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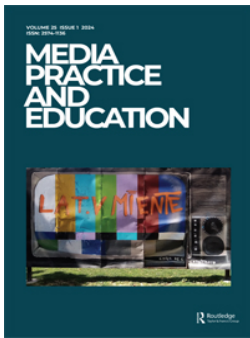
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# The importance of professional skills within the changing media landscape of the UK screen industries: a case study of the 'disruptive' phenomenon of virtual production

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## ABSTRACT

Rapid technological developments are changing media practices within the screen industries, with these shifts exacerbating already existent skills shortages and gaps. This paper focuses on the case study example of virtual production, a new media practice of making film and television content, to demonstrate the continuing importance of professional (or 'transferable') skills. Professional skills are skills required to act efficiently in different real life situations, with examples of these skills including communication and team working [Nägele, C., and B. E. Stalder. 2017. "Competence and the Need for Transferable Skills." In *Competence-based Vocational and Professional Education Bridging the Worlds of Work and Education*, edited by M. Mulder, 739–753. Springer]. The paper highlights how changes in media practices caused by virtual production actively require workers to acquire and retain professional skills such as patience, adaptability and communication. These professional skills are crucial additions to the specific technical skills already identified within the existing skills literature on virtual production. The paper also identifies existing inclusion issues which relate to virtual production, using these insights to develop recommendations for media educators on how to ensure the cultivation of professional skills for all workers. The article draws on empirical research conducted with 69 individuals working across the screen industries at all levels of their career, with nearly half actively working in the virtual production industry.

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## Introduction

The creative industries are of considerable importance to the UK economy, contributing £115.9 billion and accounting for 5.9% of the UK economy in 2019 (DCMS 2021). Much of this success is driven by recent substantial growth in the screen industries: video games, TV and film. Around 106,000 people were employed in the UK film industry in 2021, with the production workforce rising from 45,000 to 84,000 between 2012 and 2021 (BFI 2022).

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This is a marked increase compared to other areas of the film industry: film and video distribution rose from 5000 to 7000 in the same time period, whilst the workforce in film exhibition decreased from 18,000 to 14,000 (BFI 2022). Video games have also become a significant part of the UK screen industry, employing the equivalent of 73,370 full time staff, with its gross value added amounting to £5.26 billion in 2019 (BFI 2021). Games development, a sub-sector of the games industry, saw increases in both staff and studios between December 2021 and April 2023, its workforce growing to 25,026 and the total number of jobs supported by the industry increasing to 44,162 (TIGA 2023). This recent growth is predicted to continue, with ScreenSkills (2022) suggesting that film and high end television productions will require an additional 15,130–20,770 full-time equivalent employees by 2025.

Despite its recent success, the UK screen industry has been blighted by persistent skills shortages and skills gaps, and the predicted growth in the industry produces a pressing need for these to be addressed. Following McGuinness, Pouliakas, and Redmond (2017, 2, 8), we understand skills shortages as ‘relat[ing] to a situation whereby employers are unable to fill key vacant posts due to a lack of suitable candidates’, while skill gaps are the ‘extent to which workers lack the skills necessary to perform their current jobs’. A range of issues can cause gaps and shortages in the sector: skilled workers may leave due to poor working conditions (Aust 2022; Ozimek 2021); older workers ‘age out’ of the workforce with their relevant knowledge and networks lost (Hughes and Webber 2023); and early career workers are promoted before they have the required skills, resulting in a skills shortage (Jones, Brereton, and Swords 2022).

These skills gaps and shortages are being further exacerbated because of rapidly changing media practices, which are being caused by an influx of new technological developments. There are multiple examples of how technological developments have changed media practices across the history of the screen industries, from the development of Technicolour in the 1920s (Dixon and Foster 2018) to the proliferation of television in the 1950s (Cook 1990). The influence of technological developments on media practices within the screen industries continues to this day, with new developments (including the development of virtual production (VP), on which this paper will focus) influencing media practices, and subsequently skills requirements. The need for new skills as a result of these new technologies and practices are, therefore, further contributing to existing skills shortages and skills gaps.

When thinking about skills gaps and shortages within a UK context, much of the current focus is on the *technical* skills required to perform certain roles. A 2014 Film Employer Panel identified skills gaps in prosthetics, sound recording and health and safety awareness (Creative Skillset 2014), and a 2017 skills audit of the UK screen industries reiterated these shortages (Carey et al. 2017). Technical skills have also been identified as a key area of shortage in emerging areas including visual effects (VFX) and VP (Bennett et al. 2023). The BFI Future Film Skills Action Plan (2017) highlighted that changes in technology were continuing to drive skills gaps, an issue that was restated in the latest BFI review (2022). As new forms of production, such as VP, start to be used more widely across the screen industries, these technical skills will need to be developed (Bennett et al. 2021; 2023). However, given the rapidly changing media practices of the screen industries and the associated influx of technology, we argue that the continued development of professional skills (such as skills to work as a team, or to communicate well) are equally

important, to ensure the continued growth and development of the screen industries. In addition, as people are increasingly working beyond their original department or field (Bennett et al. 2021), and/or at levels beyond their experience, there is a need for a flexible workforce which can adapt to meet the changing and developing sector.

