Making Meaningful Musical Experiences Accessible Using the iPad

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Abstract. *In this paper we report on our experiences using ubiquitous computing devices to introduce music-based creative activities into an Australian school. The use of music applications on mobile tablet computers (iPads) made these activities accessible to students with a limited range of prior musical background and in a general purpose classroom setting. The activities were designed to be meaningful and contribute toward personal resilience in the students. Two theoretical frameworks inform the research design; the meaningful engagement matrix and personal resilience. We describe these frameworks and how they inform the activity planning. We report on the activities undertaken to date and share preliminary results from questionnaires, interviews, musical outcomes, and observation.*

1. Introduction

This project builds on the authors' previous work with network music jamming systems (Brown and Dillon 2007) and youth resilience (Stewart et al. 2004). These research threads have come together in this project. Taking advantage of the ubiquitous nature of mobile computing devices (in particular of Apple's iPad), the project aims to provide school students who have no particular background in music, with access to the creative and well-being benefits of collaborative and personally expressive music making. This project takes a step forward from our previous network jamming research by using Apple's GarageBand software on the iPad rather than the our own jam2jam software on laptop and desktop computers. jam2jam was specifically written for our previous research on how technologies afford meaningful engagement with music. It was used in this capacity between 2002 and 2012. The main software features of jam2jam that support accessibility and engagement are 1) the use of generative music processes to enable participation by inexperienced musicians, 2) the ability for systems to be synchronized over a network facilitating coordination amongst users, either locally or at a distance, and 3) the ability to record music making activities and export these for sharing. These features are now present in GarageBand for iPad (and an increasing number of commercial software for mobile computing hardware). In our previous examination of developing resilience in school contexts, positive contributing factors included students developing a sense of autonomy and feelings of connectedness with peers and adults. We suggest that the scaffolding effect of generative music process can

assist in promoting a sense of creative autonomy in inexperienced musicians and that the collaborative aspects of group music making can strengthen feelings of connectedness amongst peers. An aim of this project is to show how the principles of education and health-promotion developed in our previous research can transfer to the use of ubiquitous computing systems.

1.1 Brief description of the project

This project focuses on building and supporting young people's engagement and connectedness with their creative selves and to help build resilience through musical collaboration and success. Working with an Indigenous school (the Murri school) based in Brisbane, Australia we have provided opportunities for musical expression using music technology through the school curriculum. The approach involves the trialing of weekly music-based activities is several classes over two terms. The activities are design to offer opportunities for students to achieve creative educational goals, to engage them in creative music-making, to develop individual self-esteem and to develop creative collaborations with peers.

2. Accessibility via mobile technologies

A catalyst for this project is the availability of appropriate computing software and hardware for music making. Apple's iPad and GarageBand software have features that make the activities of this project much more accessible that they have previously been. The iPad's small size and battery life make it easy for students to handle and easy for schools to accommodate. The GarageBand software utilizes 'smart instruments' and 'Apple loops' that simplify music production. The smart instruments provided a constrained performance environment that minimizes 'mistakes' and can be used in music education in a similar way that restricted acoustic instruments (such as small xylophones) have been in the past. The music clips (Apple loops) allow for a constructor-set approach to music making where students can combine these building blocks without needing (yet) the facility to make the clips from scratch. The iPads and GarageBand combination support collaboration by allowing students, each with an iPad, to synchronize their music making over a local network. This activity, which we have previously called *network jamming*, facilitates groups of students to perform together. Finally, the ability of the software to record the music made and export files means that student's work can be available for reflection, or sharing with the wider community.

3. Meaningful engagement

The theory of meaningful engagement was developed by Andrew Brown and Steve Dillon (2012) and has underscored the development of network jamming research more broadly. It involves two dimensions. Musical *engagement* includes various creative behaviors, or ways of being involved in music. The modes of engagement outlined in the theory cover a range of interactions; attending, evaluating, directing, exploring and embodying. The theory suggests that *meaning* can arise from engagements with music in three contexts; personal, social and cultural. That is, music can be personally satisfying, it can lead to positive social relationships, and it can provide a sense of cultural identity. The two aspects of meaningful engagement can be depicted as the axes of a matrix, as shown in figure 1. This figure also includes exemplar activities in each cell of the matrix.

