Makerspaces in the school library environment

By Megan Daley and Jackie Child

Biographies

Megan Daley is a teacher librarian in the Junior School Library at St Aidan's Anglican Girls' School. She is a former National Vice-President of the Children's Book Council of Australia and a judge on the Queensland Literary Awards. Megan has a Bachelor of Early Childhood, Grad Dip in Teacher Librarianship and a Master of Education, and works as a sessional tutor at Queensland University of Technology. Megan is on the Queensland chapter of The Australian Children's Literature Alliance (ACLA) as well as the publications committee of The National Library of Australia. She is passionate about literature, digital technologies and social media, and blogs about all things literary, library and tech at www.childrensbooksdaily.com

Jackie Child is a teacher librarian in the Junior School Library at St Aidan's Anglican Girls' School. She has been teaching for 38 years and has held many positions within schools including deputy principal. Jackie has taught in a number of countries and values the experience these opportunities have brought to her teaching. She is passionate about teaching and is excited by the possibilities that technology is bringing to education. Jackie is looking forward to joining Griffith University as a sessional tutor for ICT Primary after spending three years involved in research for the 'Serious Play Project'.

Introduction

The term 'makerspace' has been around for some time now, often seen mentioned in public library programming and on the agenda for library and school conferences. We work at St Aidan's Anglican Girls' School (AGS) in Brisbane, Queensland, job sharing the role of teacher librarian in the Junior School. St Aidan's AGS strives to provide excellence in education within a vibrant, learner-centred community and encourages the teaching staff to explore innovative teaching pedagogy. The ideologies behind makerspaces were very much seen as a synchronistic fit with the St Aidan's vision for our school community.

This article will outline key understandings of the makerspace movement and will present a personal and practical account of how St Aidan's AGS is adopting and realising this makerspace framework in our Junior School Library. The article will conclude with key references which will provide further theoretical reading on the makerspace movement.

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Makerspaces in the educational context

The idea of making, tinkering, engineering and creating is not a new one — in fact it is as old as time itself. Most individuals and communities have an innate desire to tinker and invent and better the way things in their environments function. Where two or more people meet and discuss and tinker to solve a problem or better a solution we see community at its very best — shared ideas, knowledge and skills working towards a common goal. Community and tinkering, engineering and inventing form the conceptual framework for this term, 'makerspace'. No new ideas here, so why the need for the new jargon?

As society has turned more and more to technology to find solutions and to improve the quality of our lives and our experiences, less time is spent questioning, inquiring and fixing. We live in a throwaway society where mobile phones are outdated the minute they leave the store and the goal is to upgrade to the new model as soon as possible. Skills of tinkering and engineering are being lost, particularly in our younger people … and herein lies the idea of makerspaces — spaces to invent, share skills, put heads together to question and inquire, fix, reinvent, create, explore and wonder.

Makerspaces are the perfect partnership for libraries — where information is stored, accessed, shared, explored and wondered over. Libraries are places where people gather; they are community and school hubs with staff who are experts in finding and sharing information and can guide patrons through the inquiry process.

Inquiry-based learning underpins much of the Australian Curriculum and thus the role of the teacher librarian has never been more crucial in education in needing to equip students with new skills, knowledge and ways of learning to cope with the demands of information overload in the 21st century (Kuhlthau 2010). Quality teacher librarians support teachers and students in moving to an inquiry-based model of teaching which celebrates the collaborative process of information finding and understanding, rather than the information found (Todd 2006). Debate, questioning, critique and the human need to investigate and solve problems, are at the heart of inquiry-based learning and form the foundation of the makerspace movement (Brown 2012).

Tinkering in the 21st century

With ever-increasing new technologies available to today's learners and the informal, participatory learning that occurs in learners' digital and real lives, it is time for educators to expand the experiences of their students beyond traditional methods of teaching and embrace the creative uses of new technologies which are well within the reach of schools with even just a few desktop computers, laptops and/or portable tablet devices or smart phones.

Word processing changed the way we teach the writing, editing and publishing process. New technologies, which many of us carry in our pockets, have the ability to turn today's learners into storytellers, journalists, music composers, radio producers and animators. We carry information with us everywhere we go and we also have the ability to share that information and enhance our own environments through creative tinkering and thinking (Martinez & Stager 2013).

