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### Digital and data literacy

**Citation for published version:**

Osborne, N, Helgason, I, Lechelt, S, Michielin, L, Panneels, I, Parkinson, C, Smyth, M, Ross, J, Sulaiman, Y & Warren, K 2024, Digital and data literacy: Models for data training and upskilling for the future creative industries. in M Terras, V Jones, N Osborne & C Speed (eds), *Data Driven Innovation in the Creative Industries*. Routledge Research in the Creative and Cultural Industries, Routledge, Abingdon, Oxon, pp. 71-100. <https://doi.org/10.4324/9781003365891-4>

**Digital Object Identifier (DOI):**

[10.4324/9781003365891-4](https://doi.org/10.4324/9781003365891-4)

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Publisher's PDF, also known as Version of record

**Published In:**

Data Driven Innovation in the Creative Industries

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# 4

## DIGITAL AND DATA LITERACY

Models for data training and upskilling for the future creative industries

*Nicola Osborne, Ingi Helgason, Susan Lechelt, Lucia Michielin, Inge Panneels, Caroline Parkinson, Michael Smyth, Jen Ross, Yasmin Sulaiman, and Katherine Warren*

### Abstract

In this chapter we explore models for training and upskilling people in the creative industries in data, technology and entrepreneurial skills, situating this in the wider skills and training context. We will particularly look at the challenges of delivering training in the creative sector where innovation and problem solving are core skills, but capacity for continuous professional development is frequently limited by the nature of employment/freelancer working and existing data and business literacy.

We will consider how contemporary perspectives on learning, for example, those that see learning as emerging from within an assemblage of people, technologies, networks, spaces and other objects and actors (Fenwick, 2011), can help explain the ways that activities and interventions, such as those developed for the Creative Informatics programme, can generate conditions for individuals, teams and local networks to become part of flows and structures of skills development. Concepts of scaffolding (Vygotsky and Cole, 1978) will be brought together with these perspectives to explore the blends of formalised training offers and informal learning and reflection that emerged through the research and development process. In the context of start-up communities, informal and often precarious work, and cluster environments where diverse skill sets are sought and delivered across local networks, the blurring of boundaries and cross walking of language amongst peers is particularly notable. We consider what the Creative Informatics (CI) and the UKRI (UK Research and Innovation) Creative Industries Clusters Programme (CICP) contexts reveal about productive methods and pedagogies

for the future delivery of skills and training in complex networked contexts, with particular discussion of mechanisms to support those practitioners who work outside of large organisations and therefore rely on self-directed learning. In particular, we show that scaffolding – as part of a research and development (R&D) journey – can be a part of training and support, albeit one that is not often mentioned in prior literature in this space.

## Introduction

Practitioners in the creative industries (as in many areas of the economy) operate within the context of an increasingly rapid pace of digital transformation that is changing how they develop, produce, and distribute their work. In the United Kingdom, the term ‘CreaTech’ (Tech Nation, 2021; Siepel et al., 2022) has come to describe this intersection where creative skills meet emerging technologies. The consequence of this disruptive digital shift is an increasing pressure on those working in the creative industries, whether as employees, freelancers or as micro businesses,<sup>1</sup> to continuously acquire new technical skills and build upon existing proficiencies for creative production, collaboration, innovation and dissemination. This shift has been part of a longstanding process that looks likely to continue and accelerate, with opportunities – as well as gaps in skills and confidence – particularly highlighted by rapid shifts and innovative experiments in digital-first and ‘hybrid’ work in response to the COVID-19 pandemic.

The impact of new technologies, resultant changes to business and employment models and changing perceptions and value of creative work also intersect with funding challenges specific to the creative sector, including reductions in state funding for arts organisations and works (Shaw, 2023; Behr, 2022; Sharratt, 2023; Morgan, 2023a, 2023b) and challenges in funder and investor understanding and/or incentives to invest in creative businesses (Di Novo, 2022; Andrews, 2022; Callanan, 2021), despite the economic and social impact of creative industries (Creative UK Group, 2021; Aspen Global Innovators Group, 2018). It is in this complex and dynamic context – which presents both rich opportunities and significant threats to creative practitioners – that we explore the role of skills and training models for the current and future creative industries.

Additionally, in the UK, the economic growth of the creative industries relative to other sectors has highlighted the importance of creative skills, talent and agility to the economy (Bazalgette, 2021). The value of creative skills and roles is also recognised as having important ‘spillover’ benefits to other industries and areas of the economy (Frontier Economics, 2022; Design Council, 2022, see also Chapter 3), and (despite the emergence of generative AI (see Chapter 9) and other forms of autonomous creation of IP), it is predicted that “combinations of creative and digital skills will become more valued by employers in the future” (Bakhshi et al., 2019), suggesting a range

of additional benefits arising from effective training and development of such CreaTech skillsets extending significantly beyond traditional creative sectors. We will explore some of the key skills and literacies required for creatives to engage in this new space, and we will reflect on how the nature of creative businesses and this rapidly changing technology context shapes the types of training and development approaches that have most impact. We identify particular barriers and opportunities specific to the creative industries, and we discuss training models operating at scale through the Creative Informatics programme (introduced in Chapter 1 and considered throughout this book), reflecting on their impact and efficacy.

### **Skills development and the nature of creative employment**

The creative industries workforce is disproportionately comprised of individuals or micro enterprises, including freelancers, self-employed and temporary workers. In the UK approximately 94% of creative industries businesses are classed as micro-businesses (fewer than 10 staff) (Creative Industries Council, 2021), and about a third of the industry is self-employed (including freelancers) (Easton and Beckett, 2021), although we also note that there are ongoing issues around data collection and associated understanding of this workforce (Panneels et al., 2021). Whilst some creative subsectors and specialisms make use of more formal continuing professional development routes, sometimes tied to formal accreditation pathways (e.g., architecture), many creative practitioners lack a structured approach and formal support network to enable development. Awareness, access and upkeep of data skills, such as technical and digital training, can be particularly challenging to access and maintain (Parkinson et al., 2020), and adoption of data skills may benefit from reframing as more accessible ‘creative data literacy’ approaches (D’Ignazio, 2017) and consideration of data literacy capabilities as a broad skillset shared across a community (Matthews, 2016).

Creative employment can be defined as both ‘occupations in the creative industries and creative occupations in other industries’ (Comunian et al., 2021), and the technologies that are adopted by creatives are therefore influenced by the standards and norms within their own workplace or sector. This in turn influences the skills that they need proficiency in. For the individual practitioner, there may be extra steps involved in finding out about technologies and skills that are relevant to their practice, including social influence and peer support (Palani et al., 2022). Additionally, training and development opportunities (even when provided free at the point of use) can present significant financial barriers and ‘opportunity cost’ for freelancers, self-employed and micro-SME (small and medium-sized enterprise) employees, as they represent time that cannot be billed to any client. Individuals are thus either entirely unpaid to upskill, or costs need to be embedded in the creative’s business model and pricing of work for other projects or clients. These

challenges can be exacerbated by gaps or exclusions in the funding environment (House of Lords Communications and Digital Committee, 2023) by the short notice nature of freelance creative work (Ozimek, 2021).

