# WHO'S IN AND WHO'S OUT: THE STATE OF THE FIELD OF THE UK MAKER MOVEMENT

## Emma O'Sullivan

# Abstract

The growing body of literature on the global 'maker movement' has highlighted the existence of a number of disparate conceptions of what a 'maker' is and what they do, which raises the problem of how to assess the potentials and limitations of the maker movement when the term 'maker' is used to refer to a wide range of people and practices. This dissertation presents the results of a case study into the values and practices associated with the term 'maker' in the UK in order to assess whether 'maker' constitutes a useful categorical term for the purposes of analysis and critique, and to question whether general perceptions of what makers do and what being a maker means affect people's ability to engage with the UK maker community. It concludes that conflicting conceptions of the term 'maker' has resulted in a lack of consensus on what activities makers engage in, making the term ineffective as an analytic or descriptive category. However, it also concludes that identification with the term 'maker' is not a prerequisite for participating in the maker community and utilising the opportunities it provides for personal and social empowerment.

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# 1. Introduction

Over the past five years or so the global 'maker movement' has attracted an enormous amount of attention in academia. A number of studies of the movement have explored its potential to facilitate informal learning and upskilling (Blikstein, 2013; Kuznetsov & Paulos, 2010; Troxler, 2011); public engagement with science and technology (Delfanti, 2013; Dickel, Ferdinand, & Petschow, 2014; Nascimento, 2014); technological sustainability (Kohtala, 2016; Maldini, 2016; Rosner, 2014; Smith, Hielscher, Dickel, Söderberg, & van Oost, 2013); entrepreneurship, innovation and new methods of manufacturing (Birtchnell & Urry, 2013; Halbinger, 2014; Gershenfeld, 2007; Troxler 2010); grassroots collaboration and peer production (Kohtala & Bosqué, 2014; Kostakis, Niaros, & Giotitsas, 2015); and the democratisation of technology (Pederson, 2016; Richardson, 2016; Tocchetti, 2012).

However, what this growing body of literature has highlighted is the existence of a number of disparate conceptions of just what a 'maker' is and what they do. Therefore, when we talk about 'making' and 'makers' we may be talking about very different things. This raises a particular problem for academia: how can we assess the potentials and limitations of the maker movement when the term 'maker' is used in scholarly literature to refer to a wide range of people and practices? In this dissertation I will present the results of a case study into the values and practices associated with 'making' in the UK in order to:

1. Assess whether 'maker' constitutes a useful categorical term for the purposes of analysis and critique in this country and challenge the utility of 'maker' as an analytical label.

2. Question whether general perceptions of what makers do and what being a maker means affect people's ability to identify themselves as a maker, and whether this in turn affects their ability to engage with the UK maker community and benefit from the opportunities it provides for personal and community empowerment.

Despite international connections between maker communities and the presence of formal and informal global maker networks[1], each national maker movement its rooted in a specific national political, industrial and creative history, and has its own key figures, organisations, events and funding opportunities that influence the interests and activities of its members. A qualitative case study approach focussing on the UK therefore enables the investigation of what 'making' means in a national

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1   For example the international FabLab network is coordinated by the Fab Foundation which emerged out of MIT's Center for Bits and Atoms, and the website http://hackerspaces.org facilitates communication amongst hackerspaces around the world.

context and whether findings from research on maker movements in other nations is also applicable to the UK.

A number of recent national and global developments make a case study of the UK maker movement particularly relevant at this point in time. Firstly, the number of communal workshops in the UK has mushroomed over the past five years. I will use the umbrella term 'communal workshop' to refer to hackspaces/hackerspaces, makerspaces, FabLabs, Men's Sheds, and other places that provide people with access to tools, equipment and machinery for making physical or digital objects, as this term emphasises the unifying trait of shared access that all of these workshops have in common despite their other differences in terms of what tools they provide, cost of access, membership requirements and restrictions, etc. There are now 65 hackspaces ("List of UK Hackspaces," n.d.), 19 FabLabs ("Fab Labs," n.d.) and 326 Men's Sheds ("Find a Shed," n.d.) alone across the UK, and the number of new workshops opening has increased year on year (Sleigh, Stewart, & Stokes, 2015). Secondly, there has been a resurgence of interest in handmade goods and artisanal crafts, and online marketplaces such as Etsy have exploded in popularity and opened up new global markets for makers to make a living by selling their work (Dellot, 2014). Thirdly, the term 'maker' is becoming more well known and is starting to enter the popular consciousness, and people outside the movement are able to develop their own perceptions of what being a maker means through exposure to coverage in the mainstream technology press. Finally, there is a perceived trend towards the corporatisation of communal workshops in the UK, exemplified by Barclays bank's Eagle Labs program that is turning disused bank branches into communal workshops. Identifying the current values and practices of members of the UK maker movement is therefore important in determining whether it remains a potential site of empowerment and collaboration, and to what extent this potential is emerging.

## 2. Literature Review

### 2.1. Defining the maker movement

The maker movement can be viewed through several lenses. In the US, the maker movement is centred around the publication of the popular *Make:* magazine which launched in 2005 and the subsequent proliferation of Maker Faires (a combination science fair, craft fair, and show-and-tell event where makers gives talks, run workshops and exhibit their creations) and TechShops (a chain of communal workshops that provide its members with access to fabrication and manufacturing tools). For the founders and key figures of this movement, 'Making'—typically with a capital 'M'—covers a very broad

church from engineering, electronics and digital fabrication to cooking, gardening and knitting (Anderson, 2012; Dougherty, 2012; Hatch, 2013).

On the other hand, the European maker movement is more indebted to the technological influences of the Chaos Computer Club (CCC) hacker collective and the hacklabs and hackerspaces that began springing up on the continent in the 1990s (*Hackerspaces*, 2008; Maxigas, 2012; Maxigas, 2014). There is a history of these politically-oriented hacklabs in the UK such as the Hackney Crack House, a squat where visitors "could learn to use free and open source technologies, network security and penetration testing" (Maxigas, 2012, n.p.), and also in the Technology Networks communal workshops that sprang up in London in the 1980s to support the movement for socially useful production (Smith, 2014). Modern communal workshops in the UK continue to have a technological focus (Sleigh et al., 2015), and existing literature on these workshops considers them as sites for improving people's engagement with and control over technology and enabling STEM (science, technology, engineering and maths) outreach activities (Dellot, 2015; Smith, Hielscher, & Fressoli, 2015).

'Making' also has traditional associations with craft and design practices in both the US and the UK (Dawkins, 2011; Dissanayake, 1995; Dormer, 1994). Recent studies of UK makers engaged in craft-based practices highlighted the modern conflation of 'maker' with 'crafter', and note how they promote wellbeing and empowerment in communities by engaging people in therapeutic crafting practices and provide alternative approaches to education "in which pupils can follow their fascinations with materials and gain confidence through the achievement of making something" (Schwarz & Nair, 2010, p. 7). However, digital technologies have also had a strong impact on the craft community in the UK: in a survey of over 2,000 craft-based makers, "well over half (57%) […] were using digital technology in their practice or production" (Burns, Gibbon, Rosemberg, & Yair, 2012, p. 8). The impact of Etsy on the craft retail market (Dellot, 2014) and the adoption of social media to build relationships amongst craft practitioners (Holmes, Greenhill, & McLean, 2014) also indicate that the permeation of technology may make these two spheres of the UK maker community less distinct than they at first appear. Despite this there is currently a lack of research that encompasses both the technology and the craft aspects of the UK maker community, which this project aims to address.

