



Educational robotics and coding in the curriculum: approach to promote STEM and inclusion in the classroom

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<http://scratch.mit.edu/projects/11167825/>

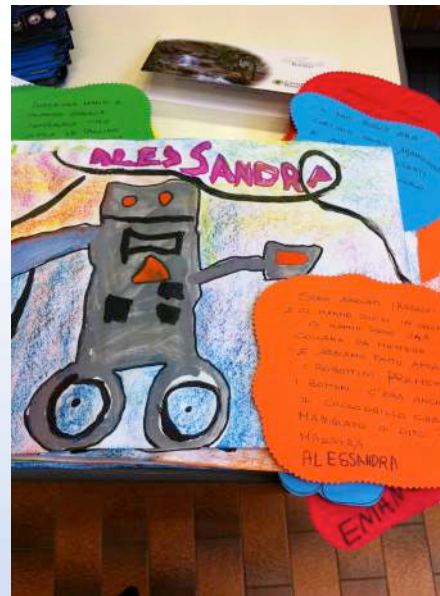
Carlotta Bernardi



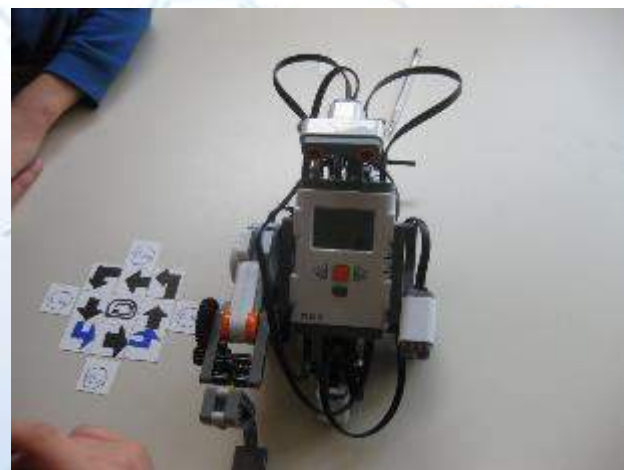
<http://etc.ch/Ynpe>

WHY USE EDUCATIONAL ROBOTICS?

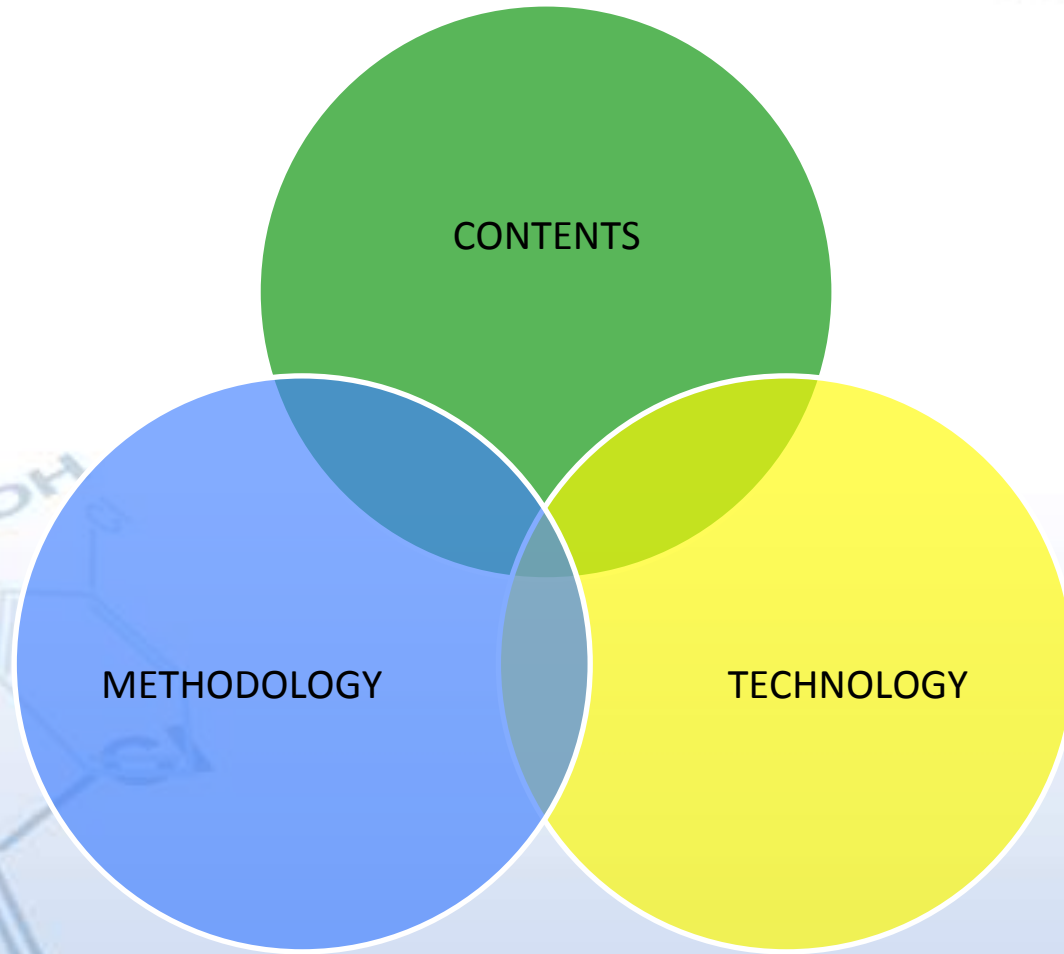
Robots capture the interest of the students, because they are related with games; they promote team working and collaboration among students, which are powerful means of deepening the learning methodology.



