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Is digital upskilling the next generation our 'pipeline to prosperity'?

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Abstract

The British government is claiming digital skills will deliver economic growth to the country and social mobility to young people: its ministers call it 'a pipeline to prosperity'. While declaring this pipeline, the government assumes the needs of the economy and young people's needs are (or should be) synchronised. We challenge this assumption and the policy it sustains with data from questionnaires, workshops and interviews with 50 young people from communities in South Wales (including a former mining town and a deprived inner city area) about digital technology's role in their everyday life. We use a new typography to compare the reality of their socially and economically structured lives to the governmental policy discourse that makes them responsible for their country's future economic success. To explain these young people's creative and transgressive use of technology, we also make an empirically grounded contribution to the ongoing theoretical debates about structure and agency.

Keywords

Digital economy, digital skills, education, gender, social mobility, youth

Introduction

For three decades, successive governments have proposed that teaching young people digital skills and literacies will help advanced market economies compete with their rivals and deliver prosperity. In England, this agenda has been realised by the elevation of Computer Science to the National Curriculum for all children aged 5–14. This was a result of a campaign by a range of policy actors who saw their ambitions align through their discourse. Initially, computer science was romanticised via claims by actors such as Google's Eric Schmidt that there was a golden age of computing in the United Kingdom that policy makers were betraying (BBC, 2011). Computer science was also sold as an opportunity for self-expression, with the Royal Society among others suggesting that 'we aspire to an outcome where every primary school pupil has the opportunity to explore the creative side of Computing' (The Royal Society 2012: 4). In this sense then, creativity,

together with computing, was therefore 'put to work' through the deployment of power to encourage self-actualisation through being creative (McRobbie, 2014). Allied to this, computational thinking was framed by the Department of Education as an essential life skill. For example, 'a high quality computing education equips pupils to use computational thinking and creativity to understand and change the world' (Department for Education, 2013: 217). Finally, computer science's contribution to the economy was asserted (Department for Media Culture & Sport, 2017). Therefore, the creative use of technology was assimilated into a 'set of capacities' or skills that professionals acquire in order to participate in the labour market (McRobbie, 2014).

In response, scholars from the fields of Sociology and Education have argued that when it is understood through the application of economic logic, young people's technological education is problematically instrumentalised and subsequently diminished (Robins and Webster, 1989). However, in lieu of any reconciliation between these two positions, deterministic claims about digital skills have, through the intensified dis-course of risk, become the primary antidote to economic decline. Through this dis-course of risk, governments are being warned that 'exponentially disruptive change' (Schwab, 2017) (as the head of the World Trade Organisation describes it) is happening now and if they don't embrace it, rapid economic decay is inevitable (Manyika et al., 2013). Consequently, governments are presenting the digital economy as a 'leading light in an otherwise stagnant economy, increasingly to the point of becoming a hegemonic model: cities are to become smart, businesses must be disruptive, workers are to become flexible, and governments must be lean and intelligent' (Srnicsek, 2016: loc 180). Despite all the critiques of applying economic logic to education (Buckingham, 1998; Selwyn, 2003; Valentine and Holloway, 2002), the 'pipeline' has become the default metaphor in policy discourse to suggest the economy is a machine that feeds on a fixed, constant supply of digitally up-skilled youngsters. For example, in the United Kingdom, the government plan to:

Equip the next generation so we have a strong pipeline of specialist skills – from coding to cyber – to support the tech industry and drive productivity across the economy. (Bradley, 2017)

This story is retold across post-Fordist economies. For example, in the United States, President Obama's 'Computer Science for All' initiative promised billions of pounds of investment into the education system because computer science is a 'new basic skill' that is fundamental to economic prosperity (Smith, 2016: n.p.). The Trump administration agrees, in collaboration with some of America's technology corporations including Amazon, Facebook and Google, it has pledged a total of \$500 million to advance computer science in public schools (Kang, 2017). Similarly, Singapore has invested in its CODE@SG Movement: 'that will see coding and computational thinking taught from an early age to students such that it becomes Singapore's national capability' (Singapore Government, 2017).

In the United Kingdom, apart from rescuing the economy, against a background of ossifying social strata (Social Mobility Commission, 2017), young people are told digital skills such as learning to code will also improve their 'social mobility' (Smith, 2016). This further suggests an instrumental and deterministic relationship between young people's personal needs and the needs of the economy. This framing also asks young people to

believe we live a meritocratic country within which responding to the economy's needs by attaching themselves to the pipeline is an act of self-interest. It therefore pre-conceives young people's agency as the motivations of homo-economicus – a rational actor guided by the will to maximise their earning and spending potentials. Therefore, educational, technological, economic and policy discourse has become indivisible. At a policy level, it is no longer possible to discuss investment in young people, digital skills or educational technology without reference to the nation-state's economic prospects and individual ambition.