In this paper, we ask what importance do professional skills have within the changing landscape of the UK screen industries? How is VP, as an example of a disruptive technology within the screen industries, influencing the impotence of these professional skills? To answer these research questions, the paper highlights the importance of 'professional skills' within the rapidly developing and innovative landscape of VP. In doing so, it contributes to existing literature focusing on education and training within the screen industries and media arts, and informs a pedagogy for screen industries education which recognises that the development of professional skills remains as important as the development of technical skills. We recognise that technical skills can overlap with professional skills, but our focus within this paper is for the recognition of the importance of *non-technical* professional skills.

Drawing on interviews carried out with educators and professionals in the UK screen industries sector, the paper opens by discussing how the changing landscape of the screen industries, including sector innovation, and the evolution of production technologies are ultimately influencing the professional skills needed within this media economy. This discussion is exemplified through a case study analysis of VP, a technological innovation disrupting established media practice within the screen industries. VP is a new way of creating film and TV content where virtual environments are captured in real-time 'in camera', rather than added in post-production (Willment and Swords 2023). VP is therefore shifting the production pipelines and workflows, bringing in new technologies including LED walls and game engines. VP is used as the case study within this paper, as by looking at VP the need for professional skills is clear, and this sheds light on what has been unseen in the rest of film and TV for decades (Bennett et al. 2023; Willment and Swords 2023).

## Literature review

### *How to define skills*

Defining the skills and attributes required by graduates entering the labour market has been an ongoing struggle: as Muhamad (2012) explains, various terms including key skills, generic skills, soft skills, and employability skills have been used to describe them. Moreover, the terminology used varies from country to country (Wats and Wats 2009) with the terms 'key competencies', 'soft skills', 'generic skills', or 'employability skills' used in Australia; 'vital competencies' or 'soft skills' in Europe and 'employability skills' or 'workplace know-how' in the United States (Marin-Zapata, Román-Calderón, and Robledo-Ardila 2022). Although each of these are considered vital when considering the 'employability' of new entrants to the labour market, with 'transferable skills' now included in recruitment strategies (Collins-Nelsen et al. 2022), a lack of agreed-upon definition means that employers and employees may be at cross-purposes when recruiting and applying for jobs.

For Bridges, 'transferable' skills are those that 'can be applied either or both: (i) across different cognitive domains or subject areas; (ii) across a variety of social, and in particular

employment, situations' (1993, 45). He notes that these terms are used loosely and often interchangeably, though transferable skills tend to be preferred when people are talking about the application of skills across different social contexts, such as when discussing interpersonal communication, management skills and the ability to work in a team' (Bridges 1993). This broad understanding of transferable skills equally applies today. Transferable skills are broadly applicable across many different fields of work, and it is this broad applicability of transferable skills, which 'makes them particularly useful for a rapidly changing economy, with plenty of uncertainty and disruption' (Collins-Nelsen et al. 2022, 422). This would seem a relevant term to use for the screen industries, particularly given the disruption caused by VP. Yet we argue that the industries are more complex and an alternative term should be used.

In their analysis of the US Accreditation Board for Engineering and Technology (ABET) accreditation criteria, Shuman, Besterfield-Sacre, and McGourty (2005) note how accreditation is premised on two sets of skills requirements, which all engineering baccalaureate graduates should possess. The first of these are focused around the application of engineering knowledge (e.g. the interpretation and application of maths or physics to engineering problems). The second is focused on features such as effective communication and the ability to work in multi-disciplinary teams. This second set of skills has been referred to across the engineering industry as professional skills, the term being commonly adopted to remove the 'naive and occasionally derogatory' fashioning of these skills as 'soft skills' (Shuman, Besterfield-Sacre, and McGourty 2005, 41). A 2017 Skills Audit of the UK Film and Screen Industries for the BFI equally identified particular requirements which those in the industry felt new graduates needed in order to be 'set-ready'. The audit noted that respondents did not mention job specific or technical skills; rather the following were identified as important in new entrants:

**Soft skills**, variously referred to as 'personality', 'having the right attitude', but also to 'have initiative' and 'be a self-starter';

**Technical engagement** was seen as very important, particularly in front-line technical production and post-production roles;

**Broader knowledge of the film and screen industries** and the production process;

Ability to work **collaboratively** and excellent **communication skills**. (Carey et al. 2017, 22)

This mirrors the sector knowledge and skills identified as professional skills by ABET, and also recognises the importance of the sector and its production process. We therefore argue that, in the screen industries, professional skills are a combination of employability skills and what employers frustratingly refer to as *soft* skills, including skills such as communication, working in a team, confidence, flexibility and the ability to apply knowledge to diverse situations. Looking at Nägele and Stalder's (2017) work on defining skill types, we can see similarities with what are sometimes termed basic or generic skills. The assumption from employers is that this group of skills are a necessary component of a screen industry worker's skillset.

