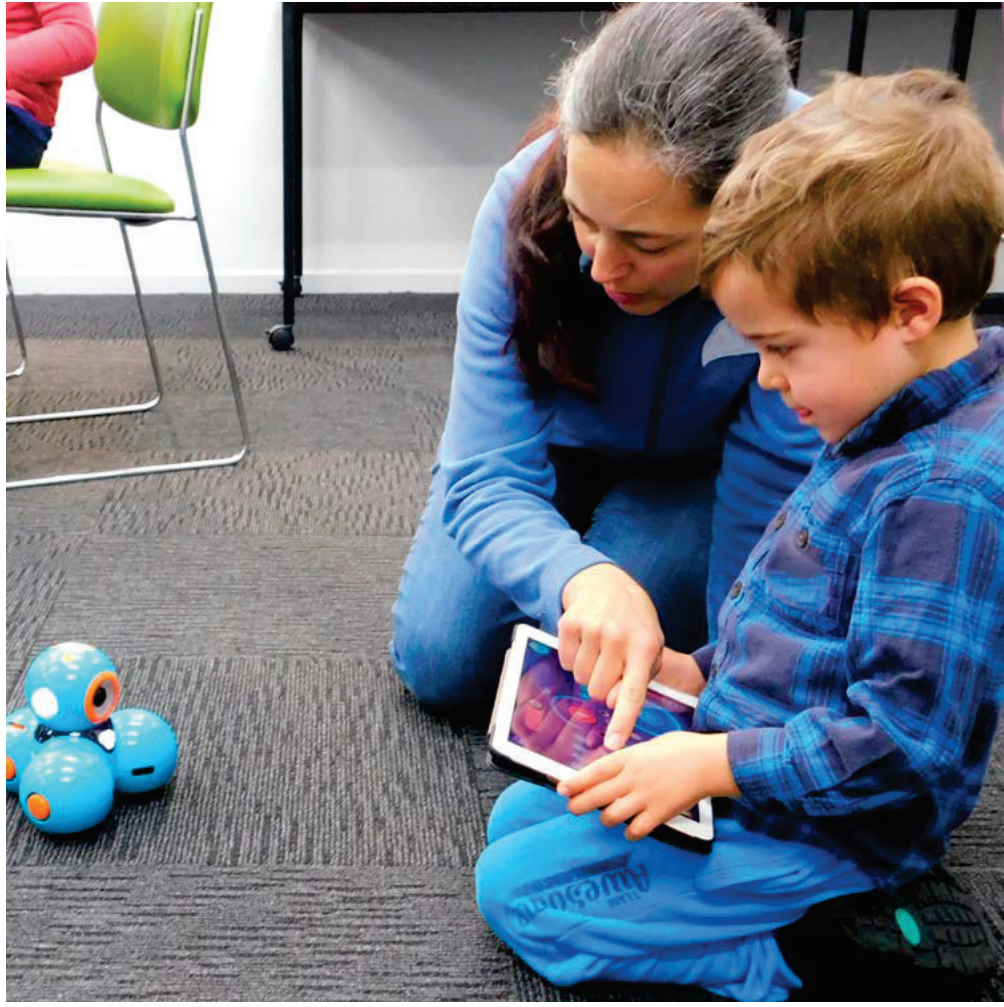
Libraries & STEM Learning: Recommendations for Future Collaborations Based on a National Survey

