Final Project: SOUND + CODE + TEST

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MUE 598: Digital and Participatory Culture

Arizona State University

May 7, 2014

Rationale

The ability to interact meaningfully with tools and work collaboratively with others are two skills that are central to modern cultural engagement, according to Jenkins, Purushotma, Weigel, Clinton, and Robison (2009). These skills, distributed cognition and collective intelligence, are also central to modern musical engagements that students may encounter in their lives. Tobias' (2013) "typical ways people engage with music in participatory culture" (p. 30) all include some element of these two skills as individuals and groups work together to make use of digital, analog, and acoustic instruments, tools, and applications in creating remixes, covers, tutorials, etc. The development of such skills not only opens up pathways to the types of musical interactions indicated above, but also can afford students ways to engage in forms of participatory culture--affiliations, expressions, collaborative problem solving, and circulations (Jenkins et al., 2009)--in a music classroom, thereby creating new ways to connect and participate in such a setting. It is on these two skills, distributed cognition and collective intelligence, as well as the notion of collaborative problem solving that this music curricular project seeks to help students foster while encouraging them to play with sound in new and interesting ways.

The project described below involves student groups creating an intermedia product (Tobias, In Press) that connects sounds, a motion controller, and movement sequences in a unique way in which all the individual parts fuse together to create a unified product. In the project, students will generate and record sounds to be triggered by a motion sound controller they construct using the web-based computer programing tool Scratch. Students will then test these controllers by composing movement-sequences as a way of assessing the product's possible effectiveness as an interactive sound installation. This project makes use of the

instructional approach of design-based learner (Barron & Darling-Hammond, 2008) that operates on the understanding "that children learn deeply when they are asked to design and create an artifact that requires understanding and applications of knowledge" (p. 45). This approach encourages students to not only create a product that exemplifies their understanding and take-aways from certain experiences, but also to dialogue with the product and other members of their design team as they refine their work in a way that is dynamic and organic. In order to help with the refinement process, the project includes elements of pilot-testing and iterative design from the works of Birringer (2005) and Dena (2011).

The overall intent of this project is to give students chances to foster skills needed so they can more fully participate in modern cultural activities, including musical activities. Music teachers must realize their role in helping students develop these cultural skills and see, as Jenkins et al. note, "[e]veryone involved in preparing young people to go out into the world has contributions to make in helping students acquire the skills they need to become full participants in society" (2009, pp. xiv-xv). In developing these skills in musical settings, student will also develop musical analytical and creative skills in their explorations of multiple musical dimensions as they generate sounds to be used in the project, during their development of a motion controller, and while they explore space and pilot-test their work through movement sequences. A secondary overarching goal of this project is to demonstrate other ways that students and community members can engage with musical sounds and products in more participatory ways that do not necessarily function within the tradition of common participatory performances (Turino, 2008). This is embedded within the culminating sharing event. Finally, I hope that this project can illustrate ways of opening up creative and collaborative spaces for more participatory interactions with music within music classroom settings. Such spaces would

allow for lower-barriers to expression and engagement, a focus on creating and sharing musical works, higher-degrees of social collaboration, and greater student agency and ownership over their contributions (Jenkins et al., 2009) in the ways of musicking.

Setting

This project is planned not for a specific curricular setting or school but is intended to be an example of one type of inquiry-based project. In order to provide more concrete examples throughout, however, the project described here is planned for a hypothetical upper-elementary choral ensemble of 30+ members. This age level is selected due to student due to relative challenge posed by the tools selected. Scratch is intended for elementary school students and might be considered to childish for older students. The choral classroom setting is selected to highlight the way that project-based approaches can be catalyzed in larger ensemble contexts beyond their traditionally general music-centric expected settings. In generating sounds, students in such a setting may be more open to using their voices as sound sources, thus opening up the doorways for interesting discussions about vocal timbre, support, and technique during design-group and full-class meetings. Also, many choral ensembles make use of choreographed movements to highlight certain pieces and, as such, students in this setting may be more comfortable with movement-based activities. It is important to note that this project could manifest in any ensemble or general music setting, yielding slightly different and more nuanced discussions based on the setting. The entire project may take between 10 and 15 class meetings of 30 minutes.

