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The limits of higher education institutions as sites of work skill development, the cases of software engineers, laboratory scientists, financial analysts and press officers.

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Abstract

Where do workers with Higher Education (HE) degrees develop their work skills? Although few would expect these to be developed in HE exclusively, there exists an assumption that the core skills of those working in graduate occupations are predominantly formed at HE. This article examines how within four graduate occupations, employers and workers assess the extent HE is thought to develop the skills and knowledge used within the work process. It draws on occupational case studies on the work of laboratory-based scientists, software engineers, financial analysts and press officers, using interview data with workers, employers and stakeholders. The study shows that structural barriers prevent HE to take a significant part in work-skill and knowledge development, but also that HE is not necessarily heavily relied upon for skill formation. More precaution is required for those who would like to directly link the skills demands for graduate work with the skills that are developed or associated at university.

Keywords: graduate occupations, graduate skills, labour market, skill development, work-based learning

Introduction

Higher education (HE) performs a range of roles within society. Preparing individuals for work is widely understood to be a key function. Historically and

traditionally, parts of HE have been predominantly professional (e.g. medicine, law and engineering). Other parts developed students into disciplines in which the linkage with the labour market and its role as developer of labour market skills was somewhat indirect (e.g. humanities). With the emergence of mass HE, a new set of degrees and educational programmes developed to reflect the wider labour market destinations as well as the occupational change within the labour market. The work graduates perform also has widened over the years with many graduates working in what are deemed new or (previously) non-graduate occupations (Elias and Purcell, 2013; Blenkinsopp and Scurry, 2006). New graduate occupations have emerged in which the skills demanded by employers and to perform the work are not necessarily aligned with the skills and knowledge that HE imparts.

The conventional understanding of graduate work and graduate occupations tends to emphasise the direct link with skills associated with university education. It is assumed that the majority of graduate workers' skills are principally developed at university or are at least associated with HE. Yet there is evidence to suggest there is considerable occupational heterogeneity. For instance, a study on where the skills of UK residential sales estate agents - a graduatising occupation found that the site of development was not HE, although it did have a role in developing soft skills (Tholen et al. 2016). Currently there is a gap in our knowledge how we to understand effectiveness and capability of HE as a site of work skill development for different occupational contexts. The question this article aims to answer is to what extent do HE institutions serve as sites of skill development in modern graduate occupations.

In order to do so, the article reports on a qualitative study that examined how within four graduate occupations, employers and workers assess the extent HE is thought to develop the skills and knowledge used within the work process. The four graduate

occupations are: lab-based scientists, software engineers, financial analysts and press officers. For each of these four occupations, I assess to what extent HE is able to provide the skills needed to perform the roles and outline some of the key limitations of HE institutions as sites of work skills development. The article shows that these graduate roles do not predominantly rely on HE to develop work skills. The unavoidable gap between practice and theory is not the only reason here; work requires abilities and characteristics that are not the purview of HE institutions. This is not to criticise HE, but instead to achieve a better understanding of the role it is able to perform in skill formation and to challenge the consensus on the necessary importance of HE sites for skill formation.

The role of higher education as a site of skill development

Within the mainstream view in politics and the media, HE tends to be understood as a foundational force of skill formation within the skilled labour force. Likewise, within the academic literature there is also a strong tenet to place HE explicitly at the centre of skill development within the modern workplace. The idea of a continuous increase in labour market demand for advanced skills and highly educated workers became axiomatic for mainstream economics (Berman et al., 1998; Levy and Murnane, 2004). The influential Human Capital Theory (Mincer, 1958; Becker, 1964), for instance, stresses that education improve individuals' skills and thus their productivity (which employers are willing to reward with higher wages). Human capital theorists highlight that HE is instrumental for developing and enhancing the productive capacities of workers (Schultz, 1961). Within a global economy, skills are understood as the global currency of the

twenty-first century (OECD, 2013, p.11) and of these, graduate skills are the most fundamental (Willetts, 2017).