In many schools there are teachers who use ***educational robotics*** as a methodology able to consolidating or facilitating the comprehension of curricular disciplinary concepts.



Technology is just one part of the whole environment...



EDUCATIONAL ROBOTICS

guided discovery

problem solving

cooperative learning

ICT Professional jobs and demand in Europe 2012 - 2020

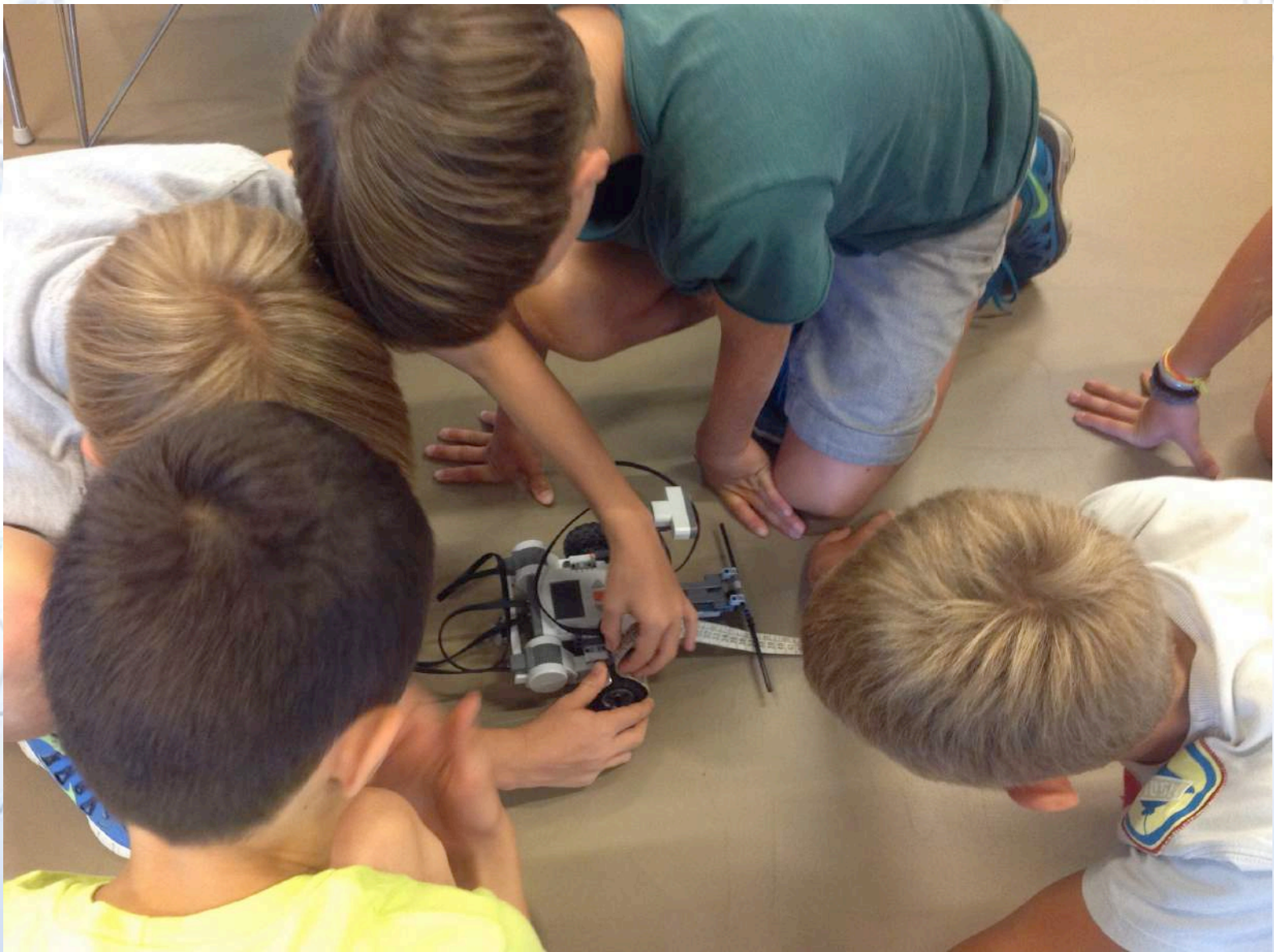
EU27 - Main Forecast Scenario



Source: empirica.

Source: E-Skills in Europe Report – Feb 2014

Robotics kits are ***learning mediators***: they combine the reconstruction of the knowledge they got during the school activities, with creation, invention and new keys, developing skills and competences.