Current specialist trends affecting the creative sector include virtual production (VP), extended reality (XR) technologies and the emergence of artificial intelligence (AI) (Davies et al., 2020). Recent rapid developments in AI have seen this technology becoming more directly involved in the development of creative content, although its full impact and potential are as yet uncertain (Anantrasirichai and Bull, 2021); there are emerging skills demands (Lassebie, 2023) and specific creative funding opportunities in the AI space (Browning, 2023). Creative practitioners can be proactive and motivated by their own curiosity and passion to stay informed, or there can be specific learning needs and purposes identified that they need to attend to (van Laar et al., 2022, p. 202). However, for the creative practitioner, the acquisition of specialist technology skills is only part of the story, and even that can be a complex undertaking (Helgason et al., 2023). Knowing which technologies to invest time and resources into learning, and to what level of proficiency, along with keeping up to date with broader technological developments that may impact the practitioner's business, are all substantial challenges, especially for those creatives who lack the infrastructure of being part of a supportive organisation or large enterprise.

Chapter 2 in this book specifically discusses the importance of supportive ecosystems and networks to support and enable data-driven innovation, and furthermore, networks have been proven to support economic sustainability in the creative industries (Bakhshi et al., 2013; Komorowski et al., 2021). In addition, with a focus on shared creation and collaborative activity, 'communities of practice' as described by Goodwin (2019) and (in the context of start-ups) by Cartland and Maras (2023) can be viewed as a form of social learning environment relevant to the creative industries that promote the development of self-efficacy for their participants and members.

The role of ecosystems and networks, and formal training opportunities, are highly connected to other factors in developing creative careers and practices. As in other informal learning contexts, creative skills are often nurtured through the building of creatives' own socio-material 'assemblages' of resources – the information, resources including places and tangible things, the people and the communities that all combine and interact to produce skills, expertise and professional identity/ies (Fenwick, 2011). Whilst these (usually) self-led tactics are well established by creatives in developing their skills and knowledge in their own domain, to gain understanding, skills and potentially mastery of digital and CreaTech skills, there is a need for them to venture into (often) unfamiliar technical domains with their own cultures, languages and ways of discovering and problem solving. Creatives must find a way to navigate 'polycontextuality' and boundary crossing (Engeström,

1995), working across complex and parallel areas with limited shared vocabularies and processes.

### **Understanding confidence and literacies gaps across disciplines**

Skills, training and knowledge acquisition are crucial for creatives seeking to work with data, data-driven approaches and new technologies. However, for many creatives seeking to expand, pivot or develop their practice, one of the biggest challenges across creative and technical worlds is having the confidence to cross the boundaries of their home discipline or practice in the first place. Our own observation, drawn from the Creative Informatics programme, is that this issue of confidence is not limited to creative practitioners but is shared by others, including technical specialists who may feel as uncomfortable with the language, culture and processes of creative practices as their counterparts feel about the data and technology sphere. The variances and occasional friction of these differences of approach and experience are a key feature and can be, in ideal circumstances, a benefit of polycontextuality.

As an example of the benefits of a polycontextual creative practice, Creative Informatics<sup>2</sup> alumni Jeni Allison,<sup>3</sup> a knitwear designer, has also developed an innovative business in which customers self-design bespoke knitted products through a web application, which are then produced as one-offs but as part of a scalable, reproducible and environmentally efficient process. The concept has required working across the parallel fields of traditional Scottish textile production and industrial manufacturing, high-end knitwear design and software engineering. Each of these fields has distinct practices, values, languages and cultures, but Jeni's business model produces (positive) disruption and a new business model by viewing key luxury knitwear challenges through a polycontextual lens and reimagining the processes and relationships across design, manufacturing, environmental values and the customer experience.

### **What kinds of skills are needed?**

An often-quoted theory of what it takes to build a start-up originates in a SXSW<sup>4</sup> session from 2012, where Rei Inamoto, who at that time was chief creative officer for ideas and innovation company AKQA, stated that "To run an efficient team, you need only three people: a Hipster, a Hacker, and a Hustler" (Ellwood, 2012). The idea is that the 'Hipster' brings creative talent and ideas to the project – and according to Ellwood "they'll make sure the final product is cooler than anything else out there," and the 'Hacker' is the technical- and detail-oriented talent, asking tricky questions and bringing ideas into fruition; the 'Hustler' is the commercially oriented money and/or salesperson finding the resources and backing to move towards a product to bring to market.

Whilst Inamoto's concept of an efficient team resonates with many in start-ups and larger organisations, for the creative freelancer, micro-SME or very early stage start up, the reality is often that one or two founders need to occupy all three Hipster, Hacker and Hustler roles or to have the skills and know-how to find and manage contractors, and perhaps additional founders or long-term team members, to fill gaps in their capacities. Doing so requires not only the 'hard skills' of data, digital and technical skills and literacies but also a range of 'soft skills' – the collaborative, business, professional, social and communications skills. Additionally these founders need to understand the business of their practice – whilst an element of these skills is now much more common in an art school education, it is also the case that new data-driven ideas and creative businesses, products, services, and experiences often, by their definition, challenge and disrupt existing business models which is only possible when founders hold a sufficient understanding of business models and financial planning but also audiences, markets and pricing.

### Soft skills

The importance of 'soft skills' is well understood in the context of employment settings where skilled, trained workers are required to adapt to the realities and complexities of working collaboratively and across disciplines (Succi and Canovi, 2020). These types of skills can be particularly relevant for creatives who manage their own freelance employment or who run small or medium enterprises. Definitions and uses of the term 'soft skills' vary; it can be used to refer to either learned competencies, to a person's individual traits or underlying characteristics or both. Soft skills tend to be defined as generic, as opposed to specific skills required for particular tasks. They concern working directly with people rather than machines or technology and draw on interpersonal, social abilities and emotional understandings rather than 'hard skills', which refers to tangible, often technical knowledge (Marin-Zapata et al., 2022). There are benefits to defining the concept of soft skills in an inclusive and broad sense, encompassing ideas of ability, personality traits and competence – where a professional has become competent either through training or experience. However, this can also lead to difficulties in defining and designing training and support to fill any soft skills gaps.

The importance of providing mentorship and support to enable employees to gain these soft skills in order to work productively and understand aspects of workplace culture and practices is acknowledged (Fettes et al., 2020). However, for workers embedded within smaller-scale employment practices, alternative strategies must be deployed to fill these gaps in formal mentorship, in-house training and the peer-to-peer and informal learning that can be accessed when part of a large workforce. This applies not only to contextual, generic and soft skills but also to specialism-based skills that need to be kept up to date. Besides formal training provided by the further and

higher education sectors, informal training is often delivered through network organisations, industry bodies or trade associations or through in-house training of small creative organisations and companies in the creative industries who provide great learning and development opportunities for individuals but often cannot retain this trained workforce (Comunian et al., 2021).