We advocate for the use of professional skills rather than soft skills for a series of interconnected reasons which illustrate that they are not basic or generic at all. First, the term soft skills suggest there are other, hard skills. But professional skills are not

easy or straightforward to learn: they require practice, experience and in certain situations, social and cultural capital to facilitate their effective application. These characteristics also mean they are difficult to teach. Second, opportunities to develop these skills are not available to all. Placements, internships and work experience opportunities are unevenly available to potential screen industries workers, with people from marginalised backgrounds less likely to have access to them. Third, this issue is compounded by the need for the necessary social and cultural capital to apply professional skills in the screen industries, where people in positions of power are disproportionately white, male and from privileged backgrounds (Henry and Ryder 2021). Moreover, the socio-historical development of the screen industries has led to the gendering and racialisation of assumptions about workers' talents and rights. This has led to high levels of inequality, discrimination and exclusion in the sector (Ozimek 2021) which compound the issues highlighted above.

It is also important to recognise the importance of professional skills at all levels, not simply for new graduates or entrants. Much of the discussion about soft, core, employability or transferable skills focuses on graduates who are entering the workforce. However what we outline above as professional skills span all aspects of the screen industries: it is as important for heads of department to be able to work in a team as it is a runner; being able to communicate effectively is essential for a commissioner looking to commission new programmes; and a broad understanding of the industry is vital for producers who may be required to adopt new technology from other parts of the screen sector, like VP.

### *The existing skills and training landscape within the UK screen industries*

Skills development in the screen industries has undergone dramatic changes since the mid-1980s in response to the structural changes in the sector (Grugulis and Stoyanova 2009). Cowle (1989) notes that up until the mid-1980s there were only three recognised routes into the UK film and television industry, and only two of those incorporated formal training: attending the National Film School or the BBC's new entrant schemes; or undertaking a degree course. Graduates from the National Film School had no difficulty in finding a job after graduating (Cowle 1989) while those who entered the industry via the BBC were offered what was essentially a structured apprenticeship, providing training and mentoring while also enabling workers to develop their broader knowledge about the industry (Jones, Brereton, and Swords 2022). The publication of the Peacock Report in 1985, following the Peacock Committee review into the financing of the BBC, saw a shift to the casualisation of employment and the use of freelance labour, which in turn led to a decrease in training budgets and subsequently in-house training (Antcliff, Saundry, and Stuart 2007). While art schools had been offering practice-based film education since the 1960s (Petrie 2012), during the 1980s tertiary education teaching institutions (known as Polytechnics) such as those in Sunderland, Glamorgan and Leeds began teaching specialist technical skills such as video engineering (Cowle 1989). The following decade witnessed massive growth in film and media courses across the sector and by the end of the 1990s, following the reassigning of Polytechnics to 'new universities' in 1992, an increasing number of film and media courses were introduced. Despite the proliferation of degree courses in this area, by 2003 there was a perception that these courses



were not delivering the vocational skills which industry required from graduates, and the publication of a national film skills training strategy recommended the identification of a 'select number of practice-based higher education film courses throughout the UK that provide the skills, knowledge and experience needed for individuals to confidently enter the industry direct from education' (Skillset/ UK Film Council 2003, 18) and created 'a limited number of recognised centres of excellence to provide appropriate, high quality and relevant training' (Petrie 2012, 366).

Conversely, the video games industry has had a much shorter evolution. While training in the already-established film and television industries became the focus in the 1980s, the UK games sector began emerging in the early 1980s with a generation of 'bedroom coders', mostly teenagers who programmed games from their bedrooms using home computers such as the Sinclair ZX Spectrum, the Commodore C64 and the Atari ST (Burnham 2001). The growth of the UK video game market in the early 1990s, however, led to a gradual decrease of bedroom coders as consoles from the US and Japan entered the marketplace along with their more sophisticated software. This required the purchase of expensive development tools and hiring larger teams of developers to work on them (Izushi and Aoyama 2006). The first games degree in the UK, the MSc in Computer Games Technology, was established at the University of Abertay, Dundee in 1997. Over 300 games and games-related courses were available in UK HE institutions by 2010 (Ip 2012, 2), while the BFI (2022) records 120 ScreenSkills (successor to Skillset) accredited courses in film and television production alone, including areas such as directing, screenwriting, post-production, sound design and cinematography.

Despite this, and the fact that a range of other training courses are available including bootcamps, short courses, webinars and e-learning (Jones, Brereton, and Swords 2022), skills gaps and shortages still remain across all of the UK screen industries. ScreenSkills identified almost 200 different roles across the sector that were subject to shortages, with '[a]ccountants, line producers, first assistant directors, series producers, storyboard artists, animators and general coders rank among the most commonly reported' (ScreenSkills and Work Foundation 2019, 9). Technological change was also identified as a contributing factor to skills shortages, with the 2017 BFI Skills Audit highlighting skills gaps and shortages for highly specialised craft roles, front line technical roles, and many post-production activities. It should also be noted that skills requirements may also vary depending on the size of the studio. The 2011 NESTA report found that large companies (defined by those employing more than 100 people) were overwhelmingly concerned about graduates' lack of expertise in the specific platforms which they used, and poor technical skills.

