CHAPTER 8 EXPLORING NEW MEDIA MUSICALLY AND CREATIVELY

INTRODUCTION

Innovations in new media and ICT are inspiring children in their creative play at home and in schools (Somekh, 2007). Today's computers, both desktop and mobile, can now be considered musical instruments in and of themselves (Ruthmann & Dillon, 2012; Thibeault, 2012), and are inspiring new practices that integrate sound, image, touch, and video as the medium and method of musical expression[1]. These practices parallel the emerging trend that today's youth are now more often going to You Tube to find and listen to music, rather than listening to mp3s and CDs[2]. With the growing prevalence of mobile devices like iPhones, iPads, and smart phones, our children now have access to powerful music making applications and new models of creative musicianship *at their fingertips*, providing new avenues for creative engagement within and outside of our music classrooms.

This chapter provides an introduction to projects and tools for exploring the creative dimensions of new media with primary pupils. I begin with an introduction to creative musicianship with new media, followed by an overview of tools for creating and being creative with new media. These tools are discussed in the context of practical projects and creative strategies for teacher and pupil exploration within primary classrooms. The first project I share focuses on a mobile app for Apple's iDevices[3] - the application *Singing Fingers*[4], which enables children to "finger paint in sound" connecting physical gesture, drawing, and sound. The second project focuses on creative performing, improvising and composing experiences with the Scratch multimedia programming environment[5] created by the Lifelong Kindergarten Group[6] at the MIT Media Lab.

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[1] See Kutiman's 'Mother of all funk chords' - http://www.youtube.com/watch?v=tprMEs-zfQA, Lasse Gjertsen's 'Amateur' - http://www.youtube.com/watch?v=JzqumbhfxRo, and Pomplamoose's 'Hail Mary' – http://www.youtube.com/watch?v=fYy2p_0DVMU.
[2] Smith, E. (August 14, 2012). Forget CDs: Teens are tuning into You Tube. Wall Street Journal. Retrieved from http://online.wsj.com/article/SB10000872396390444042704577587570410556212.html.
[3] iPad, iPhone, and iPod Touch.
[4] http://singingfingers.com/
[5] http://scratch.mit.edu/

WHAT IS NEW MEDIA MUSICIANSHIP?

New media musicianship is a broad collection of creative musical practices where video, images and sounds are interactively used as the medium for musical expression. Today, artists such as Kutiman[7] browse YouTube for videos and remix them using video-editors into completely new musical compositions. The band Pomplamoose[8] has pioneered the genre of the *video song* where all layers of the musical texture recorded in their songs appears via split screen technology in the video, providing a window into contemporary music recording production techniques. Choral composer Eric Whitacre invites and *crowdsources* singers from around the world to submit videos of their singing, which are stitched together into his multimedia Virtual Choir[9] performances. One of the common aspects across these three examples is that music, image and sound are present together in both the final product and throughout the creating process.

The innovative practices and technologies described and linked to throughout this chapter provide a glimpse into ways children use these technologies to make music with media they find culturally valuable and relevant (Ruthmann & Dillon, 2012). Children can more easily take on the musical roles of curator, video editor, producer, re-mixer and programmer of musical media with these technologies. New web-based and mobile tools open access to children's music making experiences using interactive webpages running on a computer or mobile device they have at home or at school. The simplicity of not having to download expensive and complicated music production software affords children and their teachers access to musically complex creative media making experiences producing digital stories, creating animations, designing musical instruments, video games, and interactive soundtracks. For example, the Scratch visual programming environment[10] is home to over 2.6 million child-created interactive multimedia projects; over 500,000 of them include creative use of music and sound.

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[6] http://llk.media.mit.edu/
[7] http://thru-you.com/
[8] http://pomplamoose.com/
[9] http://ericwhitacre.com/the-virtual-choir
[10] http://scratch.mit.edu/

The tools for exploring new media musicianship can be sub-categorised into tools for *social media musicianship*, *video-edited musicianship*, *tangible media musicianship* and *computational media musicianship*. Social media musicianship tools include blogs, wikis and social networking sites where music is discussed, shared and collaboratively created, such as online music notation platform Noteflight.com and audio remixing platform Indaba.com.

