

Title: Researching the Digital Economy and the Creative Economy: Free Gaming Shards and Commercialised Making at the Intersection of Digitality and Creativity.

Introduction

The digital economy and the cultural and creative economy have drawn considerable attention in the late twentieth and early twenty-first centuries. Both are part of global economic shifts and both have been the focus of significant academic research as well as government intervention (Oakley & Knell 2007; Greenhalgh 1998). A growing body of research now recognises that these two economies intersect and that failing to attend to such intersections can contribute to confusion (Duffy 2016, Baym 2018, Cunningham and Craig 2019, DCMS2017). This article contributes further to the analysis of connections between digital and creative economies. We will first identify among relevant literature several issues of connection and disconnection, then we will examine two case studies one in creative making and one in online games and on this basis offer some further thinking on research into the connections between digital and creative economies. These case studies have been selected as, though they tend to be related respectively to the digital or creative economy, aspects of both economies are crucial to them.

Understanding the Creative Economy and the Digital Economy

We will consider key ideas about the creative economy and then the digital economy and, though a comprehensive survey of relevant research is impossible in the available space, key issues are clear enough to outline some failures to connect literatures as well as intersections. As with Duffy, Baym, Cunningham and others we aim to build on existing research into the two economies while noting where treating them separately may cause problems. (Duffy 2016, Baym 2018, Cunningham and Craig 2019) We will first look at debates about the creative economy or, as it is also known 'the cultural and creative industries (CCI)', and will then examine the digital economy. Following this we

will note studies connecting such themes, notably in the work of Duffy, Baym and Cunningham and Craig.

The policy history of the creative economy forms a key environment for understanding the development of debates about it. In the late 1980s and into the 1990s, several governments turned to ideas about creativity both identifying creativity as a contributor to national economies, particularly in several formerly primarily industrial countries looking to deal with globalisation, and in trying to promote culture (Garnham 2005). Research was conducted at national and international levels (Connor, Gill, & Taylor 2015: 3; Schlesinger 2017, Pratt 2007, Banks, Gill, & Taylor 2013: 1-3; McRobbie 2015: 28; Saha 2016: 45-49; Baker & Hesmondhalgh 2011: 3-6). As McRobbie notes in this debate, both academic and policy, the word culture faded to be replaced by creativity (McRobbie 2015: 38). Here a first issue arose because what defines or picks out the creative (and/or cultural) economy as a particular economic form? As is often recognised in this debate, any activity may have a creative moment. For example, Baker and Hesmondhalgh argue: 'To create is simply to bring something into being. "Produce" has a similar meaning but "create" has strong implications of newness, invention, innovation, making something afresh' (Baker & Hesmondhalgh 2011: 3). If any economic activity that 'brings something into being' is partly a creative economic activity then this might cover all economic activity, meaning that the point of suggesting there is a specific creative economy primarily needs be examining economic activities in which creativity is in some way a defining element (Gross 2020; Connor, Gill, & Taylor 2015: 5-6.) Distinctiveness is sometimes claimed through there being something intrinsically valuable in being creative which makes work in creative industries in and of itself valuable in addition to such things as wages, medical insurance, sick pay and so on (Florida 2019).

Creativity here becomes part of a particular kind of labour that characterises the creative economy. This labour is in some sense creative and is often characterised as being project based, with little or

no long-term commitment from an employer and focused on teams with other creative workers to produce a particular product or form of media. Creativity here is the fuel for work practices that embrace risk, entrepreneurialism and a search for self-fulfilment through work. The other side of this is work practices that often require long and intense working hours, low wages (once the number of hours are taken into account), no long-term security, a lack of work benefits and often a constant search for new work as projects fail or are completed (Pratt 2002; Banks, Gill, & Taylor 2013: 3-7; McRobbie 2015: 60-70; Banks 2019; Connor, Gill, & Taylor 2015: 9-11; Saha 2016: 20-23). This critique can be extended to examine whether such labour is also gendered, raced and sexualised (McRobbie 2015: 106-112). This argument often focuses on the supposed bargain of being offered work one has a passion for even though such work involves uncertain and poorly paid employment. For example, McRobbie and other authors (Harvey & Shepherd 2017) note the way 'passionate work' may be gendered, for example in the problems posed by 'bulimic' labour for women with children (Pratt 2002; McRobbie 2015; Connor, Gill, & Taylor 2015). Saha's analysis of race in cultural industries takes these points while moving the debate back to wider issues of culture and creativity by not only exploring raced dimensions of labour but by also examining the ways commodification is part of processes through which the creative economy produces racist cultures. (Saha 2016; Hesmondhalgh & Saha 2013).

