Exploring science with low cost social robots

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Paris, Oct'2017

Agenda

Social robots for education

Learning programming with robots

Learning science with robots

Exploring science with robots

Social robots for education: The road ahead

Other issues

Discussion

Social robots for education: Context

- Education: 19th century system, 20th century teachers, 21st century children
- New educational needs: More creative, critical minds for a digital world
- Multiple intelligences
- Learn through playing, be surprised, feel emotions

- Less interest in science and engineering
- High demand in science and engineering jobs

- ICT advances
  - Robotics
  - Analytics
  - Artificial Intelligence
  - Cheap(er) hardware

Social robots for education: Context

- Structure
  - Sensors: USB Camera, Microphone, Touch, Accelerometer
  - Actuators: Wheels, Moves parts of body, Voice, Screen, Chest with colours
  - Communication: HDMI, 3USB, Ethernet, WiFi
  - Raspberry Pi
- Actions
  - Listen and speak (SP,FR,EN,CAT), Converse
  - Makes decisions, learns
  - Emotional touch!!!
  - Move
  - Vision, Recognition (Face, QRs,…)
- Programmable
  - Scratch, Blockly
  - SDK in Python
- Low cost
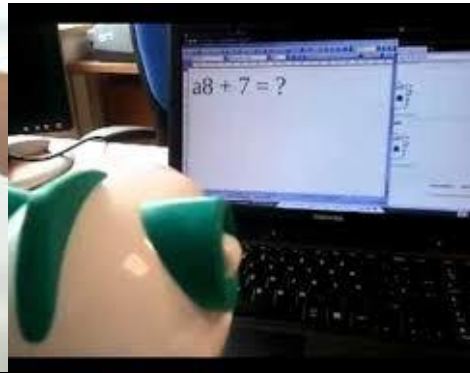
Social robots for education: Context

Product	Robotics	AI/ Emotional Intelligence	Magical/ Imaginative	Natural Language Interaction	Personalised learning strategy	Connected School-Home	Content Library	Access-ories
EMOBOT	✓	✓	✓	✓	✓	✓	✓	✓
LEGO	✓	✗	✗	✗	✗	✗	✓	✓
MakeWonder	✓	✗	✓	Only Speaking	✗	✗	✓	✓
Little Bits	✗	✗	✓	✗	✗	✗	✗	✓
Orbotix	✓	✗	✓	✗	✗	✗	✗	✗

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Exploring science with robots

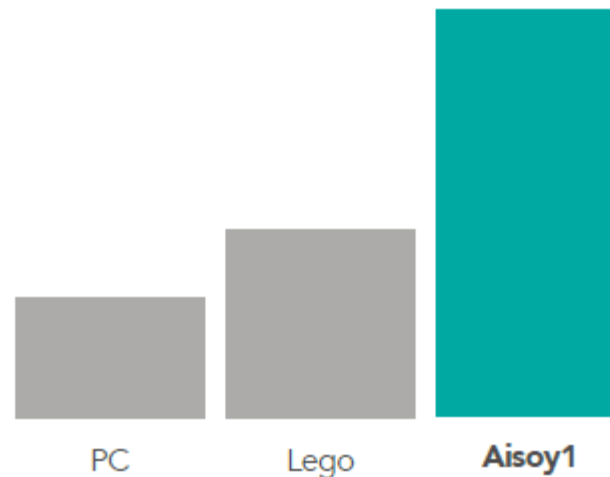Social robots for education: vision

Other issues

Discussion

Programming with robots

- Scratch

- Blockly

- SDK

Programming with robots

- Program your play

- The robot as domotic hub

Results of improvement of the capacity of understanding, reasoning and problem solving

PC   Lego   **Aisoy1**

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Learning science with robots