Video-edited musicianship tools are online and mobile apps where children can remix and edit videos as the musical medium. YouTube's interactive video editor, Smule's *MadPad*[11] application for mobile music video sampling, and interactive websites like InBflat.net provide children access to basic creative video editing in musical contexts within internet browsers and on their mobile devices.

Tangible media musicianship tools harness children's touch and gesture as the central method of exploring and being curious with musical media. Examples of these technologies include the iPod and iPad app *Singing Fingers* (discussed later in this chapter), the interactive Sifteo Cube[12] game environment, and the MaKey MaKey[13] sensor interface, where children can easily turn the physical environment around them into a musical instrument.

Computational media musicianship tools engage children in making music through computational, mathematical and pattern-based processes. The Scratch multimedia programming environment, as well as the interactive musical media websites Bohemian Rhapsichord[14] and Bangarang Boomerang[15] engage children in building, designing, remixing and making their own musical instruments, games, and music.

The common thread across all of these categories of new media musicianship is that children are new producers, designers and creators of musical environments, in addition to the traditional roles of performer and listener. These tools provide opportunities for students to use their voices, sounds and the environment around them as musical instruments inside our classrooms and also at home. It is incumbent upon us, as teachers, to encourage and study these practices and develop new pedagogical strategies

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[11] http://www.smule.com/MadPad
[12] http://www.sifteo.com/
[13] http://www.makeymakey.com/
[14] http://bohemianrhapsichord.com/
[15] http://static.echonest.com/BeatDriver/

that foster our children's musical agency and learning. I encourage you to take plenty of time to explore the linked websites, tools, and videos yourself to experience first hand these new tools. If our children have access to these tools and are making music with them in their free time, it is our responsibility to get to know them and make space for them within our classrooms.

CREATIVE STRATEGIES FOR SINGING FINGERS

Singing Fingers is an interactive media application that allows young children to "finger paint" and play with sound. When the application is loaded, the user is presented with a blank drawing surface. The user simply sings or makes sounds while touching and drawing along the surface of the mobile device (see Figure 1). When you have finished singing and drawing, the application automatically turns into playback mode, where the user can retrace their drawing, performing back the drawing they recorded. The user can touch or trace the drawing forward, backwards, or anywhere colours are drawn on the screen. If you do not like what you've recorded, you can wipe the screen and start again. And, if you really like your creation, you can save it and share it for playback and interaction at a later time.

Drawings made with Singing Fingers are also designed to be performed via multi-touch. This feature enables you to play chords with your drawings, or even a multi-part drum kit if you record non-pitched sounds. Melodic sounds are mapped to the colours of the rainbow, which correspond to each note of the chromatic scale. For example, a note in any octave is always the same colour. Non-pitched sounds show up in various shades of grey. This visual and musical design distinction opens up many possibilities for creative visual, musical and gestural expressions with Singing Fingers.

Figure 1. *Singing Fingers* – http://www.singingfingers.com/.

Fingerpainting in Sound

Activity 8.1: Fingerpainting Your First Music with Singing Fingers

1. Invite children to sing a song they know.
2. Using one iPad, invite the class to sing a phrase of the song and select a pupil to draw while the class sings the song.
3. Invite children to come up and try different ways of performing the drawing. What happens when you trace it fast? What happens when you trace it slow? Forwards? Backwards? Stopping and starting?
4. Ask the children if they can figure out why certain notes are different colours. Do they notice a relationship? Can they explain the reason behind it?
5. Clear the screen and draw a staircase while singing an ascending scale. Each step of the staircase should display as a different colour. Lead the children in the song again and ask them to think of the first note. Invite a confident pupil to find that note on the staircase. Work with that pupil and the whole class in finding and performing the melody of the song they just sang on the drawn staircase.

> 6. Invite children to come up and perform parts of the melody while the whole class sings.

Activity 8.1 is designed as an orienting, whole class introduction to *Singing Fingers* assuming that you only have one mobile device available. As the teacher, you have the opportunity to model not only how *Singing Fingers* works, but also to model and introduce creative thinking and performance of the drawing. Because *Singing Fingers* is also a visual drawing tool, it is ideal for experimenting with and reinforcing concepts such as pitch relationships, rhythm, timbre, tempo and texture, many of which are visual and gestural metaphors for sound (higher, lower, shorter, longer, slower, faster, etc.).