We argue that the acquisition of ‘hard skills’ – of technical proficiencies in digital skills – needs to be complimented with ‘soft skills’, and attention also needs to be paid to the concept of both ‘data literacy’ and ‘digital literacy’ (Pangrazio et al., 2020). Freelancers in particular need to be able to understand the terminology and landscape of data and digital skills, even if they do not wish to acquire them all themselves, in order to be able to collaborate or work closely with others, such as technology specialists. The ‘knowing about’ (Parkinson et al., 2020) is thus a critical part of the soft skills and literacy requirements when the acquisition of hard skills is not feasible or preferable. This in turn aligns with the soft skills recognised as part of the collection of general entrepreneurial skills which are critical to innovation for creatives, freelancers in particular.

Looking back, in the UK much professional development training in the late 1990s and early 2000s was delivered through grassroots arts organisations, who “developed bespoke professional practice activity and expertise over a number of years” by providing accessible advice, signposting, personal development (soft skills) and technical skills training (hard skills) (Louise, 2011). The digital skills development at this time focused initially on marketing and sales such as use of social media and web (a-n Editorial, 2010), followed by preserving and archiving, operations, business models, distribution and exhibition and creation (Nesta, 2017) to digital production, rights clearance and data analysis (DCMS, 2018). Digital skills have thus moved from business skills acquisition to include more creative production skills as production technologies have become more available.

Although a significant amount of funding has been invested into the digital upskilling of the UK creative industries since the early 2000s (Unitt, 2019), with longitudinal studies by Nesta evidencing the role and impact digital technology is having for arts and cultural organisations and the concomitant skills requirements (Nesta, 2017) these have tended to focus on creative and cultural organisations rather than freelancers and micro-SMEs. The Department for Digital, Culture, Media & Sport (DCMS) – responsible for supporting culture, arts, media, sport, tourism and civil society across England – outlined the digital skills needs for the cultural sector from basic skills, managing information, communicating, transacting, creating and problem solving to specialist IT skills such as data analysis and programme and system design (DCMS, 2018, p. 31), informed by the Bazalgette Review (Independent Review of the Creative Industries, 2017). Notable digital skills capacity-building programmes did not directly target freelancers (Unitt, 2019).<sup>5</sup> In short, whilst many digital training and skills programmes in the past decades



have focused on upskilling cultural institutions and creative organisations, arguably freelancers have fallen through the cracks.

### Changes to skills training since the COVID-19 pandemic

The global COVID-19 pandemic changed work practices across multiple sectors and highlighted significant and urgent need for greater digital skills and confidence with digital technologies. Amidst a wide range of UK government-level furlough funding, training and job placement scheme<sup>6</sup> responses to COVID, we discuss two notable interventions in Scotland, one immediate and focused on the creative industries and one longer term with strategic focus on start-ups across the Scottish economy.

In a rapidly deployed response to COVID, the Scottish government supported the £1m Creative Digital Initiative, delivered through XpoNorth,<sup>7</sup> to support Scottish creative and cultural SMEs and micro businesses to develop their digital capabilities. In addition, the Digital Pivot<sup>8</sup> programme managed by Creative Scotland<sup>9</sup> was more specifically targeted at supporting individual creative freelancers to explore the use of, and develop skills in, digital and creative technologies. The definition of ‘digital’ used in this programme is noteworthy; ‘we’re defining digital as the use of technology to connect people with content (not necessarily via the internet). Not to be confused or used interchangeably with *online* or *the internet*’ (Glass, 2021, p. 5).

Looking more strategically and long term, the Scottish government commissioned Mark Logan, a noted technology founder and former chief operating officer of ‘unicorn’ startup (a privately held startup with a billion dollar+ valuation) Skyscanner,<sup>10</sup> to look at “how Scotland’s technology sector can contribute to the country’s economic recovery after the COVID-19 pandemic,” resulting in the Scottish Technology Ecosystem Review, published in August 2020 (Logan, 2020). Several specific policy recommendations emerged from the report, including the requirement for a ‘Tech-Scaler National Backbone’ which would provide “long-term, affordable, high-quality incubation space” for start-ups and “free high quality foundational start-up education” (pp. 67–68). The Scottish government committed £42m in funding, and the Techscaler contract was awarded to CodeBase,<sup>11</sup> originally a technology incubator and now an organisation supporting technology start-ups and innovation. CodeBase are a core partner in the Creative Informatics programme, and we talk later about the training approaches developed for creative industries start-ups there, which have subsequently fed into this national-scale work.

We suggest that the need for training and skills acquisition which emerged in the wake of the pandemic accelerated a digital pivot which was already emergent but that this shift was also the result of policy interventions rather than only the grassroots-up emergence of professional training for creatives.

We note that the higher education (tertiary education) sector is moving into the space left vacant by grassroots organisations (due to changes in funding) as higher education institutions are often the mechanism through which these skills development priorities are now being delivered. The UKRI UK Creative Clusters programme<sup>12</sup> and Audience of the Future programmes, delivered through universities and research organisations in partnership with industry bodies, are key examples of this: the clusters support research and development activities through funding, and this is also accompanied by the delivery of informal or formal training programmes.<sup>13</sup>

### **R&D as a locus for skills and continuous professional development**

Whilst skills and training are often funded as discrete activities through structured programmes or networks, R&D activities are also, in and of themselves, a form of learning and capacity building, although the literature addressing this tends to focus on R&D in the context of engineering and heavy industry (e.g. Sagar (2006) in the context of innovation in the energy sector). In their report, “Creative Futures: Building the Creative Economy through Universities,” Atton (2008) argues that creative university education needs to incorporate ‘learning by doing’ and teaching that includes ‘research-like’ projects that foster greater entrepreneurial and business skills. R&D as a form of learning has particular relevance in the context of arts and creative industries where a significant proportion of (academic) design and arts research is *practice-based* or *practice-led* (Candy, 2011) in form. The training for many creative roles and careers, from fine arts and crafts through to software development for digital gaming, often takes a form familiar as a type of apprenticeship and guided and scaffolded multistage development towards a level of expertise, moving from working in lower-level production tasks through to mastery and creative leadership. The exploratory nature of R&D projects and experience of navigating unknowns in creative work clearly provides an excellent structure to support ‘learning by doing’ and practice-based training for creatives at multiple levels of experience, confidence, and prowess. Indeed, in their work on creatives in the Netherlands, Wijngaarden et al. (2019) characterised the role of innovation in the creative industries as a process of ‘continuous renewal’ and a core part of creative economic survival – drawing together key aspects of both R&D and day-to-day creative practice.