Policymakers and other influential bodies all over the world have bought into the idea that investment in (higher) education is key in moving toward this knowledge-based economy (OECD, 1996; World Bank, 2003; DTI, 2004; The European Commission, 2010). National education and training systems should be further developed to fulfil the demand for advanced skills. Although debate exists about the meaning and definition of graduate occupations, there is a consensus that they are closely tied to HE in its role as work skills developer (Green and Henseke, 2014; Elias and Purcell, 2013). Tholen et al (2016, p.511) sum up the mainstream's assumptions on graduate skills as follows: "First, distinctly graduate skills are assumed to be demanded and therefore needed by employers; second, the skills deployed in work are of a specific type—'thinking skills'; and third, these skills are, not surprisingly, uniquely acquired in university". Universities are thus thought to serve as the main provider of the high skills needed and become the situ of skill formation (Warhurst, 2008).

An opposing theoretical camp stresses that HE's contribution to work preparation and work skill development has been overstated. A long but varied line of commentators and social scientists have argued that most work skills are learned in the workplace in the form of work experience and the on-the-job training (formal or informal), rather than in school (in this case, university). Schooling itself does not improve job performance in the workplace a great deal. One of the earlier contributions was made by Thurow (1975) who highlighted that workers do not bring fully developed job skills into work. These need to be developed, and employers sort potential workers based on expected training costs. Proponents of signalling theory (Spence, 1974; Kroch and Sjoblom, 1992 and recently

Kaplan, 2018) and screening theory (Stiglitz, 1975) further theorized that employers do not tend to have reliable and sufficient information about applicants' innate productivity. HE qualifications serve as a signal or screen in a labour market where information about a person's abilities is incomplete and imperfect. Education is valued by employers because it serves as a valid signal of the extent to which a worker can be trained to become a suitable (and productive) worker. HE participation is little more than a selection mechanism that enables employers to identify given abilities (Blaug, 1985; Weiss et al, 2014). This line of thinking emphasises the relative value of qualifications as employers look for the best applicants among the candidates rather than absolute notions of knowledge, skills and ability (Brown and Hesketh, 2004). Credentialist theorists (e.g. Collins, 1979) go one step further by arguing that schooling has very little relationship to productivity at all, and that employers select based on education to seek out candidates that are socialized into the dominant status culture or have the right cultural characteristics or resources.

Mounting evidence on skill mismatch also indicates the skills and knowledge associated with HE may not be essential to work in most graduate sectors. In particular, studies on horizontal mismatch (the match between employees' field of education and the job profile) indicate that there are many graduate workers who are working in jobs in which they were not formally trained (see Somers et al., 2016, for a review of studies). Mismatches can also be 'overturned' by additional work experience. Nordin et al. (2010) found for Swedish graduates that for those working in a different field, education-specific skills and work experience are substitutes. There was also no evidence that the mismatched workers move to matching occupations over time. Bender and Heywood (2011) found for scientists that the prevalence of horizontal mismatch is lower for early-

career workers than those in middle or late stages suggesting that, over time, the necessity of discipline-specific skills and knowledge diminishes.

Others have questioned whether employers actually want the specific skills developed at university as, according to survey data, employers tend to look for work experience (Cappelli, 2015; Lafer, 2002) or attitude (Bowles et al., 2001) rather than academic skills. Humburg et al. (2013) found that when hiring for graduate entry positions, European employers value professional expertise and knowledge and skills needed to solve occupation-specific problems, rather than general academic skills (which were not seen as crucial for hiring). Employers thought that both types should be taught in HE, but interestingly felt that they should be taught through 'real' work practices in the curriculum.