- (Affective) Math Academy

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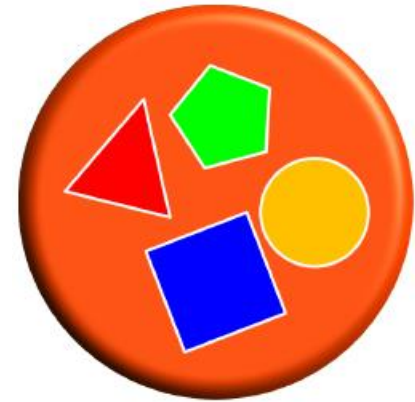Social robots for education: vision

Other issues

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Exploring science with robots

Game of colours

Game of geometry

- Educational stage, Objectives, Competences, Learning standards, Didactical resources, Timing, Suggestions, Evaluation
- 30+ Game activities

Exploring science with robots

- Understanding the concept of velocity
- Geometry concepts
- Probability concepts
- Newton laws
- Game theoretic concepts
- ….

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Social robots for education

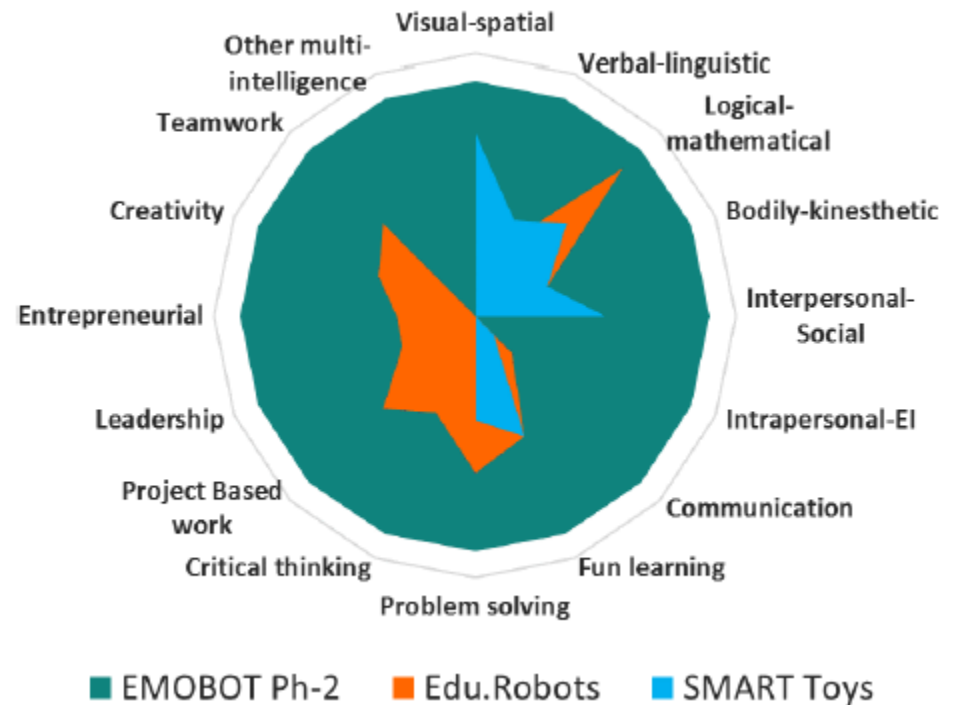Programming with robots

Learning science with robots

Exploring science with robots
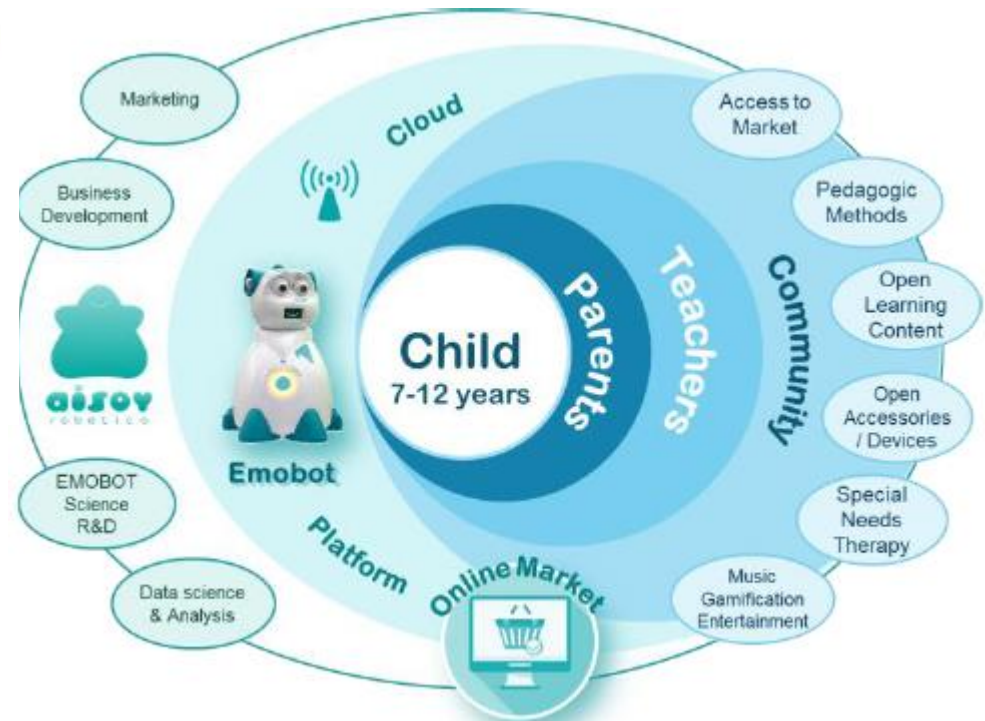
Social robots for education: vision

Other issues