In this article, we are not suggesting that digital skills are not important, but we wish to draw attention to the highly problematic co-option of important intrinsic or civic benefits of digital engagement into economic discourse. We aim to challenge the determinist assumptions within the discourse that homogenises young people and promises them a route to social mobility. We do so by providing a rich qualitative analysis of how young people's practices are informed by a much wider social, economic and technical context that these discourses fail to acknowledge. We build on the relatively small body of work that has drawn on sociological theory in understanding students' digital practices (e.g. Beckman et al., 2014; Livingstone and Sefton-Green, 2016; Robinson, 2009; Sims, 2014) to critique the essentialist claims we have discussed above (Selwyn, 2012). In doing so, we intend to respond to the call for more nuanced theoretical discussions of the interplay between agency and structure when examining the relationship between young people, learning and technology (Li, 2016) and discuss the consequences for young people of normalising such a narrow instrumental and deterministic agenda for their digital education. To make our argument, we next formulate the analytical frame through which we interpret our data and challenge this agenda.

Analytical framing

The analytical frame for this article focuses on the core Sociological concepts of field, agency and a modified conceptualisation of habitus that accounts for forms of agency expressed in the data. A field is a relatively semi-autonomous structured domain or space, which has been socially instituted, thus having a definable but contingent history of development (Bourdieu, 1990). One condition of the emergence of a field is that people operating with it recognise and refer to its history of development (Bourdieu, 1990). Typical fields for young people include their family life in domestic spaces and life at school. The influence of the broader socio-economic field of class is also central to our analysis. Owing to the importance of this field, we deliberately selected schools in areas where students were likely to be Welsh working class. In our analysis, we therefore examine how different fields defined the affordances and boundaries that structured these young people's lives within the overall context of class.

Given its importance in this study, it is also necessary to conceptualise digital technology's presence in the lives of young people within this framework by referring to digital fields. To avoid a problematic binary distinction between online and offline (Valentine and Holloway, 2002), we aim in the discussion below to provide a more intricate analysis that perceives 'online practices as playing out at an intersection between a multitude of overlapping fields, some entirely web (or Internet) based, and others spanning mediated and co-present environments' (Herzig, 2016: 16). At the same time, in order to try to

neutralise the risks of exoticising digital technology's power to induce novelty (Selwyn, 2016), we are sensitised to each field's recent history of development.

Autonomy and power are rarely evenly distributed in any field (Bourdieu, 1990). In response, young people, like adults, 'orient themselves towards the field, or take their positions within a field, in light of their resources and dispositions' available to them (Warde, 2004: 12): this involves expressions of their agency. However, such a concept of agency, particularly in youth studies, is ontologically problematic (Coffey and Farrugia, 2013). It is often used as a 'heuristic, and a property of young people, evidence of which can be found in unexpected or idiosyncratic behaviours that defy external structural constraints' (Coffey and Farrugia, 2013: 5). This means that agency becomes a 'way of discussing young people's 'resistance' for researchers who have a normative commitment to critiquing the structures that young people are said to be resisting' (Coffey and Farrugia, 2013: 7). Thus, in this article, when identifying young people's agency, we are risking presenting an all too convenient challenge to the deterministic discourses about young people's future purpose in the digital economy. However, despite being mindful of this risk, we will demonstrate below that we do have strong evidence of teenagers' ability to adapt, strategize and reflexively engage within their fields. Furthermore, these fields included new digital spaces such as social media that their parents, when they were growing-up, never had access to. Thus, it is important for us to utilise a concept of agency that accounts for the embodiment of structures in young people's lives (the institutionalised cultures or fields they are socialised into and inherit) and yet also allows for young people's reflexive adaption to rapid technological change driven by the digital economy. This concept is called 'reflexive habitus' (Decoteau, 2016). Reflexive habitus synthesises Bourdieu's (1977) concept of habitus, which describes how practice and embodied skills shape an agent's worldview, with more explicit forms of reflexivity. The concept of reflexive habitus will be explained and developed in the analysis below, but first we present the methodology.

Methodology

This study took place in two economically deprived areas of Wales. Britain, and in particular Wales, is a strong case to locate the research; particularly with the economic anxiety rising as Britain prepares to leave the European Union (EU). Transforming young people into exponents of digital, the economy is presented as a solution to the economic uncertainty around Brexit:

As we leave the European Union, it will be even more important to ensure that we continue to develop our home-grown talent, up-skill our workforce and develop the specialist digital skills needed to maintain our world leading digital sector. (Department for Media Culture & Sport, 2017)

As noted above, the government in England has already begun 'equipping the next generation'. Computer science – or at least a version of it – is compulsory for every English state-educated child from the ages of 5–13. Similarly, the Welsh government is making its new curriculum available in 2018, which emphasises cross-curriculum 'digital competency' (Learning Wales, 2017).

The fieldwork took place in two schools in South Wales in two different local settings that are affected by similar structural inequalities. The first school (Green Valley) is a co-educational comprehensive school for 11- to 16-year-olds that is administered by the local educational authority. The school is in a former mining town (the last local colliery closed in the late 1980s). The local economy is characterised by light manufacturing, public services and small to medium service companies, and levels of unemployment and deprivation are slightly above average for Wales (The Office for National Statistics, 2017).

