Skills Scoping Study for the UK's Digital Content Production Sectors

Report to the British Film Institute by Olsberg•SPI

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OLSBERG•SPI

CONTENTS

GLOSSARY OF KEY TERMS

- **AAA –** A classification used to indicate high-budget, high-profile video games that are generally produced and distributed by large, well-known publishers. These video games typically have higher development and marketing budgets than other tiers of video games
- **AI –** Artificial intelligence
- **Apprenticeship –** A paid job that offers hands-on work experience alongside educational opportunities
- **APVV –** Animation, post-production, video games, and visual effects
- **ATR –** Animation Tax Relief
- **Augmented Reality (AR) –** A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view. Unlike Mixed Reality, the computer-generated image is overlaid rather than anchored and responsive to real life features
- **BAME** – Black, Asian, Minority Ethnic
- **Big Tech –** Major multinational technology companies
- **BFI –** British Film Institute
- **BFI Skills Cluster –** National Lottery funding over three years (2023-2026) that is supporting skills development and training across the UK, delivered through six national and regional Skills Clusters
- **Bootcamps –** Short-term training programmes to learn and advance specific skills
- **CGI –** Computer-generated imagery
- **CPD –** Continuous Professional Development; the process of training and developing professional knowledge and skills through independent, participation-based or interactive learning
- **Creative Industries –** Industries which have their origin in individual creativity, skills and talent, and which have a potential for wealth and job creation through the generation and exploitation of intellectual property
- **EDI –** Equity, Diversity and Inclusion
- **DCMS –** Department for Culture, Media and Sport
- **Digital content production –** Defined as the production related to any digital content including animation, post-production, video games, visual effects and emerging tech for the purposes of this Study
- **Emerging tech –** Defined as immersive and interactive technology
- **FEIs –** Further Education Institutions
- **FinTech** – Financial technology, where computer programmes and other technology are used to support or enable banking and financial services
- **FX –** Special effects
- **GVA –** Gross Value Added
- **Hard skills –** Technical and job-specific skills that can be easily measured and are often acquired through formal education, training or on-the-job experience; examples include programming languages, data analysis, machine operation or foreign languages
- **HETV –** High-end television; typically, a production made at the cost of £1 million or above per broadcast hour, and has a broadcast timeslot greater than 30 minutes
- **HEIs –** Higher Education Institutions
- **Immersive tech –** Immersive technologies that create new experiences by enabling engagement with a digital or simulated reality; includes technologies such as Augmented Reality (AR) and Virtual Reality (VR), and is part of the emerging tech sector
- **Long-term –** Over five years from the current year
- **Medium-term –** Three to five years from the current year

- **Mixed Reality (MR)** – A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view; unlike Augmented Reality, the computer-generated image is anchored and interactive to real life features
- **People skills –** Skills related to the ability to deal with, influence and communicate effectively with other people; also referred to as 'professional skills' or 'soft skills'
- **Physical content production –** Defined as the production related to scripted film and television content for the purposes of this Study
- **POC –** Person/people of Colour
- **ScreenSkills –** The UK's industry-led skills body for the screen industries, covering film, television (including children's, unscripted and high-end), VFX (visual effects), animation and video games
- **Short-term –** Less than three years from the current year
- **SKILLfull –** A UK-based organisation providing services such as training and skills development, strategy and business development, and research in the video games sector
- **Skills gap –** Refers to the difference between the skills required for a particular job role and the skills possessed by an individual or a workforce; a skills gap indicates that employees or job seekers do not possess the necessary skills, knowledge or experience to effectively perform their jobs
- **Skills deficit –** A situation in which the overall skills level of a workforce is lower than the required skills level to achieve optimal productivity and performance; this can result from a combination of skills gaps and skills shortages, leading to a negative impact on the economy and on overall business performance
- **Skills development** – The process of acquiring and enhancing skills, knowledge and abilities through various methods, such as education, training and practical experience; skills development initiatives aim to improve the overall skill level of the workforce, address skills gaps and shortages, and promote economic growth and competitiveness
- **Skills flow –** The movement and transfer of skills within and between industries, regions and countries; skills flow is often characterised by the movement of skilled individuals and can be influenced by factors such as labour mobility, migration, and workforce development policies; skills flow helps to balance the supply and demand of skilled workers and contributes to economic growth and competitiveness
- **Skills shortage –** Occurs when there is a lack of qualified candidates in the labour market to fill the available job positions that require specific skills; skills shortages can be caused by various factors, such as rapid technological changes, retention and recruitment issues, new industry developments or insufficient training and education programmes
- **Skill set –** Refers to a collection of specific skills, abilities, knowledge and expertise that an individual possesses or has acquired through training, education or experience in a particular domain or field; skill sets are often used to evaluate a person's qualifications for a specific job or role, and they can be grouped into various categories, such as hard skills, people skills, and transferable skills
- **SME –** Small and medium sized enterprises
- **Transferable skills –** These are skills that can be applied across various industries, roles, or job functions; examples include project management, critical thinking and negotiation
- **TIGA –** The Independent Game Developers' Association, a trade association representing the business and commercial interests of video and computer games developers in the UK and Europe
- **Ukie –** UK Interactive Entertainment, a trade association for the UK's video games sector

- **UK Screen Alliance –** a trade organisation for post-production, VFX, animation, film and television studios and production services
- **UI –** User interface
- **UX –** User experience
- **VFX –** Visual effects
- **Virtual Production –** A method of filmmaking and television production that uses computer-generated imagery (CGI), Augmented Reality (AR), motion capture, and other technologies to create realistic environments and effects on a virtual set; it allows filmmakers the freedom to create sweeping vistas and vast landscapes; virtual production can be used for both live-action and animated projects
- **Virtual Reality (VR) –** A technology that provides a three-dimensional simulation of a computer-generated image or environment.

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1. EXECUTIVE SUMMARY

1.1. Introduction and Purpose

In January 2023, international screen sector consultancy Olsberg•SPI ('**SPI**') was commissioned by the British Film Institute ('**BFI**') to undertake a skills scoping study for the UK's animation, post-production, video games, and VFX ('**APVV**') sectors, as well as for emerging forms of screen content, defined as immersive and interactive ('**emerging tech**'). For the purposes of this scoping study (the '**Study**'), APVV and emerging tech are collectively referred to as **digital content production sectors**.

This Study was undertaken by SPI, with additional input from Kate O'Connor Consulting. This report draws on numerous elements of independent research sources including consultations, focus groups, and desk research.

This Study follows the *BFI Skills Review 2022*,[1] which was commissioned by the DCMS and chiefly focused on the UK's scripted film and HETV production sectors, assessing the key skills challenges they face, as well as existing initiatives to solve them.

This Study was conducted at a time when the UK's digital content production sectors were experiencing substantial growth, driven by strong consumer demand, lucrative international commissions, and collaborations with the UK and global tech sectors. Further, there has been substantial governmental and private investment into the UK's digital content production sectors.

This Study looked specifically at the following areas:

- **The current picture –** Providing an overview of the wider technological and policy factors affecting the digital content production sectors, the key skills and roles required in these sectors, and the existing skills gaps and shortages
- **The future picture –** Highlighting the required short-term (less than three years), medium-term (three to five years' time) and long-term (over five years' time) skills, and how suitable existing skills training is to meet these needs
- **Future research needs –** Providing recommendations for potential future research and avenues of inquiry.

As an initial scoping study, this report delivers an overview of the breadth and depth of skills that currently exist, how they interact and flow between the sectors, which skills are likely to be needed in the future, and the suitability of current training to close the skills gaps. Future research is recommended to test and develop the findings and conclusions of this scoping study.

The Study's findings and recommendations will help to inform a range of key stakeholders about the status of skills and training in the identified sectors, helping the development of their strategic plans and actions to address the gaps and shortages. These include:

- **Individuals** currently or potentially working in the digital content production sectors
- **Employers** assessing their own workforce's skills gaps and shortages
- **Training and education providers** looking to align their training with the industry's skills needs
- **Government, trade bodies and policymakers** designing policies to address skills-related issues.

The Skills Task Force for the Screen Sector ('**Task Force'**) is a particularly important stakeholder for this Study. It was convened in response to the

[1] *BFI Skills Review 2022: Workforce development in the scripted film and high-end television production sector*. BFI, 2022

BFI Skills Review 2022 to produce and support the delivery of a plan to address long-term skills shortages, gaps, and related challenges. The Task Force is chaired by creative executive Georgia Brown and is comprised of senior representatives from all the major broadcasters, studios and streamers, as well as key sector bodies. The focus of the Task Force was to look at skills in physical production across film and television, with interdependencies with animation, post-production, and VFX recognised in relevant workstreams (the animation, post-production and VFX sectors have some representation on the Task Force). When the Task Force was convened, it was suggested that a second phase of the work would further address these sectors via a dedicated workstream. SPI has been engaging with the Chair and some members of the Task Force during the production of this Study. Video games and immersive technologies are not currently in scope of the Task Force's work.

It is critical that the research and findings of this Study are viewed alongside those of the previous *BFI Skills Review 2022*, given that there are shared skills challenges faced by the scripted film and HETV production sectors and the digital content production sectors.

1.2. Context for Study

Over the last 20 years, the global screen sector has been transformed. Increasingly, the images we see on screen have been created digitally rather than filmed live. Digital content production has accelerated in the last five years through significant innovations in technology, as well as unprecedented consumer demand.

Due to the high demand for high-quality visual experiences, companies and individuals creating digital content have become integral to the creation of feature films, television series and video games; they also compete for skilled workers with other sectors, such as the tech industries. Together, the digital content production sectors are creating an abundance of new content, memorable experiences, and several billion pounds sterling in revenue, as well as numerous job opportunities across the UK.

At the same time, this high demand for digital content has caused critical production and skills challenges which need to be addressed to ensure that the UK's screen sector retains its strong global reputation. These challenges are driven by several factors, including:

- Ongoing skills gaps and shortages, where Continuous Professional Development (CPD) and formal training need to be constantly reviewed and updated in the light of new types of technology and workflows
- Loss of skilled workers to competing digital content production companies, based in established production hubs in the UK and overseas, and from adjacent sectors
- Recent job losses in the UK film, TV and digital industries resulting from the actors' (SAG-AFTRA) and writers' (WGA) strikes in the US.

These challenges are acute, particularly for underfinanced businesses within the studied sectors. Such businesses are unable to consistently invest in CPD for their staff, which is required to keep up with the skills demands of rapidly changing sectors.

While research has been undertaken within the individual digital content production sectors, with clear data gaps in the sectors' size, shape and trajectory, the findings and conclusions of this scoping study confirm, and provide new evidence of, the sector-specific and shared issues.

1.3. Key Conclusions

The Study's key conclusions are:[2]

1. **The digital content production sectors are a major UK success story, with a strong global reputation.[3] Collectively, the sectors are critical elements of the UK's creative industries as well as the wider tech industries.** These sectors generate significant economic value to the UK economy,[4] are at the forefront of innovation, and have strong potential for further growth. They are driven by global demand for digital content, as well as public and private investment. With technology and innovation at their core, the digital content production sectors are fundamental to fulfilling the ambitions of wider sector strategies laid out in the Creative Industries Sector Vision, published in June 2023 as a joint government and industry plan to work together to unlock growth potential.[5] Targeted and continued skills development is essential for ensuring that growth is sustainable, especially against international competition from Canada, France, Ireland, Spain and other jurisdictions that offer sizable tax reliefs and/or beneficial working conditions for digital sectors workforce.
2. **Despite projected growth, the UK's digital content production sectors are experiencing a period of increased and complex uncertainty.** This uncertainty is a consequence of multiple factors including rapid technical advances, particularly in applied Artificial Intelligence (AI) technology, increased international competition, and changing levels of commissioning spend, especially with some retrenchment of expenditure from major studios, detailed in Section 2.3.2, and recent US actors' and writers' strike action pausing transnational projects. All these have prompted the redesign of traditional processes, which requires new skills, including both sector-specific technical skills and new management skills reflecting more fluid and virtual ways of working.
3. **As a result of sector-specific and cross-sectoral challenges, companies across the digital content production sectors struggle to establish effective and sustainable skills training programmes.** Training provision is impacted differently in each of the digital content production sectors, due to a variety of business models and markets. Service providers (VFX and post-production sectors) struggle to secure skilled workers due to working in a highly competitive, international market that is sensitive to changes in prices and variation in commissions. Amongst content creators (specifically video games, animation, and emerging tech sectors), it is common to find under-financed microbusinesses who hire freelancers on a project-specific basis, resulting in high staff turnover, hindering knowledge sharing, consistent professional development, and effective planning for quality training. Larger established businesses are more likely to have well-financed training programmes, while smaller businesses regularly lack the funds and capacity for sustained skills training.
4. **Skills gaps and shortages are prevalent across the UK's digital content production sectors, particularly at the mid and senior levels**. This is for several reasons. **Firstly**, during and including the years following the COVID-19 pandemic, the workforce was ill-

[2] The specific underlying findings are summarised at the start of each related section of this report

[3] Major Hollywood studio releases including Disney's *The Lion King* (2019), which grossed over $1.6 billion worldwide, were made utilising the strong talent base and existing infrastructure in the UK; *Grand Theft Auto V* (2013), one of the most successful video games of all time, was developed by Rockstar North; virtual reality experience *Goliath: Playing with Reality* (2021), created by UK company We Are Anagram, was recognised for its innovation and creativity with an award at the Venice International Film Festival in 2021

[4] The latest sector economic statistics are found in section 2.3

[5] *Creative Industries Sector Vision*. Department for Culture, Media and Sport, 20th June 2023

equipped to meet the surging demand for UK digital screen content, especially in the video games and VFX sectors. This emphasised existing critical skills shortages and gaps, as well as creating new ones. While this surge in demand has largely come to an end, the skills gaps and shortages have been further accelerated by the recent US actors' and writers' strikes, which paused transnational production within the UK's digital content production sector, and also by the retrenchment of commissioning expenditure from major studios. Skills shortage issues are likely to continue for these and the subsequently listed reasons. **Secondly**, there is a continued migration of skilled workers to other companies, sectors, and jurisdictions, especially in animation and VFX – chiefly driven by higher salaries and training and promotion opportunities – which are not being readily replaced. **Thirdly**, there is insufficient and inconsistent training investment, especially in smaller companies and for workers who were rapidly promoted and / or took on more responsibility to meet the increased demand. Skills gaps and shortages are most acutely felt at the mid and senior levels as these are the most critical for providing key leadership responsibilities and high-quality technical skills across a range of workflows and projects. Further, it is at these levels that valuable skilled talent is most readily being hired / poached by other companies, sectors, and jurisdictions.

5. **The UK's digital content production sectors' workforce is highly qualified, predominantly to degree level. However, there are notable persistent skills gaps and deficits among recent graduates, particularly in people skills and their ability to work effectively across industry workflows[6] and teams.** These gaps persist for several reasons. **Firstly**, there is a lack of investment in industry research and trend tracking at Further Education Institutions (FEIs) and Higher Education Institutions (HEIs), limiting their ability to respond to new skills needs.[7] **Secondly**, there is a sense of 'tribalism' within most FEI / HEI courses where graduates are taught / encouraged to specialise in the industry they study, limiting their pursuit (and understanding) of opportunities in the wider sector. Bootcamps were noted as helping to broaden aspirations across the screen sector, although due to reasons such as insufficient funding and specialism (further explored in section 6.3.2), they are currently limited in their reach and impact. **Thirdly**, large production and development companies are sourcing talent from leading training providers and HEIs, removing experienced tutors / trainers that would otherwise be providing valuable practical insights and training to students.
6. **Technological advances, increased work flexibility, targeted recruitment campaigns, and joint industry actions have, according to consultees, led to the creation of a more inclusive workforce in the sectors. Despite this progress, EDI (Equity, Diversity and Inclusion) related challenges continue to be present.** These challenges persist for several reasons. **Firstly**, there are barriers in accessing work opportunities, where key roles require degree-level training, excluding those unable to access

[6] Work processes in the various digital content production sectors

[7] To rectify this issue, one of the Sector Vision's recommendations states: 'The government — including the Unit for Future Skills — will work to improve the availability of official data on the creative industries to inform actions and interventions through to 2030. Together with industry, the government will develop a labour market framework for understanding and tracking changing skills across the creative industries. This will draw on assessments of current and future skills needs for each creative sub-sector, undertaken within the next 12 months and coordinated by the CIC. This follows the example of the BFI's Film and High-End TV Skills Review and the Design Council's Design Economy research.' (*Creative Industries Sector Vision*. Department for Culture, Media and Sport, 20 June 2023)

formal training pathways and networks. **Secondly**, barriers exist within the workplace, such as inaccessible recruitment practices for people with disabilities, a lack of diversity in leadership in sectors like animation, and lack of Human Resources teams in smaller companies to address difficulties faced by staff. **Thirdly**, there is a lack of consistent, comprehensive and intersectional data collection hindering the sectors' ability to track, isolate, and resolve challenges effectively.

These key conclusions, explored in detail in Section 7, emphasise the significance of targeted skills development, addressing skills gaps and shortages, fostering collaboration between sectors, and improving EDI to sustain the growth, attractiveness, and competitiveness of the UK's digital content production sectors.

1.4. Recommendations for Future Research

Building on this scoping study, SPI recommends future research into the following areas:

1. **Quantifying employers' investment in skills, training, and recruitment in the UK's digital content production sectors.** Building on the work undertaken to date by the Skills Task Force,[8] undertake a detailed cross-sector analysis of employer investment in skills, training, and recruitment, providing quantifiable evidence on how investment levels compare across the UK digital content production sectors and with film and television production. This should include any investment in skills and training for contracted freelancers, where applicable. Doing so will demonstrate specifically which sectors and types of companies require greater employer investment to meet critical skills deficits and skills shortages – and where further funding and support may be required.
2. **Further testing of the size and shape of the UK's digital content production sectors.** Conduct further research into the size and dynamism of the workforce in these sectors. This should build on the job classification of 214 roles (a sample is included in Figure 7, section 10) created as part of this Study. This will enable more accurate data collection on the size and capacity of the workforce, as well as providing a valuable tool to track movement between the sectors in scope and others. It will help identify role and occupational changes, and specific skills shortages as they develop.
3. **Assessing the current impact and short-term sectoral changes caused by AI technology on job roles, skills, and training issues within the UK's digital content production sectors.** Given the rapid pace of change and effect of AI on the digital content production sectors, immediately commission a study into the direct and indirect impact these technologies are already having on skills, roles, and training needs. This should include anticipated short-term impacts (i.e., over the next three years). Alongside this, maintain a watching brief over the next three years, monitoring the impact of AI on the creation and development of digital content, and whether this is having unforeseen impacts. This will ensure that industry and training providers have a wider and more concrete understanding of the effect and impact of AI, including future skills needs and related pedagogical approaches.
4. **Identifying models that effectively bridge training programmes with industry and that align with the BFI Skills Clusters initiative and the work currently being undertaken by ScreenSkills.** Undertake a detailed cross-sector analysis of how

[8] *A Sustainable Future for Skills. The Report of the Screen Sectors Skills Task Force*. Screen Sector Skills Taskforce, November 2023

the UK digital content production sectors can best develop models for bridging inclusive opportunities between digital content production and education, as well as film and television production. This should include specific research into the role of, and need for, apprenticeships and bootcamps. This research should investigate the plurality of routes into the industry, including those used by people who do not access formal training pathways and networks, as well as by freelancers. Further, it should be taken into consideration that there is a higher proportion of PAYE employees in VFX, post-production, video games and animation compared to physical film and TV production,[9] resulting in different skills challenges and possible interventions. This analysis would directly link to, and capitalise on, the newly established BFI Skills Clusters, established nationwide initiatives by ScreenSkills, and the proposals from the Skills Task Force.

5. **Further exploring the factors which can contribute to improving EDI objectives in the UK's digital content production sectors, including technological advances, changing working patterns, and plurality of routes into the industry.** Conduct a comprehensive study into the influence of various factors on meeting EDI objectives in the UK's digital content production sectors. This should, for example, include an assessment of whether free and fair access to open-source software and remote / hybrid work has supported the inclusive development of critical skills as well as the ability to create high quality portfolios that give applicants a competitive edge in the hiring process. It should also consider whether these changes have helped attract and retain diverse skilled workers from other industries ('industry transfers') and via non-traditional, non-HEI career pathways. This will enable an understanding of key barriers and will harness the potential of these sectors in promoting EDI objectives, meeting the needs of various workforce groups, and enhancing the attractiveness of the sectors overall. It would enable more informed strategies and interventions to ensure the sectors continue providing 'good work'[10] to all, through higher pay, and flexible and / or remote work opportunities.
6. **Identifying international best practices for addressing skills and role retention and recruitment issues in the digital content production sectors.** Conduct a comparative research study on how competing jurisdictions, such as Canada, France, Ireland and Spain, are effectively addressing skills retention and recruitment issues within their digital content production sectors. This research should cover three areas: **firstly**, a review of other jurisdictions' investment strategies for training employed and freelance workers, including through FEI / HEI partnerships, vocational training, and CPD; **secondly**, an assessment of how (and if) other jurisdictions are successfully bridging skills gaps between formal training and industry needs, as well as retaining talent at the key mid and senior levels; and **thirdly**, the role and effect of fiscal incentives in growing a sustainable skilled workforce. This will provide insights from other successful practices and assist in improving the competitiveness of the UK's digital content production sectors, as well as helping devise strategies for effectively managing talent and bridging skills gaps within the industry.
7. **Identifying best practice for skills and role retention and recruitment in adjacent sectors.** Investigate how adjacent industries, such as advertising, FinTech and automotive, are attracting skilled workers from the sectors examined in this Study,

[9] Comparable data for the PAYE and freelance workforce division within the emerging tech sector was not available

[10] As described in *The Good Work Review*. Creative Industries Policy and Evidence Centre, 2023

and how they are recruiting and retaining talent. This research should cover two key areas: **firstly**, a review of adjacent sectors' investment strategies in training of employed and freelance workers, including through FEI / HEI partnerships, vocational training, and CPD; and **secondly**, an assessment of how (and if) adjacent sectors are successfully bridging any notable skills gaps between formal training and industry needs, as well as how they retain talent at the key mid and senior levels. This research will provide insights into the appeal of these adjacent sectors for skilled workers and identify successful strategies that could be adopted within the digital content production sectors. This will help address the drain of talent to adjacent sectors, ensuring the growth and sustainability of the UK's digital content production sector.

Section 8 explores these recommendations further.

1.5. Approach

This Study took a mixed-method approach, drawing from both primary and secondary research over a six-month period. This included:

- Conducting an **extensive review of existing sector research and policy reports** – see section 12 appendix 4 for a full list
- Conducting **22 one-on-one consultations** with stakeholders across industry, research and policymaking, throughout the UK and digital content production sectors
- Hosting **five industry focus groups** – four sector-specific and one cross-sector
- Attending **key sector events** and trade body / skills group meetings
- Developing **six case studies** to illustrate the Study's key findings.

Alongside SPI's own primary and secondary research, this report also includes unpublished research and analysis that was licensed from third parties. This includes skills and training research from the UK Screen Alliance on matters related to animation, post-production, and VFX; and from SKILLfull on matters related to video games. The report specifies where data is sourced from SKILLfull and from the UK Screen Alliance.

Section 3 provides further details on the approach taken.

1.6. Key Limitations

There are four key areas of limitation with this Study:

1. **While the UK's digital content production sectors share certain characteristics and challenges, they are also very different sectors, with their own established methods, practices and business models** (see sections 2.3.1 and 9). This demands detailed sector-specific and cross-sector analysis, which was not within scope for this initial study. The Study's recommendations for future research highlight sector-specific characteristics and needs, such as recommending a detailed cross-sectoral analysis of individual employer investment in skills training and recruitment in each of the sectors.
2. **The UK's digital content production sectors are currently experiencing acute uncertainty.** Rapid change in the studied sectors, driven by a wide range of factors (e.g., technological advances introducing new processes and associated skill sets; COVID-19 lockdown restrictions pausing and restructuring supply chains; the US actor and writer strike action pausing transnational projects in the UK; fluctuating commissioning spend from international clients; and growing cost of living impacting on demand for digital content) mean that even very recent research included in this scoping Study, in some instances, may already be considered out of date. This makes it difficult to accurately and consistently forecast future skills needs, skills shortages, and required interventions. This said, well-grounded, informed predictions and observations are possible.

