



spark
igniting innovation in education

Arduino and EduWear

Using open source electronics to construct intelligent objects so children gain a deeper insight into the workings of digital technology.

Spark

Spark is an exciting new mobile exhibition designed to showcase new and emerging technologies that can support innovative practice in education. The exhibition brings together a range of technologies from a variety of organisations including Futurelab's own freely available resources. It is a hands-on experience supporting practitioners to explore and interact with the technologies and consider how they can be used in the classroom.

Spark features both current technologies that have been used in the classroom as well as emerging technologies that have the potential to support learning. Each exhibit is accompanied by further information that illustrates its relevance to education and suggests ways of using it for learning and teaching.

Futurelab

Futurelab is passionate about transforming the way people learn. Tapping into the huge potential offered by digital and other technologies, we develop innovative resources and practices that support new approaches to learning for the 21st century. A not-for-profit organisation, we work in partnership with others to:

- _ incubate new ideas, taking them from the lab to the classroom
- _ share hard evidence and practical advice to support the design and use of innovative learning tools
- _ communicate the latest thinking and practice in educational ICT
- _ provide the space for experimentation and the exchange of ideas between the creative, technology and education sectors.

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What is it?

Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments.

Two objects are exhibited that have been created using Arduino.

The football boot was designed by students during a workshop conducted by the EduWear project (see below) where the objective was to create a "wearable" that helps people in sport. It helps football players to analyse their shots by using pressure sensors attached to the side of the shoe. The sensors measure the intensity of a shot and this data is saved on the shoe so that it can be downloaded and analysed later. It also contains some light emitting diodes (LED) that show which part of the foot hit the ball.

The Arduino accelerometer was inspired by the Fizzee, a Futurelab prototype project that enables young people to care for a 'digital pet' through their own physical actions. In order to nurture their digital pet, keep it healthy and help it grow, young people must themselves act in physically healthy ways. The Arduino accelerometer measures physical movement and records this for later analysis.

Why is it relevant?

Actively constructing intelligent objects offers children a deeper insight into the functionalities of digital technology than by simply using it. Open source platforms like Arduino can support young people to engage in digital technology outside of normal curriculum boundaries and open up the possibilities to use it in other diverse ways. Open source platforms like Arduino can make this area more financially and technically accessible.

- _ How could your students benefit from creating their own digital objects?
- _ How far are your students taught to critically engage with digital technology and understand it as a creation, not a product?

Next steps?

There are several options to engage in Arduino projects. The Arduino website below has ideas of projects and a starting guide, and there are also two books which are regularly cited as good introduction to working with Arduino.

Although Arduino does use programming code to work the projects, a lot of this is available online and can be cut and pasted into the Arduino software. Also other projects have attempted to support educators to use the equipment. The European project EduWear (2006 – 2008) worked with six partners to develop an educational low-cost construction kit for wearable and tangible interfaces. As well as hardware, the project created an easy to use programming environment which is freely available. You can find out more and download their programming tool on the EduWear site: dimeb.informatik.uni-bremen.de/eduwear.

Further information

www.futurelab.org.uk/spark/studentauthoredconstruction

Credits

The Football boot was developed by students as part of an EduWear workshop.

Arduino is an open source project supported by many, for more details see www.arduino.cc.

