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## 1.0 Introduction

The digital challenge facing archives is hugely significant. This document sets out The National Archives' approach to helping the sector meet it over the next three years. Every archive and archive professional should in turn be considering what actions they will carry out in that time to meet this challenge.

It is now thirty years since Tim Berners-Lee clicked the first web link and it is already more than a decade since Apple put that web in everyone's pocket. The challenge for cultural heritage is akin to that of every industry: how to make the best use of available, emerging and future technologies to benefit today's society. Our additional challenge is to preserve that technology and its products and present them to future generations. This is a fundamental part of what it means to be an archive professional today. This transition began from the moment the production of digital data became part of the activity of organisations – a process that in many organisations has been evolving for almost 50 years. 21<sup>st</sup>-century archives now operate within a shared digital landscape. At its centre are the systems infrastructure of software and hardware which form its physical geography. People and their data are distributed throughout these myriad systems forming a kind of architecture – and like architecture, only care will guarantee the survival of these structures into the future.

The digital realm is now a place where history happens: a president's tweets, an email commissioning a composer to write a symphony, the Word document comprising the manuscript of a novel (complete with tracked changes), the memes that spread like supercharged Rowlandson prints; the website of a public inquiry. From the dark net to the walled gardens of Facebook and Instagram, the open web and the application programming interfaces across which humans talk to machines and the machines reply - there is no digital space in which archive professionals, their collections and their collecting should not be active. But the vastness of the digital landscape makes this a daunting challenge. It is shaped by external forces of law and governance and it also faces threats: the accidental decontextualisation that can come from well-intentioned sharing of content up to the deliberate and malicious spreading of faked and manipulated information. Archives are intrinsically interconnected to the public domain and that domain must be protected. What do archive professionals need to become the information environmentalists this landscape needs?

Surefooted progress across this frontier depends partly on information literacy and digital skills, partly on the hardware and software that constitute digital tools and platforms. It also depends on all aspects of data – not only collections knowledge encapsulated as metadata and links to information but also research on the users and non-users of archives: the goals and needs that archives can meet and support online. The skills that archive professionals need in order to undertake this work are extremely varied but they do not need to become digital polymaths to take a full part in addressing their organisations' needs. Rather they must work together with information and technology professionals, culture and heritage colleagues, academic and other researchers, local and central government, businesses and industry, and the third sector - and be ready to reach for best practice wherever they find it. They must above all listen to and learn from the needs and goals of their diverse audiences and work with them on- and offline in the collaborative partnerships that the web is so good at facilitating. Those working in archives have a responsibility as information professionals to support today's citizens in their own journeys across

information landscapes and to ensure they can take advantage of what technology affords, be active and engaged creators and contributors and also alert to the contours and hazards of the digital realm.

The digital frontier is no single intractable problem, instead offering a huge range of opportunities for learning and progress, from using simple digital preservation tools to observing how users navigate your website. Archives have a number of assets which can help them. Firstly, they generally have public spaces which may already contain some technology. It may seem slightly paradoxical to regard physical space as an important asset for digital capacity but, in practice, digital engagement can quickly translate into real world engagement and vice versa. There are many benefits to being in possession of a relatively flexible space which can support different kinds of working. Secondly, archive professionals are often able to exercise considerable autonomy in terms of their activities. By no means all but many of their organisational priorities are set by themselves. Thirdly, many services benefit from the time and energy of a range of enthusiastic volunteers. It may be that not all (or perhaps even few to none) of these existing volunteers are willing or able to participate in strongly digital work. Nevertheless, many of the skills that archive professionals have developed in recruiting, engaging and sustaining volunteer programmes over many years can be used to identify and support new digital opportunities for volunteers.

At the same time, archives face clear and very present challenges. Budgets are generally reducing or flat. Recruitment may be problematic: roughly 1 in 4 archives report they have not recruited in the last 3 years and 41% find recruitment into some or all posts challenging.<sup>1</sup> This indicates that we cannot rely on recruitment to reduce digital skills gaps across the sector and must act accordingly. Finally, it is clear that archive professionals currently have little day-to-day control over their own IT infrastructure including hardware, software and their website. In the past, this was a significant disadvantage for archives which made it harder to engage with new and emerging technologies. Many local authority and other embedded services struggled in the early 2010s to secure sufficient autonomy to deliver effective and engaging social media and other digital content. Today, the urgent need to deliver robust and sustainable digital preservation elevates this issue to probably the most important management issue facing archive professionals today (and IT professionals too, although few yet realise it).

Simply put, digital preservation cannot be delivered except through partnership between organisational IT providers and archive staff. In the past, these issues could be worked around through the commissioning of external websites and the use of third party platforms. This is not the case for the transfer and preservation of a parent organisation's records. Discussions about digital preservation need to take place at an appropriate organisational level in an atmosphere in which both parties – IT professionals and archive professionals – acknowledge the high level of expertise available to both parties and work together to bridge the gap in vocabulary and practice between them. Digital preservation cannot be solved by IT service ticket. Nor can it be solved simply by software procurement because such software cannot ensure a pathway from major data sources within an organisation to a preservation environment. This is because such pathways are

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<sup>1</sup> The National Archives, Workforce Development Strategy, 2018 p.16,  
<https://www.nationalarchives.gov.uk/documents/archive-sector-workforce-strategy.pdf>

as much (or more) a matter of business process and contractual and legal agreement as they are technological.

21<sup>st</sup>-century archive professionals should be trusted experts in terms of the record, both analogue and digital. They should be confident with digital terminology – able to ‘speak the language’ of digital formats, methods and work. They should also be confident users of digital tools and intelligent customers of digital suppliers, able to determine their own requirements and make informed judgements between competing providers. They must work collaboratively both within their own organisations with IT, records management and marketing colleagues and externally with emerging and established digital groups. They must become deeply embedded in their civic digital communities. Like librarians, those working in archives have a role to play in tackling digital exclusion and improving digital and information literacy within their communities – however defined.

The evidence from our large scale survey of over 300 archive professionals, carried out with Jisc at the beginning of 2019, is that many of today’s archive professionals are not in a position to meet the demands of contemporary collections management and advocacy. Only 1 in 3 UK respondents to our survey reported that they felt they have the digital skills they need to carry out their roles. 59% say they have no digital strategy (or they haven’t read it) and only 18% of managers in archives feel confident judging between suppliers of digital systems.<sup>2</sup> This is not a remotely firm enough basis to tackle these urgent challenges and this document outlines a programme of support in order to make some impression on these numbers and allow archives professionals to take their natural place as trusted custodians of the nation’s data.

## 1.1 Strategic context

The vision for archives, [Archives Unlocked](#), committed The National Archives to develop the digital capacity of the archives sector to support preservation, discoverability and access and impact.

This document should also be read in the context of The National Archives’ own [digital strategy](#), which emphasises the challenge posed by digital records and the rapidly evolving digital landscape. It also highlights the need to develop digital capability, skills and culture, engage new audiences and form new partnerships.

