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To cite this article: Emilia C. Bell, Stephanie Piper & Carmel O'Sullivan (2023) Users' Experiences in a Regional Academic Library Makerspace, Journal of the Australian Library and Information Association, 72:2, 135-149, DOI: [10.1080/24750158.2023.2202512](https://doi.org/10.1080/24750158.2023.2202512)

To link to this article: <https://doi.org/10.1080/24750158.2023.2202512>



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Published online: 14 May 2023.



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Users' Experiences in a Regional Academic Library Makerspace

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ABSTRACT

Makerspaces are still emerging service offerings and establishments within libraries and on university campuses. They provide equipment and expertise for hands-on projects and skill-building, especially around digital fabrication. This paper presents findings from a qualitative case study of a makerspace in a regional university Library at the University of Southern Queensland. It explores users' experiences of participation and value across three usage types in the Makerspace: course curriculum, extracurricular, and research. To understand users' experiences within the space a visual research method was adopted alongside semi-structured interviews. This facilitated a participant-driven dialogue and adding depth to the data collected. A reflexive thematic analysis of interview transcripts was undertaken from which five themes were developed. These were: a tentative start, practical need, skills development, community connection, and influencing outlook. The resulting themes presented a narrative of users' participation that started with tentative curiosity and hesitancy around using the Makerspace, but ultimately saw participants finding value in new perspectives and skills.

ARTICLE HISTORY

Received 12 January 2023
Accepted 11 April 2023

KEYWORDS

Makerspaces; academic libraries; university libraries

Introduction

Makerspaces are sites of 'making', providing equipment and knowledge for hands-on projects and learning. Going beyond the physical location itself, they centre around building and creating in a collaborative environment. Library makerspaces typically focus on digital fabrication, using computerised software-driven equipment, such as 3D printers and laser cutters which are the most commonly described equipment in Makerspaces in the research literature (Soomro et al., 2021; Wong & Partridge, 2016). These spaces provide a rich variety of benefits to those who choose to use them and reflect a modern take on learning practice. In academic libraries, makerspaces represent an opportunity for interdisciplinary access to technology and resources. There is,

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however, a gap in the research literature on makerspaces within Australian university campuses, and there remains a need for empirical research on the role of makerspaces in the Australian higher education context (Wong & Partridge, 2016), especially outside of engineering and design faculties (Altman et al., 2015). Academic libraries have the potential to fill access and service gaps left by existing campus makerspace services. One such access gap is the situation of Makerspaces within academic faculties which can present a barrier to outside users (2015, pp. 61–62). While other service gaps are identified by Altman et al. (2015), mapping of community needs, and relevant library makerspace services and resources, also need to be evaluated in local institutional contexts and the Australian university context. There remains a need to continue contributing to the research literature to establish best practices and understand the impact of makerspaces on students (Wong & Partridge, 2016).

This paper discusses findings from a qualitative case study on the University of Southern Queensland (UniSQ) Library Makerspace across three different use types: research, course curriculum, and extracurricular. It responds to the following questions:

- How are UniSQ Makerspace users engaging with the space and its services?
- What can users' own experience of participation tell us about the Makerspace's value for research, course curriculum, and extracurricular benefit?

The paper begins by situating the case study in the UniSQ Library context. This includes background literature that supports and contextualises the three key usage types in the UniSQ Makerspace: research, course curriculum, and extracurricular. This is followed by a methods section which outlines each of the stages of the study within an interpretivist research paradigm. The purposes behind using a visual elicitation method and reflexive thematic analysis are also detailed, with a reflexive account of researcher positionality. The findings section then outlines five themes developed from the analysis and a discussion section interprets the findings in the context of the research questions and broader literature. Finally, research implications are considered, including opportunities for future research.

Background

Makerspaces are increasingly found in higher education and academic library settings (Wang et al., 2016; Wong & Partridge, 2016), providing a hands-on space for creation and problem-based learning (Burke, 2015, p. 500). Wang et al. (2016, p. 3) describe a maker culture as one that:

embraces the experimentation, invention, prototyping, and investigation of theory through self-directed practical work. It also encourages playful learning, knowledge sharing, creative thinking, social interaction, informal mentoring, and community collaboration and support.