## 2.2. Group formation, membership and boundary work

As with other fields such as science, the boundaries of making and the activities and practices that it encompasses are demarcated by people working within the field (Gieryn, 1983): making, like science, therefore has no essential boundaries or attributes other than those ascribed to it by people within the

maker movement. However, making currently lacks the authority associated with science, along with a set of (perceived) cultural norms that enforce that authority (Merton, 1973). People outside the maker community are therefore able to form opinions about what constitutes making based on their own perceptions of the field, and by positioning themselves outside that boundary they can also influence the opinions of others regarding what does and does not belong under the term 'making'.

As theorised by Gieryn (1995), boundary work tackles the questions of where a particular field ends and where other fields begin, and of who gets to count as a practitioner in that field. Writing about studying boundary work in science, Gieryn argued that context is vitally important as it involves looking at "when, how, and to what ends the boundaries of science are drawn and defended in natural settings" (1995, p. 392). Studying the boundaries of making therefore involves taking a constructivist approach to research that considers how definitions of making and the practices it encompasses can vary across individuals, locations, and points in time, and are inevitably tied up with localised questions of interest and intent.

In thinking about how perceptions of 'making' and 'makers' affect people's sense of membership and belonging within the community, I will consider whether the maker movement can be seen as what James Paul Gee called an 'affinity group'. In an affinity group, members share "*allegiance to, access to, and participation in specific practices*" (2000, p. 105, emphasis in original) and "see[] the particular experiences connected to those practices as constitutive (in part) of the 'kind of person' they are" (2000, p. 106). In other words, membership of an affinity group plays an influential role on a person's sense of self and identity.

Since the maker movement can be viewed through a technological lens, this raises issues with women's ability to reconcile membership of the UK maker movement with pre-existing notions of their self (Lewis, 2015). The feminist technoscience writer Judy Wajcman (2010) argued that technology has been socially and culturally coded as 'male' which makes it difficult for women to see technology or technological practices as 'for them' (see also Cockburn & Ormrod, 1993; Ensmenger, 2015; and Wajcman, 2004). Numerous studies have looked at how women find it difficult to identify with or fit into STEM communities in general (Barbercheck, 2008; Cheryan, Plaut, Handron, & Hudson, 2013; Chimba & Kitzinger, 2010; Mendick & Moreau, 2013; Powell, Bagilhole, & Dainty, 2007; Rommes, Overbeek, Scholte, Engels, & De Kemp, 2007) and maker communities in particular (Beaudoin, 2016; Fox & Rosner, 2016; Rosner & Fox, 2016; Toupin, 2014), and this is reflected in the gender imbalance of communal workshop members in the UK: of the 60 workshops that provided gender statistics in a

national survey, over 80% had more male than female members (Sleigh et al., 2015). It is therefore essential to consider how identification with and membership of the UK maker community is influenced by embodied characteristics such as a person's gender identity.

Recognition and acceptance by other members of an affinity group is also an important factor in determining whether a person feels like they belong there. Identity theorists have noted that identity is produced through social relations, and how people are perceived and responded to by others has a significant impact on their subjectivity and sense of self (Gee, 2000; Lawler, 2014). As Gee put it:

> Human beings must see each other in certain ways and not others if there are to be identities of any sort. If an attribute is not recognized as defining someone as a particular 'kind of person,' then, of course, it cannot serve as an identity of any sort. (2000, p. 109).

In order to identify as a 'maker', then, a person must both *see themself* as a maker and *be recognised by other makers* as a maker. These questions of recognition are closely tied to Pierre Bourdieu's (1979/1984) concept of cultural capital, a currency that helps individuals navigate society and alters the opportunities available to them. When a person possesses the right form of cultural capital in a certain situation it "allows its possessors to wield a power, an influence, and thus to *exist*, in the field under consideration, instead of being considered a negligible quantity" (Bourdieu & Wacquant, 1992, p. 98, emphasis in original): I will therefore also consider how a person's knowledge, skills and experience affects their inclusion and recognition within the maker community.

## 2.3. Potential for empowerment in the maker movement

Existing research has identified how the maker movement facilitates knowledge and skills sharing both within specific maker groups and between their groups and the wider public (Chan, 2014; Dellot, 2015; Hunsinger, 2011; Sheridan et al., 2014; Shrock, 2014; Smith et al., 2015; Wolf, Troxler, Kocher, Harboe, & Gaudenz, 2014). This knowledge sharing takes place in three forms:

1. Informally in physical spaces, such as during open access sessions in communal workshops where people can visit the workshop for free to get advice from workshop members or staff.

2. Online via email lists, wikis, blogs, social media, tutorial websites and instant messaging systems.

3. By providing training courses and workshops on a wide range of technical and creative topics.

The maker movement therefore provides numerous opportunities for Informal Science Education (ISE)

in both informal and semi-formal contexts. Recent research has identified several benefits of providing science and technology education in learning environments outside of the traditional school classroom settings: firstly, it can fill in the gaps of formal STEM education in schools where time, budget and pedagogical restrictions limit what can be taught to students; secondly, it can support lifelong learning amongst adults and school-leavers; and thirdly, it can help promote public engagement with science and technology (PEST) by "enabl[ing] learners to connect with their own interests, provid[ing] an interactive space for learning, and allow[ing] in-depth exploration of current or relevant topics 'on demand'" (Bell, Lewenstein, Shouse, & Feder, 2009, p. 11, see also Falk, Storksdieck, & Dierking, 2007; Falk et al., 2012; Fenichel & Schweingruber, 2010; Packer & Ballantyne, 2002; Rennie & Williams, 2006).

Research by Dellot (2015) and Smith et al. (2015) has already evidenced these benefits of ISE in communal workshops in the UK, therefore I will build on these studies to consider how communal workshops foster alternative pedagogical systems such as the 'distributed expertise' model whereby "[e]veryone in the community is an expert responsible for sharing his or her expertise with others" (Brown & Campione, 1994, p. 260), and the empowering potential of this system for its participants.

I will also consider Foucaultian concepts of power in relation to the focus on teaching practical and technical skills in communal workshops. Foucault (1975/1995; 1980; 1984) argued that, in contrast to traditional notions of power as a hierarchical top-down force operating on society by a monarchy or government, power is in fact distributed throughout society: while the operation of power can be most clearly discerned in institutions such as schools, prisons and mental asylums, power is also reproduced by ordinary members of society through the enforcement of social norms and conventions, and through broader societal structures such as capitalism and systems of labour. By disseminating alternative knowledges of practical skills that are not commonly taught in the formal education system and which don't conform to the controlled, experimental norms of official science, the maker community provides opportunities for individual resistance to systems of capitalism and consumerism. Foucault himself was suspicious of what he called "the effects of a power which the West since Medieval times has attributed to science and has reserved for those engaged in scientific discourse" (1980, p. 85), and resisted the idea that only 'scientific' systems of knowledge should be granted a legitimate status within society.

Finally, I will consider how maker practices illustrate the empowering process of creating physical and digital artefacts. The value of applying individual creativity to the process of making things with your hands has been championed since the work of John Ruskin and William Morris in the nineteenth

century (Gauntlett, 2011), and continues to attract the attention of cultural theorists and researchers (Dormer, 1994; Dissanayake, 1995; Crawford, 2010; Sennett, 2008). Ellen Dissanayake eloquently argued that:

> There is something important, even urgent, to be said about the sheer enjoyment of making something exist that didn't exist before, of using one's own agency, dexterity, feelings and judgement to mold, form, touch, hold and craft physical materials, apart from anticipating the fact of its eventual beauty, uniqueness or usefulness. (1995, pp. 40-1)

The benefits of this process have also been extended to the creation of digital objects such as websites and YouTube videos by David Gauntlett (2011). I will therefore illustrate examples of making that facilitate feelings of creativity, pride and empowerment within the maker community.