This document sets out a plan for three business years of work that will be delivered from 2019 to 2022.

## 1.2 Information sources and consultation

The Plugged In, Powered Up strategy and associated actions are based on a range of sources including:

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<sup>2</sup> The National Archives and JISC, Digital Development Survey, 2019

- A large-scale survey of the sector carried out with Jisc, with over 70 questions covering multiple areas of digital development and receiving over 300 responses<sup>3</sup>
- Two focus groups held in London and Manchester
- Quantitative and qualitative data including statistics from CIPFA, accessions returns, accreditation reports, data from accessibility software and analysis of university course curricula, amongst other sources
- Two challenge panels, held in association with the British Library
- The inaugural meeting of the Digital Archives Learning Exchange (DALE), the new network for archive professionals engaged in digital work
- Secondary literature, cited in the bibliography

### 1.3 Areas of work

This strategy focuses on three main areas of digital archival work: engagement, access and preservation:



In practice, these areas are not really separate but emerge naturally from each other. We preserve in order to provide access but the promise of access is not really sufficient, we also want to engage audiences with our collections. Social media is a part of digital engagement but many 'real world' activities are connected with or support digital engagement, including outreach and community building. Similarly, digitisation is part of access provision, but is not the same as access. Instead, many other activities come together to ensure appropriate access for a range of users. The interrelationship between these areas of work means that all of them are equally important. On the one hand, we cannot engage audiences with material we have not preserved. On the other hand, failing to engage a community of users imperils our organisational sustainability, in turn putting the preservation of records at risk.

<sup>3</sup> A summary of this data will be published separately.

Digital skills underpin delivering all three of these kinds of work and include a mix of both practical technical skills (such as generating a checksum of a digital file) and skills that are more about understanding norms, requirements and vocabulary such as writing a high-quality request for tenders or putting together a successful social media campaign. This strategy proposes additional actions to support digital skills more generally within the archives sector.

## 2.0 Engagement

Digital engagement is the process by which archives are made interesting and relevant to diverse audiences through the use of technology. Social media is a constituent of this work but any interactive or interpretive layer on top of records (beyond simply cataloguing) is a form of digital engagement, as is approaching audiences for financial contributions to archival work in the form of crowdfunding and any live event with a digital component. Live events may unite global and local communities. Working with these online communities offers huge opportunities for archives to broaden their audience. This could and should be an opportunity to attract a new digitally literate audience from both a repository's immediate physical locality and anywhere else that interest in their records may reach. By participating in digital initiatives, archives can reach individuals who can work with their collections in ways which might be completely new.

These individuals may have a role to play in augmenting the digital skills of the entire archive. Today archive professionals report that their existing volunteer base may struggle to support digital initiatives:

*"Core volunteer team are all approx age 60...who find the digital skills required to maintain the archive too taxing. Very few volunteers have the necessary digital skills required."<sup>4</sup>*

The irony is that digital engagement initiatives are themselves the opportunity to recruit new volunteers who can support expanding this work yet further. Well-defined digital opportunities offered by cultural heritage organisations with clear benefits for those undertaking them are very likely to attract collaborators. The huge diversity of digital channels and platforms available is an opportunity to consider carefully the desired audience and carefully match intentions and outcomes to platform features, norms and audiences.

### 2.1 Digital storytelling

Putting digital collections on the web is a vital precursor to digital engagement but it is not sufficient. What matters are the stories we (or our collaborators) go on to tell about them. In our large-scale survey carried out with Jisc, over 90% of the archive professionals surveyed expressed at least some confidence in their social media knowledge. But successful digital storytelling requires a pretty expansive definition of a digital skill: to understand a digital platform not as a toolbox but as an ecosystem and to master the approaches which have traction within that ecosystem. It is about the successful selection, arrangement and deployment of a small amount of material in order to

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<sup>4</sup> Two archivists, Digital Development Survey with JISC, 2019

surprise and delight, provoke or move, or achieve some other meaningful reaction. This is not in essence a digital skill but no digital engagement will succeed without it.

Archives and other heritage organisations exhibit huge variation in their use of and success with social media and other large, proprietary digital content publishing platforms such as YouTube.



The image shows a screenshot of a tweet from J.K. Rowling (@jk\_rowling). The tweet text reads: "This thread is truly wonderful." Below the text is a quote from The Museum of English Rural Life (@TheMERL): "Ok, we found something amazing and we demand you to come on a journey with us: Show this thread". The tweet is dated 12:18 PM - 7 Oct 2018. It has 3,701 retweets and 21,592 likes. The engagement icons show 214 replies, 3.7K retweets, and 22K likes. A row of profile pictures of users who interacted with the tweet is visible below the engagement counts.

*Author J.K. Rowling (14.7m followers) enthuses on Twitter about archives held by the Museum of English Rural Life (2018)*

There are superstars such as Orkney Libraries, whose friendly rivalry with Shetland (and use of book displays to reference Sting lyrics, amongst other silliness) has attracted a following roughly equal to three times the population of the entire archipelago. Reading's Museum of English Rural Life (MERL) has also achieved spectacular success on the platform. At the same time, there are 40 local authority archives with fewer than 2,000 Twitter followers, which is not indicative of reaching beyond a narrow (perhaps pre-existing) audience.

The MERL's success is not down to possessing collections completely unlike those held anywhere else or due to possessing some technical facility unavailable to other holders of archives. It comes from a deep understanding of their chosen platform and a strong connection between those conducting social media work and those with deep collections knowledge. It is the interplay between these two sets of expertise that in large part determines the success of digital engagement – and this is a theme of much digital work. Archive professionals will need to work hand in glove with other professionals who may reside in other parts of their organisation (marketing, IT and so on) or outside it. Without mutual respect and understanding, it will be impossible to deliver digital work of high quality.

The selection of large-scale platforms will be a matter of resourcing and the project at hand. Podcasting is unusual in that content can be rapidly syndicated across many platforms and



applications automatically. For much other content, the model is a series of walled gardens. Clearly the same content can be uploaded to YouTube, [Dailymotion](#) and [Vimeo](#) but maintaining all these different presences would be immensely time consuming and almost certainly purposeless. But strategic alignment of platforms can help promote certain kinds of content. Content from Instagram can be manifested on Facebook. WordPress or [Medium](#) can be used to host longer-form written content (blog posts) which can in turn be promoted via Facebook or Twitter. In this way the maximum value and exposure can be extracted from content that took time to produce. The same is true of events and activities held within the archive. All public events should have digital outputs. To do otherwise is to make inefficient use of scarce resources.

A positive aspect of these walled garden services is that they may allow institutions whose web presences are heavily managed or controlled by external IT providers or gatekeepers in other parts of their organisations more control over the kind of digital content they produce.