Currently the debate whether national systems of HE are key sites of skill development for graduate work remains open despite considerable evidence on the large body of studies that reflect on the usefulness of skills developed at university in relation to employer demand. A large literature centred around the concept of graduate employability aims to establish how generic skills, abilities and attributes developed at university could improve labour market outcomes (see Clarke, 2017 for an overview). Other educational researchers have evaluated how university curriculum and pedagogic approaches are constructed to deal with the demands of the workplace (Billett, 2007, 2009; Jackson, 2014; Smith and Worsfold, 2014). Others have shown that there are considerable differences in terms of discipline, gender and age and specialisation within the degree between recent graduates to what extent they perceive to use the skills developed in HE in their current roles (Purcell et al 2013; Jackson, 2016; Wilton, 2011). Yet very few contributions within this debate have looked at how the role of education is understood within beyond the initial phase (an exception is for instance Bridgstock,

2014). For this we need understand the nature of the modern workplace. Skills surveys (e.g. Felstead et al 2007) give us a good macro view of the skills used within work yet without giving much indication where these skills are developed. As a result, there exists an empirical gap in terms how well HE is preparing workers for graduate-level work. In order to assess some the claims of the aforementioned advocates of HE as the driver of a knowledge-based economy as well as those more critical of this position, this article aims to start filling this gap by examining where work skills and knowledge are developed within four graduate occupations.

Methodology

The study adopted an occupational case study approach. The goals of the case studies were to provide detailed vignettes of what workers do at work and how they think about their work within four occupations that are considered to be graduate occupations. In doing so, the case studies are able to provide valuable insights into the nature of graduate work and the so-called graduate labour market as they provide in-depth investigation of work, skills, career, recruitment and selection. The four occupations are: a) laboratory-based (non-PhD) scientists working in pharmaceutical and biotechnology companies; b) software engineers; c) financial analysts; and d) press officers. These four were selected on the basis of their differences to create sufficient variation and potential to shed light on major changes within the labour market for graduates (such as technological change, graduatisation and globalisation). The occupations are not deemed ‘representative’ of the whole graduate labour market, nor are they intended to be. They are used to investigate how the work that graduates perform is organised, understood and negotiated within their occupational contexts.

The fieldwork took place between January 2013 and May 2015. Over this period a total of 107 interviews were conducted. The majority of these were with graduate workers (N=77) in the four occupations. In addition, employers (N=13), HR managers/recruiters (N=6), non-graduate workers (N=6) and HE lecturers (N=5) from relevant fields were interviewed.

Participants were selected and recruited purposefully from available LinkedIn profiles to allow significant variation in sector, age, gender and educational background. A small minority were recruited through snowball sampling. Participants were located all over the United Kingdom, although the majority were in the south of England. There was considerable spread in age and career stages. The gender balance was somewhat skewed towards males (N=65), in particular in software engineering and lab-based science.

One semi-structured interview with each participant was conducted in a setting chosen by the interviewee, often either at work or in a coffee shop. Interviews lasted from 30 minutes to more than two hours, with the majority lasting more than an hour. The interviews explored a range of topics such as career development, recruitment and selection and the role of education throughout the occupation. This article mainly examines the issue of where the skills and knowledge deployed in the labour process are developed considering a wide array of potential situ. All interviews were transcribed verbatim and anonymised. After a general reading/listening to a group of transcripts, the transcripts were thematically coded using the NVivo software package to identify themes in the data, and then hand-coded the interviews to analyse patterns in the data in more detail. The initial rounds of coding on creating categories of means of skill development as well as general codes of the role HE played within the occupations. Within the fine-grain coding process codes specifically related to deviations to the role of work-specific skill developer creating a spreadsheet that included all interview

excerpts associated with the selected codes. Strong patterns of validation between participants and occupations were observed. I began to detect three core categories of deviation that appeared repeatedly across multiple codes, which form the three sections in the findings. All the participants have been given pseudonyms. There was general consistency in the views between employers and workers. The relative small number of employers in the sample would demands caution to assume homogeneity between the two groups.

What Higher Education is not expected to teach

HE remains a significant site of skill development within the four occupations. For laboratory-based scientists, university provides basic science skills as well as useful theoretical knowledge. Many financial analysts learn valuable numerical and maths skills that are of use but can also be developed elsewhere. Yet participants often mentioned various ways in which HE could serve in developing work skills but is not considered HE's role to do so. HE cannot provide all the skills needed but equally important, *nor is this the expectation*. Employers and workers in the four occupations predominantly regard HE as a starting point in skills development.

