Library Makerspaces: Evaluating the Value of Digital Making in a UK Public Library Setting

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Abstract

Makerspaces – workshops openly accessible to the public, where people can create objects or learn about making – are a much talked about subject within the library world. An increasing number of public libraries, as well as school and academic libraries, are establishing, or planning to establish makerspaces within their institutions. Many enthusiastic claims are made about the potential benefits of makerspaces, by supporting and encouraging: creativity, enterprise, learning and self-fulfilment. However, there is limited research looking at whether those claims are borne out in practice, particularly within a library context.

This study aims to evaluate the extent to which those claims are applicable to public library makerspaces, by researching what the benefits are to users of an individual makerspace. DigiLab makerspace in Barking Library and Learning Centre was chosen as a case study site, in order to test the validity of these claims in an established public library makerspace. Qualitative data was collected through semi-structured interviews with DigiLab organisers and members, and analysis of projects and objects made by members.

The research found that in the case of DigiLab, the makerspace environment supports and develops the creativity of its users, promotes informal learning and knowledge sharing between members and provides opportunities for putting skills learnt towards making money. Perhaps more than anything, DigiLab is a highly social space, which encourages people to develop and fulfil personal goals. Though the findings are specific to the context of DigiLab, it is hoped that some features of the makerspace can be applied elsewhere.
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1. Introduction

Most simply defined as “public workshops where makers can share tools and knowledge” (Taylor, Hurley and Connolly 2016, p. 1), makerspaces are currently a much talked about topic within the library world. An increasing number of libraries are establishing or planning to establish spaces where their users can create. Though the concept of makerspaces within libraries may seem unusual, their “values strongly echo libraries’ core mission of providing equal access to knowledge resources” (Taylor, Hurley and Connolly 2016, p. 2).

Public librarians in the UK are becoming increasingly interested in implementing makerspaces within their libraries. Being that it involves technology and concepts relatively unfamiliar to most library workers, there has consequently been huge amount interest in the practicalities of implementing makerspaces. There has also been much interest in defining potential benefits of makerspaces; however, this is something that can be very difficult to define and measure.

This upsurge of interest is framed by the current funding crisis facing public libraries in the UK. The implementation of makerspaces could be seen as either an expensive distraction from the core mission of libraries in a difficult period, or as a possible solution to keep libraries relevant and sustainable in modern society.

The establishment of makerspaces is still in a relatively early stage in the UK, and the debate is characterised by equal measures of excitement, trepidation, technical language, speculation, scepticism and enthusiasm. As such, there is a need for original research into this emergent area, especially in the context of UK public libraries.

2. Background

Makerspace definition

It is important to define the term makerspace, and why this particular term has been chosen over alternative names for the purpose of this research. Makerspaces refer to open workshops, accessible to any member of the public (either for free or paid for). Though they often feature high-tech digital fabrication equipment such as 3D printers and laser cutters, they can give access to low-tech and high-tech equipment. It is too simplistic to define makerspaces simply as a collection of tools; as John Burke argues, makerspaces are “combinations of a community of users, a collection of tools and a desire to create, exchange knowledge, and share what is created. The defining character of a makerspace is that it enables making.” (Burke 2014, p. xv).

There are many alternative names for these types of space – makerspaces, Fab Lab, hackerspace and TechShop being amongst the most commonly used. Each of these terms reflects a particular technical emphasis, community ethos or organisational structure. FabLabs originated in 2005 from the MIT (Massachusetts Institute of Technology) Centre for Bits and Atoms – and now form part of a global network of over 1,000 workshops, all sharing a common charter, a standardised core inventory of equipment and networks for sharing knowledge, support and education (Fab Foundation 2015). TechShop is the brand name of a for-profit chain of workshops throughout the
USA founded in 2006, which offer “public access to high-end manufacturing equipment in exchange for membership fees” (Cavalcanti 2013). As FabLab and Techshop are both brand names, it will not be appropriate to use them to describe these types of space generically. The term hackspace or hackerspace originated in Europe in the mid-1990s, and describes a much very loosely-organised informal network of community run spaces, sharing a counter-cultural “hacker ethic”. Hackspace encompass many types of making activities, but generally have an emphasis on programming and electronics. Cavalcanti argues that the negative connotations of the term hacking makes the term “fundamentally exclusionary” (Cavalcanti 2013), which to some extent works against their principle of openness.

In the UK, there are 38 spaces currently affiliated as FabLabs (Fablabs n.d.). TechShop primarily operate in the USA, though there are 3 TechShops in other countries (TechShop n.d.), with plans to open a TechShop in Birmingham (Pearson 2014). The UK Hackspace Foundation lists 66 sites across the UK which are part of its network (UK Hackspace Foundation 2016). The NESTA open dataset of UK makerspaces listed 97 makerspaces as of April 2015, which includes FabLabs, Hackspaces and other types of independent “open workshops” which fit within the makerspace ethos (Sleigh, Stewart and Stokes 2015b, p. 4).

I have chosen to use the term makerspace (Makerspace or maker space also very commonly used) as the most generic description, encompassing all of these types of space which share the common ethos of the Maker Movement (which will be further explored in the literature review). I agree with Cavalcanti (2013) that the term makerspace is more inclusive, representing “a far more mainstream vision of a publicly-accessible creative space”, which aligns well with the purpose of a public library.

Additionally, makerspace is probably the most commonly used within a LIS context, as roughly demonstrated by searching in the two biggest LIS bibliographic databases LISA and LISTA: the search makerspace* OR “maker space*” generates the significantly more results (81 in LISA, 234 in LISTA, 92 in Emerald) than hackerspace*” OR ”hacker space*” (6 in LISA, 11 in LISTA) or fablab* OR "fab lab*" (9 in LISA, 24 in LISTA).

**Context of makerspaces in UK public libraries**

The primary context for this research is the upsurge in interest about makerspaces from public libraries in the UK. The first library makerspace in the USA was Fayetteville Free Library in 2011 (McCue 2011), with dozens more established across the country since then – at least 98 established or soon to be established as of November 2013 (Burke 2014, pp. 165 - 166). In the UK, though there are numerous open workshops which would fall under the makerspace category, only a handful have so far been established in public libraries – according to Anstice, there are 12 currently operational permanent public library makerspaces, with Dundee and Exeter libraries being the first launched in May 2014 (Anstice n.d.).

Despite the relatively low uptake currently, the huge interest in the subject is evident from a number of recent conferences, workshops, resource guides and initiatives aimed at public librarians. For example, in 2015 the Society of Chief Librarians (SCL) launched Code Green, a toolkit of resources to help public libraries roll out digital making opportunities, created in response to the huge demand of libraries across the country for guidance and advice on this subject (Eastell 2015). The Code Green website provides practical advice on different types of digital making activities, case studies, and advice on volunteers, marketing and community involvement. In the past year there have been
numerous very well attended conferences and events aimed at helping UK public libraries launch makerspaces (SCL 2016; Makercart and Artefacto 2016; FabLab Devon 2015).

In Scotland, SLIC (the Scottish Library and Information Council) has funded a £76,000 project to provide 3D printers and training to all of Scotland’s 32 library authorities (SLIC 2016), which is in addition to several Scottish library authorities having their own pre-existing makerspaces (Robertson 2016, pp. 4 - 9). SLIC’s project will provide a consistent brand and level of service across the whole of Scotland, with each local authority being provided with the same 3D printer and staff training. This significant coordinated investment demonstrates the level of interest public libraries and governing bodies in incorporating digital making as part of their core offering.

In addition, the interest in makerspaces must be considered within the current situation facing public libraries in the UK, a combination of:

- declining use – number of visits dropped by 25% over the decade since 2005 (Woodhouse and Dempsey 2016, p. 18)
- severe funding cuts – funding cut by £180m (16%) from 2010 – 2015 (CIPFA 2015)
- and library closures - 8,000 (24.8%) library jobs lost since 2010 (BBC 2016; BBC Data Unit 2016) and 565 (12.8%) library service points closed 2005 - 2015 (Woodhouse and Dempsey 2016, p. 18)

Considering the situation facing libraries, there are concerns that the cost and staff expertise needed to implement makerspaces could prevent the widespread adoption. In response to these serious issues for the future of libraries, makerspaces can be seen in two ways. There are many who would advocate for makerspaces as a way of redefining what public libraries offer, and increase their relevance to modern society (Willet 2016, pp. 319 - 321). On the other hand, there is anxiety amongst some commentators over whether makerspaces prevent libraries serving traditional purposes, by diverting resources - funding, staff time and physical space (Barniskis 2016, pp. 107 - 108).

**Scope of the study**

This study concentrates on makerspaces within UK public libraries; primarily in the form of already established and operational makerspaces, but also drawing on the wider interest and debate about them within the public library sector, which is likely to lead to a much larger uptake. The reason for the focus on public libraries (as opposed to other types of library) is because of the way public libraries are open and accessible to everyone, encourage free or low-cost access to knowledge and learning, and act as the focus of community activities – all characteristics in common with the so-called Maker Movement from which the concept of makerspaces emerged.

However, as there is only a fairly limited number of currently operational makerspaces within UK public libraries, examples and literature are drawn from a wider field – the Maker Movement, research into makerspaces in other contexts, and from countries where makerspaces within public libraries are already more common.

Though examples and models will be taken from other contexts, the purpose of this research is to determine their applicability to UK public libraries – as opposed to other types of library, such as school or academic, or to establishing makerspaces in non-library settings (for example within community centres, as artists’ studios or as for-profit businesses).
This research concentrates on library services which have already implemented more fully fledged makerspaces. Many public libraries offering opportunities for making to some extent, ranging from more traditional IT courses, support with mobile devices and craft activities, to more recent trends, such as Code Clubs or Lego Robotics clubs. The scope of this research is limited to libraries that have gone a step further from offering one-off events, and established permanent or semi-permanent spaces dedicated to making. The spaces to be studied would have to fit within the definition of makerspaces as set out by Sleigh, Stewart and Stokes: “an open access space (free or paid), with facilities for different practices, where anyone can come and make something” (Sleigh, Stewart and Stokes 2015b, p. 2). Because the aim of the research is to establish the benefits of makerspaces for users, it is hoped that libraries where makerspaces have been established for some time will have had time to develop and provide real-life examples of those benefits.

3. Aims and Objectives

No two makerspaces are alike, each being uniquely dependent on the needs of the community and the level of resources available. The aim of this research is to discern what the potential benefits of makerspaces can be for their users, and to attempt to discover the extent of these benefits. It is hoped that this research will be useful for both already established makerspaces, and for libraries planning future makerspaces.

In order to achieve this aim, the following objectives will be sought to be met:

- What the types of users are of the makerspace?
- How has the makerspace attempted to find out user needs and expectations?
- What are the uses of makerspaces, in terms of physical outcomes and products?
- Outline the benefits to users
- Assess the longer-term sustainability of makerspace models

4. Literature Review

The literature review will provide a context of previous research within which the current study fits, covering three main areas: research into the Maker Movement, the LIS perspective on makerspaces and research into existing makerspaces form non-LIS domains. Examining these themes within the literature will give an idea of the historical development of makerspaces, highlight in what ways makerspaces are claimed to provide benefits and provide examples of methodologies for studying them.

Examining literature related to the Maker Movement will help define what is covered by the term “making” in this context, and provide an overview of the different variations of makerspaces. This will give an indication of the general claims made about the benefits of making and makerspaces. Looking at the LIS literature will give an idea of how the more general claims about the Maker
Movement are being theoretically discussed and practically applied within the specific context of libraries. As the concept of makerspaces in libraries is relatively new, research into makerspaces in other domains is a more established (though still developing) field, and will help bring further insight.

4.1 The Maker Movement

The emergence of makerspaces is intrinsically linked with the phenomenon of the “Maker Movement” – a term which describes the upsurge of interest in “constructing and sharing personal inventions and creative artifacts” (Halverson and Sheridan 2014, p. 496). It consists of an amorphous grassroots grouping of individuals with different objectives “united by a common desire to be involved in the production of things” (Dellot 2015, p. 13).

Interest in the Maker Movement comes from several different, but overlapping, contexts: education and schools; hobbyists and DIY enthusiast; entrepreneurs, designers and inventors; social enterprises; as well as libraries. The value of looking at the Maker Movement in the context of this dissertation is that much of the ethos, and success stories from it can be used as inspiration for innovative library services.

Some of the key elements of the Maker Movement ethos are: the importance of informal hands-on learning, play and tinkering (Dougherty 2012, pp. 11 - 12); collaborative work practices, knowledge sharing and advocacy for open source and open access (Dellot 2015, p. 17); the impact of new technologies on manufacturing and culture, as a “new industrial revolution” (Anderson 2012; Gershenfeld 2012). However, it should be taken into consideration that many of these claims within the literature appear to some commentators to be highly speculative (Hielscher and Smith 2014, p. 2), in that they are based on an emergent sector, and that the hype surrounding the Maker Movement sometimes risks “extrapolating and inflating claims” without considering participants’ own activities, aims and motivations (Hielscher and Smith 2014, p. 5).

Origins of the Maker Movement

Though the name Maker Movement sounds unremarkable, as people have been making things throughout all of history, the emergence of the internet and the cheap availability of digital fabrication technology has come together to form a huge surge in interest from ordinary people making physical objects. The lowering cost of technology such as 3D printing enables people to manufacture complex objects previously only achievable by industrial methods, whilst the internet has allowed people to learn how to make use of these technologies: seek advice, share ideas and collaborate online (Burke 2014, pp. 10 - 11).

The Maker Movement is a relatively recent term coined by Dale Dougherty, and its particular emphasis on the word “make” is largely derived from the popularity of the DIY magazine Make (founded by Dougherty in 2005) and the Maker Faires associated with the publication, started in 2006 (Anderson 2013). Though the Make brand plays an important role in popularising the concept, the Maker Movement is quite an amorphous one “comprised of individual makers, local and regional maker events and publications, and a host of digital do-it-yourself resources” (Sheridan et al. 2014, pp. 505 - 506). Dougherty’s inspiration for founding Make magazine was from publications such as
Popular Mechanics, which had their peak in the mid-twentieth century, a period he describes as “a time when most Americans commonly thought of themselves as tinkerers” (Dougherty 2012, p. 11).

Though the name is quite new, a common theme in the literature is that making is a fundamental human activity (Halverson and Sheridan 2014, p. 496), and precursors to the Maker Movement can be traced through history. Dellot (2015, p. 15) outlines four movements which champion making, from the Luddite and the Arts and Craft movements of the nineteenth century; through to the development of early home computing led by the Hacker movement of the 1960s and 70s; and finally the contemporary Maker Movement. Dougherty makes the claim that “we are all makers” – making is intrinsic to almost everyone, but some of these skills have been lost because of a declining sense of necessity for these skills (Dougherty 2012, p. 11). Like Dellot, several commentators also trace a precedent for the Maker Movement in the early pioneers of the computing industry in Silicon Valley (Dougherty 2012, p. 12; Anderson 2012, pp. 20 - 23). The computing industry of Silicon was founded largely on a DIY ethic – such as Apple’s origins from the “garage tinkerers” of the Homebrew Computer Club (Anderson 2012, p. 22) – and it is ironic that the spectacular success of these companies has led to a sense of technological disconnect with Making because the “devices they create have become so widespread and people no longer need to be enthusiasts to use them” (Dougherty 2012, p. 12).

Reconnecting with Technology

A major claim of the Maker Movement is that it can reconnect people with technology, by encouraging playful experimentation, with in turn can possibly help people move from consuming to creating technology. Dellot (2015, pp. 9 - 10) discusses the Maker Movement’s potential share the fruits of technology more widely within society. Dellot describes this as a three phase process: access, acumen and agency. The first phase is access to technology, which has been addressed by supplying personal computer technology and connecting them to the internet; the second phase is technological acumen, which involves instilling digital literacy to operate the technology. These first two phases are already being largely addressed in society, but Dellot claims that the problem of technological agency is the most pressing, with the Maker Movement uniquely placed to help people understand and use technology, in order to turn it to fulfil their own needs (Dellot 2015, p. 10).

In turn, it is claimed that this renewed engagement with technology could how have positive environmental impacts – as people gain a better understanding of how the technology they use works, they may be more able to repair and recycle devices, rather than disposing of them (Hielscher and Smith 2014, p. 42). It is suggested that if such practices were to become more widespread, it would represent not just a major environmental benefit, but also shift political shift in people’s perception of consumer technology, allowing for “material forms of civic engagement” (Ree 2011, p. 88).