3. **Consultation fatigue.** The UK's digital content production sectors have already been the subject of significant consultation – most notably the video games and animation sectors. While this Study was able to engage a wide range of consultees, consultation fatigue caused challenges in ensuring evenly spread coverage across the individual digital content production sectors, as well as across the UK.
4. **Critical data gaps.** Despite the publication of research reports and the existence of data tracking, the UK's digital content production sectors have not been consistently and comprehensively measured regarding the size and capacity of their workforce. The digital content production sectors are poorly captured within existing official classifications, i.e., the Standard Industrial Classification (SIC) and Standard Occupational Classification (SOC), and official sources of Labour Market Information (LMI), such as the Labour Force Survey (LFS) and the Employer Skills Survey (ESS). Thus, there is no clear baseline for assessing changes. Further, there is a research bias towards the needs of PAYE employees, where freelancers are often underrepresented in sector research, being harder to reach and track as they move regularly between projects and / or jurisdictions. To begin to address this, this Study created a bespoke job classification, Job Matrix (see a sample in section 10) to guide further analysis. While built and tested with industry, this classification requires further refinement during future research.

Section 2 – **Introduction**

2. INTRODUCTION

2.1. Intention and Aims

The commissioning of this Study follows the publication of the BFI's *Skills Review 2022* (the '**Review**'), a UK-wide report that focused primarily on the key skills challenges in scripted film and high-end television (HETV) production, while highlighting existing initiatives that could be expanded or that provided valuable lessons.

The Review recommended dedicated research into skills in the digital content production sectors – specifically, the animation, post-production, video games, and VFX sectors. Several stakeholders observed that employers in these sectors also face skills and recruitment challenges.

Dedicated research into skills in digital content production aligns with the objectives of *Screen Culture 2033*,[11] the BFI's ten-year strategy. Published in September 2022, the strategy sets out aims to create a cohesive screen culture for the UK through growing research support for the making, collection, preservation, and exhibition of screen content, and to embed many aspects of the industry into wider society. The BFI's *National Lottery Strategy 2023-2033*,[12] also highlights the significance of research and investment into skills gaps and needs.

To this end, the BFI committed to undertaking a review of the skills and workforce needs of the animation, post-production, video games, and VFX (APVV) sectors, starting with this initial scoping study. In addition, the BFI required this review to include emerging forms of screen content, such as immersive and interactive, given the overlapping skills and roles needed in these subsectors; section 2.4 provides further details.

[11] *Screen Culture 2033*. BFI, 2022

[12] *National Lottery Strategy*. BFI, 2022

As an initial scoping study, this report and its supporting research are intended to deliver an informed overview of the breadth and depth of skills that currently exist, how these skills and roles interact and flow between the sectors, which skills are likely to be in high demand in the future, and the suitability of current training to gain these skills. A comprehensive and in-depth assessment of the digital content production sectors individually falls outside the agreed scope of the Study.

The findings and recommendations will benefit a range of stakeholders, including:

- **Individuals –** Potential new entrants will have an improved understanding of the work opportunities across the digital content production sectors
- **Employers –** Employers will have an improved understanding of workforce needs across the evolving digital content production sectors, including factors affecting recruitment, retention and progression; this evidence will help to inform their investment in training and recruitment initiatives
- **Training and education providers –** Training and education providers will have an improved understanding of workforce needs across the digital content production sectors, including how they can design their programmes to ensure that graduates gain valuable skills and can perform in the required roles
- **Government, trade bodies and policymakers –** These stakeholders directly inform policies and interventions that address skill-related issues, including interventions to improve access and diversity of the workforce; this includes feeding directly into the Skills Task Force,[13] the industry-led task and

[13] *Georgia Brown to chair industry-led Skills Task Force for UK's screen sectors.* BFI, 29th March 2023

finish group created to advance the recommendations of the BFI's *Skills Review 2022*.

2.2. Structure of this Report

The rest of this report is structured according to the following sections:

- **Section 3: Approach –** Outline of this Study and the analytical process
- **Section 4: Current Picture: Wider Technological and Policy Factors –** Overview of the wider technological and policy factors affecting the digital content production sectors, now and in the near future
- **Section 5: Current Picture: Where are the Key Skills Gaps and Shortages? –** Detailed analysis of the current key skills gaps and shortages that exist across the digital content production sectors
- **Section 6: The Short and Longer-Term Picture: What Future Skills are Needed, and How Well Suited is Existing Skills Training? –** Detailed analysis of what future skills and roles are needed, and how well-suited existing skills training is to meet this need
- **Section 7: Key Conclusions –** Overarching conclusions across the research and analysis
- **Section 8: Recommendations for Future Research –** Recommendations on where future research and avenues of inquiry are needed
- **Section 9: Appendices –** Supplementary information, covering: an overview of the market and business models of each of the digital content production sectors; a Job Matrix of sample roles seen across the digital content production sectors; a list of consultees; a bibliography; and organisational biographies for SPI, Kate O'Connor Consulting, and the BFI.

In addition, **six case studies that** show the effectiveness of providing sustainable skills training have been included throughout the report.

2.3. Background

2.3.1. The Digital Content Production Sectors Overview

The digital content production sectors collectively encompass a wide range of creative and technical disciplines covering the production, development, and distribution of digital media content, including visual storytelling, design, and immersive experiences.

The five sectors in the scope of this Study are:

- **Animation –** The design and development of moving images from models, drawings, photographs, and other still images. Animation companies operate varying business models. Predominantly their work is via commissioned productions, but also, on occasion, they provide project-based editing services for animated films, television series, shorts, and advertisements.
- **Post-production –** The process of refining and enhancing raw film or video footage to create a final product. This includes editing clips to create a coherent narrative and applying VFX to enhance the final visuals. Commissions are typically undertaken on a project-by-project basis.
- **Video games –** The design and development of interactive and immersive digital content and experiences for video games, across a range of platforms, genres, and target audiences. The commissioning model varies across different companies, from developing new games, providing ongoing updates and challenges to existing games, or both.
- **VFX –** Comprising the integration and manipulation of filmed and computer-generated elements to create a final polished shot. VFX companies service a wide range of industries, including film, television, advertising, and video games. Commissions are typically undertaken on a project-by-project basis.
- **Emerging tech –** Representing the convergence of digital innovation and storytelling in a relatively new but rapidly

expanding market, largely driven by Virtual Production and bringing together elements from VR / AR, video games, and VFX. Immersive and interactive tech companies service a wide range of industries, including film, television advertising, education, and training. Such companies can create either products – such as hardware, software, or content, tailored to clients' needs – or direct material directly commissioned by venues and cultural exhibitors.

As a group, the digital content production sectors operate in different markets and deliver different types of products and services, through different business models. Therefore, despite some overarching trends identified in this Study, an individual company's focus and business leadership tend to shape recruitment practice and remuneration, as well as the culture and capacity for training and development. Similarly, the specific sectors will typically attract different 'tribes', with individuals specifically wanting to work in one sector over another.

Figure 6 in the appendices (section 9) provides a further detailed profile of each sector's market and business model.

2.3.2. The Digital Content Production Markets

The digital content production sectors are part of the UK creative industries and are considered high growth sectors. Prior to the COVID-19 pandemic, the UK's creative industries were expanding at double the rate of the UK economy,[14] and the latest estimates suggest that, overall, they have rebounded strongly post-pandemic, especially in the digital content production sectors.[15]

Employment levels and production spend in the UK's screen sectors and wider creative industries have experienced strong growth over the last decade, especially in meeting the significant demand created during and immediately following the COVID-19 pandemic. In 2021, it was estimated that the UK's creative industries will be creating 300,000 additional jobs by 2025.[16] Taking film and HETV in isolation, the BFI reported that production spend rose from £3.4bn in 2017 to £6.2bn in 2022, with a strong and quick return to production after COVID-19 lockdown measures.[17] Production spend on film and HETV productions is estimated to reach between £7.07 billion and £7.66 billion by 2025.[18] **This growth is expected to continue, but at a slower rate due to recent US actors' and writers' strike action pausing transnational production, leading to job losses in the UK's digital content production sectors. This is further compounded by cases of wider retrenchment in commissioning expenditure from the major production studios**. While precise data on job losses within specific UK digital content production sectors due to the US strikes is not available, there is some evidence about it. **Firstly**, a recent survey by the UK union for broadcasting, entertainment, communications, and theatre, Bectu, showed significant impact on the UK's film and television workforce, which will have a direct impact on those businesses requiring VFX and post-production services. The survey found that, of nearly 4,000 freelance workers working in the UK's film and television sector, including those working in post-production, three-quarters indicated

[14] *DCMS Sectors Economic Estimates 2019.* DCMS, 2022

[15] *DCMS Sectors Economic Estimates: Monthly GVA* (to December 2022). DCMS, 2023

[16] *The UK Creative Industries, Unleashing the Power and Potential of Creativity.* Creative UK Group and Oxford Economics, 2021. N.B. This refers to the wider creative industries and was published before the actors' and writers' strike

[17] *Film and High-end Television Programme Production in the UK: Full-year 2022.* BFI Research and Statistics Unit, 2023

[18] *Forecast of Labour Market Shortages and Training Investment Needs in Film and High-end TV Production*. Nordicity and Saffery Champness, June 2022

they are currently without employment.[19] **Secondly**, the SAG-AFTRA union has been in negotiations with video games employers regarding amendments to the Interactive Media Agreement, to increase wages that account for inflation and protections against the exploitative use of AI to create visual content and voice over recording.[20] There is possibility of some disruption if negotiations fail and if a members' strike is called.[21] **Thirdly**, the UK VFX sector has lost approximately 40% jobs since the start of the US strikes.[22] Further, one of the global leaders in VFX and animation, DNEG, is requesting employees to accept pay reductions of up to 25% or participate in a loan scheme, due to a significant work slowdown caused by the strikes.[23] Compounding these issues are cases of wider retrenchment of commissioning spend from the major productions, whose productions directly or indirectly employ the UK's digital content production sector. For example, Disney cut its content budget by $3 billion in 2023, in part due to US strikes hindering their transnational production.[24] **This said, industry consultees report that continued high levels of investment in film and HETV production in the UK, albeit at a slower growth rate, will continue to drive growth across the value chain** in the cases where VFX and post-production services are required.

Although limited in its coverage and varying in methodology, data for the digital content production sectors similarly provide evidence of continued growth and change, both globally and in the UK. The most recent figures are summarised below:

- **Animation –** The value of the global animation industry was estimated at US$391 billion (approximately £290 billion[25]) in 2022, up 5% from 2021, and is forecast to surpass US$587 billion (approximately £488 billion) by 2030.[26] The UK animation industry was last comprehensively measured in 2019; at that time, it was reported to be worth approximately £1.5 billion in direct turnover[27] and just under £1 billion in direct GVA for core and high animation intensity companies[28]
- **Post-production –** The post-production industry includes a wide range of overlapping sub-sectors, such as film and video editing, colour grading, and sound design. It can therefore be difficult to accurately estimate the value of this overall industry; and there are no current credible estimations of the value of this sector at a global level. In the UK, the market for the 'film, video and

[19] *Three quarters of UK film and TV workers currently out of work: Bectu survey*. Betcu, 4th September 2023
[20] SAG-AFTRA and video game employers statement on Interactive Media Agreement. SAG-AFTRA, 28th September 2023
[21] At the time of finalising this report, SAG-AFTRA members have authorised a strike action failing favourable contract negotiations with video games companies, which are currently on-going. *SAG-AFTRA National Board Votes Unanimously To Send Interactive Media (Video Game) Strike Authorization Vote To Members*. SAG-AFTRA, 25th September 2023
[22] This data has been reported based on an unpublished survey conducted by UK Screen Alliance. These job losses are expected to be temporary
[23] *DNEG, VFX Firm Behind 'Dune' & 'Oppenheimer', Asking Staff To Take 25% Pay Cuts Or Join Loan Scheme As Strikes Wreak Havoc*. Deadline, 15th September 2023
[24] Disney to Cut Content Budget by $3 Billion Partly Due to Strikes. The Wrap, 9th August 2023
[25] Sterling values calculated based on average conversion rate for year of data
[26] *Size of the animation market worldwide from 2020 to 2030.* Statista Research Department, 2023
[27] This includes high animation intensity companies in the wider value chain, such as motion picture and film companies, as well as 'core' animation companies
[28] *Mapping the presence of animation activity across the UK economy: Stage Two, a report commissioned by the BFI*. Hatch, forthcoming

television programme post-production industry' created £2.2 billion in revenue in 2022, an increase of 4.2% from 2021[29]

- **Video games –** The global gaming market size reached US$202.7 billion (approximately £150.38 billion) in 2022.[30] The size of the UK video games consumer market value in 2022 was £7.05 billion, up 17% compared to pre-pandemic figures.[31] Mobile games are a key part of the video games sector, with UK revenue projected to reach £4.1 billion by the end of 2023, with an annual growth rate of 4.06% per year and a projected market value of £4.81 billion by 2027[32]
- **VFX –** The global VFX market was valued at US$28.81 billion (approximately £21.37 billion) in 2022 and is expected to reach $43.42 billion (approximately £36.11 billion) by 2026.[33] While there are currently no accurate estimations for the market value of the UK VFX sector, an estimated £710 million was spent on VFX in the UK in 2019, which generated a total of £1.68 billion in Gross Value Added (GVA) across all VFX content generated in the same year[34]
- **Immersive content (XR)** – The immersive content industry (often referred to as the 'XR industry') includes Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR) technologies. The global XR market size reached $29.26 billion (approximately £21.71 billion) in 2022, and it is projected to rise sharply to over $100 billion (approximately £83.15 billion) by 2026.[35] There is no recent data estimating the value of the UK immersive content industry. The most recent figures are from 2018, when it was reported that the immersive content industry generated £660 million in sales.[36]

Consultees estimate that the historical figures quoted above have increased notably since these dates. This can be attributed primarily to the surge in demand for digital content during and subsequent to the COVID-19 pandemic and continued investment by both domestic and international production companies. However, the immediate future suggests a tempered growth expectation, as the high growth figures are likely to have tailed off over the last 12 months. For some of the digital content production sectors, this is likely to be a direct consequence of the recent US actors' and writers' strikes pausing transnational productions, and a case of reduced commissioning expenditure on new projects by major studios, indicating that short-term growth may not reach previous projections.[37] For instance, the VFX and post-production sectors are affected as a result of paused film and television productions that require UK VFX and post-production services. For video games, the SAG-AFTRA union has been in negotiations with video games employers regarding amendments to the Interactive Media Agreement, affecting video games performers.[38] There is possibility of some

[29] *Film, Video and TV Programme post-production in the UK – market size 2011-2029*. IBIS World, 2023
[30] *Gaming Market: Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2023-2028*. Imarc, 2023
[31] *UK Consumer Games Market Valuation 2022 – how much money did people in the UK spend on video games?* Ukie, 2023
[32] *Mobile Games - United Kingdom*. Statista, 2023
[33] *VFX Market Global Industry Assessment & Forecast*. Vantage Market Research, 2022
[34] *Screen Business. How screen sector tax reliefs power economic growth across the UK 2017-2019*. Olsberg SPI with Nordicity, 2021
[35] *Extended Reality (XR) market size worldwide from 2021 to 2026*. Statista Research Department, 2023
[36] *The Immersive economy in the UK.* Innovate UK, 2018
[37] Both strikes have now concluded, signalling a possible resumption in transnational production and commissioning expenditure in the near future
[38] *SAG-AFTRA and video game employers statement on Interactive Media Agreement*. SAG-AFTRA, 28th September 2023

disruption if these negotiations fail and if a members' strike is called.[39] In contrast, there is little evidence of notable impact of the US strikes on immersive content, likely due to the relatively reduced overlap with US film and television production.

2.3.3. Existing Research on the Digital Content Production Sectors

This Study builds on a wide range of existing sector-specific and cross-sector research reports and datasets. This section includes several relevant examples, with section 12 appendix 4 providing a full bibliography of the reviewed sources.

As a trade association for the post-production, VFX and animation sectors, UK Screen Alliance regularly tracks data and trends related to the sectors' size, capacity and needs, including skills and training needs. This is chiefly gathered via a workforce survey of over 150 members (whose findings are included in this report), as well as via a VFX and Animation Skills Group that meets monthly to discuss the latest trends, issues and calls to action.

To address the lack of data, in 2018 Animation UK (the trade association for the animation sector) undertook their own skills review,[40] which provided an in-depth overview of key skills gaps and shortages across the UK's animation sector. The forthcoming report, '*Mapping the Presence of Animation Activity Across the UK Economy*', commissioned by the BFI and undertaken with support from Animation UK, provides further insights into the needs and shape of the UK's animation sector. Film London released an animation strategy report in 2021,[41] giving an overview of the shape, size, and scope of the animation sector in London.

For video games, UK Interactive Entertainment (Ukie), a trade association for the UK games and interactive entertainment industry, undertakes a range of research. For example, Ukie's Games Industry Census (conducted every 2-3 years) offers insight into the demographic makeup and needs of the video games workforce. The Independent Game Developers' Association (TIGA), a trade association for independent games developers, also undertakes ad-hoc research into the video games sector, particularly around advocating for policy change. In 2021, the University of South Wales and the Clwstwr programme[42] completed a detailed mapping exercise of the Welsh video games sector. Their report analysed the scale of the video games sector in Wales, and assessed the training, support, and talent initiatives available for the Welsh sector.[43] Additionally, SKILLfull has recently undertaken a wide range of research into the skills needs and shortages in the video games sector. The findings from SKILLfull's research are included in this report.

StoryFutures, the UK's National Centre for Immersive Storytelling, has produced various reports and research that covers aspects of all the digital content production sectors, especially cross cutting immersive technology and Virtual Production. For example, in its 2021 report[44] StoryFutures provides a valuable overview of the skills needs in Virtual

[39] At the time of finalising this report, SAG-AFTRA members have authorised a strike action failing favourable contract negotiations with video games companies, which are currently on-going. *SAG-AFTRA National Board Votes Unanimously To Send Interactive Media (Video Game) Strike Authorization Vote To Members*. SAG-AFTRA, 25th September 2023

[40] *We need to talk about skills: A skills analysis of the UK Animation industry*. Animation UK, 2018

[41] *Animation Strategy 2021/22*. Film London, 2021

[42] Clwstwr, based in the Cardiff City region, was one of nine Creative Industries Clusters funded by the Arts and Humanities Research Council as part of the UK government's Industrial Strategy

[43] *Games Survey Wales 2021.* Clwstwr, April 2022

[44] *Virtual Production. A Global Innovation Opportunity for the UK*. StoryFutures, 2021

Production, including how Virtual Production will disrupt workflows, and ways of teaching and learning about traditional screen production.

Research has been undertaken in Northern Ireland, Scotland and Wales on the digital content production sectors, leading to recommendations for greater funding and support for training and development initiatives. In October 2022, Northern Ireland Screen unveiled their four-year strategy *Stories, Skills, and Sustainability*,[45] which recognised the growth of Northern Ireland's video games sector and included innovation growth funding via Studio Ulster's Virtual Production facility.

The University of South Wales and the Clwstwr programme have undertaken valuable research mapping the film, television, and digital content production sectors in Wales. This includes the 2021 video games mapping report mentioned above and their 2020 report *Screen Work* which assessed the future skills and innovation needs for the screen sector – including video games, animation, and VFX – in the Cardiff Capital Region.[46]

With Ireland having close connections to the UK sector, Screen Ireland has undertaken and / or commissioned regular studies into the skills gaps in the Irish screen sector, including a dedicated animation report in early 2022.[47]

The Creative Industries Policy and Evidence Centre (PEC) has recently released its Good Work Review.[48] This report provides valuable context about working practices in the creative industries, within which the digital content production sectors sit. Additionally, in 2011 Nesta published the landmark report, Next Gen,[49] which remains one of the key reviews of the UK's video games and VFX sectors' skills needs, with recommendations on how to address them.

These reports and others were invaluable in formulating a detailed picture of the UK's digital content production landscape. However, key data gaps remain, especially concerning crossover skills and roles, as well as skills flow between the digital content production sectors. This scoping Study begins to address these data gaps, as well as providing recommendations for further research.

2.4. The Study's Guiding Research Questions

Figure 1 summarises the guiding research questions, established with the BFI, which collectively help provide evidence for the areas of focus.

Figure 1 – Guiding Research Questions

Research Area	Guiding Research Question
1. Wider factors	What are the wider technological and policy factors affecting the digital content production sectors now, and over the next five years?
2. Current skills across sectors	What are the key skills that workers currently use in each of the digital content production sectors to undertake their roles? Which shared types of key skills are currently used across the digital content production sectors?

[45] *Business Plan 2022-23. Year 1 of the 4 Year Plan: Stories, Skills and Sustainability.* Northern Ireland, 2022
[46] *Screen Work 2020*. Clwstwr, 2021
[47] *Skills Gaps in the Irish Animation Sector: Research Report*. Yvonne Hennessy, 2022
[48] *The Good Work Review*. Creative Industries Policy and Evidence Centre, 2023
[49] *Next Gen. Transforming the UK into the world's leading talent hub for the video games and visual effects industries*. Ian Livingstone and Alex Hope, 2011

Research Area	Guiding Research Question
3. Current roles across sectors	What are the key roles currently seen across the digital content production sectors?
4. Current skills gaps	Which key skills are currently missing in each and across the digital content production sectors?
5. Current skills shortages	Which roles in the digital content production sectors are most difficult to recruit for and / or retain? Why are specific roles in the digital content production sectors difficult to recruit for and / or retain?
6. Future skills and role needs	What new skills and roles will be needed across the digital content production sectors in the future?
7. Suitability of current skills provision	How suited is the current skills provision for the digital content production sectors to meet both current needs, and future skills needs? What is needed to ensure that the UK's skills provision for the digital content production sectors meet future skills needs?
8. Recommendations for further research	What further research and avenues of inquiry are needed following this initial scoping study?

Section 3 –

Approach

Image credit: Giu Vicente

3. APPROACH

The first step of the Study was the **development of a Research Matrix**, through consultation with the BFI. This detailed the guiding research questions (see Figure 1) that collectively addressed the Study's aims and objectives, as well as the data gaps in existing secondary research. The Research Matrix also included key definitions of terms (see the Glossary of Key Terms) and the skills and competency areas that are relevant to this Study's assessment (e.g., technical, professional, creative).

Following this, SPI continued with a **mixed-method approach**, drawing from primary and secondary research over a six-month period.

The findings presented in this report are the result of analysis based on the following sources:

- **A review of 53 existing sector research and policy reports, articles, and datasets.** This included, but was not limited to, Ukie's UK Games Industry Census and UK Screen Alliance's workforce survey, as well as reports from StoryFutures, the Policy and Evidence Centre, and Animation UK. Further, this Study licensed unpublished research from SKILLfull's analysis of 10,000 video games job vacancy adverts, and UK Screen Alliance's analysis of critical role-specific recruitment challenges. Section 12 appendix 4 provides a full list of sources.
- **A total of 22 one-on-one consultations** with stakeholders across industry, research, and policymaking. This was followed by **five virtual industry focus groups** – four sector-specific and one cross-sector – to further explore and test our findings.[50] SPI also attended several **trade body / skills group meetings** for further data collection, including the UK Screen Alliance members' VFX and Animation Skills Group.

  In total, the Study engaged 82 consultees across individual and group consultations. Geographically, this included 54 consultees from England, eight from Wales, five from Northern Ireland, five from Scotland and ten who operate across multiple locations across the UK and the world.

