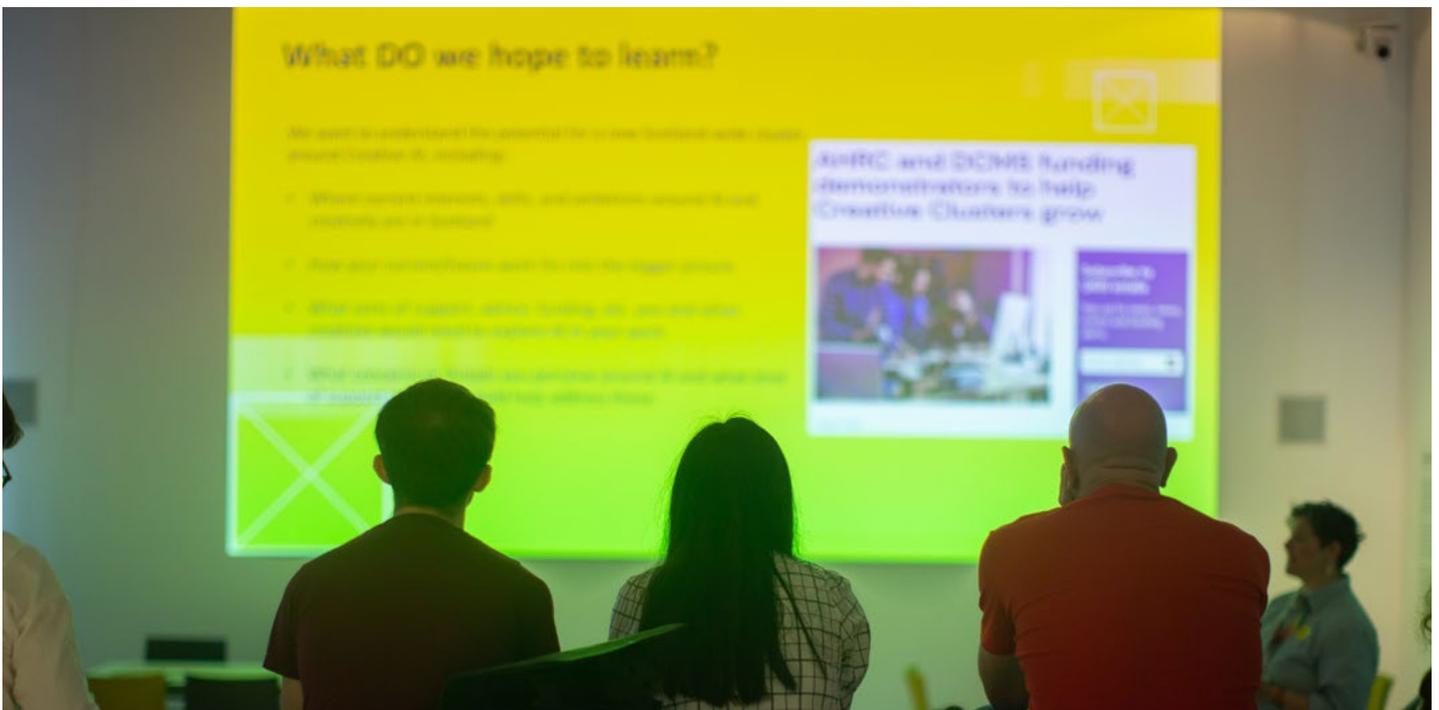## CREATIVE INFORMATICS

The Future of Creativity and AI: Views from the Scottish Creative Industries

April 2024

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CONTENTS

SUMMARY

¬ In a rapidly changing creative space, we explore the potential for using AI, specifically creative AI, in the creative industries in Scotland, as of Spring 2024.

¬ To achieve this, as part of the Arts and Humanities Research Council (AHRC) and Department for Culture, Media and Sport (DCMS)-funded Creative AI Demonstrator Project at the University of Edinburgh, we consulted with the creative sector throughout 2023 via a series of scoping workshops held across Scotland, an online survey, and funding ten rapid turnaround R&D Creative AI Music & Audio Pilot Projects.

¬ The pilot funding call attracted applications both from those adopting novel AI technologies in their creative practice and those developing their own technical applications for the creative industries. Ten projects were selected. Key issues that were explored included the use of AI to optimise or enhance creative products and work, AI as an artistic co-creator, and new ethical business models facilitated by AI.

¬ In the workshops and survey we consulted participants in or adjacent to the creative industries in Scotland who use AI or are interested in using it, capturing responses from a broad range of stakeholders.

¬ Respondents raised concerns around how we understand creativity and the place of creative practitioners, data use, ethics, IP and copyright, labour, standards and sustainability.

¬ We identified barriers faced by the creative sector around training, funding and otherwise engaging with AI technologies.

¬ We learned that those in the creative industries in Scotland want to engage with AI technologies and, crucially, want to be involved with shaping how such technologies affect the future of the creative industries.

¬ Those we consulted with see a need for interventions in the areas of adequate IP and copyright legislation, fostering collaboration, improving AI literacies, funding, infrastructure, standards and governance, and training.

SUMMARY RECOMMENDATIONS

Our activities generated a range of specific recommendations:

¬ Those in the creative industries should be involved in deciding the direction of AI use.

¬ Creative AI that is responsible, sustainable, and inclusive will provide the best outcome for creatives, audiences, the economy, and the environment.

¬ Access to training at all levels should be enabled and this would benefit from central coordination.

¬ Funding is required to support public education on AI, both at a broad introductory level, and for more targeted approaches to the creative (and other) subsectors.

¬ Sustained funding for innovative R&D working with AI in creative contexts and organisations is required.

¬ Access and financial support for large-scale compute and/or strategic pricing structures for SME access to publicly funded large-scale compute is required.

¬ We recommend the establishment of regional creative AI hubs to convene those working in this emerging and increasingly important space.

¬ We support the establishment of collaborative communities to connect those from the creative communities with funders, industry representatives, policymakers and audiences / consumers.

¬ Transparent governance needs to be put in place to set and maintain standards on ethical, legal, and policy matters by government, institutions, industry bodies, and creative communities.

¬ We need protections for creative workers and creative work as there are fears that creative AI challenges both creativity and creative jobs.
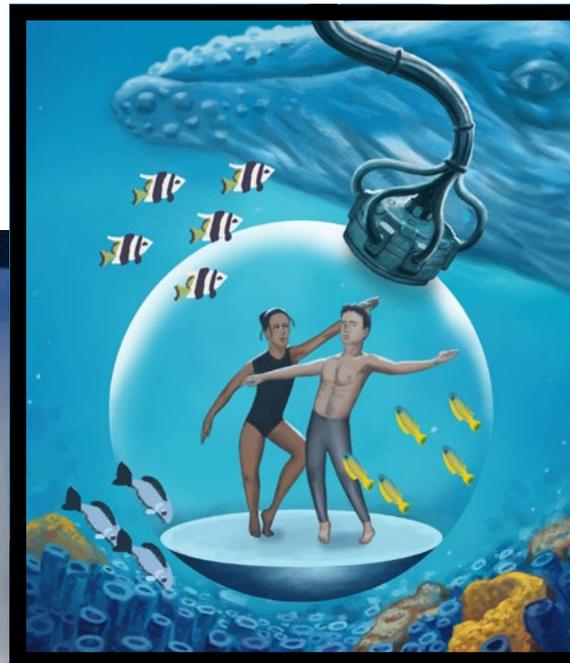
1 INTRODUCTION

Artificial Intelligence represents a suite of capabilities that every industry is currently having to reckon with: the creative industries are not exempt and may be one of the areas most affected by this sudden technological shift. As recently as 2020 the Creative Industries Policy and Evidence Centre judged *"[d]irect applications of AI in creative industries"* to be *"relatively small scale"* (Davies et al., 2020). However, since late 2022 the arrival of widely available generative AI tools such as ChatGPT[1] and DALL-E[2] has prompted all sectors to consider incorporating these technologies, and the ramifications of doing so. The increased prevalence of AI technologies has specific consequences for the creative industries, which are defined as those industries *"based on individual creativity, skill and talent, or which have the potential to create wealth and jobs through the development or production of intellectual property"* (Culture and Major Events Directorate, n.d.). AI as a disruptive technology has challenged understandings of creativity, skill and talent, particularly having a troubled relationship with legal structures of ownership and intellectual property.

In this paper we introduce the landscape of creative AI in Scotland in 2023, and report on the Arts and Humanities Research Council (AHRC) and Department for Culture, Media and Sport (DCMS)-funded Creative AI Demonstrator Project[3] (Feb 2023-March 2024), part of Creative Informatics at the University of Edinburgh,[4] which consulted Scotland's creative sector from May to November 2023 on their concerns about AI and how to address them. We provide concrete recommendations on how to support our creative industries through this increasingly urgent AI turn.

1   https://chat.openai.com/
2   https://openai.com/dall-e-2
3   https://creativeinformatics.org/programme/creative-ai-demonstrator-project/
4   https://creativeinformatics.org/

2 CONTEXT: CREATIVE AI IN SCOTLAND

2.1 What is creative AI?

Artificial Intelligence (AI) is affecting all production aspects of the creative industries, with the provision of easy-to-use online tools like ChatGPT or Midjourney[5] used to produce textual and visual assets, to tools like Google's MusicLM (Agostinelli, 2023), which can generate music from a text prompt (or whistling a tune). Many technologies come under the umbrella of 'artificial intelligence' and, given their breadth and complexity, it can be difficult to *"separate what AI has actually done from what it promises, and also from what the media think it promises"* (Wilks, 2019, p. 20). Furthermore, many technologies being sold under the banner of AI rely on human labour rather than market-ready AI solutions (Sarkar, 2023; Solon, 2018).

We operate with a definition of creative AI as any use of machine learning (ML) systems (including, but not limited to Generative Adversarial Networks (GANs), Large Language Models (LLMs), and speech, image, text and audio recognition and generation) at any stage in the creative process, which includes generating ideas, creating references and prototypes, and final production processes to contribute to the making of artistic assets, goods, services or experiences, with or without the intention of taking revenue or producing profit.