In academic libraries, makerspaces provide access to resources and equipment that may otherwise be cost-prohibitive for individual students to purchase and also provide interdisciplinary access, not aligned with a single academic discipline or department (Wong & Partridge, 2016, p. 146). At the University of Southern Queensland (UniSQ), a multi-campus regional Australian university, the Library Makerspace is physically located on the Toowoomba campus, and workshops and resources are also hosted online. It can

be used by staff and students from any discipline for curricular, research, and extracurricular projects. The Makerspace's collaborative, open, and interdisciplinary nature follows Tashjian's (2014) recognition that 'makerspaces are shifting educational and public organisations from being places where things are made, or information is found, to places where knowledge and ideas are developed, and imagination and creativity are fostered'.

At UniSQ, within curricular Makerspace usage, students studying education have an opportunity to 3D model keyrings in TinkerCAD software, have them 3D printed and mailed to them as part of the assessment piece, an activity accessible by both online and on-campus students. These students engage in active, collaborative learning rather than passive, classroom-based, learning. Such engagement with the active learning environment of makerspaces in libraries can be transformative (Colegrove, 2017). Science students who select the industry placement elective subject can also pick a project to solve a problem, typically creating learning aids for their subject area. This improves students' understanding of a concept while they learn new skills and enhance the learning experience of others.

When used for research, the Makerspace may be considered a 'third space' in the community, allowing for greater cross-collaboration and the sharing of ideas and innovation through serendipitous interactions, especially interdisciplinary. Gutiérrez et al. (1997, p. 372) describe, 'the third space in learning environments refers to a place where two scripts or two normative patterns of interaction intersect, creating the potential for authentic interaction and learning to occur'. Within the UniSQ Library, research students studying future materials projects are often 3D printing new 'smart shapes' to use for destructive testing, building custom rigs, moulds, or apparatus for optimal data gathering. These students gain project independence when they attend Makerspace workshops and inductions to design and build their project parts.

Use of the Makerspace for extracurricular activities often involves trying out 3D printers for the first time or creating something for personal use or to gift to others. Students using the space for non-serious projects often use elements of 'play' to learn skills not otherwise picked up during their coursework. In primary and secondary school Makerspaces, play is described by Honey and Kanter (2013, p. 4) as 'a diverse ecology of different engagement strategies, from kinetic to contemplative, from experiential to instructional'. These strategies allow for 'unpressured exploration and invention', leading to creative and innovative thinking. This definition remains relevant to the university context and wider maker culture where 'making with a spirit of play' (Burke, 2015) is encouraged, drives learning potential, and expands opportunities to build on passions and solve meaningful challenges (Blikstein, 2013, p. 5).

Method

This case study of the UniSQ Library Makerspace took a qualitative and interpretivist approach. Semi-structured interviews were conducted remotely with students and staff. A purposive and convenience sampling technique was used to select and recruit participants, both staff and students, based on their ongoing use of the Makerspace. The four participants fell into one (or more) of three categories of use (course curriculum, research, and extracurricular), and these categories were determined *a priori*. The interviews were followed by a reflexive thematic analysis of the transcripts. Thematic

analysis is an analytical strategy for qualitative data to search for patterns of experience and then to describe and unite these patterns through developing themes (Ayres, 2008). Reflexive thematic analysis recognises researcher subjectivity and requires that researchers are unpacking and questioning the assumptions they make and bring to the analytical process of interpreting and coding data (Braun & Clarke, 2019a). That is, the researcher is reflexive in their approach. A visual elicitation method was used to help facilitate a participant-driven dialogue, add depth to responses, and support the researchers' understanding of the projects as participants described them. Visual elicitation is the use of visual mediums, such as photographs or objects, to generate verbal discussion and elicit more information and different types of information from participants during interviews (Glaw et al., 2017).

Ethics approval for this research was obtained from the University of Southern Queensland Human Research Ethics Committee (UniSQ HREC) (approval number H21REA258). Participants were provided with digital information sheets detailing the project and returned signed consent forms before interviews took place. Throughout this paper, each participant is allocated a numbered pseudonym drawn from their Makerspace usage type: Course Curriculum (CC), Extracurricular (EC), and Research (R). While it is recognised that participants may have changing or overlapping usage types, this signifier is used to identify the predominant usage type described across the interview. Where a participant identified ongoing use of the Makerspace across more than one usage type this is also specified in their pseudonym, such as R/EC.