However, the lack of literature on R&D as a site for training and professional development for the creative industries may reflect wider challenges to understanding research and development in the context of the creative industries, reflecting the broader issues of sector-specific languages and cultures. In the context of cutting-edge science and engineering, research and development has historically been more easily recognised in terms of protectable IP

and technical innovation – something reflected in issues around broader definitions of R&D (Siepel and Velez-Ospina, 2022; Easton, 2022). By contrast, in the creative industries, research and development can be understood both in these more recognisable technical forms, but it is also the term used by, for instance, performers, writers, dancers, and so on in reference to the development to a new piece of creative work that – despite being new protectable IP – does not necessarily fit the classic science and engineering models around patenting and economic exploitation through licensing and scaling. These specific creative industries forms of research and development may also vary significantly in terms of technological sophistication and novelty, with many being about innovative adoption or forms of creative output. These variances in language and in the form and maturity in the type of innovation may be part of the reason that the crucial role creative R&D can play in development of skills and sector capacity building is often overlooked in the literature, despite the realities of developing new work in the sector. We therefore argue that there is enormous complementarity in providing an interlinked combination of structured training programmes, formal and informal mentorship, R&D for both innovation and capacity building, and scaffolding that provides a holistic framework for supporting the development of skills at multiple levels for the creative sector.

### **Engaging with technical specialisms**

The emergence of the term ‘CreaTech’, used to describe the intersection of creative skills and emergent technology, demonstrates the importance of the rapid changes being experienced across the creative industries. Artificial intelligence and virtual production (VP) are examples of how this technological expansion is affecting creative production and the wider creative sector and creating a need for specialist, often technical ‘hard skills’ (Marin-Zapata et al., 2022). It is therefore useful to consider these areas in more detail with a view to how they might shape skills development and demand in the future.

### ***The rise of artificial intelligence***

Artificial intelligence and its potential for impact on society are now regularly reported on in the UK media.<sup>14</sup> Media stories oscillate between dystopic stories of jobs being lost and the utopia of an AI revolution that will usher in new jobs and opportunities that we can’t yet imagine. Of particular relevance is work that details sections of creative sectors where AI is making inroads in areas once thought to be immune from mechanisation (Davies et al., 2020; Anantrasirichai and Bull, 2021). AI tools such as Midjourney<sup>15</sup> and ChatGPT,<sup>16</sup> used for image and text generation, are now available to the public and are being used in increasingly sophisticated ways. At a professional level, generative AI tools are being experimented with for innovative uses across a

range of creative industries. Against this backdrop of emerging innovations, there is a growing pressure, whether real or perceived, for creative practitioners to engage with the use of AI, or at the very least to better understand its potential for impact on the sector.

### ***Extended reality and virtual production***

Other technologies making a significant impact on creative production include extended reality (XR) and virtual production. XR is a term that includes a variety of technologies that blend our experience of the real world with that of the digital world or immerse us in a fully digital world. These can include equipment and applications that are becoming increasingly familiar, such as virtual reality (VR) headsets and augmented reality (AR) smartphone apps, as well as related emerging technologies that are still in development. Virtual production relates primarily to those in the screen industries drawing on opportunities offered by virtualising technologies to create digital environments. The field is evolving rapidly, making VP difficult to define precisely, but in their report, Willment and Swords (2023) define VP as

a way of making film and television which harnesses computer generated content that allows real-time visualisation and control of the digital environment in which you are shooting. Importantly, virtual environments are captured ‘in camera’, rather than added in post-production.

This industry will require skilled practitioners with knowledge of computerised domains, many of which require not only skills and training but access to technical infrastructure on which to train and experiment in areas including lighting, animation, motion-capture, game engines, XR and LED volumes. In the UK, research and development investment in VP is evident through programmes such as the XR Network+ programme<sup>17</sup> which focuses on setting the research agenda, XRtists: Supporting the Implementation of Immersive Technologies,<sup>18</sup> which includes skills development, and CoS-TAR (Convergent Screen Technologies and performance in Realtime),<sup>19</sup> a network of labs and studios supporting research and development, along with knowledge exchange and expertise. These programmes demonstrate the importance placed on the role of collaborative academic and industry R&D and the importance of upskilling in the strategically important film, TV and games industries for the UK economy.

### ***Creativity support tools: bridging hard and soft skills***

The range of digital tools available to creative practitioners has increased dramatically in recent years, along with the adoption of commercial cloud-based services offered by software providers. Initially these tools focused on

support for producing creative output. For example: Adobe Creative Cloud<sup>20</sup> designed to support media producers, photographers, illustrators and graphics designers and MicroStation<sup>21</sup> and Autodesk's AutoCAD<sup>22</sup> designed to support architects, engineers and product designers working in 3D and also widely used in the games and film industries. The impact of these tools on practice was to enable the creation of more sophisticated representations of ideas and concepts in a shorter timeframe. While formal education programmes at school, college and university levels include training in many of these packages, once a practitioner is qualified, keeping skills up to date becomes part of their own ongoing professional development (and often comes at their own expense). The challenge of maintaining skills is further complicated by the tendency within education to train in 'industry standard' commercial packages available through free or highly subsidised educational licenses (designed to build loyalty in emerging practitioners), which then cease to be accessible at discounted rates after the completion of courses, rather than training with open source equivalents (see e.g., McMahan, 2022). These technological shifts, along with the emphasis on self-directed learning, has increased the requirement of practitioners to become digitally literate irrespective of whether their own creative output has been created wholly or partly using digital tools. In their discussion of the challenges inherent in managing digital transformation in companies, Caputo et al. (2023) assert that, "the weakest factor is the human dimension itself. Indeed, mastering digital transformation requires organisational change and involves a more careful exploration of the human side of change." It is challenging enough for large organisations to support diverse and varied skills within a workforce, but for small and micro businesses, and individual practitioners, the challenge is greater still.

While ideas and theories around novel technology use and acceptance are widely researched within information systems research, there is less focus on the acceptance and adoption of these technologies specifically within the creative industries (Rahimi, 2020). In the research domain of human-computer interaction (HCI) the design, adoption and use of these types of tools, referred to collectively as creativity support tools (CSTs), has been the subject of study. For example, Frich et al. (2019), provide an overview of the range of types and applications of CSTs addressed in HCI creativity research, mentioning the wide diversity of types of tools available, aimed at a range of users from novices through to experts. Investigating the use of technology adoption by creatives, Palani et al. (2022) found that practitioners most frequently mention personal recommendations from friends, collaborators and social connections when discovering tools to adopt. This emphasises how important it is to support and promote networks and communities of practice where creatives can share this knowledge. As Ben Shneiderman wrote in 2002, 'the goal of designing creativity support tools is to make more people more creative more often, enabling them to successfully cope with a wider

variety of challenges and even straddle domains’ (p. 116). Shneiderman’s article stresses the social nature of creativity, emphasising the importance of consultation with others throughout the creative process, including peers and mentors, and dissemination of results for the benefit of other practitioners (Shneiderman, 2002).