For media archives, working with audiovisual material (digital or otherwise) is an everyday activity. But for archives without extensive media holdings or those wishing to produce their own content, multimedia is a big commitment that must be considered carefully. In the past, cultural organisations had generally poor or sporadic involvement with platforms such as YouTube. Although clearly articulated recipes for success based on analysis of prevailing norms existed for these platforms, including the use of channel hosts and series branding, institutions previously ignored them.<sup>5</sup> This is no longer the case. Historic England has a popular series of [makeup tutorials](#), the British Museum [has enlisted influencers](#) to rack up millions of views and the Tank Museum [uses strong branding](#) and supports its video content using the crowdfunding platform [Patreon](#). Social media should not be a purely 'push' medium but one which engages a community in conversation.

Staff members having this conversation must be talented communicators, trusted to take risks and supported by senior leaders. They should have the corporate knowledge to back up what they say and should also build a knowledge set of the language necessary to have discussions around particular communities and topics. A style guide such as [Buzzfeed's](#) may help with this.

Engaging seriously with these platforms requires resource and commitment. Abandoned content channels reflect badly on an organisation as does producing substandard content. But audiences will always respond to creativity. Archive professionals who are not the custodians of extensive collections of videogames may feel that they have nothing to contribute to a platform such as [Twitch](#), which livestreams playthroughs of games but they may well be able to partner with a content creator and provide them with a perspective on a game that no one else could.

The other approach is to build a website or app from scratch in order to provide a more tailored experience to a specified audience. This again is a matter of matching the desired outcome to the technical approach and not the other way round. These projects should also make the most of a budget: ideally any such productions should be reusable and the code should be as open as possible. Indeed, before commissioning expensive, bespoke tools, it is sensible to examine free and open possibilities. Journalists and cultural heritage professionals have a common interest in digital storytelling and sites such as [Newsroom Tools](#) collect such tools together in one useful place.

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<sup>5</sup> Emily Robbins, 'Art Museums and YouTube', <https://mw2015.museumsandtheweb.com/paper/art-museums-and-youtube-current-practice-and-potential-strategy/>

Websites, apps or installations of this kind benefit from intense content curation. Large databases are not very interesting without a 'way in' for audiences. Far better to tell a smaller number of stories in depth, as in a site such as [A History of the North in 100 Archives](#). Such content must also be effectively promoted. 'If you build it, they will come', was never an effective mantra and it still isn't. Websites and other digital experiences do not market themselves - even with excellent search engine optimisation (SEO) for Google. Resource for both aspects of this too often neglected work should be built into project plans.

## 2.2 Crowdfunding

The range of archival projects funded through the Kickstarter platform is extensive enough to merit [its own webpage](#). There is a dizzying array of book, art, film and document digitisation, restoration and republishing. Crowdfunding and other forms of light-touch online participation or voting can help establish or determine priority for archival activity. User groups who call for the digitisation of particular collections could be invited to literally put their money where their mouth is. Successful campaigns can also be used in the same way by a repository to demonstrate strong interest in a collection of records to a funding body. The campaign may garner interest and attention well beyond the funders. In 2016, the Science Museum raised £50,000 to restore two of their robots but the international media interest in the campaign boosted the profile of the project and the related exhibition significantly - and came free with the donations.<sup>6</sup>

The money raised (generally in the £10,000 - £50,000 range) must be offset against the time involved to design, deploy and promote the campaign and deal with any rewards for backers. In The National Archives/Jisc survey, 72% of responding archive professionals reported that they would have no idea how to run a crowdfunding campaign.<sup>7</sup> Specific guidance for cultural heritage organisations already exists on some platforms.<sup>8</sup> In fact the promotion of a crowdfunding campaign is largely an extension of existing social media activity, making this a form of digital engagement more repositories may wish to consider.

## 2.3 Events and public programming

In our survey, 73% of archive professionals reported that they had not carried out any activities to engage the public with their born-digital collections, and 62% reported that they had never run any event with a digital focus.<sup>9</sup>

Many models exist for public programming in heritage institutions around digital and digitised content. These include hosting tech meetups or running [Code Clubs](#) or [Coder Dojos](#) to teach programming skills to young people or sessions to support digital skills of older or vulnerable

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<sup>6</sup> Kickstarter, 'Rebuilding Eric: The UK's First Robot', <https://www.kickstarter.com/projects/sciencemuseum/rebuild-eric-the-uks-first-robot?ref=2cldm3>

<sup>7</sup> The National Archives and JISC, Digital Development Survey, 2019

<sup>8</sup> Crowdfunder, <https://www.crowdfunder.co.uk/funds/heritage>

<sup>9</sup> The National Archives and JISC, Digital Development Survey, 2019

adults, perhaps making use of the [Open Centres Network](#) model. [Cryptoparties](#) teach attendees about personal digital security. [Algoraves](#) turn maths into music in front of a live audience. Maker sessions using Arduino, [Makey-Makey](#), Raspberry Pi or other electronics hardware allow audiences hands-on experiences with the more physical aspects of computer science such as robotics. Many local, national and even international organisations exist who can support such work.

Hack days or game jams can be used to gather programmers together to build something exciting from archival data or collections. Scan-a-thons can be used to produce access copies of documents quickly. Wikipedia [Edit-a-thons](#) can place archival content in front of a huge global audience. Citizen science or crowdsourcing projects can assemble new groups of volunteers to tackle substantial historical challenges and produce new knowledge. Just like a livestream of an event, these types of event may bring together participants working within the archive and other participants who may be anywhere in the world. Collaborative gaming platforms such as Minecraft form yet another outlet for documents, local and virtual communities to be brought together in real time.<sup>10</sup> The [HullCraft website](#) provides an excellent record of such a project, launched as long ago as 2014. Virtual reality offers new ways to transmit and receive these experiences but even simple technologies such as QR codes allow the combining of physical and virtual installations and this is particularly effective if used in imaginative contexts, such as puzzles, games and escape-room style installations. Augmented reality technologies have much to offer archives.



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<sup>10</sup> Minecraft Earth, launching in 2020, promises to allow easy deployment of AR in local spaces.

*London in ruins in part of the Museum of London's Minecraft simulation of the Great Fire of London (2016)*

Events of this kind may produce concrete digital outcomes for the institution (in the form of photographs or scans, Wikipedia entries, games or other prototypes which help solve concrete problems). They may attract or engage new audiences or help the archive form contacts with existing civic data organisations or expand their pool of volunteers. They can also help staff develop the skills necessary to facilitate further such events. Such events might first be run by outside organisations until repository staff develop more confidence with whatever approach or platform is being used.

Our audiences and communities can think of even more exciting ways to use and reimagine our collections than we can and digital technologies allow exciting creative experiments to happen – if we let them.

## 2.4 Building engagement capacity

The National Archives can play a very significant role in developing capacity across the full spectrum of digital activity within archives. But it cannot do everything. Therefore this document includes a series of actions that The National Archives will undertake and a series of recommendations to the sector in each area of activity. Digital engagement is an under-appreciated area of heritage work which can be transformative for archives and audiences.