However, whilst concerns about limited technical skills still exist, the overwhelming skills gap identified by those working in the sector is professional skills. In the ScreenSkills Assessment (2021), four of the five skills gaps identified among junior crew by employers were professional skills such as team working, interpersonal skills and resilience. In the mid- and senior-level workforce, employers saw interpersonal skills as the main skills priority (2021, 5). The need for professional, or 'soft' skills was reiterated in the 2022 BFI Skills Review, with the need for 'the continuing professional development of crew [to] be recognised as essential' (2022, 94).



## *Emerging technologies and the production landscape of the UK screen industries*

Professional skills are now more important than ever given the changing nature of production, and the evolution of new innovations, such as VP, influencing the film and TV industry. This issue is not new: Skillset (2011) reported that 22% of companies within the creative industries in England identified that multi-skilled talent<sup>1</sup> was in short supply.

Digital technologies have irreversibly changed the film-making process. From the 1960s onwards, developments in computer science technology led to the evolution of new digital tools which could be implemented in the film production process. Film-makers could increasingly add digitally enabled visual effects (VFX) into their production process (Spelthann and Haunschild 2011). Subsequently, more film-makers began to learn about the possibilities of digital effects, with the development of more sophisticated compositing techniques allowing for increasingly complex VFX work being added in post-production. The increased role of digital VFX work has resulted in an increased reliance on those who have the technical skills to be able to facilitate such post-production work (McClellan 2007).

The games industry has also seen change. As noted, new technology in the form of consoles from the US and Japan entering the UK marketplace from the 1990s, fundamentally changed the process by which games were made and both hardware (consoles) and software (games) continue to see radical change, the console market in particular running in six-year cycles with improvements made in each cycle (Lê, Massé, and Paris 2013). From cartridges to 5 inch floppy disks and CD-Roms, new technology has led to developments in both physical hardware and playability, and the widespread introduction of the internet also opened up games to expansion. More recently, the video game industry has seen a move into new game types, formats and platforms, including social gaming on sites like Facebook, and mobile games. Game engines are also being utilised beyond the games industry as training tools in driving, medical and military simulations (Gunes and Dilipak 2021; Wang 2020; Wesenraft and Clancy 2019).

We are now witnessing another shift within the production landscape given the development of VP technologies and approaches. VP has been hailed as innovative as it offers more flexible production methods, and a 'technofix' with the potential to make film and TV carbon neutral. As a result of COVID-19 and associated restrictions on travel, the use of VP in film and TV has proliferated including in Disney's *'Star Wars: The Mandalorian'*, the *Barbie* movie and Netflix's *'1899'*. The VP industry is predicted to have an annual growth rate of 18.2% globally and the market is predicted to be worth \$6.78 billion by 2030 (Grand View Research 2023).

VP brings together digital technologies used within other media industries to the film and TV sector. Firstly, VP relies upon game engines to function. A game engine is a software development programme which was originally used and developed to create video games. It works by laying a framework which allows the user to create something more easily than if they had to make something from scratch, typically using a 2D or 3D rendering engine. Game engines are now being used for different forms of visualisation and collaboration including for VP, where they are used to create virtual environments, props and characters which are captured in camera in real-time (Willment and Swords 2023). The virtual environments which are created using game engines are often displayed on LED

volumes (large LED panels or screens) initially developed in the live events sector, but which were subsequently combined with technological developments in aviation and military flight simulation systems. LED volumes represent a significant technological progression from simple 'backdrop' technologies (such as greenscreen), as they allow for dynamic real-time environments to be displayed which actors can see and react to, creating a fully immersive environment. The volumes are also able to create ambient lighting and accurate reflections and parallax. Parallax is the perceptual difference in an object's position when it is seen from different points of view, as a result of the dynamic technology of the game engines (Willment and Swords 2023).

Due to the combination of different technologies and approaches used in VP, VP companies are seeking to recruit workers from other industries such as live events and video games, since these workers often have the technical competencies for harnessing the technologies underpinning VP. Ultimately, VP is a creative technology development within the film and TV industry which is forcing the collaboration of workers from across the industries of traditional film and TV, gaming and live events (Willment and Swords 2023), industries that traditionally had minimal crossover in terms of working practices, workflows, and techniques. The relatively new (and therefore unestablished) production pipelines and the diversity of the workers behind them, evidence the cross-cutting nature of VP and demonstrate how VP functions as a useful case study for demonstrating how the advent of innovation within different media ecologies and landscapes can result in the retained need for professional skills. Again, by focusing on VP as a case study, the continued need for professional skills remains evident, which is something that has been unseen within the rest of the UK screen industries for decades.

## Methodology

The qualitative data which underpins this research were gathered through semi-structured interviews and focus groups, which allowed us to use participants' own opinions, experiences and narratives to understand and examine the importance of professional skills within a screen industries landscape being disrupted by new technologies, such as VP. The research was subjected to University of York's full ethical review and all participants completed a consent form indicating their consent to be involved in the research. To protect their identity, participant responses were anonymised and a descriptive reference relating to their job role was assigned to each participant.