The second school (Bluebird Academy) is a public, comprehensive, co-educational, 11–19 Secondary School in a deprived area of Wales' capital city – Cardiff – that is at the forefront of the devolved government's digital strategy and investment in digital skills and infrastructure. Overall, unemployment rates in the two boroughs are similar, the largest employment sector in Cardiff is wholesale and retail trade (29,000 jobs) and there are around 5000 jobs in information and communication¹ (The Office for National Statistics, 2017). These then are two different embodiments of the educational field that are contained in the overarching field of class. The research design for this project was designed to provide us with a rich and multi-faceted insight into these young people's experiences with technology within the methodological frames of education and class. We administered a questionnaire to one year 9 (aged 13) and one year 10 class (aged 14) at each school and one year 12 class (aged 16) at Bluebird Academy (Green Valley had no sixth form) (n = 113). The questionnaire included items to measure aspects of social class. In all, 15% of the research cohort told us their parents or guardians had been to university and around 70% (77% of men and 66% of women) worked. These jobs were typically in the manual or service sector (e.g. builder, mechanic, driver, plumber, steel worker, shop assistant, barman, carer, hairdresser, cleaner) with a minority of more traditionally middle-class jobs (e.g. engineer, banking, IT consultancy). The survey also includes items about technology use and daily activities and interests. Following the survey, we carried out workshops to learn more about the cohort's digital practices by running one information, communications, and technology (ICT) class in a year 9 and year 10 group at each school. Activities in these workshops focused on gaming practices and the marketization of games; or asking students to draw mind maps to represent their digital ecospheres. Reflecting the structure of schooling in Wales, it is likely that the year 10s had a deeper interest in ICT than many of the year 9s, as they had opted to take ICT as a subject whereas for the year 9 groups, ICT was compulsory. Guided by the data above, we selected 10 students from each year group at each school for a semi-structured interview (n = 50) where students were asked a range of questions about their digital practices, motivations, ambitions and skills. Interviews took around 30 minutes each and took place within the school setting.

These data together with the conceptual framework were then used to develop a typology. The use of typologies is a well-established approach within the social sciences (Bailey, 1994). They have been used in quantitative studies of young people's uses of technology (Eynon and Malmberg, 2011) and are particularly valuable when trying to interrogate deterministic discourses about young people as they do not implicitly privilege one group or propose any kind of technological trajectory (Holmes, 2011). Here, we build a theoretical and empirically informed typology based on the ways that young people talk about and describe their technology practice. The interview data and workshop data were analysed thematically as a way to construct the initial typology and additional data from the survey (particularly around indicators of class, attitudes and

technological resources) were then used in a qualitative way to help test and refine the categories (Richards, 2014).

Findings

The discourse described in the introduction tacitly assumes young people's motivations and the class of conditions that influence these motivations are (or should be) universal. The discourse therefore also assumes a normative definition of digital technology and practice. Yet even the term social media embodies a range of technologies and motivations for using them (Alhabash and Ma, 2017). Digital technology's multifunctionality is mobilised by young people who have different personalities and socially shaped motivations, incentives and constraints guiding them.

Like most work that develops typologies of this nature, the groups are not clear-cut and there is some variation within each category. There were young people who moved between groups, some individuals who could identify with more than one group, and there are members of different groups who also socialised with each other. There were also some commonalities between all groups. For example, the vast majority owned a smart phone and used at least one group messenger service. As much as possible, we let the young people speak for themselves so that the themes and the five categories of orientation we identify were emergent rather than imposed by our preconceptions. Indeed, when students were allowed to form their own affinity groups in the workshops, their composition reflected our analysis, which suggests these groups may be meaningful to the young people themselves. However, each group used (or did not use) at least one digital technology in distinctive ways and that was having important consequences for their journey into adulthood. The terms we use to describe these groups – non-conformists, pc gamers, academic conservatives, pragmatists and leisurists – characterise each group's dominant orientation to digital technology (Figure 1).

