Inspiring Research, Inspiring Scholarship: The Value and Benefits of Digitized Resources for Learning, Teaching, Research and Enjoyment

Simon Tanner, Department of Digital Humanities, King's College London, United Kingdom

Abstract

This paper will consider the opportunities and impacts that digitized resources have made for learning, teaching, research and society. The focus for this paper comes from the significant impact and value in the United Kingdom discovered during the JISC funded research project: Inspiring Research, Inspiring Scholarship. [1] It will conclude with the suggestion that the impacts of digitized resources are being negated by the very modes of measurement and evaluation currently in place and will posit fresh areas for investigation.

Introduction

Imagine walking into one of Britain's great cathedrals. As you take in the architectural, cultural and religious ambience, your mobile device automatically engages with content on your behalf.

So, just when you ask for it, the local tour is available in your own language. But there is much more: images and information on the stained glass too high to view, videos of famous ceremonies, 3D walk-throughs showing how the cathedral may have looked in previous centuries, full text of historic and literary references, a list of people buried, baptized or married, choral works performed, oral histories of local residents, news reports through the centuries: this list of opportunities could and will grow even longer.

This is the inherent promise of digitized resources and yet we have not achieved this goal with many of our digital collections. Technology exists to drive forward a vision of intelligent environments that supply the right information to the right person at the right time. Paradoxically, what is missing is the depth of digitized content to make such technical developments more significant than mere mobile playthings. The treasure house of content has to be digitized much more comprehensively.

Much has been achieved, but there are opportunities for much more impact, benefit and a greater return if we continue to invest in the knowledge economy by digitizing our wealth of information resources.

Overview of opportunities, benefits and impacts from digitized resources

Many countries are aiming to create sustainable national content collections of compelling rich and accessible digital content. The sorts of benefits and impact from digitized resources tend to support the following areas of digital opportunity.

Sarah Thomas at the Bodleian Library states: What the Bodleian Library is doing now, in digitizing large portions of our vast collections, is like the human genome project. Thousands of people can evaluate and use creatively the digital resources to discover new ideas and make innovations. Many hands make light work and those many hands will profoundly touch Britain's future capacity for learning, research and innovation. [2]

Learning

Educational benefits are gained from a wide variety of activities introducing people to new digitized information and experiences. This might mean using digitized content to teach history at university or biology in a school classroom; an introduction to new activities such as creative writing or renovating a steam train; or visiting museum collections. Education benefits should strive to include all members of society, not just university students or schoolchildren: there is a hunger for learning and for resource discovery at all levels.

Dr Michael Wesch at Kansas State University states: Now I enter the classroom and I think, most of the content that I have to deliver and a whole lot more, is floating around them right now. What I need to do is inspire them and give them the tools to harness that information and harness the skills of other people to do the things they want to get done. And that transforms the way you approach the classroom. [3]

Research

Research benefits accrue when we invest in deepening our understanding of the world and build upon the intellectual legacy of previous generations. Digitized resources continue to transform the research process. The researcher can now ask questions that were previously not feasible; they can engage in a new process of discovery and focus their intellect on analysis rather than data collation.

Consumption

The most obvious benefit of digitized resources is the value people get from using them. The term consumption is intended to include both the "entertainment" value of engaging with digitized content and the personal value added from participating in a community of use. Increased consumption will also benefit economic sustainability.

Strengthening communities and regeneration

Digitized resources make it possible for communities to grow more cohesive as common interests and a common vision can be shared.

Building collaboration

Working together in collaboration maximizes impact – whether for research, education or societal benefits. In particular, the Digital Humanities fosters collaboration and best practice between universities nationally and internationally. They enable

mutually beneficial links between universities, memory institutions, publishing and media to develop digital content and provide a context for use by a wider community. [4]

Collaboration also has a shown a strong impact upon building recognition internationally, leading to new economic and innovation opportunities. Giving access to a high volume of digitized content will confer a high profile to the quality of the institution's work. As Matt Chapman suggests: the idea really is that Einstein's live everywhere, but you don't necessarily invite them to your meeting. [5]

Impacts and *benefits*

In overview, the impacts and benefits of digitized resources can be broadly divided amongst research, learning, economic and connecting communities. But how does this work in practice. The exemplars in the following sections will illustrate the way benefits are accruing to these broad areas.

Learning, Teaching and Research Benefits

Digitized resources transform the research process

Exemplar: The New History from Within

The Old Bailey Online at www.oldbaileyonline.org offers a fully searchable database of the largest body of texts detailing the lives of non-elite people ever published, containing 197,745 criminal trials held at London's central criminal court with over 120 billion words recorded.