EDUCATIONAL ROBOTICS to

involve students in scientific-
technological subjects

stimulate motivation

develop key
competences

reduce gender gap

share experiences with
other schools

key competence

knowledge

skills

attitudes

KEY COMPETENCES for Lifelong Learning

- Communication in the mother tongue;
- Communication in foreign languages;
- Mathematical competence and basic competences in science and technology;
- Digital competence;
- Learning to learn;
- Social and civic competences;
- Spirit of initiative and entrepreneurship;
- Cultural awareness and expression.

INCLUSION & TEACHING CHALLENGES



DYSLEXIA



ATTENTION
DEFICIT
HYPERACTIVITY
(ADHD)



IMMIGRANTS

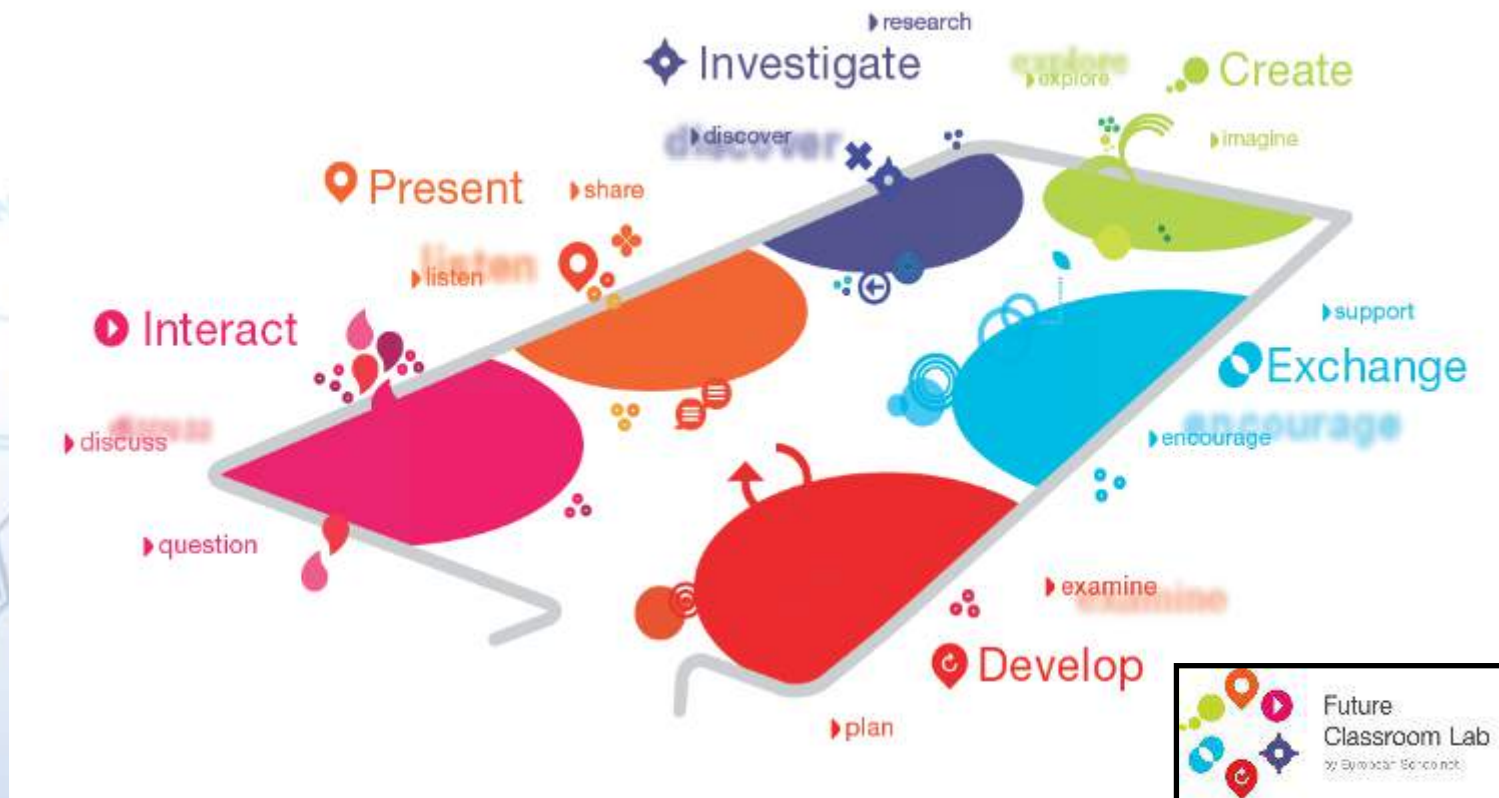


GIRLS



GIFTED

When educational robotics or other inclusive technologies are used with regularity, moreover, it becomes natural to rethink spaces in the class.



In kindergartens and early-elementary classrooms, manipulative materials and games play an important role in children's learning, enabling children to explore mathematical and scientific concepts (such as number, shape, and size) through direct manipulation of physical objects.