Turning to the digital economy there is a similar point to that raised about the problems conceptualising the creative economy because having creativity in an economic activity by itself does not define that activity as part of the creative economy. For the digital economy this definitional question arises over whether the involvement of digital and internet technologies is enough to make an economic activity part of the digital economy. Such a claim would be problematic as nearly all aspects of the economy now involve such technologies and suggests a relevant question is whether there is a specific economic activity that is digital.

A further connection between these economies is that one theme in digital economy research has been labour, with a heavy focus on 'free labour'. This work analyses the practices of those like Google and Facebook who offer a free service and then collect information from those using the service to target advertising to individuals. This practice has both transformed the nature of advertising and implemented what is often considered to be widespread surveillance of anyone using these services (Dean 2012; 127, Zuboff 2019, Stark 2009: 209; anonymised 2020 [REDACTED], Nieborg & Poell 2018). Labour here often focuses on the freely given activities of those using a search engine or posting on social media, though it should not be forgotten that there is also the paid work of those in these corporations who curate and analyse data. When focusing on such latter workers a similar picture appears to that of labour in the creative economy, in which many workers risk their expertise in projects with little long-term security, for long hours and the lottery like hope of a major success (Scholz 2017; Gillespie 2018; Neff 2012). These kinds of labour need to be complemented in accounts of the digital economy with platforms that connect service users and providers, creating in the latter small armies of what are claimed to be the self-employed, whether driving a cab, delivering a takeaway or cleaning a home (Graham and Woodcock 2020; Ticona, Mateescu & Rosenblat 2018; Cant 2020).

Such forms of labour connect closely to forms of monetisation in the digital economy. First, the free labour debate relates to targeted advertising which is the basis for the major profits of corporations like Google and Facebook. The 'gig worker' appears where a digital platform is interpolated between a service provide and service user. Here large parts of the digital economy have been formed through the possible competitive advantage for a company based on de-regulation of requirements (like holiday pay or sick pay) other businesses must incur (anonymised 2020 [REDACTED]; Rosenblat 2019; Ticona et.al. 2018; Woodcock and Graham 2020). It can be argued that the digital economy begins to be distinctively defined when its forms of monetisation and labour are examined.

Research into the digital economy offers similarities to that into the creative economy. These can be seen when considering the labour that is employed in startups and digital companies, which has deep resonances to creative economy labour, and in problems conceptualising what might be distinctive about a 'creative' or a 'digital' economy. However, there are also differences. In relation to labour, for example, it is harder to see the labour of taxi drivers or of room renters as part of the creative economy. The monetisation strategies of targeted advertising and platform co-ordination of services similarly seems unclearly, at best, and entirely disconnected from, at most, the creative economy, yet are integral to understanding the digital economy.

There is some developing research that begins to establish both connections between the two economies and theories that integrate the two. Duffy's focus on labour offers a complex view and a foregrounding of gender, while also allowing her analysis to address both creative and digital economy literatures. She particularly establishes that gender is a core element of understanding this kind of labour that is simultaneously part of both creative and digital economies (Duffy 2017).

Baym's work on relational labour similarly brings together ideas about both the creative and digital economy around the area that they are most alike, labour and its relationship to creativity and revenue. Focusing on a quintessential creative economy labourer, musicians, Baym argues that the kind of labour musicians engage in is related to the digital socio-technologies necessary to nurture their audiences. This leads to integrating digital and creative economic factors into a particular kind of labour as theorised by Baym; 'musicians are involved in relational labor, by which I mean regular, ongoing communication with audiences over time to build social relationships that foster paid work.' (Baym 2015: 16, Baym 2018).

Cunningham and Craig focus on social media to explore economic and regulatory environments while retaining key concerns with social media entertainment (SME) and creator labour, primarily in relation to video delivery platforms such as Youtube. (Cunningham and Craig 2019; 277). They

develop a theory based on the concepts of a 'NoCal' practice of information technological development involving aggressive expansion, fast iteration of technologies and speedy audience growth with a 'SoCal' model of talent-driven, premium content marketed to a mass audience. (Cunningham and Craig 2019; 22) In this way, their work connects versions of the creative and digital economy mapped onto their conceptions of NoCal and SoCal. Their work productively uses this intersection but is also limited by the archetypes of NoCal and SoCal, neither of which captures their complexity. Together these two conceptual bases of their work leave significant sectors of both economies out and miss some key elements of the digital economy where creativity is a less certain element. Similarly, Poell, Nieborg and Duffy have brought together a characteristically digital research subject in information platforms with a focus on cultural products. They explicitly seek to take the work on platforms coming from, broadly understood, digital culture and internet studies research and ask what this means for cultural production. In this way, they take not so much from digital economy literature, for example the work of those such as Elder-Vass, Huws and others is absent, but from those like Gillespie, van Dijck or Srnicek whose focus is more on information platforms and their effects and then apply this to creative economy literature. Their work accordingly innovatively focuses on analysis of creativity and platforms and provides one way of developing the intersection of creative economy and wider digital research, while also not clearly attending to some issues found in digital economy research, such as monetisation or some digital forms of labour, that are not considered part of the creative economy (Poell, Nieborg and Duffy 2022, Nieborg and Poell 2018).

