

Crash boom bang your way into the world of arts, technology and sustainability.

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Abstract:

This paper explores the planning and implementation of a technology and arts based education program at Yarra Plenty Regional Library. The program is designed to foster partnership opportunities with local educational institutions and increase the use of creative resources in the library. It is based at the Mill Park branch where the recently opened Maker Space offers new, innovative, state-of-the-art technology for people to use and create. There is technology in the space to create electronics projects, video making and editing and stop motion animation.

This paper will describe one particular project, r'Orchestra, which incorporates aspects of programming; fine motor skills, music and design. It is an interactive technology and arts development workshop program where students are tasked with inventing musical instruments using recycled materials and Makey Makey devices. By combining Makey Makey invention kits with creativity, students are introduced to the broader applications of sciences such as programming and engineering in a real-world context. A broader objective of the r'Orchestra program is to increase the use of the Mill Park Library Maker Space and its resources by school groups. It also develops the student's ability in communication skills, digital fluency, innovation, problem resolution, creativity and collaboration.

The presentation will describe how the project was developed and implemented and the outcomes that have been achieved. It will suggest criteria for selecting and implementing appropriate, sustainable technologies in library spaces to maximise access and exposure to new and useful digital tools in the community.

Keywords: r'Orchestra, Makey Makey, Yarra Plenty Regional Library, Maker Space.

Overview

This paper explores the planning and implementation of a technology and arts based education program at Yarra Plenty Regional Library, a Regional Library Corporation in the northeast of Melbourne, Australia. The program is designed to foster partnership opportunities with local educational institutions and increase the use of creative resources in the library. It is based at the Mill Park branch where the recently opened Maker Space offers new, innovative, state-of-the-art technology for people to use and create. There is technology in the space to create electronics projects, video making and editing and stop motion animation.

The paper describes one particular project, r'Orchestra, which incorporates aspects of programming, fine motor skills, music and design. It is an interactive technology and arts development workshop where students are tasked with inventing musical instruments using recycled materials and Makey Makey devices. By combining Makey Makey invention kits with creativity, students are introduced to the broader applications of sciences such as programming and engineering in a real-world context. It also develops the students ability in communication skills, digital fluency, innovation, problem resolution, creativity and collaboration. A broader objective of the r'Orchestra program is to increase the use of the Mill Park Library Maker Space and its resources by school groups.

Background

Public libraries are being challenged by major societal changes and are exploring new programs, services and business models as they capitalise on broad, enthusiastic community support for the role they play in community life.

Last year Public Libraries Victorian Network (PLVN) and the State Library of Victoria collaborated on a strategic foresight project to identify scenarios for the future of public libraries called *Victorian Public Libraries 2030*

*Strategic Framework.*¹ This project suggested two library models – the creative library and the community library which were based on the identification of five key societal trends: Creativity; Collaboration; Brain health; Dynamic learning; and Community connection.

Yarra Plenty Regional Library (YPRL) developed its 2013 – 17 Strategic Plan² based on the three focus areas that it believes defines libraries – i.e. reading; learning; and meeting. The plan also highlights that we will foster innovation with the provision of digital, creative and maker spaces.

Mill Park library is one of nine branches in the YPRL system. In 2012 it received a grant from the federal Department of Broadband, Communications and the Digital Economy to establish a Digital Hub to showcase new technologies that will enhance business, education, health and home and to provide training for community members to improve the level of digital literacy.

¹ http://plvn.net.au/sites/default/files/20130527%20FINAL%20VPL2030%20Full%20Report_web.pdf sighted 5 June 5, 2014

² http://filestore.yprl.vic.gov.au/Library_Plan/YPRL-Strategic-Library-Plan-2013-2016.pdf sighted 5 June 5, 2014

This Digital Hub has provided the springboard for implementing a Maker Space at Mill Park library and for creating new programs that encourage creativity and learning in a collaborative way. A Maker Space is an open, community space or learning lab that allows individuals and community groups an opportunity to connect with one another through learning a new skill or sharing a skill with others. It is a place for sharing resources that are designed to help produce ideas and to foster innovation and connection with others. Maker Spaces can have various targeted focuses such as technology, design, electronics, arts and crafts and digital production. The focus or theme of the Maker Space informs the tools and resources that fill that space that in turn informs the audience that engage with those resources.