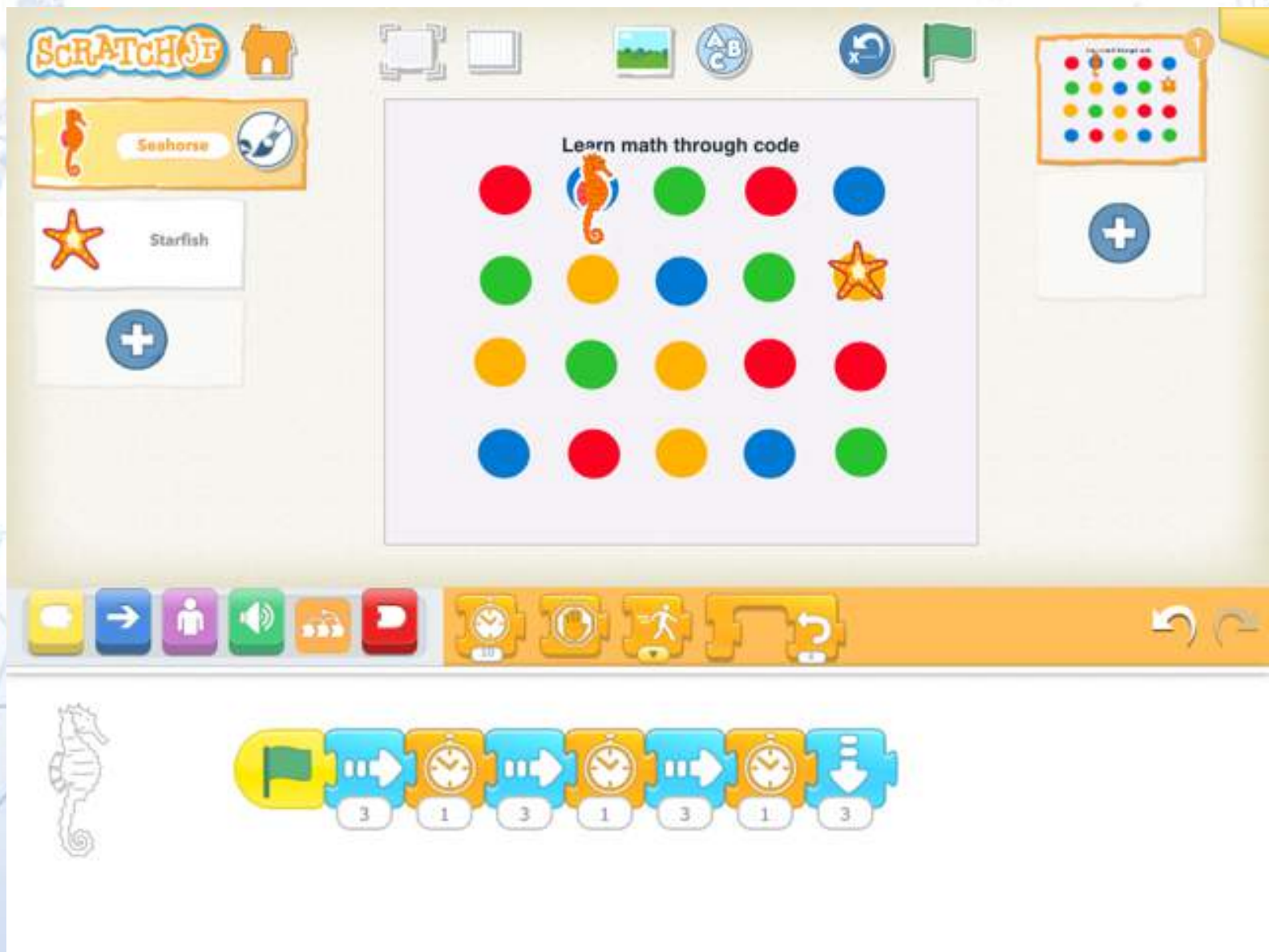


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forever
imagine
program
share