Data Collection

Semi-structured Interviews

Semi-structured interviews were conducted virtually with each participant over approximately 30 min. The same questions were asked of the four participants, irrespective of their category of Makerspace usage. The interview schedule included eight questions. A full list of questions and suggested probing questions are provided in the Appendix. Questions covered users' initial engagement with the Makerspace, their use and focus, the application of outcomes and learning, and future use and feedback. Probing questions were included to encourage elaboration and explanation and to clarify understandings (Roulston, 2008). Participants were invited to review the transcript and contribute changes, clarifications, or additions to their responses. No participants provided updates or additional responses after the interviews.

Visual Research Method

Visual elicitation helped to elicit user-driven insights and perspectives rather than topics prescribed by researcher-set themes. Visual research methods may 'increase participant agency and control and help participants to make meaning of their experiences in a manner that does not rely on language alone' (Silver, 2013, p. 163). Photo elicitation and photo voice methods have inspired other visual methods in qualitative research, such as object elicitation. Object elicitation contextualises participants' 'reflections with reference to something of substance that exists in the participants' world' (Willig, 2017, p. 3). This study did not rely solely on an object or photographic techniques, and it allowed participants to select any visual media they considered relevant.

Participants were invited to share visual media and objects representing their Makerspace projects. No other criteria were given to participants which meant that visual elicitation could challenge Library staff's existing assumptions about the use of the Makerspace as participants determined what was important. Comparatively, survey methods see the researcher set the questions and topics to address (Bedi & Webb, 2018). As methodology in library and information studies is known to be survey-heavy (Coates, 2015), incorporating a visual method helped to increase participant engagement during the interviews, allowing for meaning to be explored in greater depth than a survey would allow. While participants were reminded at the beginning of the interview that they were welcome to share visual material, during the interviews this was at their discretion with no direction provided by the researchers. While still considered data, visual contributions were primarily used to elicit data during the interview process (Coussens et al., 2020), providing further prompts for conversation when participants did choose to contribute in this way. The findings are primarily derived from interview transcripts.

Analysis

A reflexive thematic analysis of interview transcripts was undertaken, generating five themes with twenty-two (22) codes. In adopting a reflexive thematic analysis, the analysis is conceptualised 'as a situated and interactive process, reflecting both the data, the positionality of the researcher, and the context of the research itself' (Braun & Clarke, 2019b). The analysis was inductive with themes derived directly from the transcripts. This allowed patterns of shared meaning to be identified across the entirety of the transcripts rather than within responses to each question. Thus, the themes were not derived from the interview questions asked or the researchers' theoretical understandings of the topic. The initial modes of use (course curriculum, research, and extracurricular use) were determined *a priori*, but these categories were not used in developing themes and instead guided the recruitment of participants to obtain a purposive sample.

Moving through the conventional steps of reflexive thematic analysis, the approach taken was recursive, working back and forth between steps to reflect on data, codes, and themes as they developed and refined. The video recordings were returned throughout the analysis of the transcript to provide additional visual and affective context. This assisted in reflection on unstructured elements of the interviews not captured in audio transcriptions, such as students leaving to retrieve projects and designs and presenting visual material to complement the discussion. It also helped conceptualise the analysis 'as a situated and interactive process, reflecting both the data, the positionality of the researcher, and the context of the research itself' (Braun & Clarke, 2019b).

Findings

Five themes were developed from the transcripts: a tentative start, practical need, skills development, community connection, and influencing outlook. These themes presented a narrative of users' engagement with the Makerspace that grew from a tentative curiosity to finding value in new perspectives and skills.

A Tentative Start

The first theme explores users' initial hesitancy and apprehension around using the Makerspace. This presented for participants in one of three ways: a sense of not belonging in the Makerspace, not understanding the Makerspace's purpose, or feeling overwhelmed by new technologies and equipment. The sense one might be 'intruding' (CC1) by entering the Makerspace further contributed to these barriers. Even once a potential Makerspace user had accessed the space, new technology, equipment, and processes could feel overwhelming, contributing to apprehension around how to approach participating. The equipment itself was considered intimidating, with software and machines described as 'intense' and 'huge' (CC2). One student described: 'I wanted to go back because I was excited for it. But you know, seeing the 3d printers and all the stuff she [the Coordinator] has there. It's a little bit like ... I'm not gonna know how to do this' (CC2). Thus, while a lot of the initial hesitancy around entering the Makerspace had diminished, and anticipation increased, uncertainty remained around *how* to engage with the space.