### **Reflecting on developing new R&D-oriented training and development structures for capacity building in the context of Creative Informatics**

We have discussed some of the characteristics, opportunities, barriers and challenges around both the current delivery and the conceptualisation of training and development in the creative industries. In the remainder of this chapter, we reflect on the experience of developing and delivering a new complex structure for training and development in the creative industries with a focus on R&D and innovation around data and data-driven innovation for the Creative Informatics programme (2018–2024). We present the following discussion as a collection of key learnings and observations rooted in experience from this publicly funded programme which sought to build capacity through activities offered within a focused regional cluster.

#### ***Overview of Creative Informatics structures supporting informal learning***

The Creative Informatics programme offered a range of mechanisms to support networking and informal, peer-to-peer learning alongside both structured training and R&D activities to develop capacity for work with data and data-driven innovation. The five-and-a-half-year programme, part of the AHRC Creative Industries Cluster Programme (see Chapter 2 for details), was aimed at the local community of creative practitioners in Edinburgh and the southeast of Scotland, with the goals of introducing and inspiring curiosity about approaches to data-driven creative work.

Earlier we discussed the idea that the ideal startup needs “a hipster, a hacker and a hustler” to succeed, something which the Edinburgh region already had through established communities of artists and creatives (particularly given Edinburgh’s relationship to world-leading festivals), huge volumes of technical expertise emerging from universities and industry and a well-established finance sector. Into this context Creative Informatics sought to develop new opportunities for the creative industries by encouraging and enabling better connections, opportunities for dialogue and understanding and collaboration between creative, technical and business expertise through a range of interventions and support mechanisms, including: (a) events, workshops and other accessible awareness raising activities, including CI Labs, CI Studios and Innovation Showcases; (b) formal industry-led digital

start-up training through structured training and skills offerings, primarily a ten-week pre-accelerator programme, Creative Bridge, delivered by industry partner CodeBase and discussed in detail in the case study accompanying this chapter, complemented by funded placements on shorter and earlier stage training courses; (c) structured R&D funding strands for data-driven innovation, including collaborative inter-industry partnership projects (Challenge Projects), industry–academia collaborations (Creative Horizon Projects) and professional development through R&D (Connected Innovators, delivered by membership organisation Creative Edinburgh and Resident Entrepreneurs), as well as equality, diversity and inclusion–oriented R&D investments (Inclusive Capital). These planned programme strands were augmented by a range of support, formal and informal learning, peer learning and scaffolding approaches, as well as parallel small grants for engagement and development of academic researchers.

### **Stimulating and scaffolding engagement in skills development and R&D**

In seeking to bring diverse communities together to create new work, Creative Informatics first had to find methods to convene these individuals and support them to explore and understand each other's practices with a view to the cross-pollination of ideas and potential new interdisciplinary collaborations.

CI Labs<sup>23</sup> were a series of (initially) monthly events (23 in total at the time of writing), attended by between 50 and 100 people, that provided a meeting place for creative industries professionals from diverse disciplines and backgrounds, as well as those working with data and technology, to come together. They typically featured talks, demonstrations and/or live performances from creative practitioners and academics working with data and data-driven technologies in order to showcase inspiring creative work with data and support a broader understanding of what 'data-driven innovation' means. CI Labs usually followed a theme and/or were curated in partnership with host creative organisations and venues across the city.

The events were designed to reduce barriers to participation by being held in the evening (accessible to creatives who manage parallel day jobs and creative practices), were free to attend and catered (accessible to all income levels) and designed to be slick and appealing in order to reach wider creative audiences. Whilst designed to work as in-person experiences, the format was developed and offered online then in hybrid form during COVID-19 lockdowns and the early post-lockdown period. By showcasing a diverse programme of creative data work, the events encouraged participation of audiences from creative and technical backgrounds to consider the possibilities of work with data and new data-driven technologies and to become more familiar with unfamiliar approaches. At the outset of the programme in particular, these events enabled connection with both the easy-to-engage early adopters of technology and

those with much more nascent interests or ideas in expanding their practice to take initial steps to navigate interdisciplinary work. Having access to understand what could be possible with a data-driven approach, and to understand *how* these new forms of creative work were produced and developed, helped participants to reduce fears of engaging in unfamiliar domains and see pathways to potentially engaging in new forms of creative work.

Annual Creative Informatics Innovation Showcase events<sup>24</sup> extended the Lab context to a larger (100–150 people) day-long event with emphasis placed on highlighting R&D work and individuals supported by the programme, enabling the local creative community to see themselves and the work of their peers reflected in a high-profile event alongside external speakers and thought leaders. These exposure and awareness raising events were intended to draw participants to develop new ideas and did, in practice, lead directly to participants applying into training, funding and support strands to take those ideas forward.

During the COVID-19 lockdowns, when initially all events had to be paused, the Creative Informatics team partnered with Visual Arts Scotland (VAS) to host Friday Forums, weekly online community events that, with some similarities to CI Labs, sought to highlight data-driven creative work. The partnership with VAS was intended to be a rapid response to COVID which would support vulnerable artists and, whilst there remained a focus on data-driven work, this was often working with an expansive definition of data which drew in audiences who would not have previously considered data or technology in their work (reflecting the wider shift in needs and practices discussed previously), many of whom went on to explore this through funded R&D projects. The pivoting of our events also became an opportunity for digital skills development for the sector itself, through resources on online and hybrid events<sup>25</sup> and accompanying training sessions.

Alongside the larger CI Lab events, 23 smaller CI Studios<sup>26</sup> were hosted as hands-on events, typically for 10 to 20 participants each. CI Studios were regular, informal events open to creative practitioners, presented both in-person and (during COVID-19 lockdowns) online. They aimed to provide opportunities for creatives of all disciplines to explore new approaches and to try working and experimenting with data and emerging technologies in a friendly, practical environment. The choice of themes for the studios was responsive to suggestions from our community and audiences (collated through feedback forms, partnership forums and informal feedback), with sessions including building chatbots, digital music making and data sonification, coding and no-code, climate data and green making and 3D scanning. Studio events were intended to be introductory and informative and to enable peer collaboration and knowledge exchange. The events were free and open to anyone to attend and were designed to offer benefit to both novices as well as creatives with more experience.



Beyond these events, the Creative Informatics team also set up access to supported physical infrastructure for further skills development and networking. For example, E11, an informal studio space at Edinburgh Napier University, was established to offer creative practitioners a range of state-of-the-art technology equipment (e.g., VR headsets, robotics kits, video equipment, directional audio, lidar, motion capture and 3D scanning) with which to experiment, along with support for using this equipment. Similarly, Inspace, a public engagement gallery at the University of Edinburgh, was upgraded with Inspace City Screen, a multi-screen exhibition space,<sup>27</sup> and additional fabrication equipment to facilitate prototyping and exhibition of new works.