Educational benefits of the Maker Movement

Burke describes the Maker Movement as a “collective concept”, with community as the “defining element of the maker movement on both a local and international scale” (Burke 2014, p. 12). There is a strong emphasis on learning practical skills and sharing that knowledge, so that DIY Do-It-
Yourself becomes Do-It-Together. This is largely facilitated by web technology and the culture of online sharing:

Projects shared online become inspiration for others and opportunities for collaboration. Individual Makers, globally connected this way, become a movement, millions of DIYers, once working alone, suddenly start working together. [...] Thus ideas, shared, turn into bigger ideas. [...] And those projects can become the seeds of products, movements even industries. The simple act of “making in public” can become the engine of innovation, even if that was not the intent. (Anderson 2012, pp. 13 - 14)

This ties in with the extremely strong connection between the Maker Movement and education, particularly non-traditional informal forms of learning. In particular, Seymour Papert’s educational theory of Constructionism is applied to the context of Making (Burke 2014, p. 13; Sheridan et al. 2014, p. 507). Constructionism is based on the theory that learners create mental models to help them learn, and that by extension creating actual products or artefacts help strengthen students’ learning. The artefact, and the process of creating the artefact, functions as an evolving representation of the learner’s thinking (Papert 1993 in Sheridan et al. 2014, p. 507). This is often approached through problem based learning exercises “in which a student is given a problem to overcome that will teach him or her about the subject being covered” (Steger 2013 in Burke 2014, p. 13). As Burke points out, problem solving is often central to Making, as the necessity fix a problem is often the motivation behind starting many projects (Burke 2014, p. 13).

Another common educational emphasis of the Maker Movement is promoting STEM (Science, Technology, Engineering and Maths) learning opportunities in ways that engage student’s imaginations, and encourage them to consider STEM careers. The motivation behind this emphasis can be related increasing national competitiveness, filling open positions in high-technology fields, or broadening the intellectual capacities of students (Burke 2014, p. 4). Closely related to this is the drive to include arts into these educational programmes (creating the acronym STEAM). As Burke points out, the creativity associated with arts can have applications in other fields of problem solving, and is particularly suited to the “breadth of creativity available in many makerspaces, where engineering and artistic creations can exist side by side as well as integrated efforts” (Burke 2014, p. 14).

**Economic benefits of the Maker Movement**

A major claimed benefit of the Maker Movement is that it could bring major economic benefits by encouraging inventors and entrepreneurs. Van Holm claims that there are three ways in which Maker Movement supports entrepreneurs:

The maker movement attracts more individuals into product design, and thus may launch more “accidental entrepreneurs” if they find that their user solutions have a market. Secondly, the maker movement generates dense but diverse networks, creating new ideas and innovative thinking. Lastly, the maker movement lowers the costs for prototyping, making early sales and acquiring outside funding more realistic. (Van Holm 2015, p. 24)

Chris Anderson also lists three similar characteristics of the Maker Movement:

1. People using digital desktop tools to create designs for new products and prototype them (“digital DIY”).
2. A cultural norm to share those designs and collaborate with others in online communities.
3. The use of common design file standards that allow anyone, if they desire, to send their files to commercial manufacturing services to be produced in any number, just as easily as they can fabricate them on the desktop. This radically foreshortens the path from idea to entrepreneurship, just as the Web did in software, information, and content. (Anderson 2012, p. 21)

Anderson argues that this is leading to people “industrializing the do-it-yourself (DIY) spirit” (Anderson 2012, p. 9) to such an extent that he terms it a “third Industrial Revolution” – the combination of low cost manufacturing technologies such as 3D Printing and the sharing of open source ideas online “dramatically amplify the productivity of people” in ways that they could disrupt industrial scale manufacturing (Anderson 2012, p. 30).

According to Dougherty, these benefits could also be taken advantage of by companies as well as individuals. Companies could look out to the maker community as a source of talent and ideas, as well as engaging their own employees with makerspace type environments, in order to “get to the heart of what they are passionate about and what they’re working on outside the confines of the company walls” (Dougherty 2012, pp. 13 - 14).

4.2 Makerspaces in Libraries

According to Hielscher and Smith (2014, p. 20) academic literature looking at “community-based digital fabrication workshops” (analogous to makerspaces) is rare in comparison to media reports and activist writing. Most existing social science research has focussed on business, technical and industry aspects, rather than on social, cultural and political implications (Hielscher and Smith 2014, p. 20). As noted by several commentators (Moorefield-Lang 2014, p. 584 and 2015, p. 108; Barniskis 2016, p. 104) the same pattern seems to apply to literature specifically dealing with makerspaces in libraries, with most of the literature being media reports or advocacy and practical advice, with little research into social impact.

Practical advice for practitioners

The majority of LIS literature consists of practitioner reports of how particular makerspaces were set up in variety of contexts, for example school libraries (Canino-Fluit 2014; Craddock 2015; Daley and Child 2015), public libraries (Brady et al. 2014; Britton and Considine 2012; Dixon and Ward 2014; Dugmore et al. 2014; Haug 2014), academic libraries (Carr et al. 2016; Nowlan 2015; Pryor 2014) or particular types of makerspace such as mobile makerspaces (de Boer 2015; Craddock 2015; Gierdowski and Reis 2015). These tend to focus on offering practical advice and examples of best practice for other practitioners considering establishing makerspaces, based on the authors’ own experiences of planning and implementing makerspaces within their own institutions. These typically describe the following issues: the reasons for starting a makerspace in their institution; pre-existing or trial maker events; sources of funding; equipment choice; community engagement; programme development; staff training; marketing and promotion; challenges and successes; future plans.

Boyle et al. provide a list of four recommendations for other libraries, based on a literature review of library practitioner reports (Boyle et al. 2016, pp. 37 - 38).
• They recommend libraries “customise and contextualise” their plans – there is no single cookie cutter model all libraries can copy – they need to adapt equipment and activities to reflect local staffing, hours, budget and most importantly community needs.
• to “engage your community” – consulting to find pre-existing needs, interests and expertise; build a self-sustaining maker community and to recruit volunteers.
• to “be flexible”, allowing for experimentation and changing interests, in order for a space to develop. Starting small and scale up, reviewing regularly to make continuous improvements
• to “promote your space” to advocate for the benefits of a makerspace, both out to the community, but also in to library staff, who may be sceptical.

According to Boyle et al., the benefits of makerspaces include:

empowering your community, fostering community collaboration and co-creation, growing a larger, more engaged user base, enabling inter-generational learning and social connectedness, facilitating trans-literacy, developing a culture of lifelong learning and adding socio-economic advantage to communities. Creative spaces also provide an opportunity for libraries to future-proof themselves and adapt to meet the changing nature of society. (Boyle et al. 2016, p. 30)

Slatter and Howard identify three common challenges for libraries implementing makerspaces (Slatter and Howard 2013, pp. 277 - 278): the new nature of makerspaces means there is a steep learning curve for space organisers, and also makes it challenging to communicate the value of makerspace to people used to more traditional library models; budgetary constraints limiting what equipment can be purchased; and legal concerns over copyright, liability and ownership. Despite these challenges, they suggest that there are substantive benefits: “enhanced community engagement, development of a new form of library as ‘third place’, and transforming the library’s image from that of a place where works are consumed to that of a place where works are created” (Slatter and Howard 2013, p. 272).

There is evidence in the LIS literature that elements of the Maker Movement ethos are being incorporated into the education of new librarians and information professionals. Bowler (2014) and Luthy (2015) both describe pilot studies within university Library and Information Science departments to test ways of equipping students with new skills and knowledge “needed to understand, start, and manage makerspaces and maker-related technology” (Luthy 2015, p. 5). Luthy’s study focuses on the creation of resources (including online workshops and tutorials, and an online toolkit) that would be readily accessible to students and current practitioners (Luthy 2015, p. 5). Bowler’s study aims to develop ways to integrate design challenges into and “maker” experiences into a formal LIS curriculum, in order to expand “opportunities for creativity” out to school and public libraries (Bowler 2014, p. 61). Koh (2015) also identifies a lack of research studies into the skills and competencies required to run makerspaces within libraries or museums, nor any official list of competencies by professional bodies (in the USA) (Koh 2015, p. 115). Through interviews with information professionals currently running library or museum Makerspaces or Learning Labs, Koh identifies a list of five top competencies and five skills needed to successfully run these spaces:

• Competencies: (1) ability to learn, (2) ability to adapt to changing situations, (3) ability to collaborate, (4) ability to advocate for the Learning Lab or Makerspace, and (5) ability to serve diverse people. (Koh 2015, p. 119)
• Skills: (1) management, (2) program development, (3) grant writing and fund raising, (4) technology literacy, and (5) facilitating learning based on learning theories and user behaviors. (Koh 2015, p. 121)
It is not clear to what extent thinking about Making is being incorporated into LIS education more generally, or whether this would translate into benefits on practice. Moorefield-Lang claims that though training is an area of concern for those running or establishing makerspaces, practicing librarians are finding ways to gain the knowledge they need to manage their makerspaces (Moorefield-Lang 2015, p. 111).

As well as literature in LIS journals, there is a growing body of resources specifically aimed at providing practical advice for libraries seeking to start makerspaces, including: two books (Burke 2014; Willingham and de Boer 2015), blogs and resource guides (Artefacto n.d.; Ginsberg n.d.), an e-learning kit designed by the Society of Chief Librarians (SCL n.d.), and numerous conferences and events (SCL 2016; MakerCart and Artefacto 2016; FabLab Devon 2015).

**Criticisms of makerspaces in libraries**

Willet’s study of LIS makerspace discourse analyses the “ways professional journal articles and blog posts aimed at public librarians define public library makerspaces, including the people and practices involved in these spaces” (Willet 2016, p. 318). By analysing this body of literature, Willet discerned common themes in how makerspaces are being discussed and promoted, but also highlights several tensions and conflicting or unfounded claims. The three common themes identified are: *Makerspaces and the Future of Public Libraries, DIY/Maker Cultures and Public Library Makerspaces* and *Informal Learning in Public Library Makerspaces*. Some of the tensions Willet’s highlights include: whether makerspaces are a radically new approach or a continuation of what libraries have always done (Willet 2016, p. 320); making bold claims about community empowerment, encourage people to create rather than consume culture and reaching non-traditional audiences, but with no clarity from the literature whether these aims are being fulfilled by library makerspaces (Willet 2016, p. 322); a framing of creativity in terms of productive or economic benefits, rather than for individual creative expression (Willet 2016, p. 323); an oversimplified opposition between informal and formal education, which risks ignoring “who might benefit or be excluded from different teaching styles” (Willet 2016, p. 326).

### 4.3 Research into Makerspaces: non-library contexts

Research into makerspaces is more developed outside the LIS domain (though still very much a new field), with attempts to assess the social benefits of makerspaces being more thoroughly researched than with the library context. This section of the literature review selectively focuses on studies that have carried out research in existing makerspaces, in an attempt to assess the benefits derived by users of makerspaces. It is particularly useful to note the methodologies used in these cases, to help design the methodology of this research.

**Studies assessing extent of makerspaces in the UK**

Several recent projects have sought to assess the current extent of makerspaces within the UK. Nesta’s *open dataset of UK makerspaces* (Sleigh, Stewart and Stokes 2015a) aggregates extremely detailed information about makerspaces of all varieties around the UK. The aim of the study is to map where makerspaces are located in the UK, and discern what different forms they take. The
findings are published as an open data set (published under a Creative Commons Attribution-ShareAlike licence), allowing other researchers to build upon Nesta’s research. It provides both detailed information at an individual level, and a broad picture of trends and categories across the country. The report found 97 makerspaces in the UK, with socialising, learning and making stated as the top reasons for people using the spaces (Sleigh, Stewart and Stokes 2015b, p. 4; p. 6). Makerspaces are quite evenly spread throughout the UK: there are spaces in every region, most cities having at least one makerspace, though London has around a fifth of the total number (Sleigh, Stewart and Stokes 2015b, pp. 3–4). The dataset provides a snapshot of the state of makerspaces at the time of publication in April 2015, but as the authors state it is very much a rapidly changing situation – of the 97 spaces found only 9 of them had existed in 2010 (Sleigh, Stewart and Stokes 2015c). The research method used were desk research to identify sites and a survey distributed online (Sleigh, Stewart and Stokes 2015b, p. 2). The survey had questions about location; tools, equipment and materials; services, amenities and accessibility; members, visits and staff; external connections; sustainability and membership; aspirations; challenges. Sleigh et al. propose a set of common categories of makerspace, as well as comparative features for making sense of the variety of makerspaces in the UK.

The Open Workshop Network (Corbin 2016) is a project to map the makerspace community in London. There are currently 44 workshops listed in their directory, which probably demonstrates the rapid growth of makerspaces since April 2015, when the NESTA dataset lists 20, though it is also possible that Corbin’s definition of an “open workshop” is more inclusive than NESTA’s definition of a “makerspace”. The methodology used seeks to work collaboratively with the participants, encouraging them to “steer the direction of the project and hold co-ownership over the data that is produced” (Corbin 2016). One of the major products of this research is an online map tool of all the workshops, which can be searched by name, location, services, disciplines, materials or tools, which serves as an excellent tool for makers, makerspaces and researchers (Corbin n.d.).

Studies examining existing makerspaces to assess social impact

The Royal Society for the encouragement of Arts, Manufactures and Commerce’s (RSA) Ours to Master project (Dellot 2015) seeks to answer these questions: “Why are makerspaces emerging, and why now? What impact are they having on their users and the communities in which they are based? And is this an enduring trend or a passing fad?” (Dellot 2015, p. 5). This project uses mixed methods: desk research, data mining of government datasets, an expert roundtable, semi-structured interviews with stakeholders, visits to 12 makerspaces across the UK and a YouGov survey of “people’s attitudes towards making, makerspaces and the wider economy” (Dellot 2015, p. 12). Dellot concludes that makerspaces can benefit people in three key ways: self-fulfilment, learning, enterprise (Dellot 2015, p. 6).

The Making Community: The Wider Role of Makerspaces in Public Life project contends that “access to the benefits of makerspace facilities is unevenly spread” and sought to find out how they could have a wider social impact (Taylor, Hurley and Connolly 2016, p. 1). The researchers used site visits to 15 makerspaces across the UK, toured the facilities and conducted semi-structured interviews with makerspace organisers, asking about “the history, motivations and ambitions of the facility, its user base, typical activities, promotion and outreach, and specific examples relating to excluded communities” (Taylor, Hurley and Connolly 2016, p. 3). The study found evidence that makerspaces can play four broad social roles (Taylor, Hurley and Connolly 2016, p. 1):
• serving as social spaces,
• supporting wellbeing,
• serving the needs of local communities,
• and reaching out to excluded groups

In terms of being social spaces, the researchers found that though many users were initially drawn by the tools and facilities, they continued to attend because they value the aspect of socialising so much. Makerspaces have the ability to turn “otherwise solitary activities such as coding into communal activities that could be shared with others” (Taylor, Hurley and Connolly 2016, p. 4).

Linked to this is the impact makerspaces can have on wellbeing – though it may not be a stated aim of makerspaces, the shared activity of making with other people can help people who have difficulty interacting with others “to develop skills and to engage with the world in a productive way” (Taylor, Hurley and Connolly 2016, p. 7).

As for serving local needs, some spaces take on a very active role – taking on projects for local schools or councils, starting apprenticeship schemes, or one FabLab in Belfast serving to “bring together people from both sides of the Northern Ireland conflict around shared, constructive tasks and activities that helped to develop skills and economic prosperity” (Taylor, Hurley and Connolly 2016, p. 6).

Taylor, Hurley and Connolly claim that despite the best intentions, many makerspaces struggle to appear accessible to wider audiences beyond “early adopters with technical or creative backgrounds and a large proportion are affluent males” (Taylor, Hurley and Connolly 2016, p. 1), and advocate that makerspace organisers should seek to vocally highlight and promote their beneficial qualities in order to be able to widen the access and impact of makerspaces as community resources. Not all makerspaces will fill all of these roles in equal measure, but most should be able to bring at least some of these benefits to their users and communities – and I would argue that argue that libraries could play an important role in breaking down barriers to wider accessibility.