	ATTEND	EVALUATE	DIRECT	EXPLORE	EMBODY
PERSONAL	Listening, Reading Watching	Analyzing, Selecting	Composing, Instrument making	Improvising, Experiment	Practicing, Playing
SOCIAL	File Sharing	Discussing	Conducting	Jamming	Rehearsing, Recording
CULTURAL	Concert attendance	Curating, Reviewing	Patronage, Promotion	Researching	Performing

Figure 1. The Meaningful Engagement Matrix

Artistic experiences become meaningful when they resonate with us and are satisfying. The meaningful engagement matrix (MEM) has been developed to assist inquiry into our creative activities and relationships. A full creative life, the theory suggests, involves experiences in each cell of the matrix. Therefore, this framework can be useful when considering the range of experiences afforded by any particular activity, program or resource, or across a set/series of these. It is in the assessment of the whole-of-program view of this project that the MEM provides its greatest utility.

4. Resilience

Resiliency refers to the capacities within a person that promote positive outcomes such as mental health and well-being, and provide protection from factors that might otherwise place that person at increased development, social and/or health risk (Rowe, F., Stewart, D., 2009; Fraser, 1997). Factors that contribute to resilience include personal coping skills and strategies for dealing with adversity such as problem-solving, cognitive and emotional skills, communication skills and help-seeking behaviors (Fraser, 1997). Schools that aim to strengthen their capacity as healthy settings for living, learning, working and playing, and are underpinned by inclusive participatory approaches to decision-making and action, can help to build resilience (Rowe & Stewart, 2009). Connectedness in the school setting has been shown to be a protective factor of adolescent health risk behaviors related to emotional health, violence, substance use and sexuality. Creative activities, especially collaborative ones such as music making, share many of the characteristics that have been shown to promote resilience. This project seeks to take advantage of these connections.

5. Collaboration and Sustainability

This project examines how music technology can work to improve student health and wellbeing. With relevant support from the Murri school community, the project offers the opportunity to develop a creative and sustainable program for young people, in this case young Indigenous Australians, to engage in collaborative music making activities using interactive music technologies. The reason that music technology is appropriate for the proposed activities is because of its familiarity to young people and also because of our ongoing research interest in the use of generative systems in collaborative music making, often called Network Jamming. A number of creative projects use Network Jamming as a means of improving creativity, social justice and wellbeing, hence there

are many collaborations with communities that are sometimes marginalized from mainstream society (Adkins et al. 2012).

The GarageBand software supports collaborative audio production. When used as a musical instrument and compositional platform this software enables students, for example, to build on basic skills of exploration and improvisation and encourages engagement. These technologies are also easy for staff to learn and use and this, it is hoped will increase the likelihood that the network jamming activities will continue in the school beyond the life of this project. A number of strategies are being used to facilitate the sustainability of the activities. These include:

- Involvement of school administration and teaching staff in the planning and execution of the activities.
- Integration of the music activities into the broader curriculum.
- Sharing of the musical outcomes amongst the school community.
- Regular reporting on progress with the school administration.
- Provision to leave the equipment used for the project with the school.

6. Case Study - iPads and music at the Murri school

The project integrates music activities using the iPad into the normal school curriculum and involves the relevant teachers and, otherwise, uses standard classroom procedures and resources. The project involves a weekly session with each class facilitated by a member of the project team and the class teacher. The project runs for 2 x 10-week terms and, at the time of writing, one term has been completed.

Figure 2. Images from the project school

Prior to commencing, teachers and students were provided with information about the project and teachers were consulted about how the music-based activities might integrate with existing curriculum objectives. Many teachers chose to incorporate creative writing tasks as the basis for song writing and rapping. The project uses a whole-school approach and classes were chosen from across the full age range of school for participation. Students and teachers were not screened for musical background nor on any measure of resilience as we were keen to investigate the versatility and flexibility of this approach across the school community. After consultation with staff, three grade levels were selected and have been participating in the project.

- Grade 2/3, approx. ages 7-8. Students to write and record a short **4-line rap** about the good qualities they see in themselves.

- Grade 4, approx. age 9. Students to record a creative interpretation of their **sonic personal profiles** utilizing sounds and music to express their personalities.
- Grade 8, approx. age 13. Students to write and record a **sonic poem** using text and music describing themselves and their hopes, expectations and dreams.