A further area of research where creative and digital economy arguments intermingle, often without drawing explicitly on these traditions of thought, is in research on specific sectors of commerce. In particular, gaming is an area where fundamental research intermingles ideas found in creative and digital economy research, with little concern for the place of such ideas in these other research programmes but with great concern for explicating gaming. T.L.Taylor encapsulates the reason for

this when describing gaming as 'From software to institutions to informal practices to meaning systems, gaming on the ground is constituted not through one vector but the intersection of many.' (Taylor 2012; 249). Taylor's work whether on massive multiplayer online games or on esports, demonstrates that the concepts needed to understand the complexity of gaming are similar to those we have outlined as constitutive of creative and digital economy work. For example, Taylor touches on user created content, profit and professionalisation, creativity in both design and play and inter-relations of corporations and communities (Taylor 2012, 2009). Similarly, Kerr's foundational analysis of gaming interrelates production of games, playing of games and policy about games to examine such topics as work rhythms in gaming production that are near-identical to the 'bulimic labour' identified in creative economy research (Kerr 2016; 97-11), the importance of player-generated content for commercial games (129-35), free-to-play and platform payment strategies that are identical to digital economy monetisation strategies (42&74) and the ways professionalisation and play intersect, particularly around her pathbreaking work on the emergence of 'community managers' in commercial gaming (119-24). And there is other similar work; for example, De Peuter and Dyer-Witthford's connection of gaming to biopower or Kücklich's notion of playbour that is akin to prosumer theory (Dyer-Witthford and De Peuter 2009, Witthford Kücklich 2002). There is also a sense in which Cunningham and Craig's work benefits from a similar focus, in their case on online video and Youtube in particular, which allows the concepts derived from creative and digital economy research to be inter-related because they can be seen within the dynamics of a particular sector or area of creative and digital activity and commerce. However, unlike Cunningham and Craig, much of the analysis in such sector based approaches is content to explicate their topic and does not address how this might help understand the creative economy, digital economy or their inter-relations.

Duffy, Baym, Cunningham and Craig and Poell, Nieborg, Duffy and the work on particular sectors like gaming, are important examples of work that has established a basis for examining digital and

creative economies together, though there remains considerable further work to be done. When compared to the wider creative economy and digital economy literatures, these analyses of the intersection of the digital and creative are both substantial and indicate they need for further work. This paper will contribute to furthering an inter-related understanding of these two economies by examining two case studies: online gaming and a DIY electronics manufacturing and sales company. These cases are chosen because they offer clear intersections of digital and creative economies. From this analysis we will be able to suggest further key areas where joint analysis of digital and creative economies would be fruitful.

Gaming

Online games are usually included in analysis of the digital economy, yet they lie at the intersection of digitality and creativity through their necessary combination of digital and internet technologies, which enable interactivity, networking between gamers and novel monetisation strategies (such as free to play), with the creative design of game experience, of objects in the game, of the game's story and so on. For example, in a fantasy game the swing of an Orc or Elf's axe relies on the digital technologies to allow a player to initiate it, to calculate the damage it does to an opponent and communicate that to other players. At the same time, the axe must be drawn and rendered, the Orc's or Elf's looks—down to arc of swing—must be visually presented. The same can be said for looting a store in Grand Theft Auto or for driving a Mariokart and so on. To explore this intersection and what it might tell us about both digital economy and creative economy research, we will focus on a specific segment of gaming in free shards.

'Free shard' has become a term for online games that offer a free version of an existing game, with shards a more general referent for the multiple copies of each world a game may run¹. The inherent ability to copy software means that reverse engineering code or leaks of game software may enable

people outside a game company to start a new version of an existing game. Free shards are a phenomenon that takes the creativity in making a game and then generates new copied versions of a game. We will recount two free shards of massively multiplayer online games (mmo): the Nostalrius server running World of Warcraft (Wow) and the Return of Reckoning server running Warhammer Online (Ror).