The Maker Space was launched at Mill Park Library in late November last year with computer software robotics demonstrations, augmented reality and the *pièce de résistance*, a 3D printer. There was a large crowd of community members, fellow librarians, numerous politicians and dignitaries, all of whom created a real buzz and energy around technology, arts and creativity. A large component in the success of the Maker Space launch was the formation of new partnerships with the La Trobe University Robotics Department and the University of the Third Age (U3A.) Small robots, fish swimming around the ceiling, and 3D dinosaurs emerging from sheets of paper created a sense of tech fun.

However the Maker Space as a concept was short lived for a number of reasons. There was a lack of resources; in particular there were no branch staff who were skilled in the programming and software in the space; and the person who had driven the project left the organisation. People coming into the library were unaware of the space and were unfamiliar with the concept and the technologies. Once the hype was over we were left with a space filled with mismatched furniture and a 3D printer. The question was “where to from here for the Maker Space project?”

Rising to the challenge YPRL New Technologies Coordinator Felicity Gilbert and Arts and Culture Coordinator Kate Hansen came up with a big bang of an idea to create a project which combines art, science, technology and sustainability. The result was r'Orchestra.

r'Orchestra

r'Orchestra creates musical instruments using recycled materials and digital technology. It also develops the student's ability in communication skills, digital fluency, innovation, problem resolution, creativity and collaboration.

The pilot r'Orchestra program was run at Mill Park Library early in 2014 with a class of twenty Year 6 and 7 students aged 12-14 from Lowther Hall Anglican Grammar School and three teachers. The library facilitated the session with three staff each roving between the groups to answer questions and provide any necessary aid and the New Technologies Coordinator leading and overseeing the program for the day. The facilitators used judgment in their assistance, sometimes providing only hints or advice about technical details and sometimes scaffolding to assist students to the next stage.

Students were split into five groups of four and given a brief. They were provided with very little information from the school prior to attending the program on what the session was about and came armed with the knowledge that they were attending a public library to make

music. A short A4 single page written brief was handed out at the beginning of the session and identified the objectives of the program and broke the day up into tasks.

The program ran for four hours with the objectives for the students to work within their allocated group and create a musical instrument with recycled materials. The groups were told there were no restrictions and no guidelines. A short YouTube clip was shown on the large screen in the room to demonstrate ways in which a Makey Makey can be used to build or augment instruments to create music. (<http://youtube.be/wkPt9MYqDWO>.)

Room setup included a Makey Makey kit, a computer and keyboard for each group; four tables in the back of the room were laid out with various recycled materials all purchased the week before at local second hand/recycle stores and some resources from the library branch craft cupboard. Several iPads were also brought in and a free recording app downloaded to assist students with recording their own singing or sounds.

Simple instructions in the brief were to:

1. Select materials from the assorted recycled items provided
2. Put them together in an original design
3. Name their creation and give the design sound using the ICT tools provided.

Opportunities were given to record their own voices and noises, source sound files from the Internet or create mash-ups and edit them into separate tones for the designed instrument. Tasks for the session included planning their instrument, selecting materials and tools, presenting ideas to the whole class, researching how to use the Makey Makey and what materials work best with this tool, identifying the principles behind electrical conductivity and circuits, formulating the design or concept and building the instrument, connecting the sounds recorded/edited/selected to hotkeys or buttons on the computer keyboard and program them to the instrument, re test and present a musical score to the class.

Once all designs were complete the presentation to the class by each group explained the ideas behind the model, what worked and what had not worked, a rationale behind the name given to the design and why they had chosen the music or sound they did. Following on from each group sharing their model musical instrument sounds a short discussion was held to create a method for combining all sounds to a complete arrangement in an Orchestra. A test run was held combining the groups and then a complete arrangement played in one stream under the students' direction to create a collaborative piece which we called RAW r'Orchestra.

The results from the groups were five highly creative and diverse instruments that played a range of electronic sounds both recorded and sourced online.

On average the models were linked to three sounds with one expectation with the group with the badminton racket sourcing eleven sounds to their instrument model.

Learnings from the pilot

The primary objective of the pilot was to test the efficacy of the program; to ensure that it would run within the allocated four hours (half an hour lunch break and 15 minute morning tea inclusive); that it was level appropriate; and that the students would be capable of directing their own learning and would derive the projected learning outcomes. To thoroughly evaluate the outcomes of the pilot and the impact on the students the day was

filmed and short five minute interviews with staff and students were solicited both on and off the camera at various intervals in the four hour program.