6.1 Designing music-based activities

Prior to facilitating the intervention with the students at the Murri school, a series of generic activities were designed in order to facilitate creative participation in a way that adheres to the philosophy interwoven in the aforementioned MEM framework. The activities designed for each year level were collaboratively developed by the researchers and participating class teachers, keeping the MEM in mind throughout this process. Each teachers chose to utilize an age/ability appropriate literacy basis for their class project in order to facilitate the opportunity for students to individually and collectively express themselves and their interests in a personal and creative manner.

	Week 1 **01/02/13**	**Week 2** **08-11/02/13**	**Week 3** **15/02/13**	**Week 4** **22/02/13**
Activity	Visit classes. Introductions, demo.	Evaluation surveys. Explore iPads.	Overview of technologies.	Practice creating a song, selecting loops.
	Week 5 **01/03/13**	**Week 6** **08/03/13**	**Week 7** **15/03/13**	**Week 8** **22/03/13**
Activity	Recording audio and instrument tracks.	Recording and Editing.	Recording and Editing 2.	Finish Recordings. Class presentation, evaluation.

Table 1. Term 1 Timeline

The objective for Term 1 was to enable students of each participating group to develop and record their own composition using GarageBand on the iPads. The timeline below outlines the context of each weekly session dedicated to the project, allowing for students of each group to spend time experimenting, jamming, practicing playing and recording instruments and external audio, and for recording the final product.

6.2 Measuring resilience and engagement

Evaluation of this project relies on a mixed methods research design combining quantitative and qualitative methods of data collection, analysis and inference in order to investigate both the processes developed through the life of the project as well as the impact of the project over time. Students were asked to complete a modified version of a pre-existing resilience questionnaire that has high levels of reliability and validity (e.g., Healthy Kids Survey - California Dept of Education, 2004). They will also be asked to complete this again at the end of the project to enable comparative analysis and insights into the impact of the program. Thirty-four students are currently participating in the project across three grade levels: Years 2/3 (14 students); Year 4 (12 students); and Year 8 (8 students in the English stream). Activities include developing a Rap, recording a personal profile and writing and recording a bio-poem. Key informant interviews with staff are being conducted and are subject to an ongoing thematic analysis. An introductory school consultation session was attended by 9 staff members at the outset of the project. All were supportive and identified ways that they could

integrate the project into their curriculum. Due to timetabling constraints only three of these staff and their classes are participating in the project. Observations of class sessions are being recorded in a research journal by a member of the research team. In addition, files of work completed on the iPad are being regularly saved allowing for analysis of the steps taken in the creative process.

6.3 Survey results summary

The first stage of data collection is completed (baseline) and descriptive statistics show some differences emerging between the younger students in Grade 2/3 and 4 and their fellow students in Grade 8. We have not completed tests of statistical significance as the sample is small and this is exploratory work at this stage. We provide, below, a selection of the results and findings thus far.

Over 75% of the total student sample thought that being involved in the project would be fun and most (younger students) were excited at the prospect. The creative levels and aspirations of the students were uniformly high and almost all indicated that they enjoyed going to music performances. However, compared to the grade 2/3 and 4 students who relished the creative opportunities of the project, a substantially lower percentage of the grade 8 sample felt confident in the activity and their creative role. With regard to their confidence with and support structure for creative activities:

- Over 85% of all students like making things that are creative and different.
- Students felt variously confident with their own creative ability and ideas. (71% of Grade 2/3, over 90% of Grade 4 students, Grade 8 = 63%). See figure 3.
- Most students have family/elders that they can go to for help (Grade 2/3=79%, Grade 4 = 90%, Grade 8 = 75%)

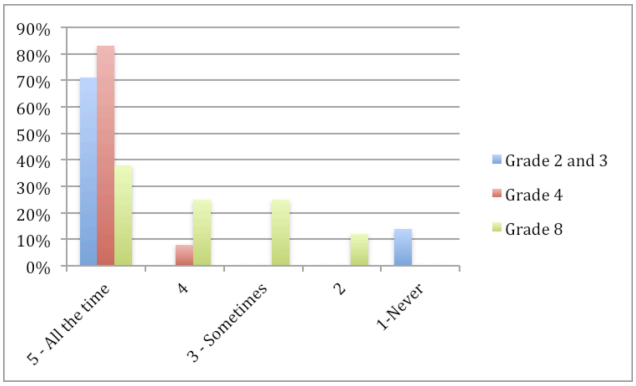

Figure 3. Distribution of student's confidence in their creative ability and ideas.