Providing access to these scaffolded awareness and experimentation environments was intended to enable practitioners to explore the potential of data and new data-driven tools and to discuss how other creatives have integrated them into their own practice, both in terms of output and process. By doing so, the goal was to increase data and digital literacy and place a greater degree of agency in the hands of creatives, supported by their peers, when they make decisions about whether and how they can engage with digital tools.

The role of the Creative Informatics team in these event and exploration spaces was as hosts, both in the literal sense and in the more important sense of scaffolding participant experiences by welcoming people from diverse practices and backgrounds into a collaborative space with safety and support, not only facilitating networking and informal peer-to-peer learning but also through brokering specific new relationships across the communities present. These hosting and brokering roles, whilst publicly visible in these spaces, was also a key feature of often more one-to-one scaffolding activities for the community across the scope and lifetime of the project.

### **Scaffolding R&D for skills development and capacity building**

We noted that the events, hands-on workshops and convening of community spaces discussed in the previous section were intended to support skills development as well as to stimulate engagement in R&D strands. All Creative Informatics R&D funding was offered through open funding calls (approximately 30 calls in total across the programme), with projects selected by a panel including external participants. A key feature of these R&D and our training strands was the expectation that participants would not be limited to participating in just one project but might move between funding strands as their practice and business developed, for example, starting with participation in the Creative Bridge training programme and then moving onto propose a new product, service or experience through the Resident Entrepreneur strand and/or responding to industry needs through the Challenge Project strand.

Rather than explore each strand in detail, here we discuss the key scaffolding mechanisms integrated into these processes to support skills development through these R&D projects and selection processes towards wider capacity building in the region for creative data-driven innovation and entrepreneurship in the sector.

Across funding strands, the following scaffolding tactics were offered and developed in response to the needs of the community:

1. Open calls with clear, documented criteria, processes and timelines
2. Funding workshops and application support (including support for those with additional needs)
3. Detailed and supportive communication of outcomes and feedback
4. Contractual support and ethics guidance
5. Brokering of relationships and signposting of tailored support
6. Reflection and reporting mechanisms to evidence development and impact
7. Follow up guidance, support, referrals and advice on further funding.

The Creative Informatics programme had been designed to enable creatives to engage in data and data-driven technologies in order to access opportunities in the wider economy around data and digital work; however, in practice the barriers to this were not always as straightforward as technology awareness. Earlier we discussed the need for soft skills around collaboration and entrepreneurship, but in addition to these areas, having the time, confidence, and capacity to engage in funding processes can be a significant barrier to accessing the grants and investment that facilitate innovation. These scaffolding measures sought to lower these barriers by demystifying funding processes, particularly the reasoning for specific funding decisions.

There are two aspects of the scaffolding, both of which take their inspiration from formal pedagogical practices, that we think have particular relevance for future creative innovation programmes and the understanding of R&D as a learning process.

### **Detailed and supportive communication of outcomes and feedback**

Whilst many funding programmes seek to support skills development and stimulate innovative work, many of those applying are provided with only minimal feedback on the reasons for the success or failure of their applications. The anecdotal evidence from the Creative Informatics community (and others) is that this can be extremely demotivating given the amount of time required to complete application forms (particularly where applicants face other barriers such as neurodiversity that may make processes more time consuming and stressful). Whilst creative sector funding can be extremely

competitive, the often very personal nature of creative ideas and work, combined with varied and often minimal exposure to training in entrepreneurship and business skills as part of creative education, can make rejection particularly painful. Creatives may therefore feel disincentivised from further engagement in application processes, particularly if applying to interdisciplinary or technology funding where language and criteria may be expressed differently and/or reviewers may be less informed about creative work leading to particularly challenging feedback (where given).

In order to both improve the quality of applications (particularly re-applications), and to address these wider issues of skills, confidence and resilience, the Creative Informatics team took the view that all applicants, whether successful or not, would be provided with clear feedback on their application. Mirroring well-established pedagogic practices, this not only identified strengths and weaknesses but also provided guidance on areas for improvement, steered towards further resources or sources of support and very clearly indicated where the application sat in comparison to the assessment criteria and the other proposals received. This meant that an applicant with a weak and poorly aligned proposal would understand why they were being rejected and either how to improve their performance or why they would not be a good fit for this opportunity. More importantly, it gave near-miss applicants the confidence to understand the outcome of their application, what worked well, where their strengths were and how they might improve or develop their approach and a clear steer on the relevance of reapplying (and/or recommendations of alternative funding sources). Feedback was also used as a referral mechanism to other sources of training and support, particularly for identifying applicants who would benefit from the Creative Bridge programme to better develop their idea and their understanding of audiences, markets and business models for their creative work.

The provision of detailed and thoughtfully phrased meaningful feedback (and in some case follow-up conversations to query and further discuss that feedback) was deeply valued by the community, reflected in both formal and informal feedback mechanisms to the programme, and led to improved confidence amongst applicants to reapply and/or engage with other funders' processes. In several cases applicants were successful on their third or fourth attempt, with their confidence and articulation of ideas enormously improved between applications. This trajectory mirrors the progress seen in academic teaching contexts where students are provided with sufficient actionable feedback and are themselves motivated to take this on board to develop their understanding and skills towards improved performance. Whilst these processes are time consuming, they are also extremely impactful, as they are targeted and specific, unlike broader best practice offerings. Additionally, in improving the overall quality of applications over time, they also have a positive impact on the quality of projects funded and the motivation of reviewer panels. Building on this experience, we would recommend that organisations

and programmes funding and supporting innovation, particularly in the creative industries, review their own selection and feedback processes to consider how they might better use funding processes as a form of scaffolded learning through improved and more specific feedback that considers the perspective and investment of the applicant.

### **Reflection and reporting mechanisms to evidence development and impact**

For those projects which were selected for funding, the Creative Informatics programme required a number of reports to capture the use of funds and impact of funding. Across most funding strands, these reports were tied to contracts so that scheduled payments would only be released on receipt and approval of midway or end reports. However, in addition to capturing a record of progress and certain required data sets for public funders, these reporting templates also included qualitative questions to stimulate project teams to reflect on their practice and learning and how their work had changed or developed, as well as feeding back on any support they had received. Again, this approach reflects well-established practices in formal education where self-reflection is a key element in an individual's learning process and where feedback processes are crucial to improvements in academic support. The purposes of this reporting process were clearly articulated to participants, with data from these processes (as well as from applications and wider programme data sources) reflected back to the community through partnership forums, annual reports and so on as part of wider transparent practices adopted to build understanding, engagement and trust amongst the community. As a result of understanding the purpose and intentions of these reports, the team found that, in most cases, funded projects engaged meaningfully with this process, taking the opportunity to reflect seriously as part of their own development.