The National Archives will:

- Produce an **engagement toolkit**, gathering together useful existing resources to improve social media impact and support digital storytelling
- Fund **grants for digital engagement**, allowing archives to run digital events to public audiences
- Pilot approaches to the cataloguing of digitised records through **crowdsourcing**, looking at existing platforms and commissioning new guidance

The sector should:

- **Work with civic tech.** Archives should look to form relationships with data mills, code clubs, citizen science projects and charities such as Wikimedia UK and the Raspberry Pi foundation
- **Diversify volunteers** by offering new, defined, digitally focused opportunities to students and young adults that benefit both archive and volunteer
- **Consider enacting community decision making.** Archives should allow their audiences more input into decisions around digitisation, cataloguing and other aspects of access via online voting, [crowdfunding](#) and discussion

- **Be clear online about how to collaborate with them.** Academic collaboration in particular can and should be strategic rather than occasional and opportunistic. Setting expectations for potential collaborators can help to start discussions on a positive footing

### 3.0 Access

Together, digital cataloguing and large scale digitisation have completely transformed not only the archival landscape but the process by which historical research is conducted. This is quite an achievement and it is unmatched in the cultural sector. It is no surprise then that when we asked archive professionals about their proudest digital achievement, many of them opted to discuss projects or initiatives which had widened access through digitisation. The material ranged from glass plate negatives, oral history recordings, court minutes and aerial photographs to posters, plans and films. These projects are practically as diverse as UK archival collections themselves and the profession is right to be proud of them. They represent buoyant digitisation activity and records that are also available through commercial platforms and other third-party sites such as Wikimedia Commons. In terms of describing these collections, most archives today have an online catalogue - or can have one for free via Discovery or another aggregation service. The reach of these aggregation and commercial services mean that search across archival holdings is more powerful than in any other part of the culture sector.<sup>11</sup> These are substantial achievements.

At the same time, considerable challenges remain in this area. Much work remains in connecting records and record creators. Many archives are locked into systems with poor public interfaces which inhibit discoverability. Cataloguing quality is immensely variable and access to born-digital records is still underdeveloped, with only 37% of respondents to the Jisc/National Archives survey saying they made these collections available to users.

#### 3.1 Digitisation

Over 46 million digitised assets were reported to CIPFA alone in 2017/18.<sup>12</sup> This represents only the tip of the iceberg of the sector's digitisation activity but it is still substantial. Digitised archival documents permit a thriving commercial genealogy sector. Today, Ancestry alone boasts of its 20 billion digitised records – the UK represents only one of 80 countries with data on the platform.<sup>13</sup> In our survey with Jisc, 57% of reporting archives said they carried out digitisation in house. Only 6% used external companies exclusively, with 37% using a mix of the two. Externally provided services produced moderately more positive feedback from respondents than in-house services. This split appears to reflect the fact that limited internal capacity for digitisation can be frustrating whereas

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<sup>11</sup> For the museums sector, for example, the Cornucopia dataset is acknowledged as the most comprehensive resource and it is not only not maintained but no longer even has a URL.

<sup>12</sup> From 88 repositories. Only 65 repositories are represented in the 2018/9 statistics so the earlier total has been preferred.

<sup>13</sup> Ancestry, <http://www.ancestry.com/corporate/about-ancestry/company-facts>



the capacity of external providers is limited only by the budget being made available. Clear (or unclear) requirement setting therefore becomes the largest determinant of the resulting experience.

The sector's manifest achievements in this area suggest that it is not, relatively speaking, one with a significant capacity problem – or, if it is, that the issue is one of budget and infrastructure beyond the scope of this work. As a result, this strategy focuses largely on other aspects of access and digital capacity more widely.

## 3.2 Cataloguing

Cataloguing and cataloguing systems represent a significant challenge for archives going forward. Cataloguing is expensive and time consuming and is often forced to take a back seat to other pressing organisational needs. On the other hand, uncatalogued collections afford only very limited access and reuse and they are as opaque to machines as they are to people. Nevertheless, extensive and exciting cataloguing projects are occurring, many funded by grants, either from The National Archives or elsewhere. Records on Clevedon Pier, Durham Light Infantry, the MP David Blunkett and the explorer Sir John Franklin are amongst many collections which will be opened up as a result of this investment.

Of more concern are the systems this new catalogue information arrives in. Many archives are using extremely old catalogue interfaces which are very difficult for users to navigate or understand. Additionally, these interfaces often do a poor job of showing the constituents of an archive's holdings at a high level, explaining archival arrangement or helping users cut through large volumes of content returned through keyword search. In spite of these manifest inadequacies, 70% of archive professionals responding to our survey felt that their cataloguing system met the needs of their organisation. This is principally because the back-end processes are deemed adequate for a repository's day-to-day needs.<sup>14</sup> This is not the case - and even if it were, it would not be sufficient.

It is not the archive professionals and researchers of tomorrow who need greater ability to ingest, manage and present technical metadata or access catalogue data at scale. It is those of today. Provision of open APIs (Application Programming Interfaces) should be a standard part of all catalogue systems. This would, at a stroke, allow new ways to present records to be built by anyone for the benefit of the sector and could act as a spur to innovation for conservative vendors. The provision of metadata under an open licence is an essential part of meeting the needs of modern digital scholarship, can support new services and underpins archives' missions of knowledge sharing, though obviously sharing data does not by itself achieve this.

The sector should be more demanding of vendors and needs to become willing and able to gather and respond to user feedback on cataloguing, cataloguing systems and cataloguing priorities, which fundamentally affect how our collections are understood and used. Remote or crowdsourced cataloguing (or even [guerrilla cataloguing](#)) provide new options for the delivery of cataloguing

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<sup>14</sup> There is however little evidence they are equipped to deal with emerging digital formats or indeed promote high metadata standards today.

projects just as crowdfunding offers the potential for new ways of funding them. They also offer the opportunity for new and more diverse voices to be represented in catalogues.

### 3.3 Web accessibility

Archives work hard to make their collections accessible in many ways. Under UK legislation, they have a special responsibility to ensure that they do not provide access in a way that discriminates against people with particular needs. Within the UK population as a whole, about 20% of us are estimated to experience some form of disability.<sup>15</sup> For those over state pension age – over-represented in many archives' audiences – this rises to 45%.<sup>16</sup> Many adjustments to websites to support partially sighted users, those with hearing impairments or limited motor functions can be made and many will benefit all visitors to a site.<sup>17</sup>

As part of the process of creating this strategy, the homepages of fifty UK archive websites were tested using the [WAVE accessibility plugin](#) to look for common issues which make access to the site difficult for users with particular needs.<sup>18</sup> These sites were chosen to represent the breadth of the sector – ten from each of the national, local, university, business and special collections areas. Many archive sites performed gratifyingly well in these tests, in some cases exceptionally well: two-thirds of the archives tested raised fewer than 10 errors and two archives (Dorset History Centre and Guildford Cathedral) generated no errors at all.

