4. *The definition of informatics curricula should rely on the considerable body of existing work on the topic and the specific recommendations of the present report (section 4).*

Informatics in the curriculum

- *fosters creativity*, **by illustrating the variety of ways to approach and solve a problem**
- *is constructive*: **designing algorithms is engineering work, producing visible (if virtual) artifacts.**
- *helps master complexity*: **learning to solve informatics problems helps solve complex problems in other areas.**
- *enhances accuracy and precise reasoning*: **writing successful programs requires exactness in every detail.**

Report Académie des Sciences, "Teaching computer science in France: Tomorrow can't wait", Paris, May 2013

<<The essential decision consists in implementing a programme in computer science from the primary to the secondary-school level, … going far beyond simple use of hardware and software. This implementation can no longer be delayed.

………………………

Teacher training is a top priority. The government proposes massive training of teachers in the uses of digital technologies, but it fails to specify anything in terms of training in computer science.>>

• What do we have to teach, where, how?

Several experiences are well known:
- … **csunplugged** from 98, still popular
- Olimpic Games of Problem Solving, Bebras or Castor, Kangourou,…..
- others where basic programming concepts are introduced already in primary schools with different approaches:
  - o EasyLogo, by L. Salanci, Bratislava University
  - o educational robotics
  - o ….
- what is "computational thinking" in first years of education?

• What do we have to teach, where, how?
Why chosing PROGRAMMING for PRIMARY?
It is the practical, almost tangible, aspect of computer science: you learn how to do something generally felt as "real" computer science

N. Wirth, Program development by stepwise refinement, CACM, April 1971

"The creative activity of programming – to be distinguished from coding- … is here considered as a sequence of design decisions concerning the decomposition of tasks into subtasks and of data into data structures".
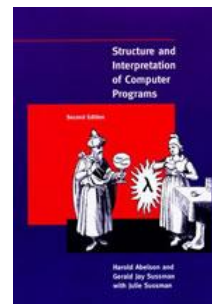
programming ⟷ problem solving

• What do we have to teach, where, how?

Abelson often remembers:
"Programs are essential to make human beings used to reason in a systematic way on the solution of a problem and to write it in a formal way rather than to make a computer execute a job"

Structure and Interpretation of Computer Programs

HOW to teach programming:
there is a danger here

We are used to teach
- either to vocational or technical students
- or at the university

the same activities though made easier are NOT suitable for all levels and types of schools:
- what kind of problems to propose?
- What do we have to begin with?

- HOW to teach programming: there is a danger here
HOW: → methodology

- Story-telling is the way we currently propose for introducing programming using a look-seeInside-modify methodology
- has proved to be quite appealing for both students and teachers having little cs knowledge
- *from Story-telling to telling-my-story producing also* sophisticated general stories and "stories-with-crossroads"
- *Students like stories also for traditional algorithms:*
  - *find how many numbers in a sequence are >6*

From Story-telling to Telling-my-story:
-- going home after school, do we nee bread?
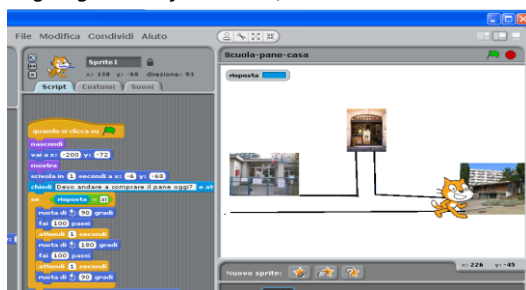
Students write stories also for "traditional" algorithms: this one is for finding how many numbers in a sequence are >6

High-low-guess-a-number

Grazie dell' attenzione

E grazie agli insegnanti e agli studenti che hanno lavorato con noi

Scrivete i vostri commenti a:

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