

IT2School-Workshop

Ira Diethelm and Melanie Schaumburg

Carl von Ossietzky University
Computer Science Education
26111 Oldenburg, Germany
ira.diethelm@uni-oldenburg.de, melanie.schaumburg@uni-oldenburg.de

Keywords: teaching materials, introduction to CS/Informatics, understanding IT

Abstract: This workshop will give a deeper insight into the materials described in the corresponding ISSEP-paper [3] about the IT2School project which aims at supporting CS / Informatics at school in grades 4-10.

The German association 'Wissensfabrik' is a widespread and stable network of over 120 different big and small companies with long tradition of cooperation between companies and schools for supporting STEM and economical thinking inside the regular school schedule. As their scientific partner, our aim was to create usable and meaningful materials that most teachers would like to teach with in their classes, regardless of their background, experience or knowledge of CS. Therefore, it had to be interesting and powerful and at the same time easy to use and understand. And it also had to be motivating and inspiring for students aged 10 to 16. For the final package of modules, we used many well-known ideas and compiled them to a flexible set that aims at fitting for all teachers in grades 4-10.

In this workshop we will give a hands-on experience on the modules of the IT2School project and its concept. We will give a brief introduction and afterwards there will be much time to try out in detail. In addition, time for discussion and reflection will also be provided.

The five basic modules to try out in this workshop are:

1. Communication from blinking to encryption: This module starts at coding information via blinking, adapted from cs4fn [2], and at the historical dimension of transporting information over large distances by Morse code. Building a string telephone and submitting pictures are also part of the CS unplugged experience [1, 4]. It ends with some easy Caesar's encryption.
2. Understanding the internet: How does such a big world fit into such a tiny box? This question leads to a setting that explains how the internet works, using paper and other craft materials only, but at the same time incorporating terminology like IP-addresses.

3. Codes in a supermarket: How does the checkout know the price? What happens if we manipulate barcodes and how are these used to run a supermarket? The answers to these questions are discovered in this module. Here, students and teachers should visit a local supermarket and get a view behind the scenes. Afterwards students think about useful innovations using QR-Codes in their school, e.g. for a game.
4. How to program, using Scratch, is a must-have module in a setting like this and is also suitable for all kinds of personas.
5. My very special input: 'What happens if we connect bananas or play-doh to the computer and use them as a keyboard?' is discovered in this module using MakeyMakeys [5] or similar controllers.

The project is (and maybe always will be) work in progress. The project material is published under Creative Commons. It is written in German at the moment. English versions are under construction. For this workshop we will provide summaries for all modules in English language.

References

1. Computer Science Unplugged. <http://csunplugged.org/>. visited 2016-06-09.
2. P. Curzon. Computational Thinking: Searching to Speak - Teaching London Computing. <http://teachinglondoncomputing.org/free-workshops/computational-thinking-searching-to-speak/>.
3. I. Diethelm and M. Schaumburg. IT2School - Development of teaching materials for CS through Design Thinking. In ISSEP - Informatics in Schools, Münster, Oct 2016. Springer.
4. T. Hunkin. The Secret Life Of The Fax Machine. http://www.secretlifeof-machines.com/secret_life_of_the_fax_machine.shtml. visited 2016-06-09.
5. JoyLabz. MakeyMakey. <http://makeymakey.com/>. visited 2016-06-09.

Resources: All documents of the project including suggested lesson plans, work sheets etc. (in German) can be downloaded at the webpage www.it2school.de. English summaries will be provided at the workshop.

Ira Diethelm She is professor for computer science education and responsible for teacher education for the subject informatics / computer science at the Carl von Ossietzky University of Oldenburg, Germany.

Melanie Schaumburg She is a scientific assistant at the research institute OFFIS in Oldenburg and at the pedagogical department at the Carl von Ossietzky University of Oldenburg, Germany.