Alongside other key projects, such as London Lives 1690 to 1800 at www.londonlives.org, this makes eighteenth and nineteenth century London the most digitized where and when in the history of world. As Professor Tim Hitchcock states: Old Bailey Online reaches out to communities, such as family historians, who are keen to find a personal history, reflected in a national story, and in the process re-enforces the workings of a civil society. Digital resources both create a new audience, and re-configure our analysis to favour the individual. [6]

Easier access to scholarly publications

A bedrock of scholarship is the ability to share, discuss and reference thoughts, ideas, and discoveries. Scholars require access to the accumulated knowledge of human endeavour to move research and discovery forward rather than in circles.

Improved access to scholarly content makes research and teaching easier, faster and more productive. Hundreds of millions of pages of historic scholarly content are now available, bringing untold thousands of hitherto hidden articles back into circulation. through initiatives including over 6 million pages accessed almost 600 million times on JSTOR at www.jstor.org or the British Library's Electronic Theses Online Service (EthOS) at http://ethos.bl.uk allowing instant access to 250,000+ UK theses that have already been digitized. Other examples include, the Oxford Journals Archive at www.oxfordjournals.org providing more than 3.4 million article pages and Welsh Journals Online at http://welshjournals.llgc.org.uk which digitized some 400,000 pages of Welsh academic content These enhance the ability of scholars to cross-search and cross-refer.

New areas of research enabled

Digitized resources enable entirely new areas of research and discovery to be opened up. New research methods can be applied to the digitized resources which were hitherto unthinkable. New collaborations across disciplines can also be fostered through joint engagement with digitized resources.

Bringing collections out of the dark

Britain's wealth of information and artefacts underpin the nation's culture. Yet because of the sheer volume, value, fragility, complexity and dispersion of physical assets they can never fully be displayed, accessed or made widely available in that form.

Exemplar: Early English Books Online

Early English Books Online (EEBO) at http://eebo.chadwyck.com provides to scholars and students a digital collection of 22 million pages of early printed text, representing 125,000 books published in England or in English between 1475 and 1700. This is the culmination of more than a century of effort in finding, cataloguing, microfilming, digitizing, rekeying and delivering what is in effect a great virtual library of early books.

Dr Sarah Carpenter at the University of Edinburgh explains the benefit: Early English Books Online itself has transformed research into early English literature. It has democratized the research process by extending this facility to individuals and institutions without easy access to specialist libraries. [7]

It is one of the world's greatest digital collections, and its impact on research and teaching is profound. It allows many scholars and students around the world access to what has been in the past only accessible to the very few.

A PhD medical history student states: I would not be able to do my research without the use of EEBO. Moreover, I am looking at lots of medical recipes and need to assess quickly what the ingredients were thought to be useful for. The ability to search full texts to find these ingredients with ease and speed is crucial to my work. It saves me a lot of time not to have to read the whole document to find one herb. [8]

Virtual reunification

Primary source material is vital to scholarly research but in some cases the source material may have been artificially separated and physically distributed over the whole planet. In the past scholars travelled to libraries around the world if they wanted

to compare sources. This was costly, time consuming and inefficient. In addition to reunifying primary sources, digitized resources enable new tools to facilitate research once they can be brought together again.

Exemplar: Jane Austen

Jane Austen's Fiction Manuscripts Digital Edition at www.janeausten.ac.uk presents all Austen's manuscripts to be viewed side-by side for the first time in 150 years. The Digital Edition gathers together in the virtual space of the web some 1100 pages of fiction written in Jane Austen's own hand. Through digital reunification, it is now possible to access, read, and compare high quality images of original manuscripts whose material forms are scattered around the world in libraries and private collections. These manuscripts trace Jane Austen's development as a writer from childhood to the year of her death and provide a unique visual record of her imagination.

Professor Kathryn Sutherland at Oxford University explains: the Digital Edition offers unprecedented opportunities for new scholarship, particularly in exploring the creative laboratory of her novels, so far an under examined area of Austen studies. It also makes the manuscript sources freely available to the wider public. [9]

Teaching benefits

The increasing availability of digitized resources allows educational institutions to provide students with more varied, more accessible and richer teaching materials than ever before. This encourages a more exploratory, research-based approach to teaching and learning. Entirely new kinds of topics and courses can be studied, new modes of assessment are possible, and students are given a richer educational experience.

Once available digitally, materials produced for one context can be used in many others: advanced research projects can be used by students in a wide range of contexts and backgrounds including schools and colleges, and life-long learners. For instance, Survivors of the Shoah Visual History Foundation identifies on its website at http://college.usc.edu/vhi/ that its content would have significant relevance to 42 academic subject areas.

Exemplar: Chopin's First Editions Online

Chopin's First Editions Online unites all of the first impressions of Chopin's first editions in an unprecedented virtual collection, thereby providing direct access to musicians and musicologists to the most important primary source materials relevant to the composer's music.