The specifics of this project require that the setting has reliable internet access and six to 10 flash-enabled computers with web cameras and either built-in microphones or auxiliary inputs for microphones. Additional speakers will be necessary for each computer during the movement-

sequence/pilot-testing phase of this project. Also, based on example works explored in the beginning phase of this project, it will be useful to have access to numerous mobile touchscreen devices with Apple or Android operating systems.

Curricular Goals

This project focuses on helping students develop their skills of collective intelligence and distributed cognition in a design-based setting in which they will practice collaborative problem-solving through creating interactive sound installations. The enduring understandings of the project include:

- Musical works are structured in many ways.
- Humans make use of technological advances to make music (Bledsoe & Peterson, 2014).
- Humans often work collaboratively with others in creating and revising expressive products.

Embedded within this project are more specific music curricular goals. In order to best explain the embedded goals, I draw on Dena's (2011) before-during-after structure to break the entire project up into three phases in which I situate the creation of sounds and drafting of a motion controller as the "during" phase. In doing so, I will briefly describe each phase and then note the embedded goals. It is important to note that the phases of this project should not be considered to involve discrete, unconnected, or linear concepts as student groups may experiences the phases in a more recursive and open manner, music like the internet model (Miller, 2011).

Phase One

In Phase, students draw compositional strategies from example works of media.

- Students will identify and discuss pertinent musical dimensions of example works.
- Students will explain different ways music can be interacted with through the examples.

- Students will understand and be able to draw on compositional strategies used in creating soundscape and ambient musical works.

Phase Two

In this phase, students work in design groups to create/record sounds and a controller.

- Students will develop their creative thinking skills via sound finding.
- Students will enhance their analytical abilities to identify and describe sound sources.
- Students will foster their sound preservation skills by using digital recording tools.
- Students will develop a basic understanding of how sound controllers are created through coding.
- Students will explore how they can organize their work via the creation of a controller.

Phase Three

The final phase involves groups pilot-testing controllers through movement sequence.

- Students will develop their abilities to work collaboratively in creating, testing, and revising an expressive product.
- Students will be able to explain their artistic process to others.
- Students will develop their abilities to reflect upon their work.

Content and Context of the Curricular Initiative

In this section, I will first highlight a few concepts of this project that are drawn from digital and participatory culture. Then, I will further unpack this project by indicating the musical concepts, examples, and processes with which students will engage. I will also include problems to be posed to students and the ways in which student growth will be assessed.

Connections to Digital and Participatory Culture and Guiding Questions

Embedded within this project are numerous connections to digital and participatory culture literature. From media selected as examples to the inquiry-basis and iterative design focus of the project, this curricular plan demonstrates an overriding ethos of helping students see media as something to be "tinkered with" (Miller, 2011, p. 15) and help them become more active participants in musicking. Also, the outcomes of this project should provide a proof of concept that music classrooms can be a place that "embraces overlaps, combinations, connections, and blurred lines among music and ways of being musical" (Tobias, Forthcoming, p. 4) in the ways in which students are asked to play with sounds, movement, and technology. Through their collaborative work, students may begin to reconsider what it means to compose, to improvise, to dance, to code and, therefore, soften their conception of the arbitrary borders between these seemingly discrete means of interaction and production. Throughout the entire project, the teacher will pose questions that will help students begin to make connections and blur lines between what they see as "discrete" acts. Such guiding questions include:

- How are the ways you selected sounds and the ways you selected movements connected?
- What things (techniques, processes, etc.) did you do in one phase that could be similar to things you will be doing later? What might be different?
- How could you describe the processes you used during each step of your work? How might these processes be linked?
- What ideas can you take from one phase of this project and use in another phase?
- How could you use what you learned in this project in another setting? What are your big "take-aways"?

Also, this project may serve as proof of concept of how music education might "modify or transform their pedagogy and curriculum to integrate technology and digital media in ways that

are flexible, contextual, and connected to diverse ways that people engage with music" (Tobias, Forthcoming, p. 7). Woven throughout this project is the idea of the teacher as facilitator and collaborator rather than teacher as lecturer or depositor of knowledge that is implicit within more traditional, banking model pedagogies (Freire, 1970/2012). Throughout the phases, the teacher may facilitate full or small group discussions and provide scaffolding questions to help student groups have discussions, critique their work, and make connections. At other times, the teacher may lead students through mini-lessons that isolate challenging concepts or highlight new tools and/or strategies as a means of responding to their needs and scaffolding their learning. Overall, it important that the teacher acts as a member of the class community and respects the students by empowering them to facilitate, lead, and grow on their own. Instead of setting up a dichotomy of the "right" way to approach phases, processes, and/or tools over all other possibilities, the teacher must introduce their ideas as one of many possibilities available to students. In discussions and mini-lessons, students should be encouraged to provide other alternative approaches or solutions. This can be accomplished by having the teacher ask students to problematize teacher-created solutions. The teacher may ask students:

- Could this approach be more complicated that it needs to be?
- How might you solve this problem?
- What could this solution help you do?
- What could this solution leave out?