These good results were not achieved by accident. Many of the sites examined incorporated WAI-ARIA<sup>19</sup> attributes which allow the provision of additional semantic content to describe the roles, properties or states of different elements within the page. The use of these attributes in and of themselves does not necessarily mean that an organisation is providing an excellent standard of accessibility (any more than the use of alt tags<sup>20</sup> did in the early 2000s) but it does demonstrate at least a certain degree of consideration of accessibility issues by the site provider.

Local government websites exhibited the fewest errors on average. They have in the past been criticised for aspects of their design or security.<sup>21</sup> It is very pleasing to see them performing well in this important area which they and other parts of the sector have clearly prioritised. This is a success which should be commended and about which site designers should be encouraged to write and speak. National archival websites performed relatively poorly. In several cases these archives included complex, dynamic elements on their pages. This does not inherently represent a

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<sup>15</sup> Disabled Living Foundation, 'Key facts', <https://www.dlf.org.uk/content/key-facts>

<sup>16</sup> Department for Work and Pensions, Official Statistics: Disability facts and figures' <https://www.gov.uk/government/publications/disability-facts-and-figures/disability-facts-and-figures>

<sup>17</sup> Gov.UK, 'Making your service accessible: an introduction', <https://www.gov.uk/service-manual/helping-people-to-use-your-service/making-your-service-accessible-an-introduction>

<sup>18</sup> This study was carried out in November 2018.

<sup>19</sup> Web Accessibility Initiative – Accessible Rich Internet Applications

<sup>20</sup> Simple HTML markup to provide 'alternative' text descriptions of images

<sup>21</sup> For example Terence Eden, <https://shkspr.mobi/blog/2014/03/the-unsecured-state-part-4-uk-government-websites-spewing-spam/>

critical accessibility challenge but accessibility interventions must become more extensive in step with these elements.

### 3.4 Digital inclusion

As in many other respects, when it comes to widening audiences, digital technology is a two-edged sword. It can be a source of exclusion: 5.3 million UK adults have either never used the internet or did not access it within a three month period.<sup>22</sup> 8% of people in the UK (4.3 million people) were estimated to entirely lack basic digital skills. These individuals could not use a search engine, email, shop online, fill in an online application or use online help.<sup>23</sup> Archives must serve these audiences too. Archival services cannot be supplied solely online and it would be hugely impoverishing for the sector in almost every way if reading room provision were to be eroded further than we have already seen in recent years. The heart of the archive is not after all repositories to which almost no one has access. Public space will continue to be needed to support engagement and access activities. In the 1990s, the arrival of the internet as a popular, domestic service caused librarians to ask existential questions about libraries.<sup>24</sup> As a result, libraries developed in new ways, particularly in their integration of technology. The People's Network, bringing internet access to libraries in the early 2000s, was a highly successful digital initiative. Libraries became, for many people, places where technology lived. Today, libraries may contain makerspaces<sup>25</sup>, VR experiences (courtesy of the BBC<sup>26</sup>), loan iPads (Leeds) or a Microbit (Newcastle) – the latter as if borrowing a book.



*Encounters with Raspberry Pis and a robot in the makerspace at Nuneaton Library*

<sup>22</sup> Office for National Statistics, 'Exploring the UK's digital divide', 2019, <https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04>

<sup>23</sup> Lloyds Bank, 'UK Consumer Digital Index 2018', [https://www.lloydsbank.com/assets/media/pdfs/banking\\_with\\_us/whats-happening/LB-Consumer-Digital-Index-2018-Report.pdf](https://www.lloydsbank.com/assets/media/pdfs/banking_with_us/whats-happening/LB-Consumer-Digital-Index-2018-Report.pdf)

<sup>24</sup> June Abbas, 'The library profession and the internet: Implications and scenarios for change', *Katharine Sharp Review*, no. 5 (1997), <https://www.ideals.illinois.edu/handle/2142/78254>

<sup>25</sup> David Lindley, 'Making space for makerspaces', *Information Professional*, September 2019, p.16

<sup>26</sup> Zillah Lammiman, 'Taking BBC VR to new audiences – in libraries', <http://www.bbc.co.uk/blogs/internet/entries/4e72062f-0000-4d0b-e3938a9fa8b2>



We should never place limits on the ambitions of archives but it is possible to articulate minimum service levels. Public libraries have set out a basic level of digital service as part of a universal service offer.<sup>27</sup> Archives offering regular public access should aim to reach an equivalent level, with the ambition for every public archive to provide free wired and wireless internet access, clear and accessible online information about collections and services and all archives staff should be able to assist users to access digital information. Information literacy, internet safety and digital research skills are critical parts of archival practice which we should share, particularly amongst vulnerable or excluded groups.

Digital tools can also help us think about other aspects of exclusion or bias. [Kat Matfield's tool for checking job advertisements](#) for gender bias is interesting and permits a wider discussion about the qualifications and competencies we add to job advertisements more generally and whether some of these could be removed in order to widen and diversify the field of applicants. Harvard University's tool for [implicit association testing](#) helps visualise some of the unconscious biases which shape recruitment and our workplaces. These tools obviously don't act directly on any of these issues. However, like Museum Detox's [White Privilege test](#), they can cause us to challenge the assumptions underpinning our practice.

### 3.4 Building access capacity

The National Archives will:

- **Produce onsite digital access guidance.** All UK archives open regularly to the general public should offer wired and wireless internet access and active user support
- **Support digital research** by producing guidance to support use of born-digital records by the research community
- **Work with vendors**, particularly of library systems, to improve archives modules offered as part of integrated cataloguing solutions.
- **Develop training in user-centred design** for the sector, including requirements gathering and user research
- **Explore sector metadata presentation** through further development of the Manage Your Collections tool to host and present sector metadata at scale via Discovery

The sector should:

- **Expand and deepen collaborations and consortia** to share digital costs and expertise
- **Make digital work visible** through sustained and effective promotion and ensure that the outcomes of funded digital projects are modular, reusable and open

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<sup>27</sup> Libraries Connected, 'Universal Offer: Digital', <https://www.librariesconnected.org.uk/universal-offers/digital>

## 4.0 Preservation



*Failed recovery of JPEG image (2006)*

Digital preservation is challenging. Although archive professionals can apply much of their accumulated skills, knowledge and practice into this new space, some of it is evolving rapidly and requires significantly different treatment from analogue records. Many significant new accessions combine analogue and digital material which presents new interpretive challenges. No institution has solved the challenge of digital preservation. But this is in part because digital preservation is a process and cannot be solved – just as preserving physical materials is not a problem subject to complete solution. Nevertheless, huge progress has been made in the last decade in meeting the significant issues posed by the quantity and complexity of born-digital and digitised material. Unfortunately a gap has developed (and appears to be widening) between institutions leading on digital preservation and the remainder of the sector. In order to narrow this gap both organisations and individual archive professionals will need enhanced support.