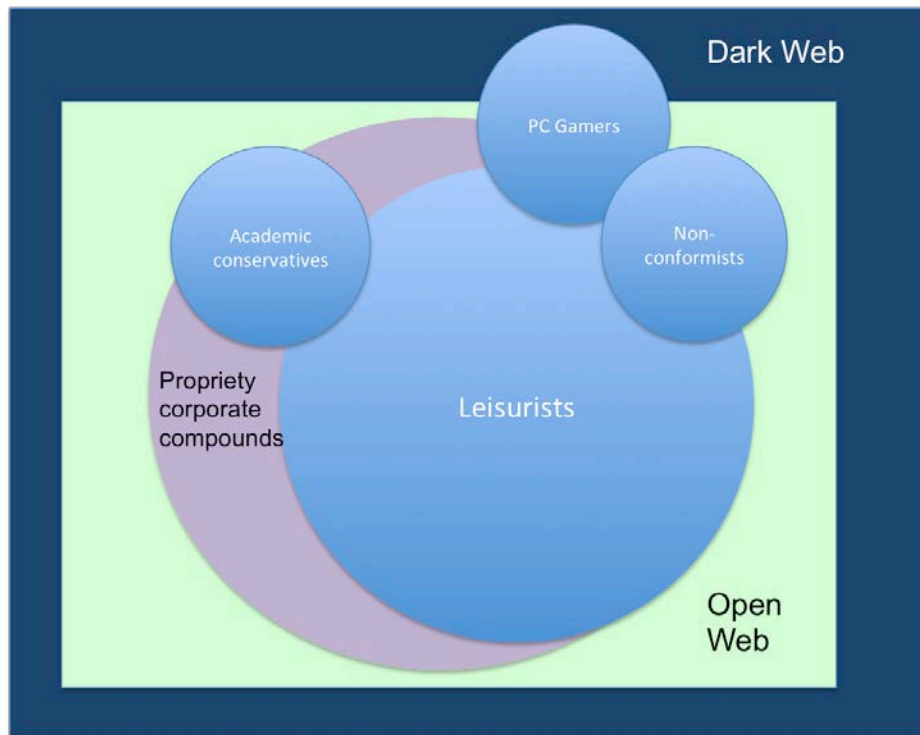


Figure 1. Young people's orientations to digital technology.

Non-conformists

The majority of non-conformists were young women. Our interviews were opportunities for them to articulate the richness of their digital lives. But there was a disjoint between their experiences when using social media and lives at school and discourses about their future. The non-conformists all shared a sense they did not fit into the school's prevailing culture but they found affiliates online. In their transition to adulthood (the majority of the non-conformists were 15 years old), they were using social media as a resource to develop their identity. For many of the non-conformists, the digital economy was included in this project. However, these practices were not (at least from the view point of these young people) directly linked to economic interests nor were they consistent with a self-willed subject presented in the discourses we describe above. The non-conformist's concerns were more immediate.

For example, the referendum on Britain's EU membership was a live issue during our research. One of the non-conformists, Abi, told us that contrary to the majority view in her community (her town voted to leave), she wanted Britain to stay in the EU. She said when she disclosed her views on social media she would be ostracised the next day in school. She told us the people she spoke to offline at school and at home were much more socially conservative than her close affiliates online. Despite her sense of dislocation, Abi was happy with her new emerging identity:

I think if it wasn't for things like Twitter, I wouldn't know as much as I do about things like feminism. (Abi)

By providing Abi with knowledge relevant to her gender and sexuality, the Internet, specifically YouTube, was also compensating for her lack of education elsewhere. It was acting as a conduit for the sort of knowledge parents and school are traditionally expected to deliver:

I'll watch videos about feminism or about things like that. There's a specific YouTuber) that does a lot of videos about feminism and about having safe sex and stuff. I learnt a lot from those videos. (Abi)

Abi and her friends drew confidence from the confirmation that there were more young people out there online who validated and supported her politics. As Elsie agreed, social media offered the non-conformists opportunities for self-expression:

I think that, like, you can express yourself a lot on there [...] I don't really know how to, like, word it [...] But, like, you can, like, show your true interests. (Elsie)

As her parents gave her more freedom, Abi began to meet her social media affiliates at concerts and YouTube conventions so that her digital identity (her true interest) was being authenticated (albeit episodically) away from the threat of social sanction at school. For the non-conformists, the Internet was an important and safer place to experiment with their burgeoning sense of identity. For example, Jess told us she and her friends play a dating simulator called Hunie Pop. These were modern versions of romantic photo stories that once appeared in magazines for teenagers but these stories allowed Jess to interact with characters, switch gender roles and explore dating norms. They also loved other role-playing games such as the survivor horror Amnesia and the adventure game Brothers. These were spaces where they could indulge and explore their emotions, make choices without suffering potentially socially harmful consequences of making them, and achieve a sense of closure that would be unavailable offline (or 'get a good ending' as they put it). They told us these games also gave them a 'sense of achievement' because they 'love problem solving'.

The non-conformists often talked about 'the butterfly effect': a metaphor played out in these games within which every tiny action has an unpredictable consequence deeper into the game's narrative. If we look at the broader context of these young women's lives, they were all having to make important decisions subject to options, careers and relationships. In many ways, they were rehearsing for the responsibilities of adulthood. They were socialising themselves into the 'risk society' (Beck, 1992) where they were told choices they were making at their age would have many unforeseeable consequences in later life: where 'the butterfly effect' would play out in reality. So, this is not a case of online/offline fragmentation where they lived a life of virtual consolation. The circuitry here is complex and recursive: the non-conformists' activities online were giving them confidence to challenge the constraints on their imagination offline.

Despite the discourses that stress the need for coding skills to 'get on' in the digital economy, none of the non-conformists were interested learning to programme. When their practices were orientated towards the digital economy and aligning with constructions of a digital entrepreneur, it was on the non-conformists' own terms. Abi, for example, wanted to be a music blogger/journalist, she told us 'it's just the case of having the confidence to do it'. Elise discovered Korean culture online (via her music tastes) and

then began learning the Korean language via Rosetta Stone and blogs on Tumblr because she would like to 'move out there and teach English'. To get work experience, Gemma had, via the Internet, contacted a company in Japan that produces anime art and was getting paid for commissions. As she explains,

So I've been doing that for I think about four months now so and they just send me cheques through the post. But it's kind of weird because my parents don't like anime at all and so they kind of don't know that I've got this job thing. So I've kind of got to sneakily take the cheques out when I'm going out with my friends to town and just cash them in in the bank but they don't really know (laughs) so that sometimes gets a bit awkward.