## 3. Methodology

A case study research approach was chosen for this project because of its appropriateness for investigating the conditions underlying complex social phenomena (Yin, 2014): in this case, the formation of a community of 'makers' based on a perceived set of shared characteristics, and the processes of identification or dis-identification with this community. Carrying out a qualitative case study at the national level enables the recognition of differences within the UK maker movement, but also allows for the identification of broader trends across the diverse groups and individuals that make up the community.

My primary research method in implementing the case study was conducting semi-structured interviews with nineteen participants drawn from across the UK (see Table 1). The interview method was chosen as it enables the investigation of concepts, ideas and assumptions and "allows us to capture the data needed for penetrating qualitative analysis without participant observation, unobtrusive observation, or prolonged contact" (McCracken, 1988, p. 11), thereby making it a time-efficient yet effective qualitative research method. A general interview schedule was prepared to guide discussion (see Appendix B), but the specific questions asked during interviews varied according to each participant's involvement in the maker community and room was left to explore other avenues of discussion that arose during interviews. Participants were also asked to fill out a short questionnaire in advance of the interview to gather basic demographic data and information on their practices and involvement in maker collectives and events in order to assist with data analysis by providing contextual information on participants' backgrounds and experience (see Appendix C).

| Name | Occupation | Affiliations | Describes themself as a maker? |
|---|---|---|---|
| Kinga | 3D design and craft student | Brighton Craft Fair – exhibitor | No |
| Simon | CEO | Maker Club (educational technology company) - CEO<br>Build Brighton (hackspace) - former member | Yes |
| Sarah* | Not provided | Southtown Hackspace* – trustee | Not provided |
| Nicola* | Electronic engineer & technical journalist | Southtown Hackspace* – trustee | Yes |
| Jason* | IT | Southtown Hackspace* – trustee | Yes |
| Mark | Film | Remakery (waste materials communal workshop) – trustee | No |
| Emma | Make-up artist & author | None | No |
| Jack | Games programmer | Brighton Mini Maker Faire – volunteer<br>Build Brighton (hackspace) – former member | Unsure |
| Andrew | Producer | Brighton Mini Maker Faire – producer<br>Maker Assembly (conference) – producer | Yes |
| Mairi | CEO | Handmade Alliance (textiles social enterprise) – CEO | No |
| Zoe | Director, artist, producer, maker | Institute of Making (university communal workshop) – director<br>Open Workshop London (communal workshop networking group) - founder | Yes |
| Jennifer | Project manager | Make It* (communal workshop) – project manager | Yes |
| Esther | Community manager | Makerversity – community manager | Yes |
| Karli | Jewellery designer & small business owner | Brighton Sellers Team (Etsy community group) – captain | Yes |
| Justin | Business development manager | The Factory (communal workshop) – business development manager | Not provided |
| Tony S | IT (semi-retired) | The Silvers Workshop (Men's Shed) – chairman | Yes |
| Michael | Product designer | Fab Lab Manchester – lead product designer | No |
| Al | Company director | BuildingBloQs (communal workshop) – director | No |
| Tony F | Director | Fab Lab London – director | Yes |
| *Name anonymised | | | |

*Table 1: Interview participants*

Sixteen of the interviews were carried out in person and three were carried out by telephone. Six of the participants were based in London, nine in South East England, two in South West England, one in the East Midlands and one in North West England: participants were drawn mainly from London and the South East as a large proportion of maker activity in the UK takes place in London (Sleigh et al., 2015) while the South East houses a diverse range of communal workshops (Nesta, 2015). All of the interviews were audio recorded, and varied in length from 15 minutes to 75 minutes. The names and/or organisations of some of the participants have been anonymised at their request, while the remaining participants provided permission to be identified in this report to facilitate contextual discussion of their work.

Most participants were chosen to represent a diverse range of maker sites across the UK including communal workshops, Maker Faires and craft fairs, maker businesses, technical and creative training providers, maker meet-up groups and higher education design departments, with the exception of one participant who came from outside the maker community. They represent a mixture of genders, ages, and experience levels. Some of the participants use the term 'maker' to describe themselves, while others do not or are unsure whether they would use the term. Speaking to people who do and do not see themself as a 'maker' and who come from both inside and outside the maker community provides insight into how different perceptions and definitions of the term 'maker' influence whether a person feels like this term is applicable to themselves and their practices. It was also important to include both technology- and craft-focussed participants in the case study as existing research has not bridged the gap between these two spheres to look at the UK maker community as a whole.

I took a semiotic approach to analysing the resulting interview data as this is concerned with "the way words, things, pictures and actions come to be 'signs', that is to convey meanings in particular times and at particular places" (Crang, 2005/2013, p. 227), and is therefore appropriate for emphasising contextual associations with the term 'making'. To do this, I intelligently transcribed the audio recorded during the interviews and then broke down the transcribed data in a spreadsheet into broad categories relating to my theoretical framework. I then coded the data in these categories to break it down further into themes such as 'community' or 'innovation' in order to draw out the wide range of meanings and associations linked to 'making'. The use of spreadsheet software and the breakdown of data into two levels of categorisation allowed for the sorting and comparison of data across participants to identify patterns both within and across these themes (Crang, 2005/2013).

# 4. Drawing a boundary around making

To investigate to what extent it is possible to define 'maker' practices I provided interview participants with a list of activities broadly related to making (see Figure 1). The list reflects common activities that take place in communal workshops and at Maker Faires or which are featured in *Make:* magazine, and includes a range of technical, creative and craft-based practices. I asked participants to comment on whether there were any activities on the list that they would not have thought of as maker activities in order to find out what kind of boundary work is being done around the term at an individual level (Gieryn, 1983; Gieryn 1995).

- Astronomy
- Biology / chemistry / physics
- Book-making and book-binding
- Ceramics
- Cooking / baking / brewing
- Digital fabrication / rapid prototyping
- Electronics / hardware hacking
- Engineering / mechanics
- Film-making / photography
- Gardening
- Glass-blowing
- Jewellery making

- Metal-working
- Painting / drawing / art
- Papercraft
- Programming / game development
- Prop making / model making / cosplay
- Quadcopter flying / racing
- Robotics
- Rocketry
- Sewing and textiles
- Wood-working
- Writing music

*Figure 1. List of making activities.*

Several participants who held a broad definition of the term 'maker' commented that they would include all of the items on the list as maker activities, or even that the list should be extended to include more activities. For example Zoe stated "I don't think there's anything that shouldn't be there, it's just a question of what more things should be there and are there". This is in line with her definition of a maker as "somebody who engages with materials by applying a process" and with her willingness to recognise even programmers and games developers as working with a "digital material", which is in turn informed by her deep engagement with materials as the founder of the Materials Library housed at University College London.

However for other participants who held a narrower view of making as involving working with your hands or making something tangible, this led to the exclusion of activities such as programming from their conception of making. For example, when asked to define what a maker is Andrew answered:

I would include anyone who makes anything with their hands. It's easier to talk about who I wouldn't include in some ways. I wouldn't include someone who's just writing software for example. […] It could be that your hands are operating a 3D printer, so you're not fabricating the thing directly, or you're holding a tool in your hands, so I'm not saying your hands have to be touching the material, but I do think it's a physical activity that involves physical engagement with materials.

As well as programming, other activities challenged by participants who held this view of making included the more cerebral and creative activities such as astronomy, quadcopter flying, gardening, filmmaking and photography, writing music, cooking, painting and the sciences. Different conceptions of what a 'maker' is therefore leads to a lack of consensus on what activities makers engage in, thereby making it difficult to draw strict boundaries around the maker community—though there was a general consensus amongst participants on the inclusion of most craft and manufacturing practices.