### 4.1 Organisational capacity

Many archives have firmly grasped the digital preservation nettle. Universities such as Leeds and Hull have amassed impressive expertise and maintain sophisticated architectures keeping contemporary and high-profile collections under active management. Gloucestershire Archives not only make use of their own 'SCAT' tool to package records but are leading thinking on how local authorities can best manage born-digital collections. Many archives, recognising the need to share (or even develop) best practice in this emerging area, have formed successful regional digital preservation consortia, with Archives First and Archives West Midlands proving particularly effective. The adoption of [NDSA Levels of Preservation](#) as part of the [Archive Service Accreditation](#) process offers a clear and simple way of judging and measuring preservation capability and makes the path to better and more robust preservation clear.

However, on some measures there is evidence that the sector is going backwards. The scale of digital collections is growing all the time. Successive CIPFA returns show an increase in born-digital archival holdings (11 TB in 2016/7 to 15 TB in 2017/8) in general. When digital and digitised collections are added together, the volumes involved can become quite large. The Guardian Archive alone holds in excess of 1.85 TB of material.<sup>28</sup> BFI digital collections are growing by 1 petabyte annually. In terms of digital public records transferred to places of deposit, however, the total is

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<sup>28</sup> Mole and Golding, 'Best kept secrets: how the Guardian archive tells the story behind the stories', *The Guardian*, 2018, <https://www.theguardian.com/membership/from-the-archive-blog/2018/aug/25/guardian-observer-archive-tells-story-interview>

negligible and may even be zero. Straightforward pipelines from traditional, institutional depositors simply do not exist for digital collections and as a result next to nothing is coming down them.

The response of organisations to this does not appear to be focused action, despite the fact that this failure to transfer categorically puts the record at risk. Our survey with Jisc allowed us to revisit some questions first asked by the Digital Preservation Coalition in 2005.<sup>29</sup> Today 36% of respondents report a “high-level commitment” to digital preservation in their organisation. 33% of the sample agreed that their organisation has “clear responsibilities” for digital preservation and 34% say they have a written strategy. This last figure has almost doubled from 18% in 2005. This would appear to be a welcome outcome from accreditation. Nevertheless these numbers are very disappointing, particularly because in 2005 52% of the DPC’s sample reported a high-level commitment to digital preservation within their organisations. The percentage of respondents reporting that funding is “adequate” in this area has halved from the 2005 sample and is now only 10%. This represents the tough financial climate in which most cultural organisations have been operating in the last decade. The figures showing an apparent waning of interest in digital preservation amongst senior leaders represents a collective failure to acknowledge this work as a core part of archival practice within many institutions. It also represents a failure by parent organisations to understand the risks and benefits of digital preservation.

It is easy to make a negative case for digital preservation (‘if you don’t hold these documents in 20 years you will end up in court’) and easy to find headlines to back up such a case<sup>30</sup> or to show the vital role such information plays in critically important - but also rather rare - events such as public inquiries.<sup>31</sup> The positive case for digital preservation is less often expressed but there is an emerging awareness of how organisations can save money by storing born-digital assets rather than paper documents and by moving old data out of live systems occupying volatile, expensive storage into ‘slow’, cheap cloud systems.<sup>32</sup> It is also clear that digital preservation can, in the first instance, make use of existing infrastructure, even though additional redundancy will be required. The need for catalogue redundancy may be met by the use of aggregators such as Discovery or the Archives Hub. In the future, these systems will likely need to expand to store more extensive forms of third party metadata such as fixity information.

Digital preservation technology is still relatively immature. Local archives are only at the beginning of archiving ‘transactional data’ – the data in large, live databases that underpin critical aspects of the work of the state, such as child protection. Ingesting this data is as much (perhaps more) about risk, business process and ownership than it is a technical challenge. Existing products may not help with this. Some systems, such as Preservica have rapidly growing user bases in many different

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<sup>29</sup> Waller and Sharpe, ‘Mind the Gap: assessing digital preservation needs in the UK’, Digital Preservation Coalition, 2006

<sup>30</sup> Findlaw, ‘Delete At Your Peril: Preserving Electronic Evidence During The Litigation Process’, Thompson Reuters, <https://corporate.findlaw.com/litigation-disputes/delete-at-your-peril-preserving-electronic-evidence-during-the.html>

<sup>31</sup> Evan Smith, ‘Historians and the online archive of the Hillsborough Independent Panel’, *Hatful of History*, 2016 <https://hatfulofhistory.wordpress.com/2016/05/04/historians-and-the-online-archive-of-the-hillsborough-independent-panel/>

<sup>32</sup> Amazon Glacier would be one example.

parts of the sector.<sup>33</sup> Conversely, some research institutions such as Wellcome Collection are reaching a level of maturity in which Preservica is no longer seen to fulfil a key role. Others, such as the University of Hull have moved directly from using simple tools to constructing a robust, predominantly open source architecture, combining Archivematica, [Samvera](#) and [Hyrax](#), Calm and [Blacklight](#). Relying as it does on distributed redundancy, digital preservation is not an activity in which the dominance of a single or small number of providers is entirely desirable.

Software is not a substitute for knowledge and archives undertaking a procurement exercise instead of developing their in-house expertise in digital preservation risk simply spending money on tools they do not really understand. A piece of software cannot by itself preserve anything and full-service solutions may include expensive, unnecessary extras or charge for storage at a rate which may quickly become unsustainable. It is possible to procure software without improving digital capacity and several archives have directly or indirectly reported that they have successfully tendered for digital preservation software without being clear about how it can be used effectively. Organisations that have not engaged in even rudimentary digital preservation activity are not well placed to make informed, evidence-based decision about their software needs for the future.

Using open source tools, such as Bagit, DROID and Fastsum to construct a simple preservation workflow is technically within the capacity of the overwhelming majority of archives. But the real barriers to robust digital preservation workflows are not primarily technical but organisational. Many archives have not succeeded in forging the relationships with IT providers necessary for this work or have been deflected with technobabble or the recitation of poorly thought out (or non-existent) business rules.<sup>34</sup> Practitioners must also ensure they choose appropriate points of contact for this work: digital preservation cannot live by IT helpdesk ticket alone.

## 4.2 Individual capacity

The confidence to have such conversations speaks to the individual digital capacity of archive professionals and section 5 will return to this. However, part of the confidence to have discussions with other professionals comes from a level of knowledge which some archivists expressly disclaim. In focus groups, one participant declared:

*"I do not have the confidence to say to my organisation, 'we will look after your digital records'".<sup>35</sup>*

From some colleagues, there is an unwarranted shyness to own considerable expertise. However, in many other cases this lack of confidence is entirely justified. In our survey with Jisc, 48% of respondents reported they could not generate a checksum of a digital file, 49% could not perform file format analysis and 55% could not extract and publish metadata from a digital file. In each case, roughly another 25% of respondents reported that they 'had some knowledge/skills' in the specified area. This amounts to a very worrying proportion of the sample of the profession being unable to carry out critical preservation functions on digital records. This is so deeply concerning because

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<sup>33</sup> Preservica is used by several local authorities and also the John Lewis Partnership, Sainsbury's, HSBC, Network Rail and Amnesty International amongst others.

