

## Story of a tinkering activity

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Introductory note: Social scientists use ethnographic methods to understand certain aspects of a given object. In fieldwork, a researcher is often required not only to observe, but to also participate in different settings – becoming involved in them and their processes. In the next step, social scientists would document their observations in the form of a diary. In the final step they stand aside, review the documentation, reflect on what actually happened.

Over the past two months, Sebastian Martin from the Tinkering Studio in San Francisco (USA) was our guest. During this time, I had the opportunity to work with him to develop a Science Centre activity based on computational tinkering. In the following passages, I am sharing with you both my diary and reflections on developing this activity.

Day 1 - It all started with a red light

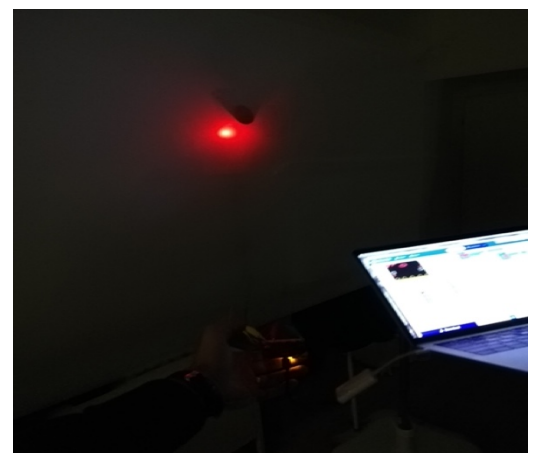
Sebastian showed me a LED lamp and told me that these lamps can be programmed with a computer. He suggested that if we could somehow attach the LEDs onto a whiteboard, it would make for an interesting activity which could take place in the Wissens°raum.

Me (to myself): What?!

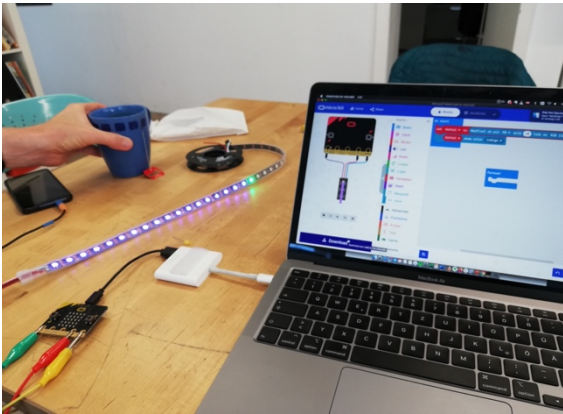
I had no idea what this was going to be, nor what Sebastian's idea was at all. Nevertheless, we played a little with [Makecode Microbit](#) and I managed to program it so that a red LED light shone on a whiteboard (Photo 1). Some ideas started to develop but we were still far from having a clear plan.

Day 2 - Art saved the mood

Next, we tried the same process while at the same time adding more LED lights onto the whiteboard (Photo 2). I also tested different variations in the programming. Sebastian showed me some colourful papers and we decided to put those papers in front of the LEDs on the whiteboard (Photo 3). Suddenly, when turning off the lights, the result was magical. It looked cool and artistic, which brought me some much-needed inspiration and motivation to work further on it.



Picture 1



Picture 2



Picture 3

Day 3 - Being a child

We knew where we were going. Colourful papers needed to be cut and attached to the whiteboard. Lots of cutting, measuring and hanging ensued. I felt like a child in kindergarten who is cutting papers into different shapes to make something - and I liked it (Pictures 4&5). Meanwhile Sebastian soldered the LEDs together. A similar task to cutting and fixing papers, but of course more advanced. Although the task was quite technical, and involved working with the hands, my mind was preoccupied with the planning. At the end, what should this whiteboard represent? One of my first ideas was to write different words in different languages so it could be used as a tool to learn new words, but I felt unsure about this idea. Sebastian listened to all my ideas and always responded: "yes that's interesting, you should try".



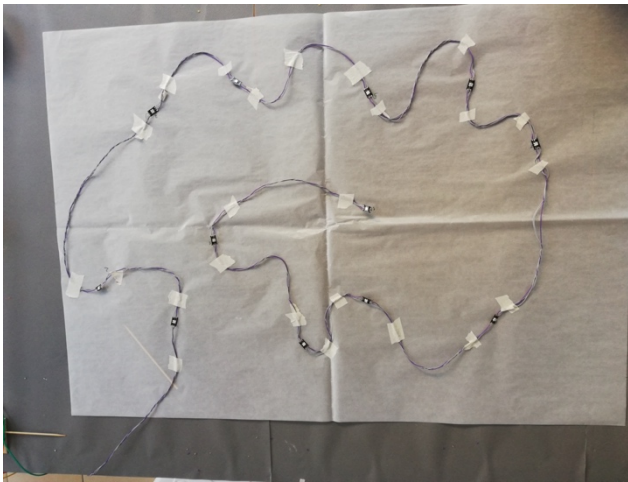
Picture 4



Picture 5

Day 4 - Reaching the end but not happy

Everything was set. The LEDs were ready (Photo 6) in pattern we wanted, and the loop was attached to the whiteboard. On top of this came the coloured paper with all the words written on it. We ran the computer program and recorded a few pictures of the result – and that was it (Photo 7). At this point, although my job as an observer and activity participant was over, my passion for developing this activity did not diminish. After returning home, I continued to think about all the things I could do with it and sometimes, I had quite abstract and even absurd ideas. For instance, I thought about programming the LEDs in such a way that I could communicate and interact with them.



Picture 6



Picture 7

#### Day 5 - Make it your own

When I woke up, I thought about it further. I pondered what was still missing here, and why. The idea was amazing and could develop this far with lots of information and support from Sebastian, but I had to connect the activity to myself and into something I would personally enjoy. Then it hit me, that I could connect it to my instrument, the Dotar, which is a very old two-stringed lute from central Asia. When I approached the activity from this perspective, I realized that these programmable LED lamps are very similar to the structure of a piece of music. You can for example divide a piece of music into different parts/blocks and organise the blocks in such a way that they tell a story, which is similar to how you organise the program for the LEDs. So, I chose a music piece with three main parts, then programmed the LEDs into three different blocks in a way that they matched the temperament of the music.

This inspired a magical moment. My instrument was played together with programmable LEDs, and somehow the two different worlds came together. I called the project LEDOTAR (LED+Dotar). (Video 1)

#### Reflection and conclusions

In the end, I had learnt not only how to make my own digital creation using a computational tinkering which was new to me; I was also able to transfer my abstract ideas into the development of an activity – and this felt joyful, victorious and empowering.