For the study, Learning in the Making: A Comparative Case Study of Three Makerspaces Sheridan et al. use a comparative case study of three makerspaces, to analyse how they function as learning environments. They employed a variety of qualitative methods to draw very detailed pictures of the activities and interactions of users within the makerspaces – conducting over 150 hours of field observations and interviews as well as extensive analyses of Web-based archives, such as blog postings, online community discussions, and video and photo documentation of making activities and finished works (Sheridan et al. 2014, p. 510). The guiding research questions were: “1. Who participates in these makerspaces? 2. How and to what ends are tools, materials, and processes used in each makerspace? 3. What are the arrangements for learning, teaching, and collaborating in each space?” (Sheridan et al. 2014, p. 510).

Sheridan et al. were guided in their analysis by drawing from literature on formal and informal learning environments. At the more formal end of their educational activities, Sheridan et al. claim that makerspaces are comparable to visual arts studio learning environments, in that “participants work independently or collaboratively with materials to design and make” (Sheridan et al. 2014, p. 508). Based on earlier research into visual art studio classes by Hetland, Winner, Veenema, and Sheridan (2013) (in Sheridan et al. 2014, p. 508), four key “studio structures” are identified as central to the design of studio learning environments:

1. in demonstration-lectures, teachers pose open-ended challenges, show exemplars, and demonstrate processes to engage and inform students,
2. in students-at-work, students work on their art and teachers circle the room observing and giving “just-in-time” instruction,
3. In critiques, the working process is paused as the group collectively reflects on student work, and
4. In exhibitions, students’ work is shared with a community beyond the studio classroom.

Though makerspaces often tend to be more informally structured than in visual arts studio education, Sheridan et al. claim that many of the characteristics of these studio structures can be identified in them, and that making use of this studio model can help them see the “pedagogical structure in the flow of the multiple informal interactions and activities” in the makerspaces they observed (Sheridan et al. 2014, p. 509).

Sheridan et al. also use the concept of communities of practice as a lens through which to analyse makerspaces. This concept, developed by Lave and Wenger, describes how groups of people who work in a common domain share knowledge within their chosen community (Lave and Wenger, 1991 in Sheridan et al. 2014, p. 509). According to Sheridan et al., the communities of practice framework is particularly applicable to makerspaces because of the way learning is an ongoing part of social interaction in these spaces, rather than a discrete activity, such as classes or lectures. The concept is useful in that it allows all the diverse elements and activities which make up a makerspace to be considered, helping to frame how “the shared use of space, tools, and materials; shifting teaching and learning arrangements; individual and collective goals; and emergent documentation of rules, protocols, and processes for participation and action work together to form each community of practice with its own particular features.” (Sheridan et al. 2014, p. 509). Furthermore, according to Sheridan other activities peripheral to making, such as taking walks, socialising or playing, are “central to learning and forming a sense of community and are important to providing space and time for idea generation.” (Sheridan et al. 2014, p. 509).

In their extensive review of “Community-based digital fabrication workshops”, Hielscher and Smith conclude that makerspaces can have a “transformative potential” in three critical areas: sustainability, inclusivity, and creativity (Hielscher and Smith 2014, p. 48). In addition, they present a very useful summary of methodological lessons to be drawn from past research into makerspaces:

- Researchers need to consider the format and distribution channels when conducting surveys.
- Researchers need to be sensitive to the diversity of workshops when considering sampling issues and consider that some workshops prefer not to limit and specify what they do.
- A lot of discussions and debates within networks can be followed on the internet (within forums and discussion groups), providing a wealth of information that requires an informed strategy of data gathering and analysis to make sense of the information.
- Activities of members occur simultaneously in different spaces and through several technological pathways, thus challenging the employment of some single site and/or single unit of analysis social science methods.
- A lot of researchers use ethnographic methods within their research, and usually are members of workshops themselves.
  (Hielscher and Smith 2014, p. 25)

The methodologies used in the studies reviewed above do largely seem to follow this list of recommendations.
4.4 Literature Review Conclusion

The literature reviewed is fairly consistent in stating that makerspaces have many potential social benefits, but that it is difficult to study and prove these benefits. From the literature, these benefits include: developing technological agency (Dellot 2015); encouraging recycling and sustainability (Hielscher and Smith 2014); encouraging civic engagement (Ree 2011); work as successful learning environments (Sheridan et al. 2014); serving as social spaces which support wellbeing, community needs and excluded groups (Taylor, Hurley and Connolly 2016); promote learning in STEM (and STEAM) subjects (Burke 2014); support and encourage creativity (Hielscher and Smith 2014) support entrepreneurs and innovation (Van Holm 2015), possibly leading to “third Industrial Revolution” (Anderson 2012). For libraries, in addition to the above benefits, it is claimed makerspace could support libraries’ “core mission of providing equal access to knowledge resources” (Taylor, Hurley and Connolly 2016), in addition to helping to future-proof and transform the perception of libraries (Boyle et al. 2016; Slatter and Howard 2013).

This list of benefits will be used as an initial framework for designing the methodology, and analysing the findings of this research, in order to ascertain whether the chosen case study makerspace supports these benefits, and if so, to what extent.

5. Methodology

The research for this study takes the form of an instrumental case study, in which a case subject is used as a vehicle to explore a phenomenon or theory (Pickard 2007, p. 86) – specifically makerspaces in public libraries – which has wider relevance beyond the chosen case. A single case study site will be selected for a “short-term, contemporary study” (Oates 2006, p. 144), in order to gain an in-depth picture of that particular site, at that particular time. Though a comparative case study approach would probably highlight insightful differences and similarities, it was not chosen in order to keep the project manageable within the given timeframe. As noted by Sheridan et al., there are no set model for makerspaces, so there is a huge diversity in how they are all organised (Sheridan et al. 2014, p. 508), which would mean that even a comparative case study could be inadequate to make generalisations beyond the chosen sites. It is also hoped that the implications arising from this study can be used to form recommendations for other makerspaces, or form the basis for further research to test against the findings.

5.1 Site Selection

From the literature review, it is clear that there are no academic studies into the number or distribution of makerspaces in public libraries in the UK, which makes it difficult to determine the overall size of the sample population. However, the purpose of this research isn’t necessarily to find out how all makerspaces function, but rather to focus in-depth on what the benefits of a particular makerspace are on its user base.

As there is no academic research or official statistics (such as inclusion in the annual CIPFA Public Libraries Profiles) into the numbers and location of makerspaces currently established in UK public libraries, other less authoritative sources were used. The nine public library makerspaces listed by
Anstice (n.d.) will be used as a starting point (nine listed as of September 2016, a further three libraries have been added to the list once this research was already under way). It is difficult to establish how comprehensive this list is, as the author does not explicitly state any methods for compiling the list, and the sources given a generally reports from local newspapers, but it gives a good indication of established makerspaces with an online presence. In addition to the nine libraries listed by Anstice, I have included the makerspace at Barking Library and Learning Centre, who I was made aware of through a presentation by the DigiLab team at the SCL’s Code Green Digital Making event in March 2016 (SCL 2016 and DigiLab 2016b).

The case study site will be selected by purposive sampling, based partly on convenience but primarily on suitability of providing an information rich example. Purposive sampling is an appropriate method in this research for two reasons, as outlined by Oates (2006, pp. 97 -98): because not enough is known about the overall population to be able to use probability-based methods, and because an in depth picture rather than generalisations are being sought. As Pickard notes, as a general rule in qualitative research, purposive sampling methods tend to be more appropriate than statistical probability based methods in selecting cases (Pickard 2007, p. 59). This is because the purpose of sampling in qualitative research tends to be descriptive – what you can learn from the chosen case – rather than what you can infer about the wider population from the findings.

The following criteria will be used to select the site:

- associated with a public library (situated in same building, funded or staffed by the library)
- to be reasonably established, and up and running (for more than six months)
- feature a range tools and equipment (at least 2 types of making activity)
- allow free or low-cost hands-on (i.e. not just a bureau service) access to members of the public
- accessible for the researcher (from the Thames Valley area)

In order to establish whether the ten locations meet this criteria, the following information will be sought: location, library authority associated with, date established, outline of equipment and facilities available. This information will be sought from the library/local authority websites, individual makerspace websites, and local media reports. See Table 1. (below) for a comparison of these selection criteria.

The level of information available online about each makerspace varies greatly – whether they have their own website, or if it is part of the library or council website, or whether they are mentioned at all. For some of the sites, I had to rely on social media posts and local news articles to find any information.

Of the ten locations, there are three sites which meet the case study selection criteria: DigiLab at Barking Learning Centre, FabLab Devon at Exeter Library and the Enterprise + Innovation Hub at Ipswich County Library. Barking DigiLab was the most easily accessible location, so the organisers were contacted by email (see appendix 9.3) and they agreed to participate in the study – so Barking DigiLab became the case study site.
<table>
<thead>
<tr>
<th>Library authority</th>
<th>Location</th>
<th>Name of makerspace</th>
<th>Facilities and equipment</th>
<th>Date established</th>
<th>Sources</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiff</td>
<td>Cardiff Central Library Hub</td>
<td>Digital Floor</td>
<td>tablet bar, digital wall, digital creative suite, children’s media zone, gaming area and a 3D printer</td>
<td>July 2015</td>
<td>Taylor 2015</td>
<td></td>
</tr>
<tr>
<td>Croydon, Ealing, Hounslow and Harrow boroughs</td>
<td>Northolt Library</td>
<td>Creative Work Spaces</td>
<td>Under consultation with local groups about</td>
<td>not yet established - not clear if project still happening</td>
<td>Pekacar 2015</td>
<td>Library services in these four boroughs operated by Carillion Cultural Community Solutions</td>
</tr>
<tr>
<td>Devon County Council</td>
<td>Exeter Library</td>
<td>FabLab Devon</td>
<td>3D printing, 3D scanning, digital embroidery, laser cutting, vinyl cutting, large format printing, soldering, Raspberry Pi, t-shirt making</td>
<td>May 2014</td>
<td>FabLab Devon (n.d.)</td>
<td></td>
</tr>
<tr>
<td>Dundee City Council</td>
<td>Dundee Central Library</td>
<td>-</td>
<td>3D printing</td>
<td>May 2014</td>
<td>Robertson 2016, p. 5</td>
<td></td>
</tr>
<tr>
<td>Essex County Council library service</td>
<td>Colchester</td>
<td>The Waiting Room</td>
<td>Screen printing and letter pressing, kiln, kitchen, photography darkroom, textiles, wood and metal workshop</td>
<td>August 2013</td>
<td>Naylor 2013, Waiting Room (n.d.)</td>
<td>Not within a library, but an independent space in an old bus station, working in partnership with library service. Described as an “integrated library-hack-makerspace”</td>
</tr>
<tr>
<td>London Borough of Barking &amp; Dagenham</td>
<td>Barking Learning Centre</td>
<td>DigiLab</td>
<td>3D Printing, Drones, Programmable Robotics, Gaming Tournament, Virtual Reality Headsets, Computer Gesture Control, Robot Wars Tournament</td>
<td>March 2016</td>
<td>DigiLab 2016a, Shales 2016</td>
<td></td>
</tr>
<tr>
<td>Library authority</td>
<td>Location</td>
<td>Name of makerspace</td>
<td>Facilities and equipment</td>
<td>Date established</td>
<td>Sources</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------------------</td>
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<td>--------------------------</td>
<td>-----------------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Manchester City Council</td>
<td>Manchester Central Library</td>
<td>The Media Lounge</td>
<td>Adobe Creative Suite on Macs and PCs, games consoles. Demonstrator service for businesses - free workshops showcasing videoconferencing, 3D printing and other technologies</td>
<td>March 2014</td>
<td>Manchester City Council (n.d.)</td>
<td></td>
</tr>
<tr>
<td>Staffordshire County Council</td>
<td>Stafford Library</td>
<td>Innovation Suite</td>
<td>3D printing, Raspberry Pi</td>
<td>August 2015</td>
<td>BBC 2015</td>
<td></td>
</tr>
<tr>
<td>Stirling Council</td>
<td>Mobile – multiple locations</td>
<td>Mobile Maker Space</td>
<td>3D printing and scanning, 3Doodler printing pens, video cameras, drone</td>
<td>August 2015</td>
<td>Anstice (n.d.), Stirling Council (n.d.)</td>
<td></td>
</tr>
</tbody>
</table>
5.2 Data Collection

Interviewing was chosen as the most appropriate primary data collection method for this research. As Oates points out, interviews are much used in case studies, such as this project. She states that suitable for situations where a researcher wants to obtain detailed information; ask questions that are complex, or open-ended; or explore emotions, experiences or feelings that cannot be easily observed via pre-set questionnaires (Oates 2006, p. 187). This last point is particularly pertinent, as this study aims to find evidence of intangible benefits such as increased self-confidence.

As Oates states, there are three main types of interview approach: structured, semi-structured and unstructured (Oates 2006, pp. 187 – 188). A semi-structured interview approach was taken, which Oates describes as having a list of themes to be covered and questions you want to ask, but allowing the order to change or for new questions to be asked depending on the flow of the conversation, and unexpected issues being raised by the interviewee (Oates 2006, p. 188). Semi-structured interviews are appropriate in this context because they allow for a large degree of interaction and flexibility, whilst still allowing the research to guide the interview in seeking answers to the research questions. The interviews were intended to be primarily exploratory, with the type of data needed to be gathered being opinion rather than fact based, in order to help build a picture of how individuals feel they benefit from using the makerspace. Though a reasonable picture of likely social benefits of makerspaces had been gathered from the literature review, the purpose of this research is not necessarily to establish to what extent the case study site fits in with pre-existing models, but also to allow the participants the opportunity to express their own feelings, opinions and experiences.

In designing the interview schedule, Pickard recommends that “thematising” is carried out first – that is establishing what the purpose of the research is, and what topics and themes are being investigated (Pickard 2007, p. 173). The overall purpose of this research is to investigate how a makerspace can benefit its users, and the main potential benefits identified from the literature review included: creativity, enterprise, inclusivity, learning, self-fulfilment and sustainability.

These formed the focus of the interview schedule, in attempting to find evidence of these categories from the interview, however the overall structure of the questions was based on more generic themes. These were: Basic information about the space; Personal information about the interviewee; Organisational information about DigiLab; Users and Community; Planning and Marketing. These were based on those employed by Taylor, Hurley and Connolly, who asked interviewees about “the history, motivations and ambitions of the facility, its user base, typical activities, promotion and outreach” (Taylor, Hurley and Connolly 2016, p. 3). The schedule was intended to be used to guide the interview, providing a logical sequence and set of prompts, but without being overly rigid.

These generic categories were chosen as the structure rather than the list of benefits, as they are more open, and provide the interviewees with the opportunity to explain the benefits in their own terms, rather than lead them towards pre-determined responses. The potential benefits would later be used as the initial basis of the coding scheme to analyse the interview findings.

See Table 2. below for the full interview schedule.
Table 2. Semi-structured interview guide

<table>
<thead>
<tr>
<th>Basic information about the space</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How long has DigiLab been established?</td>
</tr>
<tr>
<td>• Where in the library is it situated?</td>
</tr>
<tr>
<td>• What equipment and facilities do you host?</td>
</tr>
<tr>
<td>• Opening hours?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Personal information about the interviewee</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What is your role in DigiLab?</td>
</tr>
<tr>
<td>• How long have you been involved?</td>
</tr>
<tr>
<td>• What first attracted you to the idea?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Organisational information about DigiLab</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How many people visit your makerspace?</td>
</tr>
<tr>
<td>• How do people access the makerspace? E.g. membership, drop-in, bookable workshops/classes, off-site events</td>
</tr>
<tr>
<td>• How do you charge? How much/what for?</td>
</tr>
<tr>
<td>• How many staff/volunteers involved?</td>
</tr>
<tr>
<td>• How closely linked to the rest of the library service?</td>
</tr>
<tr>
<td>• How is your makerspace funded?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Users and community</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What do people make? Examples of current projects</td>
</tr>
<tr>
<td>• What do you feel attracts users to this makerspace?</td>
</tr>
<tr>
<td>• Do you target/cater for particular audiences?</td>
</tr>
<tr>
<td>• Did the local conditions in Barking have any influence on decisions in DigiLab?</td>
</tr>
<tr>
<td>• Some of the common benefits people mention when talking about makerspaces are: Supporting creativity, supporting learning, supporting enterprise/innovation, encouraging inclusivity, encouraging sustainability/recycling and self-fulfilment. Do you agree with these? Would you add anything else to the list?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planning and marketing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How do you measure your success? E.g. do you keep any stats, perform surveys</td>
</tr>
<tr>
<td>• How do you promote the makerspace/attract new users?</td>
</tr>
<tr>
<td>• Challenges and difficulties</td>
</tr>
<tr>
<td>• Future plans</td>
</tr>
<tr>
<td>• What do you see for the future of libraries?</td>
</tr>
</tbody>
</table>

It should be noted that the questions in the first section, basic information about the space, were not necessarily intended to be answered by the interviewees, as they could be found from other sources or from my own direct observation when visiting the space.