In the context of the creative industries, the existence of technologies seen as having a capacity for creativity has specific and far-reaching consequences. As Georgia Ward Dyer observes, the concept of creativity *"has always been characterised as uniquely, even sacredly human"* (n.d.). From this perspective, what computers and algorithms can do is not creative. However, creativity can also be construed as combinations of existing concepts, as *"combinational creativity"* (Boden, 2003) where *"[c]reativity is not some supernatural force. It is something that can be synthesized, amplified, and manipulated"* (Kelly, 2022). From this alternate perspective, AI-generated creative work could exceed human capacity for creation, for example: *"Computers are good at making music that humans wouldn't"* (Chilvers, 2023). Ascribing such abilities to AI technologies contradicts some understandings of creativity and can lead to resistance, fear and anger (Fry, 2018, p. 189). Renegotiating our understandings of creativity also has material consequences for how we value creative work and products. When considered in tandem with the possibility for creative AI to replace the roles of human artists, it is of existential concern to the creative sector.

5   *https://www.midjourney.com/*

2.2 Creative AI in Scotland

Scotland has a long history with AI, with the University of Edinburgh celebrating 60 years of AI research in 2023.[6] Edinburgh and Glasgow have been named in the UK's top ten AI-ready cities[7] and Dundee has a critical mass of leading games companies that are also making significant use of AI (MCV Staff, 2021). The Scottish Government has shown early leadership in engaging with AI through the development of Scotland's AI Strategy[8] to ensure the adoption of trustworthy, responsible and inclusive AI, appointing the Scottish AI Alliance to deliver against it.[9] The strategy included significant expert and public consultation, and the delivery of the strategy is similarly engaging wider publics.

Creatives in Scotland in the mid-2020s are working in the context of a thriving technology, start-up, and AI ecosystem, often working with developers and technical partners and collaborators that span both creative and tech industries. Edinburgh is a particular hotspot given that it includes a combination of four universities, initiatives to support spin outs, a large and vibrant start up community, and a number of companies in this space. For example, Creative Informatics,[10] of which this demonstrator forms part, has supported creative projects with AI and machine learning such as: DataMind Audio's music production work;[11] ImprovBot, which used AI to generate an arts festival programme;[12] machine learning consultancy Viapontica's work to develop an AI image-cropping pipeline for use in multiple formats;[13] Black Goblin's emerging sound platform for filmmakers;[14] 'Duck', a short film exploring the use of deep fake video and audio by the artist Rachel Maclean;[15] and an ongoing collaboration exploring the use of generative AI in art history and conservation with the National Galleries of Scotland. Inspace Gallery (part of the Institute for Design Informatics, University of Edinburgh), in partnership with Creative Informatics, has featured multiple artists using creative AI.[16] The New Real[17] research group and creative community, a joint initiative of the University of Edinburgh and The Alan Turing Institute, supports the creation of new art using fair and inclusive AI, such as that by Jake Elwes[18] and Inés Cámara Leret.[19]

The creative sector in Scotland operates within a wider context of cross-industry innovation with AI, which also includes the creative and cultural industries. This includes organisations like the Data Lab,[20] which was created to support the use of analytics and data science in Scottish industry and has expanded its focus to AI (also contributing to Scotland's AI Strategy). The Edinburgh and South-East Scotland City Region Deal[21] invests in innovation, skills, and infrastructure, including AI, through the Data Driven Innovation initiative.[22] There is an annual Scottish AI Summit,[23] hosted by the Scottish AI Alliance, and annual events like the Data Summit[24] and Turing Fest[25] which both have increasingly featured AI activities.

6   https://www.ed.ac.uk/c/60-years-computer-science-ai
7   https://www.sas.com/en_gb/insights/articles/analytics/sas-ai-cities-index-2023-which-parts-of-the-uk-are-most-ai-ready.html
8   https://www.scotlandaistrategy.com/
9   https://www.scottishai.com/
10 https://creativeinformatics.org/
11 https://open.spotify.com/episode/7xK-23cgzR0Jng2QodD4rBw?si=fc4e0353e-56a424e&nd=1

12 https://improvbot.ai/
13 https://viapontica.ai/
14 https://www.blackgoblinaudio.co.uk/thol
15 https://www.eventbrite.co.uk/e/ci-labs-22-digital-identities-tickets-440359145057
16 For example, Martin Disley (https://inspace.ed.ac.uk/the-sounds-of-deep-fake/), Theodore Koterwas (https://www.designinformatics.org/news/theodore-koterwas-new-artist-in-residence/), Everest Pipkin (https://inspace.ed.ac.uk/the-sounds-of-deep-fake/), and Fiona Smith (https://www.mevis.fraunhofer.de/en/press-and-scicom/institute-news/2023/AI-as-a-black-box.html).
17 https://www.newreal.cc/
18 https://www.jakeelwes.com/project-zizi-show.html
19 https://www.newreal.cc/artworks/the-overlay
20 https://thedatalab.com/
21 https://esescityregiondeal.org.uk/
22 https://ddi.ac.uk/
23 https://www.scottishaisummit.com/
24 https://datafest.global/data-summit/
25 https://turingfest.com/

Looking at the UK context, there is a UK Government AI Strategy[26] and there are significant investments being made in AI, again usually in the context of ethical adoption. In November 2023 the UK Government hosted the AI Safety Summit 2023,[27] during which invited representatives from government, major AI companies, and civil society debated the safety of AI in a global context and the AI Safety Institute was launched.[28] Innovate (part of UKRI) have launched a £100m BridgeAI[29] programme for AI for R&D in industry[30] with the creative industries included as one of four focal areas being named for its high growth potential. Additionally, the University of Edinburgh hosts the Bridging Responsible AI Divides (BRAID) project,[31] a UK-wide UKRI-funded programme to ensure responsible and ethical use of AI. In October 2023, a network of 12 UKRI Centres for Doctoral Training (CDTs) in artificial intelligence supported by £117m funding were announced,[32] with the mission to train the next generation of AI researchers, with a particular focus on ethical engagement with AI. Of the AI CDTs funded, three will be based within Edinburgh (two led by the University of Edinburgh, one led by Heriot-Watt University in partnership with the University of Edinburgh), reflecting the significant strength of expertise in AI in the region.

Scotland, as a geographic region with a particularly high concentration of research and start-ups in the AI space (Townsend, 2023), allows us to understand emergent issues in creative AI, and provides a useful lens through which to consider how AI is affecting creatives and their practices. The creative sector in Scotland has specific actors, dimensions, and activities[33] and Scotland offers a unique test case for examining the proliferation of creative AI given its own policy making and legal system. However, the development and uptake of AI technologies and their consequences are a global concern with numerous effects including the life and working conditions of people all over the world, the environment, international supply chains, and international legal and regulatory debates, which Scotland's creative individuals, organisations, and companies must navigate.

26 https://www.gov.uk/government/publica-tions/national-ai-strategy-ai-action-plan/national-ai-strategy-ai-action-plan

27 https://www.aisafetysummit.gov.uk/

28 https://www.gov.uk/government/news/prime-minister-launches-new-ai-safety-in-stitute

29 https://iuk.ktn-uk.org/programme/bridgeai

30 https://www.digicatapult.org.uk/about/press-releases/post/bridge-ai/

31 https://braiduk.org/

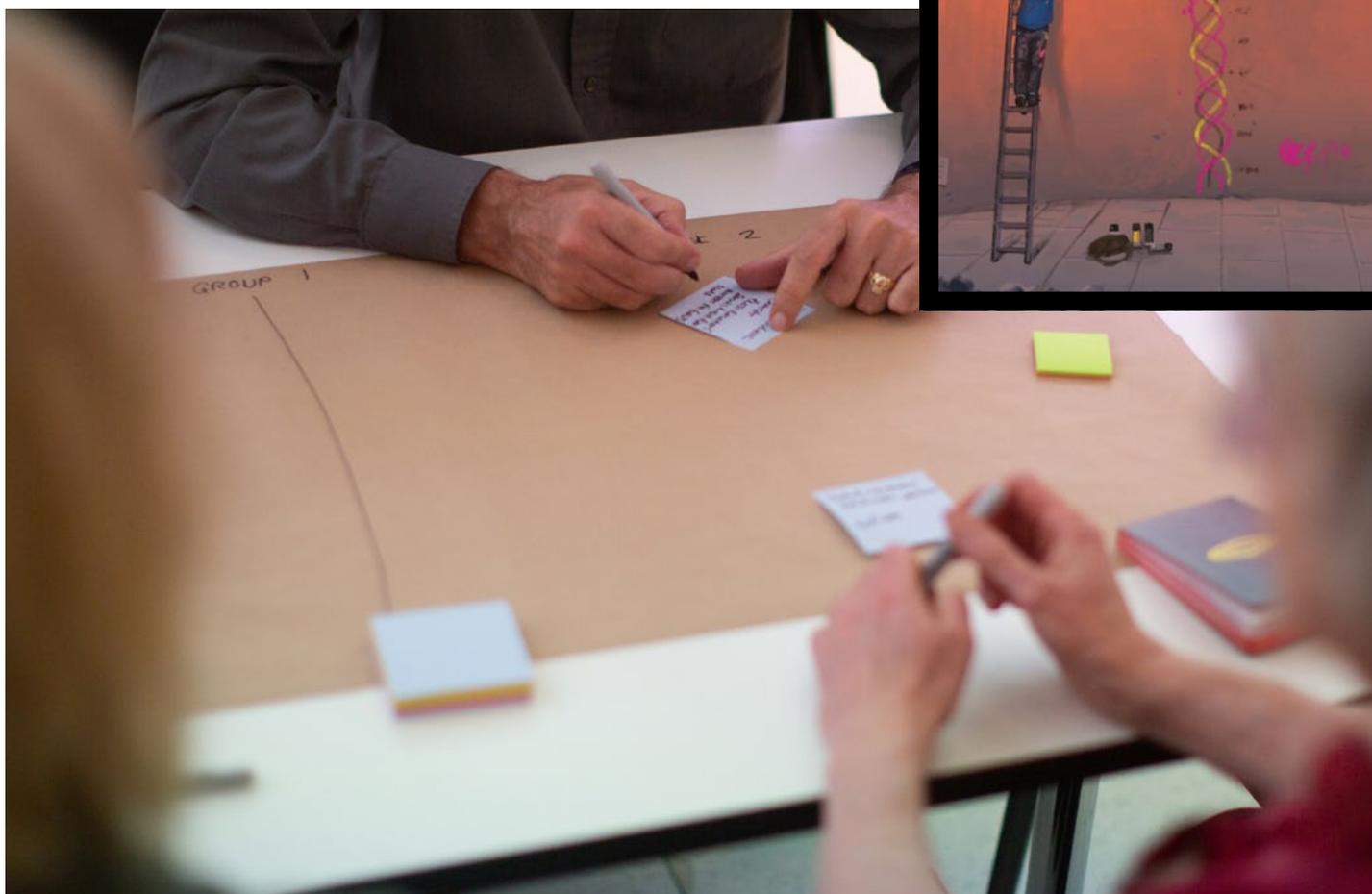32 https://www.ukri.org/news/ukri-invests-in-the-next-generation-of-ai-innovators/

33 See https://www.gov.scot/publications/scotland-national-strategy-econom-ic-transformation-evidence-industry-lead-ership-groups-sector-groups/pages/5/ and https://scotland.britishcouncil.org/programmes/arts/arts-culture-assets-report for an overview of the Creative Industries in Scotland.