World of Warcraft was launched in 2004 and is still running in 2022. It had 12 million paying subscribers at its peak and has an enduring base of 3-5 million. Like many games Wow has seen a series of major updates, with new artwork, new areas, new skills, new battles and more. Many players over time felt that the updates were increasingly taking the game away from the playstyle, look and narrative that first drew them to the game (anonymised 2020 [REDACTED]; Toft-Nielsen 2019; Gilbert 2017). The game's owners, Blizzard, refused player requests to set up a separate game based on an early version. Into this gap between player demand and game supply came a version of Wow not controlled by Blizzard that was based on reverse engineered code that allowed volunteers to run a server, creating a game that looked like and worked essentially the same as the early commercial version of Wow (Toft-Nielsen 2019; Schlüter 2017; anonymised 2020).

Volunteers here produced a game that was free and accessible meeting a nostalgia driven demand from players with, at maximum, 10,000 concurrent players and a core development and management team of forty. This free shard was built on code available from previous attempts to reverse engineer Wow's code that began in 2005 that were combined with Nostalrius' new code to handle situations the original Wow did not allow (Schlüter 2017). Such nostalgia driven engagement connects with a growing concern for video game preservation, which mingles concern for industry professionals being able to access their past projects, libraries who may have to solve complex issues of storing games built around extinct technologies in part to enable research and players who, like

many in Nostalrius or in ROR, simply wish to access an old game, like watching a favourite old film (Lowood 2009, Winget 2011). We should pause at this point to think about the intermingled creativity and digitality of this situation. The preserved game can only exist because of the copyability of software and draws on the for-profit aims of Wow which enabled the very design and production of the game in the first place. The use of creative volunteer labour is an example of co-productive work relevant to both creative economy and digital economy literature, for example in concepts of user-generated content and of free labour (anonymised, 2017, Berry 2008: 80-96).

Nostalrius only lasted just under a year, as Blizzard took legal action against both Nostalrius' coders and the company hosting its internet connection. Despite a petition of over 200,000 signatures protesting Blizzard's action, Nostalrius was closed (Morrison 2016a, 2016b). Part of the nostalgic impetus to create shards like Nostalrius was that Blizzard had for a long time stated they would never open a 'classic' server of an earlier version of Wow. However, subsequent to closing Nostalrius, Blizzard launched just such a server in 2019 called Wow Classic. Blizzard subsequently reported a doubling in subscriber numbers in the period after the launch of Wow Classic (Minotti 2019). This launch was not simple and required design creativity as well as the obvious digital and internet skills, but this time from Blizzard's paid staff who sought to achieve what volunteers had already done. Such shifting meanings of labour, leisure, paid and volunteer point not only to many existing ideas in both digital and creative economy research but also to strong points of interconnection which need the two to fully explicate the meaning of the transition from Nostalrius to Wow Classic. Though this point may seem to separate issues of intellectual property from design and redesign, with property in Blizzard's hands and redesign in Nostalrius' community, this is not the case for though property was a power Blizzard asserted, the community's designs were dependent on prior design creativity from Blizzard's original game and then provoked further redesign from Blizzard in opening Wow Classic. The shift between Nostalrius and Wow Classic is an example of

issues relevant to both creative economy and digital economy literatures particularly about fan cultures, co-production contexts and for-profit companies (Banks 2013).

A second case of a free shard is the resurrection of a dead game, Warhammer Online². This game launched in 2008. It was another fantasy themed mmo, using existing lore, look and iconography licensed from Games Workshop's Warhammer fantasy series of tabletop gaming. This was a merging of a game design team (Mythic Entertainment) who were known for their design of the player versus player mmo Dark Age of Camelot with creativity from Games Workshop. Unfortunately, the game was marred by repeated bugs in software and unfinished content and did not prosper in the long term, starting with 800,000 subscribers but dropping quickly to 300,00, and being shut down in 2013 (Matulef 2013; Orry 2009). Within two years of this shutdown fans of the game, building on an existing codebase for emulating servers while also engaging in reverse engineering, launched a free server called Warhammer Online Return of Reckoning (Ror).

Ror persists to the time of writing (2022) with a subscriber base leading to, in its most popular periods, peaks of 2,000 players simultaneously online to, by mid 2022, peaks more often around 750. The developers and game managers, all volunteers, have persistently developed the game making ongoing changes. For example, the original Warhammer Online was built on a system in which players worked hierarchically by fighting other players to capture certain open world areas (usually called zones) that would lead to previously inaccessible zones being opened to players. Ror began by opening zones of different levels, and only over time added the progression to hidden zones. By late 2020 some content from retail remained unavailable but the full end content for player versus player content, characterised by battles that culminated in one realm taking the other's city, was operating as smoothly as most mmos. Moreover, all the regular features of a retail mmo were present, with weekly updates, balancing of abilities, bug fixes, staff (though volunteer)

and so on. Development has been such that newly designed items can be added with some sourced from players. Most spectacularly, in 2021 a significant update opened up two new major areas in a Dwarf city and an Orc and Goblin city, providing content that had never been available in the retail game. The volunteer developers explained that among the files they had found a nearly finished Dwarf city, which Mythic had never been able to release, and they had been able to add to it to create two new major areas.