Some uncertainty around engagement and the purpose of the Makerspace was tied to its visibility and perceived relevance to study or work choices. A student observed that the Makerspace 'didn't really align with my studies and how I was doing things. It didn't really resonate to go in there' (CC1). Participants initially determined that the Makerspace was a Creative Arts initiative, unique to that academic discipline. This left the impression that the Makerspace did not correspond with other programs of study, such as the health sciences. An academic staff participant described how this misconception had stopped them from participating earlier, noting: 'to be honest, I thought it was ... part of the Creative Arts – sort of hub or something. And I didn't really have anything to do with it for a long time' (EC/R1). This participant went on to explain their impression that 'the Makerspace is underutilised for researchers. Either they're not really aware – aware of what's available – or that they can use it?' (EC/R1).

If students or researchers were not explicitly made aware of the Makerspace's benefits, then its visibility relied on serendipitous discovery. Sometimes the space was found unintendedly when a student went onto campus and was 'just investigating what was around' (EC1). It was only after this student explored the campus that they noticed Makerspace classes existed, furthering their intrigue and an investigation into 'other potential projects to work on' (EC1). As participants expressed that the Makerspace's purpose was initially unclear, as too was their rationale for wanting to be involved. This was not something that could always be clearly articulated: 'I always felt like it was an area where I wanted to be for some weird unknown reason ... and I always felt like I would never be in there' (CC1).

Practical Need

Practical motivations often drove users' initial engagement with the UniSQ Makerspace. Participants shared how they recognised that the Makerspace was a reliable alternative to other sites and workshops. The Makerspace was positioned to fulfil a practical need for research material, presenting a cost-effective and efficient alternative to other spaces. An academic staff participant explained: 'for work, a lot of it is just about improving productivity ... Like they're not exciting things, but they make our work projects just go a

little bit better' (EC/R1). While extracurricular or personal projects provided more opportunities for creative exploration, the functionality of the Makerspace and the practical need it filled supported ongoing use and belonging in the space.

Beyond research and work-related efficiencies, the Makerspace fulfilled practical study requirements. Its use for coursework placements provided an efficient pathway to graduation. While participants acknowledged this was their initial motivation for using the Makerspace, they also recognised it was not the only value the Makerspace provided. Remarks, such as, 'I just need to get this placement out of the way so I can graduate' [CC2] and 'I'm very study driven ... so it [use of Makerspace] was driven by placement and studies. So ... not really driven by creativity, unfortunately' (CC1) suggested students were aware there were other reasons to use the Makerspace, such as extracurricular creative pursuits. Indeed, some students had already experienced these creative opportunities, having returned to the Makerspace with peers after coursework introductions, driven by the incentive of completing a free 3D print of their own. Despite, however, the Makerspace initially being thought of as a creative arts space, it was often practical course requirements driving ongoing engagement.

Skills Development

The third theme, Skills Development, recognised how users engaged in the Makerspace to acquire new technical skills, leading to independent and continuous learning. Participants recognised the Makerspace as the starting point for their 'journey' into 3D printing and design and described learning new programs and equipment to engage in these activities. This included 3D printers, 3D scanners, Autodesk Fusion 360, Adobe Illustrator, and Arduino processes, among others. This theme saw participants shift from a position of 'coming in completely cold and not knowing where to start' (EC/R1) skills-wise to feeling comfortable using Makerspace technologies, buying 3d printers, and seeking out external learning opportunities.

The Coordinator guided staff and students in learning to use digital fabrication technology and software, enabling skills development in a supportive environment. Engagement in the Makerspace led to further independent continuous learning, including with external resources. For one participant this exploration was immediately following an introduction to the Makerspace in their coursework. After the Coordinator had 'mentioned the website Thingiverse ... in some of my free time, I looked it up and just looked at all the stuff you could do' (CC2). During the interviews, several participants went on to describe purchasing digital fabrication equipment for home use following their use of the Makerspace. The Coordinator's approach to supporting skills development saw confidence build, and as one participant described, 'we just started off really simple, and then, probably about six months later, I bought my own 3d printer' (EC/R1). Practically, the Coordinator taught users new skills but also contributed to how comfortable and confident users felt in their learning.