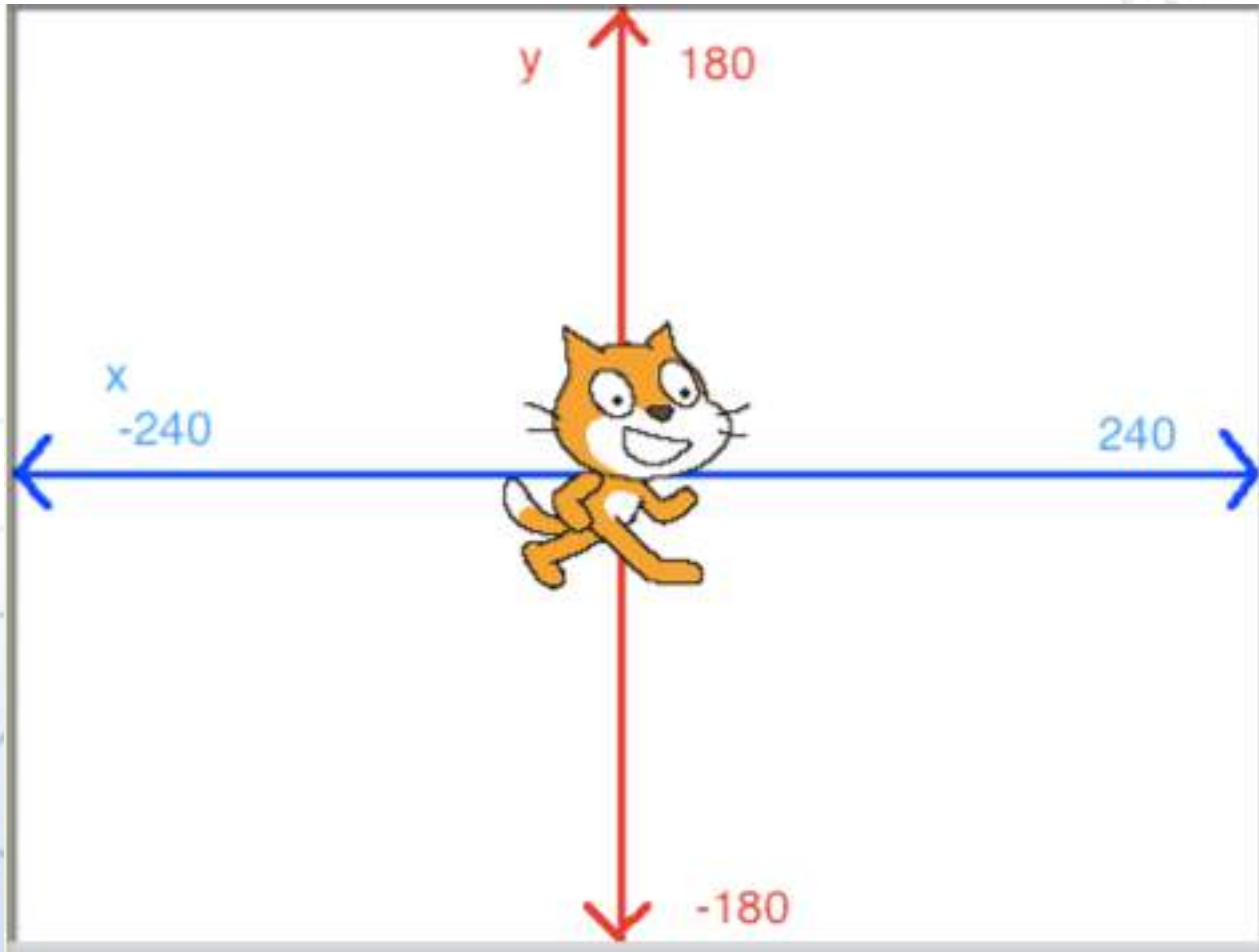


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$f(x) = \frac{1}{x^2} = x^{-2}$
 $\frac{d}{dx} \int x^a dx = \int x^a dx = \frac{x^{a+1}}{a+1} + C$
 $HCl = H_2O \rightleftharpoons Cl^- + H_3O^+$
 $v = \frac{1}{2} \omega L (20\% + 20\% + L^2) \rho = \int \frac{1}{T} H$



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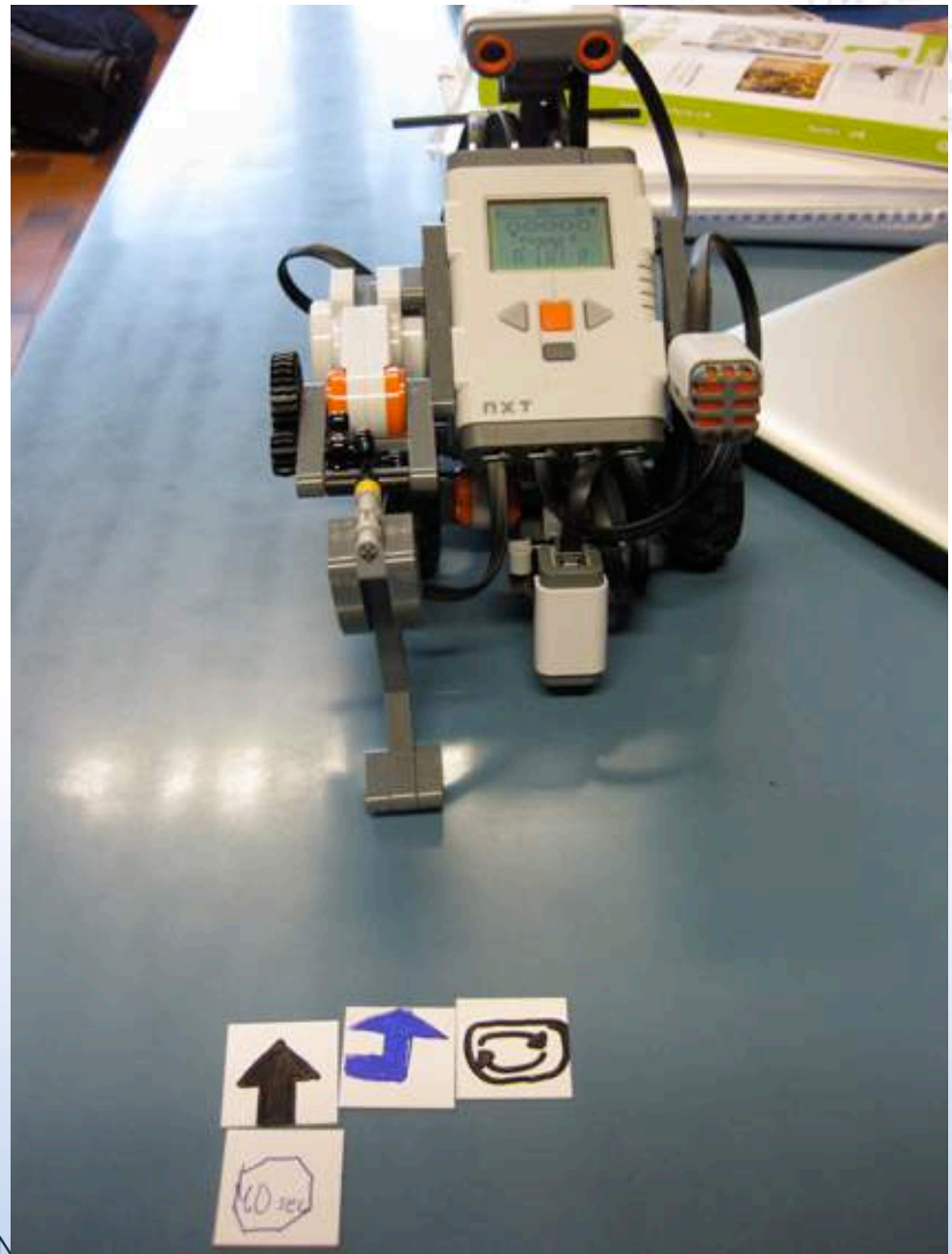
Teachers can use robots to teach many subjects: they can develop, for instance, concepts such as sensing, that is the perception of the environment...