As students become accustomed to the idea of making and enhancing technology, with just a few simple ingredients they

you have not yet seen the amazing video of 'Caine's Arcade' (http://cainesarcade.com), which went viral some years ago now, it is a must-see for all makerspace devotees or newcomers.

Low-tech options for makerspaces are many and varied and following the hashtags #makerspace, #edumaker and #youngmaker on social media will provide countless ideas. Connecting with 'makers' in the school community is the very best way to begin — drawing on knowledge already existing in the school environment and increasing enthusiasm. There will

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can explore Squishy Circuits — conductive and non-conductive dough that allows electricity to flow through it when a battery is connected. Three-dimensional printers which produce student-designed, three-dimensional objects are coming down in price and are an exciting piece of equipment which a school P&F would be amenable to purchasing. The possibilities of computer-controlled equipment and electronics is limited only by budget and the interests of the school community.

Blending the new with the known

Not all learning opportunities in a makerspace environment need be high-tech — in fact some of the very best of learning experiences in a makerspace environment are created with cardboard construction. If

be countless volunteers to teach knitting (Megan's grandmother spent a semester at St Aidan's teaching knitting to very keen students), crafting, engineering, electronics, gardening and hammering, nailing and painting. Makerspaces help to build community within a school environment and undoubtedly increase the learning opportunities, skills and knowledge of students.

An added bonus of the makerspace movement is that principles of sustainability underpin much of what makers create. With sustainability a cross-curriculum priority in the Australian Curriculum, makerspaces involve students in real sustainability experiences as they upcycle, reuse, fix and re-imagine no longer useful products

into fantastical learning opportunities that improve their world.

Makerspace opportunities at St Aidan's Junior Library

Supportive school leadership teams are vital in introducing the ideas of makerspaces to the school library environment. School libraries are the natural home of makerspace environments within a school community as they house and share information and are staffed by information-finding teacher librarians. We are fortunate in that the St Aidan's Educational Leadership Team (ELT) is at all times supportive of teachers seeking to improve student outcomes and opportunities and allows teachers to move forward with well-considered innovations with ease. We are a school community that seeks out and tries out new ideas and easily adapts to new and exciting learning and teaching opportunities for our students.

Jackie Child is a tinkerer — she was in fact a rally car driver, engine rebuilder and a keen designer and seamstress of ice skating outfits before she was a teacher librarian. Megan Daley is a gardener and a recycler and comes from a family where creative pursuits, a love of the environment and of learning have been fostered for many generations. If you combine both these teacher librarians into the one teacher librarian role, as has been done at St Aidan's AGS, you have a makerspace environment long before the term was even coined. We have been creating and tinkering with students for many, many years. Below are some our student-centred, inquiry-based learning projects.

Makerspaces in action

Below you will find some of the makerspace ideas we have been tinkering with for the past year. The books that have inspired us
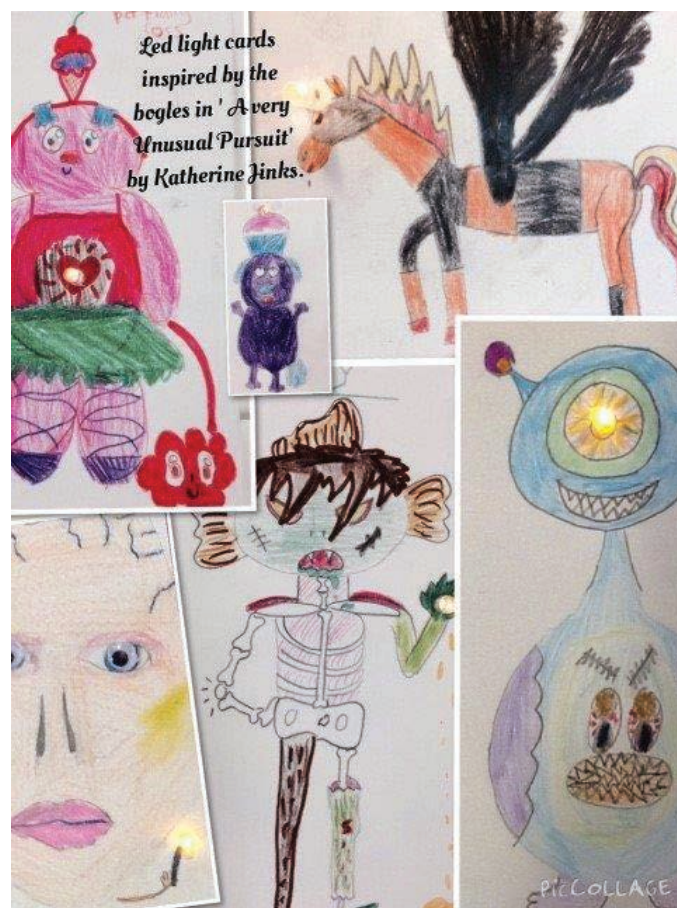
Flashing Card