In addition to using *Singing Fingers* to record and perform melodies, it is great for recording and performing percussive sounds and rhythmic ostinati. A possible extension to Activity 8.1 is to record vocal percussive sounds emulating a drum kit. Invite children to think of sounds and record and draw them on *Singing Fingers*. You with the pupils could then perform a rhythmic accompaniment to the song you sang using Singing Fingers.

Another strategy that is useful with primary pupils is to pre-record and draw various musical examples. Sometimes it is easier for younger pupils to work with drawings that have already be created, rather than go through the process of creating the drawing and then performing it. An idea you might consider is to record melodies that have different pitch contours on the *Singing Fingers* screen:

- Record and draw a melody that ascends
- Record and draw a melody the descends
- Record and draw a melody that ascends and descends
- Record a melody using only one pitch

At this point, you can invite children to look at the four straight lines you drew and recorded. Ask them if they see any visual differences between them. Before you perform them, ask them to hypothesise what they think the lines will sound like when traced. Invite the children to trace the lines and test their hypotheses about the melodic contour. What happens to the melodic contour when you trace the line backwards? *Singing*

Fingers can be a wonderful platform for musical problem solving[16], hypothesising, and exploring one's curiosities[17] in music and sound.

Singing Fingers provides an environment where children can be creative and explore the musical possibilities of their own voice. It is a space where children can make their musical ideas visual, audible and tangible, and easily share them with others. As a teacher, having access to children's musical ideas across multiple forms of representation provides additional insight into their ideas, challenges and learning process. The opportunity to learn and experiment with music and gesture through exploratory play can lead to deeper creative engagement with music.

BEYOND JUST PERFORMING

With Singing Fingers, children can explore multiple musical roles. The most obvious role is that of the *performer* and *curator* of the sounds that accompany THE drawing. Children either generate the sound themselves through singing, speaking, or making other types of sounds, or they can have others create the sounds while they draw. Once the drawing is on the screen, pupils take on the role of *improviser*, exploring and experimenting with the drawing, looking for interesting sounds and patterns. Once the drawing is set, it becomes a platform for *composing* and *arranging*, either alone by the pupil, or as part of a shared duet or trio small ensemble with other friends. The drawings can be saved for use by other children in the class or in other classes.

Once you and your pupils have had some beginning experiences with Singing Fingers, invite them to create their own free drawings and compositions[18]. For older, more experienced pupils, it may be easier to share mobile devices and integrate them into small group work. Singing Fingers works well in duets or trios of children, as they can all interact with the drawings. Singing Fingers also lends itself to integration with classroom singing, collaborative performance with other classroom instruments, and improvisatory

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[16] For more practical ideas exploring musical problem solving in primary music education, see Wiggins, J. (2010). *Teaching for Musical Understanding* (2nd edition). Rochester, MI: Center for Applied Research in Musical Understanding.

[17] For practical strategies facilitating children's musical curiosities, see Greher & Ruthmann's (2012) summarization of the work of Jeanne Bamberger.

[18] If you have multiple mobile devices, it is helpful to have several headphone splitters and headphones to keep the sound levels low enough for optimal recording.

works. Pupils can all start from the same starting picture, or can be asked to create their own, based on their level of comfort and experience with music and Singing Fingers.


Activity 8.2: Design Your Own Instrument

1. Invite children to imagine an original musical instrument. To help get their ideas flowing, ask them: If you could design you own personal musical instrument, what sounds would it make? How would you play it? What would it look like? Provide blank sheets of paper and coloured markers for pupils to explore and draft their ideas. This is useful if you have a limited number of mobile devices with Singing Fingers available.

2. Invite children to create, draw and record their instrument into Singing Fingers. If you have multiple mobile devices, this can be an individual or partner project. If you only have one, or a few, you can make this a whole class or small group project.

3. Once children have created their instruments, give them time to explore it and to make changes. As with any musical instrument, it takes time and practice to master it. Be sure to provide enough time so that pupils can explore the creative possibilities of their instruments.

4. Invite children to create an original composition with their Singing Fingers instrument and rehearse it.

5. Invite pupils to present their instrument to the class and give them time to perform the composition they created with their Singing Fingers instrument. Be sure to have them save their drawn instrument for archiving.