  The sectoral distribution of participation across consultations, focus groups, and trade body meetings was as follows: 28 from animation, 14 consultees from VFX, seven from video games, five from post-production, six from emerging tech, and 24 cross-sector stakeholders representing more than one of the sectors in scope.[51]
- Finally, SPI developed **six case studies** to illustrate the existing programmes around effective and sustainable skills development and training**.** They are:
  - **Aardman Academy –** Part of Aardman Animations in Bristol, the Academy provides industry-based training at all levels, including partnerships with academic institutions and animation schools globally
  - **BAME in Games (BiG) –** based in London, a UK-wide volunteer-run advocacy group in video games, BiG hosts regular events, a mentorship scheme and, prior to the pandemic, organised company 'open days' designed to help improve ethnic diversity in the games sector
  - **Escape Studios –** based in London, Escape Studios provides applied training with a focus on integrating

[50] The focus groups included seven international sector stakeholders
[51] Although every effort was made to ensure balanced participation across the studied sectors, this was not always possible due to consultation fatigue and consultee availability. Cross sectoral focus groups were used to explore and test the findings. Further, representation for the video games sector was augmented by the 103 video games consultees who engaged in SKILLfull's research, which is included in this report

industry skills in undergraduate, postgraduate, and short courses in VFX, video games, animation, motion graphics, and other specialist disciplines

- **Gorilla Group –** a leading post-production company based in Cardiff, with effective recruitment and retention practices and training programmes
- **NextGen Skills Academy –** a UK-distributed team within an industry-backed consortium across video games, animation, and VFX to support industry relevant courses and apprenticeships through further education colleges and regional skills bodies
- **StoryFutures Academy –** based at Royal Holloway, University of London in Egham, an Arts and Humanities Research Council (AHRC)-funded workshop training for developing skills in emerging technology among the existing film and television workforce.

Kate O'Connor Consulting acted as an industry advisor to the project. The company advised on the shortlisting of consultees and the industry focus groups, as well as on key industry developments and links to relevant policies and publications.

SPI, Kate O'Connor Consulting, and the BFI would like to thank all those who participated and gave their valuable time and insights to the Study.

Section 4 –

Current Picture: Wider Technological and Policy Factors

Image credit – Kevin Han

4. CURRENT PICTURE: WIDER TECHNOLOGICAL AND POLICY FACTORS

4.1. Technological Advances

This Study identified several key technological advances affecting the digital content production sectors that will continue to do so in the short to long-term future. They include:

- **AI** being used to undertake repetitive tasks, such as rotoscoping and match move, as well as undertaking specific research assignments
- **Blockchain technology** supporting digital rights management and secure distribution of content
- **Cloud-based computing** facilitating more efficient collaboration and data sharing among remote-work teams. This has been key in supporting the increased demand for remote and flexible working options following the COVID-19 pandemic lockdown measures, allowing teams to work remotely across the UK and internationally
- **Open-source data** providing cost-effective and flexible solutions for developers and studios to customise and improve their workflows and tools
- **Real-time rendering technology** allowing faster and more efficient rendering of images and animations, saving time and money
- **Virtual Production** harnessing the power of virtualising technologies to create digital environments in which content can be made. This allows for carbon emissions and potentially budgets to be cut and disrupts the traditional physical production processes, which has an impact on workforce, skills, and training in relation to the demand for new skill sets.

Of these, AI was the key technological advance highlighted by consultees, a finding also supported by secondary research.

To date, the use of AI technology in the digital content production sectors has been chiefly around improving the efficiency of production, including undertaking specific research tasks, as well as creating new visual content. This Study found the following examples:

- **Animation –** AI is being used to generate realistic 3D environments and characters. For example, Disney's Deep Canvas technology used AI to create a 3D environment that can be painted over to create the illusion of 2D animation
- **Post-production –** AI is being used to automate certain tasks, such as colour grading and noise reduction. For example, Topaz Labs' AI Clear software removes imperfections from images without losing detail
- **VFX –** AI is being used to create realistic digital simulations of fire, smoke and water, and remove unwanted objects from footage
- **Video games –** AI is being used to create more realistic non-playable characters (NPCs) and to improve the gameplay experience. For example, Rockstar Games' Red Dead Redemption 2 uses generative AI to create lifelike animal behaviour in the game's open world
- **Emerging tech –** AI is analysing user data to automatically create immersive and personalised experiences, such as customised environments and content, based on their preferences and behaviour.

Regarding the impact of AI technology on skills and training, both primary and secondary research found the implications to be permanent and far-reaching, with the specifics still to be fully determined. Current perspectives see AI having broadly two main impacts in relation to skills and training:

1. In the short-term (less than three years from the current year), it will continue to automate repetitive tasks, which were previously chiefly undertaken by those in entry level and junior roles, such as rotoscoping and match move. While repetitive, such tasks are key

for new entrants to get a taste of the industry, to practice and hone their skills, and to collaborate with a range of teams across workflows.

2. In the medium (three to five years' time) and long term (over five years' time), the likely impact will be on the skill sets required by 'the artist / creative' in the digital content production process. While AI is already able to create high-quality images, clips, and audio files based on set briefs, this Study found that human creativity and compelling storytelling will remain key. Here, the 'artist / creative' is predicted to play more of curatorial role, which will require new management and coordination skills to bring together a range of AI-supported or generated artistic content.

Virtual Production technologies in and of themselves are not cutting edge, but it is the applied, combined, and rapidly developing use of these technologies which is creating a change in the screen production industry. Virtual Production draws on a range of visualising systems including real-time game engine technology (such as Epic Games' Unreal Engine), Virtual and Augmented Reality, motion capture, camera tracking, dynamic lighting, green or blue screen, LED screens, and in-camera visual effects. These technologies cut across industries, and the way they are being used in screen production is unfolding in a dynamic manner.

As an example, VR technology is currently being used in a number of ways including to scout a digital version of a real place, or to construct a virtual location for global real-time collaboration. Virtual environments are now captured in-camera rather than added in post-production. This will blur the boundaries between the digital content production sectors and affect the trajectory of both screen and immersive content creation and experiences.

There was a consensus among industry consultees that Virtual Production is likely to account for up to 30% of production activity in the long term. This will directly affect workflows across digital content production, with a greater overlap and blurring of the boundaries between the digital content production sectors regarding both workforce and workflows.

Furthermore, industry consultees revealed that Virtual Production is having a direct impact on the demand for post-production, as Virtual Production redefines the production process from 'fix it in post' to 'fix it in pre' or 'fix it in production'. This is because Virtual Production happens in real time, so that activities or tasks previously reserved for post-production now take place during live shooting. This said, Virtual Production will not completely remove the need for post-production services. Rather, it will demand a wider range of skills and roles to respond to new challenges, including fixing undesirable content created in Virtual Production.

These technological advances have the potential to further equity, diversity and inclusion (EDI) objectives in the digital content production sectors — as well as to create new EDI-related challenges. This Study found during consultations that the free nature of open-source software, such as Blender for animation and Unreal Engine for video games development, has been improving access for aspiring creators from socio-economically deprived backgrounds, especially freelancers. Similarly, this Study found that cloud-based computing technology is allowing more flexibility for those with caring responsibilities or with physical disabilities who prefer to work remotely.

On the other hand, this Study also found that AI could introduce new challenges for EDI objectives. One example of this cited by consultees is AI leading to the reduced need for specific jobs, especially at entry level. In such cases, where fewer positions are required, it is possible that employers could opt to hire candidates who require less facilitation of their personal needs, which would make it harder to achieve EDI objectives. Section 5.5.5 further explores EDI-related issues.

Regarding the environment, these technological advances have the potential both to enhance sustainability objectives in the digital content production sectors, and to create new challenges. This Study found a growing focus on adopting sustainable practices across the digital content production sectors; for example, Virtual Production reduces the need for polluting forms of travel and shipping of equipment.

However, existing secondary research also noted that Virtual Production[52] and blockchain[53] require energy-intensive computer systems and servers to process the vast amounts of data required for rendering complex graphics and simulations, as well as using high levels of natural water as part of their cooling systems. Additionally, the production and disposal of electronic equipment can contribute to electronic waste and associated environmental impacts.

4.2. Policies Affecting the Digital Content Production Sectors

Public policies for skills are largely devolved by UK nation. The UK government in Westminster and the Devolved Administrations in Scotland, Wales and Northern Ireland have different approaches to skills and education, including those that benefit employers and workers specifically in the digital content production sectors.

Skills-related policy decentralisation also extends to local levels in each nation. For example, in England, Metro Mayors / Combined Authorities have some responsibility for skills and training[54]; in Scotland, City Region Deals incorporate aspects of skills and training needs into their plans,[55] although consultees in this Study reported that this approach has had limited impact in addressing skills development issues within Scotland's screen sector to date; in Wales, the 2012 Regional Skills Partnerships (RSP) advises the Government on skills provision and strategies on skills investment; and in Northern Ireland, a new advisory body on skills called the Northern Ireland Skills Council has recently been established, following the launch of the Northern Ireland Skills Strategy.[56]

The UK government's 'levelling up'[57] objectives further complement such localised skills and education policymaking through targeted structural investment in training opportunities outside London and the South-East of England.

The UK government has a particular focus on apprenticeships as a means of developing skills, which are funded through the Apprenticeship Levy. The Levy is collected by HMRC because the relevant taxation policy is centralised, with the delivery of apprenticeships being devolved to each nation of the UK.

The Apprenticeship Levy is paid at a rate of 0.5% of an employer's annual PAYE bill. Companies report and pay the Apprenticeship Levy monthly through the Employee Payment Summary. Every employer in the UK must pay the Apprenticeship Levy if they:

- Have an annual pay bill of more than £3 million – the levy is calculated on the proportion of an employer's PAYE bill above £3 million
- Are connected to any companies or charities for Employment Allowance purposes and have a combined annual pay bill of more than £3 million.

[52] *Virtual Production: A Study of its Environmental Impact*. Interreg Europe, 2022
[53] *Bitcoin's growing energy problem*. Alex de Vries, 2018
[54] Including the Department for Education's recently established Local Skills Improvement Plans, which set out an agreed series of actionable priorities that employers, training providers and stakeholders apply to meet local skills needs
[55] *City Region Deals*. Scottish Government, 2023
[56] *Lyons Launches New Skills Strategy for Northern Ireland*. Department for the Economy, 25th March 2022
[57] *Levelling Up the United Kingdom* policy paper. gov.uk, 2nd February 2022

Currently, only 2% of UK employers meet the requirements to pay the Levy. In England, funds are held in digital accounts that employers can access to fund apprenticeship training. In the Devolved Administrations, Levy payments go into a central Government pot for the respective nation to spend as deemed necessary, including on wider skills interventions such as apprenticeships. In England, non-Levy paying companies pay 5% towards the cost of apprenticeship training, whilst the Government covers the remaining 95% (referred to as co-investment). Levy paying employers in England can transfer up to 25% of their levy fund per year to a receiving company in England to use to cover the cost of their apprenticeship training in full.

The arrangements for the use of the money collected through the Levy differ in Scotland, Wales, and Northern Ireland. Money raised by the UK-wide Apprenticeship Levy is transferred to Scotland, Wales, and Northern Ireland based on the percentage of employees with an address in these nations. The UK government manages any difference between the Levy forecast and actual Levy revenues. Each of the devolved administrations can decide how to spend their allocation, and they may allow money to be spent on wider training other than apprenticeships, for example, upskilling the existing workforce.

In Scotland, Apprenticeships Scotland is the key source for employers and prospective apprentices, and for advertising vacancies and finding training providers. Scotland's Modern Apprenticeship system, which is separate from the rest of the UK, has a target of 30,000 Modern Apprenticeships starts per annum. There are also Foundation Apprenticeships for those aged 14+, and Graduate Apprenticeships. A review of Scotland's provision is currently taking place involving several stakeholders, with the possibility of developing a new model for competence-based qualifications.

Wales has not yet developed a separate apprenticeship framework. The current target is 100,000 apprenticeships per year, with Regional Skills Partnerships engaging with employers to provide intelligence on skills needs and gaps.

Northern Ireland is developing new traineeships at Level 2 and apprenticeship programmes from Level 3 to Level 7, bringing together the government, Universities, all the Further Education Colleges, and all major employers.[58]

Allowing companies that do not pay the Levy to access funds enables those working specifically in the digital content production sectors to create apprenticeship opportunities, thus supporting the growth of these sectors.

The Apprenticeship Levy is a mainstay within UK government education and skills funding. However, delivery of regulated and centrally funded skills and training options is devolved by UK nation, which means each nation operates a standalone system.

In Scotland, the Government is investing in a paid internship programme called RESET, which focuses on the animation, VFX, and video games sectors. RESET is led by TRC Media, a Glasgow-based charity and training provider for broadcast and digital funded by Screen Scotland, BBC, and Channel 4. The first iteration of the programme was launched in 2021 and focused on retraining those made redundant during the pandemic. In September 2023, applications opened for the 2023 edition of RESET.

In Wales, the animation studio Hollowpixel has created their Hollowpixel Academy apprenticeship programme. In collaboration with Creative Wales, Gower College, and the Welsh Government, apprentices are paid and, on completing 12 months of training, receive

[58] *Apprenticeships in Scotland, Wales and Northern Ireland.* Apprenticeship Toolkit

Level 4 and 5 higher apprenticeship qualifications, followed by two-month work placements in the studio.

In England, T Levels are another significant education and skills initiative, designed to provide technical education and training for young people aged 16 to 19. Launched in September 2020 and gradually being rolled out across England, T Levels are intended to offer high-quality technical education and training pathways to prepare students for skilled employment or further education. T Levels are Level 3 two-year post-16 technical education programmes, which are broadly equivalent to three A Levels. They offer a blend of classroom-based learning and industry-specific work placements, ensuring students gain both knowledge and practical skills. T Levels are available in various subject areas such as digital, construction, healthcare, education, and more. T Levels are a structured qualification that includes a core set of technical and industry-specific components. Students also develop transferable skills such as teamwork, problem-solving, and communication. One of the key features of T Levels is the mandatory work placement component, of at least 315 hours. Students spend a significant amount of time gaining practical experience in a real workplace setting, helping them apply what they learn in the classroom to real-world situations. Supported with funding from the UK government, as of August 2023, there are 283 T Level providers across England providing such training for the 2023/24 academic year. This is set to increase to 438 T Levels providers for the 2024/25 academic year.[59]

As explored further in section 6.3.1, **there are current reservations among industry consultees on the value and applicability of T Levels for addressing the specific skills needs in the digital content production sectors**. This is largely related to the courses being only partially focused on training in post-production roles and games development, and a noted absence of focus on animation, VFX and emerging tech-related skills.

There are skills funds specifically available and tailored for animation and indirectly for VFX and post-production, but absent for video games or emerging tech. The Animation Skills Fund, initiated in 2013 and overseen by ScreenSkills, has garnered over £400,000 since its inception, aimed at advancing animation talent development in the UK.[60] While public subsidy for post-production training had seen a decline since 2004, the UK Screen Alliance, in partnership with ScreenSkills, has been pivotal in directing resources for post-production and VFX training via the High-End Television Skills Fund.[61] Conversely, there remains a gap in dedicated skills funds for the video games sector and emerging technologies such as VR and AR. Some of the BFI National Lottery funded Skills Clusters have a focus on training in Virtual Production, with an emphasis on training diverse local talent to work in Virtual Production hubs.

Finally, it is important to note the UK government's Kickstart Scheme, which ran from September 2020 to January 2023. Part of the government's Plan for Jobs, this was a UK-wide initiative aimed at addressing youth unemployment by providing job opportunities and support to young people aged 16 to 24 on Universal Credit who were at risk of long-term unemployment. Employers participating in the initiative received funding from the UK government to cover the cost of the young person's wages, at National Minimum Wage or National Living Wage, as well as associated employer National Insurance contributions and minimum automatic enrolment pension contributions. In addition, the employer would get £1,500 funding per job. This money was to cover setup costs and supporting the young

[59] *Providers delivering T Levels and the T Level foundation year*. gov.UK, 7th August 2023

[60] *About the Animation Skills Fund*. ScreenSkills

[61] *Subsidised Training for Post & VFX*. UK Screen Alliance

person to develop their employability skills, such as training and employability support, IT equipment and software, and uniform or Personal Protective Equipment.

Into Games was a gateway provider for the video games sector, helping bridge the gap between young people looking for work and those studios who were looking to take on new talent as a part of the Scheme. As of January 2022, Into Games had managed to get 230 placements successfully funded through the Scheme, resulting in 95 young people being hired. This included those from outside traditional HEI routes. In addition, Into Games trained over 200 work coaches in 'Gaming Industry Awareness' to assist studios in finding the right candidates.[62]

4.3. Case Study 1 – Aardman Academy

The Aardman Academy is a training provider run by Aardman Animations, the British animation studio known for producing stop-motion animated content, such as *Wallace & Gromit*, *Chicken Run* and *Shaun the Sheep*. The Aardman Academy offers a range of courses, workshops, and partnerships designed to teach aspiring animators and filmmakers various animation techniques and production processes, including stop-motion animation, character design, storyboarding, and more.

The Aardman Academy

The seed of the Aardman Academy was planted in 2000 when the studio was producing *Chicken Run* and needed more animators to create a feature-length film. Since those early days, the Aardman Academy has expanded to provide industry-based training at all levels of experience and has developed partnerships with leading academic institutions and animation schools worldwide. Clients include the Northern School of Art, University of the West of England Bristol (UWE), University of Westminster, University of Edinburgh, Edinburgh College of Art, Sheffield Hallam University, and the School of Visual Arts (New York City). These partnerships unlock a range of benefits aimed at supporting students and academic staff, by delivering animation training online and in-person, providing portfolio feedback, exclusive marketing material, a suite of masterclasses and events for a fee, with lower rates for members and associates, studio visits, lectures in the Aardman cinema, and behind the scenes access. Students work on real life projects, across teams and workflows.

Courses include short four-week foundation courses, such as Model Making, Stop Motion 1, a 12-week online masterclass, and a seven-month in-person stop motion filmmaking course conducted at the Aardman studios. The Aardman Academy also offers bespoke courses tailored to the specific needs of individuals and partnerships. Additionally, alumni are given priority notice of job openings at Aardman, as well as continued support.

Aims and Objectives

The Aardman Academy aims to develop talent and promote growth in the animation industry by providing top-tier animation-related courses addressing both technical and people skills.

The Academy provides industry-focused training to all, regardless of skills level. Their courses are designed and led by experienced animation professionals who offer support, guidance, teaching, and mentorship to all students.

[62] *How Into Games Improved the Kickstart Scheme for the Games Industry*. Into Games, 31st January 2023

What Works Well

The courses are led by seasoned professionals from the Aardman studio. This helps foster connections between learners and the industry, which can prove invaluable for future recruitment and retention opportunities.

Many students return to take additional courses or workshops, demonstrating a high level of retention and student satisfaction. UWE Bristol hosts an MA Animation course with the Aardman Academy that has a 100% student satisfaction rate. The Northern School of Art, another Aardman Academy partner, reported a satisfaction rate of 91%.

The Academy promotes diversity by providing bursaries to enable greater inclusivity, particularly to people from diverse backgrounds and other groups who may not have the opportunities or means to attend university. The Academy also runs a development programme that is designed specifically for animation lecturers to help them stay abreast of technological advances and industry standards, thereby enhancing their skills.

Lessons Learnt

Aardman Animations faced an issue common to the digital content production sectors, where graduates from colleges and universities were trained in specific technical skills, such as use of design software, but lacked work-ready essential 'people skills', such as teamwork, adaptability, and the ability to work effectively on collaborative projects and across multiple workflows. To address this challenge, Aardman Academy builds people skills training into all the courses it offers to ensure that all graduates are fully equipped with the relevant skills and expertise to enter the industry.

A key factor contributing to Aardman's success has been their partnerships. While the sector often faces a mismatch between the skills acquired from university programmes and the industry's requirements, the Aardman Academy courses are taught by leading members of the Aardman team, and their curated partnerships bring current industry expertise into the education system.

> *If you are wondering if you should take this course, then the answer is 'yes, you should'. I never could have achieved the level of work I am producing without this type of instruction and mentorship.*
>
> *– Stop Motion 2 Participant*

Section 5 –

Current Picture: Where are the key skills gaps and shortages?

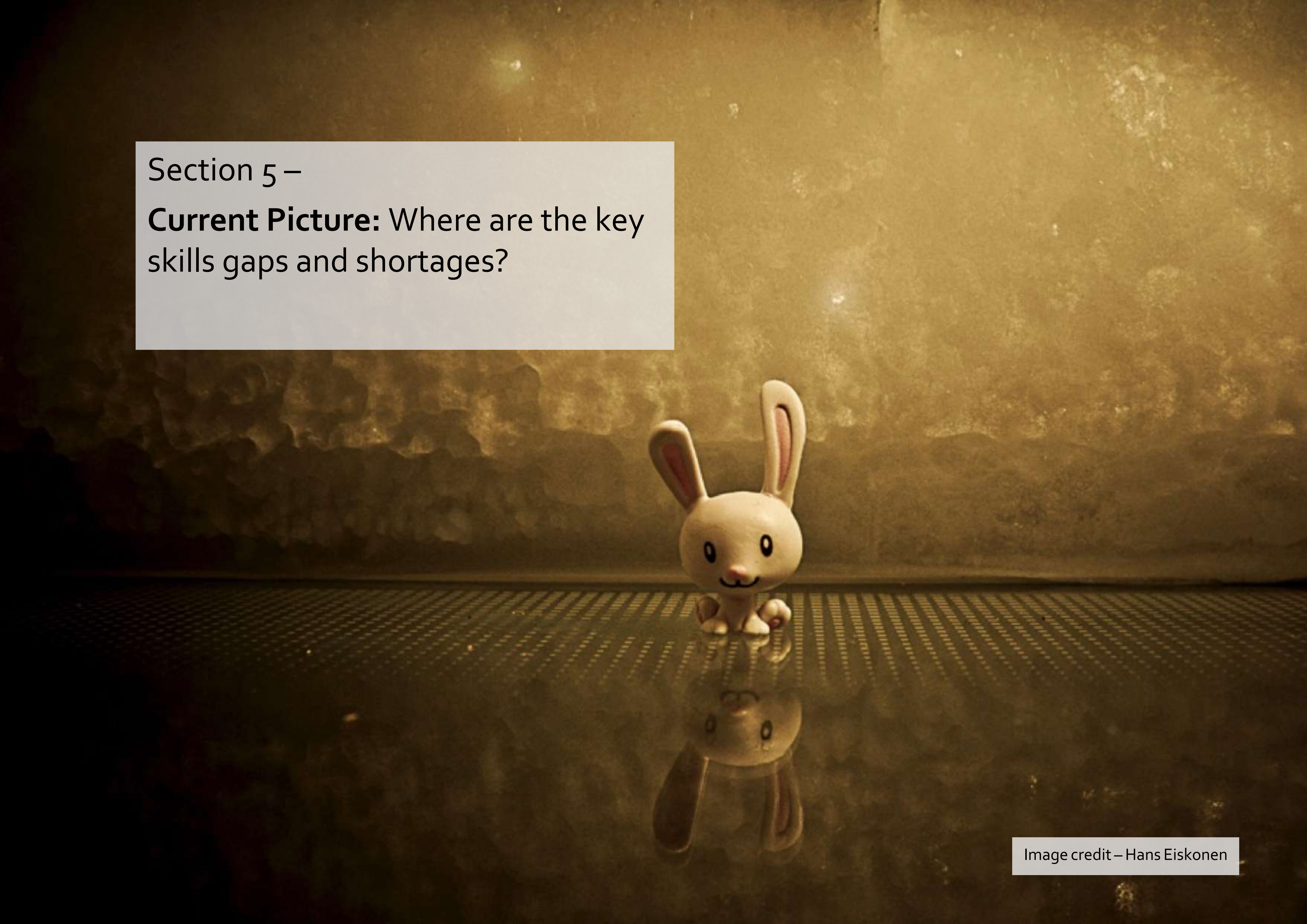

Image credit – Hans Eiskonen

5. CURRENT PICTURE: WHERE ARE THE KEY SKILLS GAPS AND SHORTAGES?

Key Findings

- The digital content production sectors require a combination of creative, technical, and people skills
- There are overlaps in skills demand across the sectors, with a stronger alignment of skill sets among video games, VFX, animation, and emerging tech sectors than in the post-production sector
- Although technical skills gaps exist across the sectors, practitioners have cited critical gaps in people skills across them all, especially at the mid-level
- All the sectors are struggling to recruit and retain staff at the mid to senior levels
- Some pressing retention issues include a small local talent pool in some digital content production sectors; the movement of staff from the UK to overseas; and movement from smaller, regional companies to London, and to outside the sectors in scope entirely, including Big Tech, FinTech and automotive
- In the UK, some movement of staff is being reported between the digital content production sectors. Where reported, this is typically from VFX and animation to video games. In post-production there is movement within the sector (i.e., to post-production on scripted and non-scripted production) rather than to other digital content production sectors
- Tax reliefs, public and private investment, the COVID-19 pandemic and UK's exit from the EU have been cited as the major factors influencing current recruitment and retention patterns
- Other trends such as the sectors' 'cannibalisation' of their own supply chain by production companies, and the premature professional advancement of employees have exacerbated recruitment and retention challenges
- Through targeted recruitment and retention initiatives, the digital content production sectors have been making positive progress in creating a more inclusive, diverse, and equitable industry. That said, barriers remain for the entry and progression of Black and Global Majority people, those identifying as women, people with disabilities, and people from underrepresented socio-economic backgrounds

5.1. Introduction

This section examines the current picture relating to skills gaps and shortages across the digital content production sectors in four ways:

1. It details the key skills and roles required to enable business and sectoral growth, innovation, and resilience
2. It discusses key skills that are missing from the sectors' workforce (skills gaps) that are not sufficiently being addressed through training
3. It outlines the specific roles that are difficult to recruit to or retain in the sectors (skills shortages), and the wider trends influencing these recruitment and retention patterns
4. It explores the progress made by the digital content production sectors across various diversity, equity and inclusion parameters.