Three data sets on skills gaps and shortages in the UK screen industries provide the basis for this empirical work. These include insights from: screen industries training providers, individuals who were working in VP and who were familiar with the impact of the technology on industry, and individuals who had recently completed some form of screen industries training provision. These groups provided data on intersecting perspectives without privileging a single view point.

The first dataset was gathered through semi-structured interviews with 39 people working across the screen industries. Interviewees were identified through desk-based research, predominantly using internet search engines to identify companies and individuals, the use of crew databases, social media and LinkedIn and other online profiles. In some cases, individuals who had previously taken part in Screen Industries Growth Network (SIGN; [screen-network.org.uk](http://screen-network.org.uk)) training events were approached. No specific

job roles were targeted in the interview recruitment process in order to initiate conversations about skills gaps and training provision from a range of perspectives. Several of those working in training provider organisations stated that they had previously worked in film or TV production but moved into training after they had children; half of the games professionals interviewed had previously worked in Higher Education, mainly teaching on games-related degree programmes. The majority of practitioners interviewed were new entrants to the industry or early career entrants, on whom the majority of training provision is focused (Carey et al. 2017).

The second data set comprises semi-structured interviews with 30 professionals working in VP across the UK, the US and Europe. Participants were recruited through the researchers' participation at three industry events focused on the development of VP within the screen industries. Follow-up messages were sent via email to individuals who the researchers had met at these events. Additional participants were then recruited through snowball sampling or through a speculative request for participation shared by the authors on LinkedIn. We used purposive sampling to ensure interviewees worked across different areas of VP from skills and training provision to studio facilities, to the production of content. Interview questions were focused on themes including the opportunities and challenges of VP for skills provision, what new skills are needed for the rapidly changing film and television industry, and the current state of skills and training provision within the screen industries. Both sets of interviews (with VP practitioners and screen industry workers) were conducted online via online video conferencing software, and lasted between 60 and 90 minutes.

The third data set is drawn from two focus groups which were conducted to learn more about skills and training provision within the screen industries. The first focus group (Focus Group 1) consisted of individuals who had previously been involved in training courses within the screen industries; the second (Focus Group 2) consisted of individuals who had recently attended a training course specifically focused on VP. Each of the focus groups were conducted in person, one in Leeds and one in York (the UK), by an experienced facilitator. The themes introduced within the focus groups included discussion on skills and training provision, what current skills gaps exist within the industry, how participants felt about upskilling/reskilling themselves and how they felt VP had influenced both their own skills, and the skills and training landscape within the UK. Each focus group lasted roughly two hours. Notes were made by hand to include key quotes from participants directly after each of the focus group sessions. All interviews and focus group notes were transcribed by hand; all interview material and focus group notes were coded in NVivo, and analysed using a mixture of inductive and deductive coding.

## **Research findings: VP and the continual importance of professional skills**

### ***Continued importance of professional skills across all areas of the screen industries***

In December 2023, the BFI released its skills scoping study for the digital content production sectors. The report highlighted how emerging technologies (including video games and VP) were all contributing to the continued success of the screen industries.

However, they also found that skills gaps and shortages were prevalent across the UK's digital content production sectors, including at mid-and senior level. The report identified a notable skills gap among recent graduates, particularly in 'professional' skills around working with different people, team working and efficient communication (BFI 2023).

One of the most detailed investigations into the skills required for VP is that of Bennett et al. (2021) who develop a 'skills mandala' to highlight the various creative and technical skills workers need to possess in order to progress in VP, and the associated bringing 'together of departments that had previously worked sequentially into simultaneous interaction ... Hands-on experience of VP and its associated technologies remains low, with demand for talent and training far outstripping supply' (Bennett et al. 2021, 6). The VP skills 'mandala' identifies two main areas of skills shortages. The first is around creative and communicative skills, including the skills needed to manage production planning and associated interactions between different departments, such as the virtual and physical art departments. This was a factor which was also identified within our interviews:

In VP, because it's so new, there's just so many different types of things to do, or challenges. So you need technical people, you need operators who are operating the software and running the stage and [you need] good communicators on the radios to keep things moving, to react to any requests from the DP [director of photography], who's in the volume. So yeah, there's kind of a mix of operators and problem solvers. (Virtual production supervisor, North American virtual production company)

The second skills shortage is focused around technical skills such as the 3D modelling skills required for VP, specific game engine skills and wider digital skills such as asset building, coding or plugin design. Crucially, the Bennett et al. (2021) report identifies the need for 'highly creative, technical artists who can write code, problem-solve and communicate effectively with creatives while fixing complex technical issues; all within the fast-paced film and TV set environment' (2021, 4). As an industry professional told us:

So Virtual Art department, they need to be building environments and assets in Unreal Engine that can be optimised for use in a volume. And simply put, there aren't enough artists out there. In order to create those fantastic environments, and to create the worlds that get shot in camera, you need teams of artists to build those. And right now, there's a very limited number of skilled practitioners in that sphere. (Department head, virtual production studio)