and have provided much of the theoretical framework for our makerspace can be found at http://childrensbooksdaily.com/school-libraries-makerspace-movement/

Flashing cards

Inspired by the winner of the YR CBCA *A Very Unusual Pursuit* by Katherine Jinks, the girls created images of a 'Bogle'; they could use an LED light on their card making a circuit with a battery and either electrical paint or copper adhesive tape and create an on/off switch. Website inspiration was www.bareconductive.com and www.adafruit.com

Squishy circuits (makezine.com)

Girls used conductive dough, LED lights, wire and batteries to create 'Bogles', again inspired from words such as basilis, grindylow, tarasque, which refer back to the
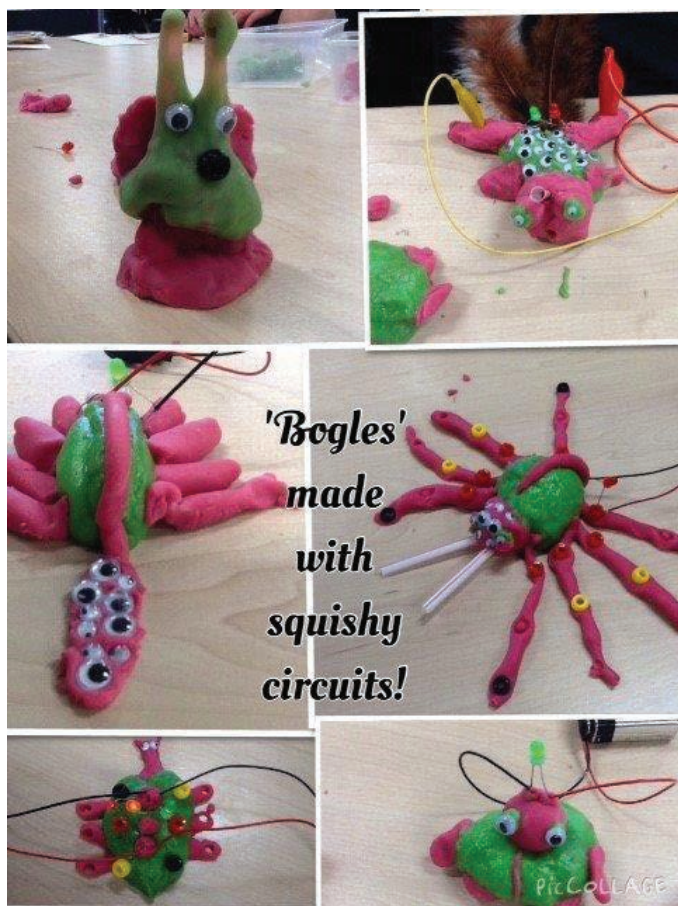
Squishy Circuits

Active Library Lessons

novel, *A Very Unusual Pursuit* by Katherine Jinks.

Active library lessons

During rotations in library skills, the Dewey Decimal System was a focus, whilst one group had fun with a WebQuest, which included rapping and cartoon creating. Another group set about finding within the non-fiction area of the library books to invent, create or build 'stuff'. The girls then set about writing instructions, collecting materials and in the third session began to assemble … with lots of failures, problem solving, persistence and excitement, some wonderful 'stuff' was exhibited as part of an end of year 'Library Spectacular'.

Sewing and crafting

Many of our students have enjoyed finding projects in our extensive collection of crafting, knitting and sewing books — our favourite sewing books are at http://childrensbooksdaily.com/sewing-kits-and-sewing-books-for-children/.