2.3 Concerns about AI for the creative industries

The use of AI has raised multiple concerns, some of which are specific to the creative sector, with this debate occurring across academia, news media and popular science coverage:

¬ Ethical concerns regarding the sourcing of training data, fair attribution, and payment practices, as well as a lack of transparency in these processes (Crawford, 2021).
¬ A concern that bias in training data, algorithms, and their implementation may contribute to the perpetuation and exacerbation of existing power structures, leading to increased inequality gaps (Fry, 2018).
¬ A lack of protocols, standards, and guardrails for the use of AI (Pouget, 2023).
¬ Concern that the largest global tech players operate beyond the reach of any one jurisdiction (Valtysson, 2022).
¬ The environmental toll, which is often invisible, and which is not distributed evenly throughout the world (Stokel-Walker, 2023).
¬ Intellectual property and copyright regulations around digital asset classes struggling to keep up in the variety of legislative contexts at play (Appel et al., 2023).
¬ Fears around replacing creative jobs with AI technologies (Cox, 2023).
¬ The idea that in the future we will want to label artworks as being 'made by humans' (Booth, 2024).
¬ A reappraisal of how creative work is defined and valued, which exacerbates how badly creative work is often remunerated (Pace, 2023).
¬ The consequences for authenticity and trust rising from the circulation of unlabelled AI-generated data, deep fakes, and disinformation (Gregory, 2022).

These concerns point to the fact that innovation in AI within the creative industries must be undertaken responsibly (Luger & Vallor, 2023; Tahaei, 2023).

3 SCOPE OF CREATIVE AI DEMONSTRATOR PROJECT

In order to investigate the creative practitioners of Scotland's understanding of and reaction to concerns around creative AI, we designed the Creative Informatics[34] Creative AI Demonstrator Project.[35] Funded by the AHRC and DCMS,[36] this project was designed to explore the potential for using creative AI in the creative industries in Scotland and find out what kinds of support, training, advice, funding, or other resources might enable responsible innovation in this space. Throughout 2023 we reached out to communities across Scotland at different stages in their engagement with creative AI in a series of workshops (online, and in-person in Edinburgh, Dundee, and Glasgow), an online survey, and by funding ten rapid turnaround Creative AI Music & Audio Pilot Projects selected after an open Scotland-wide call.

3.1 Why now?

Creative Informatics has been watching the development of creative AI – which rests upon the use of data and data-driven innovation in the creative industries – for some time (Osborne, 2021). Through our Creative Informatics work we have also seen a significant increase in engagement and use of AI reflected in funding applications over the last five years (across approx. 40 funding calls), especially in the music and audio projects being proposed. We also hold a strong interest in the ethical use of AI – in line with our broader proactive approach to ethics – and have been excited to see how Scotland's AI Strategy[37] is encouraging responsible and ethical use of these technologies. Creative AI has been increasingly visible, coming into more widespread public use and discourse – particularly in the creative industries – since late 2022 due to the availability of Large Language Models (particularly ChatGPT), and generative AI tools such as the text-to-image platforms DALL-E2 and Midjourney. These tools raise real challenges for the creative industries. However, we also believe that there is far more potential for AI and machine learning in creative work, whether through use of existing tools, development of new ones, or turning a critical lens on AI, particularly when AI is used in an ethical and appropriate way.
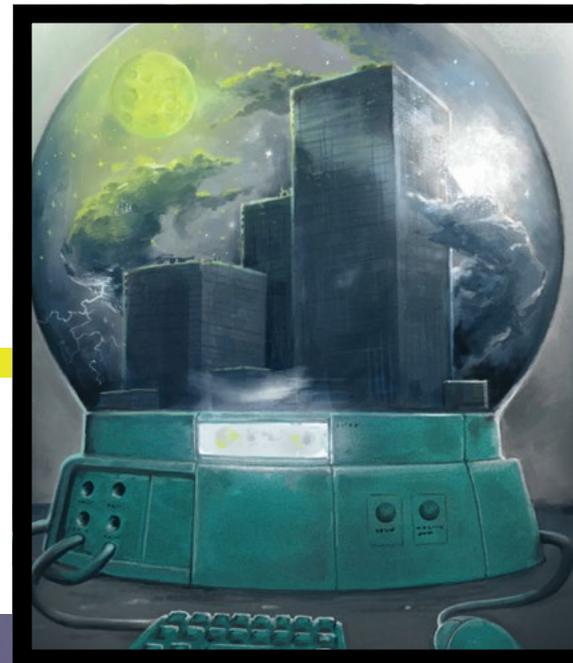
3.2 What next?

This paper synthesises what we have learned from the scoping workshops, survey, pilot funding call, and desk research about creative AI activities in Scotland. We provide an overview of the priorities of the creative industries for successfully working with and alongside creative AI and provide recommendations to creative practitioners, policymakers, researchers, and technologists for how to achieve this.

34 https://creativeinformatics.org/

35 https://creativeinformatics.org/programme/creative-ai-demonstrator-project/

36 https://www.ukri.org/news/ahrc-and-dcms-funding-demonstrators-to-help-creative-clusters-grow/

37 https://www.scotlandaistrategy.com/

4 RESEARCH PROCESS: WORKSHOPS, SURVEY, PILOT CALL

We approached a range of creative practitioners across Scotland in the workshops, survey, and funding call to ascertain their concerns about AI for the creative industries and the support and resources they require to fully engage with it.
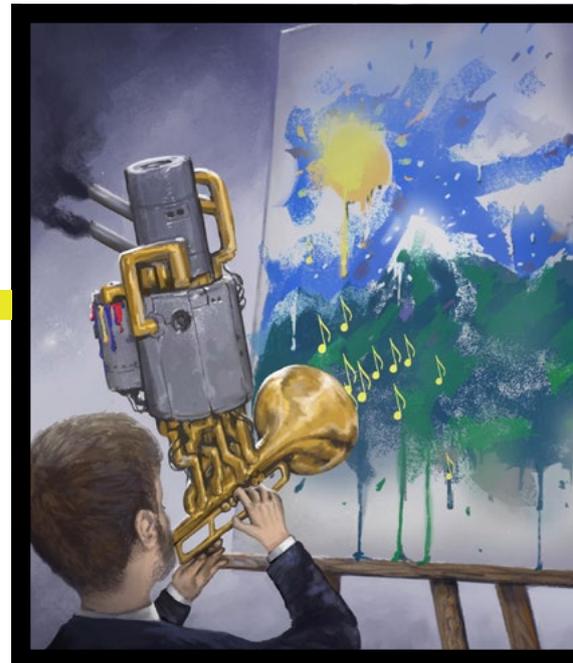
4.1 Workshops

We held a series of workshops in 2023, digitally and physically, to reach participants across Scotland who use AI in their creative practice or are interested in doing so, or otherwise work in the creative industries:

Date of workshop	Location of workshop	Number of participants
8 August 2023	Online	35
10 August 2023	Edinburgh	21
7 September 2023	Dundee	27
16 November 2023	Glasgow	16

The workshops consisted of an introduction to the Creative AI Demonstrator Project and its aims, a talk introducing debates around creative AI (by Professor Frauke Zeller, from Creative Informatics, Edinburgh Napier University),[38] individual ice breaker tasks, and a two-part, hands-on, small group speculative activity to ideate and design a creative AI tool, thinking through all the resources required to create that tool, which also stimulated discussion of key opportunities, issues, and concerns.

4.2 Survey

In addition to the workshops, we ran an online survey garnering 85 responses, 30 of which were analysed (as detailed in the next section). A call for participants was distributed on social media, on internal and external mailing lists, and to participants of the workshops. These sites were chosen based on the potential to reach participants with experience of using AI technologies and allowed us to gather more detailed data about AI use, reflections, and requirements.


38 *https://www.napier.ac.uk/*

The online workshop suffered some unanticipated problems. We offered vouchers as an incentive for participation across our scoping activities and this led to us being targeted by opportunists who were not genuinely interested in sharing their perspectives, some of whom went as far as using chat bots to generate responses to questions during the workshop. As a result, only a few participants were unambiguously identifiable as genuine engaged participants, and we have had to discount the data from that workshop. This experience is becoming more prevalent in online research (Gibson & Beattie, 2024). It reflects the growing challenges to authenticity raised by AI and bots and we include it here as it warns us about the potential disruption AI can cause. The irony of this incident is not lost on us during an exploration of issues around AI, one of which is the potential erosion of trust and authenticity. To read more about the incident please see Black (2023).