CREATIVE STRATEGIES FOR USING SCRATCH

Scratch is a free, visual programming environment created by the Lifelong Kindergarten Group at the MIT Media Lab[19]. This environment was created as a means for children to "remix" and "play" with computer code in the same way that DJs and turntablists remix, play with, and recombine musical samples and drumbeats. Also inspired by LEGO building blocks, children are asked to *imagine, program, and share* blocks of computer code, creating simple to very complex interactive computer programs and animations as a result. Rather than just being *consumers* of technology and games, Scratch enables children to be the *designers*, *producers*, and *creators* of the games. Additionally, the Scratch website serves as an online community of practice for both Scratch users and teachers to upload, discuss, and share the projects they create.

Kafai, Peppler, and Chapman (2009) profiled children's use of Scratch in afterschool *computer clubhouses* in greater Boston, Massachusetts. Their work documents how Scratch and the clubhouse teachers and environment inspired children to think of themselves as competent, creative and critical thinkers and learners. In the clubhouses, this was accomplished through a approach to the design of Scratch and the children's experiences where they actively build and design the tools with which they work.

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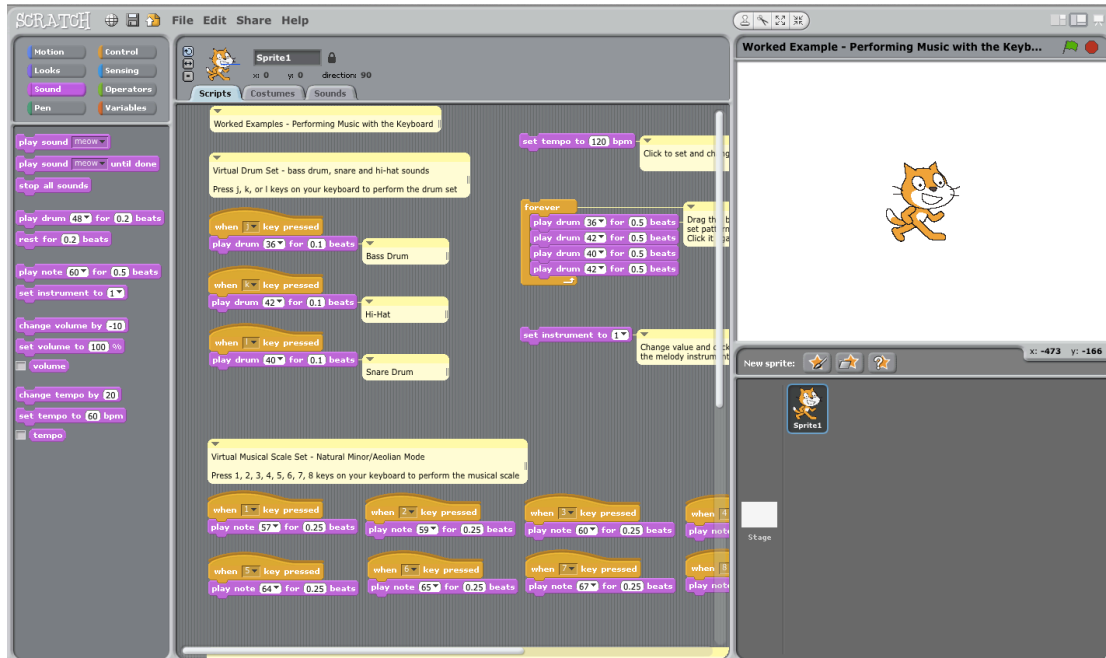
[19] Scratch can be accessed at http://scratch.mit.edu/.

Figure 2. *Screenshot from Scratch 1.4 – http://scratch.mit.edu/.*

Scratch is designed so that primary school age children can easily enter into computer programming experiences, while providing enough complexity to enable the creation of sophisticated projects by motivated pupils. This is, in part, accomplished through careful design and by putting the processes of play and remixing at the centre of the learning experience.

While Scratch is a general purpose programming environment designed for kids, it has a strong set of musical and sonic capabilities[20]. The music and sound blocks (see left side of Figure 3 on previous page) enable children to work directly with musical concepts such as pitch, melody, duration, rhythm, tempo, tone colour, form, texture, and volume, among others. Children can record in and edit their own sounds and sound effects, or they can create drumbeats and musical riffs, sequences and songs that accompany and interact with their animations and computer games. As a result, Scratch is a sophisticated, yet accessible, platform for musical and computational play that can foster creative expression among primary school age children.