As I had little prior knowledge of the membership or organisation of DigiLab, the selection of the participants was largely down to the DigiLab organiser. This approach did risk potential bias in the selection, or a low response rate, but it was hoped that subsequent interviews would be able to be arranged after the initial contact. I requested interviews with three to five people, listing as example organisers, volunteers or library staff, and stated they needed to be aged over 18. Though children
and teenagers are one of the key audiences of DigiLab, only participants over the age of 18 could be interviewed, in order to avoid ethical complications. Information about how under-18s use DigiLab was sought indirectly from the interviewees.

Information sheets and consent forms (see appendices 9.5 and 9.6) were distributed to participants a few weeks before the site visit, with further hard copies brought on the day of the site visit. The forms detailed what the purpose of the project was, why DigiLab had been chosen, and exactly what be involved if they agreed to participate. It was made clear that participation was entirely voluntary, they could change their mind at any time without penalty. The form also asks whether participants were willing to be identified by their name, or only by their role/job title.

On the day of the site visit two interviews were conducted, one with the DigiLab founder/organiser, and one with a member/volunteer. Unfortunately, no other members were available on the day. Further skype interviews were offered with two other members, but we were unable to agree on mutually suitable time.

The interviews were recorded using a mobile phone, with notes were taken during the interviews. The audio files of the interviews were later transcribed. Field notes and photographs of the space, equipment and some of the projects were also taken during the tour of the DigiLab. It should be noted that in the transcripts, any other individuals mentioned who did not consent to participate are identified by their initials only.

5.3 Data Analysis

Thematic coding was used to analyse the transcribed interviews. The initial list of themes – the list potential benefits deduced from the literature review – was used to go through the transcripts and categorise sections relevant to those particular themes. More themes were added as they emerged from the interview transcripts. This thematic coding forms the basis for deriving the most important aspects of the interviews, which emerged to be creativity, enterprise, learning and self-fulfilment. These benefits will then be used to analyse the findings, and link them back to the theory.

There are many different characteristics, activities and outcomes which would serve as possible indicators of these benefits, see Table 3. below:

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Potential indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>art projects; mash-ups; original projects; interdisciplinary work; supporting artists and creatives (e.g. through facilities, skills, networking); encouraging creative thinking</td>
</tr>
<tr>
<td>Enterprise</td>
<td>supporting entrepreneurs and start-ups; business advice; IP advice; bureau manufacturing services; supporting inventors; commercial services</td>
</tr>
<tr>
<td>Learning</td>
<td>new skills; courses, workshops or formal learning; links to schools, colleges or universities; induction courses; informal and peer learning</td>
</tr>
<tr>
<td>Self-fulfilment</td>
<td>achieving personal goals; socialising; gaining new social skills; supporting mental health; tackling loneliness; improving employability</td>
</tr>
</tbody>
</table>
6. **DigiLab site visit results**

I visited Barking DigiLab, was taken on a tour of the facilities by the DigiLab founder and organiser Seun Oshinaike, then conducted two 30 minute interviews – the first with DigiLab member and volunteer Ayo Arigbabu, and the second with Seun.

The space is run on behalf of the library be the social enterprise Brighter Steppings. Seun Oshinaike is the co-founder of Brighter Steppings, and founder and organiser of the DigiLab space. As part of their arrangement with the library, Seun is able to use the DigiLab space as an office for the Brighter Steppings team when it is not open to the public. Brighter Steppings had previously worked with Barking Library to produce an app, and in late 2015 decided to work together to open a makerspace in the library. The original DigiLab opened in March 2016, in an empty room which had previously been used as a council one-stop-shop on the ground floor of the library. The DigiLab team converted the empty room into a fully functioning makerspace. DigiLab was very rapidly outgrowing its original site, so when another area in the library became available they also converted that, and official re-launched their new in October 2016, with a space which is about twice the size of the original. The new DigiLab also includes separate rooms for a YouTube recording studio, and VR experience room.

6.1 **Tour of DigiLab**

Barking Learning Centre is a multi-purpose building, providing access to learning facilities and council services. The library, split over two floors, is the central component of the building, with classrooms, a job shop, a café, art gallery and DigiLab all accessed via the library.

DigiLab is on the ground floor of Barking Library and Learning Centre, in a series of rooms in the far corner of the library, next to some adult learning classrooms. DigiLab signage is prominently visible above the entrance to the space (see Figure 1).

![Figure 1. DigiLab entrance (Source: DigiLab 2016c)](image)
I visited DigiLab at about 10am on a weekday morning, during which it was closed to the public (it opens at 2pm on a weekday). They had hosted an event the previous evening, so there was left-over food and drinks packets in the seating main area, and there was evidence of lots of ongoing projects dotted around the space – this added to the first impression of being quite a sociable space, despite there not being anyone using it at the time.

From within the library, the new location is not quite as visible as the previous location, which could be seen from the entrance to the building. However, there are glass walls on three sides, so DigiLab and all its equipment is clearly visible from the outside of the building. Seun explained that he has plans to create an entrance directly into DigiLab from the outside, which would allow people to enter the future shop area of DigiLab.

![DigiLab floorplan](image)

*Figure 2. DigiLab floorplan (not to scale) (Source: London Borough of Barking & Dagenham 2016) [annotations and internal partitions added]*

Inside, DigiLab is divided into various spaces (see Figure 2). The overall size of the space is approximately 6m x 12m. The main area at the entrance has low multipurpose tables, chairs and beanbags for events and socialising (see Figure 3). Seun explained that the layout of the space would be continually evolving – the team had designed and built most of the furniture themselves, so would be able to change and adapt as new projects or equipment are introduced. They also keep lots of old unwanted electrical equipment (from the library, council and elsewhere), which get stripped and recycled for components in other projects.
It also contains the DigiLab “D” – a big blue wooden D built by the team which people can sit in (see Figure 4). The D serves as a gaming station, with two PS4 consoles, screens and controllers. Seun explained he was planning on establishing a network of DigiLabs, after other public libraries in the UK had approached him wanting to host similar spaces. He described how all of the DigiLabs in the network would have a big blue D like this one, which he hopes will serve as an instantly recognisable trademark for DigiLabs.
To the side of the main area are two rooms – a YouTube Room and a Virtual Reality (VR) Room (see Figure 5). The YouTube Room has professional level video equipment – cameras, microphones, tripods, lighting stands and reflectors, live preview monitor and a green screen backdrop. There is also comfortable seating and emoticon cushion props. The VR Room contains a powerful gaming PC with VR headset, and gesture controllers. The VR room also houses the large-scale 3D printer.

At the other end of the main space there is a desk area with several Mac computers and space for laptops, used for programming, 3D modelling and game designing, and benches for electronics and assembly (see Figure 6). There is also the second 3D printer in this area.
In the far corner of DigiLab, next to the bench area is a large empty space currently being used for storage, but where Seun plans to create a shop. They are applying for planning permission to create an entrance directly from the street into the DigiLab shop, which would increase the accessibility and prominence of DigiLab in the local area. The shop would sell gadgets, as well as products developed and manufactured by DigiLab members. Above the YouTube and VR rooms there is an empty double height space, which Seun and Ayo have earmarked for future expansion – potentially for housing more sophisticated manufacturing equipment such as laser cutters or CNC mills, or as co-working office space to hire out to local start-ups.

Equipment and Activities

The equipment hosted at DigiLab, which I saw or discussed in the interviews includes: two 3D printers, 3D scanner, two PlayStation 4 consoles, VR headset and gaming PC, multiple PCs and Macs, soldering equipment, two drones, programmable robotics, Lego Mindstorms kits, Raspberry Pis, Anki Overdrive racing cars and track, YouTube recording studio, various power tools.

Organised classes and activities hosted by DigiLab include: Code Club, YouTube Club, 3D design and printing classes, Raspberry Pi classes, gaming tournaments (including girls’ only gaming tournaments), Robot Wars events, game jams, board game club, and hosting the East London Raspberry Pi Jam.

Opening hours

DigiLab is closed to the public on weekday morning, then opens at 2pm-7pm, getting at its busiest after school and on Saturdays.

6.2 Interviews

Interviews were carried out with two participants – Seun Oshinaike and Ayo Arigbabu. For full interview transcripts, see appendix 9.4.

The interviews were quite free-flowing, only loosely following the interview schedule, perhaps closer to an unstructured interview than originally intended. This made for a very open conversation, with much information and interesting detail offered by the interviewees, covering some areas which I had not anticipated when planning the interview. The interview questions were referred back to at moments when a particular line of conversation came to an end, though many of the topics were brought up by the interviewees without the question being explicitly asked. However, this approach meant that some important questions from the schedule were left out, in particular questions about statistics and measuring performance.

Personal Information

Seun is the founder and main organiser of the DigiLab space, and has been involved with the Barking Library with other projects since before the launch of DigiLab in March 2016.
Ayo is a member and volunteer at DigiLab, who describes himself as the “Architect in Residence”. As a qualified architect, this role includes space planning for DigiLab, but more broadly as building “opportunities for innovation” within the space. He has been involved with DigiLab for about three months, and uses the space to work on his own creative projects, as well as being involved in running classes, working on project teams, and informally mentoring other users.

**Organisational information**

**Access and charging**

There is a membership scheme, which costs £5 a month, which gives people access to most of the equipment and facilities, including the YouTube room (as long as they have been trained to use the equipment). The VR experience is charged separately (£2 for 20 minutes), which is “ridiculously cheap” compared to the “not so cool Oculus” VR experience at Stratford Westfield shopping centre. Classes, such as Code Club sessions, are also charged separately (£5 per session).

The proportion of people who are members regularly attend to work on their own projects, and those who just attend classes is “very mixed”.

**Links to the library service**

I got the impression that DigiLab is fairly independent from the library service. Seun mentioned that “some of the library staff do get involved here, like help us out with maybe some of the social media stuff, or just designing flyers, they do get involved” – which sounds as if some staff take a personal interest, but there is not a formal working partnership.

This does give DigiLab a large degree of flexibility:

“We’re partners with the library, but we’re the ones responsible for it, we have that flexibility. I guess the disadvantage of other places is that, if they, whoever is running the space doesn’t have that flexibility to make the call and things, then they’re not, they need to be able to move and develop faster, and to be able to take more risks, and see what’s going to work, what’s not going to work.”

Though they may not necessarily work closely, Ayo suggested that the proximity to the library made DigiLab “unique”:

“Because, if DigiLab was just in some building, somewhere, that kind of connection wouldn’t be, it wouldn’t happen so quickly, you know, you have to come and have a meeting. Here you don’t have to have a formal meeting per se - somebody from the library is going to stroll in, while you’re, you know, joining some wires and then they’re going to ask you “What are doing?” and then by the time you’ve explained, they’re thinking “But we can use this for....” And then a conversation starts, and, you know, something interesting happens.”

The partnership with the library, and by extension the borough, has already provided DigiLab with several opportunities “for projects to go live”. For example Ayo has had a major project he started at DigiLab – an interactive storytelling installation – being commissioned to be hosted by the library.
**How is DigiLab funded?**

DigiLab received initial seed funding from the library to all the building materials and some of the equipment, but beyond that they don’t receive any funding. Interestingly, the library does not charge DigiLab rent for the space – this would not necessarily be the position taken by other library authorities. Because they don’t pay rent, the costs of running the DigiLab are fairly low, and they are able to make enough money from charging for membership and courses.

**Users and community**

**Do you target or cater for particular audiences?**

I received a mixed response to this question. On the one hand, it was fairly clear that the main user group was children, teenagers and young people. Both interviewees made repeated references to “young people”, “teenagers” and “kids”, with much less reference to “adults”, and many of the classes and clubs they offer are aimed at children.

However, when asked directly if there was a focus on young people and teenagers, Ayo stated that it was open to anyone, with a mix of adults and young people. He used himself as an example of an adult using the space for “serious stuff”, but said that the “kids are prominent because whenever they are in the space they make noise, and, you know they run around”. His first impression when walking into the very first time was seeing “young kids, you know, lounging on bean bags” and thinking “this looks more like teaching kids how to code and that kind of stuff”, but was not put off because he had a strong interest in makerspaces. It is likely however, that other adults perhaps would be put off by that. He went on to say that “the mix is good”, and found working alongside fun and enriching: “their excitement rubs off on you, and then the fact that you find out that there’s some things that they don’t know, and then you’re telling them, and you see their eyes light up when you pass on that information.” Teaching also works in the other direction, with the young people being able to pick up new information much quicker than him, and help when he gets stuck.

Seun gave the example of their oldest member of Code Club being an 83-year-old man, with most of the other members being young children.

“And the oldest person we have in the Code Club is 83. An 83-year-old man, which is very brave of him, learning how to code. And yeah, he enjoys it.”

However, when asked if DigiLab would consider opportunities to work with older people, in a similar vein to the Men’s Shed organisation, Seun did not categorically rule it out, but stated that: “I wouldn’t say no to it, but me personally I would say no because I simply don’t have the time for it.”

**What do people make? Examples of current projects**

Numerous different projects and objects were mentioned throughout the tour and interviews. These ranged from simple projects that were produced as part of courses and clubs – such as 3D printed houses, videos from the YouTube club or video games produced using simple coding software such as Scratch – to complex commissioned projects on behalf of the council. Below are some example projects:

- Group project: a group of 9 – 12 year olds designed and built an autonomous robot (see Figure 7), which uses sensors to detect obstacles and change direction accordingly. The
group worked together over several weeks to come up with the design the robot, connect the components, write the code for the Arduino control board, test and iteratively de-bug problems until it robot worked as planned. The project’s progress was published through all DigiLab’s social media outlets.

Figure 7. Autonomous robot produced by a team of 9 - 12 year olds

- Retail items: the Lollicopter (see Figure 8) is a DIY helicopter kit designed by a 14-year-old member, with advice from Seun and other DigiLab members. Inspired by Ikea flat-pack furniture, it contains a set of instructions, an electric motor and components, and is assembled by using day-to-day household items such as drinks bottles and lollipop sticks. The parts cost £2-£4, and the item will be sold online and in DigiLab for £9.99, with the 14-year-old designer receiving half the takings. It has been featured in the local press, with the boy’s stating that the experience of DigiLab has had big impact on him: “He was very shy, but now he’s a different boy altogether now, he’s got the confidence wow factor” (Cooke 2016).

Figure 8. "Lollicopter" retail product (Source DigiLab 2016d)
• Commissioned projects: There were several projects which had been commissioned by the council or the library, which DigiLab members have been paid to produce. Commissioned projects are worked on by “Digital Avengers” – a pool of DigiLab members, of all ages with a variety of skills, who work to produce commercial solutions for problems, and receive a 70% share of any profit made from commissions. For example, a team of “Digital Avengers” were currently working on a project to encourage recycling in the borough by gamifying it – they were designing prototypes for low cost weight sensors to be added to recycling bins, which will connect to an app that would allow streets to compete against each other over who recycled the most. Another example given by Ayo was J, a 15-year-old who got to design a licence plate reader for the council: “we have a service ready that can be deployed across the borough, you know, wherever it is that the council wants to monitor parking […] even if J gets just £50 for doing it, you know, the fact that his work is what’s being used around the county, is really good for his CV.”

• WorldPay Hackathon competition: Seun, Ayo, a 13 and a 15-year-old members took part as the youngest team in a Hackathon sponsored by multinational payment processing company WorldPay. Though they did not win, the organisers were so impressed by their work that they created a special third prize especially for them, invited the team to their offices in London for a demo day, and will be sponsoring future projects at DigiLab. Ayo said that the recognition for their work gave the teenagers “rockstar status” and was a “major boost to their confidence” and “further down the line they’re going to come back to that kind of experience, that what, what made them have that determination to succeed in tech.”

What do you feel attracts users to this makerspace?

According to Seun, the main driver for attracting people to the space is curiosity – people seeing the space, and the library being an accessible location where people feel comfortable to come in and ask what DigiLab is. This was demonstrated in Ayo’s account of how he first became aware of DigiLab:

“I just came into the library, and I walked down and I saw DigiLab, and I was like “What’s DigiLab?” This is the kind of stuff I’m interested in, and I go to lots of spaces, makerspaces and all that. So, I was like “I never knew something like this existed. What do they do?” it wasn’t very clear, so I walked in.”