Similarly, upon reviewing the survey responses, some of them were found to be generated by chat bots or otherwise not given in good faith. One answer even identified the writer as an AI tool:

"My design and development was done by a team of professional AI engineers and data scientists who used vast amounts of data and algorithms to train and optimize my models to improve the quality of my answers and the accuracy of my responses."
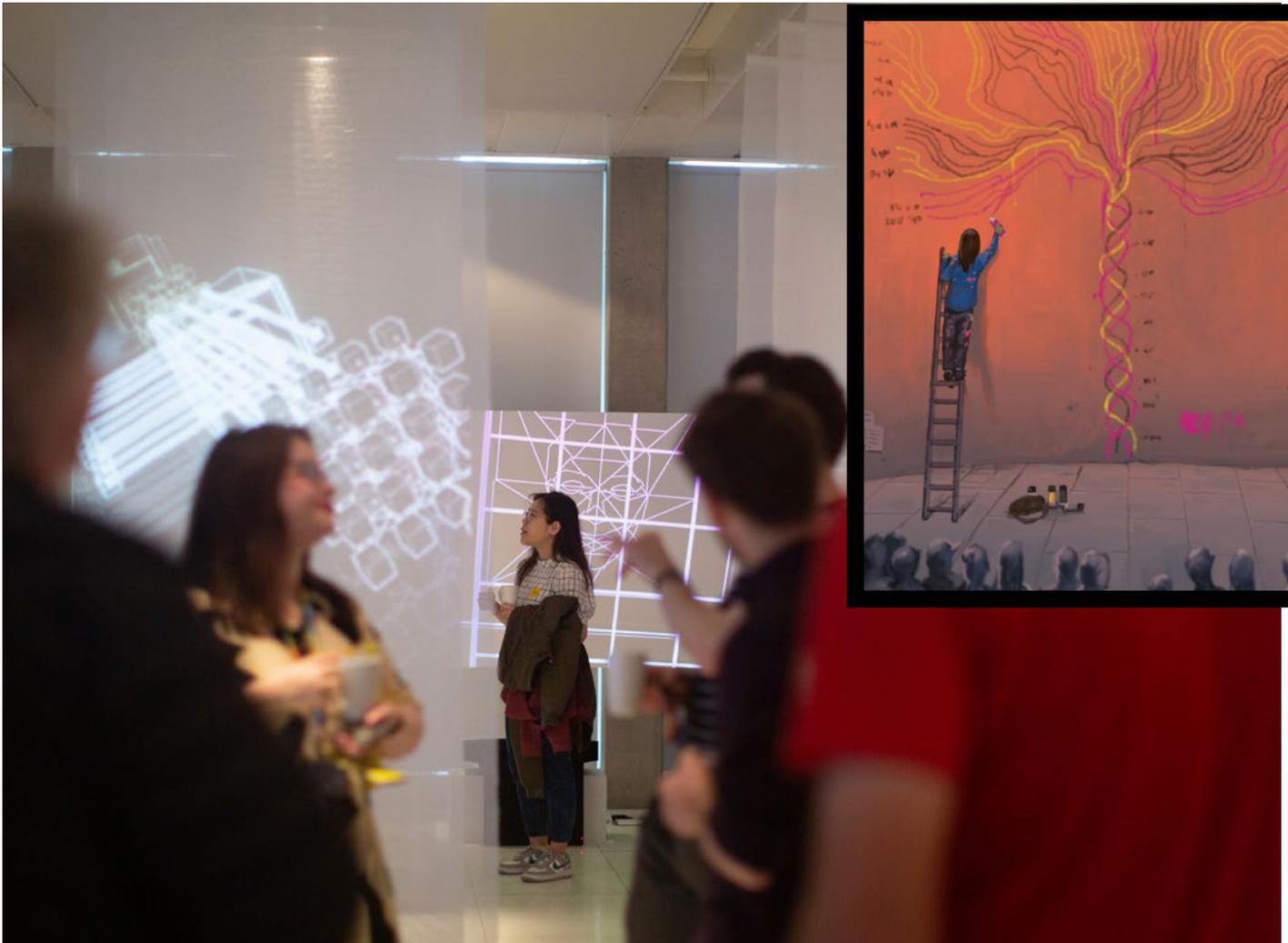
Of the 85 survey participants, 55 were deleted as giving bot-generated or otherwise bad faith answers (for example, strings of gibberish text). Research methods, particularly online research methods, must be adapted in this age of AI-led disinformation.[39]

39   For advice on how to mitigate bot responses in online studies, please see Simone (2019).

4.4 Pilot Call

We launched the Creative AI Music & Audio Pilot Projects Call, offering ten lots of £5000 grant funding to individuals and SMEs to undertake small-scale rapid R&D projects that explore creative AI in the context of music and audio (a context in which we knew there to be existing regional strength and expertise in AI and ML). We received proposals for projects working within music production, filmmaking, gaming, work with voices and speech, and exploring audio archives, which generated new technologies, intervened into creative practice, turned a critical lens on AI and, in some cases, resulted in live performance. The breadth of these projects demonstrates the wealth of creative AI work taking place in Scotland and the ambitions of creative communities to do more in this space.

We awarded £5000 to each of the following:

Company / People	Project
BearHammer Games Limited[40]	Improving the integration of music into an immersive adventure fitness game.
Black Goblin[41]	Accessible sound design generating sound effects to accompany moving images.
DataMind Audio[42]	Developing a neural audio plugin for AI-generated sound design using ethically-sourced training data.
Jamie Grier	Developing a hardware sampling synthesiser using AI audio analysis and resynthesis.
Painting Music Limited[43]	Using AI to create music from live painted drawings.
Playable Technology Limited[44]	Building upon the machine vision approaches of their BeatBlocks app,[45] which allows users to build music in real time with traditional children's building blocks.
Studio Scott Myles[46] / Oscar Middleton[47]	Developing a public art installation built with Eurorack synthesiser modules bringing together elements of improvisation, AI and audience engagement.
Synthetic[48]	Working on an audio engine for 'no-code' solutions for creating personalised software tools.
Theodore Koterwas[49]	Creating a performance exploring embodied interactions with data, culminating in a special performance, Metempsychosis ex Machina, at InSpace on Friday 3 November 2023.[50]
Unit Test[51]	Using AI to organise, categorise, and navigate large-scale heterogenous sound archive collections.

Ben Cantil, DataMind Audio

40 https://bearhammergames.com/
41 https://www.blackgoblinaudio.co.uk/
42 https://datamindaudio.ai/
43 https://katesteenhauer.com/painting-music/
44 https://www.playable.tech/
45 https://beatblocks.app/
46 https://creativeinformatics.org/community/scott-myles
47 https://creativeinformatics.org/community/oscar-prentice-middleton/
48 https://www.gen-ai.design/
49 https://theodorekoterwas.com/
50 https://creativeinformatics.org/event/metempsychosis-ex-machina/
51 https://unittest.studio/

4.5 Events

We held several public facing events, which had the dual aims of informally testing sentiment around creative AI and beginning to build networks of those interested in creative AI.

Activity	Date	Location
The Sounds of Deep Fake exhibition	5-28 August 2023	Inspace, Edinburgh
Edinburgh Festival Fringe Cabaret of Dangerous Ideas Show: Can Data Unlock Creativity? By Nicola Osborne	9, 12 & 21 August 2023	New Town Theatre, Edinburgh
Exploring the Potential for AI: Showcase	7 September 2023	DCA, Dundee
Creative Informatics Innovation Showcase panel: Exploring the Potential for Creative AI	28 September 2023	Central Hall, Edinburgh
Metempsychosis ex Machina by Theodore Koterwas	3 November 2023	Inspace, Edinburgh
BEYOND panel: How AI Can Aid Creativity: Dispelling the Fear of AI for Art and Artists	22 November 2023	Royal Institution, London
Exploring the Potential for AI: Showcase	28 November 2023	Platform, Glasgow

These conversations continued at events at the Edinburgh Science Festival in April 2024, and at time of writing we are aligning with the Scottish AI Alliance on a future event.

Data gathered from the workshops, survey, and funded projects was combined to inform our analysis of the creative sector in Scotland's experience and engagement with AI, what barriers they have faced using these technologies and their concerns around them, and what resources and support the sector needs. Feedback from the pilot projects contributed to two case studies – on BearHammer Games Limited and Black Goblin Limited (sections 9 & 10) – which express overlapping concerns to those of the workshop and survey participants.

# 5 CREATIVE SECTOR IN SCOTLAND: WHOM WE CONSULTED

Across the workshops, survey, and pilot call we consulted with a range of individuals working across the creative industries in different capacities and with different levels of engagement with AI. Participants were recruited through calls that were shared and amplified through established networks including Creative Informatics, the Data Lab, and the Scottish AI Alliance, as well as specialist music and AI experts and communities across and beyond Scotland. We found that the workshop participants were, generally, curious about AI but had not implemented those technologies in their practices. In contrast, the survey participants were more engaged with AI technologies, and the pilot call respondents were much more experienced with AI (though this wasn't a requirement of the call).

5.1 Workshop experience with AI

The majority of the workshop participants (total number 64) stated an interest in AI (61%) and in using it in creative / artistic work (59%) (see Figure 1). 19% of the participants indicated they already used it in creative / artistic work with 20% using it for other purposes, which signals that the participants are interested in AI technologies but not necessarily experienced in using them.

FIGURE 1

WORKSHOP PARTICIPANTS' EXPERIENCE WITH AI
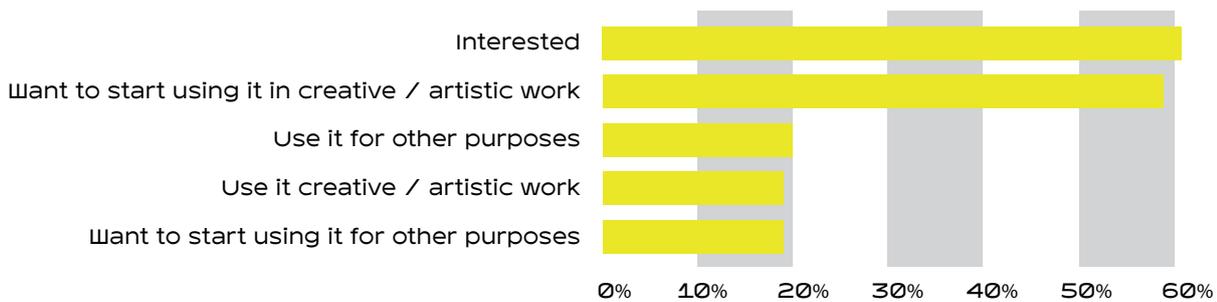
5.2 Survey experience with AI

Almost all (90%) of the 30 survey participants stated that they had a little (30%), some (43%) or lots (17%) of experience with AI, indicating that the survey participants were more engaged with using AI technologies than the workshop participants (see Figure 2).