5.2. Key Skills

As with physical film and television production, the digital content production sectors require a range of creative, technical, and people skills. The specific combination of skills and depth of expertise vary depending on the job role and the sector. Smaller companies typically require employees to have a wider range of skills and be able to fulfil multiple roles.

Both primary and secondary research conducted during this Study identified the paramount importance of people skills across the studied sectors,[63] such as time management, collaborative and communicative working, multi-tasking, taking the initiative, and being self-starters and quick learners. Such skills are even more important following the COVID-19 pandemic when a sharp increase in content demand (especially for video games and animation) was combined with the immediate switch to remote working. This meant that all employees, but particularly those in mid and senior supervisor roles, were required to remain continuously active, often using virtual communication channels, to meet demand.

Each sector also requires core technical skills, which can be sector-specific, transferrable to or overlapping with other sectors. Figure 2 provides an indicative list of some widely required sector-specific and overlapping technical skills for the sectors in scope. While based on consultations and desk research, the boundaries between the sectors are porous, so this is not an exhaustive list.

Figure 2 – Examples of Sector-Specific and Transferrable Core Technical Skills

Sector	Overlapping Skills	Sector-Specific Skills
Animation	Storyboarding and animatic creation 3D character and object animation Rigging and character setup Game Engines design AI programming 3D supervision	Traditional hand-drawn animation 2D digital animation (e.g., Toon Boom, Adobe Animate), stop-motion animation, motion capture, and performance capture
Post-production	Motion graphics and title design (e.g., Adobe After Effects) Visual effects compositing (e.g., Nuke, Fusion)	Non-linear video editing (e.g., Adobe Premiere, Avid Media Composer, Final Cut Pro) Colour grading and correction (e.g., DaVinci Resolve) Sound editing and design (e.g., Pro Tools, Audacity) Music composition and arrangement Encoding and mastering formats
VFX	3D modelling and sculpting 3D supervision Texturing and shading Rigging and skinning Animation Lighting and rendering Compositing	Rotoscoping and clean-up Match moving and camera tracking Fluid, cloth, and particle simulations Scripting and programming languages (e.g., Python)

[63] People skills are often referred to as professional skills or soft skills

Sector	Overlapping Skills	Sector-Specific Skills
	AI programming	
Video Games	3D modelling, texturing, animation 3D supervision Game design and mechanics Level design and world-building Game Engines (e.g., Unity, Unreal Engine) and physics simulations AI programming	Game programming languages (e.g., C++, C#, Java, JavaScript)
Emerging Tech	3D modelling, texturing, and animation for real-time rendering Interaction design and user experience AI programming	Virtual Reality (VR) and Augmented Reality (AR) development Spatial audio design Game engines with VR / AR support (e.g., Unity, Unreal Engine) Head-mounted display (HMD) Motion capture and volumetric capture 360-degree video production and stitching Understanding of human factors and ergonomics in immersive environments

This Study has identified a wide range of skills transferable among animation, VFX, video games, and emerging tech sectors; less so in the post-production sector. The former sectors share common technologies, techniques, and software, and often require similar skills in areas such as 3D modelling, texturing, animation, and real-time rendering, whereas post-production focuses more on refining and polishing raw footage or assets generated by the other sectors. It involves skills such as video editing, colour grading, sound design, and motion graphics, which, while still relevant to some extent in animation, VFX, video games, and emerging tech, are not as central to their processes.

Some skills required in the digital content production sectors are also used in industries outside the sectors in scope, such as the tech sector, film and television production and the automotive and medical sectors. This transferability of skills has led to the movement of digital content production sector employees to industries outside these sectors. Examples include video game engineers and programmers moving to Big Tech (e.g., Alphabet and Meta), and skills in User Interface (UI) and User Experience (UX) being increasingly used in sectors like music. Post-production employees tend to move within physical production, showing, to an extent, that the less transferable nature of their skills across the other digital content production sectors does not necessarily have an adverse impact on their careers. Skills shortages in and across each sector are examined further in section 5.5.

5.3. Key Roles

Key shared roles can be found across the digital content production sectors. This is demonstrated in Figure 7 (in section 10, appendix 2) through a review of 214 job roles across these sectors. However, there are nuances in the responsibilities involved in these roles across the sectors. For example, the 'above-the-line' creative roles of producer, director, writer, and composer require similar skills, but experience and specialties are often sector-specific and applied in context.

Further, there are differences in the definition of key roles between larger companies and SMEs / micro businesses within the same sector. The latter often require professionals to have a wider, cross-disciplinary skill set, given such companies have fewer employees. In such companies, according to consultees, there is a need to have the flexibility of a 'Swiss army knife'.

Across the **sectors in scope, roles often require a combination of artistic talent, technical proficiency, and people skills** like teamwork and multitasking, as described in section 5.2.

Examples of overlapping job roles across more than one digital content production sector are listed in Figure 3. Notably, most of these overlapping job roles are not found in the post-production sector, illustrating post-production requires relatively distinctive skill sets, which are not readily transferable to other digital content production sectors (as detailed in section 5.2).

Figure 3 – Examples of Overlapping Roles Across the Digital Content Production Sectors

Role	Description	Digital Content Production Sector
Animator	Brings characters and objects to life using a range of animation techniques	All, except post-production
Lighting artist	Crafts lighting setups and uses various techniques to enhance the mood, atmosphere, and visual appeal	All, except post-production
Producer	Oversees the planning and coordination of various aspects relating to the production of digital content	All, except video games
Director	Directs the production of digital content and is the key creative lead of the production process	All, except post-production and video games
Writer	Develops and writes content for production	All, except post-production and VFX

Role	Description	Digital Content Production Sector
Production coordinator	Responsible for logistics and all matters related to the day-to-day running of the project	All
Production manager	Oversees production, manages budget and schedule, liaises with and manages the work of other staff such as production coordinators	All, except video games
Rigging artist	Develops skeletal structures and controls for 3D models	All, except post-production
Texture artist	Develops textures and materials for 3D models, ensuring visual appeal across platforms	All, except post-production
Technical artist	Bridges the gap between art and programming; develops game engines, is responsible for optimising assets, and developing tools	All, except post-production
VFX artist	Creates digitally generated imagery and simulations, and integrates digital effects into games, live-action, or animated scenes	All, except post-production
3D modeller	Crafts 3D models of characters, objects, and environments for use in multiple sectors	All, except post-production

5.4. Skills Gaps

5.4.1. Shared Skills Gaps Across the Sectors

Across the digital content production sectors, this Study found substantial gaps in people skills. Employers from the animation, VFX, post-production, and emerging tech sectors are finding that people skills, such as adaptability and teamwork, are particularly lacking in recent graduates at the entry level who have less industry experience of working across multiple workflows.

Gaps in people skills are particularly relevant given the constantly and rapidly changing nature of the digital content production sectors, largely driven by technological advances like AI and machine learning, among others (see section 4.1). Therefore, there is a need for skilled talent that can adapt to the rapidly changing sectors, work collaboratively, and are self-starters. Such talent is then able to develop the cross-disciplinary skills required to navigate a dynamic and rapidly changing set of industries.

Further, **all the digital content production sectors reported a lack of leadership and management skills at the mid-level.** Examples include time management, communication skills, skills in managing people and conflict, and skills in using teamwork tracking software. This reinforces other findings in this Study that show wider skills shortages, including technical skills, are concentrated in the mid-to-senior level roles (see section 5.5). While these skills are necessary at all levels, their lack is more acutely felt in the mid-to-senior levels, where these skills assume greater importance.

5.4.2. Sector-Specific Skills Gaps

Figure 4 provides a closer examination of key skills gaps in each of the digital content production sectors. The table includes sector-specific gaps in both technical and people skills, identified through primary and secondary research for this Study.

Figure 4 – Overview of Current Skills Gaps in the Digital Content Production Sectors

Sector	Skills Gaps
Animation	• Largely around technical skills and mid-level people skills • Key technical skills gaps include using Blender, 3D animation and 3D modelling
Post-production	• Largely around technical skills and junior and mid-level people skills • Key technical skills gaps include using Avid and ProTools
VFX	• Largely around technical and junior / mid-level creative skills • A notable gap in creative production talent that can 'take a brief from a lead and develop the idea through to execution'
	• Key technical skills gaps include a comprehensive understanding of real-time engines, and expertise in 3D modelling and virtual reality • The rise of real-time engines as a significant shift towards cross-disciplinary skill sets, making it crucial for producers to have a broad understanding of the overall industry
Video games	• Typically around junior and mid-level people skills • There are relatively few technical skills gaps compared to the other studied sectors. The main technical skills gaps identified were in 3D programming, as found in the primary research for this Study • SKILLfull's research noted gaps in digital skills, as these are typically only taught from Level 3 and above, as well as requiring the purchase of hardware and software, which is not always affordable for all • Smaller, independent video games developers and companies require new entrants to be multi-skilled and adaptable as 'jacks of all trades', to fill several different roles, as well as apply cross-disciplinary skills. This is less of a requirement for larger companies who favour more specialist skill sets
Emerging Tech	• Largely around specialist technical skills and critical analysis skills at all levels • Key technical skills gaps are in 3D technical

Sector	Skills Gaps
	skills, including for use in 3D product design, 3D character design or 3D animation, as well as C++ and C# programming skills for use in Unity and Unreal • The sector often hires workers with a cross-disciplinary background, including those from manufacturing, engineering, and the creative industries at large; they undergo reskilling to adjust their skill set to fit with emerging technologies

5.5. Skills Shortages

5.5.1. Shared Skills Shortages Across the Sectors

While consultees from each sector reported different kinds of skills shortages, an analysis of primary and secondary research conducted during this Study suggests that these skills shortages are most consistently found at the mid-to-senior levels across the digital content production sectors, having a direct impact on the sustainability and competitiveness of businesses. If the skills gaps and shortages are not plugged, sectors will be competing for employees from an ever-decreasing talent pool. This directly affects the ability of companies and producers to deliver projects. This will, in turn, result in the loss of projects and work to overseas jurisdictions, will affect the economic health and reputation of the sector, and will potentially enable a further 'brain drain' to other jurisdictions as explored further in section 5.5.2.

5.5.2. Sector-Specific Skills Shortages

Animation

The ScreenSkills Assessment 2021[64] and the UK Screen Alliance's 2022 workforce survey[65] noted the following specific roles as facing shortages in the UK's animation sector:

- Animation editor
- Animator – 2D and 3D
- Art director
- Background designer
- Colour concept artist
- Creative director
- Director, FX supervisor
- Key animator
- Lead FX artist
- Line producer
- Mid-to-senior level animators[66]
- Producer
- Production manager
- Real- time developer
- Rigger – 2D and 3D
- Storyboard artist
- Technical artist

[64] *ScreenSkills Assessment 2021*. ScreenSkills, 2021

[65] In this analysis, UK Screen Alliance mapped the roles most difficult to recruit against the number of those roles present in the workforce sample they surveyed. We have reproduced some of the roles most difficult to recruit mapped against roles having low to least numbers of staffing among the surveyed workforce, and combined them with shortages from existing research

[66] According to the UK Screen Alliance 2022 survey, mid-to-senior level animators are difficult to recruit, but account for relatively high numbers of employees in the surveyed workforce

- Toon Boom animator
- 2D designer
- 3D supervisors.

This Study has confirmed many of these shortages in the animation sector, as well as others, including shortages in:

- Designer[67]
- Director
- Director of photography
- IT technicians
- Production accountant
- Production coordinator
- Sound engineer
- Stop motion animator
- Technical director
- 3D animator (UK-based)
- 3D modeller (UK-based).

This Study found that the sector is experiencing recruitment challenges in sourcing staff for specific roles from within the UK. For example, one production company reported they received 80-90 applications for a UK-based 3D modeller role, out of which only 15 were UK-based.

The UK Screen Alliance's 2022 annual workforce survey evidences the sector's tendency to recruit staff from outside the UK, showing that the animation sector is currently recruiting about 20% of its staff from outside the UK, with 12.9% of the surveyed workforce being hired from EU countries.

Movement of staff and other wider trends affecting retention are further explored in section 5.5.3.

Certain departments in the animation sector are facing a bigger recruitment crunch than others. For example, IT teams, including developers and IT technicians, ere particularly hard to recruit. These recruitment issues are especially acute for IT roles that are permanent PAYE positions.

Video Games

The ScreenSkills Assessment 2021[68] noted that the following roles and disciplines are facing shortages in the UK's video games sector:

- Animator
- Artist
- Back-end programmer
- Game designer
- Network programmer
- Technical artist director
- Technical artist
- UI designer
- 3D programmer.

SKILLfull's analysis of disciplines[69] that are most difficult to recruit into (i.e., disciplines with job vacancies open for more than four months and

[67] In this Study, consultees found 'designers' overall as a shortage. This is different from specific 2D designers, among whom skills shortages were noted through existing research

[68] *ScreenSkills Assessment 2021*. ScreenSkills, 2021

[69] SKILLfull used 'disciplines' to conduct its analysis. While there is overlap in terminology, 'roles' are typically understood to fall under the wider 'discipline'. Hence, SKILLfull's analysis differs slightly from that of this Study. However, the terminology has been reproduced to retain the authenticity of SKILLfull's analysis. In total, SKILLfull analysed 11 disciplines, including art, business operations, sales / marketing / communications, production, writer, audio, design, IT, localisation, programmer, and quality assurance

those with vacancies that remained open for more than six months) include 'programmers' and 'art'. 'Programmers' and 'art' have respective percentages of 37% and 29% of vacancies still open after four months, and 41% and 30% of vacancies still open after six months.[70] They are therefore the two disciplines facing the most role shortages of all disciplines analysed.

This Study found that there are additional technical roles for which it is particularly challenging to recruit candidates, including:

- Game director
- Senior software engineer
- Technical art disciplines (including technical art, animation, VFX, and character art), particularly around mid-level roles.

This Study found shortages in highly specialised technical skills; for example, a studio recently struggled to source a head of combat design, as this demanded a combination of skills in animation, gameplay, motion capture, and VFX, at a mid-to-senior level.

Both this Study and SKILLfull's research found role shortages prevalent at the mid-to-senior level. Supporting findings from consultations, SKILLfull's analysis of job vacancies by seniority revealed most opportunities advertised (48%) are for experienced professionals. Senior roles make up 25% of vacancies, followed by managerial positions at 17%. Junior roles accounted for 7% of vacancies, while the remaining positions (multi, intern, and principal roles) each represent 1% of total vacancies. Further, SKILLfull's research found that the hardest-to-fill vacancies were typically the roles requiring the most experience, with 92% of the vacancies open for more than four months being categorised as either 'experienced', 'senior' or 'manager'.

Consultees for this Study reported that in the last three years, trends in skills shortages in the video games sector have begun to shift. This has been chiefly due to easing of the significant demand for video games content observed during the COVID-19 pandemic - for instance, the reduced need for specialised roles, such as senior software engineers, to rapidly create content.

Visual Effects

The ScreenSkills Assessment 2021[71] and the UK Screen Alliance's 2022 workforce survey[72] noted that the following roles are facing shortages in the VFX sector:

- Creature technical director (mid)
- DFX supervisor
- Facial modeller
- Generalist technical director (senior)
- Line producer
- Pipeline technical director (mid)
- Real-time engine coder (for Virtual Production)
- Senior compositing artist[73]
- Tracker (mid)
- VFX editor
- VFX editorial assistant
- VFX producer

[70] In SKILLfull's analysis of hard to fill vacancies after four months and six months, percentages of open vacancies in each discipline were calculated based on the whole number of jobs open at the time of analysis (i.e., at four months and then at six months)

[71] *ScreenSkills Assessment 2021*. ScreenSkills, 2021

[72] In this analysis, UK Screen Alliance mapped the roles most difficult to recruit against the number of those roles present in the workforce sample they surveyed. We have reproduced some of the roles most difficult to recruit mapped against roles having low to least numbers of staffing among the surveyed workforce, and compiled them with shortages from existing research

[73] 'Compositing artists' are the same as 'compositors'

- 3D supervisor.

This Study revealed a further shortage in recruiting compositors, as well as a general recruitment challenge for **mid-to-senior level roles.**

Post-Production

The ScreenSkills Assessment 2021[74] and the UK Screen Alliance's 2022 workforce survey[75] noted that the following roles are facing shortages in the post-production sector:

- Colourist
- Department head
- Department manager
- Dubbing mixer
- Edit assistant
- High-end tech ops (MCR pipeline[76])
- Line producer
- Post-production producer
- Senior flame operator
- Systems engineer (mid).

This Study further identified shortages in **editors** and **editorial and factual assistants**, especially at the **mid-to-senior levels**.

While this Study found substantial skills shortages and recruitment issues at the mid-to-senior levels, there are also **challenges in recruiting entry-level staff, relating largely to their lack of industry readiness, despite having the necessary technical skills for the job**. Therefore, while post-production companies do not particularly struggle to recruit entry-level staff, they have reported diverting resources to provide the necessary skills training to plug the gaps in key people skills for this level.

Emerging Tech

The 2022 Immersive Economy Report[77] identified the following roles as facing shortages in the emerging tech sector:

- Technical artist
- Unreal and Unity game developer

These skills shortages are more frequent at the senior levels.

Since the existing talent pool for many of these senior roles in the UK is small, this Study found that **the sector often hires workers with cross-disciplinary skills from other sectors**, such as the wider Creative Industries, engineering, and manufacturing. In such cases, there is a need to reskill workers to adjust their skill sets for the use and application of immersive technologies.

Research into the skills gaps and shortages in the emerging tech sector is in its infancy. Accordingly, while this Study has revealed gaps and shortages noted above, these are indicative and have not been comprehensively supported by statistical or secondary data, unlike the findings for other sectors in scope.

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[74] *ScreenSkills Assessment 2021*. ScreenSkills, 2021

[75] In this analysis, the UK Screen Alliance mapped the roles most difficult to recruit against the number of those roles present in the workforce sample they surveyed. We have reproduced some of the roles most difficult to recruit mapped against roles having low to least numbers of staffing among the surveyed workforce, and combined them with shortages from existing research

[76] Master Control Room

[77] *2022 Immersive Economy Report*. Immerse UK, 2022

5.5.3. *Retention Issues*

Skills shortages across the digital content production sectors have been exacerbated by issues of retention faced by employers, particularly related to mid-to-senior level staff.

As reinforced by consultees from all the sectors, key retention issues in the sectors include:

- **Losing talent to overseas companies.** The animation and VFX sectors are losing skilled workers to jurisdictions such as Canada, France, Ireland, and Spain. This is due to better funding opportunities, tax incentives and employee-friendly legislation, leading to greater productivity and job opportunities. For example, the 'Intermittent du spectacle' scheme in France provides a unique safety net for individuals working in the digital content production sectors, allowing them to receive unemployment benefits during periods of inactivity, which are common in these project-based industries.[78] This distinctive employment status, combined with other favourable conditions, is drawing skilled workers away from the UK animation and VFX sectors.
- **Premature promotion of under-skilled and inexperienced employees has exacerbated retention issues across the digital content production sectors**. During and after the COVID-19 pandemic, especially the animation, video games and VFX sectors faced a sharp increase in demand for content. Consultees reported that, in response to this sharp increase, junior members of their teams were required to quickly take on more senior role responsibilities, which typically require deep specialist skills that can only be achieved through long service and specialism in that area. In many cases, this led to high work pressure, and eventually higher levels of attrition at the mid-senior level which now included the erstwhile junior level staff who were promoted.
- **Higher salaries, work pattern flexibility, and greater career prospects in other UK-based companies are the key drivers for the loss of staff in the mid-to-senior levels.** This disproportionally affects smaller companies, especially those based in England's regions and the UK's nations, who are not able to offer the same salary levels or CPD investment as larger companies in London. Positions in the video games sector such as UX / UI are particularly affected by this, as salaries in the video games sector are often lower compared to the wider tech industry, which is competing for the same talent.
- **London remains a significant pull for talent across the UK**. Companies based in other parts of the UK struggle to recruit new entrants from England's regions. Animation companies based in Wales have reported losing most of their staff to London, which accounts for a high concentration of animation businesses, being home to 37% of core animation businesses and 42% of wider animation value chain businesses[79]. It has been estimated that more than 50% of the UK's animation output is produced in London.[80] Similarly, smaller companies in sectors such as VFX and emerging tech are losing talent to bigger companies based in London that are able to offer higher salaries. Two notable exceptions to this are Aardman Animations in Bristol and Gorilla

[78] *Mode d'emploi – Être intermittent du spectacle dans le cinéma d'animation et les VFX*. Olivier Schmitt, April 2015

[79] 'Wider animation value chain businesses' refers to a broad range of sub-sectors that use animation skills and activity to varying degrees; *Mapping the Presence of Animation Activity Across the UK's Economy: Stage Two, a Report Commissioned by the BFI*. Hatch, forthcoming

[80] *Animation Strategy 2021/22*, Film London, 2021. Film London made this estimation based on BFI data detailing the animation programmes and films that received final tax certification in 2021

Group in Cardiff who have been able to retain key talent due to their reputation, strong connections with the wider industry, and training programmes (see Case Study 1 and 3). In contrast, the video games sector is more regionally dispersed across the UK's nations and England's regions, compared with the other studied sectors. Aside from London, there are video games hubs elsewhere in England (Manchester, Brighton, Guildford, Leamington Spa and Liverpool), in Scotland (Edinburgh and Dundee) and in Northern Ireland (Belfast).[81]

- **There is some movement of skilled workers, both within and outside** the sectors in scope. Consultees reported that such movement is typically from VFX and animation to video games, with VFX and animation studios reporting losing designers to video games. Further, both this Study and SKILLfull's research found that there are a small number of cases of video games workers moving to other sectors, such as Big Tech, FinTech, Web 3.0,[82] venture capitalist start-ups, and automotive sectors. In cases where such movement has been reported, this is typically linked to higher salaries (as explored above).
- **Skilled post-production workers typically move within that sector, instead of other digital content production sectors.** For instance, a post-production employer reported that it is more common for staff to move from scripted to non-scripted post-production work, rather than to other digital content production sectors. This trend is attributable to the sector requiring relatively distinctive skill sets, which are not readily transferable to the other digital content production sectors. While there are some overlaps between visual effects and post-production (e.g., booking positions or post-producer), and engineers may move around, these are exceptions.
- Although not specifically reported by the other sectors, the **difficulty of retaining freelance staff was reported as a key problem facing the video games sector**, particularly for roles like voice talent and composers.

5.5.4. Wider Trends Impacting Recruitment and Retention

The recruitment and retention issues outlined in this section are linked to wider trends impacting the digital content production sectors, which have created both opportunities and challenges.