Only her trusted close friends knew about this arrangement. She was concerned her parents would find out because they were 'completely against social media' so she would 'never talk to my parents about it (her job)'. Gemma, like other non-conformists, was operating outside her community's norms. So, while their lives in school were constrained, being online afforded these young women opportunities for self-expression, experimentation and transgression.

They had a liberal, global cosmopolitan outlook that often produced problems for them. The specific lack of synchronicity between their educational and their digitally enabled pastimes that can be seen here creates boreholes in the pipeline to prosperity model.

Pc gamers

As the name suggests, this group, who were made up entirely of young men, were characterised by significant engagement with pc gaming and the range of technical skills that flowed from it. The pc gamers were differentiated from other groups by their specific hands-on engagement with computer hardware particularly while building pcs around powerful CPUs that could render high-definition graphics without any lag. These teenagers had become pc owners because they were dissatisfied with constraints imposed on their gaming experience by consoles. Yet, like all our groups, the pc gamers were not a homogeneous collective. Ross, for example, was a pc gamer who played rugby for his school and local team, so he successfully interloped between the subcultures of gaming and sport. In the interviews and workshops, the young men in this group explained how gaming had initially been a way to relate to and spend time with their dads, but as their expertise grew and they got older, the boys would only play their peers or experts online. For Ross and others in this group, the cultures of digital gaming and sport were synchronised by their mutual offer of male-to-male sociality. These young men were not developing their expertise so they could play in isolation; they were motivated by the opportunity to play games with their friends. They told us they would play, for example, Team Fortress 2 while watching the game on a video app called Team Viewer and while talking to each other on conference call app called Team Speak so that pc gaming was, for them, simultaneously a spectator and participation sport. Experimenting with technologies that in other contexts were constructed as alien and transgressive was also an opportunity for bonding. As Ross told us,

Well, it's like – we get bored sometimes so like we just go on the dark web and just browse some of the stuff you can buy and stuff like that really.

Again, they shared screens and used Team Speak to discuss what they are exploring together, often daring each other on to go a little further. Ostensibly, this pc building represents a convergence of the kind of intrinsically motivated networked learning that would fit well with the policy discourse described above. Their formal education, however, did not direct this practice. The young men learned to build pcs and customise games from each other and guides on YouTube. As James told us, 'I haven't necessarily learnt anything from school about what I do with my computer personally'. There was a sense the pc gamers had mastered the digital field and this gave them specialist skills and experiences (particular around the dark web) that gave them more status and kudos than the stereotypes usually associated with pc gamers suggest.

In many ways, pc gaming as the young men framed it, had continuities with more domestic masculine pursuits such as home engineering, DIY and tinkering in a shed that helps to carve out a space and time they own. As an enabler of mastery, they codified the pc as a male technology. Pc building was therefore part of this group's identity work. They were making something that gave them pride, sourcing components on eBay and saving money in the process. They were confidently intervening in their environment to refashion it. When their mastery of the technical challenge was confirmed, it reinforced these young men's in-group status. Based on the questionnaire data, the fathers of the young people in this group were in technical and engineering or managerial jobs that required the same forms of mastery their sons were rehearsing in their hobby. This suggests pc building was then becoming one of the mechanisms of gendered class reproduction as the young men were readying themselves for a technical career in local industries.

Therefore, the pc gamers appeared prime targets for educational policy that couples coding to the future of the economy. However, they were uninterested in coding as it is presented to them in school (so far). As Paul told us,

There was a little bit of a workshop we did in school where people from university I think came in and they had Raspberry Pis and we did a bit of programming on that and I just found it pretty stressful because you mess up one little bit of the code and it just doesn't work at all.

This experience did not appeal to him; 'not at all'. Yet, the digital economy was never far away from this group's practices. Hayden had his own YouTube channel. He said he was earning money from it by offering 'unboxing' videos and consumer advice about, for example, unlocking phones and tablets. Alex, an A level student (aged 17) who was invested in science and computing, had taught himself a range of computer programming languages. For a modest payment, he had helped out small company by making one of their apps more streamlined. But he wasn't otherwise trying to make money from his skills: he was in the process of building his own adventure game from scratch in C++. For this group of students, being a pc gamer, with coding and technical and game-based expertise, was an important part of their identity. Rather than business ambition or an ambition to make money, at least for now the pc gamers were driven by what we can broadly call the process of individuation within which they reinforced their identity among their friends and online communities by pursuing their hobbies.