FIGURE 2

SURVEY PARTICIPANTS' EXPERIENCE WITH AI

Lots of experience
17%

No experience
10%

Some experience
43%

A little experience
30%

5.3 Diversity in the Scottish creative industries

Of the 64 workshop participants, the majority identified as white (61%). The largest age group were those 25-34 years old (30%). 42% identified as female. While 53% declined to reveal their sexual orientation, we found that 39% identified as heterosexual.

Of the 30 survey responses, 80% of the participants identified as white, 50% as female, 33% aged 45-54, and 70% as heterosexual. Additionally, the majority (84%) were based in Scotland with 13% from the rest of the UK and 3% from further afield. 67% identified as not having a disability, 10% identified as having a disability, and 23% preferred not to answer.

These statistics compare to a Scottish population[52] that is around: 92% white and 8% global majority (BAME) or white non-British in origin; 51% women; the largest age group is between 45 and 64 years old and the second largest group between 25 and 44 years old; estimated to be 95% heterosexual. Scottish population estimates are that a third of all adults have a long-term mental or physical disability.

We note that the participants are a more diverse cohort than the Scottish population and the creative industries as a whole (Black et al., 2023; Brook et al., 2020). We attribute this to the workshops attracting participants at early stages in their careers and Creative Informatics' work establishing networks for underrerpresented minorities in the industry. It has been recognised that inequality is a problem in the creative industries, particularly in leadership roles where there is a dominance of middle-class origin, able-bodied, white men (Brook et al., 2020).

52 All Scottish demographic data from *https://scotland.shinyapps.io/sg-equality-evidence-finder/.*

53 *https://creativeinformatics.org/programme/creative-ai-demonstrator-project/*

5.4 Pilot Call

The individuals and teams whom we awarded funding for rapid turnaround R&D projects using AI in the area of music and audio were, understandably, more experienced using AI technologies, though this was not a requirement of the criteria for award.[53] While we are not sharing the detailed data on this small cohort, we note that the majority of project leads are male, which we believe reflects a number of factors, including what appears to be a self-selecting bias in those working with AI, which may be partly due to the known issues of bias and inequality in AI work to date (O'Neil, 2016). The same gender trend was not seen in our AI scoping workshops, indicating that there is no lack of interest from female and minority gendered creatives, but the confidence and opportunity to pursue, rather than critically engage and contribute to debate around AI, does seem to be somewhat gendered.

5.5 Method

The data we gathered enables us to present an overview of the concerns of the creative sector about the arrival and potential consequences of AI technologies. They are presented in the sections below on: concerns about AI in the creative industries; barriers to using AI in the creative industries; and resources and support needed by the creative industries. The views of the pilot project teams are represented in two indicative case studies (sections 9 & 10).

6 CONCERNS ABOUT AI IN THE CREATIVE INDUSTRIES

Those we consulted during the workshops and survey raised the following concerns about AI and the creative industries: Creativity, Data Use, Ethics, IP and Copyright, Labour, Standards, and Sustainability. Although many of these issues are known concerns with AI, the participants brought lived experience of these issues and more nuanced concerns around them specific to the creative industries. These concerns have many areas of overlap and are listed in alphabetical order.

6.1 Creativity

There are concerns around the effects of using AI on the quality of creative output and how this may prompt reappraisal of defining and valuing creative work. Art made with generative AI calls into question trustworthiness and authenticity, two factors that are important to how creative output is defined and valued. The existence of deepfakes and the ability of generative AI tools to quickly replicate artistic styles erodes the relationship between artists and audiences. A number of legal cases on AI have addressed this from a technical point of view (Vincent, 2023), with artists arguing that AI text-to-image generators use ill-gotten training data to mimic particular artists' styles to *"generate digital images and other output that are derived exclusively from the Training Images, and that add nothing new"*, while advocates of AI generated art argue that such tools are *"'transformative' enough to not violate copyright laws"* (Chen, 2023).

While the problem of technology companies taking the world's data to train their AI algorithms has been much discussed (Wong, 2023), the result of this is that a wealth of AI-generated data now exists. There are known practical problems with the entanglement of AI-generated and 'authentic' data, where training AI models on AI-generated data leads to the deterioration of those models (Franzen, 2023) and with the limits of generative AI to produce new outputs instead of copying existing ones (Carlini et al., 2023). The consequences of training models on AI-generated text (and art) may mean that *"the algorithmic underpinnings of society will operate on a textual knowledge base that is more and more artificial, its origins in the ceaseless churn of the language models"* (Kirschenbaum, 2023), and this is potentially an existential threat to the creative industries, as well as our overall information environment.

6.2 Data use

There are concerns over bias in training data, algorithms, and their implementation being used to perpetuate and exacerbate existing power structures and increase inequality gaps. The massive training datasets used to power OpenAI's DALL-E 2 are not visible to the public while Stable Diffusion's transparency around their datasets is hampered by the size and complexity of the data, making it difficult for individuals to download and search (Baio, 2022). The ethics of where training data is sourced has proven problematic. There has been a pattern of tools, apps, and platforms duping users into contributing training data through low grade perks (Mattei, 2022; Vincent, 2020). The first lawsuit has been filed against OpenAI over the legality of its data acquisition (Creamer, 2023). Moreover, the idea that data and the classifying activities required by AI technologies can be objective is problematic (Bowker & Star, 2000; Feinberg, 2023).

"My concerns are around genericness of style, looking like creativity but just actually parroting. A potential flattening of creativity"
SURVEY PARTICIPANT 30[54]

"Can AI be creative?"
WORKSHOP ED

54 Quotes from participants are either attributed to individual survey participants, with an id number, or to workshop participants (ED = Edinburgh, DD = Dundee), from whom data was collected in aggregate.

"Who owns data?"
WORKSHOP ED

"My main concerns are: datasets used in machine learning (whether they are representative, what data they contain, how they are annotated); who builds the machine learning systems, who makes the decisions, who has control, and whether diverse voices are represented in these processes"
SURVEY PARTICIPANT 16

6.3 Ethics

Ethical issues surrounding creative AI extend to the creation of datasets as well as the implementation of algorithms using those data. The creation of massive training datasets, often comprised of data scraped from the internet without consent, raises challenging issues of issues of IP and copyright. In addition to these issues of fairness in the sense of legal protections and data protection are issues of inequality, representation, and bias. In a recent example, the 2023 writer and actor strikes in Hollywood were in part related to ways in which AI technologies could hamper hard-fought diversity battles and potentially *be used by studios to generate 'diverse' content without actually having to work with a diversity of artists"* (Beckett, 2023).

AI also perpetuates dangerous biases and concentrates and broadcasts them (Crawford, 2021; Fry, 2018). This bias doesn't just come from the data, but also from who is coding and training the systems, as there are both direct and subconscious biases in the populations who tend to develop AI systems, which are feeding into perceptions of privacy, fairness, and inclusivity in the resulting systems (Nicoletti & Bass, 2024; Small, 2023).

"What makes it ethical?"
WORKSHOP DD

"Concerns about the perpetuation and amplification of harms to marginalized communities due to the social biases engineered into AI/ML technologies"
SURVEY PARTICIPANT 13

6.4 IP and Copyright

Many of the regulatory and legal issues surrounding AI technologies arise from friction with existing systems of intellectual property and copyright relating to both training data and the outputs of AI models. Companies who are building generative AI tools, like OpenAI,[55] which provides ChatGPT, are accused of a lack of transparency about the source of their datasets (Gowran, 2023) and of *"committing mass copyright infringement"* (Choudhry, 2023). Legal challenges are gathering, such as authors suing OpenAI for training their ChatGPT tool on copyrighted literary material without consent (Capoot, 2023; Italie, 2023). The fast pace of AI growth has left legal reform around copyright and IP reform around digital asset classes struggling to keep up (Terras et al., 2024).

Our own pilot projects have had to explore the very non-trivial complexities of navigating Intellectual Property Rights in the context of AI, including generative AI. Those complexities include understanding the IP of training data underpinning code that may be being used/ reused, rights and licensing of the code itself, the data being used in the current application, and how IPR of the resulting outputs can and should be treated, including how it can or cannot be used. This is all further complicated when the data sets at play are in copyright and exist in complex historical rights licensing systems, which often have a wide range of owners / licensees depending on the geographical territory or particular usage type - which global AI and data systems can particularly challenge. As evident in both the policy conversations and the lawsuits, there is also a matter of how one chooses to take any legal action, which jurisdictions apply, and what the variations in their IP law look like. The relationship between data, software, and resultant content is much more complex and opaque in AI contexts.

"Ethical concerns around lack of consent gathered for collecting and using the data that powers AI/ML technologies"
SURVEY PARTICIPANT 13

"What are the copyright implications for AI-generated materials?"
WORKSHOP ED

6.5 Labour

There are fears around replacing creative jobs with AI technologies. This is both a local and a global issue. Outsourced workers who were previously able to make a living selling their writing and artwork on freelance job websites now have to compete with the speed and lower costs of AI-generated output (Deck, 2023), affecting all areas of the world, but with particular consequences for the areas where income is low and labour is cheap. In Scotland and the rest of the UK, the capability of AI to generate routine graphic design work, for example the production of logos, that is 'good-enough' is an existential threat to local creative roles and can potentially trigger a global reappraisal of how to define and value creative work. Though arguably this & similar creative work was already challenged by "we weren't calling it AI at the time" software tools like Canva.

