

Making Music-Making

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Abstract— Our work explores the intersection of music, making, and (software) engineering in school education. We offer a hands-on participative demonstration of our most recent technical approach based on LEGO® and Raspberry Pis, allowing workshop attendees to explore the possibilities for themselves.

I. INTRODUCTION

We are undertaking a long-term interdisciplinary programme of research exploring the intersection of music, making, and (software) engineering in school education. We have previously shown how the approach of combining instrument-building using familiar construction kits like LEGO®, exploration of the principles involved, and music performance can be effective in engaging and educating school pupils in interdisciplinary activities [1]. We undertake this work with a view to enhancing computational and engineering thinking and draw on constructionism and related approaches.

We recently ran two successful workshops for a total of 61 secondary-school children in which they created their own instruments and instrument controllers using LEGO® and Raspberry Pi computers. In preparation for these we developed a range of instructional resources, custom software, and LEGO® kits for students to use. We will demonstrate the technical platform used at our workshops, giving CHIME workshop participants the opportunity to experiment with and explore the resources created.

II. WORKSHOPS

At the workshops, acoustic instruments were built along similar lines to those reported in [1]: students were provided with a range of standard bricks and other components and asked to make instruments such as shakers and drums. This enabled them to compare the process of building instruments where sound production was direct and inherent in the design, and with hybrid instruments where sound production was more abstract through a synthesizer. The workshops concluded with a group ‘jam’ where students played their acoustic instruments along with the organisers.

The subject of our CHIME demonstration arises from the other part of the workshops. To provide the comparison with acoustic instrument construction, students were provided with LEGO® EV3 [2] and Spike Prime [3] sensors connected to Dexter Industries’ BrickPi3 hats [4], and Raspberry Pi Build Hats [5]. We provided them with a customized and highly-simplified form of the Build Hat API [6], integrated with the BrickPi3 driver platform [7] to enable them to trigger sounds

in real-time, and control an OSC-enabled synthesizer running in PureData (*polywavesynth* [8]). The PureData implementation and interface were hidden from the students, leaving a very clean and succinct API and template code for simple and quick programming. This enabled them to successfully create instruments in the 45-50 minutes of session time available to them (with little prior programming experience), and explore the effect of connecting different kinds of sensors to various parts of the synthesizer.

III. DEMONSTRATION

In this session we will demonstrate our technology platform at the CHIME workshop aiming to offer a practical and participatory exposition of our experiences that may be useful to others working in similar interdisciplinary areas with young people. We will support participants in exploring the platform we developed for this work and discuss the educational possibilities, technical challenges and solutions with them. We will also share a rolling digital slideshow of images of instruments built during the workshops.

ACKNOWLEDGMENT

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REFERENCES

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