Ror refuses any payment from players including donations or patreon style arrangements. The staff state that they gain income from ads on the game's website and request that players remove adblockers but that they want no other income. The reason given is that Ror is using Games Workshop content, that Games Workshop is believed to be a litigious company when protecting its intellectual property and that refusing all payment with no rival game (there is no other Warhammer mmo) means Ror is more likely to be left alone, and not suffer Nostalrius' fate. Monetisation is not then absent in this free shard but is present as a condition of the shard's existence, with refusal of more than minimal monetisation perceived to be key to its survival. Similar to the different kinds of labour the previous paragraph explored, we can see intersections such that separating out digital and creative elements would be difficult in understanding such events. For example, there is the labour of volunteers who released a Dwarf city based on the paid labour of Mythic employees, who themselves had first designed a city that never saw release but which languished in hidden code until enabled and updated by the free labour of volunteers.

There are in Ror significant connections of issues from creative and digital economy research. As to be expected from free shards reliant on volunteer fan labour, issues of co-production through fan and player activity are central. Further, Ror now mirrors the relationship between a game company and players through the relationship between the volunteer staff and the players. As a private server

the relationship is not exactly the same, particularly with forum moderators able to say that as they run Ror as a passion project then they can be strongly critical of players, such a position is not as easy to take for a subscription game. Indeed, many feel this has led to at times arbitrary punishment (to the extent that one blunt forum moderator has had a forum thread collecting their 'best' insults).

There is an intermingling of creativity and digital skills in this example, particularly in the coding that reverse engineered so much of a dead game to the point of creating major new content. For example, there were several occasions when volunteer staff asked the players to check if they had old versions of Warhammer Online software asking that they be sent in for staff to analyse. Further creativity is spent on developing the community into co-producers, from things like designing new looks for armor and weapons to mass bug collecting and testing on a test server. Ror by 2021 offered an experience not that different to many retail experiences of mmos (albeit with outdated graphics). For example, in a move similar to many commercial games, in mid-2020 in Ror new events offering new rewards were integrated with Twitch streamers, both creating an in-game event and seeking to leverage Twitch streaming as a kind of advertisement for the game to attract new players. Ror is then a private server resuscitating an old game that has through volunteer labour and creativity established an mmo that offers close to a retail gaming experience.

Even this brief examination of free shards suggests points where the creative and digital economies intersect. Culture and creativity can be seen in the co-production gamers engage in on free shards, feeding their nostalgia, and these seem almost identical to issues around digital labour that digital economy research examines. The embedding of inequalities through creative game design is something that happens in both, with race and gender characteristics baked in such that free shards simply reproduce them unthinkingly. (anonymised 2019; ████████) For example, Warhammer Online had one of the most sexist representations of women seen in any game in the Witch Elf character,

who is generally clad in a bikini and g-string, has Barbie-like physique and comes with gyrating pre-set animations (all even as a Witch Elf will be carrying several daggers, poison and is a high damage-dealer). Examining such gender representations using existing creative economy research would be relevant to digital economy research. (Nakamura & Chow-White 2013; Malkowski & Russworm 2017) Similarly, digital economy literature's attention to monetisation would benefit creative economies research, which sometimes suggests more of a focus on government policy than on the mechanics of profit. (anonymised 2020; Elder-Vass 2016) In summary, the case of free shards offers examples of connections and differences between digital and creative economies. Free shards foreground the ability of creative economy research to connect design choices and non-economic relations of power in ways digital economy literature does not always attend to, whereas the focus on forms of monetisation in digital economy literature offers a grounding in economic structures not always to the fore in creative economy analysis. Moreover, some examples suggest that the two are necessarily intertwined and need attention together, such as in the transition from Nostalrius to Woe Classic. Before taking these inter-relations further, it will be useful to look at a second case study in Adafruit.