"I think there needs to be a level of awareness and caution around AI. Make sure it becomes a useful tool, but doesn't immediately pose a threat as replacement for job roles and personnel."
SURVEY PARTICIPANT 26

"people should value human creation, but if it's cheaper and quicker people will use it without thought."
SURVEY PARTICIPANT 1

6.6 Standards

There are a lack of protocols and standards for the use of AI. This affects technical interoperability, but also governance. Until recently, AI had *"no formal professional governance structure or norms – no agreed-upon definitions and goals for the field or standard protocols for enforcing ethical practice"* (Crawford, 2021, p. 224). AI strategies from Scotland,[56] the UK,[57] and European Union[58] are beginning to address some of these concerns, especially the UK's AI Standards Hub[59] and the Centre for Regulation of the Creative Economy.[60] Further afield, AI and Creative and Cultural Industries (CCI) is the first policy area being addressed by the EU-funded EKIP: European Cultural and Creative Industries Innovation Policy Platform project.[61]

"Governments need to be involved to decide on what's allowed. There needs to be more conversation about these topics"
SURVEY PARTICIPANT 3

"Government legislation is needed to get companies to comply with ethical standards. Arts unions are way behind with knowledge and lobbying in this field."
SURVEY PARTICIPANT 18

6.7 Sustainability

AI technologies often have a significant environmental impact, especially when training models on large amounts of data. *"Data centers are among the world's largest consumers of electricity"* (Crawford, 2021, p. 43) and in addition computers require rare earth minerals, the mining of which often generates harmful waste products and endangers the lives of those doing the mining. Additional challenges come from the lack of transparency around energy use. The environmental impact of AI depends on how the AI works, which is so opaque in most cases, that it feels far removed from fossil fuel consumption. There is a disconnect between energy production and the products of AI that require huge energy to produce, that it is near impossible to understand the carbon footprints of that processing.

"I think from a national sense it's important to consider the infrastructure involved in supporting AI and the importance of connecting that with the energy sector"
SURVEY PARTICIPANT 11

"environmental impacts of LLMs (Large Language Models)"
WORKSHOP ED

56   *https://www.scotlandaistrategy.com/*
57   *https://www.gov.uk/government/publications/na-tional-ai-strategy*
58   *https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence*
59   *https://aistandardshub.org/*
60   *https://www.create.ac.uk/blog/2023/09/07/prior-ities-for-generative-ai-regulation-in-the-uk-cre-ate-response-to-the-digital-regulation-coopera-tion-forum-drcf/*
61   *https://ekipengine.eu/policy-areas/*

7 WORKSHOP EXAMPLE: GLAZE TRACE

Here we describe one of the projects proposed by the workshop participants during the speculative design activity as an example of how these concerns work together. Group 5 from the Dundee workshop came up with a design for an AI tool to generate recipes for the glazes used in ceramics, called Glaze Trace. The tool would take in data about glaze ingredients, glaze properties, the kiln temperatures required to fire the glaze, and the opinions of ceramicists about the glaze results. It would then suggest glaze recipes optimised for the effect desired, the sustainability of the ingredients, and the energy required to heat and cool the kiln. The tool could act as a repository for historical recipes and techniques, and a way to develop new and innovative recipes and approaches.

This proposed project highlights some of the potential benefits of using AI technologies within creative practice by minimising environmental impacts and raises some questions around what might be lost if more experimental processes are abandoned. The group asked what the effects might be of using algorithms to optimise creative processes where the outcomes may lead to artists losing their *"unique sig[nature]s"*.

Finally, the group emphasised both how the tool would need to be sold to the ceramicists who would use it as the *"benefits would need to be explained to persuade recipe holders"* and the customers who would buy their pottery, they suggest by *"create[ing] a narrative of unique craft and artisan values"*. This group calls for both educating creative practitioners and the education of those in the creative industries on AI technologies and consumer awareness, which factors into the values of goods and services and an understanding of (human and/or AI) creativity in the process. It is not clear what the business model for such a tool would be, nor who would pay for and sustain such a tool for the creative sector if it supports a relatively niche community. The issues raised by this group reflect those of the wider workshop participants around AI literacies, creativity, labour, and sustainability.

# 8 BARRIERS TO USING AI IN THE CREATIVE INDUSTRIES

Via our survey, we also consulted the creative sector about any barriers they faced to using AI, including accessing funding and accessing training, in order to see where there may be opportunities for intervention. The media presentation of AI is often sensationalist, painting it as impossible to understand (Mittelstadt & Wachter, 2023). These discourses impact individuals' perceptions. Simultaneously, international investment in funding programmes, skill and research on AI are uneven. These factors make it difficult for creatives to navigate the realities of AI as a threat or opportunity.

8.1 Barriers to Using AI

When asked about possible factors preventing them from using creative AI, the most common barriers identified by the survey participants were: access to tools and software, time, funding, training, concerns around privacy / ethics / legality, and having the requisite skills (see Figure 3). Other barriers mentioned were access to compute, lack of clear career paths, and availability of training at flexible times.

FIGURE 3

BARRIERS TO USING AI IN THE SCOTTISH CREATIVE INDUSTRIES
(FROM 30 SURVEY PARTICIPANTS)
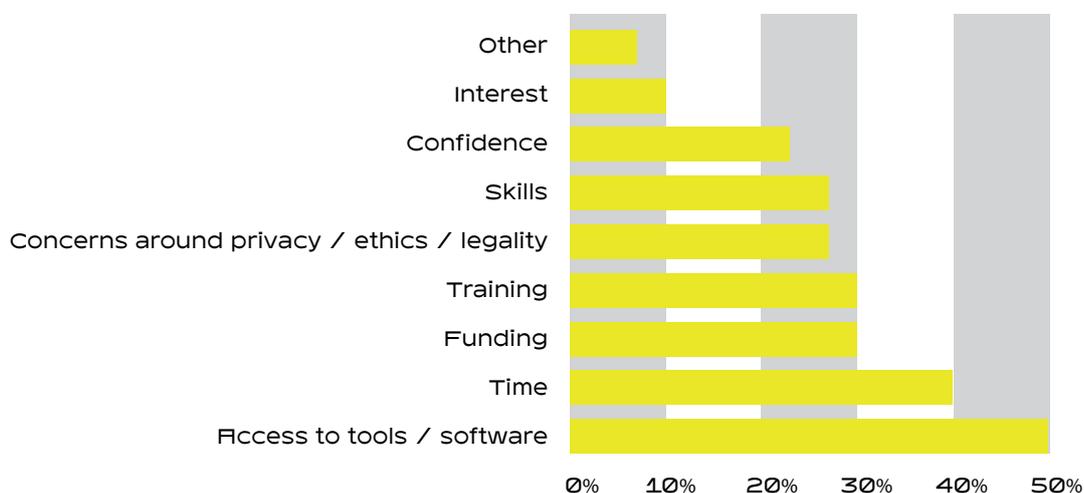
8.2 Barriers to accessing AI training

We asked for more details about any barriers to accessing training and the most common issues were: lack of funding, lack of time, uncertainty about which training to pursue, and lack of information about the training available (see Figure 4). We attribute some of these specific needs to the large number of freelancers and SMEs in the creative space. Creative freelancers make up around 32% of the creative workforce in Scotland and 16% of the UK creative workforce (Connell et al., 2022, p. 4), and their added precarity means that they often do not have the time or funds to devote to training, apply for opportunities, or even undertake horizon scanning. Other issues raised were difficulties in finding training at more advanced levels and choosing which AI training is most applicable to creative work. One participant wrote of feeling *"Overwhelmed ...I need help understanding what I can learn from creative AI specific trainings vs where developing other skills to bring into my AI use would have a bigger impact"* (Survey participant 19), suggesting that training options are available but navigating them is difficult.

FIGURE 4.

BARRIERS TO ACCESSING AI TRAINING FACED BY SCOTTISH CREATIVES
(FROM 30 SURVEY PARTICIPANTS)
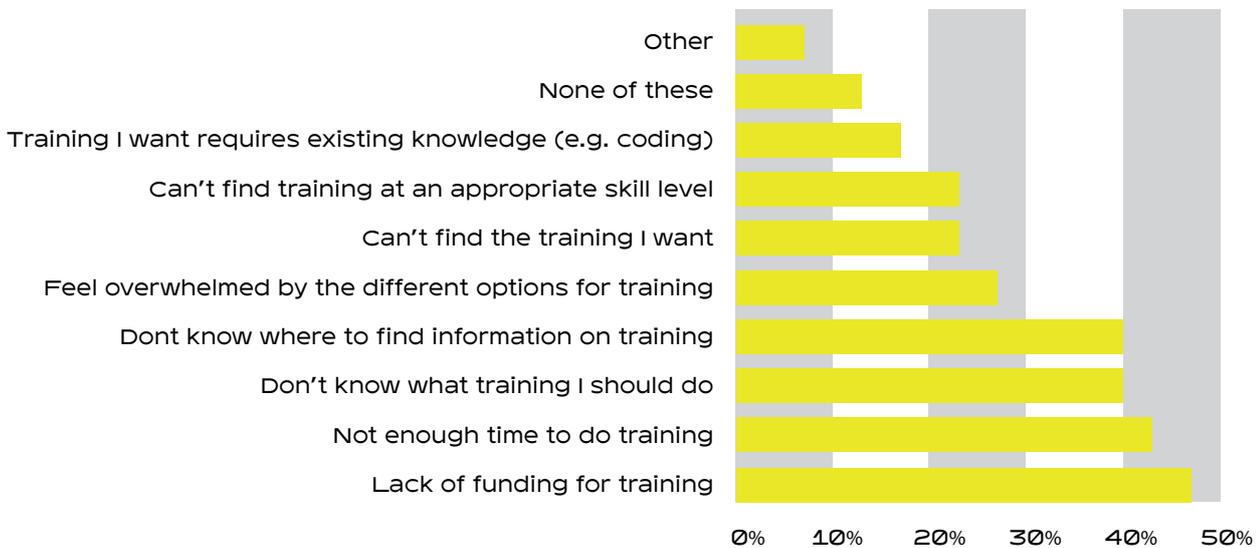
8.3 Barriers to accessing funding for AI

Additionally, we asked about barriers to accessing funding for creative AI and machine learning projects, with the most common responses being a lack of awareness about funding opportunities, the limited applicability of existing opportunities, and complex application forms (see Figure 5). 30% of participants mentioned other barriers, and these included the small value of many funds, limited eligibility criteria (including requirements around citizenship), the time it takes to generate application material (especially when not supported by full-time employment), lack of clarity on whether funders are open to creative applications of AI, and issues faced by disabled applicants including those who are neurodiverse who may have difficulties in communicating the value of their projects in written applications or in-person interviews.