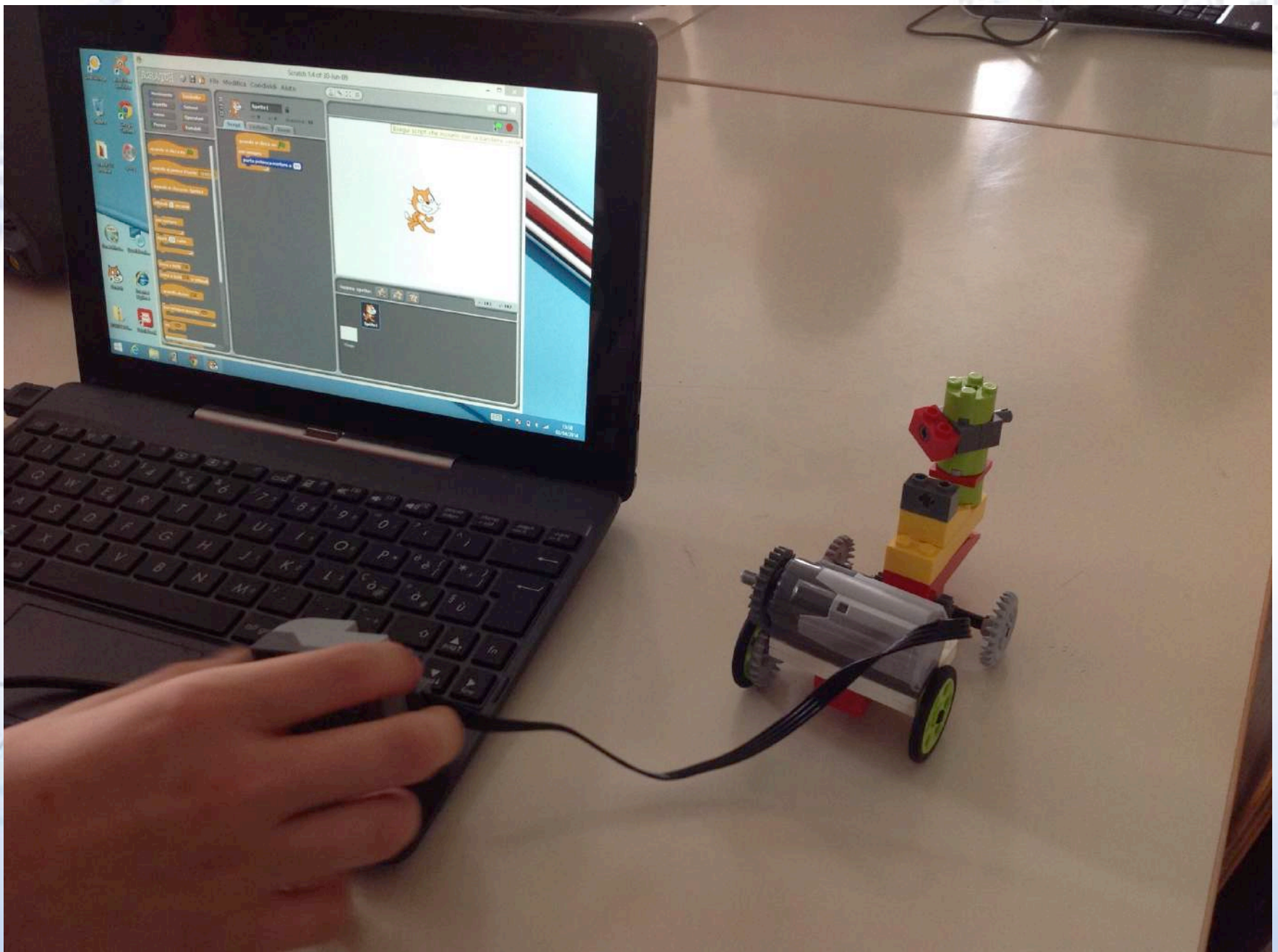
Of course, when working with little children, the approach is different.