For more collaborative projects, with multiple partners, these written reports were augmented by facilitated meetings to bring all partners together with the programme team to reflect, provide honest feedback and look forward to any further collaborative opportunities. Where collaborations had been more challenging or relationships more problematic, these were not always easy meetings but did provide opportunity to reflect, discuss and address issues, reflecting both industry practices around client/service provider relationships and educational best practices around peer feedback in the context of group projects. Including the Creative Informatics team as facilitators also enabled them to learn and reflect on the scaffolding and support provided and how it could be improved.

Building on our experience, we would encourage those supporting R&D in the creative industries to consider mechanisms to better support those undertaking R&D to reflect upon their experience, their learning and

how undertaking exploratory or innovative work has changed their practice and understanding so that they are better able to evidence and communicate their capabilities and development. We believe this has significant benefits for those participating project teams as they develop their resultant products or skills to market and/or as they seek to undertake further R&D funding or contracts, though such reflection also supports R&D support organisations and programmes to properly articulate their impact on the sector.

### **Conclusion: the Creative Informatics approach to skills support**

The experience of the Creative Informatics programme in the provision of skills support and learning through R&D for the creative sector has highlighted two key points: First, access to informal skills learning requires multiple delivery formats; there is not a single solution to this complex and nuanced problem. The specifics of the creative sector, together with a rapidly changing technological landscape, raise particular challenges around how best to expose creatives to what is both available and financially appropriate. Once decisions about potential technology options have been made, these initial sessions should ideally be complemented by more in-depth skills development that is tailored to the need of a specific project. The timing of learning activities is also crucial; in order to be up to date and effective, they should coincide with the development of creative projects while also being sensitive to the time commitments of the practitioners. Activities should be flexible in delivery and prioritise peer support in order to maximise ongoing impact. The experience of the COVID-19 pandemic brought these requirements into sharp relief, as many of the planned activities had to be moved to an online format, requiring the team to reflect on the most effective way to support our community.

Second, the scaffolding of skills and learning through R&D processes is critical to supporting learning and the development of confidence in both undertaking innovative work and articulating newly gained skills and expertise. Offering scaffolding across a range of tactics alongside a programme designed to offer a range of parallel pathways through skills and R&D opportunities has been especially impactful; however across all programme structures, adopting meaningful feedback processes and more reflective reporting practices are recommended in support of achieving learning and capacity building through R&D programmes.

Informal skills support across any sector requires appropriate resourcing, and in that the creative sector is no different. The development, maintenance and legacy of active networks across the creative sector require appropriate financial support. While Creative Informatics operated for a period of five years and undoubtedly had a positive impact on the sector (e.g. see Upton et al., 2021, 2022; Osborne et al., 2022), a robust ongoing infrastructure

is required to continue and build on this work both to support individuals within each discipline and to build strong links across disciplines. The existing membership and support organisations serving this geographic area, such as Creative Edinburgh,<sup>28</sup> Creative Arts Business Network (CABN)<sup>29</sup> and Applied Arts Scotland,<sup>30</sup> need continued support in order to provide the right services across the whole creative entrepreneurial ecosystem. Additionally, further evidence-based research and evaluation is required – and is ongoing – in order to interrogate the issues we have raised and to inform decisions around the development of networks and support mechanisms for skills acquisition.

As we look forward to a post-pandemic world, where we are seeing both technology and employment models shifting rapidly, we see a clear demand and many opportunities for creative practitioners to engage with data and technology in new ways. However, to enable individuals to thrive, there is a need for those working in and supporting the creative industries to prioritise skills and training and to reflect on how capacity and confidence can be nurtured to meet current and future needs. We have argued here that taking a nuanced approach to supporting a connected range of hard skills, soft skills, hands on-experience through research and development and highly relevant applied work and connected networks of peers and informal learning – a complex tapestry rather than a focus on singular skill areas – is vital for the continuous development of those working across the creative industries and for the blossoming of new areas of the creative economy.

## Notes

- 1 Those with (fewer than 10 employees or turnover beneath £632k: <https://www.gov.uk/annual-accounts/microentities-small-and-dormant-companies>)
- 2 <https://creativeinformatics.org/>
- 3 <http://jeniallison.co.uk/services>
- 4 <https://www.sxsw.com/>
- 5 For example, Amb:IT:ion Scotland (2009–2014). <https://www.hannahrudman.com/2012/07/makeithappen-with-ambition-scotland/>. Building Digital Capacity of the Arts (2011–2012) with BBC and Arts Council England [https://www.bbc.co.uk/pressoffice/pressreleases/stories/2011/02\\_february/08/arts.shtml](https://www.bbc.co.uk/pressoffice/pressreleases/stories/2011/02_february/08/arts.shtml). Sync programme (2012–2014) as part of Creative Scotland's Cultural Economy programme, the Digital Research and Development Fund for Arts and Culture (2012–15) supported by Nesta, Arts Council England and the Arts and Humanities Research Council (Nesta, 2013) and later rolled out across the UK via its devolved partners in Scotland and Wales (2013–2015). <https://www.nesta.org.uk/blog/launching-the-digital-arts-and-culture-accelerator/>. Digital Arts and Culture Accelerator (2016) with Nesta and Arts Council England and more recently the Digital Culture Network (2019–ongoing).
- 6 For example, the Kickstart scheme which provided funding to employers to create job placements for 16–24-year-olds. <https://web.archive.org/web/20200902014953/https://www.gov.uk/government/collections/kickstart-scheme>
- 7 <https://digitalfunding.xponorth.co.uk>

- 8 <https://www.creativescotland.com/funding/funding-programmes/targeted-funding/digital-pivot-support>
- 9 <https://www.creativescotland.com/>
- 10 <https://www.skyscanner.net/about-us>
- 11 <https://www.thisiscodebase.com/>
- 12 <https://creativeindustriescusters.com>
- 13 <https://audienceofthefuture.live/about/>
- 14 <https://www.theguardian.com/technology/artificialintelligenceai>
- 15 <https://www.midjourney.com/home>
- 16 <https://chat.openai.com/auth/login>
- 17 <https://xrnetworkplus.xrstories.co.uk/>
- 18 <https://www.ukri.org/blog/breaking-the-boundaries-of-immersive-tech-experiences/>
- 19 <https://www.ukri.org/news/uks-creative-industries-benefit-from-significant-funding-boost/>
- 20 <https://www.adobe.com/uk/>
- 21 <https://www.bentley.com/software/microstation/>
- 22 <https://www.autodesk.co.uk/>
- 23 <https://creativeinformatics.org/ci-labs/>
- 24 For example, CI Innovation Showcase 2022. <https://creativeinformatics.org/innovation-showcase-2022/>
- 25 Creative Informatics Guide to Online Events. <https://doi.org/10.5281/zenodo.3980961>; Creative Informatics – A Toolkit for Digital Events. <https://doi.org/10.5281/zenodo.6012621>
- 26 <https://creativeinformatics.org/ci-studios/>
- 27 See <https://www.designinformatics.org/posts-by-tag/?tag=Inspace-City-Screen>
- 28 <https://creative-edinburgh.com/>
- 29 <https://www.cabn.info/>
- 30 <https://www.appliedartsscotland.org.uk/>

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## CASE STUDY

### **Creative Bridge: industry-led digital start-up training for the creative industries**

Creative Bridge was a ten-week, cohort-based education programme designed to introduce creative practitioners to start-up thinking, innovation and digital product development. It was delivered by CodeBase, the UK's largest, and one of Europe's fastest-growing, technology incubators (<https://www.thisiscodebase.com/>), as one of six Creative Informatics activity strands.