These wider trends, which were revealed through this Study's extensive research, include:

- **Tax credits are available for some digital content production costs and play a key part in how businesses in the UK finance their projects.**[83] From 1 January 2024, the new Audio-Visual Expenditure Credit (AVEC) will come into force to replace the current film, high-end TV, animation and children's TV tax reliefs, while the Video Games Expenditure Credit (VGEC) will replace the Video Games Tax Relief (VGTR). Film, HETV and video games will be eligible for a credit rate of 34% (equivalent to 25.5% net) on qualifying expenditure and animation will be eligible for an increased rate of 39% (equivalent to 29.25% net).[84] An 80% cap on qualifying expenditure will continue to apply. Further, in the 2023

[81] *UK Games Map*. Ukie, January 2023

[82] A new iteration of the world wide web built on decentralised blockchains, and related sectors

[83] Currently, there is no specific tax relief for post-production or VFX, however post-production and VFX costs are eligible under the Film, High-end Television, Animation, and the Children's Television reliefs. Immersive tech businesses are eligible for the Research and Development (R&D) Tax Relief for a portion of their qualifying R&D expenditure. Further, immersive tech companies that are involved in the development of video games or animation, such as Virtual Reality games, are eligible for the Video Games or Animation reliefs

[84] *Reform of audio-visual creative tax reliefs*, Policy paper. HM Revenue & Customs, 18th July 2023

Autumn Statement, the Government issued a call for evidence to inform the development of proposals for increasing the AVEC specifically for visual effects, which they aim to implement from April 2025.[85]

- **The lack of competitive fiscal incentives for all the digital content production sectors in the UK affects recruitment and retention patterns across the sectors.** This Study found that the more advantageous tax credits and other fiscal reliefs (which have enabled increased levels of production and related work opportunities) in the VFX, animation, and video games sectors offered by other jurisdictions are key reasons that UK-based talent is being lost to jurisdictions like Canada, France, Ireland, and Spain. For example, the Canadian province of British Columbia offers a 16% refundable tax credit on eligible labour expenditure for digital animation, VFX, and post-production activities Meanwhile, Quebec offers a tax credit of up to 38% refund on eligible labour costs for animation and VFX work. The Quebec VFX sector's turnover rose from CA$57 million in 2011 to CA$780 million in 2021.[86] Similarly, Ireland offers a tax credit of up to 32% on eligible production costs for film, television, and animation projects. Ireland also offers a digital games Corporation Tax for the digital games sector, with available credit per digital game being 32% of the lowest of eligible expenditure, or 80% of total qualifying expenditure or €25 million.[87] Notably, while not mentioned by this Study's consultees as a jurisdiction actively pulling UK video games staff, Australia also recently introduced an advantageous games tax incentive. In June 2023, Australia introduced the Digital Games Tax Offset, which provides eligible game developers with a 30% refundable tax offset for qualifying Australian development expenditure.[88]
- **The COVID-19 pandemic exacerbated retention issues in some cases while creating recruitment opportunities in others.** As described in section 2.3.2, this Study found an increased demand for digital content during the pandemic. This led to companies across the digital content production sectors having to prematurely promote employees with inadequate skills and experience, to senior roles, which typically require deep specialist skills that can only be achieved through long service and specialism in that area. This contributed to a cycle of staff attrition due to mounting stress and a lack of training opportunities, especially in smaller companies. On the other hand, examples of opportunities created as a result of the pandemic include the recruitment of staff into the emerging tech sector located close to them. A combination of primary and secondary research shows that there has also been an overall benefit from remote working patterns across the sectors, with some companies now being able to hire (and work) from beyond their immediate geographic area. [89] However, at the same time, remote working patterns exacerbated retention issues in some cases, with employees based in the UK but working for overseas companies.
- **The UK's exit from the EU has exacerbated recruitment and retention issues across the digital content production sectors.** Before associated legislation was passed in December 2020, the sectors in scope were able to recruit and retain EU / EEA-based staff residing outside the UK. Consultees reported that recruitment and retention of staff from the EU / EEA has now

[85] *Call for evidence on the UK visual effects sector*. HM Treasury, 22nd November 2023
[86] *Quebec Film and Television Council Annual Report 2021-2022.* Quebec Film and Television Council, 2022
[87] *Digital Games Relief*. Irish Tax and Customs, 18th April 2023
[88] *Digital Games Offset*. Australian Taxation Office, 18th July 2023
[89] *2022 Immersive Economy Report*. Immerse UK and Oxford Insights & Data City, October 2022

become more complicated and expensive for companies because of the need for work permits and visas and other logistical issues. The UK Screen Alliance's 2022 workforce survey supports this finding, reporting a notable percentage of EU / EEA staff being employed on Skilled Worker and Creative visas after the UK's exit from the EU. 18% of Skilled Worker visa holders and approximately 59% of Creative visa holders[90] from the surveyed sample of post-production, VFX, and animation sectors are from the EU / EEA region and did not need visas or permits before 31 December 2020 (when free movement of workers ended). Workforce data from 2017[91] and 2018[92] compared with the UK Screen Alliance's 2022 workforce survey shows that there has been a decline in surveyed EU workers in animation, VFX and post-production. The percentage of EU workers across animation, VFX, and post-production sectors was approximately 20% in animation in 2018 (dropping to 12.9% in 2022); 32% in VFX in 2017[93] (dropping to 23.7% in 2022); and approximately 12% in post-production in 2018 (dropping to 5.3% in 2022). In the video games sector, Ukie's 2020 Industry Census, undertaken before employment legislation related to the UK's exit from the EU came into effect in December 2020, found that EU / EEA nationals made up 19% of the workforce. Ukie's 2022 Games Industry Census showed that EU nationals made up a similar proportion of the workforce, accounting for 20%. Statistical data for the emerging tech sector is currently lacking.

- **Industry is 'cannibalising' its own talent pool and pipelines.** This Study found that skills shortages are being exacerbated by bigger, better-resourced companies poaching talent from smaller or regional companies. Further, larger companies are poaching staff from FEI / HEIs, attracted by more competitive salaries. This disrupts the training pipeline as FEI / HEI students are not consistently being taught by practising industry tutors, which leads to the widening gap between the outcomes of education provision and industry needs.

5.5.5. *Equity, Diversity and Inclusion in the Digital Content Production Sectors*

Primary and secondary research conducted during this Study has revealed that access for underrepresented groups to the digital content production sectors has improved in recent years – for instance, through a growing emphasis on flexible working patterns and better access to software for underrepresented and disadvantaged creators. In most cases, where data is available, the numbers of underrepresented groups in the studied sectors' workforces have either matched or exceeded the respective population benchmarks (as shown below). However, barriers to entry for people from underrepresented socio-economic, cultural, and ethnic groups continue to exist across the studied sectors. Further, while the increasing numbers of underrepresented groups in the sectors' workforces is a positive change, it is only one piece of the larger EDI conversation and does not speak to other aspects such as nature and quality of jobs held by such groups.

The findings in this section have been structured according to EDI parameters considered separately, which makes the approach non-intersectional. It is worth noting that research in this area is limited and is not consistently available across the sectors. Accordingly, while this

[90] The UK Screen Alliance's 2022 workforce survey showed that 15% of the entire surveyed workforce were employed on the Skilled Worker visas, while 6% were employed on the Creative visas

[91] *The UK's VFX Workforce*. UK Screen Alliance, 2017

[92] Data on EU workers in animation and post-production in 2018 is unpublished and was sourced through consultation during this study. Hence, these percentages are indicative

[93] *The UK's VFX Workforce*. UK Screen Alliance, 2017

section includes all findings from this Study's primary and secondary research, there are evidence gaps in this area. This signals the need for further, more targeted, research in all the sectors in scope, ensuring uniform and intersectional data collection and analysis across all EDI parameters.

Gender

Overall, the studied sectors are characterised by a smaller proportion of employees who identify as female and non-binary compared to those who identify as men.

The VFX and post-production sectors reportedly have a significant gender imbalance. Within its sample of 40 companies and 5,717 employees, the UK Screen Alliance's 2022 workforce survey recorded that in each sector only 32% of surveyed staff were women; the gender imbalance across the sectors was confirmed by consultees during primary research conducted for this Study.

Animation, on the other hand, has more balanced gender representation. The UK Screen Alliance's 2022 workforce survey recorded that 46% of surveyed workers were women. Still, this Study found a pronounced 'lad culture' in animation, which is causing some female staff to consider leaving the sector, as they feel 'out of place'. Similarly, consultees for this Study reported a lack of women in leadership positions in the animation sector, particularly a lack of female directors.

In a similar vein, the **video games sector has been facing issues in recruiting and retaining female staff**. According to Ukie's 2022 Games Industry Census data, the video games industry currently only has 30% female staff, and a further 2% of staff identifying as non-binary or 'other'. Primary research conducted during this Study supports the statistic on low numbers of female staff. Additionally, the consultees reported difficulties faced by female workers in returning to work following maternity leave. Concerns were raised that, if support is not given in early / mid-career years, there will not be enough diverse workers to promote and hire at senior levels.

While not raised by this Study's consultees, there have been recent online discussions in the UK's video games industry focusing on the toxicity of misogynistic working culture experienced by women working in the sector. This resulted in a roundtable being convened at a key UK games industry event to bring attention to the issue and discuss potential solutions.[94]

Finally, this Study found that the **emerging tech sector also has a higher proportion of men than women among its workforce**. This mirrors low female representation in tech more generally. However, there is limited data available to test this view, so this finding, based on consultations, should be treated as anecdotal.

Sexual Orientation

Overall, **LGBTQ representation in the digital content production sectors is highest in the video games sector, followed by animation and VFX, and lastly post-production**. Associated data for the emerging tech sector is currently lacking.

According to Ukie's 2022 Games Industry Census report, around three quarters (76%) of the video games workforce identify as heterosexual / straight, compared to 12% who identify as bisexual, 5% who identify as lesbian / gay, and 3% who identify as queer.

Ukie's 2022 Games Industry Census report also found that **LGBTQ representation in the video games sector is significantly higher than**

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[94] *Abuse allegations emerge in the wake of GDC 2023*. GamesIndustry.Biz, 28th March 2023

the comparative national population. The 2017 national population estimates[95] found that the percentage of LGBTQ people in the adult population was 6.3%, compared with 24% of people working in video games in the same year. Ukie's 2022 Games Industry Census report indicated that the higher percentage was in part due to games workers being more likely than the general population to live in London, where the percentage of people who state that their sexuality is anything other than heterosexual / straight is the highest of all UK regions.

According to UK Screen Alliance's 2019 report, the percentage of people identifying as lesbian, gay, bisexual or another preferred description was highest in animation at 22%, followed by VFX at 14% and post-production at 12%. In comparison, the percentage of people identifying as heterosexual across these sectors was approximately 75% (animation), and 82% (VFX and post-production). Notably, while VFX and post-production have the same proportions of people identifying as heterosexual, post-production has a higher percentage of people preferring not to disclose their sexuality compared to VFX.[96]

The percentage of people identifying as gay or lesbian was similar across VFX, animation, and post-production, ranging between 6-7%. The only major difference was a higher proportion of bisexuality (10%) and pansexuality (4%) in animation, compared to VFX and post-production.[97]

It is important to note that these findings come with some caveats. Firstly, the two reports used different sexual orientation identifications, so aren't directly comparable; Ukie's study covered a wider range and intersectionality. Secondly, the reports were undertaken three years apart from another – though it is unlikely that the figures would have changed significantly between the two reports.

Socio-Economic Background

Existing statistics on socio-economic background of the workforce in the digital content production sectors are inconsistent, with different sources using different metrics and methodologies. This section includes the most relevant and recent data available.

The animation, VFX, video games, and post-production sector workforce is highly educated.[98] This indicates high numbers of workforce that are degree educated, indicating the possible exclusion of those from low-income backgrounds who are unable to afford access to FEI / HEI. The rising costs of university education adversely affect the pathway for those unable to afford tuition fees and living fees.

The UK Screen Alliance's 2019 inclusion and diversity research study[99] reported that 85% of the UK's VFX, animation, and post-production sector workforce hold at least a degree or postgraduate qualification.[100] Further, the sectors also exceeded the population benchmark of 7% for workers receiving private secondary school education, with the largest being the VFX sector at 17%, and animation and post-production sectors reporting 9% of staff having had a private school education. **The video games sector workforce similarly comes from affluent backgrounds.** According to Ukie's 2022 Games Industry Census, overall, 82% of people working in games have at least an undergraduate degree, and 28% have a postgraduate qualification. Further, 10% of the

[95] The most recent national statistics at the time of Ukie's study
[96] *Inclusion and Diversity in UK Visual Effects, Animation and Post-Production.* UK Screen Alliance, 2019
[97] *Inclusion and Diversity in UK Visual Effects, Animation and Post-Production.* UK Screen Alliance, 2019
[98] Comparable data is not available for the emerging tech sector
[99] *Inclusion and Diversity in UK Visual Effects, Animation and Post-Production.* UK Screen Alliance, 2019
[100] Percentage of sector workforce with a degree: Animation, 93%; VFX, 80%; post-production, 79%

workforce attended fee-paying schools. There are no similar statistics available for the emerging tech sector.

This Study complements these findings, reporting that **entry into the digital content production sectors typically relies on access to formal education and training provision.** Across the studied sectors, this Study found that recruitment is often a result of access to networks and formal training pathways. These include attending expensive training programmes and courses by education providers, which provide access to the technologies required to develop the relevant technical skills.

This Study found that the video games sector has been taking positive strides towards increasing access to entry for people belonging to lower income backgrounds. Examples include improving access through free and / or low-cost technical tools and software, such as Epic Games' Unreal Engine which is free to use for learning and for developing internal and commercial projects.[101] Similarly, scholarships are being awarded by some of the bigger video games companies like PlayStation to enable students from lower income backgrounds to access education and training opportunities and enter the sector.

Ethnicity

Employees working in the UK's digital content production sectors are predominantly from white ethnic groups, which mirrors the relatively low percentage of Black and Global Majority workforce in the UK's working population. Notably, the animation and VFX sectors exceed the population benchmark for Black and Global Majority employees.

According to the UK Census 2021, 19% of people of the working population belong to Black and Global Majority ethnic groups.[102]

UK Screen Alliance's 2022 workforce survey shows that the percentage of People of Colour (POC)[103] working in the animation and VFX sectors exceeds the UK's Black and Global Majority population benchmark, while post-production mirrors the population benchmark. POC make up 25% of employees in the animation sector, 20% of the VFX sector, and 10% of the post-production sector.[104] It is worth noting, however, that the UK Screen Alliance's 2022 workforce survey reflects a sample of the workforce and is not a census, and therefore these numbers are illustrative only.

Ukie's 2022 Games Industry Census found that only 11% of games workers identified as Asian (5%), Black (2%), Mixed or Multiple ethnicities (2%) or other ethnicities (2%),[105] which is below the UK's population benchmark.

Similar data for the emerging tech sector is currently lacking.

Disability

Across the VFX, animation, and post-production sectors, 12% of workers reported having at least one physical or neurological disability, according to the UK Screen Alliance's 2019 study,[106] with 50% of those having a learning disability and 27% having other

[101] A 5% royalty only kicks in when the commercial title earns over US$1 million
[102] *Working Age Population*. Government of UK, 15th September 2022
[103] Although this Study uses the term 'Black and Global Majority' to refer to people belonging to Black, Asian, Brown, dual-heritage, indigenous to the global south, and / or have been racialised as 'ethnic minorities', the term POC is used in this section, as this is the term used by respondents in UK Screen Alliance's workforce survey
[104] *Annual Workforce Survey 2022*. UK Screen Alliance (Unpublished)
[105] *UK Games Industry Census.* Ukie, March 2022
[106] *Inclusion and Diversity in UK Visual Effects, Animation and Post-Production.* UK Screen Alliance, 2019

neurological disabilities, such as autism and / or obsessive-compulsive disorder (OCD).

For video games, the 2022 Ukie Census reported that 38% of people reported either anxiety or depression, or both. 18% of people reported both anxiety and depression; 15% people reported anxiety; and 5% reported depression.

Further, according to the 2022 Ukie Census, 10% of the sampled workforce reported having Attention Deficit Hyperactivity Disorder (ADHD) or other conditions affecting concentration, 7% reported having a learning difficulty such as dyslexia, and 4% reported having autism.

It is worth noting that **disability data is inconsistent and is not uniformly available for all the studied sectors, with a lack of such data in the emerging tech sector**. Further, accurate benchmarking of disability data from the studied sectors against the UK's working population has not been possible. This is because the latest available population data on disabled people in the UK's workforce follows a different categorisation of analysed disabilities, compared with the categories used in the UK Screen Alliance's and Ukie's surveys. In the few instances where consistent categorisation is available, such percentages have been calculated based on the total number of disabled people in the UK's workforce, rather than the total number of employed people in the UK, making it difficult to report an accurate comparable benchmark.

Further primary and secondary research shows barriers in the workplace for people with disabilities. This Study identified difficulties in entry and progression for neurodivergent employees. A common example of exclusionary practices was related to job advertisements, where consultees from the video games and animation sectors reported that entry requirements regularly require candidates to be 'confident speakers' or 'good team leaders'. This is very likely to deter engagement by neurodivergent staff. Further, the animation sector reported other barriers in the workplace for people with disabilities, according to a recent 2022 animation sector report. [107] That report found that 50% of the sampled disabled workforce disagreed that the animation sector is a good sector to work in if you have a disability, with 43% of disabled respondents strongly disagreeing that recruitment processes in animation encourage applications from disabled people. 74% of the disabled respondents also felt that the sector discriminates against people with disability, indicating a strong perception of disability related discrimination in animation. Further, 72% of the sample felt that they were not given training on how to create an inclusive workplace for disabled people in the animation sector.

5.6. Case Study 2 – BAME in Games

> BAME in Games (BiG) is a UK-wide volunteer-run advocacy group for the video games sector. BiG organises regular events, offers a mentorship scheme, and collaborates with video games companies to enable 'open days' to help de-stigmatise the industry for people in the Black and Global Majority.

BAME in Games

BAME in Games (BiG) is a UK-wide non-profit organisation, founded in 2016. It offers a variety of programmes and initiatives, such as professional networking, a mentorship scheme, and events aimed at improving opportunities and training for underrepresented ethnicities looking to break into the video games and broader entertainment sectors. The programmes are also aimed at existing professionals looking to further improve their prospects. As a volunteer-run advocacy

[107] *Accessibility in Animation*. ScreenSkills, February 2022

group, BiG is funded through a combination of volunteer donations and partnerships with corporate sponsors.

Aims and Objectives

BiG's principal mission is to encourage and improve ethnic diversity within the video games and broader entertainment sectors.

What Works Well

BiG's advocacy work in the video games sector focuses primarily on recruitment processes. It has urged employers to reconsider the language used in job advertisements and advocated for more flexibility in the qualifications deemed essential or desirable for a role. By suggesting that employers look beyond traditional qualifications and embrace alternative criteria, BiG aims to make job listings more inviting, especially for those who may not have had access to formal education routes into the sector, thereby creating more inclusive recruitment practices that consider diverse educational pathways.

At the core of BiG's work is its Games Digital Mentorship programme. Designed with an intersectional lens, the programme connects young diverse talent with experienced industry professionals online, to encourage more diverse talent to work in the video games sector. BiG launched the programme in September 2020 in collaboration with Developing Minds, Studio Gobo, Electric Square, and Prospela. In its inaugural year, the programme received over 2,000 registrations and is having a real impact today. In 2023, 35% of mentees reported that they gained clarity for their career progression, 30% had received guidance to inform pivotal career decisions, and 25% reported enhancements in their portfolios.[108] Further, given that 30% of mentees were previously unengaged in employment, education, or training, BiG's mentorship is playing a crucial role in guiding talent into the video games sector.

Collaboration is another cornerstone of BiG's advocacy. By partnering with leaders in the video games sector, it amplifies awareness about challenges faced by underrepresented ethnicities. BiG's Virtual Meets, conceived in response to the COVID-19 pandemic, not only host diversity panels but also draw participation from industry heavyweights like Square Enix, Sega, and the BFI. These events continue to serve as platforms for discussions on empowering diverse talent.

In a bid to expand its mentorship, and in response to challenges in finding enough senior mentors from underrepresented ethnicities, BiG has adopted the strategy of enlisting junior employees as mentors. This move, while doubling as managerial experience for the juniors, also ensures a more diverse and empathetic mentorship pool. Another key focus for BiG is to encourage senior professionals who are allies to sign up as mentors.

BiG also collaborates with various companies to host open days, aiming to make the sector less daunting for potential employees. Its regular events, in association with entities including the BFI and Ukie, further provide invaluable networking platforms.

Through BiG's initiatives, mentees develop essential soft skills, including collaboration and communication within a fast-paced industry context. These are important first steps in providing aspiring video games professionals with the confidence and conviction that they can succeed if they pursue further training and work opportunities in the sector – in part via the network BiG provides them with access to. These opportunities then provide the key technical skills transferable to adjacent sectors – for example, being trained in software such as Unity and Unreal Engine, which are used in video games development, and are increasingly used in the film, television, and automotive industries. Therefore, BiG's efforts not only equip underrepresented ethnicities with the skills to step into the video games sector, but also guide them

[108] Impact data from BiG's Mentorship Programme. Source: Prospela

towards professional opportunities in the broader tech and entertainment sectors.

Through their numerous partnerships and support with various EDI reports, such as Ukie's UK Games Industry Census, BiG highlights the importance of discussion and collaboration to improve diversity and inclusion standards.

Lessons Learnt

The success of BiG is a testament to the significance of a multifaceted approach to advancing EDI objectives in the digital content production sector.

Key takeaways include the criticality of redefining recruitment norms, amplifying mentorship opportunities through innovative and inclusive programmes, and the importance of collaboration with sector leaders. By facilitating open dialogue and mentorship, and endorsing alternative qualification pathways, the UK's digital content production sector can cultivate a more inclusive environment. Additionally, thanks to the cross-over skills across all digital sectors, such as programming, 3D production, compositing, and team collaboration, these initiatives have broader applicability and impact. For meaningful progress in EDI objectives, it is imperative to combine strategic partnerships with tangible actions that directly benefit underrepresented communities.

> *I feel a lot more confident about my skills as a game designer and about how to improve myself, my portfolio and my job prospects!*
>
> – Participant of the Games Digital Mentorship programme

Image credit: BAME in Games

5.7. Case Study 3 – Gorilla Group

Gorilla Group is one of the leading and most prominent post-production firms in Wales. The organisation provides a wide suite of post-production services for UK and international clients.

Gorilla Group has been able to mitigate critical recruitment and retention challenges through a comprehensive, multi-dimensional strategy. This includes collaboration with educational institutions, in-house training, flexible and inclusive working opportunities, and hosting recruitment fairs.

Gorilla Group

Established in 1999, Gorilla Group (Gorilla) is the largest post-production company in Wales. It is based in Cardiff Bay, with additional facilities in the wider Cardiff area and in Bristol. The company is a full-service, end-to-end post-production and VFX facility, delivering content to both UK and international clients.

Gorilla's portfolio includes work for clients across several content genres, covering sport, children's, factual, entertainment, and drama including high-end television programmes for some of the UK's leading broadcasters. Notable recent projects include *Doctor Who, War of the Worlds, Gardener's World and Countryfile.*

Gorilla has partnered with other key screen organisations to further their impact and outreach. This includes organisations such as Into Film, Iris Prize, Bafta Cymru, the National Film and Television School and Screen Alliance Wales.

Aims and Objectives

Gorilla aims to build a stable workforce with the necessary skills to meet industry demand. To do this, and to strengthen the partnership between industry and education, Gorilla has created initiatives such as recruitment fairs, with a focus on apprenticeships, and partnerships with the University of South Wales and organisations including Screen Alliance Wales. Gorilla is further addressing the issue of skills gaps by offering in-house training and encouraging self-driven learning. Gorilla recently launched Gorilla Academy as part of their training and engagement division which looks to provide relevant industry.

What Works Well

Gorilla has effectively addressed skills shortages in the Welsh post-production sector through a multifaceted approach, implementing both recruitment and training initiatives.

Gorilla collaborates with the University of South Wales to help create new pathways into the industry. Master's degree students are allocated two weeks' work experience with Gorilla, with a chance for one participant to take part in a 12-month placement. In 2022, Gorilla appointed a former VFX course leader at the University to the position of 2D supervisor, enhancing the synergy of education and industry.[109] Through these collaborations, students gain hands-on experience with practical placements, further enhancing their abilities, but also acquiring skills that are current and relevant to the industry. This allows the company to not only recruit potential talent, but also train and develop them according to industry needs.