<sup>34</sup> The Local Digital Declaration, for example (<https://localdigital.gov.uk/declaration/>) underscores how absurd protestations by local government IT against the use of open source software actually are.

<sup>35</sup> The National Archives/Jisc focus group, November 2018

these findings amount to an admission that the nature of contemporary collections is such that today many archive professionals can no longer care effectively for the material they hold. That many digital collections are not held safely was highlighted further in the survey where 60% of respondents said that their digital collections were not held in multiple, geographically distinct locations and 82% admitted the collections were not regularly fixity checked.<sup>36</sup>

Current training provision has not so far been adequate to the (not inconsiderable) task of raising the skill level of the majority of the profession. It is also very evident in this area that open source software can lead to not only awkward challenges and conversations within institutions but also leads to individual challenges as novice users are forced to confront unfamiliar tools armed with documentation which is simply not written with them in mind.<sup>37</sup>

Training must also be the right sort of training. It certainly cannot be purely theoretical. A 2017 report by Archives West Midlands showed that despite 10 out of 11 services surveyed receiving digital preservation training by a range of high quality providers, 9 of the services subsequently reported that “staff within their service feel unprepared to deal with digital preservation activities”.<sup>38</sup> This training had failed to provide “practical experience of managing digital records” and future provision must be mindful of this and not focus purely on planning or advocacy. In common with other conservation work, digital preservation is a craft skill and must be learned in practice as well as theory.

### 4.3 Building preservation capacity

This is a particularly urgent area of need.

The National Archives will:

- **Develop and deliver an intensive practical short course** in digital preservation
- **Commission new entry-level guidance** aimed at installation and use of open source preservation tools
- **Publish details of preservation workflows and infrastructures** in use within the sector
- **Actively pursue grant funding** to support digital preservation work in local and specialist archives
- **Raise the profile of digital preservation in local government** through engagement with the Society of IT Managers and the Local Government Association

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<sup>36</sup> 200 respondents gave an answer to this question.

<sup>37</sup> This documentation is not poor by the standards of the open source community. In some cases, judged by this measure, it is good. But it is not adequate for the archival community as a whole.

<sup>38</sup> Archives West Midlands, 'Understanding digital preservation activities across the West Midlands region', August 2017

The sector should:

- **Make digital preservation work and training a strategic priority.** Other work may have to be temporarily scaled back to allow critical new capacity to be developed.
- **Begin or intensify discussions with senior IT managers** within their organisation to form the partnerships necessary for sustainable preservation

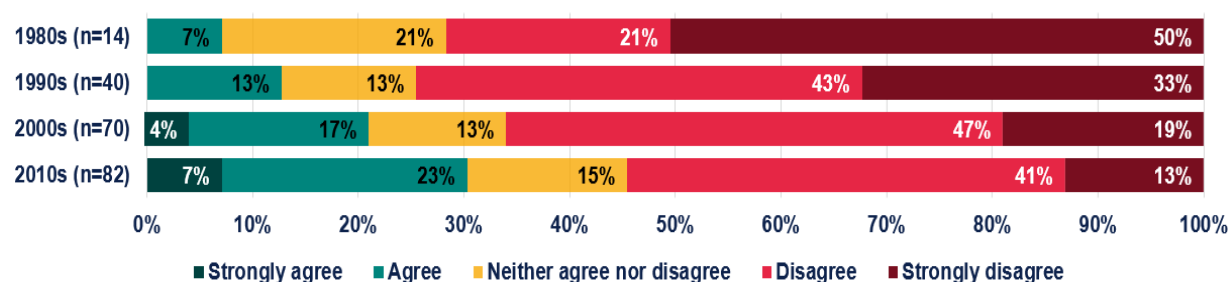
Many of the actions in the next section are also aimed at narrowing the digital preservation capacity gap.

## 5.0 Skills

Digital archival work requires specialist knowledge specific to archives and is not simply a collation of digital skills. Nevertheless, effective 21<sup>st</sup>-century archival work is impossible without an appropriate level of digital knowledge and training. Some of these skills are technical or tool-based (generating a checksum) while some are strategic or organisational (writing a tender for a digital product or service). Today, as already observed, only around one in three UK archive professionals in the survey cohort believe they have the digital skills they need to carry out their roles. 59% reported that their organisations either had no digital strategy or they haven't read it and of managers only 18% reported that they felt confident judging between suppliers of digital systems.

### 5.1 Qualifications

Archive professionals with qualifications in Archives Administration, Records Management and the like, overwhelmingly report that they feel these courses did not provide them with sufficient digital capability to work in the sector today.



*206 respondents to the question 'To what extent do you agree that [your postgraduate archives] qualification has provided you with sufficient digital capabilities to work in the sector?', broken down by the date that the course was undertaken. (Jisc)*

Even of those who have undertaken their qualification in this decade (the largest group responding to the survey) only 30% judged the course's coverage favourably. While this trend is improving over time, on this rate of progress we could not expect to reach even 50% satisfaction until around 2035. This strongly suggests that existing postgraduate qualifications are not moving quickly enough to

meet the needs of sector graduates and that these courses (or at least some of them) may require refreshing. In particular, it does not seem appropriate for students to be able to take a set of core and optional modules which exclude digital work. The digital content of modules should be clearly expressed online so that students can make intelligent judgements about their study but entirely 'non-digital' paths should no longer exist.

## 5.2 Barriers

Once in post, archive professionals report significant barriers to skills development. In these straitened times it may be felt that the main barrier is cost. This appears not to be (directly) the case. "Time and opportunity", "competing priorities" and "capacity resourcing" came up again and again. This really amounts to insufficient strategic attention to digital work and digital skills by senior leaders. Senior management must make time even if that involves temporary curtailment of other workstreams.

Confident digital management is the biggest challenge facing archives - bar none - because it puts both the integrity of the record and long term organisational sustainability at risk.<sup>39</sup> Yet our results (see particularly 4.1) suggest that organisations are reluctant to admit this. Archive professionals at all levels lack the confidence to make the digital case they need to make, whether at a high strategic level or at a practitioner level. Indeed at this latter level, when we ask what skills respondents feel they lack, they are almost unable to answer - with "everything", "digital archiving" or "I don't know what I don't know" all being popular responses. An inability to be able to even outline the problem which needs solving shows how much work needs to be done in this area. And yet at the same time we see digital excellence manifested in all parts of the sector, from business and charity archives to university to local archives. These much needed skills simply need further dispersal. Archive professionals with experience in digital work need to be invited to share their expertise widely and digitally mature organisations to support those at a lower level of maturity. The National Archives can and will lead by example in developing this ethos. More generally, learning and skill development must be seen as an integral part of every archival role and organisations not in a position to hire expertise must allow staff the necessary development time to develop these skills.