On entering the space, Ayo’s very first conversation with Seun rapidly moved to a serious discussion about what projects he was working on, and how DigiLab could help support him – Ay said that thinks that “is the experience for most other people too.”

Seun elaborated that curiosity is “like our filtration system”. There are certain influential members, “ones that are really key at doing lots of things here”, who are “clever enough to only invite certain type of people”. Seun stated that “I mean to me, there’s no point trying to force someone that doesn’t have, like, an interest into the space.” Though this process of self-selection is probably mostly a positive way of recruiting engaged members, there is a risk of excluding people who don’t know they have a pre-existing interest in technology.
Did the local conditions in Barking have any influence on decisions in DigiLab?

Asked whether people would have access to similar facilities in the local area, Ayo responded that there are lots of spaces like DigiLab, but closer to central London, especially Hackney and Shoreditch. Locally, the only alternatives would be in schools and universities, but Ayo said that they are “kind of corralled off, and they’re like for when you are having classes, or somebody’s doing a training, you know, it’s not open access”. DigiLab offers a very different experience to that, with no curriculum, and “nobody looking over your shoulder saying “you must do this, you must do that””.

Planning and marketing

How do you promote the DigiLab and attract new users?

Word of mouth is the main way people here about the space, but DigiLab is also very active on social media, where “people come across [DigiLab] o there naturally”, with almost daily posts on Instagram, Twitter, Facebook and YouTube

Challenges and difficulties

Seun discussed several different challenges which they face, which were primarily: getting others to understand what the benefits of DigiLab are; and money and time pressures of running the space.

He described their “biggest challenge” as getting parents in particular to understand that the activities their children are doing are of value: “No, they’re not just playing a game, they are actually learning.” He feels that parents do not understand the informal learning, asking for the “learning pattern”. He also suspects that parents wouldn’t ask the same questions of a teacher, as they would “automatically give them that trust.”

The other issue raised repeatedly was that of financial sustainability, and juggling other commitments:

“We can’t do everything for free, all the time, which is how we’re running the space. Which we don’t mind, but there’s like, there’s a limit to how far we’re all going to stretch ourselves, to keep doing that”

The time he and the other volunteers puts in is largely unpaid, and they all have to fit full-time jobs or school around running DigiLab, in order to “pay the rent”. There does seem to be an expectation for DigiLab to provide their services for free, within Barking Library and also in the project to support other libraries set up a Digilab network, and it is sometimes a challenge to “force [himself] to be more rigid”. It is unclear why there is this expectation – perhaps it is down to the library setting, or perhaps because DigiLabs is run as a social enterprise. Seun suggested it was quite difficult working with libraries because “at the end of the day they don’t have a lot of money”, but then reconsidered, and suggested that to a certain extent they do, but: “it’s just that they’re choosing to spend it in the wrong places. So, if you’re still spending time buying more books, buying more DVDs and CDs, it’s a stupid waste of money.” This may be a controversial viewpoint, but does reflect some of the arguments from the literature review about libraries needing to re-define themselves.
Future plans

A primary motivation for DigiLab’s future plans is in order to ensure its long term sustainability, and counter some of the challenges mentioned above. The ways Seun envisioned doing this was through corporate sponsorships, seeking more paid work for the Digital Avengers, and establishing the network of DigiLabs (which would involve paid consultancy). Seun hoped that pursuing these avenues should “take off a tiny bit of pressure”.

Their other plans were to expand the space, in order to meet future demand. As mentioned earlier, these plans involve opening a shop (with direct access from the street) and expanding into the empty void space above the YouTube and VR rooms, or possibly in another building in Barking. Ayo said that evidence that there was increasing demand for DigiLab was that they had outgrown their previous space in just six months, and claimed that “clearly in six months’ time the [current] space will feel choked”. He has plans, dependant on accessing funding, to “up the whole making thing, with more 3D printers, and CNC cutters, and laser printers”.

Asked whether their future space would still be in the library, Ayo said it would “make a lot of sense” for it to stay in the library, or at least keep a “presence in the library”, which would perhaps focus on activities for kids, with another site within walking distance to which “teenagers and adults can graduate into”.

7. Conclusions

The main aim of this study is to assess the possible social impact of makerspaces on their users and community. The claims made for the social benefits of makerspaces which were found in the literature review will be used as the basis discussing the research findings. Specifically, these were supporting and encouraging: creativity, enterprise, learning and self-fulfilment. There was evidence that all four of these were supported to some extent.

DigiLab is a huge enabler of creativity in many forms, by creating “opportunities for innovation”, as phrased by Ayo. This is achieved in a variety of ways. Not only are powerful tools provided, such as game development software, but training on how to understand and master the processes behind them are offered. This take the shape of both formal courses, and informal gatherings, such as the monthly game jams.

Another possible element of what makes DigiLab a creative space is that it is situated in a library. The openness and accessibility of libraries means people feel comfortable to “stroll in” to DigiLab and start asking questions, and becoming inspired. This ease of access allows for serendipitous encounters which would not be so easy in a less public location.

Inter-disciplinarity plays a key role in supporting creativity. The mixture of people with some common interests, such as playing PlayStation, but with varied skills allows for a cross pollination. For example Ayo, who considers himself as having a creative background has picked up knowledge in hardware development from other members. Conversely, a 15-year-old member who had considered himself only as a “core programming kind of person” has been introduced by Ayo into game development, and from that started “immersing himself in the world of storytelling”, and started seeing connections between coding and creativity. This would seem to be evidence that
DigiLab can help people become more confident in their creative abilities, by seeing that the problem solving involved in technology is a creative process.

There was a very strong emphasis on entrepreneurship throughout the discussions, with DigiLab members being encouraged to use the skills they learn to make money in various ways, such as by designing items to sell in the shop, or becoming a Digital Avenger. Ayo claimed that DigiLab is able to provide an agile and low cost way of solving problems, and that the council were interested in investing in them to act “like an extension of their IT department”. However, it is unclear to what extent these initiatives would have truly commercial success, or if they aimed more as a means of confidence building or CV enhancing.

There was evidence of a variety of informal learning practices employed in DigiLab. There appears to be a lot of peer-based learning, with people “skilling up informally, by rubbing off each other”, as described by Ayo. Tellingly, activities such as playing on games consoles play a key part in the learning arrangements of the space. Ayo described how the PS4 acts as an entry point into DigiLab – young people come to play on the console, but then start asking questions about what other people are working on. Then, as they start learning about game development, they start understanding the game mechanics when playing the PS4, and start asking questions like “How did they code that?” “How can I do that in my own game?” This strongly corresponds to the aspect of “legitimate peripheral participation” from the communities of practice model, which Willet describes as the “ways learners join a community of practice on the periphery and gradually move toward the center of the community as they become involved in the practices of that community” (Willet 2016, p. 317).

Perhaps more than anything, DigiLab is a highly social space, which encourages people to develop and fulfil personal goals. Self-fulfilment is necessarily an explicit aim of the space, but supporting people in the other aspects discussed above – creativity, enterprise and learning – all play towards helping people build confidence.

Based on the research carried out, there does seem to be evidence to support the claims that makerspaces can benefit their users in several ways, namely supporting creativity, enterprise, learning and self-fulfilment. Moreover, the library setting does seem to make the technology more accessible to a wider audience, and provide a possible solution for the problem of accessibility highlighted by Taylor, Hurley and Connolly (2016, p. 1). Though specific to the context of Barking DigiLab, the findings should be encouraging for practitioners seeking to establish makerspaces in public libraries, and could serve as the basis for further research and advocacy.

Given the limitations of the small scale of this project, further research into this area would be useful for researchers and practitioners. Specifically, a longitudinal case study tracking the various impact indicators over the course of several months would help give a clearer picture of how long-term benefits of library makerspaces for users. Additionally, research into the current extent of library makerspaces, taking a similar approach to the Open Workshop Network online map (Corbin 2016) or Nesta’s Open dataset of UK makerspaces (Sleigh, Stewart and Stokes 2015a). This would help to identify what working models have been put in place, and allow networking opportunities between makerspaces.
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9. Appendices

Appendix 9.1  Dissertation Reflection

The overall focus of the dissertation – the studying the benefits of makerspaces in public libraries – remained same from the proposal into the final dissertation. The original proposal had been to perform a comparative case study of two different public libraries with makerspaces, however once I had started planning the methodology it became clear that a single case study site would be both more manageable, and provide more detailed insights. Also, given the varied nature of how makerspaces function, the ability to make generalisations about the whole population were less of a concern, so a smaller sample size could be justified.

It took longer than I expected for the participants to respond, and to be able to arrange a suitable date to meet. This delay, along with other time commitments meant that I was only able to make a single visit to DigiLab, and on the day there were only two interviewees available. They offered two other interviews via Skype, but we were unable to arrange a mutually suitable time. As such, I fear that there were some serious shortcomings in the amount of data collected. Had I been able to interview more participants, with different roles in the space, it would have provided more weight to the findings. Apart from interviewing, I also analysed some of the projects, which provided some level of triangulation. Ideally, as well as interviews I would have carried out observations (of organised classes and freer open-lab times), which would have enabled triangulation of what the participants say they do, against how they actually work. However, in the case of DigiLab, this would have been difficult to do without further ethical clearance, as under-18s make up a very large proportion of the user base.

I felt that the semi-structured interview technique was largely successful – though it was perhaps closer to an unstructured interview than I had planned. This in large part is due to lack of experience in conducting research interviews, but would now feel more confident in using this method again. The conversations were open and free-flowing, with both participants offering extremely interesting insights, and raising issues which I had not anticipated, so worked well as an exploratory tool.

Overall, though I was disappointed by the amount of data collected, I was pleased to get a much better insight into what is still an emerging field. I have gained useful practical advice I can use professionally (particularly in being able to better advocate for the benefits of makerspaces), as well as greater confidence in interviewing. I feel that the data collected so far would be a good basis for further, more detailed research.
Appendix 9.2  Dissertation Proposal

Working title
Creating a Library Makerspace: Evaluating the Value of Digital Making in Public Libraries

Introduction

Most simply defined as “public workshops where makers can share tools and knowledge” (Taylor, Hurley and Connolly 2016), makerspaces are currently a hot topic within the library world. An increasing number of libraries are establishing or planning to establish spaces where their users can create. Though the concept of makerspaces within libraries may seem unusual, their “values strongly echo libraries’ core mission of providing equal access to knowledge resources” (Taylor, Hurley and Connolly 2016).

Public librarians in the UK are becoming increasingly interested in implementing makerspaces within their libraries. Being that it involves technology and concepts relatively unfamiliar to most library workers, there has consequently been huge amount interest in the practicalities of implementing makerspaces. There has also been much interest in defining potential benefits of maker spaces; however, this is something that can be very difficult to define and measure.

The establishment of makerspaces is still in a relatively early stage in the UK, and the debate is characterised by equal measures of excitement, trepidation, technical language, speculation, scepticism and enthusiasm. As such, there is a need for original research into this emergent area, especially in the context of UK public libraries.

Aims and objectives

No two makerspaces are alike, each being uniquely dependent on the needs of the community and the level of resources available. The aim of this research is to discern what the potential benefits of digital making can be for users of maker spaces, and to attempt to discover the extent of these benefits. It is hope that this research will be useful for both already established makerspaces, and for libraries planning future maker spaces.

In order to achieve this aim, the following objectives will be sought to be met:

- Determine the different models of maker space currently implemented in UK public libraries
- How public libraries have attempted to find out user needs/expectations
- What the types of users of public library makerspaces
- What are he uses of maker spaces, in terms of physical outcomes and products
- Outline the benefits to users/community/library
- Make an assessment of the longer term sustainability of maker space models

It is hoped that by answering these objectives, a generic framework for evaluating the benefits of makerspaces will be able to be created, which should be of use to any public library.
Scope and definition

This project will concentrate on maker spaces within UK public libraries – both in the form of already established and operational makerspaces, and the wider interest and debate about them within the public library sector, which is likely to lead to a much larger uptake. The reason for the focus on public libraries (as opposed to other types of library) is how public libraries are open and accessible to everyone, encourage free or low-cost access to knowledge and learning, and act as the focus of community activities – all characteristics in common with the Maker Movement.

However, as there is only a fairly limited number of currently operational maker spaces within UK public libraries, examples and literature will be drawn from a wider field – the maker movement more generally in the UK and internationally, and from countries where maker spaces within public libraries are already more common.

Though examples and models will be taken from other contexts, the purpose of this research is to determine their applicability to UK public libraries – as opposed to other types of library (eg school or academic), or to establishing maker spaces in non-library settings (eg. within community centres, as artists’ studios or as for-profit businesses).

It is important to define makerspace, and why this particular term has been chosen over alternative names for the purpose of this dissertation. Makerspaces refer to open workshops, accessible to any member of the public (either for free or paid for). Though they often feature high-tech digital fabrication equipment such as 3D printers and laser cutters, they can give access to low- and high-tech equipment. It is too simplistic to define makerspaces simply as a collection of tools; as John Burke argues, makerspaces are “combinations of a community of users, a collection of tools and a desire to create, exchange knowledge, and share what is created. The defining character of a makerspace is that it enables making.” (Burke 2014, p.xv).

There are many alternative names for these types of space – makerspaces, Fab Lab, hackerspace and TechShop being amongst the most commonly used. Each of these terms reflects a particular technical emphasis, community ethos or organisational structure. FabLabs originated in 2005 from the MIT Centre for Bits and Atoms – and now form part of a global network of over 1000 workshops, all sharing a common charter, a minimum inventory of equipment (Fab Foundation 2015). TechShop is the brand name of a for-profit chain of workshops throughout the USA founded in 2006, which offer “public access to high-end manufacturing equipment in exchange for membership fees” (Cavalcanti 2013). As FabLab and Techshop are both brand names, it will not be appropriate to use them to describe these types of space generically. The term hackerspace originated in Europe in the mid-1990s, and describes a much very loosely-organised informal network of community run spaces, sharing a counter-cultural “hacker ethic”. Hackerspaces encompass many types of making activities, but generally have an emphasis on programming and electronics. Cavalcanti argues that the negative connotations of the term hacking makes the term “fundamentally exclusionary” (Cavalcanti 2013), which to some extent works against their principle of openness.

I have chosen to use the term makerspace (Makerspace or maker space also very commonly used) as the most generic description, encompassing all of these types of space which share the common ethos of the Maker Movement (which will be further explored in the literature review). I agree with Cavalcanti (2013) that the term makerspace is more inclusive, representing “a far more mainstream vision of a publicly-accessible creative space”, which aligns well with the purpose of a public library.
Additionally, makerspace is probably the most commonly used within a LIS context, as roughly demonstrated by searching in the two biggest LIS bibliographic databases LISA and LISTA: the search "makerspace* OR "maker space*" generates the significantly more results (81 in LISA, 192 in LISTA) than "hackerspace*" OR "hacker space*" (6 in LISA, 11 in LISTA) or "fablab* OR "fab lab*" (9 in LISA, 24 in LISTA).

Research Context

The primary context for this research is the upsurge in interest about maker spaces from public libraries in the UK. The first library maker space in the USA was Fayetteville Free Library in 2011 (McCue 2011), with dozens more established across the country since then – at least 98 established or soon to be established as of November 2013 (Burke 2014, pp.165-166). In the UK, though there are numerous open workshops which would fall under the maker space category, only a handful have so far been established in public libraries – according to Public Libraries News, there are 9 currently operational permanent public library maker spaces, with Dundee and Exeter libraries being the first launched in May 2014 (Public Libraries News n.d.). Despite the relatively low uptake currently, the huge interest in the subject is evident from a number of recent conferences, workshops, resource guides and initiatives aimed at public librarians. For example, in 2015 the Society of Chief Librarians (SCL) launched Code Green, a toolkit of resources to help public libraries roll out digital making opportunities, created in response to the huge demand of libraries across the country for guidance and advice on this subject (Eastell 2015). The Code Green website provides practical advice on different types of digital making activities, case studies, and advice on volunteers, marketing and community involvement. In the past year there have been numerous very well attended conferences and events aimed at helping UK public libraries launched makerspaces (SCL 2016; MakerCart and Artefacto 2016; FabLab Devon 2015).