Academic conservatives

The academic conservatives (the majority of whom were female) were differentiated by their commitment to their formal education, which they defined as more important than the draw of digital technology. This is not to say other groups were not also committed to doing well academically but, unlike other groups, the academic conservatives framed digital technology as an unedifying distraction from what they considered were loftier ambitions. For example, we asked them how many general certificate of secondary education (GCSEs) do you want to get? Their reply was, 'all of them' because they wanted to 'get away' and 'go to university'. The academic conservatives such as Sian 'preferred to do homework' or revise than 'waste time on games'. Ellen told us, 'we have friends who play games but we don't play with them'. Like other groups, they used social networks such as Instagram but, as Helen explained, they had strong normative ideas about what people should not do on there like 'post pictures to show off'. Unlike the non-conformists and pc gamers, they didn't 'have any friends they don't know offline', and overall were far more measured and controlled in their digital practices. Given their relative conservative disposition to digital technology, this group would be unlikely to be persuaded their destiny was to help grow the digital economy: they still believed in what the digital upskilling discourses characterise as 20th-century jobs such as veterinary practice. It was in these kinds of jobs where their aspirations lay.

Pragmatists

As the name suggests, the pragmatists tended to view the digital only as a means to an end, whether this was to meet in parks with friends or complete very specific tasks online. Instead of pragmatists, we may have labelled this group traditionalists because they drew a distinct normative boundary between authentic experiences that previous generations would value such as outdoor leisure and what they considered less valuable screen time. When we discussed their preferences, a typical response was 'I'd rather be out than stuck behind a screen'. We asked if any of them would describe themselves as gamers? One of the pragmatists, Phil, replied (scoffing), 'no I'd rather go out with my friends, play football and socialise, go to parties' because 'I learn more by going out than staying in on games'. Sally was similarly disparaging of her friends' use of social media.

She 'didn't see the point' and said 'friends just talk about all what they saw on Facebook, what they said on Facebook, what this and that on Facebook, and I'm like, Facebook again. Addicts!' Seth distanced himself from the Internet by telling us that he preferred books to look up his love of animals as 'quite a lot of stuff on the Internet is wrong'.

Pragmatists tended to use technology for quite specific purposes. For example, social media was typically used to arrange meet-ups such as games of football and reinforce their social attachments by replaying and adding commentary to amusing episodes of these meet-ups. Geraint told us, 'If something funny occurs (when we are out) we might talk about it later (on social media)'. Apps such as SnapChat were particularly popular with this group because they 'didn't care about having an audience'.

As their digital lives are, at least relatively, inconsequential, this group could be seen as the inverse of the non-conformists. However, it is not straightforward, a number of young people in this group had often experienced some forms of digital exclusion (e.g. limited

money for games their friends played, lack of home access to the Internet, feeling behind in terms of digital skills, or having constrained access to the Internet for safe-guarding purposes). Thus, the orientations found in this group could partly be about trying to justify to us and to themselves their relative digital exclusion. Given their current experiences, training for jobs in the digital economy (as framed in the discourses described in the introduction) would be relatively disconcerting for this group. For example, they would have no pc at home on which to do their homework. It is not just a case of getting the right curriculum, but one that is sensitive to young people's lived experiences.

Leisurists

The leisurists encompass the largest group of young people in this study and tend to use the Internet primarily for entertainment, such as listening to music, watching YouTube or playing games, engaging in social networking (particularly to follow celebrities and engage with friends and families) and, to some extent, for information seeking, homework tasks and revision.

This group typically used technology to alleviate boredom, to relax or cheer themselves up after a difficult day and to socialise. Their level of engagement with others varied (e.g. to the extent to which they played individual or multiplayer games or posted and commented on social networking sites) as did their skills and confidence to use technology. For this group, the Internet was seen to varying degrees as a useful tool for pursuing interests (such as watching YouTube for makeup tutorials, getting past stages in games, learning to cook or revision). Yet, characteristically rather than break-out from walled gardens (as the pc gamers did) or normative constraints on participation (as the non-conformists did), they synchronised their digital practices with friends and family, activities set by their school and the affordances that the apps and platforms on their mobile devices. For example, when asked if technology was helping her to meet her current goals, Mia explained, 'yeah, I think so, because in school if you want to get good grades the Internet helps if you're stuck; I use BBC Bitesize and stuff'. This isn't to say the leisurists weren't also capable of some creative strategising. Members of this group (as with other groups in our taxonomy) told us they used Facebook to appease their parents' anxieties about the risks and opportunities for getting into trouble online. We were told that parents who were friended on Facebook were then reassured they had oversight. A sanitised public Facebook profile allowed the teenagers to be themselves on platforms like Snapchat beyond any parental knowledge and intrusion.

These activities tended not to translate into pursuing a passion or developing skills that could be monetised in the digital economy. For some, this could be explained by their school year (the majority in the group were year 9 and had yet to formally deliberate on their career goals). For example, Brandon told us, 'I don't really have any goals'. Whereas for others it seemed that it had not even occurred to them that the Internet could be used to support those interests. Some even dismissed the Internet's potential. For example, when Jessica was asked if she thought the Internet was helping her to achieve what she wanted to do, or would do so now or in the future? She laughed and replied, 'I don't think so!' The majority of young people in this group were disconnected from the discourses of the digital economy; digital technology was just a normalised and integrated part of their teenage life rather than something that could transform their lives and lead to future economic success.