Musical Concepts, Processes, and Problems

This project has at its foundation the musical process of music creation and organization—composition. Throughout the phases, students engage in imaging, creating, preserving, and organizing sound. Students even compose movement sequences. Yet, composing

may be too discrete or stigmatized a term to fully encompass how students are engaging during this project. To give a more accurate portrait, below are some general musical concepts students may encounter:

- Pitch and rhythm are central musical dimensions people play with when creating music.
- Timbre and texture are uniquely related.
- The manipulation of melodic material can lead to interesting harmonic musical content.
- There are many ways to organize music into form, including by creating a controller.

In addition, the project leads the students to engage in the following musical processes:

- Creating, organizing, and preserving sound (composing).
- Discussing sonic, organization, and technical properties of musical works (analyzing).
- Recording, labeling, and describing newly created sounds (notating).
- Triggering and interacting with sounds via movement (responding).
- Creating and programing a unique motion controller (coding).
- Discussing and giving feedback regarding one's own group creation and the creations of other groups (analyzing and responding).
- Sharing finished products with others (performing).

Lastly, the following musical problems will frame each phase of the project:

- Phase one: How do and can people organize sound?
- Phase two: How might you organize sounds as a way to create an interactive musical work?
- Phase three: How can you test the effectiveness of your work?

Media and Tools Used

During the opening phase of this project, students will interact with, discuss, and draw strategies for their own work from numerous media creations. The media works discussed here are selected either due to their familiarity or the way in which they exemplify concepts or processes explored in the project. Throughout, students will also be encouraged to bring in media from their own experiences and research new works to discuss and serve as examples.

In order to provide a foundation of how music is organized, students will first explore the popular songs *Problem*[1] by Ariana Grande and *Demons*[2] by Imagine Dragons, as well songs of their own choosing. Both pieces indicated above were selected for either their popularity on the radio or their appearance on iTunes top downloads list. Both of these examples, and possibly the examples offered by students, are organized using a song-form with the melody as the primary driving musical element. They also display traditional homophonic harmonic structures and related percussive patterns. Some also demonstrate repeating rhythmic ostinati or "beats."

As students may not be familiar with ambient, soundscape, or interactive sound installations works, the teacher must supply examples for students to engage with and as a means from which to draw concepts. The examples I selected include one recorded track, one web-based interactive work, two interactive/generative sound applications, and one example of a controller as composition created by myself. Brian Eon's *2/1*[3] from *Ambient 1: Music for Airports* is an example of a differently structured work that draws on vocal sounds without a specific melodic drive or traditional form-based organization. *In Bb 2.0*[4] by Darren Solomon is an example of an interactive soundscape work where the "composer" collected and organized sound fragments and placed them into an interface for users to engage with as they create an

[1] https://www.youtube.com/watch?v=SoJ8s90NLc4
[2] https://www.youtube.com/watch?v=mWRsgZuwf_8
[3] https://www.youtube.com/watch?v=0R-mscnjI14
[4] http://www.inbflat.net/

ever-changing musical experience. The interactive apps *Bloom*[5] by Eno and *Polyfauna*[6] by Radiohead and Universal Everything display similarly interactive ways for users to engage with musical material that creators have embedded within a programmed atmosphere that responds to the user's interactions. Finally, my own creation, *Sound Field Generator*[7], is used as an example of a controller as the sole organizing factor for a work.

As suggested by Barron and Darling-Hammond (2008), it is useful to provide relevant resources for students. One useful resource is a tutorial video created by KRNFX and Maker Music[8] about how to beatbox. As students explore the sounds afforded to them by their voices, they may want to explore beatboxing, which is an extended vocal technique that some students might not consider using at first. The rest of the resources provided serve to help student groups in learning how to use Scratch. I have generated a list of general FAQ and tutorial sites in the form of a Diigo[9] list for students to use when learning Scratch. However, it may be more useful to embed the links onto a school or class website for ease of use and access. Finally, I have generated a short tutorial[10] on how to create a motion controller in Scratch similar to *Sound Field Generator*. This tutorial will be provided to groups who have difficulties discovering or learning how to make use of Scratch on their own.