New entrants into software engineering jobs are generally expected to have a degree in an IT-related course. For them, the basis of software engineering can be learnt at university. It teaches students the principles of software engineering and hands-on experiences in coding. HE is perceived to be able to provide a decent skills base. Susan, a starting software engineer in the oil and gas industry reflects

I see my previous university degree, like taking a driving test, so it gets you to a very basic level to get on the road and then you start learning. And now I'm at that basic level to go into a job or a field and now I can start learning and I can get real experience from other people who've been doing this.

Laboratory scientists who would identify HE as a legitimate and key site of skill formation, still would define university as a starting point within their professional skill development. Dominic, a scientist at a major pharmaceutical company explains the role of universities in the development of work skills

They can certainly give an introduction to certain technologies; that would be a good grounding for people going into a position. But on the whole I think it comes from doing it, and that's likely to come from a job-based full-time job role where one is doing it regularly for a period of months ... usually a bit longer than months, into years.

Similarly, financial analysts with degrees in finance or economics found out when they start working that the real world does not work according to econometrics or economic theory, and that this is where the real mastery of financial analysis commenced. Financial analysts rely on professional judgement and this comes through experience. It was accepted that universities do not *have to* teach it.

Social and other soft skills are important in all four occupations. Some workers commented that they have developed social skills whilst being at university and felt that they have aided their professional development. The responsibility to deliver these are

not often placed on the HE institutions but on the individual by workers and employers. It is also important to realise that many employers provide on-the-job training in the four occupations, teaching mainly job or company-specific skills and knowledge.

What Higher Education does not know how to teach

Despite all the worthwhile attempts within the UK context to construct a curriculum more tightly aligned to the demands of employers or the labour process (Pegg et al., 2012; Wilson, 2012), there are some fundamental boundaries that prevent HE from taking a more prominent role in skill development. An important reason why it is not deemed the main provider of skills is the perceived lack of relevance of academic programmes. HE is not always seen as *capable* to deliver the skills needed. The discrepancy between what is taught and what is needed to perform the role in the workplace can be quite large, even in field-specific courses. This may be due to the fast-changing nature of the workplace. HE has trouble catching up on what is happening on the work floor. Some courses are deemed too theoretical or too broad to really connect with work practices. For instance, many of the laboratory-based scientists observe that universities are not teaching the right technologies and using the right pieces of laboratory apparatus. Ella, an ex-scientist in biotechnology comments

You can have a general understanding of how a lab works, but yeah you'd learn on the job and as new techniques come in you get taught those or, you know, somebody else learns them and passes them on to you. So yeah it is ... it's very fast moving, so you have to learn on the job really.

British undergraduate programmes tend to be quite broad and it is thought impossible to deliver the specific knowledge and skills needed in the workplace. Universities always must find a balance between width and depth in their curriculum. As a result, employers are thought to be looking for university-educated candidates willing and able to learn (very much in line with screening and signalling theories). Trevor, a senior scientist working in a biotechnology company explains

They're looking for bright students who they know are capable of learning because, after all, they are going to put on top of that a great deal more specialist knowledge and taking, you know, the ability to, I don't know, consolidate balance sheets or do the tax affairs of companies to a much higher level than we're ever going to reach at a university.

For press officers, although writing skills be can trained at university, other core skills or abilities such as having 'news sense' would seem not amiable to formal education or, at least, university educators have not found a way to effectively develop it. The variable ability of HE in teaching the skills needed by press officers is expressed by Fred, a PR educator as follows

The craft bit that's quite easy to teach, you know, write a well-written, well-structured press release, but there's a wider thinking bit that's much harder to teach.

What Higher Education cannot teach

Not only is university education not overly well-equipped to teach the skills and knowledge needed to perform graduate roles, there are also more *fundamental* barriers that prevent HE to be a more important site of skill development. These relate to organisational differences, the importance of slow learning and personal development and employability concerns.