Analysis and discussion

The discourses used to justify the focus on digital skills programmes suggest that the needs of the economy and the needs of all young people are synchronised so that an archetypical young digital citizen enjoys using technology in ways that increase national economic output. This discursive construction denies the possibility that young people have their own motivations and uses for digital technology that may not translate to feeding 'the pipeline to prosperity'. It also implies that when young people's practices are contributing to the digital economy there are no significant impediments to them having a long and successful career in the technology industry. In contrast, this study demonstrates that young people mobilised digital technologies in a variety of contrasting ways that, because they defy discursive construction, require a sociological explanation. While it is important to draw attention to the student's own choices and behaviours, their agency, it is essential to simultaneously account for patterns in the data that suggest this agency had limits. Indeed, the students themselves recognised these limits as this quote from Gemma shows:

When I was in year eight [12–13 years old], I was kind of obsessed with planning my future. I would look at loads of different universities some which I knew that I'd never be able to go to, I will probably never even go to like university.

As noted above, in order to offer an explanation that resolves the tension between the frontiers (however defined) built into these young people's lives and their agency, and simultaneously account for digital technology's in role catalysing and channelling this agency, within the data we locate 'reflexive habitus' operating at the intersection of fields including digital fields.

Archer (2007) argues, 'if every habitus derives from "socialised subjectivity", change is now too rapid and appropriate practices now too evanescent for inter-generational socialisation to take place' (p. 40). Yet, we observed some intergenerational socialisation in process: just through a different means now. For example, in the past, young men living in this area who would have been taught by their fathers to play rugby or customise a car; now, through a new yet equally gendered intergenerational transfer of embodied skills, many of them at an early age learned how to play football on console games from playing their fathers and older siblings before learning how to put together a gaming pc for more serious gaming.

As can be seen from the typology, there are some individuals who go with flow and use technology in practical or habitual ways that suits their needs but with relatively little evidence of critical reflection. There are some who adjusted to 'newness of the games' by taking pleasure from more traditional embodied skills and practice like going off to play football in a park. Some were more defined by the constraints on their choices, while others, the data show, were more able to reflexively engage with their socio-technical class of conditions. Whether it was to reflexively strategise, or to habitually adjust to aspects of their lives they are relatively powerless to change, each group's response is accommodated in the concept of reflexive habitus. This is because this concept retains the embodied nature of the habitus but it also allows for reflexive adaptation so that its deployment in our analysis reveals the continuities with previous generations and it shows how the digital is refracting young people's lives in unprecedented ways that deterministic discourses about the pipeline to prosperity neglect.

The most effective way to explain reflexive habitus is to use it to account for the tension between structure and agency with our data. According to reflexive habitus, each young person 'is always situated at the intersection of multiple overlapping fields, with disparate valuations and distributions of capital, which can provide them with multiple (and quite often contradictory) ontological orientations and perspectives' (Decoteau, 2016: 316). In our data, these include the fields of education, gender relations, class and digital fields (as conceptualised above). Young people's identities are constituted through their participation in these fields (Decoteau, 2016: 316). The amount of reflexivity required to develop and maintain this identity depends on whether norms and values between fields are synchronised. Decoteau calls this synchronisation 'doxic homology' and its absence 'doxic heterodoxy'. Disjoints between fields or doxic heterodoxy can produce the necessary conditions for reflexivity. According to the logic of reflexive habitus, if engagements in digital fields create such disjoints in young people's reality and challenges their way of thinking, they are more likely to think reflexively about their participation in other fields.

Five theoretical groups

Returning to our typology, the non-conformists experienced more doxic heterodoxy than other groups. Abi, for example, the pro-EU feminist found the doxic homology of her life at school, as she experienced it, was much more socially conservative than her digital field. The digital field therefore fragmented the doxic conditions of Abi's life. The non-conformists' reflexive habitus is revealed in their ability to reflect on and adapt to the structured fields they operate within by leveraging the affordances of digital technology. They did so by connecting with like-minded individuals in a global community from, for example, Japanese, Korean, Australian and American culture. Their digitally enabled 'interstitial positionality' (Decoteau, 2016: 317) between fields offered the non-conformists vantage points from which to reflexively evaluate and navigate the structural and cultural conditioning that has shaped their lives. Therefore, social media provided them with 'resources and perspectives that allowed for reflexivity' (Decoteau, 2016: 309) to flourish, but at the cost of feeling alienated from their communities in other fields. They were therefore 'ensconced in a struggle' (Decoteau, 2016: 316) to manage the dissonance they experience between fields. Of the non-conformists we met, Gemma was most committed to the digital economy in a way that led to her reflexive assessment of the contrast between opportunities the digital field offered her and the doxic conditions of her family and social class. From her vantage point, Gemma thought her conventional route to social mobility, university, was blocked-off. To realise this, she had experienced enough symbolic violence to lead her to re-evaluate the 'gravity' of her 'trajectory' (France and Threadgold, 2016: 625). The non-conformists, like Gemma and Abi, had then realised the doxic conditions of their digital lives and discourses about their future were jarringly out of synch. Young people in disadvantaged positions 'consistently show that they reflexively understand their lowly status in social space and make plans to negotiate this' (France and Threadgold, 2016: 625). The non-conformists were adjusting to their reality by participating in the gig economy where they would animate or blog to order.