This leads on to the question of how people form different conceptions of the term 'maker', and the factors that influence this. In some cases, these definitions may spring from an individual's personal life history or world view: for example, as a Swedish person who was first introduced to the term 'maker' when she moved to the UK two years ago, Kinga's ability to associate a wide range of practises with the generic English verb 'making' may be due to her holding relatively few pre-conceptions of what constitutes 'maker' activities in relation to the UK maker movement. For British nationals, cultural factors may play a larger role in shaping their definitions. Two major cultural influences were identified by participants when talking about their perceptions of the terms 'maker' and 'making': firstly, the American *Make:* magazine which focusses on technology and DIY; and secondly the British tradition of design and craft.

One participant described O'Reilly, the original publishers of *Make:* magazine, as blending traditional male-oriented hobbyist magazines with the exciting new computer culture emerging on the West Coast of America:

They said "let's reframe this dad electronics stuff in the sphere of this Silicon Valley software engineering entrepreneurialism. And particularly the open source aspect of that. Let's turn it into a radical act and a thing about independence and the frontier spirit".

Today, *Make:* magazine continues to heavily feature projects centred around traditionally masculine activities such as electronics, programming, woodworking, metalworking and astronomy, as well as emerging new technologies like 3D printers and quadcopters, while its sister magazine, *Craft:*, publishes

fashion, textiles and art projects. By side-lining craft activities from *Make:* magazine, they therefore risk limiting the definition of 'making' to include only technological and manufacturing practices. However, as noted above, some participants were not comfortable with including activities like programming, quadcopter flying or astronomy—all activities heavily featured in *Make:* magazine—under the term 'making', whilst they were happy to include craft activities.

The UK maker movement therefore encapsulates a spectrum with what Zoe describes as the "West coast American computer geek" at one end and "a British tradition of art and craft" at the other. Al—the director of a communal workshop in north London—emphasised that this is a key component that makes it distinct from the maker movement in the US:

> I think in the States the maker movement is much more synonymous with the tech community, so the hackspace community, the hack community, the Fab community, where makers as a London concept has tended to embrace some very old-school practitions reaching back to trades that have venerable companies of guilds, so they include people who are part of guilds and have a tradition that goes back 600-700 years.

Ideas of what 'making' means in the UK are therefore influenced by a nationally specific history encompassing artisan guilds, institutions such as the Women's Institute, and an attitude of 'make do and mend' that emerged during the second World War, which is encapsulated in Tony F's comment that for him the word 'maker' is associated with "jam, knitting, crochet, brewing, trinkets, bodging and just stuff".

The result of this juxtaposition of technology and craft within the UK maker movement may be an inability to reconcile these two spheres under a single definition of 'making'. As Karli explained:

> I feel like in my head the term has two separate meanings. There's things like the Maker Faire in Brighton and when I go it's all digital and all people playing pianos made out of bananas and things like that. And then there's the craft side of it, and we also call ourselves makers but we don't do anything to do with what they're doing. So when you talk about makerspaces and hackspaces, I do see those as makers, but I see that as the more techie side of it. But it's weird as in my head they're two separate things even though they're the same word. When I say maker to describe myself I don't see it as encompassing any tech-type stuff.

Karli runs an Etsy shop that mainly sells lasercut jewellery, and her own practice utilises digital fabrication tools that are commonly found in communal workshops around the UK (Nesta, 2015). This

difficulty in reconciling her own use of technology with a concept of herself as being a maker on the "craft side" of the movement highlights the term as being highly problematic, complex, and individualistic, an issue that was also foregrounded in several participants' struggles to consistently define 'making' or 'maker' activities without contradicting themselves. For example Jack, a computer programmer, initially describes making as being "a physical thing, not like my job", but later goes on to admit that he's "redefined the term maker in [his] head several times already" after being exposed to different practises at his local communal workshop and Maker Faire.

This difficulty in conceptualising the boundaries of making even at an individual level, along with the fragmentation of the term into distinct conceptual spheres of 'technology/digital' versus 'craft', challenges the utility of 'maker' and 'making' as categorical terms both within academia and for people engaged in the maker movement itself: as Al puts it, "for me, because it's such a broad term I don't find it altogether useful". Tony F put this more bluntly:

TONY F:

You can almost associate anything with making, which is why the word is... yeah.

INTERVIEWER:

What were you about to say there?

TONY F:

Bloody useless. Excuse my French.

While 'maker' is therefore not useful as a general descriptive term, two key benefits arise for makers in not having strict boundaries demarcating their field. The first is the ability to utilise certain connotations associated with the term 'maker' to project a desired image of themselves and their work. For example, several participants with artistic or design backgrounds commented on the use of the term 'maker' or 'designer/maker' as a more professional-sounding alternative to 'craftperson'. Kinga noted:

On my course we have lectures about [the origin of the term maker] and it's a way to escape from the word craft, cos craft seems very negative, everybody has an image of what it is. On the design side it's used to make it sound better, that you do things but it's not the home craft knitted things or making cards at craft fairs, that you do something better.

In this situation Kinga and her classmates are being taught that they can utilise the term to reap the benefits of positioning their work closer to that of 'art' than 'craft', such as charging higher prices for their creations, attracting greater prestige, and the potential to be showcased in traditional art galleries.

As Gieryn (1983) discussed in relation to science, ambivalences in what counts as science can be exploited by promoting certain attributes in specific cases depending on the specific professional or personal goals a scientist is attempting to achieve. As with science, in making there are a lot of different practices and attributes that makers can select from when defining themselves, and makers can exploit this to use the term 'maker' in certain contexts that fit their own interests.

The flexibility of the term also means that individuals can resist specific interpretations of 'making', and indeed Kinga herself does not accept this interpretation of making as 'better' than crafting. For her, there is a distinction between the design processes and the building/manufacturing processes involved in creating objects. She defines the latter as making and the former as design, and places value on the process of designing objects rather than making them: "I don't think it's the actual act of making that makes people want it or want to see it or want to go and have it, it's something else, the design of it." She therefore rejects identification with the term 'maker' when describing herself as making is "just labour work" for her, but she may still utilise the term in a professional context to present a more 'respectable' image of her work.

The second benefit of including many different practices under 'making' lies in its ability to help facilitate knowledge dissemination and cross-fertilisation between different disciplines. Al commented on the construction of laboratories where scientists from different disciplines work together under the same roof to facilitate knowledge communities, and how they aimed to replicate this in their workshop:

> 'Cos if you can build that community of knowledge what you're likely to be able to do is break down the barriers, the silo thinking between different disciplines, and see much faster collaboration. And that happens socially like it does here at BuildingBloQs. If you happen to have people who know each other working in different fields and they start a bit of chit-chat and then they realise where the synergies lie in their work then that speeds up the dissemination of useful information from one silo to the next.

BuildingBloQs has a large workshop area housing woodworkers and metalworkers, and a separate fashion and textiles room within the same building (with a shared café area between them). Al provided an example of how housing practitioners from this mixture of disciplines under the same roof has led to knowledge sharing across disciplinary boundaries:

> When one of our furniture-making members needed some knowledge about how he's going to make his furniture he came to us and said "who do I speak to in the textiles department?". And we said "we don't know, go and speak to them". [laughs] He wandered through and was able to

find a couple of people that he could download some knowledge from in order to inform his making.

The process of doing boundary work is therefore not just useful for excluding certain things, but also for grouping things together. The fragmentation of knowledge into different disciplines is dysfunctional because it inhibits its utilisation and dissemination (Fisher, 1990), and existing research has highlighted how cross-disciplinary collaborations between scientists and artists can help facilitate idea generation and problem solving (Crafts Council, 2011). Drawing a line around diverse disciplines to group them into the same field of 'making' can therefore help to break down those barriers preventing the dissemination of knowledge.