Organisational differences

Within occupations, great heterogeneity in job tasks exist (Auto and Handel, 2013) despite the unity that occupational classifications imply. In addition, organisational differences in work protocols, management styles and structures, company cultures and product market *inter alia* all shape which tasks are performed, how they are performed and how they are valued and understood. The effect organisational characteristics and workplace-specific work practices have on the skills and knowledge needed, means that some can be exclusively gained through work experience. As one financial analyst discovered, the impact of companies' practices and characteristics on job roles is significant.

I think it's something that I probably didn't really have a good sense of when I was at university. I sort of thought okay, a job is a job. It's all about what you do and not so much about where you do it, what sort of organisation and who you're working with. I think that's probably something that wasn't as obvious to me when I was a student. [Lee, ex-analyst for a major global investment bank]

Likewise, technical skills for scientists are company specific as expressed by Maria, a scientist in a biotechnology company

You move from one place to another, it's not exactly the same, so you have to adapt and alter your skill to this particular working environment because some things... the ideas are the same but they don't work exactly the same... And so there is a lot of company specific skills involved.

Even if universities were able to technically prepare graduates for work, in most cases they cannot do much to improve how well graduates would fit the company culture (as part of their 'acceptability', see: Jenkins, 1986). Ian, a lab director in a biotechnology company explained that at the selection stage he is actively looking "for a fit within a team and knowing absolutely what would be complementary to the team". Bob, a senior software engineer working in an IT company reflects on the experience of selection processes in smaller software companies

So not only do they look at the technical skills of the person but they also look at how the person will gel in with the rest of the company (...) So I guess they thought I could gel in fine and I thought I was fine staying here, so I joined.

Slow and work-based learning

Workplace learning (as opposed to formal learning) is accepted as highly developmental (Lester and Costley, 2010). A substantial body of literature suggests that workplace

learning is highly effective and key in occupational skill developmental (Eraut and Hirsch, 2007; Tynjäl, 2008) in particular for professionals (Enos et al., 2003; Eraut, 2007; Kyndt et al., 2016). Workplace learning is incremental. Many workers mentioned that learning to master their job takes time due to the developmental nature of work experience. Although many university programmes integrate workplace learning within their curriculum, traditional three-year undergraduate programs are not always set up to develop slow learning.

Although software engineers are expected to get up to speed very quickly and start coding straight away or within weeks when they enter a new company, it is the general mastery of coding that takes practice and time. Problem solving is improved over time and in constant development and shaped by new technologies, languages, hardware and products and services. Although formal education can teach individuals to code, it is accepted that the real craft is developed by working within a commercial setting.

For laboratory-based scientists, the specificity of laboratory techniques and equipment means in order to perform the role, on-the-job training (often informal) and work experience is fundamental. Entrants into the labour market cannot surpass this with their formal training.

It's probably more the skill I've learned in the job than I had before I started the job, mainly because of the progression of the company and what we now offer compared to what we did. I didn't really need to know those skills or have those skills beforehand. Now I do and it was basically I'll need to learn them and through training or through literature research or any other kind of research. [Leo, scientist, biotechnology]

Financial analysts believe it takes considerable time to fully understand delicate and intricate aspects of financial analysis. The core features of financial analysis develop gradually and sometimes unconsciously. Financial analysis demands good social skills and these skills develop through interaction with other managers, colleagues and in particular other stakeholders who have certain desires and interests in specific content as well as a particular delivery of that content. Troy, senior financial analyst in a senior public sector, explains

But then as you progress and get more experienced and more involvement in working with more senior people it becomes more about sounding credible in what you are presenting, so having experience and authority to do that. Sometimes its persuasion skills, negotiation.

The educational make-up of the financial analyst workforce further shapes the reliance on work-based learning. Financial analysts have diverse educational backgrounds and are expected to learn most of it on the job and for some, in combination with the pursuit of a professional qualification.