Since 2019, ten cohorts and a total of 220 individuals completed the programme, which centred around three learning outcomes:

1. Turning a creative idea into a sustainable business
2. Breaking down barriers to the start-up world by demystifying the jargon around tech entrepreneurship
3. Sharing toolkits and processes which empower creatives to respond to fast change and to cultivate resilience

Within the Creative Informatics cluster, Creative Bridge<sup>1</sup> was a first step for creatives looking to develop an early-stage idea, with the ambition of taking them from plan to pitch through the programme and equipping them with the tools to grow their idea beyond it.

### **Redefining 'success'**

Cohort 2 alumnus Elena Höge founded mission-led indie games developer Yaldi Games<sup>2</sup> shortly after completing Creative Bridge. The programme provided teaching and collaborative exercises on key topics around entrepreneurship, such as market and customer research, with a natural progression through the duration grounded in templates like the Lean Canvas.<sup>3</sup> Höge credits this learning with providing the structure needed to grow an entrepreneurial mindset and build beyond the creative idea she had developed.

Embedded within Creative Bridge was freedom around the idea of 'success.' As part of the programme, attendees were encouraged to reflect on their aspirations, setting aside pre-defined expectations for start-up success. As participants spanned the Department for Digital, Culture, Media and Sport (DCMS) recognised creative sectors and beyond, these aspirations and creative backgrounds were varied. Across the programme, ambitions ranged from achieving high growth and substantial investment to making social impact, building strong communities and achieving personal stability.

As a pre-accelerator, Creative Bridge did not offer investment or set post-programme requirements (other than a first draft pitch deck), which gave

participants freedom to define their next steps. For example, Yaldi Games' first offering, *Wholesome Out and About*,<sup>4</sup> is rooted in social impact and connecting games that cross digital and analogue boundaries so users can connect and learn in real life, as well as virtually (Martin, 2021). For Höge, hearing from a variety of start-up founders throughout the programme allowed her to see that "I didn't need investment to get started. . . . I could just start" (Creative Informatics, 2020a). For Yaldi Games, 'starting' meant building a network and honing skills around pitching and business planning through funding applications. Höge could refer to programme resources, for example, revisiting the Markets session ahead of undertaking market research. She continues to be an active member of the start-up ecosystem, with many media and speaking engagements, and has been successful in a number of funding applications, including winning the Creative Challenge category at the Converge Awards 2020, a prize of £20k in cash and £21k in in-kind business support.

Equipping creatives with a toolkit of resources, best practices and frameworks allows learners to adapt and revisit topics at their own pace. Creative Bridge participants were empowered to continue their development outside the ten weeks, ensuring continued resilience and adaptability.

### **Weaving together an ecosystem**

Creative Bridge featured contributors from globally successful start-ups as well as local talent. The Creative Informatics partnership has allowed networks from the creative industries, academic and tech entrepreneurship spaces to weave together a strong ecosystem. The programme highlighted the ways in which problem solving, critical thinking, adaptability, resilience, building engagement and working iteratively are essential to both start-up thinking and the creative industries.

Craig Fleming is co-founder of Centrline.<sup>5</sup> Designed for the performing arts, Centrline combines project, scheduling and data management tools to enable individuals and organisations to work together effectively. Craig took part in Cohort 3 of Creative Bridge and has since continued to grow Centrline's offering through multiple funding opportunities and major partnerships. Craig came to Creative Bridge with a background in the performing arts, experience in some aspects of building a business and a clear understanding of the key problem Centrline sets out to address. The move into the tech entrepreneurship space was a natural step, and throughout the programme, Craig realised "how many parallels there are between the two spheres" (CodeBase, 2021).

Building strong partnerships with creative organisations has been vital to Centrline's growth. They went on to secure £12k of Creative Informatics

Resident Entrepreneur funding, affording time and space to develop and connect with the sector, and were successful Creative Informatics Challenge Respondents, collaborating with National Theatre of Scotland on a data-driven project to map the company’s touring activity – a key partnership in the development of their business. Craig credits Creative Bridge with “opening up pathways to the entrepreneurial and tech community . . . and [enabling] access to a wealth of knowledge and experience and information” (Creative Informatics, 2020b).

### **Building community**

Creative Bridge was delivered in person at CodeBase Edinburgh, online during the COVID-19 pandemic and then took place in hybrid form. The programme continually placed peer support and interactivity at the forefront of its learning approach.

Across cohorts, collaborations have formed, team members have been recruited and ideas developed because of shared ambition amongst participants. During the sessions, founder stories and learning theory were supported with group discussion, workbook activities, presentation and peer feedback. In addition, there was a network of alumni support opportunities.

Both Höge and Fleming described themselves as people with a creative idea but uncertainty about how to build a business around it. For Yaldi Games, working in an “environment that was super nurturing and encouraging . . . is essential to grow and inspire entrepreneurship” (Creative Informatics, 2020a). For creatives unfamiliar with the tech start-up ecosystem, Creative Bridge built confidence, developed participants’ strengths in their own creative practice, and inspired ambitions towards next steps beyond the programme.

For Centrline, being able to “understand and demonstrate your value” (Fleming, 2022) has proved a key skill when it comes to partnerships and investment. Working alongside a peer group created a safe working environment for Fleming to explore key questions and identify a sustainable business model and to understand how to test that model, thereby gaining “a really clear idea of how [their] business could work” (Fleming, 2022).

### **Conclusion**

Over the course of ten cohorts, Creative Bridge developed according to the principles it taught by remaining flexible and adaptable to the needs of learners, to a changing environment and to an evolving start-up ecosystem. It offered a combination of structured learning time, peer support, tried-and-tested frameworks, first-hand stories and access to a diverse ecosystem of entrepreneurs.

Each of these tools has allowed creatives to break down, scrutinise and rebuild their ideas, bolstered by a free, focused and supportive space which amplified the skills already available to them and encouraged development of new ones.

Katherine Warren

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### Case study notes

- 1 <https://www.thisiscodebase.com/creative-bridge>
- 2 <https://www.yaldigames.com/>
- 3 See, for example, <https://blog.leanstack.com/> or <https://www.oreilly.com/library/view/running-lean-2nd/9781449321529/>
- 4 <https://www.yaldigames.com/outandabout>
- 5 <https://www.centrline.com/>