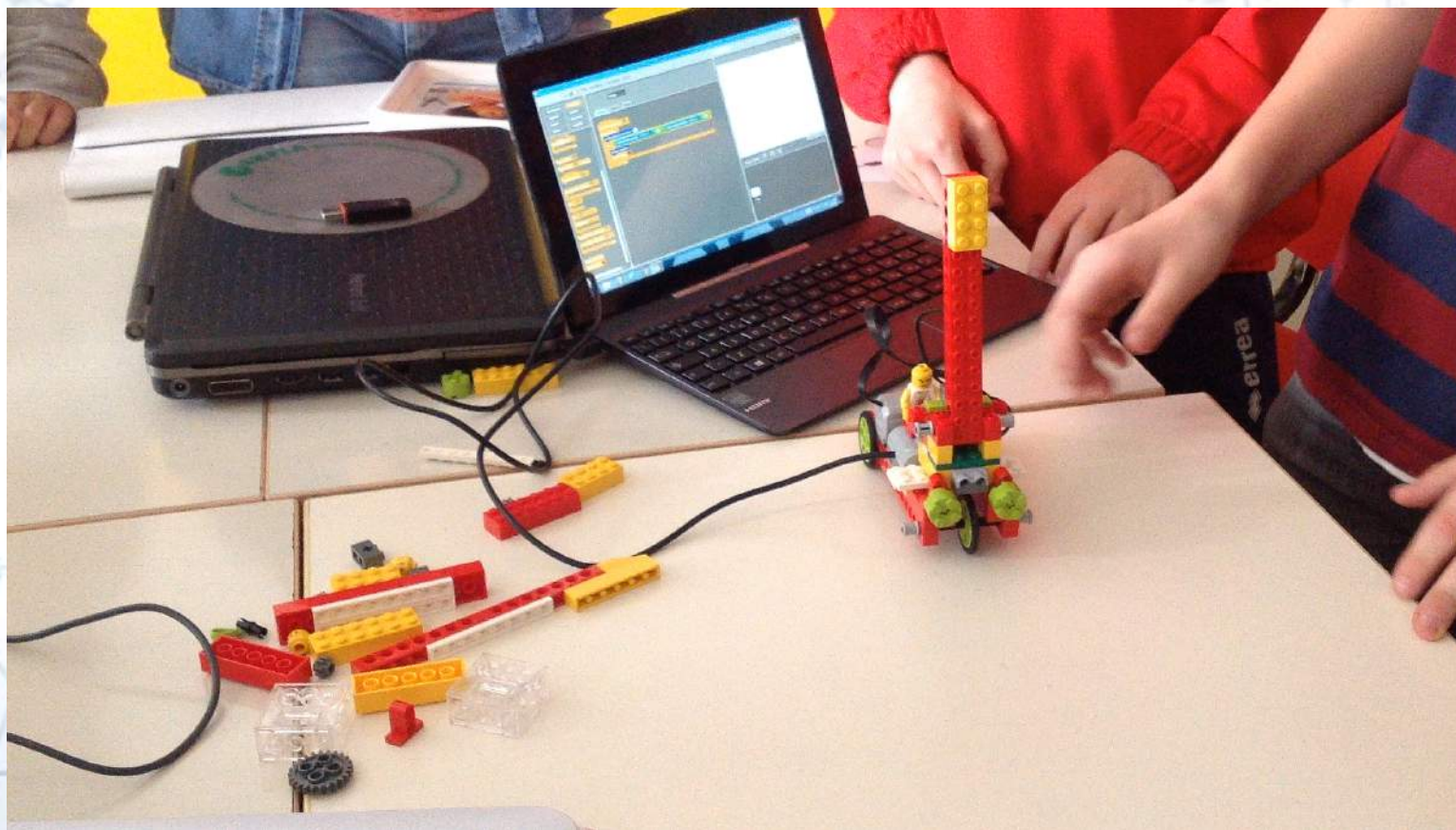


As children grow older, and learn more advanced concepts, the educational focus shifts away from direct manipulation to more abstract formal methods.