The students attitudes toward peer collaboration varied between the younger and older students. The following data reflect these attitudes to working with classmates:

- Students like to share their creative ideas with their classmates (Grade 2/3 = 78%, Grade 4 = 90%, Grade 8 = 37%).
- Students enjoy hearing about their classmates' creative ideas (Grade 2/3 82%, Grade 4 = %85, Grade 8 = 63%).
- Students thought that being a part of the project would help them have more friends (Grade 2/3 = 75%, Grade 4 = 75%, Grade 8 = 12%).

As with attitudes to collaboration, the students' sense of self-confidence in public music making also reduced with age. In relation to producing an outcome:

- Students thought that they could put together a performance or recording that would be enjoyed by others (Grade 2/3 = 86%, Grade 4 = 66%, Grade 8 = 12%).
- Students felt that people would come to watch their performance or record launch (Grade 2/3 = 90%, Grade 4 = 75%, Grade 8 = 25%).

A clear trend in this data is the difference in reported self-confidence, in music at least, between the younger (7-9 year old) and older (13 year old) students. This is consistent with much more extensive research that shows a dip is self-confidence in adolescents (Orenstein 1994). As a result of this, and informal feedback from the grade 8 teacher, we are adopting a different strategy for the older group. Activities for this class focus more on personal meaning, than on social or cultural meaning, and try to minimize potentially embarrassing public presentations of the music. As well, work for older students has a greater individual focus whereas activities for younger students are heavily biased toward group work and include class and public presentation of outcomes in the form of recorded media and live performance. What is interesting to note, is that the accessibility features of the music technologies employed are equally applicable for both groups and approaches.

6.3 Qualitative results summary

Qualitative data collected to date includes interviews conducted with teachers and notes maintained by research team members. Staff members recorded their initial plans for implementing the project within their classrooms for Term 1 and Term 2, 2013. Eight out of the nine staff members participated in this component of the staff session. Participant responses about their hopes for the project include:

- For the students to record stories created for English unit. To gain confidence in speaking and sharing their stories/ideas.
- To see students engage with iPad technology to enhance and extend learning already happening in subjects.
- Improve teacher and student confidence with technology; have children work together cooperatively; tap into different learning styles; student enjoyment.
- To use the jamming as a learning/teaching tool in classroom – to integrate curriculum to make learning fun.
- To learn myself and get children expressing themselves orally and musically.
- To record a performance, to make learning fun and for students to use an iPad.
- Enhancement of student work (oral and written) – familiarity with technology.
- Increase iPad literacy, learn with students how to use this tool for work.

The research team utilize the Meaningful Engagement Matrix categories to record the frequency and intensity of behaviors they observe in students. Video footage and photography are also being used to provide further documentation of project implementation activities, and to facilitate review and analysis.

6.4 Next steps

By the end of Term 1, a selection of creative pieces will be compiled and subsequently provided to key stakeholders including the school Principal, participating teachers and students. A meeting will be held with teachers participating in the project to determine a clear direction for the next phase of the project for Term 2 which will focus on performance or production of a final product.

7. Conclusion

In this paper we have described our use of mobile technologies and software to make music-based activities accessible to young people in a way that promotes meaningful engagement and resilience. The project is based in the Murri school in Brisbane, Australia that is dedicated to the education of indigenous Australians. The project involves weekly activities with three classes from that school with student ranging from ages 7-13. The design of project activities are informed by theories of meaningful engagement and resilience, but are guided by the advice of class teachers and student survey responses to ensure appropriateness to the local context. Data collected thus far indicate that staff and students are enthusiastic about using the iPads and music apps, and that they are making previously unimagined music production activities accessible. The portability of the iPad hardware has assisted with the integration of the devices into the school environment, and their multi-purpose nature makes for fluid shifts between music and other curricular tasks (such as creative writing). The GarageBand software has facilitated rich music production outcomes, although the devices alone provided limited audio recording and playback quality. Consistent with other studies, our data shows a dip in the creative self-confidence of students in their early teens (compared to younger students). This has been accommodated for by shifting the emphasis for those students toward individual and personal expression and away from collaborative and public activities. We plan to address this in the next stage of the project through more extensive use of external microphones and headphones. Early indications are that the students are keenly engaged in the activities but require ongoing facilitator support to maximize creative outcomes. The features of the music-based activities with ubiquitous technologies align well with characteristics that promote resilience, including personal autonomy and connectedness with peers and adults, and we remain optimistic that evidence of a positive effect on student resilience from the project can be achieved.

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