Community Connection

The Community Connection theme focuses on the engagement and connection the Makerspace provides, positioning it as a community hub and 'place to meet up with

other like-minded students wanting to make things' (EC1). This includes diverse types and sites of connection, both within and outside of the university. Opportunities for connection presented through sharing ideas, helping others, finding inspiration, problem-solving, and co-construction of knowledge. Participants described connecting with peers and the Coordinator, engaging with communities outside UniSQ, and using new skills to connect with others through volunteering.

Much of the project-based learning occurring in the Makerspace is self-directed, chosen by users and unique to their specific curricular, extracurricular, or research contexts. This means there are nuanced understandings of what collaboration means in the Makerspace, and interpretations of this can appear conflicting. Some participants described their projects as 'independent' (EC1), separating the discussion that takes place in the Makerspace from collaboration. Conversely, one student reflected that the discussion and knowledge sharing was indeed collaborative, describing: 'I mean, you go in with the idea of what you want to do but being able to bounce the ideas off [the Coordinator] or if she's not there, another person that's in there. Yeah, collaborative, you know, getting everyone's opinion' (CC2). Irrespective of whether discussion and problem-solving were collaboration, this sharing of knowledge and community was described by all participants. The Makerspace was experienced as a site of community connection. Being able to 'bounce ideas off' (EC1), 'get input' (CC2), 'clarification' (EC1), or receive 'ongoing advice' (EC/R1) from peers or the Coordinator was a valuable part of the Makerspace experience and contributed to what engagement in the space looked like.

Once users were comfortable using the Makerspace independently, the space presented as a cooperative space and creative hub, regardless of whether the Coordinator was present. This opened opportunities for students, to engage with peers outside of their academic program. One participant described how, as a science student, 'talking to someone that's an engineering student that I really wouldn't cross paths with otherwise at the university. That's really nice' (CC2). The opportunity to share learning experiences and see how other users' projects progressed positively contributed to how the space was experienced. The willingness of Makerspace users and the Coordinator to help others and to share expertise created a positive and participatory environment. There was an understanding that 'everyone that goes in there is willing to help everyone and listen what you're doing and give you their ideas' (CC2). The sense of a creative community hub was formed through this readiness to find creative solutions and share knowledge.

Influencing Outlook

The final theme, 'influencing outlook', is developed from the value of new opportunities, directions, and perspectives provided, as the Makerspace was used 'as a way of taking a new perspective on things' (EC1). The influence and the benefits of the Makerspace extended beyond the university and included the home environment:

nearly every day I'm thinking about what I can print, what I can design, what, how I can make something better for, for my son, for my husband, for my parents, for gardening, and like I can make a tool for that. (CC2)

These new perspectives saw users realise how technology could be used to help others and provided new ways of thinking about how science, technology and creativity were connected and might inform future opportunities.

Many student reflections relating to the benefit of the Makerspace were future-oriented, connecting technical skills were connected to future opportunities. Building on the 'skills development' theme there was a recognition of the advantage the Makerspace provided: 'Adobe Illustrator, 3d printing, modelling all of that, you know, it's kind of given me an edge from just being the normal science student that I am' (CC1). The difference that the Makerspace made for students extended to their future study goals and career paths. This was not only in the advantage new skills provided but the confidence it built and the new directions it highlighted: 'it's given me a lot of hope in my life decisions in a way to help me see that what I've done in my placement is something that I could do in the future' (CC1).

Discussion

The five themes developed across the analysis present a narrative of users' engagement with the Makerspace developed from a tentative curiosity to finding value in new perspectives and skills. Looking at the initial curiosity and hesitancy experienced by users (Theme 1: A Tentative Start), we find embedding an introduction to the Makerspace in courses helps to facilitate access and introduce both its relevance to study and research, as well as some of the more creative components. This recognises that the Makerspace has relevance and a very practical and functional value (Theme 2: Practical Need). Through participation, the opportunities for skills development (Theme 3: Skills Development) and community connection (Theme 4: Community Connection) are also realised. It is, then, through this ongoing engagement that new perspectives, knowledge, and future pathways are realised and make a difference outside of the university, opening new solutions and opportunities (Theme 5: Influencing Outlook). This discussion section contextualises the findings in relation to both research questions. First, it interprets findings around users' engagement with the space and its services, and second, it explains the relevance of these findings to the value of the Makerspace for research, course curriculum, and extracurricular benefit.