The decision not to brief the students about the r'Orchestra program before the day was a conscious one as we wanted to ascertain and encourage student capabilities in discovery and problem solving. To our surprise, students generally picked up the use of the Makey Makey and music download or editing with minimal direction. They quickly discovered the principles behind the electricity component and sound for the invention kit and most groups adjusted their model to maximise the sounds.

By the end of the pilot students had achieved the learning outcomes detailed in the planning of the r'Orchestra program. They were capable of using both experimentation and research to elucidate the nature of circuitry and basic programming; they were able to source and create sounds using online resources and could program the Makey Makeys with only a nominal amount of assistance. The big plus was the students enjoyed themselves immensely and struggled to stop for their lunch break.

The feedback in the interviews with the individual student groups was that although their concept of how the day would run was different from the actual day, they all said it was better. Some thought it was going to be just a session with instruments and a recording, or more time on the computers using technology. What they enjoyed most was the opportunity to create something with the recycled materials, use their knowledge or computer skills and create music of their own editing.

Future incarnations of the program will include a prior session by YPRL staff with the facilitator to up skill them and provide more knowledge of the technology used and the lesson plan. A minor disturbance to the flow of the pilot resulted when the assisting staff were not all familiar with the Makey Makey kits. When working with the younger students the brief will be expanded to include more content explaining the nature of circuits.

What's next?

Following the success of the pilot, additional schools in the area have attended the library and participated in the r'Orchestra program. Learning Kits which comprise a lesson plan, running sheet, Makey Makey inventor kits and a design brief are held in the collection and are available for loan. The program is online so that any library or educational institute may run or adapt the program. www.rOrchestra.com.au has an explanation of the program, photographs and video from the pilot class and a free downloadable version of the learning kits. The program classroom set notes and loanable kit have been written in accordance with Level 5 and Level 6 curriculum standards as outlined by the Victorian Curriculum and Assessment Authority (AusVELS) and the Australian Curriculum Assessment and Reporting Authority (ACARA).

We aim to develop the capacity for all of our branches to run r'Orchestra by next year. Future goals include the development of similar programs utilising other Maker Space resources such as Arduino Starter Kits.

CONCLUSION

r'Orchestra has been an engaging program for staff, students and community members who have participated. It has provided a connection with music and technology, inspired creativity and made science experiments fun. It combines literacy, digital literacy, arts, science and ICT into an educational package that has the potential to influence the future workforce. By utilising the Makey Makey invention kits, students were crash boom banging their way into the broader applications of sciences such as programming and engineering in a real world context.

r'Orchestra has enabled YPRL to package the facilities of the Maker Space into a borrowable learning resource and provide a new platform to promote its services.

It is amazing what can occur when an organisation allows individuals and/or a team the room to be innovative, provide the freedom to explore uninhibited, employ the skill set of staff with strong imaginations and self-belief in their passion.

Acknowledgments

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Christine Mackenzie, CEO, Yarra Plenty Regional Library

References

Further information about Makey Makey from Scratch Wiki:
http://wiki.scratch.mit.edu/wiki/How_to_Connect_to_the_Physical_World:

Makey Makey allows people to turn everyday objects into keys and use them with their computer.

How does Makey Makey work?

- Makey Makey works by opening and closing circuits.
- If you attach two **alligator clips** to the Makey Makey board and an apple and you, when you touch the apple you complete (close) the circuit and the computer recognizes this as a key is pressed. The computer thinks Makey Makey is a regular keyboard or mouse even though you have made your own unique key!

Example use of Makey Makey:

- To make Makey Makey work with Scratch, plug in the **USB** to your computer and create a program like you normally would in Scratch. For example, when the right arrow key is pressed, the sprite moves 10 steps.
- Then connect one of the alligator clips to **Earth** at the bottom of the Makey Makey board and touch the metal at the other end of the **alligator clip** with your finger.
- Next connect another **alligator clip** to the apple and the right arrow on the Makey Makey board.
- When you touch the metal clip and apple at the same time, you complete a circuit and Makey Makey sends a signal to your computer saying a key is pressed. Every time you touch the apple your sprite will now move 10 steps!