Literature Review

For the literature review I shall focus on two main areas of research, which will help give a theoretical and methodological background to my project. These are: literature relating to the Maker Movement and current research into existing makerspaces (both within libraries and more generally).

The Maker Movement

It would be impossible to consider makerspaces without considering the wider cultural drive behind their growth, known as the “maker movement” or “maker culture”. Though the name sounds unremarkable, as people have been making things throughout all of history, the emergence of the internet and the cheap availability of digital fabrication technology has come together to form a huge surge in interest from ordinary people making physical objects. The lowering cost of technology such as 3D printing enables people to manufacture complex objects previously only achievable by industrial methods, whilst the internet has allowed people to learn how to make use of these technologies: seek advice, share ideas and collaborate online (Burke 2014, pp.10-11). Makerspaces are the “epicentre” maker movement, as physical spaces where people can come together to share tools and knowledge (Dellot 2015, p.13).

Some of the key elements of the maker movement ethos are: the importance of informal hands-on learning, of play, tinkering (Dougherty 2012, pp.11-12); collaborative work practices, knowledge
sharing and open source/open access (Dellot 2015, p.17); the impact of new technologies on manufacturing and culture, as a “new industrial revolution” (Anderson 2012; Gershenfeld 2012; Hatch 2013).

Interest in the maker movement comes from several different, but overlapping, contexts: education and schools; hobbyists and DIY enthusiast; entrepreneurs, designers and inventors; social enterprises; as well as libraries. The value of looking at the maker movement in the context of this dissertation is that much of the ethos, and success stories from it can be used as inspiration for innovative library services.

**Research into current makerspaces**

Looking at current research into makerspaces (both within libraries and more generally) will give an overview current organisational models of makerspace, the types of users, and the benefits they draw. It will also provide an overview of the methods used by researchers, and help in designing the methodology for this dissertation.

According to Hielscher and Smith (2014, p.20) academic literature looking at “community-based digital fabrication workshops” (analogous to makerspaces) is rare in comparison to media reports and activist writing. Most existing social science research has focussed on business, technical and industry aspects, rather than on social, cultural and political implications (Hielscher and Smith 2014, p.20). The same pattern seems to apply to literature specifically dealing with makerspaces in libraries, with most of the literature being media reports or advocacy and practical advice, with little research into social impact.

Several recent projects have assessed the current state of makerspaces within the UK.

Nesta’s *open dataset of UK makerspaces* (Sleigh, Stewart and Stokes 2015a) aggregates extremely detailed information about makerspaces of all varieties around the UK – including locations, equipment, facilities, policies and programmes. The report found 97 makerspaces in the UK, with socialising, learning and making stated as the top reasons for people using the spaces (Sleigh, Stewart and Stokes 2015b p.4;p.6). The research method used were desk research to identify sites and a survey distributed online (Sleigh, Stewart and Stokes 2015b, p.2). This open dataset builds upon a previous report by Nesta investigating the *Making Sense of the UK Collaborative Economy* (Stokes et al 2014) and *Young Digital Makers: Surveying attitudes and opportunities for digital creativity across the UK* (Quinlan 2015).

The Royal Society for the encouragement of Arts, Manufactures and Commerce’s (RSA) *Ours to Master* project (Dellot 2015) seeks to answer these questions: “Why are makerspaces emerging, and why now? What impact are they having on their users and the communities in which they are based? And is this an enduring trend or a passing fad?” (Dellot 2015, p.5). This project uses mixed methods: desk research, data mining of government datasets, an expert roundtable, semi-structured interviews with stakeholders, visits to 12 makerspaces across the UK and a YouGov survey of “people’s attitudes towards making, makerspaces and the wider economy” (Dellot 2015, p.12).

The *Open Workshop Network* (Corbin 2016) is a project to map the makerspace community in London. The methodology seeks to work collaboratively with the participants, encouraging them to “steer the direction of the project and hold co-ownership over the data that is produced” (Corbin 2016).

The *Grassroots Digital Fabrication* project develops a framework for looking at themes of “inclusion, creativity and sustainability in grassroots digital fabrication” and makerspaces (Smith 2014).
Making Community: The Wider Role of Makerspaces in Public Life project used site visits to 15 makerspaces across the UK, and conducted semi-structured interviews with makerspace organisers, asking about “the history, motivations and ambitions of the facility, its user base, typical activities, promotion and outreach, and specific examples relating to excluded communities” (Taylor, Hurley and Connolly 2016).

Literature relating to makerspaces in libraries tends to focus on practical advice about implementing makerspaces (Burke 2014; Fontichiaro 2015; SCL 2016) or case studies, often focussing on how the spaces were created (Britton 2012; de Boer 2015; Craddock 2015; Nowlan 2015). As such, there seems to be room for more research focusing on the impact of makerspaces on their users.

Hielsher and Smith present a very useful summary of methodological lessons to be drawn from past research into makerspaces:

- Researchers need to consider the format and distribution channels when conducting surveys.
- Researchers need to be sensitive to the diversity of workshops when considering sampling issues and consider that some workshops prefer not to limit and specify what they do.
- A lot of discussions and debates within networks can be followed on the internet (within forums and discussion groups), providing a wealth of information that requires an informed strategy of data gathering and analysis to make sense of the information.
- Activities of members occur simultaneously in different spaces and through several technological pathways, thus challenging the employment of some single site and/or single unit of analysis social science methods.
- A lot of researchers use ethnographic methods within their research, and usually are members of workshops themselves. (Hielscher and Smith 2014, p.25)

Methodology

The research for this project will take the form of comparative case studies of two public library makerspaces. The initial stage will be desk research into the current level of provision of makerspaces in UK public libraries, with the nine public library makerspaces listed by Public Libraries News (n.d.) as a starting point. Content analysis of websites and social media postings will be used to determine: what facilities the makerspaces provide, whether they are aimed at particular audiences (children, artists, businesses etc), gauge the level of community involvement.

This desk research will then be the basis for selecting two makerspaces as case study sites. The selection will partly have to be based on a convenience sample of locations within easy reach of London, in order to keep travel expenses down. The main criteria will be to choose two makerspaces operating under different models, eg. one FabLab within an enclosed area and well equipped, and one mobile makerspace.

After making contact with the spaces, and if they agree to participate in the research, semi-structured interviews would be undertaken with a sample of organisers and users of the space. Heeding Hielsher and Smith’s advice, semi-structured interviews are likely to be an appropriate method for makerspaces, given the diversity of workshops. The semi-structured interviews would be based on the approach taken by Taylor, Hurley and Connolly, asking about “the history, motivations and ambitions of the facility, its user base, typical activities, promotion and outreach”.
From this data collected, a framework for evaluating the benefits of makerspaces will be developed, which it is hoped will be more widely applicable to other public library makerspaces and digital manufacturing activities.

### Work plan

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### Resources

The resources needed to carry out this research are anticipated to be travel expenses, recording device and printing costs. Unless external funding can be found, the number and distance of case study sites will necessarily have to be kept low – I anticipate that this will limit me to a maximum of two sites, within London or the South East of England.

### Ethics

Please see completed ethics checklist, Appendix 1.

Though one of the key audiences of makerspaces are children and teenagers, I will only include participants over the age of 18 in my research. Information about how under 18s use makerspaces would be sought indirectly from interviews/questionnaires with librarians, organisers or volunteers responsible for running the space.

### Confidentiality

I do not anticipate that any significant confidentiality issues will arise from this project. Contact details of groups or individuals for the case study may be collected if participants consent to further interviews. These will be securely stored in password protected documents, kept separately from any research data collected. Interview subjects will be given the choice whether they wish to be identified by name, or simply by role. No personal or contact details will be requested in questionnaires, and any responses will be anonymised when included in the dissertation and appendices.
References


Appendix 9.3  Email sent to potential participants

Subject: Dissertation research project on makerspaces in libraries

Hello DigiLab team,

My name is Pablo Calvo and I am Masters student in Library Science at City, University of London.

I am currently doing a dissertation looking at makerspaces and digital making in public libraries, and what impact they have on their users and the local community. I saw Seun’s presentation about DigiLab earlier this year at the Code Green event in Clapham, and I think DigiLab is a fantastic example of a makerspace and library working together.

Would you be willing to let me use DigiLab as a case study for my research? This would involve me visiting the DigiLab to have a look at your projects and facilities, and carrying out some interviews with people involved in running the space - for example organisers, volunteers or library staff aged over 18.

If you are willing to participate, the visit and interviews would take place at a time of your convenience in November.

If you’ve got any questions about my project, please get in touch with me at pablo.calvo@city.ac.uk

I look forward to hearing from you.

Thanks

Pablo Calvo
Interview 1

Interviewee: Ayo Arigbabu, DigiLab member and volunteer

Pablo:
I just wanted to start off with asking you what you do in the DigiLab, what your role is?

Ayo:
Ok, I’ve been given a role – Architect in Residence.

Pablo:
Architect in Residence?

Ayo:
So, I think, that’s … that I like to think of what I’m doing more in the line of innovation architecture. Meaning trying to build a structure around, trying to build some kind of opportunities for innovation within the space. Looking at what’s been done already and seeing in what ways we can extend it and push it in new directions. For example, the 3D printer is there, but we need people to use it. So, how do we do that? Beyond just showing off things that we can do with it. How do we get new people to start using it? So, we came up with the idea of 3D modelling training. Because you need to, it gets more interesting if you are able to model what you need yourself and design it yourself.

Pablo:
Instead of just downloading from the internet?

Ayo:
Yeah. We’ve got a bunch of kids. It was interesting for them to do something in a piece of software, and see it being printed, and that just imprints in their mind that I can make things myself.

So, another area where I’ve tried to intervene is game design. There are lots of tools here – we’ve got Oculus Rift, we’ve got all sorts of VR [Virtual Reality] headgear, and, all sorts of I mean... PS4 is there. It’s like, it’s like a candy shop for a game developer. We, before we didn’t have so many people doing that. We had designers and people working with hardware, but not a lot of people doing game development, so I tried to build some, some opportunities around that.

So, one key thing that we’ve tried to do is have a game jam, and we’re aiming at having that every month. And already, the first one was scheduled for the 3rd of December, but we’re going to move that forward, because we didn’t have enough sign ups. Well partly because we have a sponsor who expects a certain type of turn out. But for us we have like 15-20 people who’ve signed up. That’s fine for us to do an event. Just to satisfy the sponsor we will shift till January to try to get more people on board.

But the impact of that already is that lots of people in-house are already picking up game development skills. There’s a bunch of teenagers there, if you’re here in the evening, you just hear them talking game development, talking Unity [game development software], you know using all the terms and stuff. And I just smile because, just a few weeks ago they had no clue about this. But now they are actually talking as if they are a games studio about to make the next big thing. And, you know, charting their progress is quite impressive. In a very short time they’re, they know it. They understand it, they get what is going on, and they are able to make something. And...
Pablo:
And how, how do they pick that up? Is it from…?

Ayo:
They just, they just jump on the PC, go on the internet, and then I look over their shoulders once in a while, and just give them tips: “No, don’t do that. If you do that you’ll spend longer doing it. Why don’t you try that? Why don’t you Google this? If you run into trouble with this sort of thing, Google these sort of key words, and you’ll get the kind of help you’ll need.”
Because all the information is really out there. What I’ve found is that, self-learning is actually the only type of learning that exists. Doing my own Masters programme, that was very plain, you know. Even when you’re having classes, what they’re really doing is to try to help you structure your own self-learning. So you go off to do the actual learning on your own.
And, these kids are bright. So, some things that even took me a bit more time to, to learn, you know, they are just snapping it up very quickly. They even get impatient with me at times when I’m trying to help them de-bug their code, because they’re like maybe thinking three steps ahead of me, and I’m still, you know, trying to catch up like an old man.
So, that’s the motivation actually to, have these bright minds, and have them exceed themselves in every way.
So apart from the game jam, what else have I been doing? I’ve also tried to get us into competitions. We had a successful run with our first one. The second one, was a total failure. But the first one was very good, it makes up for any other failure that might come up afterwards.
Because we, with, with two of the teenagers we, we went for this hack-a-thon sponsored by WorldPay [multinational payment processing company]. And, we, they … we didn’t win, but they created a third prize, just to, you know, award something to us – which was really cool -and subsequently they invited us again to come with the kids to, to their office. And we actually thought it was like a party or something, that they were doing, and that they were just going to, you know, show us: “See these young lads that we…”. But actually it was about us, kind of, and that was like really, encouraging that, OK, if you’re doing good stuff you get recognised. And, for the kids, it’s giving them rockstar status. It’s, I’m sure, it’s a major boost to their confidence, and it’s, further down the line they’re going to come back to that kind of experience, that what, what made them have that determination to succeed in tech.

Pablo:
Do you think, they, well in the local area, would they have access to this kind of stuff anywhere else?

Ayo:
Um...

Pablo:
Or would they would they have...?

Ayo:
Well from my experience in other spaces, there are lots of spaces like this. Maybe not necessarily really in Barking, because there is more activity close to central London – Hackney area, Shoreditch area, that’s where most of this sort of stuff goes on. Otherwise you would have spaces like this in schools and universities, but they are kind of corralled off, and they’re like for when you are having classes, or somebody’s doing a training, you know, it’s not open access, I can just. Because what
goes on here is there’s no curriculum, there is no, nobody looking over your shoulder saying “you must do this, you must do that”. The success you make out of it is up to you.

So those guys doing the, the game programming stuff now, before they started, after we told them about it, they were spending a lot more time playing on the PS4, you know. But that in itself is also part of the experience, because playing a game and understanding the game mechanics, and... What is now going to be happening to them is that as they’re playing, they’re trying to decipher “How did they programme that?” “How did they code that?” “How can I do that in my own game?”

You know, so, it’s open access here, so you can just pop in, and just hang out. If there’s nothing that you’re doing, or nothing, no project that you’re involved in, or you don’t know anybody, you can play the PS4, and that’s the process through which you start to know people, you know. Somebody comes to play with you, and then you engage with the person, and you’re like “That guy is cool, that dude is cool. I want to check in there tomorrow and see if he’s there.” And then you ask him “So, what are you working on?” That’s one common thing that happens a lot you know. I usually see that. And every now and then, even the little kids will come and say, “so what are you doing?” And then, I have to like, format my brain and remember what exactly it was I was doing, and try to find the words to explain it to them, you know. And so, by asking “What are you working on?” “What are you doing?”, you know you get to see what other people are doing, and you get to see what the possibilities are, and you start to see connections between what you’re doing and how, you know, maybe you could collaborate in the future, or you could ask for advice.

Like, there’s somebody that comes here often as well, S, he’s, a more experienced programmer than I am, and he’s also a lot more experienced in hardware. You know, so every now and then he comes to ask me what am I doing. You know, and I tell him, and then he, you know, gives me tips, and that kind of stuff. And when I feel I’m stuck with something too, if he comes in, I could be asking him “What do you think, how do you think I should do that?” Then he gives me advice. And then, because of the game jam, he’s also started taking an interest in Unity. You know, so, then the reverse happens, and I’m giving him tips on how to use Unity.

So, what happens is that we are all skilling up informally, by rubbing off each other. And, yeah. And, what, what also makes DigiLab unique is the partnership with the library, and by extension the partnership with, with the borough. Because, it creates opportunities for projects to go live, because the library and the borough, they’ll typically have, things that they want to do. Simple things, nothing complicated, that because of the way that they are structured as organisations, to get those things done commercially might take time or cost so much, and all that. But because they know there’ll be somebody in that DigiLab space who understands that kind of thing, and can solve it for us, so they come. And typically they’ll ask Seun. And he just thinks, “OK, who do I know in the team who’s doing something interesting that we can apply to this?”, and then he calls somebody over “Can you do this?” And, bam, that thing that was a pet project, or that skill that was just something that you’d learnt just while playing, becomes something real, that you can do as a live project.

You know, and S has done, you know, different things here. J, who’s the 15-year-old who’s a Python [programming language] guru and Raspberry Pi [credit card sized programmable computer] guru, he’s done, you know, stuff that was paid for. You know, likewise, I’ve had a major project I started off with here being commissioned by the library to be hosted, an interactive story telling installation, to be hosted in December.