GETTING INTO SCRATCH

With the metaphor of "remix" at the centre of the design of Scratch, children are encouraged to first visit the Scratch website - http://scratch.mit.edu - to browse and play one of the over 2.6 million projects created by kids across the world. Once children find a project or game that they like, they can simply click a button to literally "see inside" the project, which exposes all of the programming code, animations, sounds, and images that were used in the creation of the project.

A simple introduction to working with Scratch is for pupils to replace the images and sounds of the main objects (called "Sprites" in Scratch) in one of the Scratch games with their own, using Scratch's built-in image and sound editors. Pupils who are more

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[20] For more examples of projects and information on teaching music with Scratch, visit http://scratchmusicprojects.com and http://performamatics.org/.

experienced with Scratch can further play with, explore, and remix the inner code to any project as a way to learn how it was created or to make it their own. Though one can begin with a blank project and start from the ground up, this can be intimidating to pupils (and teachers!) who are new to computer programming. Starting in the "middle" by remixing existing programs is often the most accessible entry point for primary age pupils.

There are many tutorials and related resources for getting started with Scratch available online. Many of these can be found on social media sites, such as YouTube and on the educators' page for Scratch at http://scratched.media.mit.edu/. I encourage you to search out introductory tutorial videos to watch and also to connect with other primary educators working with Scratch on the ScratchEd site as you explore the project in this section of the chapter.

MAKING MUSIC WITH SCRATCH: PERFORMING WITH A KEYBOARD

The project I am sharing with you starts with the principles of creative musical play and sound exploration. To begin with, download and open the example Scratch program - ScratchMusicKeyboard.sb[21] - in your version of Scratch. In this project, we're starting with a small, working program that turns your computer keyboard into an interactive drumset and melody player. You can choose to start from the example program, or open a new Scratch file and duplicate the code, as shown in Figure 4.

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[21] You can download the ScratchMusicKeyboard.sb file that accompanies this chapter at http://bit.ly/scratchmusickeyboard.
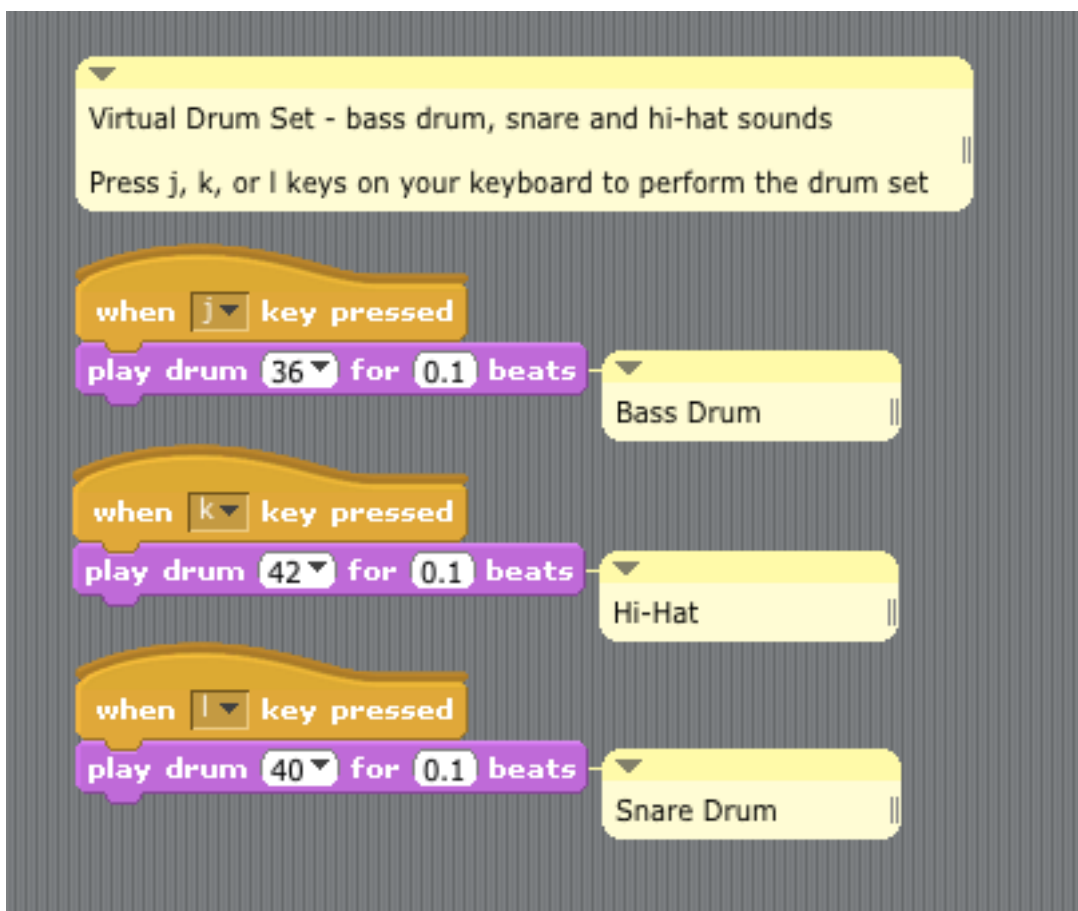
Figure 3. *Code for a keyboard drum kit in Scratch.*