It becomes very useful to employ some **learning mediators**.







http://youtu.be/GaBvLUf6Y_U

We are experimenting an effective use of Educational Robotics to give new hopes for interaction to one of our student who uses CAA (Augmentative and Alternative communication)



<http://vimeo.com/99708531>

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...ing in the curriculum

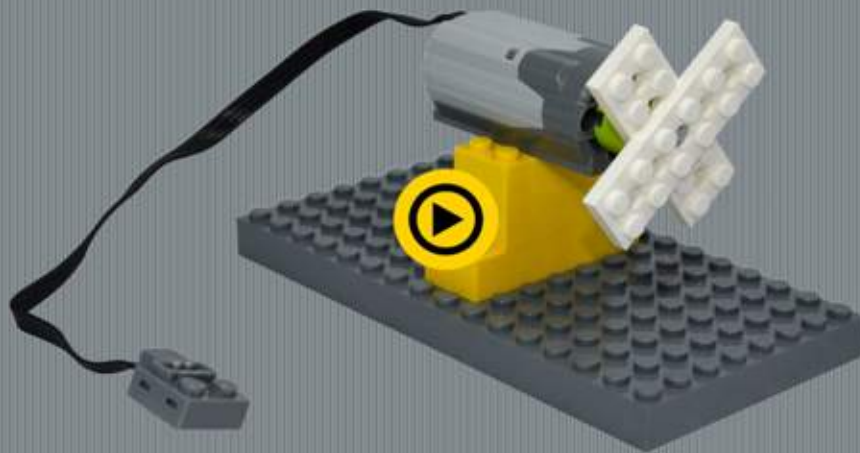
Nel video vediamo funzionare il mulino a vento tramite una semplice pressione di un tasto della tastiera.

Questo esercizio può essere, come sottolineato all'inizio, realizzato in differenti ordini di scuole.

Sicuramente per la complessità di tutti gli esercizi è proponibile nella scuola secondaria di primo grado.

Mentre per poterlo portare alle elementari bisognerà sottolineare altri punti: la costruzione, il concetto di motore, di tempo, di verso di rotazione, di potenza.

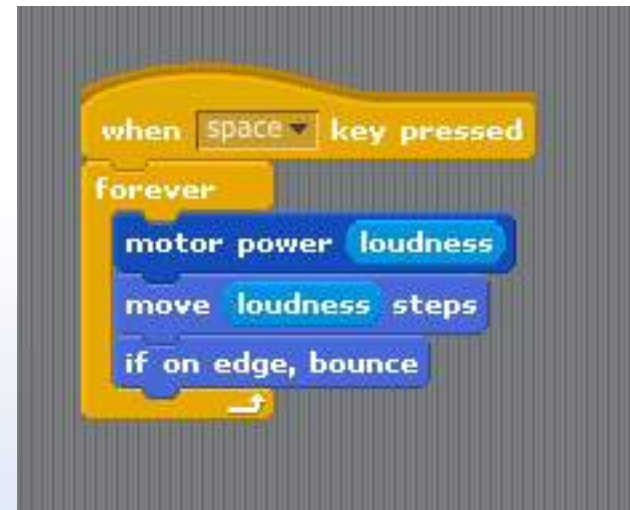
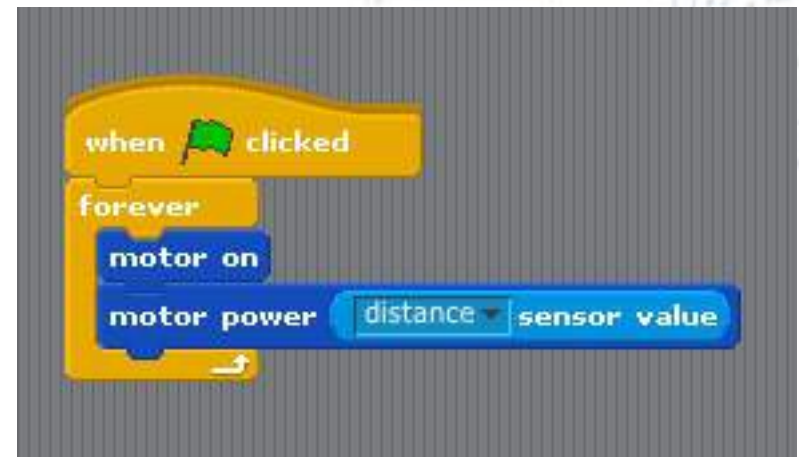
Con studenti della primaria sarà nettamente più difficoltoso introdurre il concetto di "variabile" che abbiamo proposto negli esercizi finali.



TAG CLOUD

primaria secondaria primo grado energia ambiente microfono
geografia storia matematica motore ciclo proporzionalità diretta

6/6 →



<https://itunes.apple.com/it/app/scratch-for-wedo/id906613379?mt=8>

- eskills- teacher toolkit – ICT teaching resources
http://eskills4jobs.ec.europa.eu/c/document_library/get_file?uuid=43ba3a81-2fbd-4dfb-916b-2e3f138197b4&groupId=2293353
- Why coding is important?
https://www.youtube.com/watch?v=eq_8oCDcRV8
- Robots for inclusion
<https://vimeo.com/20807238>
- Learn math through code
<http://www.slideshare.net/Scientix/learn-maths-codeurschitzws11scientixconf>
- Low threshold: how inclusive is Constructionism
http://constructionism2014.ifs.tuwien.ac.at/papers/2.7_1-8538.pdf

Q & A

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<http://www.europeanschoolnetacademy.eu/web/how-to-teach-computing->

<http://scientix.eu>