

## Chapter 5.17

# Shaping Interactive Media with the Sewing Machine: Smart Textile as an Artistic Context to Engage Girls in Technology and Engineering Education

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### ABSTRACT

*In the context of converging media technologies, the concept of mobile media embedded in wearable material was introduced. Wearable Computing, Fashionable Technology, and Smart Textile are being developed at the intersection of media, art, design, computer science, and engineering. However, in Germany, little research has been undertaken into Smart Textile in education<sup>1</sup>. Those activities are not realized at school in the context of artistic processes in general MINT<sup>2</sup> education in classroom settings. In order to research the interplay of electronic textiles and wearable technology, hard and software tools, such as Arduino LilyPad, a programmable board designed for stitching into clothing and flexible applications are scrutinized. In the project, contemporary media art projects in the field of Fashionable Technology are explored to inspire interdisciplinary technology education. The project described in this paper engages girls in technology and engineering by integrating artistic processes as well as a more playcentric approach to technology and engineering education.*

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## INTRODUCTION

One of the drivers for the initiation of the research project was the dramatically low number of female students in the field of technology, engineering and computer science at university level.<sup>3</sup> The hypothesis of the project claims the introduction of artistic processes linked to meaningful contexts developed by the girls themselves can be key to trigger interest and motivation to deal with technology embedded in everyday life. Artistic processes, diverse materials and media aim to mediate technology as aesthetic experience, embedded in artistic processes of shaping, designing, constructing, programming and presenting interactive technology in individual project contexts. The paper is based on the research project “Artistic Approaches to Engage Girls and Young Women in Technology and Engineering in Education at School and University” held at the KIT’s Institute of Vocational and General Education.<sup>4</sup> The research approach looks at coupling arts, sciences, and technology in engineering education. It explores a new approach to technology and engineering education at both school and university level integrating the artistic processes to the engineering curriculum and teaching culture. It discusses examples of more playful approaches towards ludic textile and wearable interfaces for interdisciplinary media-art-science and technology education based on shapable low cost media such as Arduino. Secondly, the project aims to facilitate transdisciplinary education scenarios, in order to integrate artistic processes and aesthetic experiences as a key to support learning in any subject, that is, especially in the subjects of science, technology and engineering. The project aims to answer the question, why the support of an in depth interaction between arts, science and technology is important for future curricula and the rethinking of education.

## AIMS AND OBJECTIVES

Technology is blurring the disciplines of arts, design, computer science and engineering, crossing the borders of curricula. Rather than using technology in art education the aim of the underlying approach of integrated arts-science and technology in education is to understand *technology as aesthetic experience* through artistic processes – as opposed to simply using technology for art education purposes. McCarthy and Wright (2004) have mapped technology as lived experience. Dewey has argued in *Art as Experience* that any experience is an aesthetic experience perceived through the human senses in the very sense of the Latin term of *Aisthesis* (Reimann, 2010). The research project aims to bridge the gap between arts, design, sciences and technology by integrating artistic processes in technology and engineering education. It aims to contribute to the development of a transdisciplinary research approach to Smart Textile technologies and to generate transdisciplinary research methodologies to integrate the education through arts approach the curriculum. The research aims to improve the integrated arts-science-technology education to support girls interest and understanding of technology in order to contribute to the generation of a wider gender- and art-oriented curriculum and teaching culture in technology and engineering education.

## RESEARCH QUESTIONS

The main research question scrutinizes the issue of the girls’ motivation, and their understanding and perception of computer technology. The project looks at appropriate classroom settings, aesthetic contexts and meaningful themes to engage girls in technology, that is, to encourage them to develop, construct, program, reflect and present smart textile objects and wearable devices by themselves in a project context. What are processes which

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