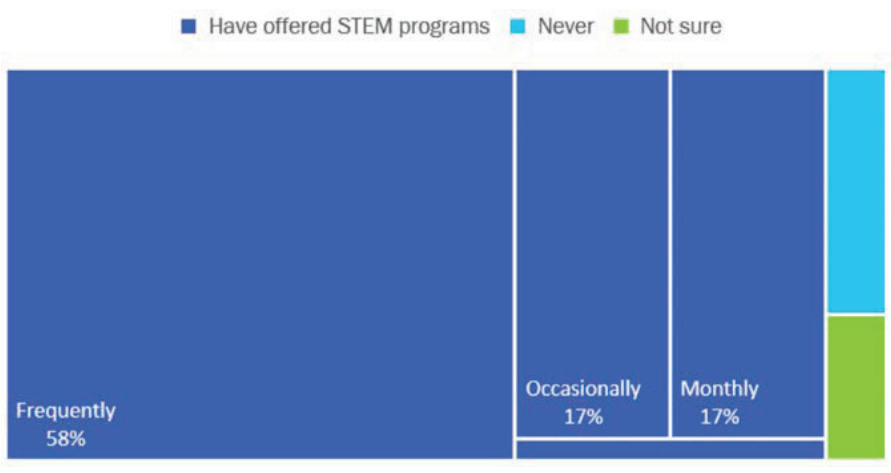


Intergenerational STEM learning at Kingston Library, Tasmania.

STEM IN LIBRARIES: AN INTERNATIONAL ENDEAVOUR

As our global community continues to make leaps forward in science, technology, engineering, and mathematics (STEM), citizens of all ages need to access STEM learning. In the United States (US), public libraries are undertaking a transformative revolution in their services and core functions to address this need. A 2015 survey of US librarians captured the state of STEM learning opportunities in libraries and needs for the future, and the resources developed to answer those needs are free and available online through the STAR Library Network (STAR Net) and its searchable STEM Activity Clearinghouse.

To help build on these successes and challenges internationally, and to develop promising directions for collaboration, a Fulbright Global Scholar project captured the state of STEM learning opportunities in Australian libraries through an adapted version of the 2015 US survey. Library professionals from various communities across six Australian states and the ACT provided their anonymous responses from August – November 2018. This article presents recommendations from input provided by 122 survey respondents and 19 interviewees from state, public, and school-based community libraries.



Of 114 responding library professionals, the majority (93%) have offered STEM programs, while 4% have never offered them and 3% are unsure. Many (58%) offer STEM frequently, but some also offer STEM programs monthly (17%) or 3–4 times per year (17%) and 2% have offered them once.

STEM LEARNING IN AUSTRALIAN LIBRARIES

There is an active movement of STEM learning in libraries: 92% of respondents offer STEM at least occasionally and 58% frequently, while only 4% have never offered STEM. Even if they don't do so already, most respondents were 'interested' or 'extremely interested' (90%) in offering STEM learning opportunities to their users. However, STEM is not a current focus for every library: 9% of responding library staff had 'some interest', but 1% had 'no interest' in offering STEM.

> There's more to [STEM] than an acronym, but social skills, teamwork, collaboration. The library is a safe environment for developing those skills. - *Interviewee*