In the past we have had grandparents and parents come and teach sewing and knitting as lunchtime and Friday Clubs activities. In 2015 we hope to expand this and have parents or school community members come to the Junior School Library to teach students skills that they have, such as crochet, knitting and stitching.

Earth Angels

The Earth Angels are a group of students interested in making our school environment a better place through the development of sustainable practices. The club has been operating for six years, providing lunchtime learning and leadership activities for those

Sewing

Sewing

interested in nature, gardening, sustainable crafting and reducing our ecological footprint. Earth Angels have undertaken community tree planting, established the primary school vegetable patch, worm farms and composting systems, undertaken waste audits and managed a reusable tuck shop bag system to reduce paper bag use. The Earth Angels use library resources (primarily our non-fiction collection) to plan our crop planting calendar, find recipes to use with our crops, work out sustainable crafts and learn more about our worm farms and composting systems. Our best used gardening books are at: http://childrensbooksdaily.com/childrens-books-about-gardening/
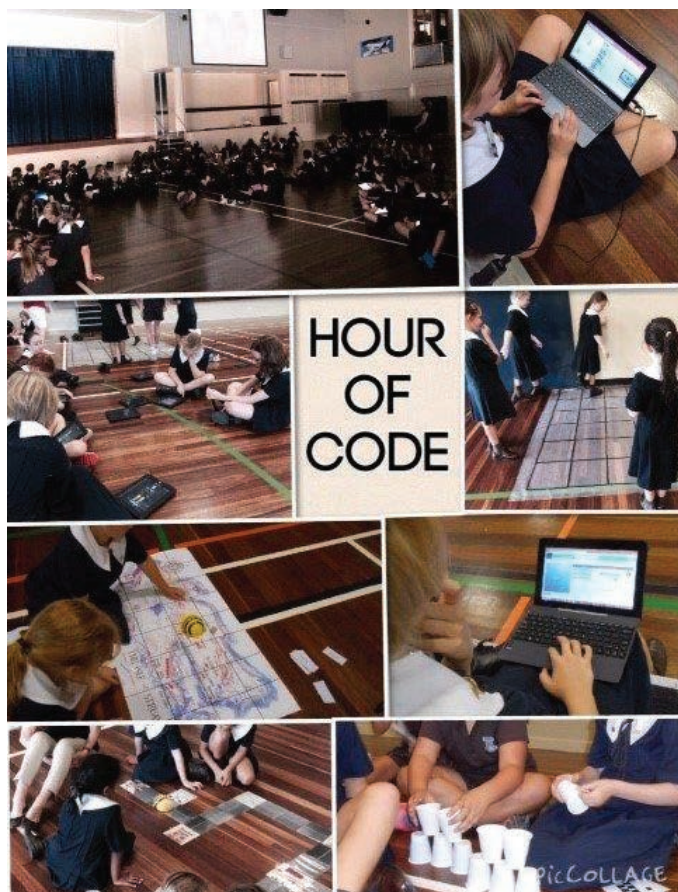
Code Club

Code Club invites girls to come along and have fun while learning to code. Coding is becoming more and more important as we live in a digital world. Our girls know how to use technology, but in Code Club they
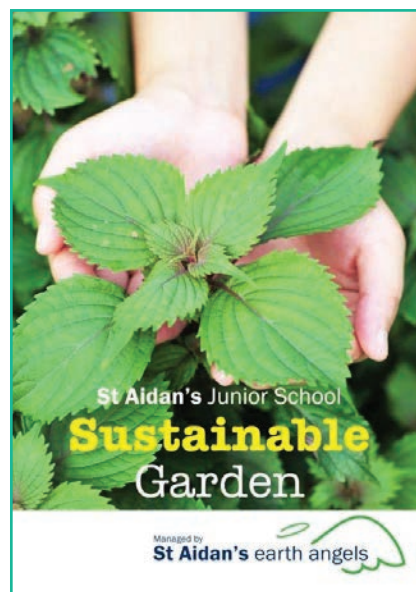
Earth Angels