Throughout the project, students also interact with a few technological tools. In the introductory phase of this project, student will experience the media examples listed above as materials from which to draw strategies and technique to use in their own work. To facilitate the

[5] http://www.generativemusic.com/bloom.html
[6] http://www.radiohead.com/deadairspace/140211/PolyFauna
[7] http://scratch.mit.edu/projects/20536719/
[8] https://www.youtube.com/watch?v=q8fHwMbdI90
[9] https://www.diigo.com/list/jesse_rathgeber/Scratch/38enesoap
[10] https://www.youtube.com/watch?v=FVYKNLJx4Ms

collection of these findings, students record their ideas into a collaborative mindmap[11] generated via the website mindmeister. Groups will keep track of their ideas and end of class reflections using a Google document. Also, groups will record sounds using the free website Vocaroo.[12] This tool easily allows students to record audio and then export the sounds as .mp3 or .wav files. These files will be saved to a group file on Google drive. Cloud-based applications and tools are used throughout this project so that students do not need to be tied to the same computer and/or device from class meeting to class meeting.

It is important to note that I suggest the use of these specific tools not out a sense of technocentrism or fetishism, but due to their relative ease of access as well the lowered barriers for students to make use of the tools. These tools have their own inherent constraints and affordances and it is possible that other tools might also be useful (Tobias, In Press). Yet, my personal experiences and experiences working with students of this age group as they made use of the tools suggest that they are right for this project.

Embedded Forms of Assessments

Assessments are embedded throughout the course of this project. The use of assessment here draws heavily on Tobias (Forthcoming) as they occur in forms "ranging from observing students' engagement to having them articulate challenges [and] successes" (p. 32). Discussion and reflection provide some of the strongest formative assessments. These assessments will yield information regarding student discoveries and challenges that the teacher will use in adapting instruction and pedagogical approaches as well as developing topical mini-lessons. The daily iterations of group-constructed controllers will also provide formative assessment documentation. Also, each group's Google document will function as formative assessment

[11] http://www.mindmeister.com/409892830
[12] http://vocaroo.com/

material in the process of working on the project as the teacher can draw from it to adapt instruction. The same document can then be looked at as a summative assessment document of student growth upon the project's culmination. Finally, at the end of the project, each student will write a reflection that will be used as a summative document. Students will be asked to share their reflections and explain their final products at the culminating event.

Instructional Strategies/Process

In this section, I will first provide a basic overview of the project. Then, reflective of the tripartite nature of this project, I will narratively explain and frame each phase of the project. I will indicate the expected duration in class meetings for each phase, though the phases and the durations should be considered highly flexible based on the needs and interests of the students.

Overview

In this project, students will work in collaborative design groups over the course of ten to fifteen class meetings to create and record sounds, craft a motion-controller to trigger the sounds, and test the controllers and sounds via the generation of meaningful movement sequences. To ground their work, students will first explore soundscape, ambient, and interactive musical works from which they may compile a set of strategies to use in creating and/or collecting sounds. Next, design groups will interact with the web application/coding language Scratch to craft their own motion controller. Finally, through creation movement sequences that make use of the Scratch controller, students will interact with and revise their sounds and controller as a way of pilot-testing their work.

Phase One: 2-3 class meetings

To begin this phase of the project, the teacher will ask students to seek out and discover different ways that people organize. To frame this inquiry, students will listen to *Problem* by

Ariana Grande, *Demons* by Imagine Dragons, and pieces of their own choice. While students listen, they will be encouraged to talk to peers about what they hear and how the sounds are organized. After the partner/small-group discussions, students will share their ideas and the teacher will help students discover organizational strategies at work in their examples. Then, students will explore the Internet and available classroom media for examples of music that is organized in different, less linear ways. The teacher will suggest that students search using keywords like "ambient music," "sound installations," and "soundscape". As they find example works, students will add to a teacher-curated list of music organized in non-traditional manners. After this exploration, students will explain what they found and what they learned about the keywords in a whole-class discussion. In this discussion, the teacher will attempt to problematize the situation by asking students if there are other ways that music can be structured beyond focusing on melody and/or lyrics.