## 4.1. Key Values of Making

Although there was no consensus on the activities and practices that makers engage in, four recurring values emerged relating to the UK maker movement:

1. knowledge sharing and education,

2. community and accessibility,

3. problem solving,

4. and the therapeutic benefits of making.

I will provide some brief vignettes here to illustrate the benefits of these values for personal and community empowerment.

### 4.1.1. Knowledge sharing and education

When discussing informal learning processes at Southtown Hackspace, Nicola provided an example of how all of the workshop's members contribute to a reciprocal network of knowledge and skills sharing:

> One of our older members, a lady called Margaret[2], says "I'm so interested in the idea but I can't really bring anything to the space", and I say "rubbish, you're really talented, shut up", then as if by magic Margaret mentions in passing "oh, I'm a weaver!" And suddenly Margaret is going to bring her loom in and she's going to show us how to weave. "How do you say you're not bringing anything to the space?". Everybody, no matter whether they think they do or not, whether they're into electronics or coding or all these rockstar things, everybody brings

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2  Name anonymised.

something to the space.

Classroom studies have explored the benefits of these 'distributed expertise' models, which simultaneously broaden the available knowledge base in a community and provide opportunities for its members to gain empowerment through sharing their own knowledge (Brown & Campione, 1994). Communal workshops therefore foster a 'community of learners' (Brown, 1994; Brown et al., 1993)—which Sarah, another member of Southtown Hackspace, describes as 'co-teachers'—who benefit from experiencing the validation of their own individual skill-set while simultaneously learning from others.

In a second example, Simon, who founded a technology education company that utilises "project-based learning" to teach children 3D printing and electronics, commented on the value of imparting practical and technical skills:

> There's something nice about using technology to better your life or to make things easier for yourself or to improve your conditions. It's the sort of thing where you can just buy it off Amazon, but there's a sense of empowerment where even if you don't do it very often you know that you can if you want to.

This focus on improving people's relationship with technology through self-paced, hands-on engagement—what other researchers of the maker movement have called 'tinkering' (Kera, 2014; Martin, 2015; Resnick & Rosenbaum, 2013; Vossoughi, Escudé, Kong, & Hooper, 2013)—gives learners the opportunity to work around dominant systems of education and to move from becoming dependant consumers to independent producers by imparting the knowledge required to develop their own technological solutions. Even if these opportunities are not always pursued in practice, there is a sense of power that comes just from possessing this knowledge and recognising its liberatory value in bypassing capitalist systems of control (Foucault, 1980).

### 4.1.2. Community and accessibility

The maker community creates opportunities for like-minded people with similar interests to meet up in real life or online, to make friends, and to socialise. Tony S, the chairman of a Men's Shed, explained that the social aspects are the primary reason for their workshop existing:

> It really goes back to the ethos of what we are, rather than being a makerspace as such we're a charity aimed at combating social isolation and depression in older men. We want it to be a social environment as much as a... The fact we use tools all the time and do things, as you can hear in the background, is not as relevant as it might be in a makerspace.

Although Tony S stressed that making activities are secondary to social activities in their workshop, there are other locations where the group could congregate or other activities they could engage in as a group, yet they have chosen to socialise in a workshop with wood-working, metal-working and electronics tools and machinery. Their making activities therefore appear to be a key facilitator for their social activities, possibly by providing a physical space to engage in shared hobbies or by providing an impetus to visit the workshop regularly to continue work on ongoing making projects.

Jennifer also described how maker groups can be accessible to newcomers with little prior making experience. When she began working as a manager in a communal workshop she was sent on a training course at a FabLab to learn how to use digital fabrication tools, and explained:

> The biggest thing is the encouragement that anyone can get involved with making stuff. When I first went up there I said "I'm not really a creative person, I've been more about academics and not really ever been arty or in that sort of mindset", but from just being given the time to learn up there it makes you realise that it's a confidence thing.

The willingness of this maker group to include people who do not necessarily already possess specific knowledges or skills challenges the importance placed on cultural capital as theorised by Bourdieu (1979/1984), as it suggests that when joining a maker community little attention is paid to an individual's formal qualifications or their existing practical, technical or creative experience. Indeed, as discussed above, people who are more knowledgeable on a specific subject (who possess a specific cultural capital) actually benefit on a personal level from being able to share that capital with newcomers. This therefore reduces the barriers to entry to (some sections of) the maker community and provides opportunities for people to gain skills in new areas.

### 4.1.3. Solving problems

Communal workshops provide people with access to tools, machinery and knowledge for developing practical solutions to social problems. When I asked Tony F to tell me about any projects at FabLab London that he's been particularly proud to be involved in, he answered:

> It's a really common question, and we don't make a judgement about any particular project as it's about individuals, and individuals solve problems. One of the simplest ones somebody solved was a mother had bad arthritis in her hand, the person scanned the mother's hand and 3D printed a walking stick handle to remove the arthritis from that hand as she could keep it where the arthritis didn't hurt her. Now is that going to scale as a product? No. Is it world-

beating? No. Did it solve a problem? Yes.

While research on the maker movement has asked whether it can be useful in supporting or reinvigorating technological enterprise and manufacturing at local or national levels (Gjengedal, 2006; Lindtner, 2012; Lindtner, 2015; Stangler & Maxwell, 2012), for Tony F the emphasis is not on the scalability of a product created in the workshop or on its ability to be sold for a profit, but on how it can directly help somebody.

There are numerous other examples of communal workshops helping visitors during open access sessions who need assistance with a project or a solution to a problem: for example, members of the Build Brighton hackspace helped a visitor to build a customised wheelchair for their disabled pet, and members of the Silvers Workshop Men's Shed are currently building a library box for a visitor who is setting up a local free library. Innovation in communal workshops therefore does not have to involve developing new smash-hit products for market: it can also mean coming up with practical solutions for localised 'low-hanging fruit' social issues, and helping individuals get access to the tools they need to solve their own problems (see also Diez (2014), Kera (2012) and Schaub (2013) for examples of maker groups outside the UK who are engaging with their local communities to develop solutions to social, environmental and health challenges).

### 4.1.4. The benefits of making

The final value I will discuss here is that of the process of making itself: of the sense of pride and empowerment that comes from bringing something into existence. In her work running a social enterprise that taught textiles skills to day-release prisoners, Mairi commented on the contrasts between watching prisoners first learning to make things and her own experience growing up in a creatively stimulating environment:

> It's interesting when you meet people, prisoners, who've had absolutely no stimulation or encouragement their entire lives, so these bits just haven't been activated. And seeing people go "wow" and think through physical stuff. It's not a theoretical experience, it's a sensual and psychological one. I think that's the power of somebody making something and not coming at it through intellectual thinking. It can unlock something in people that they weren't necessarily aware of.

Although key texts on the personal benefits of craft and trade work focus on the satisfaction that comes from applying a skill (Crawford, 2010; Dormer, 1994), this example suggests that it is not necessary for

someone to be a skilled craft person to benefit from making something as the process of making decisions and crafting an object is empowering in and of itself. Through the physical engagement with materials, the making process itself is therefore a conduit for unlocking creativity in people with little previous experience of developing creative skills or exercising their own originality.

Justin also commented on the sense of satisfaction and pride that he got from his experience of making a log storer for his home:

> I had a need the other week... I've got a log burner in my house and I needed somewhere to put my logs, and I really enjoyed the process, I gathered up some raw materials and I designed and made a log storage place. I suppose it was really interesting, I was just doing that out of necessity and I wanted to do that in a personal sense, and I did get a lot of enjoyment out of doing that. I enjoyed there was a design process, a making process, an end product. I'm reasonably proud of my creation, I think it isn't too bad considering it's made out of reclaimed materials.