Maker Culture

While online games have been generally included in analyses of the digital economy, conversely, maker culture tends to be linked to the creative economy (Luckman & Thomas 2018; Wen 2017; Lindtner 2014). Craft practices such as woodworking, knitting, sewing, and crochet, glassblowing, welding, and metalwork are part of a long pre-digital tradition of maker culture (Luckman 2015). Yet, 'making', as a broad range of DIY practices, increasingly merges aspects of digitality and creativity: this is partly due to the popularisation of craft-related electronics and machines like laser cutters or 3D printers (Smolarczyk & Kröner 2021) and partly due to e-commerce possibilities becoming accessible to individual makers (Luckman 2015). Digital equipment facilitates creative business

practices, and the latter co-shape emerging DIY technology in turn. The second case study accordingly complements the analysis of online games, by highlighting why we should not neglect intersections of digitality and creativity in sectors that tend to be seen as part of the creative economy. We do so by analysing *Adafruit*. Founded by Limor 'Ladyada' Fried in New York City in 2005, *Adafruit Industries* specialises in digital (open) hardware to be used in creative, DIY electronics practices, hacker and maker projects. It is a Minority and Woman-owned Business Enterprise (M/WBE), as certified by the public New York City small business services. Adafruit sells tech products developed in-house as well as devices produced by external companies, that are distributed online via its website (see Figure 1). The company will be mainly analysed through its web shop and digital content.

Despite 'crafts' being traditionally a creative industry domain (see Luckman 2015), and craft practices being a main driver for the products sold, digital expertise is just as important for *Adafruit*. As a technology manufacturer and e-commerce business, the company draws heavily on information technology expertise, in both development and manufacturing of electronics and in online sales. However, Adafruit does not merely produce and sell digital technology. Instead, it also shapes and is shaped by a craft-oriented culture of creative, technological exploration, for example with its electronics devices being marketed through narratives focused on creativity. This approach is embedded in a company image that stresses societal responsibility and solidarity with marginalised groups (see Figure 1). This business model requires creative input as much as it requires digital expertise. Creative labour and expertise are invested to design and market Adafruit's products, a strategy of creating a demand rooted in a culture of ethical making and techno-social exploration, which is not unlike the kinds of labour explored in Baym and Duffy's work.

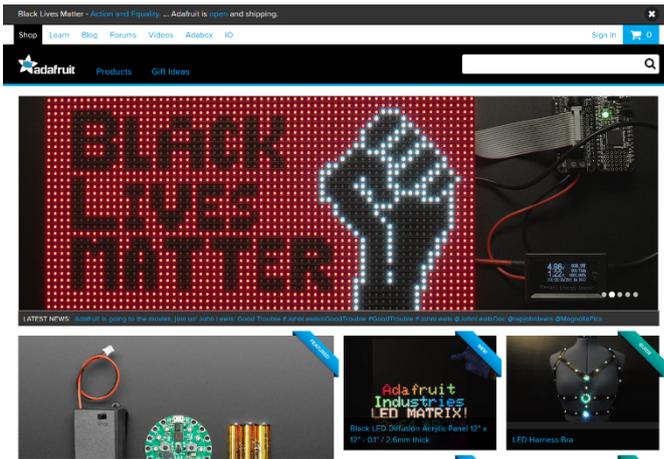


Figure 1: Front page of the Adafruit Industries website (www.adafruit.com, accessed on 10 August 2020).

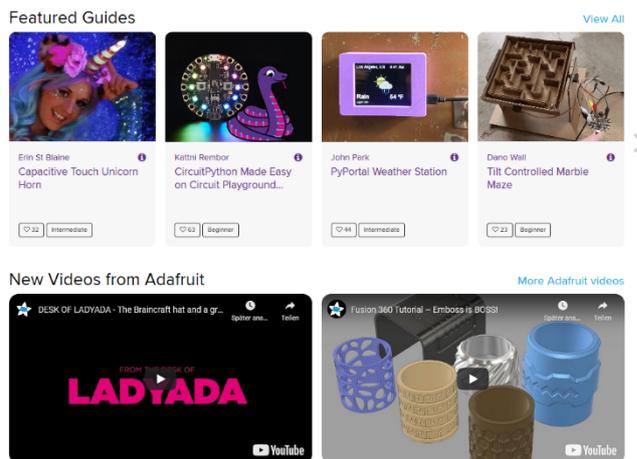


Figure 2: Guides and videos suggested in Adafruit’s ‘Learn’ section (<https://learn.adafruit.com>, accessed on 10 August 2020).