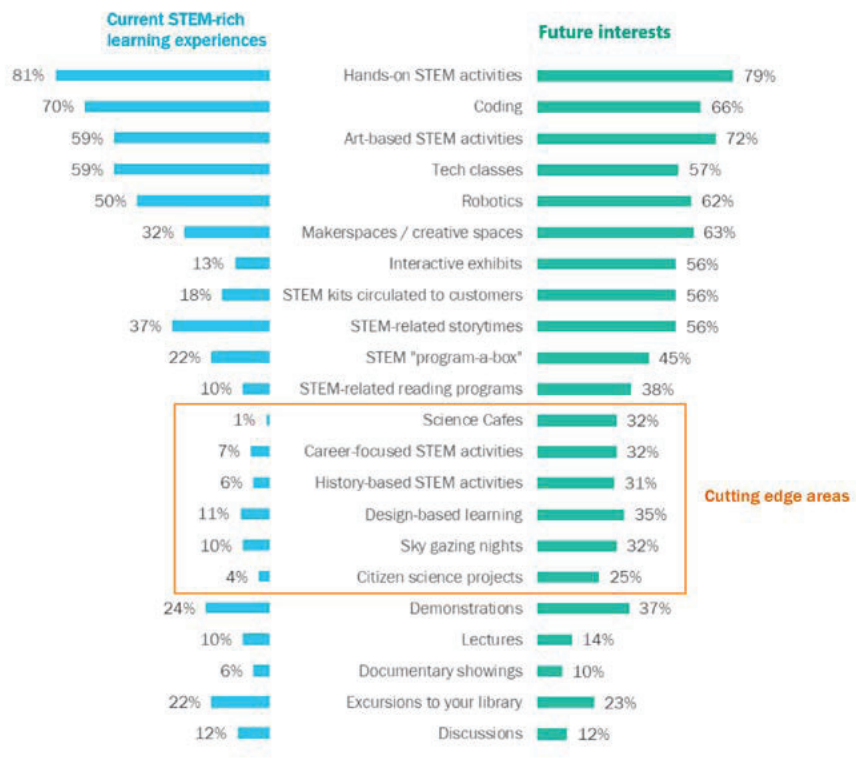
STEM learning in libraries is intended to be social, with a focus on the 21st century skills of active learning, creativity, problem solving, curiosity, and critical thinking. Future efforts will expand beyond the current mainstays of hands-on activities, coding, art-based STEM activities, tech classes, and robotics to more innovative services like makerspaces, STEM kits, and interactive exhibits.

Library professionals get hands-on practice with the STEM activity, UV Kid. Photo courtesy of the State Library of Western Australia.

Cutting-edge areas worth exploring are design-based learning, career-focused STEM activities, sky gazing nights, science cafes, history-based STEM activities, and citizen science projects.

Libraries currently target audiences aged between 3–12 years for STEM programming but intend to expand their audience bases, especially to teens, adults (ages 18-40), and family groups.

Libraries are largely providing STEM learning internally. STEM programs are typically developed and facilitated by library staff. Nearly all rely on the library budget, as opposed to external sources, to fund STEM programming. Less than a quarter of respondents listed government agencies, primary schools, museums/discovery centres, universities, and not-for-profit organisations as STEM collaborators. Fewer still work with cultural services, schools, and industry. Some (13%) indicated that they do not collaborate with any organisations.



STEM-rich learning experiences in Australian libraries currently take many forms (left side). Of 104 library professionals responding, they indicate increased interest in several areas (right side).

However, 40% of survey respondents collaborate with other libraries, and indeed, networks of libraries were highlighted as key sources for learning about STEM activities, programming opportunities, and resources, and they can share funding opportunities and local STEM resources in the future. A deeper form of these networks, a 'community of practice', is ranked as a top need.

> **The skills that we've seen participants develop from coming along to STEM workshops have been wonderful – so much curiosity, learning and creativity and I think that is so valuable that libraries can facilitate this!**
> – *Survey respondent*

NEXT STEPS: COLLABORATION

Library professionals facilitate access to innovative STEM experiences for learners of all ages and backgrounds. Yet, collaboration – between libraries and with external organisations that have STEM expertise – will be essential for leveraging limited library resources. Collaborations will be most successful where they celebrate the spirit of STEM learning in libraries: social, intergenerational, hands-on, and fun.

External collaborators can help library staff gain confidence and experience in STEM through practical training and sharing procedures for facilitating hands-on STEM experiences, sample program ideas, and sources for ready-made programming materials and kits.

ACKNOWLEDGEMENTS

The Fulbright Program is the flagship international educational exchange program sponsored by the US Government and is designed to increase mutual understanding between the people of the US and the people of other countries. The views expressed in this article are entirely those of its author and do not represent the views of the Fulbright Program, the US Department of State or any of its partner organisations. Thanks to the University of South Australia for hosting this project, especially Dr Graham Hardy, Dean and Head of School of Education; and Dr Sue Nichols, Associate Head of School of Education.

KELIANN LACONTE
Fulbright Global Scholar

EMAIL
keliann.laconte@alumni.caltech.edu