Again, in this case the application of a skill isn't as much of a factor as the sense of personal empowerment that comes from creating a functional object to meet a particular need—even when that is a small need like having a place to store firewood. As Gauntlett summarised, "making things for ourselves gives us a sense of wonder, agency, and possibilities in the world" (2011, p. 2): the act of making things, regardless of skill level, is therefore political in its ability to affect our sense of agency and control over our environment.

## 5. Identifying with the maker community

Although a wide range of practices and interests are demonstrated across the maker community as a whole, individual maker groups are made up of people who share a set of similar interests: for example in a communal workshop these interests may be based around the specific set of tools, machinery, and knowledge available there, and in a meet-up group it may be based around a shared practice such as selling handmade goods on Etsy. This set of interests is narrower in some groups than others which leads to the exclusion of people who don't share that set of interests, as Zoe illustrated with the example of a theoretical maker community focussed on the creation of replica props from the TV series *Game of Thrones*:

> Some spaces are niche, and have a group of people in them who are wonderful and love what they're doing, but are only interested in the things they're doing. They might be interested in

other things and have lots of interests, but other people might come there and go "I don't even know what *Game Of Thrones* is, this isn't the space for me", and they'll leave.

For a person to find their place in the maker community, it is therefore important for them to find a maker group that shares their own passions and interests in order for them to feel like it is a "space for them". Tony F also explained how having a shared passion is a more important factor in whether people get on with others than whether they share a broad self-identificatory term such as 'maker':

It depends if you're actually following their passion. If you're in a steam engineering workshop and you wander in talking about quadcopters it ain't gonna work. [...] I think you've gotta work out what people's passions are and why they want to associate with other people with the same passion, and it's more about the passion than about being makers that they have an interest.

In this sense individual maker groups are therefore an example of Gee's (2000) 'affinity groups', as they are made up of members with an allegiance to a set of shared interests or practices and because individuals who join those groups see those practices as closely tied to their sense of self. For example, when asked how he got involved in the Remakery Mark explained that it was because the organisation represented his own personal interest in reuse and material sustainability: "Fundamentally because of the reuse angle here, it's something slightly ingrained in me. I don't know why, but the idea of trashing things and permanently buying things is offensive to me." Mark's decision was therefore to join 'the Remakery' rather than 'a communal workshop' or 'the maker movement', as other workshops or maker groups would not necessarily have this shared value that makes them relevant to his own interests.

However, the ability to adopt a particular interest or passion is not apolitical as it is affected by a person's gender identity. This issue is highlighted in a conversation with Sarah and Nicola at Southtown Hackspace:

INTERVIEWER:
Do you feel like when you first came into the maker community like you were welcomed, like you fit in?

SARAH:
Nope.

NICOLA:
I definitely did, but it's because my background means I can talk the talk. I have the confidence

that comes with driving a 55-year-old car, I have the confidence that comes with having a blacksmith for a dad, I have the confidence that comes with being an electronic engineer. So I probably got an easy ride on that. Also, it helps being a bit older, I've spent most of my career in dot-com companies and that's a baptism of fire when it comes to kicking ass for oneself.

SARAH:

The movement needs to do a lot more for women, still. Most of the women who come here leave and there's nothing I can do about it.

This exchange highlights two points. Firstly, women who visit their workshop tend not to return or join up as members. Nicola's focus on her knowledge and experience regarding mechanics, metalworking and electronics engineering suggests this may be due to the activities that currently take place there being predominantly technology-focussed and therefore culturally coded as 'masculine' (Wajcman, 2010). Other workshops that provide a range of both technical and craft-based activities are more successful in maintaining a gender balance amongst their members, and Zoe explains how their curation of these activities at the Institute of Making contributes to their achievement of a 49% male and 48% female membership base:

You can be a member and not have to be into everything, but when something comes along that's for you... And we make sure that we curate that program, so one day we'll have an electronics / robotics / Arduino thing, then there'll be a sewing machine thing, then there'll be experimental pewter casting, then blacksmithing, then glassblowing, and it just helps to not keep it all for one type of person or community or point of view.

Secondly, and relatedly, difficulties in identifying with a community on the basis of certain embodied traits like gender can be overridden by other personal characteristics such as age, knowledge and family background. This can be very useful when countering already entrenched imbalances in a particular community: Nicola described how Southtown Hackspace are in the process of building a textiles room in the hope that this will attract more female visitors and members by "provid[ing] a nucleus of people like them when they come in"[3]. By attracting people who share the same interest, such as textiles, sub-groups can form within communities that provide an entry point for people who may otherwise not be comfortable or familiar with other practices taking place there: the "people like them" who make newcomers feel comfortable in the workshop need not necessarily be "like them" on the basis

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3    Although sewing machines and other textiles-related machinery such as irons are of course also technologies, they are typically not recognised as such due to the historical construction of textiles work as 'women's work' (Bray, 2007).

of gender, but on the basis of shared knowledge or interests.

Although individuals form their own personal definitions of 'makers' and 'making', they may also be aware that other definitions exist and that their idea of a 'maker' may not be what comes to mind when other people think of this term. Cultural artefacts such as *Make*: magazine and Maker Faires have influenced a general conception of 'making' in the popular imagination that people may consider when thinking about whether other people would recognise their own practices as making:

> The term has a general understanding which isn't shared by everyone, and it might feel like if I'm fiddling around with an Arduino that I'd feel like a Maker, as I think of that term, with a capital M, as drawing a line around certain activities, which aren't the same ones I'd draw a line around. It's a bit of shared language, so my own conception of what a maker is isn't the only thing I think of when I think of that word, I also think "what would other people think of this?"

Alongside a personal identification with the practices taking place in a maker group, a person must also therefore feel that their practices will be recognised and accepted by other members of their affinity group in order to feel like they belong there (Gee, 2000; Lawler, 2014). Emma explained how, for her, her writing and make-up artistry practices would not exclude her from being a 'maker', but that she doesn't feel other people would share this view:

> With writing you're still making things, you're creating, you're just not making something physical. You're making a story [...] Then with makeup artistry, maybe not so much with your everyday or bridal makeup, but when it comes to the application of prosthetics then you're making something, you're making bits of costume, you're making things that adorn the face, so in my mind I think they should both be attributed to being a maker, but I don't think other people would see it the same way. People who maybe don't realise.

As Gee noted, a person's attributes must be recognised by others as defining them as a "particular 'kind of person,'" (2000, p. 109) in order for them to consider it part of their identity: Emma's belief that other makers won't recognise her practises as making may therefore have influenced her decision not to identify herself as a maker, even though she personally sees her practises as making activities.

Staff members of communal workshops also struggled to describe themselves as 'makers' in comparison to some of the more highly skilled makers that they interact with in their work. For example Michael commented when asked if he considers himself to be a maker:

It almost seems a bit relative, as if I was in my normal group of friends I'd describe myself as a maker, but in comparison to some of the hardcore makers that I see week in week out the last five and a half years I've worked here, I'm not sure. I think I'm on the spectrum. That's probably the right way to put it. But not necessarily the hardcore... I'm really interested in designing and making, the designing as much as the making aspect, and I think that to some people I'd be seen as a maker and others I'd be seen as not quite as much of a maker as them.

There is a recognition here that different people hold different ideas of what 'making' means and what skill levels are required to be a 'maker', which Michael believes affects whether they would recognise him as a maker or as "not quite as much of a maker as them". A scale of 'makerness' may therefore exist in which people identify as a maker in some contexts but not in others depending on the specific people they are speaking to or interacting with.