FIGURE 5.

BARRIERS TO ACCESSING FUNDING FOR AI FACED BY SCOTTISH CREATIVES
(FROM 30 SURVEY PARTICIPANTS)
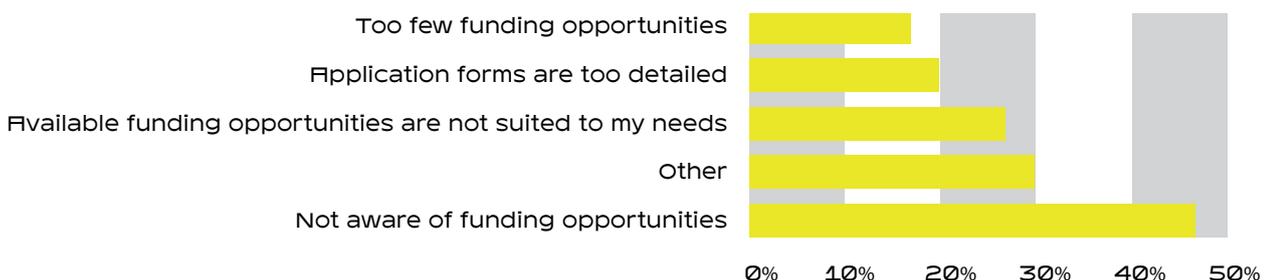
9 PILOT PROJECT CASE STUDY 1: BEARHAMMER GAMES LTD

About the team

BearHammer Games Ltd, founded by Brian Allen in Edinburgh, make video games with virtual reality (VR). They are currently developing a new VR rhythm game where the player's own music can be uploaded to shape the gameplay.

For more about BearHammer, see *https://bearhammergames.com/projects*

About the project

BearHammer applied for funding to help integrate music into their VR rhythm game. They aimed to use AI to speed up the development process by building a tool to identify the beats and movements of music, which can then be used to create new challenge maps. To achieve this, they used their Creative AI Demonstrator funding to hire a dedicated developer, Octavia Lea[62], a software developer and Abertay University graduate. Octavia, in the role of gameplay programmer, designed and created an internal tool to analyse music using AI and speed up development of assets for the VR game. The creation of this tool has enabled the team to speed up production, allowing them to quickly iterate upon prototypes of the game and, from this prototype phase, have attracted further funding.

62   *https://www.linkedin.com/in/tavicodes/*

What support in creative AI did you value the most?

BearHammer appreciated the access to wider networks that was enabled by working with Creative Informatics, particularly around opportunities to share their products with potential audiences and investors.

What other support is needed?

BearHammer spoke of the importance of collaboration in creative AI cohorts such as our pilot funding call, and for keeping up with advances in AI technology:

"I think a regular communication channel like e-mail newsletters of relevant examples/market research could help"

Additionally, they pointed out the value of the right forms of collaboration:

"My recommendation is that funding bodies would do well to earmark certain funding that requires another studio to work directly with another studio at a similar growth stage. The absolute best thing we've done to push things forward on this project and our future work was collaborating with Yaldi Games who were able to help us with new techniques on the art side and in turn learn from us some new techniques on the programming side."
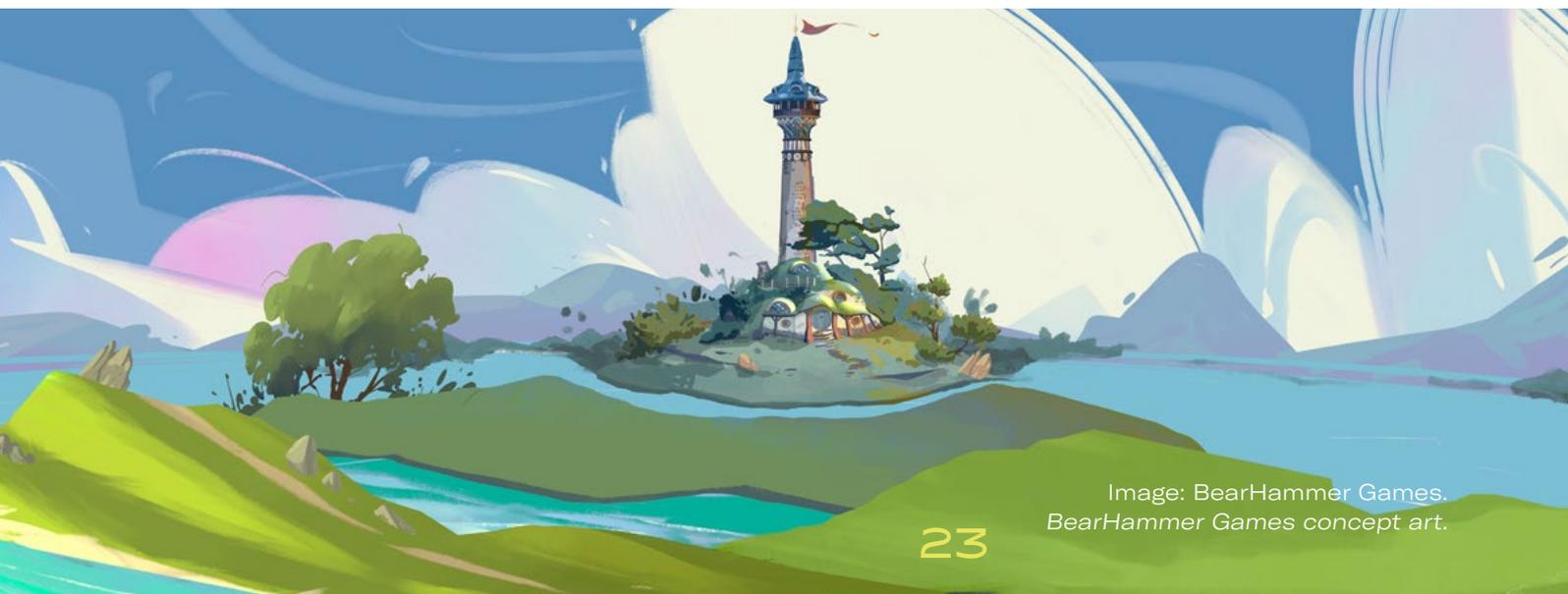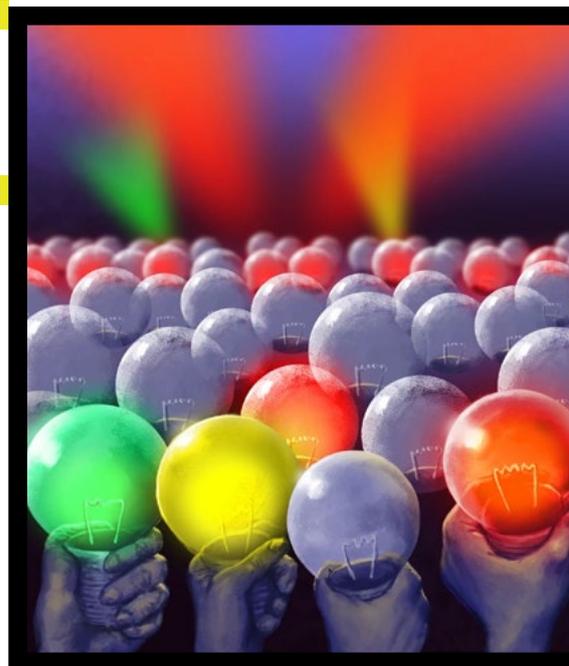

Image: BearHammer Games.
BearHammer Games concept art.

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10 PILOT PROJECT CASE STUDY 2: BLACK GOBLIN

About the team

Black Goblin, a sound design and technology company founded by Ana Betancourt and Gabrielle Haley, were awarded funding to work on Thol, a software that uses AI to generate and apply audio to video.

About the project

Thol is a design suite that uses machine learning to generate sound effects to accompany moving images. Their demonstrator project was focused on solving some of the difficulties around creating layered ambient sounds, which can be complex in locations such as coffee shops or public parks. During the demonstrator they created datasets necessary for creating these soundscapes.

What support in creative AI did you value the most?

Ana Betancourt, of Black Goblin, valued the potential for collaboration:

"I have been really privileged that beyond the financial support that Creative Informatics has offered to continue with Thol's development and research, the contacts, introductions have yielded as many benefits allowing for opportunities to showcase and talk about our work and as a result potential collaborations."

She also expressed the value in a small amount of funding in getting the project and the company to a more advantageous place with

"better chances than ever before to further fundraise to finish development and market test our tool".

What other support is needed?

Ana spoke of the constraints that come with small funding pots which, although welcome, *"does not allow for a significant amount of work to be conducted"*. She described this as being of particular relevance to creative AI where *"the most important resource is skills and people"* and suggests that one solution may be *"paid collaboration either with academics or departments within university"*.

For more about Black Goblin, see *https://www.blackgoblinaudio.co.uk/*

Ana Betancourt, Black Goblin

11 RESOURCES AND SUPPORT NEEDED BY THE CREATIVE INDUSTRIES

Those we consulted in the survey and workshops had ideas for how to mitigate some of the above concerns by implementing: Adequate IP and copyright legislation; AI literacies for the Creative Industries and the Public; Collaboration; Funding; Infrastructure; Standards and Governance; and Training.

11.1 Adequate IP and copyright legislation

Working with AI brings specific legal challenges to safeguard the rights of creative workers in the variety of legislative contexts at play, such as different definitions of 'fair use'. IPR legislation is designed to protect both the rights and the revenue potential of creatives. However, by circumventing IPR, AI threatens to bring about a loss of revenue for individual artists and a wider devaluing of artistic contribution as replicating artistic styles through easy and automated generation takes precedence over originality of work or aesthetic value. Creatives need regularly updated guidance in this rapidly changing space.

"There's a need to clarify intellectual property rights for AI-generated work"
SURVEY PARTICIPANT 22

11.2 AI literacies for the Creative Industries and the public

Better understanding of AI is needed so that those in the creative industries can make informed decisions. Beyond the creative industries, there was a call for educating the wider public. There is an acknowledgement that AI is already part of the creative industries and must be grappled with.