The pc gamers meanwhile experienced greater synchronicity between cultures on-and offline. From our data, it was clear that the pc gamers experienced less disagreement between fields than the non-conformists so they were not compelled to reevaluate their situation and consequently experienced a weaker requirement for reflexivity. Their

masculine mastery of digital technology was recognised in other fields at home and at school (including by the non-conformists who commented on the pc gamers' technical skills). The comparison with other groups, particularly non-conformists, suggests that in this instance, the uses and gratifications of digital technology is producing gendered forms of reflexive habitus. The non-conformists were performing what Duffy (2017) calls 'aspirational labour': a form of work that women are more likely to undertake usually for little or no money in the expectation they will have a fulfilling career in the digital economy. McRobbie (2014) argues this form of freelance creative work is romanticised while many of its exponents are never able to achieve the rewarding career they are promised (McRobbie, 2014). This indicates the digital economy could reinforce rather than transcend structural inequalities including gender (Duffy, 2017).

The data for the academic conservatives suggest this group was intrinsically motivated to commit to the field of education and it was perhaps a reflexive act to reject technology's colonisation of their lives. If, however, we look at the data from the questionnaire about parental qualifications, almost all their parents had gone to university and were in jobs that required a degree such as veterinary and head teacher. It is therefore likelier the doxic homology of their multiple fields, particularly education and family, was intact and it was resistant to any influence from social media and entertainment technologies.

The pragmatists meanwhile seem to have recognised that their experiences and uses of technology stand in contrast to popular discourse and the activities and practices of many of their peers. The reasons for this are complex. Yet, it appears that in order to manage the dissonance between their digital field and others, they reflexively rejected technology as superficial and therefore less important than 'real' life. This was easier for some, where such a position resonated with a small group of friends and their immediate family. It is, however, difficult to conclude that such adaption was not without its tensions: some young people in this group were clearly conflicted about the position they had taken in relation to the digital as if they were merely adapting to structures that they knew were powerless to challenge.

The leisurists' fields are relatively closely synchronised. Thus, while technology was assimilated to varying degrees into existing social and entertainment practices, the doxic homology of these young peoples' fields remained intact.

Conclusion

In presenting the typology above, we have sought to challenge the deterministic discourses that tell young people learning to code would be an act of economic self-interest that will, in turn, defibrillate the economy. In doing so, we have shown that this discourse ignores young people's agency and the influence of the structured fields in which this agency is expressed: this highlighted the importance of situating modern teenagers' practices in their wider historical context. As identified above, there were parallels between the way these teenagers use digital technology and the ways in which, before the web and smart phones, teenagers made their own cultures with analogue materials, such as magazines.

Presenting coding skills as a valuable commodity in the job market that can be translated to personal advancement is problematic. This is because in the job market for coders, being male (Vitores and Gil-Juárez, 2016), holding a degree from a 'high-tariff' university,

being geographically mobile and having an internship are also valuable assets in the competition to land a well-paid career in the digital economy (Shadbolt, 2016). Many of these advantages were beyond the reach of most of our research cohort. We are asking them to believe their ability to code will transcend the structural conditions of the job market: in particular, the young women. The solution is often to problematise women for their failure to choose computer science (Vitores and Gil-Juárez, 2016). This will, however, only 'contribute to reinforcing the naturalisation of gendered identities, assuming as natural the existence of women and men with different interests and needs and perpetuating the vision of male technological trajectories as both neutral and normative' (Vitores and Gil-Juárez, 2016: 675). Instead, we need to rethink the purpose of digital education and the forms of digital work we value and remunerate.

We mentioned in our introduction that its instrumentalisation to serve economic logic delegitimises other possible civic, ethical or humanitarian motivations for learning to master digital technology. This has consequences for young people. They are socialised into a market for jobs within which 'unrealised talent' (Littler, 2018:5) and all the disillusionment that brings is a 'necessary and structural condition of its existence' (Littler, 2018). Meanwhile, the system's winners are encouraged to develop a 'corrosive ethic of competitive self-interest' (Littler, 2018) that justifies success with the ideology of meritocracy (Littler, 2018). This form of digital education also has consequences for a society within which technological development for social good is undervalued or even a counter-hegemonic act of resistance. Beyond the pipeline to prosperity discourse that emphasises the imperatives of maximising personal wealth, we urgently need to find ways of nurturing, valuing and rewarding learning to write software that can lead to a more inclusive and socially cohesive society.

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1. Nomis, our source for labour market data, covers the whole of Cardiff (twice the population of the Caerphilly area); we are therefore unable to focus on the school's area.

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