And, I cannot overemphasise how useful that is for a creative person, the fact that, not just because you’re earning income, which goes a long way, you know, because you have to like, fund, oil the wheels, you know. But not just that, just the idea that finally, you know, my work is going to get out there, because that is what every creative person wants. You want your work to be out there, you want people to engage with it, you want to be able to get feedback. So that’s something that’s very useful.
Because, if DigiLab was just in some building, somewhere, that kind of connection wouldn’t be, it wouldn’t happen so quickly, you know, you have to come and have a meeting. Here you don’t have to have a formal meeting per se - somebody from the library is going to stroll in, while you’re, you know, joining some wires and then they’re going to ask you “What are doing?” and then by the time you’ve explained, they’re thinking “But we can use this for...” And then a conversation starts, and, you know, something interesting happens. So, yeah.

Pablo:
Yeah, I think that’s why libraries are so interested in it, because we’ve got, we are open to anyone, people can do anything, and we’ve got real life situations.

Ayo:
And it’s also 100% educational. You know, yeah it’s serious learning, even though it might not be done formally. It’s life skills, and yeah...

Pablo:
So, in terms of, like when people talk about makerspaces, the kind of benefits they often talk about first are supporting creativity, learning, enterprise and entrepreneurs, encouraging people who wouldn’t know about tech into tech. Is there anything else you’d add, any other benefits?

Ayo:
Solving problems for people.

Pablo:
So real life?

Ayo:
Yes. So with DigiLab here, most likely, especially as we get the word out, lots of people in the community will tend to remember that “Oh, there’s that place in the library where I can, you know, get something solved for me.” Maybe some problem with their computer, or, something that a little programming can solve, you know, which they won’t have access to developers out there, who have some corporate structure shielding them from, you know. They can just come in and ask, you know, and get a 12-year-old to do it for them, and give them £10 an hour or something. So, yeah. So, problem solving I think is useful. Which is something interesting that Seun might talk a bit more about.

We had a meeting with the council recently, and that came up prominently. The fact that they spend quite a bit on certain things, and they might not be getting exactly the sort of results they want. And you know, just by maybe putting some funds, not even paying for those services directly, even just doing some funding to DigiLab that “OK, train your people some more, get more equipment” that kind of stuff, you know, automatically make DigiLab, you know like, like an extension of their IT department – or a cooler extension, you know, more fun and hip.

Pablo:
Because it is always really hard get things done, IT have always got their rules “you can do this, you can’t do that, you need to go to tender for this”
Exactly. So in terms of problem solving, that’s real tangible scenario happening that we’re actually getting the council to consider using some of the funds they use to pay for certain services, through into DigiLabs, so DigiLabs can naturally just solve those problems for them. That makes a lot of sense.

Pablo:
And do you think you can, do you think you’d be able to cope with the scale of a big council project?

Ayo:
Yeah, so that’s the thing. A big council project really – lines of code are lines of code – so it doesn’t really matter if the code was written in some expensive office in New York, or in some kid’s dorm room – Facebook. You know, lines of code are lines of code. If its intelligently done, if it solves a problem, then it works.

For example, J, the 15-year-old that I mentioned, got to build something for a client – a licence plate reader. So, using cameras and blah blah blah, as your car is driving in it can read your licence plate number and store that to a database. That’s the kind of technology that Lidl use for their parking system and stuff. And he’s done it, he’s done the prototype, it works. All he has to do now is, you know, send the PCB [Printed Circuit Board] drawings to China and they can, you know, manufacture loads of it and send back here. We can print 3D casings for it, pay Amazon for web hosting, for cloud hosting, and boom, we have a service ready that can be deployed across the borough, you know, wherever it is that the council wants to monitor parking, or anything like that, we can deploy it, or manufacture it to whatever order. You get what I’m saying? It’s the same thing that could be charged loads more money for, you know. But because we’re trying to find our feet, and even if J gets just £50 for doing it, you know, the fact that his work is what’s being used around the county, is really good for his CV. So, yeah.

So, in terms of scaling up, that’s why we also have workshops and things like that. Like the game dev thing that we’re doing now. What that will mean, is that we can, once we do that for a couple of more months, and the guys who have been skilling up have improved their skills to a certain level, what it means is we can take on more ambitious versions of the kind of installation that I’m going to put up in the library in December, for example. We can do more impressive things, because now there’ll be a team, so what one man can do is different from what a team of 5 or 6 can do. Yeah, so it’s the same thing that we’re doing with 3D printing, the same thing that we are going to do with the Raspberry Pi, we had a Raspberry Pi Jam recently. And J is being primed to start running some classes targeting, really, young girls. So by the time we run that kind of cycle a few times, means we’ll have more J’s in a few years, and in a few months. Yeah, so that means we can do more hack-a-thons like the WorldPay, and get more exposure. Even if they don’t win, it means that we’re replicating the experience for more kids.

Yeah, so it can scale, and evidence that it can scale is the fact that we were in the smaller room over there for six months. I was there for maybe like a month and a half or so before the move to this space, which is bigger and is doing more things, and I reckon that in less than six months we will. Because one of the directors of DigiLab came in after the launch, and he was like “Guys, you guys are talking about having a bigger space. I don’t understand how this space is bigger, the place is already looking cluttered and people are already sitting elbow to elbow.” So clearly in six months’ time the space will feel choked, because that place now that is empty is going to be a shop. Yeah, and I’ve already been talking to Seun that we need to up the whole making thing, with more 3D printers, and CNC [Computer Numerical Control] cutters, and laser printers. You can see there is no space to put such equipment, because you need to put them in a protected area, so that people don’t just bump into things and cover up the CNC machine area, so that dust doesn’t go everywhere. So, this space
can easily fit into a floor or two, you know in a building, easily, with activities and all. So, yeah it can scale rapidly.

Pablo:
Yeah, Seun was telling me about the plans to build up.

Ayo:
Yeah, building up in that direction *[void space above YouTube and VR rooms]*, so that’s expansion space. But even that, I think, in less than a year there’ll be a need to get a floor somewhere. Especially if we’re accessing funding, you know, decent funding to get proper equipment, and stuff.

Pablo:
Do you think you’d still be based in the library, or would you move on somewhere else?

Ayo:
If there’s space in the library, that would make a lot of sense, you know, if there’s space in the library. But if there’s no space in the library, what I suppose will happen is that this presence in the library will remain, but there’ll be like an extension to DigiLab, but within walking distance. Yeah, so the focus here might be for the kids, you know, that creates activities for kids, and let that be going on, while the more hectic kind of stuff can be moved. So, someone like J can graduate into that other space. You know, the teenagers and the adults can graduate into the other space. That’s kind of what I foresee.

Pablo:
I get that you’ve got a focus on young people and teenagers, but do you see it expanding into, for anyone to come in?

Ayo:
Yeah, yeah, it’s actually anyone. Like, I came in – to tell the truth I’ve not told Seun this before – when I, I just came into the library, and I walked down and I saw DigiLab, and I was like “What’s DigiLab?” This is the kind of stuff I’m interested in, and I go to lots of spaces, makerspaces and all that. So, I was like “I never knew something like this existed. What do they do?” it wasn’t very clear, so I walked in. But when I walked I saw some, you know, young kids, you know, lounging on bean bags and stuff. I was like, OK, let me just be part of this space, because I want to be part of this space, but this looks more like teaching kids how to code and that kind of stuff, but it doesn’t matter, let me just have fun, you know.

But it turned out that I, it wasn’t just about having fun because the first conversation I had with him [Seun], he was asking me what it was that I did. And then he saw some of my work, and the conversation moved immediately to “what are you working on right now?”, and then the conversation moved immediately to “Ok, if we’re going to support what you’re doing, are you going to be interested in using this space to do that, you’re project?” you know, and it moved to a serious phase of, you know, of discussion very quickly, very rapidly, and that I think is the experience for most other people too.

For example, one of my course mates, we finished a course together. I invited her over, on Seun’s insistence, because once I mentioned what she was working on he was interested. And the next thing they had a conversation, and boom, they had agreed on how she could make a copy of her installation here, and, you know, that conversation is still open today.
So it’s not, it’s not just kids, it’s a mix, you know. The kids are prominent because whenever they are in the space they make noise, and, you know they run around, and they corral, and we have to set up the corrals and stuff like that.

But, you know, there is serious stuff going on as well. Like a team went to Brussels for Code Week, at the EU Parliament, and they went to present a project built here, for locating books on shelves using LED lights. A string of LED lights that would, you know, trace a path to the location of the book. And there were no kids on that team, you know, it was purely adult stuff, and it was all done here. So. But the mix is good. For example, what we did at WorldPay was much more enriching for me, that the kids came and participated, and they were super tripped. I mean, even if I won I would still be jaded, and be looking for the next mountain to conquer and all that, but for them it was something major, it was you know, really exciting.

And besides that, it’s quite fun working with kids, you know, their excitement rubs off on you, and then the fact that you find out that there’s some things that they don’t know, and then you’re telling them, and you see their eyes light up when you pass on that information.

And also, when you also get stuck with some things and you, you call them, you know, and they’re like “Oh, that’s easy” and they tell you. You know it’s just kind of fun, it’s different experience from working with other adults. Yeah, so.

Pablo:
So, you said something about, you were talking about creativity – that’s really interesting how technology and science and creativity. How do you see them working together in a space like this?

Ayo:
My Masters was...

Pablo:
Yeah, can I just ask – what’s your background? Because I haven’t asked you.

Ayo:
Yeah, my Masters was in a programme called Creative Technology.

Pablo:
OK.

Ayo:
So, I don’t see any, I don’t see any dichotomy between creativity and technology. One of the things I studied was something called a multiplane camera – I did a small paper on that – which was developed by, well not really by Disney, but they made it popular. Walt Disney Studios way back in nineteen, late twenties or early thirties. Yeah, and what it was a technological device, you know, for creating different planes on which you have your images, and then when you shoot it gives a parallax effect, like a sense of depth, perspective, but it’s still 2D images, so, yeah, lining up. And, that was a piece of technology, that it was so advanced then that it would be comparable to what VR is to us now. You know, but they didn’t, that wasn’t “tech”, like we call tech now, but really it’s still tech, it’s still the same thing, you know, but it was for creative use. It wasn’t something that they brought from somewhere and applied to the art of animation. No, it was made for animation. And, so likewise VR and everything. So, creativity, technology is, even the process of problem solving, you need some creative capacity to iterate through possible solutions and arrive at the one you use, and all that.
So, yeah, well my background, I studied Architecture in Lagos, worked professionally for a few years, and then ditched everything to jump on the tech bandwagon. And at some point, I’ll find a way to fuse all that, because there is exciting stuff happening in that direction as well. Especially with 3D printing and digital fabrication and stuff. So, the way architecture is being delivered in physical terms is really evolving very fast, as well. So again, I don’t really find any conflicts in you know, those different directions. I think it’s just different, different manifestations of the same thing.

Pablo:
And do you think that there’s, that that could help people who don’t realise that they’re creative, or creative people who don’t realise they can do tech?

Ayo:
Yes, definitely. So, like the course, this Creative Technology course I just finished now, you can come in either as a creative person who wants to learn about tech, or you can come in as somebody who is a core programmer, who wants to learn about creativity and how to add that creativity to that. And we had different people like that. I clearly came from the creative industries, and so I had to learn programming, and that was pretty new to me. I’d already started trying, but I now had to really go into it, and it was like being dropped in at the deep end, and struggling to stay afloat. I survived it. And most of my classmates were like that too. I think the class, there were 4 of us, and all 4 of us were new to programming, but there were 2 part-time guys, and one of them was a professional developer who works in London in a firm as a developer. But he did the course – so for him, he was picking up all these things about creativity, brainstorming, coming up with ideas. We did courses like that too, apart from all the coding courses, and yeah. So, yeah, a space like DigiLab can make that clear to people. So, someone like J, who was a Python programmer, and he worked with hardware, Raspberry Pi. In fact, he used to joke that if there was any problem that needed solving, he would not only solve it with Raspberry Pi, he would find an excuse to enforce it that it had to be solved using a Raspberry Pi. You know, and I had to talk to him at a point that “Dude, it’s great that you understand Python, you love Raspberry Pi, but there’s a whole universe outside of all that, that is also interconnected, you know, and I’m glad that you got convinced to jump on Unity.”
So from being a core programming kind of person, he, when he talks about coding he’s like the ultra-geek, you know. That stereotype for a geek, that’s him. But now he’s shifting into game development, and suddenly he’s going to start immersing himself in the world of storytelling, and you know, and then the connections, he starts to see the connections. And I’ve already started showing him the connection between what he was doing before, and what he’s doing now. For example, you could start prototyping game controllers, since he works with hardware, he can you know, create a unique game controller for the kind of unique games he’s trying to make. You know, and then things start getting even more interesting, because that’s how stuff like the Oculus Rift, and all these other hardware devices came about. They, people were thinking about new ways of engaging with media, like the Microsoft HoloLens [VR headset for interacting with holograms] for example, they really tried to re-imagine the way we interact with media, and then boom, something new, a new paradigm is being unleashed on the world.
The thing about coding is that, if you stick at it you succeed. You know, you’ll break through the barriers and you’ll solve the problem, yeah, and you, you will really feel great, when you get to that point. Then you move on to the next stage and you get stuck again, so it’s like a continuous cycle. But what then happens is that over time you are building confidence, your building your knowledge base and you stop being so scared about it, and then it becomes a part of you.
Interview 2
Interviewee: Seun Oshinaike, DigiLab founder and organiser

Pablo:
What do you think first attracts people to DigiLab?

Seun:
Curiosity - it’s like our filtration system. So, and a lot of the ones that are really key at doing lots of things here, they get to talk to their, I mean they have lots of friends. They’re clever enough to only invite certain type of people, because “Oh you’ll like this kind of thing” then they invite them, which is great.

Pablo:
Because yeah, I’m interested in how do people hear about DigiLab?

Seun:
Word of mouth. I mean, they recommend it to other people, they come. And then maybe when we go somewhere, we’ll mention “Oh, you should come and check us out at DigiLab, we do this, we do that.” People will come.
And then, obviously we do a lot of activities online as well: Instagram, Twitter, Facebook, and people come across us on there naturally. If they have, like, an interest in that area, they’re not sure, they come in. I mean to me, there’s no point trying to force someone that doesn’t have, like, an interest into the space.

Pablo:
So, can I just ask you a few questions about how you’re organised and run? Do people become members, is there a membership scheme?

Seun:
Yes, so they pay £5 a month to use the space, and they get a card, which they scan in on the iPad [by the entrance] whenever they come in.Yeah, that’s how it works. They get a membership, and that gives them access to pretty much come in here, and use the things in general. But if they want to, that also gives them free access to the YouTube room, provided they know what they’re doing, and they’ve been trained on to handle the cameras, so they can use it. The VR [Virtual Reality] room, it doesn’t give them access to that, they have to pay £2 to be able to have a 20-minute experience. Which is like, still ridiculously cheap. They would not get that if they go to Stratford, and try the not so cool Oculus one. Code Club we charge £5 per session, and often the ones that consistently come pay in bulk. They’ll buy like, if they buy 5 sessions, they get one session discounted. If they buy ten sessions, they get two sessions discounted, so some parents prefer to do that.

Pablo:
And do you reckon that people just come for the code Club, or when they start doing Code Club do they start picking up other things?

Seun:
It’s a mix. It’s very mixed. I mean now, we don’t actually have a lot of people in the Code Club currently. The plan is to try to kick start that again next year. So, primarily, because a few actually, which is kind of weird, have moved out of the borough because of travel, so we need to get new fresh people in to Code Club.

Pablo:
Do you use Scratch or do you do other things?

Seun:
Code.org. We use Code.org and then we use Code Combat, and we also try and use some of the robotics – Ozobots [miniature programable robots] for example. They code it, and then do some more interesting stuff with that.

Pablo:
OK.

Seun:
The biggest challenge is trying to let the parent realise that “No, they’re not just playing a game, they are actually learning.” They just: “oh, is this just what they’re doing?” Oh, and I’m just like, seriously? I just think, sometimes I’m tempted to say “OK, why don’t you sit down and do exactly what they’re doing, and let’s see how you get on? You just think that they’re playing games? No, they’re not just playing games.”

Pablo:
Do they not realise it’s kind of a big opportunity for them, for learning? Do they not see it in the same way as the kids?

Seun:
They’re just confused, they’re just. Some of them, no sorry, not all of them, some of them are just confused and then, because obviously, they don’t understand this kind of language, and also some of them are just wanting to check, like, what’s the learning pattern, what are they learning? The funniest thing is, I’m pretty sure, most of them actually, they don’t even do that at school. They don’t know ask a teacher, like a specific question about what are they learning. They just automatically give them that trust.