For press officers, the work experience of dealing with journalists is crucial and hard to practice or simulate in an HE environment. This also is why the skill set of journalists is valued by PR employers. Communicating clearly and placing stories, again, improves through work experience.

You just get used to adapting and being more flexible. The more you do the job the more you understand you have to deal with different situations and how to get the best outcome from a situation. As you're required to work on more high profile

campaigns, for example when you move up into different organizations, you do just improve by nature. [Patricia, senior press officer, charity]

In other cases, mastery of the role of press officer is slow, not because of the pace of skill development but due to the accumulative nature of building networks with journalists (networking skills also develop and improve over time).

Employability and personal development

Another reason why HE is unlikely to be the core site of occupational skill development in many graduate occupations is that skill development itself is unpredictable, and constructed along the lines of personal career and employability trajectories and personal interest. For many graduate workers in the study, lifelong learning was achieved by keeping up with the latest developments within the industry and studying to master the skills needed to deal with them, but also to increase or improve employment and promotion opportunities.¹ At least as important as formal training is the practice of self-study. Many workers in the four occupations tended to gain knowledge and skills initiated and driven by their own accord. This was especially relevant for scientists and even more important for software engineers.

For scientists, keeping up with the latest scientific knowledge and relevant research findings requires constant reading both during work time as well as outside. Again, it is often up to the individual to do this, although many companies provide

subscriptions and access to the relevant literature. Often a thirst for a deeper subject knowledge was a strong motivator.

Yes, scientific journals play a relatively large role in what we do [...] So, I mean, yeah, we've picked up a fair bit just from reading the work that other people have published, kind of even completely new directions into different kind of targets and things just from reading around. [Nigel, senior scientist, biotechnology company]

Because of changes in software programming language and technological change, IT professionals need to upgrade their skill and knowledge accordingly. Engineers aiming to maintain employability often develop an aim to gain experience and knowledge around technologies and languages they deem will become more important in the future. Finding out how to train oneself and in which areas can be a rather haphazard process driven by impressionistic notions of what is happening within one's own field. Developers expressed a high degree of ambiguity and uncertainty in their learning strategies. Nonetheless, they are developed through personal initiative.

I do occasionally sort of read some sort of textbook, sort of a programming book on the bus or being about. But I think a lot of the stuff you just pick up as you go along because you are sort of dealing with the technologies. You have to sort of research them as you go along and you sort of build up knowledge that way. [Bruce, software engineer, IT company]

Financial analysts took their own initiative to upgrade their IT skills to keep up but also felt required to keep up with economics, finance and sectoral changes and trends. These forms of skill development rely on continuous efforts often centred around reading financial news and trade publications, and would likely be ineffectively and inefficiently transferred within a formal learning context.

Concluding discussion

The findings show that, perhaps unsurprisingly, vocational preparation through HE courses is variable between the four occupations. It ranged from delivering a theoretical knowledge base and a basic practice with various laboratory techniques (scientists), to far less specific vocational contribution to the knowledge and skill base of workers (press officers). More significantly, the data shows that for these four occupations, the role HE can perform as a site of skill development is demarcated by both choice as well as the demand of work itself. The data shown in the article illustrate not so much that training is employer led by design, but that there is indeed little reliance or expectation in the four occupations that HE takes a prominent place outside initial and general training.

Here we need to understand the national institutional context in which structures of HE operate. In the UK context (as opposed to countries such as Germany, Netherlands or Austria), the higher educational system is predominantly generalist and oriented towards rather general curricula and programmes.² It tends to be loosely connected to the labour market in general and occupational demand specifically. HE is less likely to teach students specific skills that are required for existing jobs (van der Werfhorst, 2004;

Andersen and van de Werfhorst, 2010). The UK education system provides relatively few institutionalised pathways to the workplace. Employers are also less likely to shape jobs according to the expected level and orientation of the skills taught (Marsden, 1999). It seems likely that if the UK's HE vocational level in curriculum and structure remains relatively low, the general role of HE in skill development may be modest.