"Raising public awareness about the shortcomings and dangers with these tools to encourage policy changes"
SURVEY PARTICIPANT 13

"An awareness that AI is coming down the track and therefore I need to become familiar and skilled in using it"
SURVEY PARTICIPANT 29

11.3 Collaboration

There is an understanding that AI cannot be tackled alone and so the creative industries as a community needs to come together and collaborate facilitated by networks with events such as meet-ups, consultations, mentorship, and incubator hubs. Arguably, many of these already exist for data that include AI, such as The Data Lab,[63] but they may not be welcoming enough or well-publicised, or are targeted at technology start-ups rather than creatives.

"Help for creatives who are new to AI to collaborate and learn from each other"
SURVEY PARTICIPANT 6

11.4 Funding

Funding is needed for both projects and for training with minimal restrictions on eligibility for accessing that support, whether from universities or organisations that support tech start-ups. Participants suggested clearer eligibility and evaluation criteria, especially around how funders approach work that combines creative and technological elements.

"Funding with fewer eligibility restrictions"
SURVEY PARTICIPANT 13

63 *https://thedatalab.com/*

11.5 Infrastructure

Access to large compute capabilities is one aspect of the complex dependencies of AI systems, as is access to operational code and training data. Even when projects have the funds for compute it can be difficult to find. We have experienced this with our pilot projects. The only people with ready (supported, or low cost) access to large-scale compute tend to be universities and very large commercial or public sector organisations. Large-scale compute facilities often have restricted access, or operate at scales and costs that mean SMEs and freelancers often cannot access those infrastructures. There are also skills barriers to using this compute as it requires using more sophisticated set-ups than consumer facing tools. Providing access to compute and specialist expertise such as Research Software Engineers (RSEs) – and their creative equivalents – can be effective mechanisms for bigger technology and creative organisations to ensure they are collaborating with and empowering smaller players, stopping AI reinforcing uneven power and economic structures.

"Access or Funding to pay for GPU / Processing Cycles"
SURVEY PARTICIPANT 28

11.6 Standards and Governance

There was a sense that oversight should come from the government level to set and enforce ethical standards. Practical suggestions for more industry and community-oriented approaches included data audits, representation targets, and a publicly appointed advisory body. There are difficulties with supportive guidance documents such as process-based flow charts: who are they created by, do they operate at a national or international level, do they represent an independent viewpoint, or are they designed specifically for creatives? There are also difficulties with codes of practice: Eddie Copeland (2019) finds that they are often too high-level to apply in practice and that they cannot keep pace with the increasing complexity of AI so that maintaining the transparency or 'explainability' of models and decision-making becomes impossible. Copeland (2019) stresses that existing UK and EU legislation covers issues such as *"the right to explanation in any process in which a human is not involved"*, which in theory applies to explaining AI-based decision-making, although he admits that this is untested and further safety provisions are likely needed. Instead, he proposes educating and guiding public sector staff, and we see the value in extending this to the creative sector.

"I think that a simple code of practice would be a good start? A flow chart that determines what kind of practitioner you are, which leads on to provide simple ethical guidance"
SURVEY PARTICIPANT 14

11.7 Training

Training requested included short courses, boot camps, mentoring, university courses at all levels, online courses, workshops, YouTube tutorials, and guidebooks on a range of topics and suitable for all levels of previous knowledge. As a lot of this is already available, there is clearly an issue of overwhelm around where to start with training and scope for intervention to better link up and signpost resources.

"In my experience, it is practical training that is needed most"
SURVEY PARTICIPANT 27

12 RECOMMENDATIONS

Taking into account the needs of the creative sector in Scotland discovered via our project, we set out a list of recommendations for the benefit of all.

1. There is an appetite in the creative industries for more engagement with AI and those in the creative industries should be involved in deciding the direction of AI development, not just as adopters and consumers of AI. Creatives should be involved in AI's creation and implementation.[64]

2. Creative AI that is responsible, sustainable, and inclusive will provide the best outcome for creatives, audiences, the economy, and the environment.[65]

3. Access to training at all levels should be enabled and this would benefit from central coordination. The creative industries need pipelines for education in AI technologies tailored to different levels: from the interested lay person (to enable them to make informed decisions about using AI or supporting businesses and creative outputs that implement AI)[66] to doctoral level courses and beyond to provide opportunities for creative workers to innovate at the forefront of these rapidly changing technologies.

   i. There is a specific need for a focused creative AI training hub that can connect and deliver this training pipeline, drawing on the best existent resources and networks of support.

   ii. Creatives require regularly updated toolkits that provide up-to-date information in key AI areas such as IP and copyright issues, other legal issues, ethical questions, environmental impacts, and data complexities.[67] There will be an ongoing need to support and sustain such resources as the technologies change quickly, and best practices, particularly around ethics, are also in flux. The Scottish AI Alliance have created the Scottish AI Playbook[68] in the form of a wiki; we need a resource that is tailored specifically to the creative industries.

4. Funding is required to support public education on AI, both at a broad introductory level, and for more targeted approaches to the creative (and other) subsectors.

5. Sustained funding for innovative R&D working with AI in creative contexts and organisations is required. While Innovate UK's BridgeAI[69] addresses more developed ideas, there remains a gap at early ideation and exploratory stages that contribute significantly to creative SME and freelancer skills.

6. Access and financial support for large-scale compute and / or strategic pricing structures for SMEs access to publicly funded large-scale compute is required to give creatives the space and capacity to work innovatively as creators and contributors (not just consumers) of AI.

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64 The Creative Industries Policy and Evidence Centre echoes this call for more connection between AI and creative industries policies (Davies, 2020).

65 Bridging Responsible AI Divides (BRAID), led by the University of Edinburgh is one initiative seeking to connect academic, industry, policy, and regulatory work on responsible AI.

66 Such as the Scottish AI Alliance who offer a course 'Living with AI' (*https://www.scottishai.com/living-with-ai*).

67 Resources, such as this briefing for the heritage sector (*https://www.heritagefund.org.uk/about/insight/research/artificial-intelligence-digital-heritage-leadership-briefing*) are starting to appear.

68 *https://www.scottishaiplaybook.com/*

69 *https://iuk.ktn-uk.org/programme/bridgeai/*

7. We recommend the establishment of regional Creative AI hubs to convene those working in this emerging and increasingly important space. Regional hubs would enable brokering of relationships between creative SMEs and freelancers with necessary infrastructure, funding opportunities, training and skills development, and peer support. Working through art schools, specialist AI and computer science departments, and commercial partners would strengthen the reach and impact of these hubs, mirroring partnership models proven in the Creative Industries Clusters Programme.[70]

    i.   We suggest that the UK's National High Performance Computing system[71] expand its remit to support the UK's leading creative industries, and practitioner training and education.

    ii. Connecting and maintaining networks of stakeholders involved in these will be key. We support the establishment of collaborative communities to connect those from the creative communities with funders, industry representatives, policymakers and audiences / consumers.

    iii. Our project has already begun to develop a network of those in the creative industries who are engaging with creative AI throughout Scotland, working with the Scottish AI Alliance. We recommend building upon this with regional and national hubs.[72]

8. In order to stimulate skills, products and wider economic development for ethical creative use of AI in the UK, we recommend funders consider supporting cross-sectoral innovation. This will have particular success in combining the dynamism of SMEs, the leading research and ethical groundings of academia, and the expertise and resources of larger organisations (e.g. the depth of cultural knowledge and digitised assets of the GLAM sector, or the emerging AI applications and R&D teams of larger organisations). Funding ambitious collaborations, complemented by early-stage ideas that stimulate SME and creative freelancers to ideate and innovate, has the potential to make a significant positive impact on the capabilities, credibility, and economic benefit of responsibly applied AI in the context of creative industries, and the wider UK economy.

9. Transparent governance[73] needs to be put in place to set and maintain standards on ethical, legal and policy matters, by government, institutions, industry bodies, and creative communities.

    i.   We suggest a consultation into whether an AI code of practice (or more than one) is wanted by the creative industries, and how it would work in practice.

    ii. If codes of practice are wanted, we suggest further consultations with artist-led and creative-led organisations (such as the Artists' Union, the British Interactive Media Association, Creative Edinburgh, Creative Stirling, Equity[74]) to co-create them.

70 https://creativeindustriesclusters.com/

71 https://www.epcc.ed.ac.uk/hpc-services/archer2

72 In Scotland, this may link into the Techscalar programme (https://www.techscaler.co.uk/).

73 There is currently a Global AI Regulation Tracker that allows comparison of regulations by different countries (https://www.techieray.com/GlobalAIRegulationTracker.html).

74 https://www.artistsunion.scot/; https://bima.co.uk/; https://creative-edinburgh.com/; https://www.creativestirling.org/; https://www.equity.org.uk/

10. We need protections for creative workers and creative work as there are fears that creative AI challenges both creativity and creative jobs.

   i. The UK government is already considering this (Intellectual Property Office, 2022) and IP law will likely have to evolve as our use of these technologies develops.

   ii. There is a need for unions representing creatives and creative work to become quickly informed on the opportunities and threats of AI in order to ensure employment contracts and agreements over IP reflect current threats and potential use of data and creative work. Building on the SAG-AFRA actions that have brought AI in the context of acting and screen writing into widespread public discourse (Weiss, 2023).

   iii. We recommend the funding and distribution of example agreements and template contracts for creatives that accommodate AI, so that creatives are able to appropriately represent themselves as they enter new agreements, freelance arrangements, commissions, etc.

   iv. We suggest clear labelling practices for work created using AI and metadata standards to help train computer systems – and allow consumers – to know the difference, such as those developed by the Coalition for Content Provenance and Authenticity (C2PA).[75]

11. Institutions and organisations that steward the outputs of the creative industries (such as Galleries, Libraries, Archives, and Museums, as well as publishers, commercial art galleries, etc) need to become aware of the opportunities and threats of AI in order to protect existing and emergent creative work.

While this paper focuses on the Scottish context for creative AI, these are technologies with a global reach and many of the key challenges and needs of creatives in Scotland are mirrored elsewhere. This paper therefore contributes to a global conversation around the use, regulation, and material consequences (for creative workers, for labour forces, for the environment) of these technologies.

13 REFERENCES

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