The teacher will introduce the project to the students by describing the final event and overall arch of the project. The teacher will then pose the following essential questions:

- What are some ways that music can be structured other than melodically or lyrically?
- What ways can people control and play sounds?
- What ways other than watching/listening/playing through a performance can people experience and engage with music?

The students will also share their own driving questions. Next, to demonstrate some other ways that people have organized sounds and to provide students with examples from which to draw techniques, the teacher will give students time to explore the following works in self-selected groups of three to five students: *2/1* from *Ambient 1: Music for Airports* and the app *Bloom* by Brian Eno, *In Bb 2.0* by Darren Solomon, the app *Polyfauna* by Radiohead and Universal

Everything, and *Sound Field Generator* by myself. In their explorations, students will create group lists of comments about what they notice about each work, how the people created the sounds in their manipulation of musical dimensions, and how the sounds are organized and/or triggered. Students will add their findings to the already-created collaborative mindmap. Following the group inquiry, the entire class will reconvene to discuss what the students discovered. The teacher will display the mindmap and ask students to discuss major ideas they drew from the examples that they may use when creating a similar work. This drawing upon the ideas of others, students will be working with and fine tuning their abilities to appropriate not only musical/cultural works, sampling and remixing the content (Jenkins et al., 2009), but doing so with the concepts that undergird these products. If needed, the teacher will direct students' attention to Darren Solomon's *In Bb 2.0* submission instructions that indicate the following basic sound creation constraints/strategies:

> -Sing or play an instrument, [specified] scale.
>
> [-] Simple, floating textures work best, with no tempo or groove.
>
> [-] Leave lots of silence between phrases.
>
> -Record in a quiet environment, with as little background noise as possible...
>
> -Thick chords or low instruments don't work very well. (Solomon, n.d.)

Phase Two: 4-5 class meetings

This phase sees the students creating and recording sounds and then developing a motion sound controller in Scratch. As a whole class, the students will discuss different ideas and/or ways that they might be able to work toward solving the problem: "How might you organize sounds as a way to create an interactive musical work?" When students begin to discuss how they will organize or trigger their sounds, the teacher will suggest that they use Scratch. If some

students know of other ways to create similar controllers, the teacher will work with them in following their own paths.

In this phase of the project, students will continue to work in their self-selected, phase one groups. However, each member of the group will now have a specified role, as suggested in Barron and Darling-Hammond (2008). The roles will be created through a whole-class discussion with the teacher asking students what possible job they might need in creating an interactive musical work that uses music, computer coding, and movement? If necessary, the teacher can provide ideas like: a producer who is in charge of keeping the group working and on-task, an engineer who will take care of all recording and technical needs, a resource manager who will keep track of time and all resources used by the group, a reporter who will regularly update the groups' work and collect end of class group reflections via a Google document, and researcher who will seek out solutions to any inquiries or problems the group encounters. The roles can be rotated within the group every few days, if necessary. Each group will decide how they will split up the roles and work with the teacher helping if needed.

During the sound generation and collection part of this phase, the teacher will ask groups to come up with approximately 20 different sound fragments. First, the teacher will suggest that students generate 10 sounds using their voices. As the groups work independently to discover sounds, the teacher will walk around and ask students questions and/or facilitate small discussions regarding different vocal techniques that can be used to create unique sounds, even drawing the student's attention to the sounds possible through beatboxing. Groups will record their sound fragments using Vocaroo, exporting each file to their hard drive. Groups will label each sound fragment and provide a description for each on the group's Google document. After students have recorded their vocal fragments, they will be charged to explore the sounds afforded

to them by the environment. To add to the possible sound sources, the teacher may bring in some simple percussion instruments and students will be encouraged to bring in their own instrument from other ensembles or home. As the groups work, the teacher will rotate around, asking questions about their strategies, and remind them of the strategies from the class mindmap.

Next, students will begin to interact with Scratch, or other controller application if they have some expertise in it, to construct a motion controller. The teacher will ask students to revisit *Sound Field Generator* and look into the actual code to figure out how it works. This model is given to help students begin to think of a possible way to go about using Scratch to make a sound controller, though the teacher should be responsive about helping students think through other avenues they may explore. While they interact with the coding of *Sound Field Generator*, if groups are able discover how to use Scratcho, they will be encouraged to start constructing their own controller. If some groups have trouble, the teacher will provide the curated list of resources and, possibly, a teacher-created tutorial. Each group will have a teacher-generated login for Scratch, though they are free to use their own if they have one. At the end of each class period, the teacher will ask the producer to save a copy of the work with that day's date in the title and the reporter to share a link to copy on the Google document so the teacher can see each group's progress and see possible problems that need to be assisted with during the next class. These iterative copies will act as draft examples and also allow students to go back to an older copy if a major issue arises.