Although delimitation between creative and technical skills remains useful for highlighting gaps within specific technological or creative proficiencies, this siloing of creative and technical skills downplays the inherent importance of professional skills for *all* workers across the VP pipeline. VP, therefore, provides a useful case study for demonstrating the importance of professional skills for the screen industries (and beyond) which are undergoing new, disruptive technological change resulting in a shifting production landscape. The existing literature on the skills required for VP highlights both the technical competencies needed, alongside the creative and communicative skills required to manage the new workflows and pipelines associated with VP. However, across both the technical and creative/communication sides of VP, professional skills remain vital. This is because VP presents a new and disruptive challenge to the previously siloed

ways of working within the film and television industry. VP technologies and ways of working are still evolving and changing rapidly, which highlights the continuing importance of professional skills such as communication:

Well, there's like some formal roles, like the stage operator, but I would say there's like soft skills that need to be learned. We can put roles on a piece of paper and say, we need more virtual production stage operators. We need people that are skilled in environment design, and understand how to optimise for these real time applications. We have a need for LED techs [technicians]. But you actually really need people in those different disciplines that understand the greater context of the role they are in and that's challenging to put on a piece of paper. And I found, regardless of how much you talk that through in the interview situation, you'll never know how prepared someone is until you've put them in that situation. (Founder, North American virtual production studio network)

Thus it is important for training providers to think through and account for how emergent technologies and shifting production landscapes might include or exclude different groups. The paper therefore uses the findings from the VP case study, as motivation for developing recommendations for media training providers and their provision of new educational programmes and associated pedagogies.

Before highlighting the professional skills required specifically for VP, it is important to outline the continued importance of professional skills across all areas of the screen industries, including for VP. The importance of these skills was highlighted by interviewees in different professions and career stages across the sector. One training provider noted how these 'soft' skills had previously been seen as secondary to technical skills, but were actually fundamental to industry success on both an individual and company level:

There's a real drive now to call them professional skills, because we realised that if you don't have those, you will not succeed. We can teach the technical skills very quickly. We can't teach following an instruction or actually listening to what somebody's saying and writing it down. And they are the skills that you need to do well in your profession. The soft skills had always been considered secondary. I think the word soft is kind of a word that makes you not take it seriously. Whereas in actual fact, it is the absolute crux of it. (Founder, film and television industry training company)

While a university lecturer, who also runs a games company, noted that the main skills gap he sees with students is not on the technical side but communication skills they lack: 'They struggle to communicate either their own ideas, or thoughts and feedback on a given brief or idea. So it's a soft skill, but it's, it's paramount to everything you do within the company'.

### ***Professional skills as fundamental to sustainable career progression***

Professional skills, however, are not just a requirement for new entrants or early career workers. One of the recurring issues identified in interviews was that of people being promoted before they were ready. There was a sense that, particularly following Covid-19 and the subsequent uptake in production, the demand for work over-rode the need to ensure skills gaps were filled. Developing professional skills such as adaptability and communication could help to support workers in new managerial positions when they have been quickly promoted up the career ladder:

I feel like when it's really busy, people get chucked up the ladder, not because they're necessarily ready or you're ready to support them, but because there's a demand for it. But then there's skill gaps up that ladder, because sometimes they've just not had enough time. Like, if you've been a supervisor on one job once, that doesn't mean you're necessarily ready to step up and be the head of a department. But if there's a need for it, and a demand for it, like, nobody's gonna be like, we're not going to (Production manager, media production company)

The 2021 ScreenSkills assessment suggested that 'tailoring the training to different career stages would help employers and staff identify the training to best meet their need' (ScreenSkills 2021, 31). Drawing on the ScreenSkills career grades, Jones, Brereton, and Swords (2022) propose a structured form of training which provides new entrants with the skills and knowledge they need, while offering those in senior positions a plan for training that includes higher level professional skills, such as having difficult managerial conversations. Senior-level practitioners and educators were also understood to be integral in promoting and driving the commitment to professional skills development, which is required to sustain the success of VP. Bringing senior-level practitioners in from other industries who have experience of leadership, management, communication and adaptability thus sets the tone for what is expected in the VP environment, and models good practice seen within other industries.

### *Professional skills and the informal recruitment process*

Several interviewees also suggested that professional skills should also be foregrounded in recruitment practices, citing the current practice of the credits list used in film and TV as not fit for purpose as it shows experience, but not a worker's full skillset, such as their ability to work with others:

One of my things I'm championing for is to do away with the credits list because I get a little frustrated, when it's all like, 'Well, what have you worked on before?' And I'm like, 'What have you done before? What have you been up to?' because it's those transferable skills that we need. You obviously need experience, and I'm not discounting experience. But I think we have to look more broadly at people's transferable skills and what they bring across the board, rather than the first question being 'What have you worked on before?' (Freelance training provider)

Although employers discussed wanting more staff with professional skills, informal recruitment processes still dominate within the industry, with recruitment often focused around personal networks, recommendations through friends, or using tools which do not indicate skills (BECTU 2021; Pinoncelly and Washington-Ihime 2019):