After recently filling a new position for a trainee and engagement manager, Gorilla has been working on developing further recruitment initiatives, such as Gorilla Academy. The academy will provide organisations such as schools, training bodies, and local government with a single point of contact for post-production, and engagement and skills advisory activity.

Although supportive of junior staff members enhancing their skills through short-term external courses, Gorilla strongly encourages internal training initiatives, with senior members providing in-house training support. Their emphasis on fostering internal development showcases a proactive approach to mitigating skills shortages in the creative industry.

In terms of staff retention, Gorilla's focus is on providing beneficial working conditions and the importance of maintaining a dynamic and adaptable work environment. By offering flexible working hours and a supportive atmosphere for employees at different life stages, Gorilla effectively retains its workforce. Moreover, the ability to adapt to employees' needs, and the investment in new technologies and practices, demonstrate the company's forward-thinking approach. This level of commitment not only retains talent but also attracts employees looking for a progressive company outside of London.

[109] *Spotlight On…Gorilla VFX: Expanding Into HETV and Film.* UK Screen Alliance, 28th October 2022

Gorilla's adoption and normalisation of remote working arrangements has allowed them to tap into a wider talent pool and adjust to post-COVID-19 demands. This strategic move has opened new avenues for recruitment and resolved some skills shortage issues by enabling them to engage the services of remote workers and freelancers.

Gorilla encourages retention by offering clear progression opportunities within the organisation. The company's robust development pathway has facilitated many senior staff members in advancing from junior roles. By maintaining a clear roadmap for career growth, the organisation aims to keep employees engaged and committed, fostering a culture of internal growth and stability.

Gorilla is contributing to a strong skilled freelance and employed workforce in the Cardiff region. Even those who leave to work as freelancers often remain nearby and continue to work on Gorilla projects. This demonstrates a marked loyalty. Gorilla's operational philosophy underscores a strong commitment to supporting both the employed workforce and the freelance community, thereby nurturing a diversified and skilled talent pool.

Lessons Learnt

The successful aspects of Gorilla's recruitment and retention strategy lie in its forward-thinking approach and adaptation to the changing work environment. It has adopted strategies by fostering partnerships with educational institutions and establishing recruitment initiatives. The company's focus on apprenticeships helps to fill skills gaps while also securing a workforce that is aligned with the company's culture and objectives. Their partnership initiatives with organisations like Screen Alliance Wales exhibit forward thinking, by tapping into the future generation workforce. Gorilla exemplifies an organisation that has successfully curbed the migration of Welsh post-production talent to London through its targeted recruitment and retention initiatives. Further, through their steady pipeline of work, Gorilla has also been able to attract skilled workers from London to Wales.

These practices hold valuable lessons for the wider digital content production sector. The integration of apprenticeship programmes and partnerships with educational institutions could be a feasible approach to tackle skills shortages and ensure a consistent influx of talent.

Section 6 –

Short and Longer-Term Picture: What future skills are needed, and how well suited is existing skills training?

Image credit: StoryFutures Academy, ARRI / CT Group

6. SHORT AND LONGER-TERM PICTURE: WHAT FUTURE SKILLS ARE NEEDED, AND HOW WELL SUITED IS EXISTING SKILLS TRAINING?

Key Findings

- It is difficult to accurately predict what specific future skills and roles will be needed in the medium and long-term (i.e., over three years' time), though informed decisions can and are being made
- Interpersonal or people skills will become increasingly important, as employees work across multiple virtual and physical teams and workflows – especially at the mid and senior supervisor role levels, and in smaller production companies where a wider skill set is required working across multiple roles and workflows
- Technological advances will continue to blur roles and skills boundaries across the sectors in scope, as already seen in Virtual Production. This does not necessarily mean the loss of current skills or roles; rather, that it may herald the development of and demand for more cross-disciplinary roles and related skill sets
- While there has been progress in recent years, the current skills provision at FEIs and HEIs is not keeping up with industry needs; the courses are perceived as too narrowly defined, with a lack of appropriate signposting for career opportunities outside of the immediate course focus
- The most effective FEI and HEI courses directly engage with the industry as part of designing and delivering the syllabus, as well as those teaching multidisciplinary skills used across the digital content production sectors
- Compared to apprenticeships, bootcamps were seen as having higher potential for bridging the skills gaps found between FEIs / HEIs and the industry. Further funding of bootcamps is required to maximise this potential

6.1. Introduction

This section looks to the future, exploring the skills and roles that will be needed to meet the changes already taking place in the industry. It also assesses the suitability of the current skills provision for the digital content production sectors to meet both current skills needs and those that are likely to arise in the medium (three to five years' time) and long-term (over five years' time).

6.2. Future Roles and Skills Needs

6.2.1. General Observations across the Digital Content Production Sectors

The digital content production sectors are dynamic and rapidly evolving, especially due to regular technological advances (see section 4.1.) **that require new and / or upgraded skill sets**. For this reason, the specific skills and roles needed for these sectors to thrive in the future will also constantly change. Employers and academics are already making informed decisions and taking action to help develop the required roles and skills. Examples of such skills development initiatives, including the development of more pathways into the industry and greater engagement between industry and academia, are detailed in section 6.3.

Most stakeholders mentioned the difficulty of identifying specific future skills needs and predicting exactly when such skills are likely to be needed. This was attributed to the rapid pace and unpredictable nature of changes in and across the sectors. Therefore, most of the commonly cited future skills (identified in this section) pertain generally to the next five-year period, with no distinction between short-term and medium-term skills needs.

Shared observations on future skills needs across the studied sectors relate mainly to interpersonal skills, such as client management, teamwork, co-ordination, and multitasking, among others**. These types of skills are becoming increasingly important as employees continue to work across multiple teams and workflows, both virtual and physical.** As described in section 5.2., while remote working has long been part of the production and development process for digital content (especially for VFX and video games development), it became more prevalent because of the COVID-19 pandemic-related lockdown measures. This said, some employers in the studied sectors are increasingly requesting that their staff return to site, favouring in-person training and instruction. Therefore, the demand for interpersonal skills required across virtual and in-person working will vary between individual employers, based on the employer's preferred way of working, their location, and / or the distribution of their workforce.

Interpersonal skills are becoming especially important for smaller production companies, where employees are more likely to serve in numerous roles and to feed into multiple teams and workflows. **Consultees noted that interpersonal skills will continue to be critical for mid and senior supervisor roles**, as these are responsible for ensuring input from multiple departments and workflows. Employers are prioritising new hires with proven skills in collaborative and communicative working, across a mixture of in-person, remote, and hybrid digital content production processes.

Interpersonal skills related to client management and clients' engagement with the development of digital content is likely to continue to change in the future. For example, while real-time technology[110] is not yet an industry standard, embedding real-time collaborative pipelines will allow clients to engage as the work progresses. This will require new and enhanced people skills around agile client coordination, feedback, and project delivery.

New technology is more likely to redefine future roles and jobs, rather than completely replace them. Following an analysis of data collected from primary and secondary research, this Study predicts that artificial intelligence (AI) will continue to redefine the role and skill sets of 'the artist / creative' in the digital content production process, though specifics are unclear. Across the sectors, consultees noted that they expect to see the artist / creative retaining the key role in the direction of the production and development but playing a more curatorial role by bringing together a range of AI-supported or generated content. For instance, the human element of storytelling, particularly the emotive approach to production and development, was cited as irreplaceable by AI. Similarly, project managers who are specialists in traditional linear production are being trained to understand and oversee the more fluid and non-linear workflows associated with Virtual Production techniques (see section 4.1.).

Technological advances will continue to blur roles and skills boundaries across the digital content production sectors. This is already happening in Virtual Production, as it operates at the intersection of multiple digital content production sectors and skill sets. As detailed in StoryFutures' Virtual Production skills report,[111] the integration of film and video games development technology,

[110] Fast rendering of 3D digital assets to create a single frame of a shot in the same or less time than the duration for which the frame will be displayed within a sequence of frames, allowing continuous instant playback of a scene and real-time interaction with user input

[111] *Virtual Production Skills Report 2023.* StoryFutures, 2023

described as 'Film-Games Culture Integration', is key to making a success of Virtual Production. While this involves reconciling different mindsets and varying production and development cultures, there are several skills areas that sit between filmmaking and video games design and that are embedded in the working relationship between the two; technical workflow integration is one such area, with the Virtual Production supervisor, director, and first artistic director all having prominent roles in bridging these different approaches.

To remain future-proof and able to adapt to changes, employees must understand not just what they do, but why they do it. Because of technical advances in the industry, employees (and future candidates) need to have an in-depth understanding of the systems and processes underlying digital content production. This will allow them to apply their knowledge to multiple and changing situations.

While some FEIs, such as NextGen Skills Academy, Escape Studios and StoryFutures Academy, have been known to equip students with such 'adaptive thinking' skills, this Study found that such skills are largely missing in recent graduates. Instead, they tend to be overqualified in specific techniques and software because they have been trained to respond to a narrow brief.

6.2.2. Sector-Specific Future Roles and Skills Needs

As described in section 6.2.1., general observations across the sectors relate largely to the need for enhanced interpersonal skills to navigate rapidly changing workflows and processes.

By comparison, since each sector requires specific applications of changing technologies, **sector-specific future skills needs relate largely to technical skills**. This section, based on a combination of secondary research and consultations, details the most cited future skills needs of individual digital content production sectors.

Animation

- **3D animation and modelling –** As technology advances, audiences expect more immersive and visually striking content. The ability to create realistic characters, objects, and environments in 3D will be crucial to meeting these expectations
- **Mixed Reality techniques –** As VR and AR technologies continue to gain momentum in various industries, including entertainment, animators must be able to create immersive and interactive experiences for VR and AR platforms
- **Character animation –** Skilful character animation is essential for bringing stories to life. As storytelling remains at the core of animation, animators must be able to create nuanced performances, convey emotions, and master body mechanics.

Post-Production

- **Rapid non-linear editing –** As the volume of content continues to increase across various platforms, the ability to work efficiently in non-linear editing software will be crucial. Post-production professionals must be able to navigate vast amounts of footage, quickly assemble sequences, and apply VFX and transitions. The demand for quick turnaround times without compromising quality will make proficient editing skills essential in the future
- **VR and AR expertise –** As virtual reality (VR) and augmented reality (AR) technologies become more prominent, familiarity with post-production techniques specific to these formats is crucial. This includes 360-degree video editing, where editors work with spherical video formats, and interactive storytelling, where post-production professionals work closely with developers to integrate interactive elements seamlessly into the production and story's narrative
- **VFX integration –** The integration of VFX into live-action footage will continue to be a key aspect of post-production. As technology advances, the boundaries between practical and digital effects

blur. Post-production professionals must be able to seamlessly blend VFX elements with live-action scenes. The ability to collaborate effectively with VFX artists, understand VFX workflows, and communicate with the VFX team will be crucial.

VFX

- **CGI and VFX software proficiency –** The ability to work with industry-standard software, such as Autodesk Maya, Houdini, and Nuke, will remain crucial in the future. As VFX techniques become more advanced and complex, proficiency in these tools and keeping abreast of the latest software features will remain essential
- **Compositing –** Skills in compositing are essential for seamlessly integrating CGI elements into live-action footage. The ability to match lighting, colours, and camera movements accurately will continue to be in demand
- **Simulation of natural phenomena –** The demand for realistic simulations of natural phenomena, such as fire, water, and smoke, is growing. VFX artists who can create credible simulations using tools like RealFlow and Phoenix FD will continue to be highly sought after.

Video Games

- **Mobile games development and 'Live Ops' –** The skills required for mobile games development differ from those for consoles and computers. Mobile games rely more heavily on live operations ('Live Ops') in the form of continued updates after the release of a game, rather than being static. This technology demands new models and skills in 'building as you go' and needs to be responsive to users' experiences and engagement. Additionally, mobile games development commonly operates a business model in which games are offered for free (or for a nominal fee), but then offer in-game purchases. Consequently, studios developing mobile games need enough staff members with entrepreneurial skills to seize commercial opportunities as they become available
- **Game development engines –** Proficiency in game development engines like Unity and Unreal Engine will be essential. These engines provide the foundation for creating interactive gameplay, 3D environments, and other core elements of video games. Knowledge of scripting languages like C# or C++ in these engines will enable developers to create engaging experiences
- **AI managers, prompt craft and related AI skills –** It is anticipated that the emerging role of AI manager will oversee the production of AI-generated content and coordinate with the teams creating AI-generated content. There has also been an increased focus on skills related to AI and generative AI systems (prompt craft) as well as areas such as Software Development Engineer in Test (SDET), development engineering, and Machine Learning (ML) engineering. Technical art and prompt craft for generative AI are identified as long-standing skills needs that are not likely to diminish in the future
- **Polymaths –** Due to the increasing complexity of video games and a need for staff who can perform across a project's various inputs, video games companies are seeking out individuals who possess a combination of technical and creative skill sets
- **Senior technical roles and specialist skills –** The sector is also witnessing an increase in demand for more senior roles with deep expertise, including the new but growing 'principal' role – a senior role for a highly specialised person but without the people management requirements typical in leadership or other senior roles. The need for individuals with targeted skill sets at the senior level is prevalent in both AAA and indie development teams. However, insufficient funding and skills shortages prevalent in the video games production environment limit the degree to which a company can conduct future workforce planning and development to cultivate these specialist skills.

Emerging Tech

- **Cross-platform development –** As immersive tech continues to evolve, the ability to develop experiences that can be deployed across multiple platforms will be important. Developers who can create content that works seamlessly across various VR and AR devices, such as headsets, mobile devices, and gaming consoles, will be in-demand
- **Immersive design –** As the requirements for immersive experiences grow, there will be a need for designers who can create engaging and intuitive user interfaces and interactions specifically tailored for immersive tech. These designers must understand the unique considerations of VR and AR, such as spatial design, depth perception, and user comfort. Immersive design skills will be necessary to craft compelling and seamless user experiences within these technologies
- **User experience (UX) and user interface (UI) design –** UX and UI design skills will be essential in creating intuitive and user-friendly immersive experiences, especially for those with additional needs. Designers who can effectively map out user journeys, design clear interfaces and optimise user interactions in immersive tech will play a crucial role. The focus will be on creating seamless and natural user experiences that minimise discomfort and maximise engagement.

6.3. Suitability of Current Skills Provision

There are different pathways into the digital content production sectors in the UK, including via FEI / HEI, apprenticeships, and a mixed-education approach. Aside from formal education, industry often provides its own skills development opportunities via bootcamps and CPD training schemes. This Study found that the current skills provision has varying levels of suitability to meet the demand for current and future skills and roles.

6.3.1. FEI and HEI Courses

While there has been progress in recent years, primary research found that the current skills provision at FEIs and HEIs is still failing to keep up with the needs of industry across all the studied sectors; this was observed across all nations of the UK.

The most effective FEI and HEI courses in the UK are those that have close and meaningful engagement with the industry while designing their syllabus and delivery. This is demonstrated in the Escape Studios, Aardman Academy and StoryFutures Academy case studies, and is being achieved in several ways:

- Recruiting tutors with extensive industry experience to design / teach the courses and / or deliver guest lectures and masterclasses
- Regularly consulting the industry on their needs
- Directly and consistently engaging with production companies for work experience and internship opportunities.

FEI and HEI facilitators and lecturers must be given the time and resources to remain engaged with industry to ensure they are up to date with the latest expectations around skills, technology, and workflows, and bridge any gaps that may exist between industry and education. The Aardman Academy offers an illustration of how to bridge this gap. They introduced an intensive Lecturer Development Programme to enable animation lecturers to upskill and enhance their teaching practices, as well as add insight into areas such as career development and employability for their students. This also highlights the importance of market-led R&D as part of the ongoing design of the training programmes.

Consultees report that FEI and HEI courses are often too narrowly defined, with insufficient signposting of career opportunities outside their immediate scope. This Study found that career opportunities were often only advertised or recommended to graduates within the sectors they studied, and excluded sectors for which they have transferrable skills. This insufficient signposting isolates students and creates a sense of 'tribalism' among graduates. They lack an in-depth understanding of how the digital content production sectors interact and overlap, and of the wide range of career paths available to them. This is particularly common among graduates of animation and video games courses.

Taking a more holistic approach to the digital content production sectors and the overlapping skills within them would help future-proof the sectors, as new technologies such as Virtual Production and AI increasingly benefit from collaboration across the sectors in scope.

Industry consultees report concerns about the potential value and applicability of T Levels for addressing the specific current and future skills needs in the digital content production sectors. This reservation is largely due to the current lack of specific tailored courses for young people aspiring to progress into these sectors post-16. For example, while there are opportunities to learn about software design and development relevant for aspiring video game developers, as part of the Digital Production, Design and Development T Level, and to learn about audiovisual engineering and video editing as part of the Media, Broadcast and Production T Level, commencing in September 2024, the training content is seen as too general. Further, the Media, Broadcast and Production T Level, while including aspects of post-production content training, will focus primarily on physical content production for film and television, with an absence of specific focus on VFX, animation, and emerging tech.

Further, industry consultees spoke of the risk to Level 3 qualifications, such as those offered by NextGen Skills Academy, being defunded by the Department for Education, as they do not qualify as a T Level (or an A Level). Industry's related concerns are that, at this stage, T Levels have not yet been sufficiently tested to provide a superior and targeted training option in place of more established Level 3 vocational qualifications.

Consultees of this Study also noted that video games FEI / HEI courses have an overemphasis on developing content for computers and consoles for the AAA market.[112] This comes with certain sector expectations. For example, video games development studios within the AAA market, compared to smaller video games development and production companies, and those creating mobile games, typically have more clearly designed roles (e.g., environmental artist), and higher budgets, enabling big teams and industry-leading technology, and work consistently with publishers.

6.3.2. Bootcamps

Bootcamps are short-term, intensive training programmes designed to help people develop specific skills and typically last from five days to 16 weeks. They are aimed at employees, freelancers, or unemployed people.

Bootcamps were identified by this Study as tending to be the preferred method of training in the digital content production sectors. Due to the shorter time associated with this method of training, bootcamps were seen as more adaptive than traditional FEI / HEI courses to the specific needs of a company or employee.

Bootcamps in animation and VFX have the potential to complement training at several intervals in a career pathway. As shown in Figure 5 and supported by this Study's findings, a pre-apprenticeship bootcamp can provide specialised training to prepare someone who has recently completed their Level 3 education for a Level 4 apprenticeship. Additionally, in England, students coming out of an A Level or T Level

[112] A classification used to indicate high-budget, high-profile video games that are generally produced and distributed by large, well-known publishers

will have typically acquired underpinning knowledge but may not have developed specific work-based skills, which is what an apprenticeship typically provides. In such cases, a bootcamp would offer a valuable bridge between education and industry, enabling these students to move into and succeed in their apprenticeships.

Bootcamps for the video games sector are not well-established and are very specific in their focus. Consultees for this Study noted that the limited number of bootcamps available for those aspiring to work in the UK's video games sector are predominantly focused on development. This means they are currently only addressing a portion of the skills needs within the video games sector and not at all stages of career development.

This Study found that **work readiness bootcamps can provide an opportunity to quickly upskill new graduates or early-career workers, introducing them to the realities of working in the sector** and to company culture and company workflow.

Figure 5 identifies how **CPD bootcamps can provide VFX and animation professionals with valuable opportunities to progress to the next level**. CPD bootcamps were seen as an effective tool for retaining staff.

Consultees identified NextGen Skills Academy and the StoryFutures Academy as specific examples of effective bootcamp providers (see respective case studies). Both organisations offer bootcamps to introduce, upskill, or reskill people to work in the digital content production sectors. The success of NextGen Skills Academy and StoryFutures hinges on industry-education partnerships, which ensures alignment of taught skills with industry demands. This helps enhance employability of graduates and assisting companies in finding skilled workers. NextGen Skills Academy collaborates with stakeholders (e.g., Sony, Microsoft, and Ubisoft) to offer industry relevant courses. On the other hand, StoryFutures focuses on practical, research-based learning through the design, development, and testing of real productions.

The Department for Education periodically releases funding for bootcamps in England (focusing on dedicated sectors of the UK economy). However, consultees noted that the impact of this funding on the screen sectors has so far been limited, arguably due to insufficient awareness of this funding and how to make best use of it. Both the BFI Skills Clusters programme and the Creative Industries Sector Vision highlight bootcamps as important bridges into industry. The Creative Industries Sector Vision also notes the Government's plans to work with the creative industries nationally and locally to ensure they are well placed to take advantage of future procurement opportunities for skills bootcamps in England.[113]

Each of the UK nations have their own approach to skills bootcamps for certain digital content production sectors, which are supported by the Devolved Administrations.

In England, the UK government offers the Lifetime Skills Guarantee and Plan for Jobs initiative, which covers investment in the skills bootcamps. These bootcamps are developed in partnership with employers and training providers to help people develop the skills that are in demand. If employers want to use bootcamps to train existing employees, then government funding subsidises 70% of the overall cost for large companies and 90% of the cost for SMEs. Employers do not contribute to the cost of the bootcamp if they recruit someone new from it. Bootcamps must guarantee participants an interview for a real job at the end, with a minimum of 75% of participants needing to secure a paid

[113] *Creative Industries Sector Vision*. Department for Culture, Media and Sport, 20th June 2023

job (or freelance contract). The government holds back 30% of the funding until these targets have been met.

In Wales, Digital Skills Wales offers Tech Fundamentals Bootcamps. Among other skills, the bootcamps offer courses in new technologies and legacy tech.

In Northern Ireland, the Skill Up programme offers free courses to those over the age of 18 and eligible to work in Northern Ireland to help retrain and upskill. These courses, covering a range of digital skills, are delivered by local FEIs and HEIs in the region. The programme is supported by Northern Ireland's Department for the Economy, with funding from the Northern Ireland Office and the Department of Finance.

In Scotland, this Study did not find any directly comparable skills bootcamps. However, in 2021, the Scottish Government collaborated with TRC Media on the RESET internship programme. This initiative aimed to equip those made redundant during the COVID-19 pandemic, and those effected by the UK's exit from the EU, with new skills, particularly in Scotland's animation, VFX, and video games industries. The programme provided cost-free training, culminating in an eight-month paid internship for participants, hosted by Scottish studios such as Wild Child Animation, Freakworks, Blazing Griffin, and Tag Games. In September 2023, applications opened for the 2023 edition of RESET.

6.3.3. Apprenticeships

Apprenticeship schemes in the UK are designed to provide an opportunity for individuals to earn an income while learning and gaining the necessary skills to reach competence in an occupation or occupational field.

The UK government requires companies with an annual PAYE bill of £3 million or more to pay an Apprenticeship Levy. The design, delivery, and funding of apprenticeships is decentralised across the four UK nations. In Scotland, apprenticeships are managed by Skills Development Scotland. In Wales, apprenticeships are managed and funded by the Welsh Government, with training being delivered by the Welsh Apprenticeship Provider Network. In Northern Ireland, Apprenticeships are funded and managed by the Department for the Economy. Each UK nation has nuanced funding and employment rules for apprenticeships.