Therefore, although there isn't a general consensus on what practices come under the umbrella term 'making' and although the label can include a wide variety of activities, individual and group perceptions of what being a maker means can affect whether people choose to identify with that term and apply it when describing themselves or others. Crucially though, participants' involvement in the maker community—or, since many of them do not associate with the term 'maker', their involvement in a loose network of workshops, meet-up groups, events, businesses and training providers focussed on championing technical, creative and craft-based practices—depended not so much on their identification with a specific conception of 'making' as on their identification with the four values of personal and social empowerment shared amongst this network. As an example of this, Michael described why he preferred to work at Manchester FabLab over other product design companies in the area:

I've always thought it would be quite nice to get into teaching but I'm not sure if I'd want to do it all the time and if the people would drive you crazy or not. What's nice about working here is the mix of "yeah you've gotta do commercial stuff" so you've gotta have the right skillset and keep pushing yourself, but there's also the non-commercial stuff which is more to do with the people and getting the most out of people. That's interesting too.

The opportunities that working at the FabLab provides for developing both his own skills and those of others therefore help Michael to pursue his personal goals and interests, regardless of whether he considers himself to be a 'maker' in this environment. This suggests that identifying as a 'maker' is therefore not a prerequisite for being able to benefit from the opportunities provided by specific maker sites such as communal workshops, or by the wider maker community in general.

# 6. Conclusion

It is now possible to return to the questions outlined at the start of this dissertation and review them in light of these findings:

1. Does 'maker' constitute a useful categorical term for the purposes of analysis and critique in this country?

The influence of various different cultural factors from the fields of both technology and craft has resulted in a diverse range of associations with the term 'maker' in the UK. This has led to conflicting conceptions of the term amongst individuals (and sometimes within individuals) and a lack of consensus on what activities makers engage in, although there was a general agreement on the inclusion of most craft and manufacturing activities.

This inability to draw a decisive boundary around what constitutes 'making' results in the inclusion of a very broad range of activities and interests in different contexts and areas of the community. While this provides positive opportunities for makers to facilitate knowledge dissemination across disciplinary boundaries, it makes the term too nebulous as an analytical or descriptive term. Studies of the 'maker movement' therefore need to be aware of the highly contextual and contested nature of this term in the specific community or area they are studying, and to qualify and define the term in relation to the boundaries of their specific piece of research.

2. Do general perceptions of what 'makers' do and what being a 'maker' means affect people's ability to identify themselves as a maker, and does this affect their ability to engage with the UK maker community and benefit from the opportunities it provides for personal and community empowerment?

The association of a wide range of different practices and attributes with the term 'making' enables people from various disciplines and with various interests to describe themselves as a maker, even if this is only in certain contexts where the use of this term is beneficial in pursuing a specific goal. However, the perception of a shared cultural notion of 'making' can affect whether individuals see themselves as a maker or feel that others will recognise them as a maker, thereby preventing them from identifying with the term.

The key finding is that identifying as a 'maker' is not a prerequisite for participating in the maker community and for utilising its potential for personal and social empowerment. Rather than identifying with a specific notion of 'making', more important factors in engaging with the maker community are

finding a group that shares a specific passion or interest and embracing shared community values around the benefits of making things and of building communities to share knowledge and solve problems.

The use of the term 'maker' is political as it includes people in certain contexts and excludes them in others. While in some cases the term may enable people from different disciplines and backgrounds to form a unifying social group, in others it may prevent people from joining that group because of pre-existing conceptions of what 'making' means and who it applies to. The term may also be too broad to be useful in gathering people together to pursue a specific goal or activity. The use of terms such as 'maker' and 'makerspace' should therefore be carefully considered in relation to a group's collective goals and the types of people they are aiming to draw in to their community. As the UK 'maker movement' continues to grow, fragment and diversify, these questions of self-definition and the choice of identificatory terms will become an increasing concern in attempting to maximise the reach of the community's shared, positive values.

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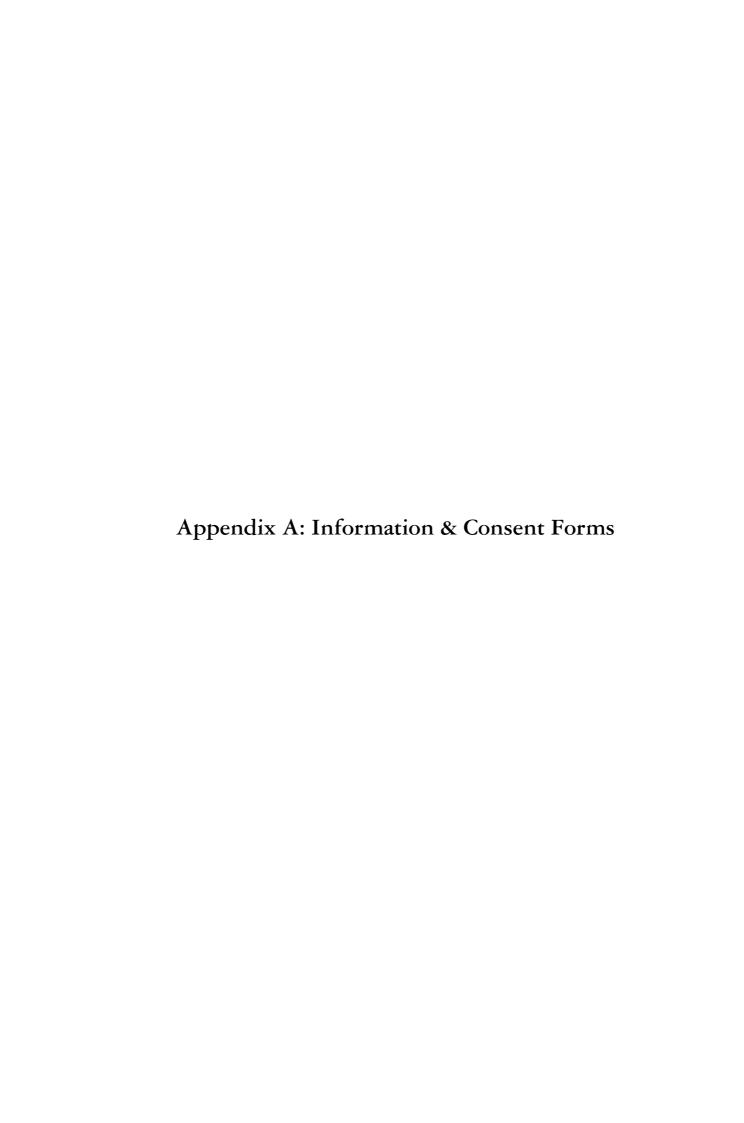Sheridan, K. M., Halverson, E. R., Litts, B. K., Brahms, L., Jacobs-Priebe, L., & Owens, T. (2014) Learning in the making: a comparative case study of three makerspaces. *Harvard Educational Review, 84*(4), 505-531.

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# Appendix A: Information & Consent Forms

# PARTICIPANT INFORMATION SHEET

## PROJECT TITLE: The State of the Field of the UK Maker Movement

I would like to invite you to participate in a research project that aims to identify the values and practices attached to the term 'maker' in the UK at this point in time, whether/how these have changed over the past decade, and how perceptions of the term 'maker' affect people's identification with and membership of the maker community. This information sheet has been put together to help you decide whether or not you wish to take part. I would very much value your participation, but taking part is entirely voluntary. If you decide to take part you are still free to withdraw before Monday 1st August 2016 without giving a reason. If having read this information sheet you would like to find out more, or discuss any aspect of the project prior to deciding whether to participate, please contact the researcher (Emma O'Sullivan) using the contact details overleaf.

### WHO I AM

I am an ESRC-funded Masters student in the department of Science & Technology Studies at University College London.

