SELECTION OF ROBOTS

CODESKILLS4ROBOTICS: Promoting Coding & STEM Skills through Robotics: Supporting Primary Schools to Develop Inclusive Digital Strategies for All

IO1: Building the CODESKILLS4ROBOTICS Competence Framework: From Theory to Practice

Partners: Emphasys Center, Cyprus

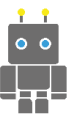Grant Agreement No: 2018-1-EL01-KA201-047823

Website: http://codeskills4robotics.eu/

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Contents

1. Robots Platforms Research

Concerning the selection of the robotics platform, the consortium performed a detailed research on the platforms currently available in partner's countries.

There are several tools presently offered in the market which target Robotics and STEAM skills advancement.

The analysis included well-established brands such as Lego products, some Open-Source products such as Arduino, and a new start-up product (Edison).

Overall, five different tools – robotics platforms went under investigation.

The research took under consideration the following parameters:

- Cost per unit

- Appropriate Age group

- Classroom ready - does not require complex assembly

- Prior programming knowledge for the user - student

- Prior programming knowledge for the educator

- Product availability

- Additional Hardware Requirements

- Any available teaching/educational material related to coding and STEAM

- Support from manufacturer

- Proprietary rights of the product

1.1 Product Comparison

A detailed analysis of these can be seen in the following product comparison tables:

Robotic Platform	Cost per unit	Appropriate Age group	Classroom ready	Prior programming knowledge for user (student)	Prior programming knowledge for educator
Lego EV3 Education	450€	10+	Yes	No	Yes
Lego WeDo 2.0	200€	7+	Yes	No	No
Lego Boost	170€	7+	Yes	No	No
Arduino	80-150€	13+	No	Yes	Yes
Edison	40€	6+	Yes	No	Yes

Table 1 - Product comparison 1

Robotic Platform	Availability	Requirements	Teaching Material	Manufacturer support	Proprietary rights
Lego EV3 Education	Retiring in 2021	Laptop/Tablet	Available	Stopping in 2021	LEGO
Lego WeDo 2.0	Yes	Laptop/Tablet	Available	Yes	LEGO
Lego Boost	Yes	Tablet & Batteries	Not Available	Yes	LEGO
Arduino	Yes	Laptop & Batteries	Depends on built	No	Creative Commons
Edison	Yes	Laptop & Batteries	Available	Yes	Microbric

Table 2 - Product comparison 2

Considering the cost, the skills required by both teachers and students, the availability and suitability for the age group (pupils aged 9-12), the ideal kit which is currently available in the markets is the **Lego Boost** kit.

Additionally, the consortium chose this option because it is a new platform incorporating the latest in educational Robotics (advanced sensors and motors) and currently does not offer substantial educational material that will exploit the product's full potential to its utmost capacity.

Concerning the other platforms:

The **Lego EV3 platform** was rejected due to the high cost, the already vast library of educational material accompanying it as well as its age and the notion by LEGO that it would retire it soon and stop support in favor of a new Mindstorms product.

The **Lego WeDo 2.0** was rejected due to its simplicity (suitable for younger ages than our target group) and the fact that there is already an extensive library of available educational content.

The **Arduino** platform was also excluded due to its high complexity (students have to connect wires to a circuit board and coding in an advanced programming language - C++, which is not suitable for the target group)

The **Edison** robot was also a strong candidate due to its low cost and ease of use but was also eliminated for its simplicity (students could not add and remove features such as sensors and motors) and also due to the fact that it already has a complete educational curriculum freely available.

References:

1. Lego Boost Website:

   https://www.lego.com/en-us/kids/boost

2. Lego Boost Cost:

   https://www.amazon.de/-/en/17101-Creative-Building-Blocks-Multi-Colour/

3. Lego EV3 Education Website:

   https://education.lego.com/en-us/products/lego-mindstorms-education-ev3-core-set/5003400#lego-mindstorms-education-ev3

4. Lego EV3 Cost:

   https://www.amazon.de/-/en/LEGO-Mindstorms-Core-Education-Version/

5. Lego WeDo 2.0 Website:

   https://education.lego.com/en-us/products/lego-education-wedo-2-0-core-set/

6. Lego WeDo 2.0 Cost:

   https://www.amazon.de/-/en/LEGO®-Education-WeDo-2-0-Core/

7. Arduino Website: https://www.arduino.cc/

8. Arduino Shop: https://www.arduino.cc/

9. Arduino Car Robot Cost: https://www.amazon.de/dp/B07474MMB5/

10. Edison Website: https://meetedison.com/

11. Edison Robot Cost: https://meetedison.eu/