As the groups create their controllers, they will be encouraged to upload each of their sounds into their Scratch project and have an individual sprite, which is the term for an image in Scratch, for each sound. Once all sounds are loaded and sprites are created, the teacher will ask

groups to begin to discuss the intended layout of the controller. The teacher will ask groups to think about how they will want the controller to function, asking them question similar to these:

- How can the placement of sprites/sounds affect the overall way the controller functions?
- What types of movements might you make to trigger each sound and what might you need to do to make sure it works?
- How many people will be able to use your controller at once?
- How close or far away will users need to be to use your controller and how does that affect how you will organize the sprites?

The answers to these questions should be typed into each group's Google document to act as important design points that will help determine how the controllers are altered in the next phase. Groups will create a first version of their controller, editing out any sprites or sounds that they find to be unneeded and creating a thoughtful organization for the controller. As they generate this first iteration, the teacher will encourage them to begin to physically interact with their controller and transition them into phase three.

Phase Three: 4-5 class meetings

In the final phase of this project, students pilot-test their controllers by creating meaningful movement sequences. The terms "meaningful" and "sequence" are used to indicate the necessity for students to plan out movements that not only trigger the sounds in an interesting and organized manner as a way of creating a performable product, but also as a mean of directing students' attention towards testing out the capabilities of their motion controllers. Based on design points generated in phase two, students will either create group or individual movement sequences. During this phase, the teacher may want to bring in a physical education specialist or dance instructor to help students think about different ways they might use their bodies in

exploring space and triggering their controllers. As the groups create their sequences, the teacher will rotate around the classroom, asking student groups how their controllers are working in relation to their movements and how they might alter their controllers to make them function more effectively toward their stated ends. The intent here is help students think about how they might revise their work and begin to enter into dialogue with each other and the tool they have created via informal pilot-testing (Birringer, 2005). The rest of this phase involves interactive design as a means of revising works.

Once students feel comfortable with their controllers and movement sequences, they will share their works in class. During these sharing opportunities, the teacher will facilitate a question and answer session between the sharing group and the rest of the class. The teacher will help students pose questions to the sharing group about their movement sequences, sounds, and/or controller prior to offering suggestions. The reporter will record the questions posed and eventual suggestions into the group's Google document. After all groups have shared, the entire class will break back up into design-teams to discuss possible alterations to their work.

At this point, the teacher will reintroduce the final goal of the work, that of sharing the controllers as interactive sound installations. The teacher will explain that the class will host an event for their friends, families, and teachers to come see and interact with their works. In preparation for this, the next class period will be a chance to have non-group members interact with the controller and pose questions and suggestions for revision to its creators. This second share session will occur in the form of a gallery-walk in which all the computers/controllers and auxiliary speakers will be set up around the room. Two or three representatives of each group will stay with their controller while the other members circulate around the classroom, trying out other groups' controllers. Representative group members will collect new user comments and

input them into the group's Google document. All members of a group will have the chance to explore the other controllers as members switch roles. After the sharing session, groups will reconvene to revise their work. Groups will also be asked to think of where in the school their work should be installed. If possible, students should be able to give their works a final trial in their desired setting so they can fine-tune it even more so.

The Event: 1 night

The final sharing of the student works will take place at an afterschool or weekend exposition. Leading up to the school event, students will be asked to reflect on the entire process and create a short statement of what they have learned and how they foresee themselves using the knowledge and skills developed in the process in other settings. The reflection will be posted alongside the installation. At the event, those in attendance will walk around interacting with the installations. The student groups will stay with their controller and will explain what they have created. The event may end with a demonstration of a new whole-group installation where those in attendance add new sounds to a preexisting controller with volunteer students coding the work into Scratch, which is projected for all to see. The installation could be set up at the exit so that everyone will interact with it on his or her way out. The students can then have an informal interview with family, friends, and/or teachers to ask they what they thought, learned, and any questions they had. This information could be used as an interesting assessment point.

Resources

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