## 5.3 Relations with IT

IT and archives do not share a common language. Scott Prater has outlined some of these differences.<sup>40</sup> One that he does not mention is that in some technical circles the word 'archive' means 'delete'. This may not appear the basis for a burgeoning beautiful relationship - nevertheless, that is the relationship archive professionals need to build with their IT counterparts. Both are now shared custodians of their organisations' data and need to collaborate seriously and at a senior level as such. Previous adversarial conversations about individual pieces of software (or

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<sup>39</sup> Indeed organisations facing existential threats are usually failing partly because of their inability to engage with this digital preservation/access/engagement agenda.

<sup>40</sup> Prater, Scott. "How to Talk to IT about Digital Preservation." *Journal of Archival Organization* 14, no. 1-2 (2017): 90-101.



nonsensically bashing the concept of open source) must be set aside in pursuit of the common goals of safeguarding the organisation's information into the future and providing high quality and engaging experiences for users. Archive professionals must know enough to sustain their side of this conversation and demonstrate that they are the knowledgeable partners that their IT colleagues need to preserve data past the lifetime of today's systems and to meet future legal and other obligations. Building and maintaining these relationships is a digital skill as surely as writing a programme or performing file format analysis and may, at the outset, require similar levels of preparation and persistence.

## 5.4 Developing digital skills

The National Archives will:

- **Launch a network** for archive professionals undertaking digital work. The Digital Archives Learning Exchange (DALE) will meet regularly off and online to share skills and best practice
- Develop a **peer mentoring programme** to encourage the transfer of skills from those experienced in digital work to those less experienced
- Develop a **digital leadership programme** to ensure senior managers can formulate and execute the digital strategy and advocacy needed now and in the future
- **Publish metrics** showing the relative digital performance of UK archives to facilitate comparison and promote transparency and excellence
- Continue to **develop and support novel routes into the sector**, including apprenticeships and the Bridging the Digital Gap traineeships
- Support the British Library and Birkbeck, University of London to **create and deliver a new postgraduate qualification** in Computing for Cultural Heritage.
- Work with the Archives and Records Association to **ensure postgraduate archives courses provide a greater focus on digital archival skills** and practice

The sector should:

- **Support staff** to develop their digital skills and share knowledge with colleagues and the wider sector.
- **Share experiences** of digital work while it is being undertaken – through blogs, social networks and by working in the open using code repositories such as Github



## 6.0 The Future

The future of archives will not be the same as their past. Digital information requires significantly more active management than analogue, and archive professionals must adapt to this changing world.

As memory organisations in an information environment in which unverified information can circulate very rapidly, archives may well find that they have a role in authenticating digital information – is that newsclip from 1976 on Facebook a true representation of a Tyne-Tees TV broadcast or has it been altered in some way? The ability of archives to check the fixity of their own collections is likely to be useful outside their systems. Data which has not been retrieved from an authoritative source may come to be regarded as of very little value. Distributed ledger technology (more commonly known as blockchain) may have a role to play in preserving digital archival collections, protecting through the decentralisation of records or secured information about them.<sup>41</sup> Many current implementations of this technology are adversarial and immensely resource hungry but this would not be the case in a future archival system. This is significant because archives will inevitably turn their attention to their own environmental footprint, of which digital storage is a part.

Today, digital storage is exceptionally energy intensive. Data centres alone account for 1% of global electricity demand and by 2030 this has been projected to reach 12%.<sup>42</sup> It will very soon become unethical (if it isn't already) not to make use of data farms powered by renewable energy and many other aspects of archiving will need to be considered from an environmental standpoint.<sup>43</sup> Digital storage in the cloud may even prove to be a transitional technology. Using DNA to store large amounts of data is today an expensive and unreliable technology – but it is no longer science fiction.<sup>44</sup> Its costs and error rates are reducing and it is possible to imagine certain kinds of high value data being stored in this way.

On the web, platforms will continue to proliferate. This may sound intimidating but it is simply the management of a diverse collection of depositors which archives have always managed in a new guise. Archiving relevant Facebook content is not fundamentally more difficult than extracting precious records of significance from a reluctant owner. It requires time and patience and is hard to do at scale but if the collection is significant enough, the process begins. The tools we will have to harvest web content will continue to develop and one big and so-far unresolved challenge are the access systems needed to negotiate this content at scale. The use of artificial intelligence (generally machine learning) to make judgements or derive information about digital records is already driving approaches in areas as diverse as sensitivity review or handwriting transcription. But AI also

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<sup>41</sup> Collomosse, John, Tu Bui, Alan Brown, John Sheridan, Alex Green, Mark Bell, Jamie Fawcett, Jez Higgins, and Olivier Thereaux. "ARCHANGEL: Trusted archives of digital public documents." In *Proceedings of the ACM Symposium on Document Engineering 2018*, p. 31. ACM, 2018.

<sup>42</sup> Nicola Jones, 'How to stop data centres from gobbling up the world's electricity', *Nature*, 2018  
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<sup>43</sup> Heidi Abbey, "The green archivist: A primer for adopting affordable, environmentally sustainable, and socially responsible archival management practices." *Archival Issues* (2012): 91-115.

<sup>44</sup> Andy Extance, 'How DNA could store all the world's data', *Nature*, 2016, '<https://www.nature.com/news/how-dna-could-store-all-the-world-s-data-1.20496>

has a role to play as an assistive technology. Future catalogues must actively help searchers find what they are looking for, rather than merely performing query matches without any consideration of whether so-called 'relevant' results really help the confused user resolve a question or meet an information need.

Systems will need to become more open and more interoperable to support the delivery of this and other technologies. Thanks to the wisdom and foresight of successive generations of custodians in creating and maintaining the National Register of Archives, today accessible through Discovery, archives have a national collections portal unparalleled in the cultural sector. This data needs to continue to be connected, shared and augmented to help researchers unlock the full potential of the (inter)national records landscape.

Our profession also needs to open up. We must adopt a wider view of archival work. This document deliberately avoids use of the term 'archivist' because this currently implies a narrow professional qualification and set of expertise. Archives must become places in which many professionals collaborate to safeguard, provide access and tell stories (or explain the evidential value) of or about records. It is not sustainable to introduce new specialist paths into the profession, imparting invaluable expertise, if colleagues deny the value of that expertise. Specialists in digital records and projects may come from many backgrounds but their specialism should be consistently recognised. Archive professionals are those carrying out archival work.

That core work remains unchanged. A dichotomy between 'traditional' and 'digital' archival skills is not only unnecessarily adversarial, it is completely false. Preservation, access, engagement – and indeed scholarship – are all fundamentally traditional archival practices which simply acquire a new dimension when digital technologies are considered. Today, archiving is digital archiving – amongst other things. Archive professionals must continue to develop their skills to ensure that they can continue their most critical functions in a digital age. There is no more urgent challenge facing the sector today.

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