There's not a lot of training for heads of department and things like that, I don't think, about managing people and training people up. Because it's such an industry of 'Oh I hired so and so's cousin, or this is my mate', it's so bad for that. You're not always getting the best person. [But] when you're working with somebody completely separate to you, who you may have a completely different personality, there might be a real personality clash. You as the manager have to know how to manage people, and it's not about personalities, not being your pal, it's about being able to get the best out of them. I actually think a lot of it needs to kind of start up near the top and train heads of department to train their team there. (Production manager, media production company)

These informal recruitment practices disadvantage many entrants to the screen industries, who do not have existing networks. Twenty-three percent of respondents to BECTU's

(2021) survey of the UK television industry stated that they had got their first career break in TV through personal contacts, and 76% had experience of people getting jobs they were less qualified for than others, due to their personal connections. Getting on-set experience was also often premised on the ability for individuals to undertake internships or 'work experience' which was predominantly unpaid. Thirty-seven percent of BECTU respondents stated that their first career break in TV was through an unpaid placement or work experience (BECTU 2021).

### *The importance of adaptability, communication and patience as professional skills*

Within VP, producers or directors often work closely with game engine operators or computer programmers to complete a production. The close proximity of workers from different disciplinary backgrounds means that communication skills and patience are necessary. These skills were cited as central to ensuring producers/directors can explain their vision, and the technical operators are able to communicate the possibilities and challenges of realising it. Professional skills such as ability to communicate were again seen as a bigger asset than formal qualifications in many instances in VP:

I think an emotional intelligence and understanding of the politics, hierarchies and communication ways on set is a huge one. I was speaking to someone in one of the big visual effects houses in London, and she says at the moment, she is more or less handpicking, based on as long as they got a vague qualification. It's how she thinks they'll fit in her team as a human, which I think says a lot. (Virtual production lead, major broadcaster)

Adaptability was also noted as an important skill within VP working practices. VP is a huge disruptor, and as such, there has been some resistance to adoption of this technology. As the technology is so new, there are also multiple standards and ways of working with it. Therefore, a willingness to adapt to VP technologies and to learn about how one specific area of work may affect other areas of the VP pipeline was noted as a highly valued professional skill:

Live events, I think they're more adaptable than the gaming guys, because it's more people orientated. What holds them back is like, trying to learn more about the production process. So if you get an LED technician, I bet you nine times out of 10, he won't talk to the gaffer in the lighting crew to learn about how what he's doing affects the lighting, because the lighting will then affect the camera crew, and the costume design and the actor. So it's, I mean, you get a few of them, like you get your unicorn that does want to learn. (Director of virtual production, AV technology company)

Individuals from different sectors coming to work in VP may not have experience of working with others from across different disciplines. Ensuring that team working or group projects are included in the structure of screen industries training, is vital to providing individuals with the opportunity to develop these skills alongside their peers, in an environment where mistakes are encouraged as part of the learning process, and not within the high-pressure on-set environment.

The ability to be adaptable and, crucially, to perform well under pressure was again identified as an incredibly important professional skill. This is especially true for individuals who may not be used to the high-pressure environment of working on set:



I don't think there's a fundamental issue here. It's just how we use our language, and also difference of work culture. I think that there is a level of stress and demand in production that actually a lot of developers from technical backgrounds will not have experienced on the set. Like there's this, you'll get shouted out, you will have to have some really scary people saying they need something right now, when really, you know, that's not possible. (Virtual production lead, major broadcaster)

This need to perform well under pressure and be adaptable to the changing needs and technological issues associated with VP may be a contributing factor to the overall skills shortage in the sector, as workers from other industries are reluctant to make the move into the new, overtly pressurised on-set working environments of VP:

You know, getting people to move from working in games is hard, because generally, you know, it's a good industry to work in, it's well remunerated, it's creatively rewarding. Generally, if you're designing games, you're probably pretty happy in that space. (Head of studio, International VFX / VP company)

### *Professional skill development helping to prepare workers for the realities of screen industries work*

Many interviewees therefore felt that skills and training courses in VP should do more to prepare individuals to deal with the harsh realities of work within the screen industries. The UK screen industries are terribly unequal. 90% of the industry is white; 56% is male; 63% of jobs are concentrated in London/South East England; only 7% of workers are disabled compared to 20% in the working age population (ScreenSkills 2019); '61% of Global Majority respondents ... had experienced racism at work' (Rogers and Ryder 2022); workers over 50 account for just 19% of the sector compared to 32% in the wider economy (Ofcom, 2021) and '21% of carers find it ... difficult to get by' (Wilkes, Carey, and Florrisson 2020). This workforce profile has been formed by persistent asymmetrical power relations that (re)produce high levels of precarity, reinforce excessive working hours (Swords et al. 2022), limit opportunities for women's career advancement and exacerbate mental health crises (Wilkes, Carey, and Florrisson 2020).

