Hands on with Electronic textiles (E-textiles) – Promoting technology through craft and design

Insight

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Novel wearable technologies are changing the way we live – not only supplying us with the desired information in an instant but also in monitoring health, fitness and lifestyle. While smartwatches and similar devices are dominating the "Wearables" trend, smart garments with textile based electronic systems have the capability to enhance the functionality of our clothing. This creates a new interface to interact with our own body and its surrounding environment.

Some of the work at Insight's Inspirefest Workshop "Sew and Glow" in June 2015

Electronic textiles means that the electronics element should be inherent to the fabric or garment. This means can be done at various stages of garment development, from fibre right through to finishing. Conductive threads and sewable components are becoming increasingly popular for DIY enthusiasts, artists and hobbyists to create their own e-textile and smart garment designs. By designing such kits in a fashion suitable to various ages e-textiles could be used to promote Science Technology, Engineering and Maths subjects throughout the educational path from pre-school to 3rd level.

As the development of electronic textiles involves multidisciplinary skills, students can learn about properties of materials, textile technology, principles of simple electric circuits, sensors, computer programming, in addition to design principles in integrating it all together. There is currently little cross-over in the teaching of these disciplines. The aim of this work is to promote cross-disciplinary learning between craft and design and technology, starting at an early stage in the education process to promote 21st century thinking where creativity and problem solving skills are needed hand in hand.
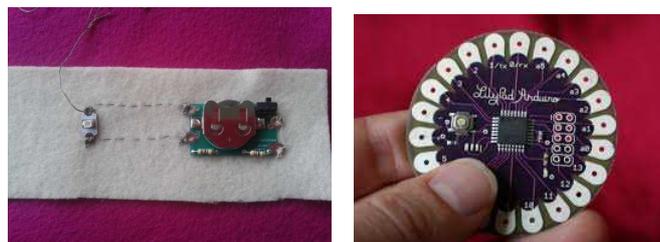
(Left)Simple sewable circuit with LED, conductive thread and battery holder
(Right) Sewable microcontroller, Lilypad Aduino for more complex garments including sensing elements

It is well established that practical exercises enhance the learning experience[1], therefore designing e-textile kits and tutorials of varying levels of expertise could be used to provide hands on exploration of new materials to promote lateral thinking across all age ranges within the educational curriculum[2, 3].

• 1.Millar, R., *The role of practical work in the teaching and learning of science. Paper prepared for the Committee: High School Science Laboratories: Role and Vision, National Academy of Sciences, Washington, DC* 2004.

• 2.Buechley, L., M. Eisenberg, and N. Elumeze.(2007) *Towards a Curriculum for Electronic Textiles in the High School Classroom.* . In: Proc. *Proceedings of the Conference on Innovation and Technology in Computer Science Education (ITiCSE),* . 2007. Dundee, Scotland.

• 3.Peppler, K. (2013) STEAM-Powered Computing Education: Using E-Textiles to Integrate the Arts and STEM . . IEEE Computer. September 2013:38–43.