Hour of Code

Robotics Club

Our students enjoy the enthusiasm of a member of staff who creates and 'plays' in the world of robots! Robotics Club involves the students in designing and creating machines that move. The students program, operate and control their robotics with software on their tablets.
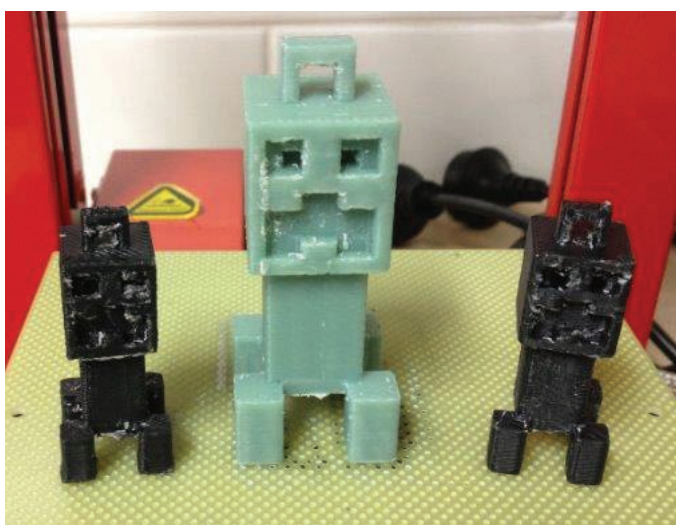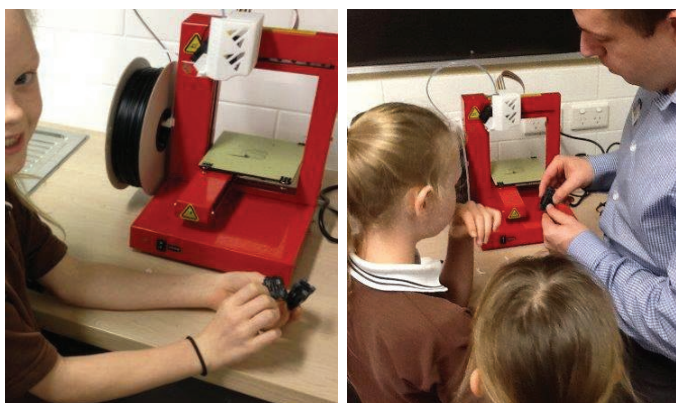
3D Printer

During a unit of work in Minecraft the students were able to replicate figurines on the rapidly popular technology of a 3D printer. This was on loan from the senior school … but hopefully will be the Junior School's very soon!

Lego Story Starter

A grant was used to purchase a number of sets of Lego Storystarter software and Lego in 2014. These kits were used extensively with English Extension students and in makerspace rotations. They provide a storytelling framework within the context

discover how it works and how to build it. They enjoy 'unplugged' activities as well as learning how to program using a variety of apps and software. It strengthens computational thinking, problem solving, planning, designing and collaboration as well as having plenty of creative fun! In 2014 we had our first 'Hour of Code' with Prep to Year Six students taking part.

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Robotics Club

3D Printer

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of the Lego blocks and characters. Students build their story, photograph it and enter the photographs into the software to create comics and graphic stories.

Useful sites

http://www.inventtolearn.com/about-the-authors/

http://www.scholastic.com/browse/article.jsp?id=3758299

http://makerspace.com/

http://www.edutopia.org/blog/creating-makerspaces-in-schools-mary-beth-hertz

http://www.slq.qld.gov.au/whats-on/calevents/general/talks/makerspaces

http://time.com/104210/maker-faire-maker-movement/#104210/maker-faire-maker-movement/

http://www.instructables.com/

References

Brown, K 2012, 'Seeking questions not answers: the potential of inquiry-based approaches to teaching library and information science', *Journal of Education for Library and Information Science*, vol. 53, no. 3, pp. 189–199.

Kuhlthau, CC 2010, 'Guided inquiry: school libraries in the 21st century', *School Libraries Worldwide*, vol. 16, no. 1, pp.1–12. Retrieved from: http://search.proquest.com/docview/217762150?accountid=13380

Todd, RJ 2006, 'From learning to read to reading to learn: School libraries, literacy and guided inquiry', *International Association of School Librarianship. Selected Papers from the 2006 Annual Conference*, pp. 1–18. Retrieved from: http://search.proquest.com/docview/236087169?accountid=13380

Further reading on Makerspaces in school libraries can be found here at: http://childrensbooksdaily.com/school-libraries-makerspace-movement/