This article makes two main contributions to the extant literature on the role of HE in skill formation. The first is that more precaution is required for those who would like to directly link the skills demands for graduate work with the skills that are developed or associated at university. Against the dominant view outlined earlier, there is little evidence to suggest that HE drives skill development for what is considered high-skill work. In relation to the ongoing sociological debate around the purpose of schooling in modern post-industrial economies, the study offers considerable support for existing critiques on the dominant view that skills developed at university exemplify the work of high-skilled professionals. This mainstream consensus built around human capital theory struggles to deal with the fact actual work skills in some cases are too far removed from the activities that come with schooling and much better understood by signalling, screening and credentialist theories. Also, again against the mainstream view, fast changing technological context does not necessarily increase the relevance of HE in skill development.

Secondly, it contributes to the ongoing debates on what the role of HE (or more specifically universities) should be (e.g. Collini, 2012; Roth, 2014; Willets, 2017). Recently, within debates about graduate overqualification, some have argued that HE is too narrowly defined and should incorporate wider aims such as personal development and social benefits (Andrews, 2015; Green and Henseke, 2016). With the mainstream expectation of HE delivering work preparation for its graduates comes the question what

do we mean by preparation? It depends on the expectation we have towards work readiness. The latter is a fluid concept. Employers will expect something different than will employees. Some employers do have clear needs for specific academic skills (Rosenbaum and Binder, 1997) but for many others, the reliance on HE strongly depends on the roles they recruit for as well as their own approach to 'train or hire' strategies towards skill. Within the UK context, reported skills gaps have helped given rise to an encouragement of HE institutions to help develop so-called employability skills within their curriculum. These skills would allegedly be more aligned to the skills that employers are looking for and help students find graduate-level work after they graduate. We know that those working in highly skilled occupations tend to be the least likely to have skill gaps. Only managers and professionals (2.7 and 3.0 percent, respectively) experienced them according to a recent study (UKCES, 2016, p.173). As skill is a derived demand, it depends on the job role how much of the skill is allowed to be used through job design and management approach or what is deemed a skill in the first place (Warhurst et al., 2017). There is no absolute standard of how well HE can deliver on the wishes of the employer. Likewise, policymakers may expect more from HE than it can deliver. Due to an assumed explicit tight relationship between HE skill provision and labour market outcomes, UK governments have justified an array of policies ranging from economic policies that highlight investment in HE (BIS, 2013), to increase productivity and to measure and improve social mobility (Cabinet Office, 2011; Milburn, 2012). What the study shows is that there are clear limits to what HE is able, is likely, or is expected to do.

A limitation of this study is its reliance on interview data. Workers may not realise what skills they possess, what skills they use at work and where these skills are developed. Employers may show a similar bias. Reflections of employers and workers on skill

requirement and development are still valuable, but ideally should be supplemented with observation data that records and interprets what workers do at work. An organisational rather than an occupational focus would have lent itself to such an approach. It would, however, still be extremely challenging to observe skill development outside work and impossible to directly witness workers' learning in the past. It is also important to realise the study showed considerable heterogeneity in the skills used between those working in the same occupation.

The aim of this article is not to argue that HE does not matter in the development of work skills. It clearly does. Yet without an accurate understanding of its role in skill development, it will be challenging to comprehend how HE may lead to better labour market outcomes or processes. We do need to be careful to not make sweeping generalisations about the role of HE in skill development. HE is not a homogenous entity. A wide variety of courses (some vocational, others academic), universities and levels exist within British HE alone, resulting in a wide variety of educational experiences and learning outcomes. Further studies should investigate alternative sites of skill formation in more detail and depth (including in respect of early education, family and membership of voluntary organisations such as religious, sport and interest groups), as well as the opportunity for and the effect of on-the-job training, informal learning and employer-funded external training for those in graduate occupations.

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¹ Some have argued that HE does not provide skills for life, and they highlight the importance for lifelong learning (e.g. Hincliffe, 2006).

² Diprete et al 2017 found that there is considerable heterogeneity in school-to-work linkages within countries across educational field and occupation.