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Social robots for education: Vision

Social robots for education: Vision

Social robots for education: Vision

- Low cost. Important for CESAME centers!!!

350 € --$\rightarrow$ 250€ School version

150 €   Family version

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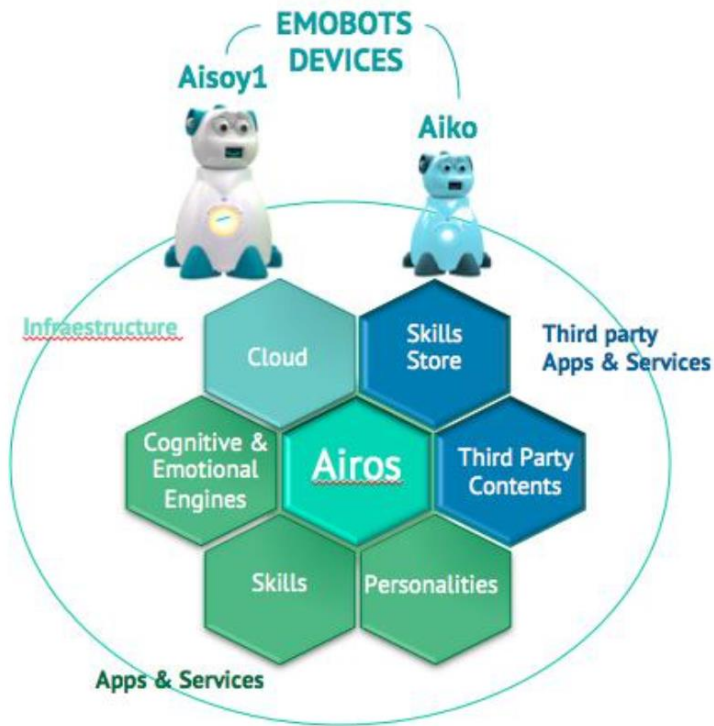Social robots for education: vision

Other issues

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Other issues

- The gender issue
  - Our experience

- Children with special needs
  - ASD. Our hypothesis

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- Social robotics and AI
- Not just to learn technology, but to learn and explore science (and other subjects) in a fun way
- The affective bond
- Teaching assistants
- Mentor at home
- Low cost

Thanks!!

Collaborations welcome!!!

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