When you've downloaded opened the ScratchMusic.sb file in Scratch, take a moment to view the first set of blocks (see Figure 4 on the previous page) and press the 'j', 'k', and 'l' keys on your computer keyboard. If your volume is turned up, you should hear the three basic drum set sounds of a bass drum when you press the 'j' key, a hi-hat when you press the 'k' key and a snare drum when you press the 'l' key. This simple set of Scratch blocks maps the computer keyboard keys to perform three drum sounds when the keys are pressed. In Scratch, the blocks can be *read* similarly to regular language. For example, you can convert the top set of two blocks into the following statement:

> *When the 'k' key is pressed,*
> *Play drum sound '36' for '0.1' beats.*

Take a couple of minutes to play around with those keys and drum sounds. Can you find and perform a drumbeat?

The yellow blocks in Scratch are referred to as "event" blocks. In this case, they are "listening" for when a specific key on the computer keyboard is pressed. If it is pressed, Scratch detects that *event* and does what the next block in line tells it to. In this case, each of the three "when ____ key pressed" blocks is connected to a "play drum" block. Whenever one of the specified keys is pressed, the "play drum" block plays the sound of the specified drum.

In the ScratchMusicKeyboard.sb project file, the 'j,' 'k,' and 'l' keys are assigned to the drum sounds and the drum instrument values of '36' (bass drum), '42' (hi-hat), and '40' (snare drum). Other drum sounds can be selected by clicking on the black triangle to the left of each number and changing the values in the "play drum" block. This action brings up a list of many different drum sounds that can be used and assigned to various keys on the keyboard. Additionally, any key on the keyboard can be mapped to any sound in Scratch.

REMIXING THE SCRATCH DRUMSET

While it is possible to create interesting drum rhythms using just a bass drum, hi-hat and snare, encourage your pupils to explore additional sounds by remixing and duplicating the existing ScratchMusicKeyboard.sb code. Pupils are also not limited to only three drum set sounds at a time. They can create additional sounds by dragging a new yellow "when ____ key pressed" block to screen and connecting a new purple "play drum" block. By repeating this process, pupils can build an entire percussion orchestra in Scratch for their own creative play and performance.

This example harnesses the interactive aspects of computer programming. Computers take input from various devices (such as mice, touch events, and keys) and put those actions into motion to do various things, in this case to play musical sounds.

CREATING AND EXPLORING RIFFS, PATTERNS AND MELODIES

Just like with drum sounds, melodic pitches can be also mapped to keys on the computer program. Take a look at the example code a bit further down on the screen in the ScratchMusicKeyboard.sb example. In this example, the number keys on the computer keyboard are mapped to the pitches of a minor scale. Take a moment to press the numbers 1 through 8 on your computer keyboard and listen to the result.