To understand *Adafruit* as a business, it needs to be contextualised within the maker movement and hacker (sub-)culture. The maker movement refers to a revival of DIY (do-it-yourself) facilitated by digital technology, often involving means of digital fabrication and electronics devices. While there certainly have been precursors, maker culture and the maker movement have been popularised

since the early 2000s (anonymised & anonymised 2017), the maker movement stresses not only ideals of creativity but also of inclusivity, as illustrated in slogans such as ‘Everyone can be a maker’. ‘Making’ has been established as a notion aspiring to civic, creative and hands-on, DIY practices as well as a means of developing digital expertise. Despite making having distinctive cultures of technological creativity and DIY, the term ‘culture’ is rarely foregrounded in maker discussions, rather ‘(creative) communities’ is often used. This tendency reflects the policy preference for ‘creativity’ over ‘culture’ discussed earlier, with here a key being the way ‘culture’ is associated with ‘diffuse theory’ rather than the innovation of ‘creativity’ (Baker and Hesmondhalgh 2011). This is understandable, yet symptomatic, when it comes to commercial communication. However, it is important to acknowledge the relevance of culture because the tech-heavy maker movement is grounded in a DIY ethos that intersects with hacker cultures. These are creative, civic computing communities with a passion for the ingenious (de-)construction of technological systems and open source/free soft- and hardware activism (for a more detailed perspective on hacker cultures see anonymised 2017). Both, hacker and maker (sub-)cultures are based on ideals of technological creativity, curiosity-driven exploration, and lifelong learning – which is reflected in *Adafruit’s* marketing efforts and lingo. The BBC’s Microbit for instance is advertised with the heading “Play, learn, explore”.

Apart from the ‘Shop’ page, *Adafruit’s* website menu features items such as ‘Learn’, ‘Blog’, ‘Forums’, and ‘Videos’. The blog and video (Youtube) content is made by *Adafruit*, as is the material posted under ‘Learn’. The forums include content created by *Adafruit* staff as well as user generated content and technical support – a theme extensively, though separately covered in digital and creative economy literature alike, as demonstrated by the previous case study. Users can browse specifically within the ‘Products’ section or look for ‘Gift ideas’, a section that links certain technologies to project and purposes. For example, users receive suggestions for “What to make over summer break” and “Kits and projects for educators”. The need for creative input becomes

particularly obvious when considering the web shop's emphasis on kits, guides, and project ideas. Rather than mainly presenting individual parts, the website offers themed combinations of electronics devices and accessories (Figure 2).

The 'LED Protest Sign' guide is an illustrative example (see <https://learn.adafruit.com/led-protest-sign>). It provides instructions on how to "build a protest/demonstration sign that can be seen at night." The images featured in the guide show the completed sign, with LED lights displaying the messages "Black lives matter", "George Floyd", and "Trans rights now" (Figure 1). Next to a short description of the project, the site links to all electronics needed from the Adafruit website and some additional material (e.g. yard stick, screws, zip ties). The guide draws on political and cultural events, notably the *Black Lives Matter* movement, and uses these as motivation for the suggested project. In doing so, it relates Adafruit to societal values, aligning the company with those fighting discrimination. This approach frames the selling of electronics by Adafruit as a means of solidarity and activism or 'craftivism' (Greer 2014). While the creative input is particularly clear when it comes to such guides as well as project suggestions and kits, even individual parts are advertised by making suggestions for customer's creative projects. For instance, the RGB LED Matrix starts with the description: "Bring a little bit of Times Square into your home [...]". The product entry then links to projects that can be realised using the LED part. While there are clearly digital and economic practices here, they would be poorly understood without acknowledging the connected creative practices (see also Saha 2016; Hesmondhalgh & Saha 2013).

The guides, project suggestions, and learning approaches presented on the website serve as a narrative for the electronics being sold. Creative expertise is required to produce a desire and demand for technological products. However, this expertise is not directly visible when looking mainly at what and how a company is selling. While considering Adafruit in the context of the

creative economy may highlight the economic relevance of cultural, creative, and artistic expertise, its separation from the digital economy might in turn increase the risk of undervaluing and exploiting creative labour. Authors such as Terranova (2000; Huws 2014) have long warned that creative free labour is crucial for the digital economy, and noted such labour is often invisible or framed as freely, benevolently, and joyfully given. The gendered logic behind devaluing certain expertise and professions has also been pointed out in this context (Hicks 2017, Duffy 2017). The Adafruit case study thus suggests that failing to understand interrelations between the two economies risks disadvantaging creative practitioners. Seeing the implications of a research and policy split between digital and creative economy on the one hand and the merging of relevant practices and expertise on the other when examining *Adafruit*, we therefore conclude that tacitly subsuming creative input within the digital economy, or neglecting digital economy aspects of creativity focused businesses are problematic alike. In the conclusion, we will elaborate on the interconnections between creative and digital economies and research about them that might help future work.