User Engagement

Case study participants reflected on how other students and researchers might experience barriers to participating in the Makerspace which would contribute to it being under-utilised. Even with uncertainty around the purpose of the Makerspace, participants expressed wanting to be involved and experience what was on offer. The initial hesitancy around using the Makerspace was overcome in two ways, enabling access and participation, and support to increase users' confidence.

First, access to Makerspace participation was enabled through the visibility of the Makerspace and its service offerings. Having an introduction embedded in student coursework helped to demonstrate the practical relevance of the Makerspace while still highlighting its creative elements and the opportunities it afforded to innovate in other areas. These findings aligned with those of Hilton et al. (2018, p. 13) who found 'initial

motivation does not impact involvement in the space as strongly as being presented an initial opportunity to use the space'. In the UniSQ Library, the visibility of the Makerspaces through coursework helped to encourage engagement. The opportunity to participate through coursework drew on existing curiosity but it was the often formal introductions supporting initial engagement.

The presence of existing Makerspace projects also added to the visibility of the space. The visibility of other users' projects heightened awareness of the space and prompted initial engagement without formal introductions through coursework. Such engagement through sharing is explored by Blikstein (2013), with a particular focus on the role of makerspaces as constructionist learning environments without fixed curriculums. Building from Piaget's Constructivism and Papert's Constructionism, Blikstein (2013, p. 5) describes how 'the construction of knowledge happens remarkably well when students build, make, and publicly share objects'. Recognising this tangible and hands-on quality of Makerspace outputs, these objects 'can be shown, discussed, examined, probed, and admired [...] It attaches special importance to the role of constructions in the world' (Papert, 1980; as cited in Bill & Fayard, 2013, p. 5). Thus, for potential users, the UniSQ Makerspace was initially a source of intrigue based on outside glimpses of the physical space and tangible outputs. This curiosity from a distance meant that formal entry points to using the Makerspace, such as embedding introductions in coursework, were valuable to highlighting its relevance and value to both students and staff.

Second, users overcame barriers to engagement through the continued support of the Community Engagement Coordinator. For new or potential Makerspace users, the presence of the Coordinator was invaluable for turning hesitancy into participation. Benjes-Small et al. (2017, p. 433) note that trusting Makerspace users and giving them the freedom to make what they what contributes to the success of academic makerspaces and the sense of community around them. This suggests the importance of ensuring users' confidence in using the space independently, and the need for initial support and training to facilitate this. At UniSQ, the Coordinator supported users in developing this confidence and feeling comfortable using the space. While coursework introductions were an entry point to overcoming initial hesitation, helping to facilitate access and interest, the Coordinator carried on this role by supporting confidence around skills development. The findings of this case study do not indicate whether the presence of other Makerspace users in the space helped to overcome participation barriers, however, participants in this case study did share the value of having peers working alongside them. Participants commenting on the Makerspace's underutilisation shared an understanding that having more people involved would be beneficial to the quality of users' engagement and overall participation.

Finding Value

The Practical Need theme demonstrated the functional value of using the Makerspace, for work or gradation purposes. It was seen as helping to reduce research costs, increase productivity, or accomplish academic goals. It was in the Skills Development theme that more affective, holistic, and creative understandings of the Makerspace's value developed. Attending workshops and engaging with the Makerspace through various projects builds future skills and allows students to create portfolio projects

that may be unrelated to their study area but make the student more appealing to a potential employer. Undertaking these side projects fosters innovative practice and contributes to the wider university graduate outcomes. The Community Connection theme continued to build on this value through social impact, presenting opportunities for knowledge sharing and construction through collaboration. These findings revealed the wider social implications of the Makerspace. This included volunteer projects for local communities outside of the university but also extended to the use of makerspace skills and knowledge in home and work environments to innovate, problem-solve, and help others.

Opportunities to interact with other students and to connect socially are important to enhancing students' sense of belonging at university (van Gijn-Grosvenor & Huisman, 2020). The UniSQ Library Makerspace provides such an opportunity for its users to develop social and reciprocal connections, based on shared interests and experiences. The findings in this case study highlighted how the Makerspace allowed for connection outside of users' academic program, facilitating interactions in a non-class setting and encouraging input and shared problem-solving from users with different academic backgrounds. It provided new sources of expertise for knowledge sharing, innovation, and campus-library collaboration (Burke, 2015; Fisher, 2012; Lee, 2017). This aligns with understandings of library makerspaces as 'not necessarily born out of a specific set of materials or spaces, but rather a mindset of community partnership, collaboration, and creation' (Library as Incubator Project, 2012). Thus, the Makerspace may be conceived as an 'informal social learning space', that develops as an interdisciplinary and cross-year community of practice and contributes to a sense of belonging (Morieson et al., 2018).