### WHAT AM I RESEARCHING?

This research will lead to the production of my dissertation entitled "Who's In and Who's Out: The State of the Field of the UK Maker Movement" for the award of MSc in Science, Technology & Society. The research project aims to investigate what it currently means to be a maker in the UK, how the maker community has changed over the past decade and why different people identify as makers. It also aims to challenge the use of the term 'maker' in current scholarly literature to refer to a diverse range of people and practices, and to investigate whether these differences prevent meaningful study of 'makers' as a cohesive social group. This will be achieved by speaking to a diverse range of makers from across the UK from sites including makerspaces, FabLabs, Maker Faires, craft fairs and maker businesses, and also by speaking to people who engage in similar practices to makers but who choose not to identify with the term. Speaking to people from both inside and outside the maker community will provide insight into how perceptions of the term 'maker' influence whether a person feels like they 'belong' in the UK maker community or not.

### WHY WOULD I LIKE TO TALK TO YOU?

I am conducting interviews with 15 organisers of specific makerspaces, FabLabs, maker events, maker businesses and maker funding/support organisations, as well as 5 interviews with non-makers. As part of these interviews, I would like to hear about your own creative and technical practices, activities that take place in your organisation, your links with other areas of the maker community, your insights into the meaning of the term 'maker' and what it means to you, and your experience of any changes in the maker community over the past decade. Specifically, I am interested in learning about how different people within and outside the maker community define the term 'maker' and whether different definitions of the term lead to the exclusion of certain people from the community.

### WHAT DOES PARTICIPATION INVOLVE?

Prior to the interview I will ask you to fill out and return a short survey that will help to guide the topics of conversation for the interview. The interview will be pretty relaxed and informal. It will take up to 1.5 hours and will be audio-recorded. The audio recordings will not be distributed or broadcast and will be securely stored in accordance with UCL's Data Protection Policy and the Data Protection Act 1998 along with the completed survey forms.

**WHAT ARE THE POSSIBLE BENEFITS OR RISKS OF TAKING PART?**

I foresee no direct benefits or risks to participants of taking part in this research, but I hope that the results will contribute to open and informed debate on the subject of the potential opportunities and challenges faced by the UK maker movement.

**HOW WILL THE RESULTS BE USED?**

- The research material will be kept strictly confidential and will be available only to the researcher as specified above.
- Excerpts of research material may be made part of the final dissertation or included in conference presentations. You will have the opportunity to request an anonymised name for yourself and/or your organisation if you wish for your comments to remain anonymous.
- Any interview transcripts and research outputs (including the dissertation and conference presentations based on the research material) will be sent to you prior to distribution so that you have the right to veto information that should not be made public.

**WHAT ARE YOUR RIGHTS AS A PARTICIPANT?**

I would like to reassure you that as a participant in this project you have several very definite rights.
- First, your participation is entirely voluntary.
- You are free to refuse to answer any question at any time.
- You are free to keep your comments anonymous by request
- You are free to leave the project at any time before Monday 1st August 2016.

Please do not hesitate to contact me at any stage of the project.

Emma O'Sullivan
Department of Science & Technology Studies
University College London
emma.o'sullivan.15@ucl.ac.uk
00447xxxxxxxxx

This research project has received ethical approval in accordance with the UCL Department of Science & Technology Ethical Research policies and procedures, application reference number **STSEth094**. If you have any concerns about the way in which the research has been conducted, please contact the STS Director of Research who reviewed the project at jonathan.agar@ucl.ac.uk.

**THANK YOU!**

# CONSENT FORM FOR RESEARCH PARTICIPANTS

**PROJECT TITLE: The State of the Field of the UK Maker Movement**

I agree to take part in the above research project. I have had the project explained to me and I have read and understood the Information Sheet, which I may keep. I understand that agreeing to take part means that I am willing to:

- Be interviewed by the researcher

- Allow the interview to be audio recorded

I give approval for my name and my institutional affiliation (where applicable) to be used in the final dissertation based on the project and in further publications, and for results or comments included in the study to be attributed to myself and my institution unless otherwise requested. I understand that I have the right to request that my name and/or institutional affiliation (where applicable) are not used in the final dissertation based on the project and in further publications, and that results or comments included in the study can be anonymised on request.

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw from the project at any time up to Monday 1st August 2016 without being penalised or disadvantaged in any way.

I consent to the processing of my personal information for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998.


Name: _____


Signature: _____


Date: _____

# Appendix B: Interview Schedule

**Personal background**

- How did you get into your making activities? Did you have friends or family members who engaged in these activities when you were younger?
- Did you take any of these subjects at school, or were they offered at school?
- Did you study any of these subjects in higher education?
- How did you get into your current role?
- Do you do any of these activities as part of your job?

**Views on making**

- How would you define the term 'maker'?
- Are there any activities on this list that you would say aren't 'maker' activities?
- Where did you first hear the term 'maker'?
- Do you have any thoughts on where the term comes from?
- Do you think the meaning of the term has changed over time?
- How long have you thought of yourself as a maker?
- What are your personal goals as a maker?
- Do you have any projects that are particularly meaningful to you or that you're particularly proud of that you can tell me about?

**Community involvement**

- Have you ever visited a makerspace or had any contact with makerspaces through knowing people who are members?
- How did you get involved with your makerspace?
- Why did you decide to join?
- Do you have any links with other maker communities?
- Did you feel like you were welcomed into your maker community? Did it feel like it was easy to fit in?
- What kind of activities do people do in your maker community?
- Are there any particularly interesting projects that you can tell me about?
- What kinds of people are in your maker community?

**Event involvement**

- How did you get involved with maker events?
- What were you exhibiting?
- What were your main motivations in getting involved with the event?
- How was your experience of the event? Would you be involved with it again?
- What kinds of projects or activities were people exhibiting at the event?

**Wrap up**

- Is there anything you would like to redact?
- Are you happy for me to use your name and institution or would you prefer to be anonymised?

# Appendix C: Participant Questionnaire

# The State of the Field of the UK Maker Movement

## PRE-INTERVIEW QUESTIONNAIRE

DEMOGRAPHIC INFORMATION

What is your age?

How would you describe your gender?

How would you describe your ethnicity?

How would you describe your nationality?

Do you consider yourself to have a disability? If yes, please provide details.


ABOUT YOU

What is your occupation?

Would you describe yourself as a 'maker'? (Please delete as appropriate.)
YES    NO    UNSURE

Please specify how long you have been involved with any of the following activities:

| Activity | I have been doing this for... |
| --- | --- |
| Astronomy | |
| Biology / Chemistry / Physics | |
| Book-making & Book-binding | |
| Ceramics | |
| Cooking / Baking / Brewing | |
| Digital fabrication / Rapid prototyping | |
| Electronics / Hardware hacking | |
| Engineering / Mechanics | |
| Film-making / Photography | |
| Gardening | |
| Glass-blowing | |
| Jewellery making | |
| Metal-working | |

| | |
|---|---|
| Painting / Drawing / Art | |
| Papercraft | |
| Programming / Game development | |
| Prop making / Model making / Cosplay | |
| Quadcopter flying / racing | |
| Robotics | |
| Rocketry | |
| Sewing & Textiles | |
| Wood-working | |
| Writing music | |
| OTHERS: (Please add on extra lines) | |
| | |

Are you a member of any makerspaces / hackspaces / FabLabs / shared machine shops / open access workshops? If yes, please provide details.

Have you been involved with any maker events (eg Maker Faires, craft fairs, science fairs) as an organiser, exhibitor or volunteer? If yes, please provide details.

Have you attended any maker events (eg Maker Faires, craft fairs, science fairs) as a visitor? If yes, please provide details.

**THANK YOU!**