Discussion

Our aim has been to contribute to understanding the digital economy and the creative economy by highlighting possible benefits to be gained from the research programmes focused on these economies attending to each other. The two case studies have been presented highlighting areas of particular relevance to the debates about creative economy and digital economy research that we had already outlined. We have kept our analysis of the case studies short and focused to keep discussion to a reasonable length and to provide a clear analysis of the consequences of our case studies for bringing creative and digital economy research into conversation. While this somewhat truncates discussion of inter-relations between the case studies, we highlight in the below the key findings for our overall argument from these case studies. These conclusions must also, however, be suggestive rather than conclusive given the limited extent of research we have been able to present, however we argue that they are grounded in our case studies and suggest useful possibilities.

First, the attention in creative economy literature to relations of power would help digital economy literature extend its analyses which tend to focus attention on labour and economic factors. This is a point Duffy (2017) also makes when identifying labour as gendered. When analysing free shards, it was clear there were strong connections through creative decisions to issues such as race, gender, sexualities and so on. For example, we noted gender representation in Warhammer Online. Work such as that on the role of 'passion' in creative labour and how that relates to gender disparities would be a useful extension to understanding labour in the digital economy. It would particularly help in examining in more complex ways algorithmic and software-implemented inequalities of power.

This contributes to a second point our work suggests, because creativity and creative labour are important to the digital economy in ways that have not been fully explored in digital economy research. This is a point that echoes Cunningham and Craig's attempt to link software driven models of development with more Hollywood inspired models of development through premium creative products. As we saw in Adafruit, creativity exists sometimes merely as a taken-for-granted assumption, with its relevance and economic value not being acknowledged. Instead, the attention of much research is more on, for example, means of digital marketing and sales or relations between volunteer communities and technologies. The important point here is that the understanding of creativity in economic settings appears significantly more developed in creative economy literature.

Further, the focus in digital economy literature on monetisation, on the patterned and repeated ways that income and profit or loss are generated, is something that could be important to understanding whether there are characteristic economic structures in the creative economy. It can sometimes appear as if the creative economy is closer to a series of policy objectives that influence inputs to the wider economy rather than a specific economic activity in its own right³. The digital

economy literature, on the other hand, explores the ways we might think of the digital economy as a specific economic sector marked by new forms of monetisation. The example of games developing a ‘free to play’ way of generating profit or of the Google and Facebook success in offering a free service funded by data-driven advertising are examples of practices in which innovations that mark an economic activity can be identified. Our research suggested significant complexities here, for example in the different entanglements of profit motives and free labour in Nostalrius, Wow Classic and Ror. This accords with Poell, Nieborg and Duffy’s attention to what they call ‘business model alignment’ being undertaken in relation to information platforms by cultural producers. (Poell, Nieborg and Duffy 2022; 25-50) Such attention to monetisation is often unclear, if not absent, from creative economy literature.

It seems clear that creative and digital economy research are most similar and have immediate results to communicate to each other around issues of user generated content and labour. In both literatures the kind of freely given labour seen in free shards and in the maker movement are held to be constitutive of the economic phenomena under analysis. Indeed, this now appears from our work to be an area where it should be difficult to distinguish creative and digital economy research, with both concerned about volunteer labour, exploitation of labour, and intensity of labour particularly on ‘passion’ projects. This confirms the paths taken in Baym, Duffy, Cunningham and Craig and Poell, Nieborg and Duffy’s work. (Harvey and Shepherd 2017; Duffy 2017; Baym 2018, Cunningham and Craig 2019, Poell, Nieborg and Duffy 2022).

Conclusion

On the basis of our analysis, we argue that research into overlaps between creative and digital economy research is worth continuing to develop into a research programme that draws on the insights of both and generates a more unified understanding. We are not suggesting our list is exhaustive but the following are some of the ways our analysis suggest that such a programme

might benefit research into creativity and the digital: by understanding creativity better in the digital economy and how this may link to social inequalities; by examining strategies for monetisation that help identify specific economic structures; and by drawing together work on voluntary and paid labour and user generated content in both digital and creative economic practices.

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- 1 Many virtual world games cannot sustain all players being on the one server and so create multiple copies of the same world that are populated by different players. Each world will appear and act the same, but only a world's specific player population will be able to enter that version of the world. This spreads the load across servers, remembering that games often number over half a million players, with World of Warcraft at times over 10 million.
 - 2 Methodologically, the evidence about the free shard that is now discussed (Warhammer Online Return of Reckoning) derives from one of the author's one year of structured observant participation using virtual ethnography methods. This involved extensive playing, focused periods of visual and aural recording for close analysis, recording of chat logs for close textual analysis and examination of the official game forum. (Boellestorff et.al. 2012; Kaminski 2004)
 - 3 This is a point made to us by Mark Banks in discussing early versions of these arguments.