In the Influencing Outlook theme, there was a recognition of the value offered by the Makerspace beyond its efficiencies and practicalities. This appeared in conflict with the Practical Need theme which saw staff and students engaging with the Makerspace to fulfil course or work requirements. This reflects the findings of an audit of Australian university makerspaces which found coursework projects were the most promoted activity (Wong & Partridge, 2016, p. 153). While the Practice Needs theme showed an initial detachment from other creative or personal projects in the Makerspace, the Influencing Outlook theme recognised value beyond the immediate project and explored changed perspectives, future opportunities, and benefits outside of the university context. As one participant shared: 'It's made a huge difference, and I didn't think it would' (CC2).

Research Implications

The findings of this case study addressed users' experiences in the UniSQ Library Makerspace concerning how they engaged with the space and its services and the value the Makerspace is providing across diverse use types. Further research on Australian library makerspaces is needed to continue building an empirical evidence base that can inform decisions around best practices, the value of use, and the sustainability of Makerspaces in libraries (Lee, 2017; Wong & Partridge, 2016). The findings suggested that the use of the Makerspace is informing students' decisions around career directions and study choices, and therefore future research may explore the impact of Makerspaces on student decision-making in this area. From a methodological perspective,

Kim et al. (2022) highlight the ‘use of diverse and robust methods’ as a limitation of current library makerspace research. Future studies within the UniSQ Library Makerspace could consider a different research methodology that provides opportunities to triangulate other data sources. This may include integrating data from usage statistics or surveys into the methodology or exploring other research methods involving observational studies, focus groups, participatory action designs, or students-as-partners or researchers.

Conclusion

Academic library makerspaces represent opportunities for interdisciplinary access to technology and resources for creative and innovative projects, and for collaboration and knowledge sharing. This paper presented findings of a case study exploring experiences and value in a regional academic library makerspace through semi-structured interviews and a visual elicitation method. It discussed how UniSQ Library Makerspace users engaged with the space and what their experience of participation showed of the Makerspace’s value for research, course curriculum, and extracurricular benefit. Through reflexive thematic analysis, five themes were developed: a tentative start, practical need, skills development, community connection, and influencing outlook. Together these themes presented a narrative representing users’ engagement while highlighting the different stages and types of value they experienced over ongoing Makerspace use. The findings contribute to the UniSQ Library evidence base, helping to inform the continuous improvement of services and contributing to understanding the value the Makerspace provides for its users, both students and staff.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

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Carmel O’Sullivan is the University Librarian and Director, Library Services at the University of Southern Queensland. She is committed to leading teams to work collaboratively to be creative and innovative, and to perform at their best for themselves and their community.

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Appendix: Interview questions

Area	Questions	Suggested probing questions
Initial engagement	1 How did you first hear about USQ's Makerspace?	When did you first start using the makerspace?
	2 Can you describe your initial motivations for using the Makerspace?	Had you used any other Makerspaces beforehand? Did you have any expectations around what the Makerspace might be like?
Use and focus	3 What do you typically use the Makerspace for?	Have you mostly worked independently in the Makerspace, or collaboratively with others?
	4 Can you tell me about your most recent project in the Makerspace?	What tools or equipment did you work with in your most recent Makerspace project (or your current one)? Were there any tools or equipment that weren't available that you would have found helpful in using the Makerspace?
Application of outcomes and learning	5 Can you describe what you learnt from your project and your use of the Makerspace?	Did you seek any additional resources or advice when you were completing your project? Who or where did the resources/advice come from?
	6 What benefits has using the Makerspace had for you?	

(Continued)

Continued.

Area	Questions	Suggested probing questions
Future use and feedback	7 Are you likely to use the Makerspace again in the future?	Why or why not? Can you describe what you might use the Makerspace for in the future?
	8 Is there any feedback you have for the Makerspace?	How could your experience of the Makerspace be improved? Is there anything that would be useful to see the Makerspace offer?