Scratch@MIT 2012 Session Proposal

Accepted for Scratch@MIT 2012, July 25-28, 2012, Cambridge, Massachusetts

Session Title: **Getting into the Digital Music Game With Scratch**

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Session Type:
- ○ Poster/Demo
- ○ Presentation
- ○ Panel discussion
- ⊙ Workshop

SESSION DESCRIPTION (400-800 words)

> "There is nothing like making music and messing with sound to inspire people to learn how to program."
> -- Prof. Dan Trueman, *co-founder of the Princeton Laptop Orchestra*

We couldn't agree more. However, the cost of "getting into the digital music game" can be prohibitive on many fronts. Our work strives to make the excitement of music technology accessible to students of all levels.

This workshop presents a subset of the techniques we've developed to allow students to explore the intersection of computing and music using the sound capabilities built into Scratch. In addition, it gives participants the opportunity to create music-generating programs themselves using a variety of Scratch constructs. The workshop will conclude with a mini concert in which some participants will play the music they created using these techniques.

One of the distinctive characteristics of the workshop is that it is presented in true interdisciplinary fashion: by a CS and a Music professor working together. This is a hallmark of our work. Participants will be exposed to a fresh approach to teaching that they may be able to implement to a greater or lesser degree in their own schools and institutions.

Background

Music applications are incredibly powerful and engaging tools for getting students interested in learning about technology. They can range from music cataloging applications such as the popular musicbrainz.org site, to music playing applications such as the ubiquitous Apple and Adobe products, to music transcribing and composing applications such as Finale, Sibelius, and Noteflight.

We are interested in harnessing the engaging power of music to stimulate student interest in computing in general and computational thinking in particular. Toward that end we have designed an interdisciplinary, general education (GenEd) course that teaches computing *and* music to undergraduates in novel ways and that is open to all students in all majors. Our project is called "Performamatics," and it has been funded by two grants from the National Science Foundation. (Please see www.performamatics.org for further information on this project.)

The centerpiece of Performamatics is "Sound Thinking," an interdisciplinary course taught with a music and a computer science professor in the room for all class meetings. This approach models the interdisciplinary environments that students will encounter when they graduate and provides valuable lessons for life in the world of work.

The computational thinking component of our approach not only helps arts majors learn to think analytically, but also helps technical majors understand computing concepts at a deeper level through applications that employ the engaging power of music. We take advantage of the "low floor and high ceiling" of Scratch to appeal to students at both ends of the curricular spectrum. We believe that this is one of the real powers of this media-rich visual programming system. We have seen that harnessing its music capabilities is a tremendous "hook" for making programming appealing to a wide range of students, from those in middle school to those in undergraduate programs.

Workshop Take-Aways

In addition to seeing demonstrations of the techniques we use in our "Sound Thinking" course and examples of student work, participants will be provided with an extensive handout containing some of our teaching materials and links to our course websites, where even more materials are publicly available.

SHORT SESSION DESCRIPTION FOR THE PROGRAM (100-200 words)

This workshop introduces participants to Scratch's music-generating capabilities and shows how they can be used to teach computing concepts to students with a wide range of music and computing experience. The workshop demonstrates techniques that we use in "Sound Thinking," a university General Education (GenEd) course open to all students in all majors. Participants will receive an extensive handout with links to our teaching materials, and they will have the opportunity to create music-generating programs themselves using a variety of Scratch constructs. The workshop will conclude with a mini concert in which some participants will play the music that they created.

Although our experience is based primarily on a university-level course, we have used some of the techniques we've developed with middle and secondary school students in after-school programs. This workshop is therefore appropriate for teachers at all levels, including those with little or no music or computing experience and those who are just beginning to work with Scratch.

OTHER NOTES

The concepts and techniques in this workshop were developed as part of an NSF-funded project called Performamatics. This project is ongoing, and we are now offering two-day workshops on the use of our techniques to foster interdisciplinary education. These workshops are intended to be attended by pairs of professors from the same institution, one from a technical field and the other from an arts field. We hope that this short workshop at Scratch@MIT 2012 will interest participants in attending one of our longer workshops and learning more about Scratch, interdisciplinary teaching, and the power of music to engage students in computing fields. There is no charge to attend our larger workshops, and we also offer limited travel support to those who need it.

Our workshop at Scratch@MIT 2010 entitled "Exploring Musical and Computational Thinking Through Musical Live Coding with Kids in Scratch" received rave reviews. See, for example, the short video at http://www.youtube.com/watch?v=oA-PxrvIJxM which is a snippet of an interview with a participant in our 2010 workshop just after it concluded.

We look forward to sharing our work with a new population of Scratch users, and of course introducing things we have learned in the two years since we last presented at Scratch@MIT.