Just as the drum set sounds and computer keys could be changed, so can the musical pitches. Again, by clicking on the black triangle to the right of the note value in the "play note" block, you can change the pitches in the scale (see Figure 5.). Convert the scale from a minor scale to a major scale by adding 1 to the "play note" values under the "when 3 key pressed" and the "when 7 key pressed" blocks. Changing these values from 60 to 61 and 67 to 68, respectively, will create a major scale across the number keys on the computer keyboard. Take some time to see if you can find a melody or short musical riff using the number keys.

Figure 4. *Code for performing minor melodies with the keyboard in Scratch.*

Tips for Play and Further Exploration

- Duplicate the blocks to add more notes to the scale.

- Adjust the existing values to create new scales.

- Play around and try to find a melody or musical riff or pattern that you know.

- Try performing a melody *and* a drum beat at the same time, or with a partner.

- Assign the same keyboard key to multiple notes to create chords.

LISTENING FOR PATTERNS AND BUILDING LOOPS

Computers are great at doing repetitive tasks. We can write a very small piece of code that tells the computer to do something over and over, and it will do that for us. The computer never gets bored repeating a task. We can harness this power of computers to our advantage when working creatively with music. Professional musicians spend hours practicing in order to learn to play and perform well the music they play. In fact, I'm sure you spent some time practicing the drumbeat and melody patterns you found above before you felt successful.

Patterns and sequences are key concepts in music. They are everywhere, from the riffs and drum beats we find in popular songs, to the ostinati of Stravinsky, and motivic development of Beethoven. Below is a basic four sound drum set pattern with a bass drum on beat 1, hi-hat on beat 2, snare drum on beat 3, and hi-hat on beat four:

$36 - 42 - 40 - 42$	$36 - 42 - 40 - 42$	$36 - 42 - 40 - 42$
J - K - L - K	J - K - L - K	J - K - L - K

Take a moment to practice and perform the pattern above in tempo.

The pattern you just practiced above has been re-created as a connected set of blocks in Figure 6. If you connect multiple "play drum" blocks together, you create a *sequence* of blocks, which in turn performs a musical sequence of drum sounds. Take a moment to duplicate and click on the above set of blocks in Figure 6. When you click on the blocks, Scratch will play drum 36 for 0.5 beats, drum 42 for 0.5 beats, drum 40 for 0.5 beats, and finally drum 42 again for 0.5 beats. If you want the beats to be performed
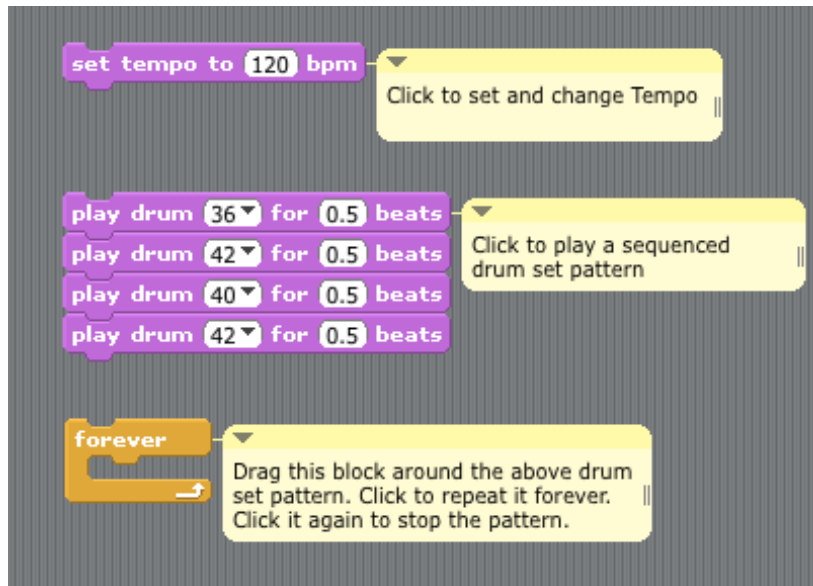
at a faster or slower speed, change the value of the "set tempo" block and be sure to click the block after changing the value.

Figure 5. *Code for sequencing drum sounds in Scratch.*

The real power of Scratch comes when you need it to repeat things and perform code blocks over and over. You can play with this feature by dragging the yellow "forever" control block around the four purple "play drum" blocks. Once that is set, click on the yellow block and your drumset pattern will repeat *forever*, until your computer loses power or you click on the yellow block again. You can use this feature to set up a regular drum pattern accompaniment.

