Perfect Harmony: Team Teaching Computing & Music

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ABSTRACT

One of the ways to attract a more diverse group of students to computer science is by offering courses that are interdisciplinary. Some of the first examples of this combined multimedia with programming. There are many more possibilities, but as computer scientists, we often do not have the domain knowledge to teach these courses alone. Team teaching offers a solution to this dilemma. The goal of this panel is to present some of the problems we have encountered and to discuss some of the solutions.

CCS CONCEPTS

- **Applied Computing → Arts and Humanities** → Sound and Music Computing
- **Applied Computing → Education** → Collaborative Learning

KEYWORDS

Team Teaching; Computing and Music; Interdisciplinary

ACM Reference format:

R. Weiss, J. Caristi, J. Heines, A. Koehl, and K. Rossum. 2018. SIG Computer Science Education. In *Proceedings of 49th ACM SIGCSE Technical Symposium on CS Education (SIGCSE '18), Baltimore, Maryland, USA, February 2018*, 2 pages.
https://doi.org/0000001.0000001

SIGCSE '18, February 21–24, 2018, Baltimore, MD, USA

ACM ISBN 978-1-4503-5103-4/18/02.
https://doi.org/10.1145/3159450.3159619

1 POSITION STATEMENTS (in alphabetical order)

1.1 James Caristi

I have twice team taught a course on Computing and Music with the chair of the Music Department at Valparaiso University, and we have plans to make this a regular offering in the General Education Program. There are, in fact, two courses involved: one with a MUS number and one with a CS number. They meet at the same time and place with both of us. Each course has its own set of learning objectives, but students learn both sets, even though they only get either Fine Arts credit (if they took MUS) or Quantitative Literacy credit (if they took CS). Students use Scratch to produce musical sounds and develop a project that is displayed to passersby during our Hour of Code day. The course is evolving toward more algorithmic composition and machine learning. Although our course is immensely popular and extremely highly rated, our detailed assessment shows that a negligible number of non-CS students intend to take another CS course after this experience. But this course does make them feel much more comfortable and knowledgeable about computing.

1.2 Jesse Heines

I team taught an interdisciplinary course called "Sound Thinking" once per year for eight years with three different colleagues in my university's Dept. of Music. (Please see jesseheines.com/~heines/91.212/91.212-2015-16s/ for the most recent course website, and compthinkinsound.org for the book by Music Prof. Gena Greher and myself on our experience team teaching this course.) Our experience with the students was consistently fantastic, and course enrollment tripled over the eight years. The interpersonal relations between faculty were always respectful, of course, but small clashes sometimes arose when the different demands of our different departments caused us to have different priorities. None of these small clashes was egregious, but it was important to keep in mind and account for the differences in our departments. Despite such small setbacks, I can say without reservation that the team teaching experience was as enriching for the participating professors as it was for the students.

1.3 Aaron Koehl

Our University was looking to explore interdisciplinary, co-taught courses. What two disciplines could be more orthogonal? Computer science changes rapidly with new advancements in technology, while music (academically) is considered new after 1850, so we took the challenge to integrate the two! I teamed up with our director of jazz studies and we attended an NSF workshop on computing and music to explore the idea. During the workshop, we sketched a design for what ultimately became Computing and Electronic Dance Music (EDM), a cross-listed major elective for both computer science and music. The offering was our most successful interdisciplinary course to date. We consciously avoided a course divided in half by discipline. Instead, both instructors were present and contributed at each class session, which required coordination and frequent meetings. After an exploration of the EDM genre, a viewing of a documentary on the Roland 808 drum machine, and sessions on music theory, students were introduced to technology in a well-equipped music lab. A discussion of sound waves led to sound synthesis of high hats, kick, and snare in PureData. This provided adequate foundation for students to develop their own sounds and sequenced music using Logic Pro, a professional digital audio workstation (DAW). Special class sessions were dedicated to rhythm, bass, software plugins, and the "Drop," a hallmark of the EDM genre. The course concluded with software-based lighting control and discussions of the Digital Multiplex (DMX) protocol. Students exhibited their final projects publicly during a "rave night" held in our studio theatre, with professional lighting and sound equipment.

1.4 Kelly Rossum

I served as the co-instructor (with Aaron Koehl) of the "EDM - Computing and Electronic Dance Music" course at our university. This class served as a special topics experiment to expand traditional music pedagogy into the realm of computer science and electronic dance genres. In addition to university level computational fundamentals, basic music theory, notation, and compositional approaches were delivered to a mixed class of physicists, information systems, and computer science majors, with the inclusion of a handful of interested musicians. As an indirect result of this course, the department has hired an electronic/new music specialist to lead a "Creative Studies" program that would include a music technology degree track. The overwhelming success of the EDM class has created a buzz within the student body, and we will probably be developing this course full-time in the near future.

1.5 Richard Weiss

I have taught Music, Math and Cybernetics with composer and music faculty Arun Chandra. This was a 16-credit program, in which students learned the basics of programming, 16-channel sound synthesis, and the principles of cybernetics as applied to social and musical systems. Evergreen does not have departments, so we did not have external constraints on the content of this class. This kind of team teaching is the norm. The students came from a range of backgrounds and about half of the students continued in computer science. It allowed them to combine their interests in music and computing. For the coherence of the class, it was important for Arun and me to talk frequently about the learning goals and scheduling events such as attending concerts. We had planned to create a piece together, but we did not allow enough time to do that.

2 PLAN FOR AUDIENCE PARTICIPATION

Each panelist will introduce his experience in no more than 8 minutes. With 75 minutes allocated for the panel, this will leave about 30 minutes for audience discussion. We will encourage audience members to raise issues with and obstacles to team teaching that we can all address collectively. Such issues might include difficulties in finding a compatible partner, in getting classes approved by governing parties, in synchronizing disparate schedules, and reconciling different department expectations. We expect a lively discussion from many perspectives, as the panelists themselves are from vastly different types of institutions. A summary of the obstacles and solutions presented will be prepared dynamically during the session and made available to all participants on a publicized website.