Here, a focus on developing professional skills of communication, adaptability and patience may help to mitigate against some of these problems. The development of these professional skills could help address the industry skills shortage, by ensuring workers are better informed about on-set realities of screen industries work and specifically, screen industries work in VP:

I was kind of angry afterwards that the course leader presented such a rosy picture to us during the course and would have rather he was more up front about what problems we might be facing. (Focus group 2, participant 5)

Workers from the live events industry were repeatedly singled out as individuals who embodied professional skills (such as those around adaptability), which made them well placed to deal with the unexpected nature and fast-paced environment of VP. This finding highlights a potential avenue of skills and training development, with the focus on problem solving and adaptability which is evident in live event industry training being embedded and replicated within VP training provision:

The people who have worked in live again, they're used to kind of the show must go on mentality and even if isn't exactly what we thought we would do. You know, the show starts at eight o'clock and it needs to start at eight o'clock. So we're prepared to be probably a bit more pragmatic about technical solutions in order to get the show on sort of thing, but equally pushing the boundaries as well. (Development director, production studio)

## Conclusion

As we have argued, the shifting production landscape, the emergence of new technologies, and the increasingly interdisciplinary nature of production requires professional skills at all levels of the UK screen industries workforce. The need for and importance of professional skills such as communication, the ability to work in a team, problem solving skills and leadership/management skills are highlighted by those working in the screen industries, the VP sector, as well as those in education and training, and the importance of these skills should not be underestimated.

VP is undoubtedly a disruptive technology within the media industries, and this paper demonstrates the continuing importance of professional skills as a means to contend with this disruption. As new digital technologies (such as AI) continue to emerge and further disturb the established order of many media industries, the example of VP shows the importance of future workers remaining equipped with professional skills, as these new sub-sectors of the media industries continue to evolve and develop, bringing with them new workflows and ways of working. Using VP as a case study emphasises why professional skills are fundamental to the shifting media landscape of the screen industries, as well as offering potential ways in which they can be developed. As the boundaries become blurred between film and TV, video games and live events, crew and staff from these disparate industries need to be able to work together effectively at all levels in VP. While professional skills are important throughout the screen industries and beyond, the unique position of VP and its integration of different sectors and technologies demonstrates the vital need for professional skill development, which has implications for media education and training provision across the UK screen industries. The paper has also highlighted the importance of education in developing professional skills, as there is currently a gap between employer expectations and higher education. Recent research into the games industry (Jones, Brereton, and Swords 2022) demonstrated that professional skills are the skills most in demand - just as is the case in film and television:

We're very, very good at teaching technical skills. That's not necessarily what employers want. You can teach technical skills. And you can acquire technical skills, it's much harder to acquire the soft skills, but even just the wider understanding of the world, you know. (HE lecturer, male)

This is not new: in 2011 SkillSet reported that 22% of companies within the creative industries in England identified that multi-skilled talent was in short supply and little seems to have changed. As Jones, Swords and Brereton point out, 'as employability becomes a buzzword in industry and education, professional skills become increasingly important' (2022, 17). The findings within the paper will help to inform skills-focused curriculum development for VP, across both further and higher education providers. The paper therefore makes three recommendations to ensure that the importance of professional skills be recognised by both the industry and educators:

- (1) Seventy percent of individuals with management responsibilities felt that they had not received adequate training in the practical and legal aspects of managing people (BECTU 2021). One recommendation of this paper then, is that the UK screen industries ensure that training opportunities are available and tailored to different career levels, and that senior-level practitioners and educators embody a commitment to further developing their own professional skills and those within the broader workforce.
- (2) Absence of social capital (in the form of personal networks) and/or economic capital (e.g. the financial resources to be able to pursue an unpaid entry level role) are creating huge inequalities, with those lacking these capitals being unable to enter and progress within the screen industries (Pinoncelly and Washington-Ihieme 2019). Another key recommendation of this paper for the UK screen industries then, is the provision of paid opportunities for all individuals to gain experience working on set. In instances where opportunities to experience working on set are not possible, lived-experience educational resources (such as Play Your Way Into Production ([playyourwayintoproduction.com](http://playyourwayintoproduction.com)), a game developed by the SIGN to give potential new entrants to the industry experience of the tasks they may be expected to carry out) should be utilised to help provide individuals with experience of on-set scenarios, many of which highlight the continued importance of professional skills.
- (3) The coming-together of individuals from different disciplinary backgrounds to a completely new way of working in VP highlights the importance of professional skills around team working. Another recommendation for UK screen industries training provision then, is for more widespread use and development of specific team working exercises. Many new entrants to the UK screen industries come from college and university environments and are often young adults who may not have gained experience in a formal workplace, and so are unskilled in areas such as team working, communication, time management and organising themselves or others.

VP has been just one of many significant disruptions to the screen industries in recent years and yet as technology progresses, the need for more sustainable production practices is realised, and working patterns, affected by Covid-19, continue to change, more disruptions are likely to occur. Professional skills seem set not only to maintain their importance, but to significantly increase in importance as the landscape of technology driven media practice continues to evolve.

## Note

1. Skillset defines multi-skilling as 'an understanding of different technology platforms and their impact on content development and digital workflow, and new approaches to working in cross-functional creative/technical teams within and across companies' (2011, 16).

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