Pablo:
Because they’re at school?

Seun:
They don’t ask what’s going on. So that’s interesting.
And the oldest person we have in the Code Club is 83. An 83-year-old man, which is very brave of him, learning how to code. And yeah, he enjoys it.

Pablo:
Do you know why he wanted to start?

Seun:
Um, that’s a good question. I’ve never really asked him. We’re just happy to see him there, you know, just learning. Learning and wanting to, and actually having the patience to go everything step-by-step. Which many people that age, you know, they won’t. Even my mum can barely use her phone, not talking about an 83-year-old man. So we’ve not actually really asked him that question, but we’re planning on doing a case study on him at some point.

Pablo:
Do you think that would be an opportunity, to sort of, work with older people?

Seun:
Yes, but...

Pablo:
Because there’s other makerspaces doing kind of Men’s Shed type things, where they get older men, who are lonely, who maybe don’t go to other places.

Seun:
Um, I mean I wouldn’t say no to it, but me personally I would say no because I simply don’t have the time for it. But also, um I have to do my full-time job. But if like we got sponsorship or some sort of funding to do it. We can’t do everything for free, all the time, which is how we’re running the space. Which we don’t mind, but there’s like, there’s a limit to how far we’re all going to stretch ourselves, to keep doing that, to keep. To go beyond these bars.

Hence why we’re thinking of putting some paid work stuff together to try and see how can we do a network of DigiLabs [other public libraries in the UK have approached Seun, wanting to host DigiLabs in their own libraries]. Also, get foundations in to invest in that CSR [Corporate Social Responsibility] stuff, try to keep looking into that, to keep it going.

But then what I’m more interested in, especially if we’re going to build a network of DigiLabs, is the self-sustaining side of things. Because, especially with the first one, the first few that we’re working on now, you know, one of their strong points is around, they’re more strongly focused on the business side of things, how to generate revenue, which I’m helping them really hard with. We’re still learning things out here, and trying to pass on that knowledge - we’ll do this, we’ll do that there. I mean even now, there was an arrangement we had with someone that was meant to be using, was using the DigiLab space, to do some – sorry the YouTube room – to do some stuff. And I’m having, like once we’re into that, I’m having to, I have to put a structure around it, because you know I can’t just give her unlimited access. No matter whatever she’s giving in return, it just can’t work, because if you’re doing that and I can’t go on Groupon to get more bookings for people to come and use the room for studio stuff, I won’t be able to sell a network of DigiLabs to other people, because if we can’t even prove that we can make money.

So, it’s trying to get across to people, without. And sometimes you just have to be, just have to be really force myself to be rigid about some of those things. The point that I’m saying is that I’m always learning too, from trialling different things. See what works, if it doesn’t work, how quickly can we make changes?

The good thing is that we have the flexibility, because we’re partners, we’re the ones running this space. We’re partners with the library, but we’re the ones responsible for it, we have that flexibility. I guess the disadvantage of other places is that, if they, whoever is running the space doesn’t have that flexibility to make the call and things, then they’re not, they need to be able to move and develop faster, and to be able to take more risks, and see what’s going to work, what’s not going to work.
Pablo:
I think that that is one of the biggest challenges for libraries, because they are often quite risk averse, and strapped for cash.

Seun:
I’ve noticed that even with some of the guys that we’re working with. Our first day, the guys in our team were saying to me “So, how much did you charge them?” for my time to help them, answer their questions, help them to get the money. I said “Nothing.” “Oh you should charge them because…” I said “It’s fine.”

Even though I looked like an idiot then, but I knew what I was doing, because what I think is that I know that they’re going to have to come back to me because they’re librarians, they can’t run this thing. Well, they can, if they want to go ahead and try and do it, I feel sorry for them because it’s going to be like a disaster, because they’ll struggle. And they then send an email to say, later on “Um, we can’t do this ourselves, how heavily involved are you going to be? Blah blah blah.” I can do one day a week, but you need to set an amount out for my time, for if I’m going to be doing that. It wouldn’t be more than the cost of sending one of the Digilab Avengers going there, or Ayo or maybe someone else. Then the time needs to be covered, otherwise it’s unfair, if they expect.

This is like a massive experiment for us. We can’t be expected to be experimenting everywhere else, and just spending our time. These guys need to pay the rent. I need to pay the rent. It’s nice to do things for free, but that’s not cool. They’re librarians that are getting paid to do their stuff. So you’re just trying to find all that balance, like all the time.

And also, on the understanding that at the end of the day they don’t have a lot of money – but actually, to a certain extent they do. But, it’s just that they’re choosing to spend it in the wrong places. So, if you’re still spending time buying more books, buying more DVDs and CDs, it’s a stupid waste of money. Like seriously, even the people – yes there might be a very small percentage that still borrow – but we’re moving out of that, we’re shifting out of that. They should be looking to spend that money into somewhere else, that is you know, the next thing that is going.

Pablo:
So, what do you see as the future of libraries?

Seun:
So, in Canada for example, their libraries are so different to how it is here. They’re more, to a certain extent makerspace type of library, in the sense that you can also use it just for like general community use. Which is how they’ve converted this library, if you need housing help or if you’re a refugee, you go there. It’s multi-purpose. That’s what the future of the libraries here in the UK needs to be, if they are going to survive. But I also think that more importantly, they need to adopt more things like this [Digilab]. Because, the libraries themselves, they don’t make a lot of money anyway, other than the ones that have rooms that they’re renting out. Here [Barking Library] they make a lot of money from renting out rooms, halls and stuff. They do that, but they don’t make a lot of money and they’ve been doing that for a while. So, it’s not a bad idea if they have things, with this type of feel, where people can just be sporadically creative, be inspired by things and they can experiment and quickly build prototypes, and not necessarily make money.

My aim for us is to be making between 10 to 50% of our revenue in-house, from what we’re selling. Which is, we’re at like 10 to 20%, thereabouts at the moment, which is not bad. How can we continue to push that forward?
Pablo:
How are you funded?

Seun:
We’re not funded, at all. We just make our own bits of money. Like now, he’s on work placement [work placement student in the office area], he’s just gone to Wilko to get some bits that we want to use: some washers and some screws, that we want to use to build the sensors for the bin, for an experiment that we’re trying. It’s from the money that we made from the Code Club, just into the parts. Take some of that and get it, it’s fine.

But in terms of how we built the space itself, the library had given us some seed money to buy all the materials, the wood to build it, and to buy some equipment. That’s it. Everything else is up to us, how we just keep it going. We don’t use, we don’t really need much, really. We’re not paying rent, so we don’t really need much, other than the fact that if we need to build something, we need to buy some of the materials. That’s it. And obviously the time, people’s time, ideally, of running the space.

So, with a lot of the networks that we’re going to be building, I guess that we need to factor in is – I guess there’s two keys things. One, to have transition time, of covering the cost of someone from the main DigiLab that helps them to transition, of their time to do that. And then the other thing being, doing early consultation, or community engagement early, to find the right people who are your Ayos, your J, your S. Those sort of people, that would be the ones that they’re really passionate about it, and they’ll be there most of the time. And then they, once you get those people, they’ll then be fine to co-ordinate what’s going on.

Then you pick a specific time that you’re open, that’s going to be convenient for everyone. And some of the library staff do get involved here, like help us out with maybe some of the social media stuff, or just designing flyers, they do get involved. But once you’ve set that in place and then you have – you’re not open 24/7, you’re not open all the time. Keep the time – even if you just start with just three, four days a week only, or two days a week – that the space is going to be open.

Pablo:
Because then you can concentrate?

Seun:
Exactly, then you can concentrate, and you build and you can add additional, maybe in six months, in twelve months’ time, you can add additional days that you’re open. That way it makes sense, rather than if, I think most people see it as “Oh, it needs to be open all the time.” Just because the library is open, it doesn’t mean that our part of the library needs to be open all the time. Like the shop, for example, we’re only going to be open at first just Thursday, Friday, Saturday. That’s it. Then they’ll know, that’s when it’s going to be open, and everyone can come and order their stuff during that time. Outside of those specific times it’s not open, but then, because first I need to focus on those three days. And then, make sure we have a staff member that is responsible for the space.

If this is going to work, then you can add another day, another two days to it. Trying to do it one go, it’s chaos.

Pablo:
What are you going to sell in the shop?

Seun:
Like, drones, VR headsets, just all sorts, like gadgets. And then we have two products that we’re going to be, that were made in-house, that we’re going to be going there as well. One is, it’s kind of like an instruction manual, of how to make your own helicopter, with normal, just any random drinking bottle. So one of the guys, he’s thirteen, worked on it. He’s really into design, and making things. So he designed, he made one, and he’s working on his second product now actually, and I just told him “OK, think of IKEA, when you go there. When you’re setting up your wardrobe, there’s an instruction manual of how to make it. Design the same thing, and I’ll give it to one of our other designers in here. They’ll set it up with their Photoshop skills, or whatever software they want to use.” And then he did that, then I paid him some money to cover his time to that, from my own pocket. We’ve done that, and we just now told his parents to begin to buy a bit of the material. That’ll cost us, each product for us to make will be like, maybe no more than £2 to £4 maximum – between £2 and £4. And we’re going to make two dozen of those, buy some electric motors, and then some bits that maybe they might not find easily. And then the rest, just drinking bottles, some sticks. They’ll make it themselves. And we’ll sell, we’ll package these two to three pounds’ worth of things with the manual, put it the packaging, and sell it for £9.99 in the shop.

The other thing is a stylus pen made out of foil paper, and sellotape. And then again we’ve done an instruction manual. That one is purely instruction manual, because those two things you can easily find from your own home. We’re going to be selling that – the design is nearly done – selling that as just the paper, £1. He gets 50p of it, 50p goes to DigiLab.

So they’ve got two products now. And both of them are already working on their second product. These are different sets of different young people doing this. And eventually, before you know it within a year, I reckon easily, there’ll be ten products being made exclusively out of DigiLab. So there are other products we’re going to order from outside and sell here. And we’ve got mix and other experiments going on in-house. That’s the magic.

Pablo:
Do you reckon that eventually you’ll be able to sell them externally?

Seun:
Sell them externally? Yeah, definitely. Especially first from our online shop, that we’re going to be adding to the website, so people can order from there and we’ll deliver to them. But definitely, we’ll be able to sell externally. And sell some of our things in other shops as well as our online store. We’ll experiment with our own in-house first, to see how that goes.

I think also, it’s, there needs to be like, before, we’re doing a lot of everything in-house, but then, in terms of our own [unclear word] we’re putting a lot of energy into that, which is fine to a certain extent, but we’ll never scale if we just do that. Hence why we’re trying to make sure we secure the two corporate sponsorships as well, because then that will take off a tiny bit of pressure.

We have more kit from Pi-tops [company who produce Raspberry Pi powered laptop DIY kits], and they’ll be using us as a test bed to test their new products. And then the other one, WorldPay [multinational payment processing company], that will involve cash. They’re going to give us some money to run, maybe I don’t know, something sponsored by WorldPay. That’ll be pretty cool. So, from those two points of view, it’ll really help us out. We need to make sure we get another two or three of those from different companies. And then, you know, it’s becoming happy days.
Appendix 9.5  Participant Information sheet

Creating a Library Makerspace: Evaluating the Value of Digital Making in Public Libraries

I would like to invite you to take part in a research study. Before you decide whether you would like to take part it is important that you understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and discuss it with others if you wish. You may contact me if there is anything that is not clear or if you would like more information, by contacting me at pablo.calvo@city.ac.uk

What is the purpose of the study?
This study is looking at public library services that are creating spaces which give their users access to innovative digital manufacturing equipment. These types of spaces often have a variety of names, such as Makerspaces or Fab Labs. Many libraries in the UK are creating these new services, and the aim of this study is to find out what sorts of activities are taking place, and how these benefit the people using them.
This project is being done as part of my Master degree in Library Science at City University London, to be completed in January 2017.

Why have I been invited?
DigiLab has been invited to participate because it has a maker space associated with a public library service, gives access to a wide range of digital equipment and has been open for more than 6 months. You should be able to provide insight into how people use DigiLab’s facilities, and be able to share some of the lessons learnt in running the space.

Do I have to take part?
Taking part in the project is voluntary, and you can choose not to participate in part or all of the project. You can withdraw at any stage of the project without being penalised or disadvantaged in any way.
It is up to you to decide whether or not to take part. If you do decide to take part, you will be asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen if I take part?
- DigiLab will be used as a case study for the project. The researcher Pablo Calvo will visit DigiLab to view the facilities and to interview people responsible for running the space. For example, this may be the people who founded the space, volunteers or library staff. Any participants agreeing to be interviewed would have to be aged 18 or above, and each agree to sign a consent form.
- Interviews will take between 30 minutes to an hour. They will follow a semi-structured format, discussing what facilities and activities you offer users, and how people interact with the makerspace. Pablo will be taking notes and an audio recording of the discussion.
- Accompanied by a member of the makerspace, Pablo will view the facilities and equipment, and take photographs to illustrate the final report.
- The research project will end in December 2016

What are the possible benefits of taking part?
Taking part in this research could help raise awareness about the benefits of digital making in libraries, by creating an understanding of how your maker space works, and how it benefits your users. Taking part could help other library services in the UK to launch similar services for their communities.
Will my taking part in the study be kept confidential?
You can decide whether to be identified in the final report by name, or only by a description of your role in the library/maker space, such as participant, volunteer or organizer. No other personal information, such as contact details, will be published in the final report. If collected, any other personal information will be stored in a password protected document, which will only be accessed by the researcher, and will be deleted after the project is complete. Audio recordings will be transcribed, and the original recording deleted after the project is complete.

What will happen to results of the research study?
The results of this study will be written up as a dissertation for a Master Degree in Library Science, which will be stored by City University London. If the study is included in any future publications, such as a journal article, the same level of anonymity chosen by you will be maintained.

What will happen if I don’t want to carry on with the study?
You are free to withdraw from the study without an explanation or penalty at any time.

What if there is a problem?
If you have any problems, concerns or questions about this study, you should ask to speak to a member of the research team. If you remain unhappy and wish to complain formally, you can do this through the University complaints procedure. To complain about the study, you need to phone 020 7040 3040. You can then ask to speak to the Secretary to Senate Research Ethics Committee and inform them that the name of the project is: Creating a Library Makerspace: Evaluating the Value of Digital Making in Public Libraries

You could also write to the Secretary at:
Anna Ramberg
Secretary to Senate Research Ethics Committee
Research Office, E214
City University London
Northampton Square
London
EC1V 0HB
Email: Anna.Ramberg.1@city.ac.uk

City University London holds insurance policies which apply to this study. If you feel you have been harmed or injured by taking part in this study you may be eligible to claim compensation. This does not affect your legal rights to seek compensation. If you are harmed due to someone’s negligence, then you may have grounds for legal action.

Who has reviewed the study?
This study has been approved by City University London Research Ethics Committee

Further information and contact details
Researcher:
Pablo Calvo
Pablo.Calvo@city.ac.uk

Project supervisor:
Dr Lyn Robinson
L.Robinson@city.ac.uk

Thank you for taking the time to read this information sheet.
Appendix 9.6  Participant Consent form

Creating a Library Makerspace: Evaluating the Value of Digital Making in Public Libraries

Please tick box

1. I agree to take part in the above City, University of London research project. I have had the project explained to me, and I have read the participant information sheet, which I may keep for my records.

I understand that the research will involve:

- granting access to the researcher Pablo Calvo to the makerspace, and allowing him to photograph the facilities and equipment
- being interviewed by the researcher, and allow the interview to be audiotaped
- activities in the maker space being observed by the researcher
- agree to answer further questions after the site visit by email or phone if required

2. This information will be held and processed for the following purpose:

- I understand that I have given approval for my name and/or the description of my role to be used in the final report of the project, and future publications.
- Audio recordings of interviews will be transcribed, and the original recording deleted after the project is complete.

3. I understand that my participation is voluntary, that I can choose not to participate in part of or all the project, and that I can withdraw at any stage of the project without being penalized or disadvantaged in any way.

4. I agree to City University London recording and processing this information about me. I understand that this information will be used only for the purposes set out in this statement and my consent is conditional on the University complying with its duties and obligations under the Data Protection Act 1998.

5. I agree to take part in the above study.

Name of Participant ___________________________ Signature ________________ Date ________________

Name of Researcher ___________________________ Signature ________________ Date ________________

When completed, 1 copy for participant; 1 copy for researcher file.