The UK Screen Alliance launched its Apprenticeship Levy Transfer Fund (ALT Fund) in 2018. This enables small employers working within the UK's VFX, post-production, and animation sectors to receive a levy transfer to fund 100% of their apprentice training costs from a levy-paying employer's unspent digital apprenticeship fund. There is at least £150,000 available for apprenticeship training in SME companies in the VFX, post-production, and animation sectors.[114] Apprenticeships currently eligible for funding under the ALT Fund scheme include:

- Accounts assistant – Level 2 and Level 3
- Assistant technical director (visual affects) – Level 4
- Broadcast and media systems technical operator – Level 3
- Broadcast and media systems technician – Level 5
- Broadcast production assistant – Level 3
- Business administrator – Level 3
- Creative industries production manager – Level 7
- Digital marketer – Level 3
- HR support – Level 3
- Junior 2D artist (visual affects) – Level 4
- Junior animator – Level 4
- Junior content producer – Level 3
- Marketing executive – Level 4

[114] *UK Screen Alliance Apprenticeship Levy Transfer Fund.* UK Screen Alliance

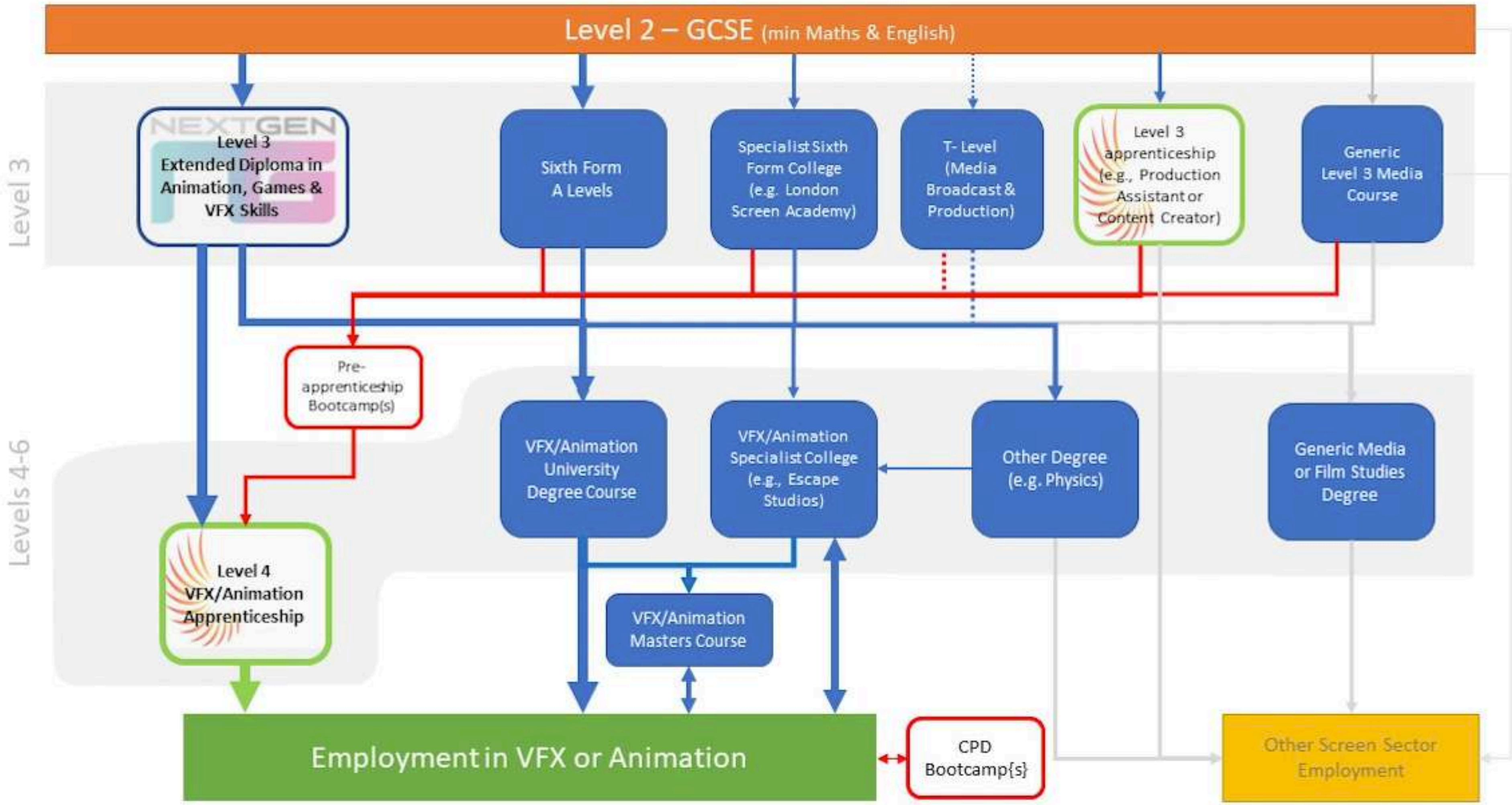
- Media production coordinator – Level 4
- Post-production technical operator – Level 4
- PR assistant – Level 4
- Project manager – Level 3
- Storyboard artist – Level 7
- Team leader – Level 3
- 3D VFX artist (generalist) – Level 4.

As with bootcamps, some consultees noted apprenticeships as a potentially valuable training route for the digital content production sectors, across the UK's nations and regions. Due to their targeted, occupation-specific approach, apprentices are trained in line with industry needs and are considered 'work ready' and more employable upon completion of their apprenticeship.

However, **in practice, apprenticeships have had limited impact.** For example, video games consultees reported that, despite paying into the Apprenticeship Levy, apprenticeship training programmes do not align with industry needs. For this reason, engagement has been minimal. Meanwhile, apprenticeships for animation, post-production, and VFX were just starting to gain traction as the COVID-19 pandemic hit, and the lockdown measures meant that the plans and momentum of in-person apprenticeships have been slowed, paused, or cancelled. One of the Creative Industries Sector Vision's recommendations says that 'DfE and DCMS will work with industry to better understand the opportunities and challenges facing creative apprenticeships. This work – including through ministerial roundtables – will improve engagement with small businesses, the quality of specialist training provision, the relevance of standards for creative apprenticeships, and the effectiveness and sustainability of the Flexi Job model.[115]

[115] *Creative Industries Sector Vision*. Department for Culture, Media and Sport, 20th June 2023

Figure 5 – Entry Level Pathways to Employment in VFX or Animation



Source: UK Screen Alliance (2023)

6.4. Case Study 4 – StoryFutures Academy

StoryFutures Academy is the national centre for immersive storytelling. The centre introduces storytellers to emerging technologies to inspire them to craft immersive experiences. The centre is considered a successful education provider for teaching and producing immersive experiences, as well as for conducting research and development (R&D) for the sector.

StoryFutures Academy

StoryFutures Academy is the national centre for immersive storytelling. It is run by the National Film and Television School and Royal Holloway, University of London, and is funded by the Arts and Humanities Research Council, part of UK Research & Innovation (UKRI).

The Centre was founded in 2018, as part of the UKRI Challenge Fund Audience of the Future.[116] As a publicly funded institution, it is committed to providing accessible skills development training to a wide number of professionals and trainers, with most opportunities offered free of charge.

StoryFutures aims to enable storytellers to use emerging technologies to craft new forms of audience experience, as well as to understand new production tools such as Virtual Production and AI. The centre delivers research projects and training programmes to enhance the skills of the UK creative workforce who are active in the screen and performing arts industries in emerging technologies. Training programmes include masterclasses, placements, workshops, structured R&D productions, and an accelerator programme.

Aims and Objectives

StoryFutures Academy's aim is to build a pipeline of professionals equipped to develop and market innovative immersive experiences. The Centre aims to position the UK at the forefront of global media and entertainment production by focusing on their objective of upskilling professionals and introducing them to its network. Public investment is used to cover R&D costs and leverage industry investment.

Researchers at the Centre are particularly interested in accessibility and inclusion, with the aim of learning how immersive content can provide a better experience for all. StoryFutures also runs 'Train the Trainer' programmes with UK HEIs to include immersive storytelling in their curriculum and train their teaching staff in these subjects.

What Works Well

Evaluation of the Centre's work[117] shows that StoryFutures is successful in its objective of supporting the development of new skills. Participants have reported improving their knowledge of the sector and its processes, as well as developing technical skills, such as development with real time game engines, creative art direction, and writing for immersive experiences.

In addition, the Centre supports participants in increasing their production capabilities – understanding of budget, timeline, and other project management considerations – as well as getting a better understanding of the opportunities or limitations of integrating technology into the creative process.

Lessons Learnt

StoryFutures Academy pays particular attention to making sure its work is 'production-led'; this approach means that teaching and research are

[116] *Audience of the Future.* UK Research and Innovation, 2018

[117] *Evaluation of the ISCF Audience of the Future: Final Report*. Technopolis and BOP Consulting, 2022

based on the design, development, and testing of real productions that are created with the support of the centre by participants in the various programmes. The Centre has described this approach as the most effective way to facilitate professional training and, at the same time, to drive R&D activities that enable industry and researchers to work together.

The Centre also demonstrates the importance of interdisciplinary approaches. For StoryFutures, bringing together professionals from a variety of backgrounds has proven effective because it prompts key stakeholders to consider ways to adopt a less isolated approach to talent development.

StoryFutures Academy's experience shows that hands-on and production-led teaching, married with interdisciplinary approaches, are key for the effective development of skills for professionals in the immersive sector.

Image credit: StoryFutures Academy

> *I kick-started a path towards learning how to use Unity as an artist. It has set off a path of discovery into software that will undoubtedly change the way I create artistic work in the future.*
>
> *– Participant*

6.5. Case Study 5 – Escape Studios

Escape Studios is an applied training institution with a focus on integrating industry skills into undergraduate, postgraduate, and short courses in VFX, video games, animation, motion graphics, and other specialist disciplines. It is a private, not-for-profit institution, delivering its services in partnership with Coventry University to over 1,000 students per year.

Escape Studios demonstrates that the creation of networks and strong links with the industry are central to providing high-quality education for the digital content production sectors.

Escape Studios

Initiated in 2002, Escape Studios offers a variety of courses spanning animation, video games, and visual effects, both on campus and online. Formerly a member of Pearson College London, Escape Studios garners acclaim for its industry-specific training and alumni, who have progressed in the industry to work for studios including DNEG, Framestore, Industrial Light & Magic (ILM), and The Mill.

Escape Studios is the first UK Epic Games Unreal Authorised Training Centre. Its partner list includes leading industry companies such as ILM, PlayStation London Studio, Framestore, The Mill, DNEG, Milk, Creative Assembly, Cinesite, Blue Zoo, and MPC. Escape Studios offers numerous courses across two academic schools — the School of Animation and Visual Effects and the School of Interactive and Real-Time — aimed at honing the skills of future professionals in VFX, video games, animation, and motion graphics.

Aims and Objectives

Escape Studios champions the development of industry-ready skills and focuses on nurturing students to thrive in the digital content production sector. This philosophy is evident in their collaboration with key industry partners, designing and delivering updated, industry-centric courses. Building a network of industry stakeholders is another core objective; the institution's ecosystem facilitates connectivity and collaboration among students, alumni, and professionals who operate in a variety of digital industry sectors. Furthermore, Escape Studios promotes visibility and recognition for its students, encouraging their participation in international festivals and awards, thus enabling broader exposure and recognition for their high-quality work.

What Works Well

Escape Studios' graduates exhibit positive outcomes, indicative of the institution's successful approach to skills development and training. According to the 2020 Graduate Outcomes survey from the Higher Education Statistics Agency (HESA), 93% of Escape Studios' graduates found employment or further education within 15 months of graduation, surpassing the national average of 89%. Furthermore, approximately 84% of these graduates secured highly skilled positions, a number again exceeding the national average of 77%. This demonstrates the institution's ability to instil high-level skills, opening doors to prestigious roles for its students.[118]

The success of Escape Studios largely stems from the integration of industry professionals into the education process. They serve as mentors, visiting lecturers, and assessors, providing practical insights and guidance. Additionally, by aligning their programmes with

[118] *Escape Studios in the Top 10% for UK Graduate Recruitment.* Escape Studios, 30th July 2021

contemporary industry demands, Escape Studios ensures their graduates are well-prepared and employable.

Lessons Learnt

Escape Studios' effectiveness largely derives from its ability to weave a robust network between students and industry professionals, ensuring an adaptable and industry-relevant curriculum. This model is particularly successful in ensuring graduates are prepared to excel in the digital content production sectors. The model, which includes short courses in new technologies, also helps professionals gain new CPD skills, while tutors further develop their skills through regular exposure to industry. The approach taken by Escape Studios sets an example for the broader sector, demonstrating how bridging the gap between theoretical knowledge and practical application can enhance graduate employability. By maintaining strong industry ties, Escape Studios presents a blueprint for delivering high-quality education and providing students with the requisite skills and opportunities for professional growth.

Image credit: Escape Studios

"About 10% of all our employees are Escape Studios alumni! That really speaks to the long-standing relationship we have had together and the collaborative and supportive nature of that relationship.

– Amy Smith, Global Director Recruitment & Outreach at Framestore

6.6. Case Study 6 – NextGen Skills Academy

NextGen Skills Academy effectively merges industry and education by offering courses in video games, animation, and VFX skills, developed alongside leading companies in these fields. Available across selected colleges in England, its courses include industry masterclasses and live streams.

NextGen Skills Academy

Founded in 2014, NextGen is an educational institution with a team distributed across the UK. NextGen offers courses in video games, animation, and VFX skills, designed in collaboration with leading companies in these sectors, including Sony, Microsoft, Ubisoft, Framestore, DNEG, Blue Zoo, and MPC. The curriculum, available at select colleges across England, includes industry masterclasses, live streams, and the pursuit of the AIM Qualifications Level 3 Diploma / Extended Diploma in Games, Animation, and VFX Skills.[119]

Currently, 650 students are actively partaking in the NextGen / AIM programme across 15 Further Education colleges throughout England. This number is projected to rise to an estimated 900 in the forthcoming years. The anticipated increase includes an upcoming cohort of 120 students from Further Education colleges in Northern Ireland, with Northern Ireland Screen identifying the NextGen programme as a vital contributor to stimulating growth in the province's screen industries.

NextGen Skills Academy is funded through multiple sources. For Level 3 activities, NextGen charges its member colleges an annual fee per learner. Learners do not pay fees to NextGen. All NextGen course support or bootcamps to date have been free to the learner. Revenue to support the Academy's activities outside Level 3 courses comes from funding bodies, such as the West of England Combined Authority. Additionally, in-kind donations from individuals and organisations supplement the Academy's funds, demonstrating their support for its mission and vision.

NextGen offers employers a recruitment service for three types of apprenticeships: VFX, junior animator, and camera prep technician. The apprenticeships last for 18 months and combine workplace learning with classroom training at one of the NextGen partner colleges. The Academy encourages employers to offer the living wage to apprentices while they work towards a nationally recognised qualification at the end of the programme. Apprentices also benefit from mentoring, networking, and career guidance from industry professionals and NextGen staff. Companies which offer these apprenticeships include Framestore, Blue Zoo, VMI, Industrial Light and Magic, and more.[120]

Aims and Objectives

NextGen's goal is to increase the diversity of the workforce entering the video games, animation, and VFX sectors. By bringing education and industry together, they offer learners opportunities to be well-equipped and industry-ready, whether they proceed to university, take up 'earn as you learn' apprenticeships, or enter the workplace.

What Works Well

Consultees for this Study noted the successes of NextGen's teaching methodologies in meeting sector-specific needs, boosting the job readiness of graduates, and aiding businesses in their search for qualified professionals.

Consultees specifically commended NextGen's effective blend of industry and education, designing and delivering the training through partnership with significant industry players. Students enrolled on NextGen's courses benefit from an industry-written curriculum,

[119] *NextGen Skills Academy - Level 3 Course*. Next Gen Skills Academy

[120] *NextGen Skills Academy Apprenticeships*. Next Gen Skills Academy, 2022

masterclasses, live streams, and work experience that are designed to provide a holistic learning experience. These courses are designed to mimic real-world working environments and offer students unprecedented access to mentors and industry briefs from leading companies.

NextGen's Creative Industry Apprenticeships programme is also well-regarded for its effective 'earn as you learn' model. This approach has given students valuable experience and practical skills in the workplace while simultaneously pursuing academic study. It ensures that students not only contribute to their employer's productivity but also build a strong foundation of real-world skills that can be invaluable in their career progression. This dual model of learning has been designed to cultivate a highly skilled workforce ready to meet the future demands of the creative industries.

Further, NextGen also offers bootcamps to bridge the skills gaps between FEI and HEI. From 2018 to 2022, NextGen delivered VFX-specific bootcamps, funded by the Greater London Authority and the West of England Combined Authority. In 2023, a NextGen bootcamp was exclusively funded by Warner Brothers, which reportedly led to 50%-75% of participants moving on to a better job within six months.

Lessons Learnt

NextGen Skills Academy has been successful in addressing specific skills shortages in the video games, animation, and VFX industries, which have been identified by employers. These government and industry-backed initiatives offer pathways into various digital creative sectors while addressing these skills shortages. Offering paid work whilst training, set within a formal qualifications structure, has proven successful. As a result, the Academy has played an important role in providing a stream of highly skilled talent into these industries.

For the wider animation, post-production, VFX, and video games sectors, there are two main lessons to be learned from NextGen's approach. **Firstly**, a strong industry-education partnership can help ensure that the skills being taught are aligned with the needs of the industry. This not only makes graduates more employable, but also helps companies find the skilled workers they need. **Secondly**, combining workplace learning with classroom study in an apprenticeship format can be effective. This gives students the opportunity to apply their learning in a real-world context while still receiving the theoretical knowledge they need. It also allows them to contribute to their employer's productivity, providing a clear return on investment for companies that choose to offer such programmes.

Image credit: NextGen Skills Academy

These last two years have helped me develop my skills and my confidence in the work I do to ensure that I can absolutely surpass myself each time.

– Michael Palka, Programmer, Hartlepool Sixth Form, Class of 2021

Section 7 –
Key Conclusions

Image credit: Mo

7. KEY CONCLUSIONS

1. **The digital content production sectors are a major UK success story, with a strong global reputation. Collectively, the sectors constitute a critical element of the UK's creative industries as well as the wider tech industries.** They deliver considerable economic value, enabling cross-sector innovation, while also demonstrating strong potential for further growth. Based on the latest calculations for the respective UK sectors,[121] the immersive content industry generated £660 million in sales in 2018; The UK animation industry was reported to be worth approximately £1.5 billion in direct turnover and just under £1 billion in direct GVA for core and high animation intensity companies in 2019; all VFX content in the UK generated £1.68 billion in GVA in 2019; the video games consumer market was valued at £7 billion in 2022; and post-production generated £2.2 billion in revenue in 2022. The historical figures are estimated by industry and policy consultees to have increased substantially since they were published. This has been driven by the global demand for digital content during and following the COVID-19 pandemic, as well as public and private investment.

   Targeted and continued skills development is essential for ensuring that the growth is sustainable, especially against international competition from Canada, France, Ireland, and Spain. The Creative Industries Sector Vision,[122] published in June 2023, identified driving growth, building talent, and developing skills, and maximising the positive impact of the creative industries, as pressing priorities. With technology and innovation at their core, the digital content production sectors are fundamental to these ambitions.

2. **Despite this potential for growth, the UK's digital content production sectors are experiencing a period of increased and complex uncertainty**. This uncertainty is a consequence of multiple factors. **Firstly**, there are rapid technical advances – particularly in applied AI technology – which involve constantly re-designing traditional processes and require new skill sets. Notably, these rapid shifts are distinct from the common uncertainties associated with technology-driven industries and they have heightened the insecurity in these sectors. **Secondly**, international markets are increasingly competitive, meaning the UK needs to compete against jurisdictions around the world for commissions and to retain its domestic talent. **Thirdly**, fluctuating commissioning spend, especially in response to the recent US strike action pausing transnational projects, and retrenchment in commissioning spend from major studios, is causing uncertainty for setting training budgets alongside other development and production costs.
3. **As a result of sector-specific and cross-sectoral challenges, companies across the UK's digital content production sectors struggle to establish effective and sustainable skills training programmes.** Training provision is impacted differently in each of the digital content production sectors, due to a variety of business models and markets. Further, larger established businesses are more likely to have well financed training programmes, while smaller businesses regularly lack the funds and capacity for sustained skills training, stunting workforce development. VFX and post-production companies function as service providers, and often struggle to secure skilled workers for price-sensitive, competitive domestic and international contracts. Moreover, longer term contracts in these areas are often difficult to secure.

[121] Data sources and further statistics included in section 2.3.2

[122] *Creative Industries Sector Vision*. Department for Culture, Media and Sport, 20 June 2023

Conversely, the video games, animation, and emerging tech sectors are more commonly content and experience creators. Apart from a few notable, large UK exceptions (e.g., Aardman, Framestore, The Mill, MPC, DNEG, Rockstar North, and Dimension Studios), the sectors are characterised by a high number of underfinanced microbusinesses that rely on individual project funding and lack business growth and training strategies. Content creators typically hire freelancers on a project-specific basis. Temporary contracts limit the opportunities for sharing knowledge and skills between staff and projects, as well as the potential for sustained organisational CPD programmes.

4. **Skills gaps and shortages are prevalent across the UK's digital content production sectors, particularly at the mid and senior levels**. These skills gaps and shortages are a consequence of multiple factors. **Firstly**, during and including the years following the COVID-19 pandemic, the workforce was ill-equipped and lacked the necessary capacity to meet the surging demand for UK digital screen content. This was especially the case in video games and VFX sectors, but also across post-production and animation. This demand emphasised existing and created new critical skills shortages and gaps. While this surge in demand has largely come to an end, the skills gaps and shortages have been further accelerated by the recent US actors' and writers' strikes, which paused transnational production within the UK's digital content production sector, and also by the retrenchment of commissioning expenditure from major studios. Skills shortage issues are likely to continue for these and the subsequently listed reasons. **Secondly**, companies are not able to replace skilled workers moving to other companies, sectors, and jurisdictions, driven by higher salaries, training opportunities, and flexible working conditions. **Thirdly**, there is insufficient and inconsistent training investment, especially in smaller companies and where workers took on more responsibility to meet demand.

   These gaps and shortages are most acutely felt at the mid and senior levels, as they are the most critical for providing leadership skills and high-quality technical skills across a range of workflows and projects. It is at these levels that valuable skilled talent is most readily being hired by other companies, sectors, and countries. The sectors must address these gaps and shortages to ensure a qualified workforce is able to meet the considerable opportunities that exist.

5. **The UK's digital content production sectors workforce is highly qualified, predominantly to degree level. However, there are notable persistent skills gaps and deficits among recent graduates, particularly in people skills and the ability to work effectively across industry workflows and teams.** These gaps persist for several reasons. **Firstly**, there is a lack of investment in industry research and trend tracking at FEI / HEIs, limiting their oversight of technological advances and related changes in required skills needs. **Secondly**, while there is some evidence of movement between the studied sectors, a sense of 'tribalism' within FEI / HEI courses has meant that graduates are commonly taught / encouraged to specialise in the industry they study. This has led to a general lack of awareness of and, in some cases, support for cross-cutting industry skills and pathways. Bootcamps were noted as helping to broaden aspirations across the screen sector, although they are limited in their capabilities and reach by lack of understanding of possibilities and a lack of liaison between employers and training providers to seize the opportunity. **Thirdly**, large production and development companies are sourcing talent directly from leading training providers. Unable to compete on salaries, training providers then struggle to find suitable replacements, meaning that students aren't given access to valuable practical insights and training from sector experts.
6. **Technological advances, increased work flexibility, targeted recruitment campaigns, and joint industry actions have,**

according to consultees, had a positive impact on the creation of a more inclusive workforce across the sectors. Despite this progress, EDI-related challenges continue to be present. These challenges persist for several reasons. **Firstly**, there are barriers in accessing work opportunities, where key roles typically require degree-level training, excluding those unable to access formal training pathways and networks. **Secondly**, the Study uncovered barriers within the workplace, such as cases of non-inclusive work practices in some sectors, lack of diversity in leadership in sectors like animation, and lack of human resources teams in smaller companies to address difficulties faced by staff. **Thirdly**, there is a lack of consistent, comprehensive, and intersectional data collection across all the UK's digital content production sectors, especially regarding contracted freelance workers, hindering the sectors' ability to track, isolate, and resolve challenges effectively.

Section 8 – Recommendations for Future Research

Image credit: Escape Studios

8. RECOMMENDATIONS FOR FUTURE RESEARCH

This section outlines recommendations for future research and avenues of inquiry that can build on the findings of this Study but were out of its scope.

Further research should focus on potential solutions and help inform a skills strategy for the UK's digital content production sectors.

1. **Quantify Employer Investment in Skills Training and Recruitment**

   Given the key differences in employment models among the sectors in scope, and varying levels of reliance on freelance and short-term professionals, a detailed cross-sector analysis of employer investment in skills training and recruitment would provide valuable quantifiable evidence on how investment levels compare, both between sectors and within film and high-end television production. This would show in more detail which sectors and types of companies require greater employer investment to meet critical skills deficits and skills shortages – and where further funding and support may be required. This analysis, building on the work undertaken to date by the Skills Task Force,[123] should cover employers' training and development budgets and approaches, their investment in outreach programmes, and links with FEIs and HEIs, and, in the case of animation, their contribution to the Animation Skills Fund. The research should include any investment in skills and training for regularly contracted freelancers, where applicable.