TIPS FOR PLAY AND FURTHER EXPLORATION

- Start a drum set loop going within a "forever" block and use the number keys on your keyboard to perform a melody over it.
- Create a more complicated drum pattern by adding "play drum" blocks within the "forever" block.
- Change the "beats" values to create different rhythms.

- Drag "play drum" blocks in and out of the "forever" block while the loop is going to create variety and to explore different patterns.
- Apply the same "forever" block repetition technique to "play note" blocks to create *melodic* riffs and patterns.

CONCLUSION

In this chapter, you have read about tools and projects in tangible media and computational media musicianship. The same creative threads and themes discussed in other chapters throughout this book also apply to new media musicianship. New media tools provide access to new communities of musical practice and help to scaffold pupils' musical expression. All of these tools engage pupils as makers, designers, and curators of musical instruments and experiences. In these roles, children have new opportunities for musical agency through participation in the design of instruments and environments for musical exploration, performance, improvisation, and composing in addition to the simple use of these engaging tools. And, these tools provide opportunities for creative musical experiences anytime pupils have access to a mobile devices or a computer, at home or at school.

In *Singing Fingers*, timbre and melodic contour are made audible, visible and tangible for children. This shifting of representations can help strengthen children's understanding of musical concepts and music making skills. *Singing Fingers is* designed in ways that allow the students to participate in music making and creating at multiple levels, and with any sound imaginable. This aspect is further developed within the Scratch environment as a platform for musical interaction, creativity, and interdisciplinary connections with math and computing. The sheer volume of student created projects on the Scratch website and the worldwide network of Scratch educators is a great resource for beginning your work teaching music creatively with new media.

Because children are working with these tools on their own outside of school, the challenge, then, is for the teacher to cultivate a culture and community of new media musicians inside and around their classroom. This requires that the teacher take on the

role of musician and learner *alongside* their pupils, creating spaces for pupils to share their music, and actively engaging with and learning these new media musicianship practices. These new media musicianship tools enable you to extend your pupils' engagement with your music curriculum outside the physical and temporal bounds of your classroom, and provide a space for students to bring their own musical ideas, *familiar and unexpected*, to the classroom.

One strategy to create this community of practice is to adopt a process advocated by ethnomusicologist Bruno Nettl - *musical cartography*[22]. When confronted with new technologies, it is natural to look for pre-existing maps to guide the way. In fact, one way to view this book is as a general map to follow and to orient you to the possibilities of learning and teaching music creatively. However, in order to facilitate creativity, one needs first hand experience traversing the landscape and making one's own map. This is strengthened for pupils when the teacher sets off with their pupils on that same journey of creative exploration and collaborative map-making.

Now that you've read through this chapter, take time to review the tools and projects described, and view the website links. Explore these yourself, make your own music with new media, and think about what connections you might make to your curriculum, your musicianship, and the interests and proclivities of your pupils. Document your own creative exploration with these new media musicianship projects, and read other accounts of teachers sharing the findings of their own action research projects with new media technologies (e.g., Finney & Burnard, 2007; Somekh, 2007). And, join online communities of practice focused around primary classroom issues.[23] Many of these communities have dedicated discussion groups around technology and new media. They are a great place to discuss your challenges and interests with other like-minded educators.

The tools for making and creating music have always been changing. Our children are making music with new media on their own, finding their own way and discovering new pathways for musical expression. Join them on their journey, and create

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[22] See Nettl, B. (1960). Musical cartography and the distribution of music. *Southwestern Journal of Anthropology*, 16(3), 338-347.

[23] http://www.facebook.com/group/musicpln & http://www.musicteachersproject.net/.

maps together helping them achieve deeper levels of musical understanding, expression and creativity with new media.

WEBSITES AND APPLICATIONS

Singing Fingers	http://singingfingers.com/
MadPad	http://www.smule.com/madpad/
Bohemian Rhapsichord	http://bohemianrhapsichord.com/
Bangarang Boomerang	http://static.echonest.com/BeatDriver/
InBflat Project	http://inbflat.net/
Scratch	http://scratch.mit.edu/
MaKey MaKey	http://makeymakey.com/
Scratch Music Projects	http://scratchmusicprojects.com/

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