2. **Further Test the Size and Shape of the UK's Digital Content Production Sectors**

   While this Study has provided a range of sector statistics, the sectors in scope have not been comprehensively and consistently measured to date in terms of their size, shape, and value. This is chiefly due to these sectors being underserved by major Office of National Statistics (ONS) surveys. This has led to official publications inaccurately reporting on employment numbers and market size, especially at regional and national levels. Such sector reports, like the Shortage Occupational List submitted to the Migration Advisory Committee, are largely based on the Standard Industrial Classification (SIC) and the Standard Occupational Classification (SOC) codes. While the codes are updated periodically to reflect changes in industry and employment, this has not kept pace with the evolution of the sectors in scope, especially the emerging tech sector, which has varying definitions.

   The Job Matrix created as part of this Study identified 214 occupational roles (with a sample included in Figure 7 in section 10), covering the sectors in scope. Using this Job Matrix, shared separately as a 'living document' and not a part of this report, the sectors' trade bodies and other research organisations should collectively further refine this list and use it as the basis for a job classification to structure future data collection at a more granular, sector-specific level. Focus on the specific roles will enable more accurate data collection regarding the size of the workforce. It will also serve as a valuable tool to track movement between the studied sectors and others, as well as identify role and occupational changes, and specific skills shortages as they develop.

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[123] *A Sustainable Future for Skills. The Report of the Screen Sectors Skills Task Force*. Screen Sector Skills Taskforce, November 2023

3. **Assess the Current Impact and Short-term Sectoral Changes Caused by AI Technology**

   The role and impact of AI was the main technological factor identified as affecting the digital content production sectors, now and in the future.

   AI technology is already having a notable impact (e.g., undertaking market research and removing unwanted aspects of images, formerly performed by researchers and designers). However, there is still mostly speculation around the short to longer term impacts and changes that AI technology will have on job roles and skill sets. SPI therefore recommends that a study is immediately commissioned into the direct and indirect impact these technologies are already having on skills, roles, and training needs. This should include foreseen short-term impacts (i.e., less than three years from the current year).

   Given the pace of change, a watching brief over the next three years, whether as part of the same study or as a separate commission, should be undertaken, monitoring the changes AI technology is causing in the creation and development of digital content, and whether these are causing new unforeseen impacts.

   This would benefit the industry through a wider understanding of the impact of AI, as well as education and training providers through a better understanding of future skills needs.

4. **Identify and Align Effective Models that Bridge Training Programmes with Industry**

   The *BFI Skills Review 2022* recommended greater investments in bridging the gap between the film and HETV industry and education. Similarly, further research on how the digital content production sectors can best develop models in such bridging arrangements and opportunities would be invaluable. Such research can further explore how these models may be linked to the newly established BFI Skills Clusters, as well as build on the work of ScreenSkills, and the Skills Task Force.

   The research should include a specific analysis of the role of apprenticeships and bootcamps in providing training and bridges into the industry, building on ScreenSkills' evaluation of its two apprenticeship pilots.[124] The research should also investigate the availability of alternative routes into industry for those who cannot access formal training pathways and networks, as well as those who work as freelancers.

5. **Further Test the Impact of Technological Advances and Changing Working Patterns on Achieving EDI Objectives**

   This Study found that technological advances and changing working patterns (accelerated by the COVID-19 pandemic lockdown measures) will continue to dramatically alter the way digital content development and production is undertaken, in the UK and globally. Further research into the impact these changes are having on diversity and inclusion would be valuable. Such research would enable the development of better strategies to ensure the sectors continue offering 'good work'[125] to all, through higher pay and flexible and remote work opportunities.

   Areas of inquiry could include whether free and fair access to open-source software and remote work has supported the development of critical skills and attracted diverse skilled workers from other industries ('industry transfers'). It should consider

[124] *ScreenSkills' Apprenticeship Pilots: Summary Findings.* Tim Weiss, May 2023

[125] As described in *The Good Work Review*. Creative Industries Policy and Evidence Centre, 2023

whether this has enhanced the role of non-traditional (outside HEIs) pathways and enabled stronger retention and better career progression.

6. **Identify International Best Practice for Addressing Issues Related to Skills and Role Retention and Recruitment**

   The UK faces increasing competition from other jurisdictions around the world, including Canada, France, Ireland, and Spain, which all have a higher level of fiscal incentives to attract inward investment and support sector growth. It would be valuable to investigate how these jurisdictions are effectively addressing skills retention and recruitment issues in the digital content sectors. This would help inform interventions that support the UK's competitiveness for both skilled workers and projects.

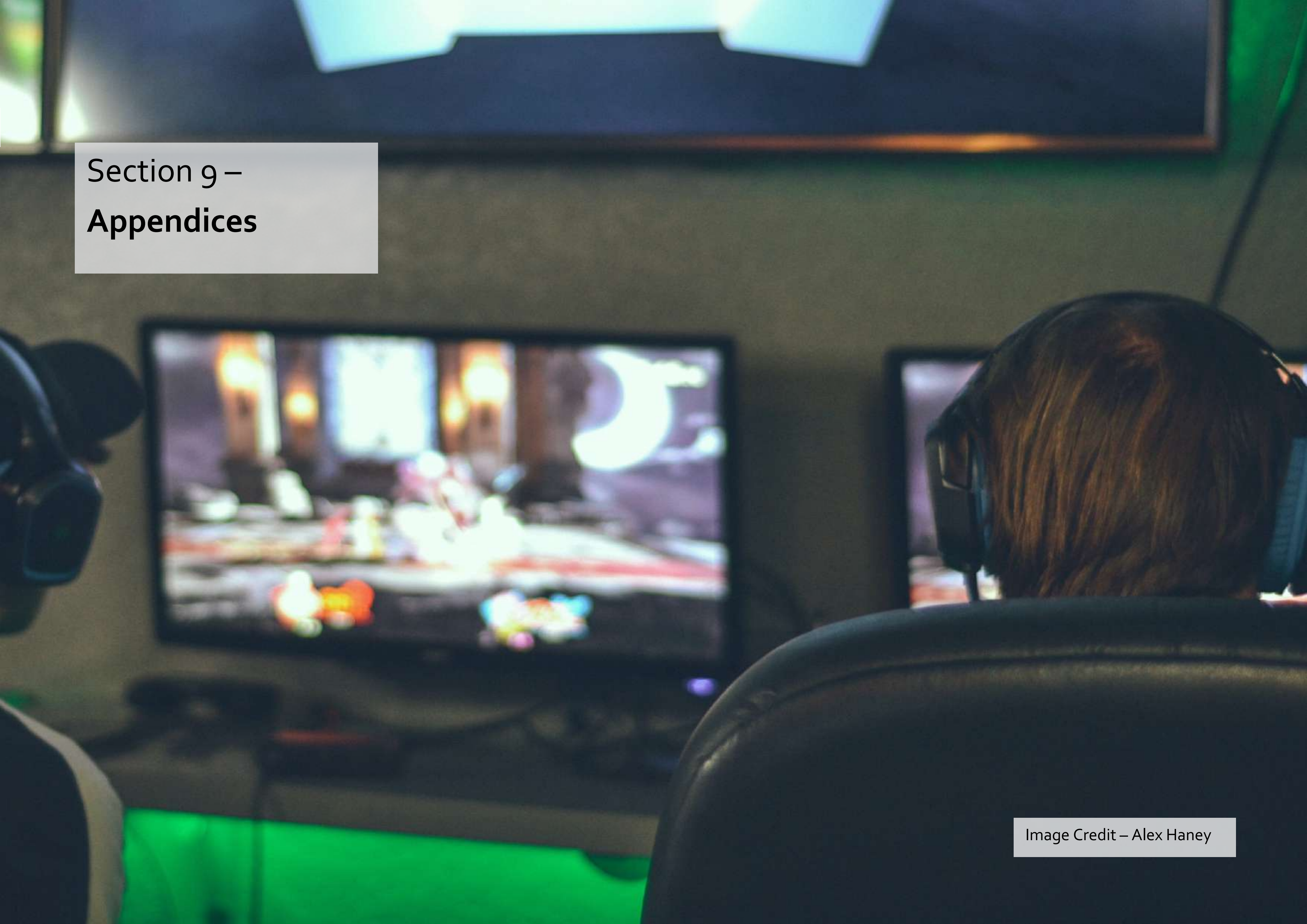
   Areas of inquiry should include a review of other jurisdictions' investment strategies in the training of employed and freelance workers, including through FEI / HEI partnerships, vocational training, and CPD opportunities. This research should provide a detailed assessment of how (and if) other jurisdictions are successfully bridging any skills gaps between formal training and industry needs, as well as retaining talent at the key mid and senior levels. Finally, this research should determine the extent to which fiscal incentives are playing a role in growing a skilled workforce through opportunities created by attracting inward investment.

7. **Identify Best Practice for Addressing Issues Related to Skills and Role Retention and Recruitment in Adjacent Sectors**

   This Study found that, in some cases, skilled workers in the digital content production sectors are moving into adjacent sectors. Examples include animators, VFX artists, and video game designers moving to work in the advertising sector; people with skills in computer engineering moving into FinTech to design apps; and people skilled in Virtual and Augmented Reality moving into the automotive industry, creating three-dimensional visualisations of cars.

   It would be valuable to gain further insights into the appeal of these adjacent sectors for skilled workers and to identify strategies for retention that could be adopted within the digital content production sectors. This will help start to address the drain of talent to adjacent sectors, assisting the growth and sustainability of the UK's digital content production sector.

   Areas of inquiry should include a review of investment strategies in those adjacent sectors for developing the skills of employed and freelance workers, including through partnerships with FEIs / HEIs, vocational training, and CPD. This research should include an assessment of how (and if) adjacent sectors are successfully bridging any notable skills gaps between formal training and industry needs, as well as non-financial strategies for retaining talent at the key mid and senior levels.



Section 9 – **Appendices**

Image Credit – Alex Haney

9. APPENDIX 1 – SUB-SECTOR PROFILES

Figure 6 – The Markets and Business Models of Each Sub-Sector

Animation	
Overview	In addition to creating new, IP-rich content for films, television series, shorts, and advertising, as well as corporate communications content, the animation sector provides animation content and effects for hybrid productions.
Market	The animation market caters to various industries, such as film, television, video games, advertising, and education. It includes traditional 2D animation, 3D animation, and stop-motion animation. International demand for animated content has been growing, driven by the success of animated films, television series, and the increasing use of animation in other forms of media. However, there are indications of a slowdown, and a decline in funding for children's content in the UK.
Business model	Animation studios often mix service provision with the creation of content commissioned or bought by international buyers, platforms, and distributors. In cases where the animation company holds the IP, they generate additional downstream revenue from licensing, merchandising, and distribution deals.

Post-Production	
Overview	Post-production refers to the process of refining and enhancing raw film or video footage to produce a final polished product. Central to this process are editing, colour grading, visual effects, sound design, and music composition. During post-production, editors select, juxtapose and trim shots to create a narrative flow. Concurrently, sound designers and composers create an auditory landscape.
Market	The post-production market is essential to the film, television, and advertising industries, as well as any other sector that produces video content. As the demand for high-quality content continues to grow, post-production services remain critical in refining and polishing raw footage.
Business model	Post-production studios typically offer services on a project-by-project basis, working with clients to edit, colour grade, design sound, and create motion graphics for their projects.

Video Games	
Overview	The video games sector encompasses the design and development of interactive digital gaming experiences, immersing players in imagined worlds. Key elements include crafted narratives, visually realistic environments, and engaging gameplay mechanics. Players may encounter fictitious beings, explore vast terrains, and solve challenging puzzles; less apparent features, such as adaptive artificial intelligence, intricate physics simulations, and responsive sound design, enhance the immersive gaming experience.
Market	The video games market covers a diverse range of platforms, genres, and target audiences, including computers, consoles, and mobile gaming. It encompasses casual games, independent titles and blockbuster AAA productions. The market has experienced significant growth in recent years, driven by an expanding player base across a wider demographic, significant demand for entertainment during COVID-19 lockdown measures, and the rising popularity of esports and streaming.
Business model	The video games industry is characterised by a variety of business models, including one-time purchase, subscriptions (e.g., Xbox Game Pass, PlayStation Plus Extra), free-to-play with in-game purchases (e.g., Fortnite, League of Legends), and ad-supported games (common on mobile platforms). Developers and publishers may also generate revenue through licensing, merchandising and live events.

Visual Effects (VFX)	
Overview	VFX involves the integration and manipulation of filmed and computer-generated elements to create a final polished shot. Examples include fantasy creatures, spaceships or apocalyptic events, and digital characters. Lesser known examples include facial replacements for stunt doubles, digital aging or de-aging of cast members.
Market	The VFX market services a wide range of industries, including film, television, advertising, and gaming. Demand for VFX has been on the rise due to its growing use in film, HETV, and moving image, and the increased reliance on digital tools in modern filmmaking.
Business model	VFX studios typically operate on a service and project-focused basis. They are contracted by clients such as production companies, advertising agencies or game developers to create visual effects for specific projects.

Emerging Tech (immersive and interactive tech)	
Overview	Immersive and interactive technology content represents the convergence of digital innovation and storytelling, transforming traditional filmmaking and content creation processes. Pivotal to this is real-time rendering, motion capture, and volumetric video capture, which blend physical and digital environments seamlessly. Closely linked to this is Virtual Production, which enables filmmakers to visualise complex scenes in real-time, offering unparalleled creative flexibility and cost-efficiency. Immersive and interactive technology content, such as Virtual Reality, Augmented Reality and Mixed Reality, transcends traditional media boundaries, permitting users to determine their preferred interactions and journeys.
Market	Emerging tech and Virtual Production are relatively new but rapidly expanding markets. They cater to industries like film, television, video games, advertising, education, and training. The growing interest in immersive experiences and the increasing accessibility of Virtual Production technologies are fuelling market growth.
Business model	Companies in the interactive technology and Virtual Production sectors typically provide services or develop products, such as hardware, software, or content, tailored to clients' needs. However, immersive content is increasingly in demand in the form of direct experiences, commissioned by venues and cultural exhibitors. Companies may generate revenue through product sales, licensing fees, service contracts or project-based work. In some cases, companies may adopt a subscription model for software, content or platform access.

10. APPENDIX 2 – SAMPLE JOB MATRIX

This Study reviewed 214 job titles from across the digital content production sectors. A variety of sources were used, including the UK Screen Alliance Job Role Taxonomy, Ukie's 2022 Games Industry Census, StoryFutures' research and ScreenSkills' research and job profiles.

The resulting Job Matrix presents an alphabetically organised list of job roles in the UK's digital content production sectors, with Figure 7 providing a sample. This identifies the occurrence of each job role across the different sectors. Because of the scope of this Study, it exclusively covers digital roles. If required, selected non-digital roles could be added after further consultation with stakeholders.

Shared as a live document, the Job Matrix will aid consistent data collection, emphasising both where sector-specific and shared roles exist, and where notable skills shortages exist. It should, however, be noted that the specific nature of these roles is often unique to particular sectors and workflows due to the requirement for different kinds of knowledge and experience. For instance, a 'designer' in VFX and animation primarily deals with visuals and concepts, whereas in video games they focus on interactive elements like combat, quests, levels, and mechanics. That said, the Job Matrix offers a high-level framework for identifying roles prior to unpacking sector-specific skills requirements.

Those marked in a red "X" are the roles that SPI found to have acute and immediate skills shortages and / or identified as showing attrition or retention issues.

While this classification was tested with industry through one-to-one consultations and focus groups, SPI recommends further research and analysis. To this end, the full list of job roles has been provided to the BFI as a dynamic spreadsheet, allowing for updates, amendments, and cross-references with other UK and international job matrices or maps.

Once refined, this classification will provide a robust barometer of role shortages that can be cross-referenced with the Shortage Occupation List (SOL), compiled by the Migration and Advisory Committee for the Government.

Figure 7 – Sample Job Matrix

Job Title	Animation	Post-production	Video Games	VFX	Emerging Tech
3D sequence supervisor	X			X	
3D supervisor	X		X	X	
ADR recordist		X			
AI programmer	X		X	X	X
Animation director / Series director	X		X		
Animation producer	X		X		
Animator – Junior	X		X	X	X
Animator – Mid	X		X	X	X
Animator – Senior	X		X	X	X
Animator 2D	X		X		X
Animator (stop motion)	X				

11. APPENDIX 3 – LIST OF CONSULTEES

11.1. BFI

- Ania Ostrowska, Research Manager
- Anna Mansi, Director of Certification and Video Games
- Matthew Hall, Senior Policy Analyst
- Rishi Coupland, Director of Research and Industry Innovation
- Sara Whybrew, Director of Skills and Workforce Development
- Yvonne Harris, Senior Fund Manager, Research and Innovation.

11.2. Study Advisors[126]

- Animation UK, UK-wide
- Creative Policy and Evidence Centre, UK-wide
- Creative Scotland, Scotland
- Creative Wales, Wales
- NextGen Skills Academy, UK-wide
- Northern Ireland Screen, Northern Ireland
- ScreenSkills, UK-wide
- TIGA, UK-wide
- UK Screen Alliance, UK-wide
- Ukie, UK-wide.

11.3. Department for Culture, Media and Sport

- Abby Brown, Senior Policy Advisor Video Games and Esports
- Alexandra Gillespie, Head of Film and High-End Television
- Susanna Lazarus, Head of Video Games and Esports.

11.4. Focus Group Attendees and 1:1 Consultees

Sector-Support Organisations

- BAME in Games, UK-wide
- Creative Scotland, Scotland
- Creative Wales, Wales
- Film London, England
- Northern Ireland Screen, Northern Ireland
- Scottish Games Network, Scotland
- ScreenSkills, UK-wide
- Screen Yorkshire, England
- UK Screen Alliance, UK-wide.

Academics

- Dr Mark Taylor, Senior Lecturer in Quantitative Methods, University of Sheffield.

Training Providers and Education Bodies

- Escape Studios, England
- Hollowpixel Animation, Wales.

Animation

- Axis Studios, Scotland
- Bumpy Box, Wales
- Cloth Cat, Wales
- Jam Media, Northern Ireland
- Kelebek Media, England
- Locksmith Animation, England
- Lupus Films, England
- Wild Child Animation, Scotland.

Post-Production

- Clear Cut Pictures, England
- Digital Orchard, Wales

[126] Organisations that were also consulted individually are included in section 11.4

- Gorilla TV, Wales
- Salon Ltd, England
- WB De Lane Lea, England.

Video Games

- BAFTA Games, UK-wide
- PlayStation (Sony), UK-wide
- Sharkmob, England
- Wales Interactive, Wales.

Visual Effects and Emerging Tech

- BlueBolt, England
- Cinesite, England
- Flying Duck Studio Lab, England
- Industrial Light & Magic, Global
- Jellyfish Pictures, England
- Megaverse, England
- Scanline, Global
- Union VFX, England.

Cross-Sector Organisations[127]

- Aardman, England
- Alex Hope, OBE
- Disney, Global
- Framestore, Global
- Jellyfish Pictures, England
- Megaverse, England
- NextGen Skills Academy, UK.

11.5. Group Meetings with Trade Body Members[128]

- A Productions, England
- Alt Animation, Northern Ireland
- Entertainment One, Global
- Eye Present, England
- Factory, England
- Flying Duck Studios, London
- Framestore, Global
- Ghost VFX, Global
- Gutsy Animations, Global
- Industrial Light & Magic, Global
- Keyframe Studios, England
- Lola Post Production, England
- Lupus Films, England
- MPC, England
- NextGen, UK-wide
- One of Us, England
- Outpost VFX, England
- Pixomondo, Global
- Rusty Monkey, England
- Studio Liddell, England
- Sun & Moon Studios, England
- Taunt Studios, Northern Ireland
- Tiger Aspect, England
- Timeless Films, England
- Union VFX, England
- Vine FX, England.

[127] Organisations whose work spans more than one of the studied sectors

[128] Organisations that were consulted outside of trade body meetings are also included in section 11.4

12. APPENDIX 4 – BIBLIOGRAPHY

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13. APPENDIX 5 – ORGANISATIONAL BIOS

13.1. About Olsberg•SPI

Olsberg•SPI ('**SPI**') is an international creative industries consultancy, specialising in the global screen sector.

SPI provides a range of expert consultancy and strategic advisory services to public and private sector clients in the worlds of film, television, video games, and digital media. Formed in 1992, it has become one of the leading international consultancies in these dynamic creative screen industries.

The firm's expert advice, trusted vision, and proven track record create high levels of new and repeat business from a diverse group of companies and organisations, including:

- National governments, including culture and economics ministries
- National film institutes and screen agencies
- Regional and city development agencies and local authorities
- Multi-national cultural funds and authorities
- National and regional tourism agencies
- Established studios and streamers
- Independent companies at all points of the screen business value chain
- National and international broadcasters
- Trade associations and guilds
- Training and skills development organisations
- Publishers and conference organisers.

With expertise in all areas of the fast-moving global creative sector, SPI offers a wide range of services, including:

- Analysis and strategic advice for building healthy and sustainable national and regional industries, and recommendations for public policies to support this
- Mapping and assessment of physical infrastructure, services and workforce
- Delivering economic impact studies of whole sector activity or of incentives
- Advice on the creation of fiscal incentives for screen productions
- Helping businesses and governments interpret the strategic implications of digital media innovations
- Business development strategies for content companies
- Feasibility studies, and marketing and business strategies for small and large-scale studio facilities
- Evaluations of publicly funded investment schemes
- Acquisition and divestment advice for owners or managers of SMEs
- International cost comparisons for small and large film and television productions
- Strategic advice on inward investment and exports for national and regional public bodies
- Analysing and explaining the links between growth in tourism and a nation's film and television output
- Providing strategic advice for screen commissions, including business and marketing plans
- Keynote speakers at industry events.

Further information on SPI's work can be found at www.o-spi.com and within the SPI Company Brochure.

Please contact **Joshua Dedman** at joshua@o-spi.com for further information about this Study.

13.2. About Kate O'Connor Consulting

Kate O'Connor is a distinguished senior consultant in the creative industries who collaborates with private and public sector clients throughout the UK, Ireland, and internationally. With a successful 20-year tenure as the founder and Executive Director of Creative Skillset, Kate played a pivotal role in transforming the organisation from a start-up to a thriving enterprise, becoming an exemplar for industry / public sector partnerships and creating ground-breaking approaches to screen-based training and development.

In her consultancy practice, Kate O'Connor Consulting, Kate delivers strategic insights to leading UK and international clients, leveraging her comprehensive expertise in skills, training, strategy, and policy related to the screen industries' growth plans. As the founder and Executive Chair of Animation UK, Kate represents the sector at the governmental level and formulates business, export, and skills-related policies to bolster the industry's growth. This position situates her at the vanguard of international policy and the analysis of global fiscal developments.

Appointed as Co-Director of XR Stories and the Yorkshire-based Screen Industries Growth Network, Kate supports this government-backed initiative to invest in innovative storytelling and production techniques, such as immersive and interactive content for film, television, and gaming.

Kate's non-executive roles encompass numerous UK universities, film schools and the BFI Screen Industries Research Advisory Group, where she served as chair. Kate is also a BAFTA member and a long-standing advisor to the BAFTA Learning and New Talent Committee.

13.3. About the British Film Institute (BFI)

The BFI is a cultural charity, a National Lottery distributor, and the UK's lead organisation for film and the moving image.

The BFI's mission is:

- To support creativity and actively seek out the next generation of UK storytellers
- To grow and care for the BFI National Archive, the world's largest film and television archive
- To offer the widest range of UK and international moving image culture through its programmes and festivals – delivered online and in venue
- To use its knowledge to educate and deepen public appreciation and understanding
- To work with Government and industry to ensure the continued growth of the UK's screen industries.

Founded in 1933, the BFI is a registered charity governed by Royal Charter.

The BFI Board of Governors is chaired by Tim Richards.

Please contact **Yvonne Harris** at yvonne.harris@bfi.org.uk or **Ania Ostrowska** at ania.ostrowska@bfi.org.uk for more information about this Study.