Professor John Rink of Cambridge University: This digital resource is the only complete collection of the Chopin first editions, which otherwise are scattered across the globe... users have at their fingertips source materials which they otherwise would never have sight of, or only with considerable difficulty and concomitant expense. [10]

Availability of new kinds of materials

Digitization takes primary sources beyond the book and the laboratory. Digitized sources bring into the classroom simulated practical experimentation in science as well as rare and fragile artefacts to support teaching.

Time-based media

Time-based media can be difficult to access for teaching, though the tape recorder and later the video machine brought about the birth of media studies, a popular and vitally important area of study. Now, digitization allows students and researchers to edit sources into multimedia publications and comment directly on them in ways that were never before possible.

Integrating many different kinds of resources

Students can now participate as genuine researchers and real contributors: online courses and reading lists can link directly to digitized resources—not only for library-type materials but digitized images for the study of image-rich subjects (art history, for example); 3-D models for chemistry or physics; simulations for teaching medicine; rich data sets for statistical modelling.

Students are no longer limited by geography, these resources do not even need to be in the student's own institution, they could be on the other side of the world.

Bestowing Economic Benefits

Widespread access to digitized resources enhances education and research at all levels of attainment. They contribute to the vibrant cultural and intellectual life of the UK, promoting education and enjoyment for all whilst bestowing a range of benefits to local and national economies.

Higher Education has a key role in transferring ideas, research results and skills between universities, other research organizations, business and the wider community, conferring a whole range of benefits: economic, social and political. In the modern world, the digital agenda and the digitized resources to support innovation are essential components for Higher Education investment.

Competitiveness – increasing value whilst accruing cost savings and efficiency gains

I believe that the economic profile of the acquire, store and access chain suggests that switching to digital has so many cost benefits that the cost of acquiring through digitization is a solid investment, especially for text-based resources, film and video, or scientific datasets.

Learning, teaching and research are all enhanced by wider, easier and cheaper access to digitized resources. This is being achieved through the large-scale digitization of materials held by educational and cultural establishments worldwide. One result of this is that costly, time consuming and inefficient travel to visit collections or collate data sets has been radically reduced. Digitization allows multiple resources to be interrogated and compared instantly, making the research process more rapid and facilitating more in-depth study.

Efficiency savings

Significant efficiency savings are being achieved through the use and re-use of data and by reducing the cost of collection and creation.

Re-use is a key economic benefit, with many research and learning uses becoming available to many audiences—many of these uses having not been foreseen by the original creators. The benefits and impact of secondary analysis of digitized resources have been particularly apparent in the sciences.

Dr Amy Irwin, research fellow at the MRC Institute of Hearing Research, has used the British Library's Archival Sound Recordings (ASR) during the course of her work to assess the impact on the human brain of sounds perceived as either pleasant or unpleasant. Amy explains: Being able to download clips directly was a great time-saver – the variety of soundscapes available was also useful. Combined with the soundscapes I found from other sources, Archival Sound Recordings provided for all my needs. [11]

Doing more for less

The cost of creating digitized resources is continuously dropping, and investment in digitization is delivering its benefits and impacts more quickly than previously was possible. As real economies of scale are realised, further benefits accrue through sharing both the direct and indirect costs, whilst international collaboration is fostered by the ability to share knowledge and resources.

An excellent example of the economic and intellectual leveraging of community engagement through sharing digitized resources is provided by crowdsourcing. Crowdsourcing is a distributed problem-solving and production model with the community or crowd submitting solutions. It is a very low cost means of engaging with a community, and delivers the benefits of increased skills, enhanced digital resources and improved institutional links with that community.

Optimizing the research and teaching environment

Digitized resources and the increased sharing of data sets provide opportunities to create a more complete and transparent record of scholarly endeavor.

The availability of digitized resources can:

Skills

The growth of digitized resources generates new and improved skills in students, scholars and the wider public. The silver surfer generation has been fostered by the growth in family history resources available online.

Crowdsourcing has raised the skill levels of the wider public by aligning simple online tasks with exciting digital content. The Victoria and Albert Museum have crowdsourced Search the Collections at http://collections.vam.ac.uk/crowdsourcing/asking the public to help manage the 140,000 images in the collection. This brings the users to the content and lifts their information and subject literacy skills.

Connecting people and communities

Connecting people and communities with digital content greatly improves life, work and leisure, and ensures that all are included in our digital future.

Access to over one hundred million digitized archival records from archives and libraries transforms local history research and builds expertise in genealogists and local historians. Octogenarians now regularly use complex resources with great facility—the silver surfer generation has been created.

Connecting communities with news

The news, local, national and international, is a vital resource. Now it is put into the hands of everyone, and reveals a wealth of information about our daily lives of the last three centuries.

Professor Stewart Purvis, former Chief Executive and Editor in Chief at ITN states that: Newsfilm Online is a ground-breaking example of a creative partnership between higher education and a leading commercial news archive. It is set to move the agenda forwards in the appreciation of the long-term educational and scholarly value of broadcast news. [12]

Community cohesion

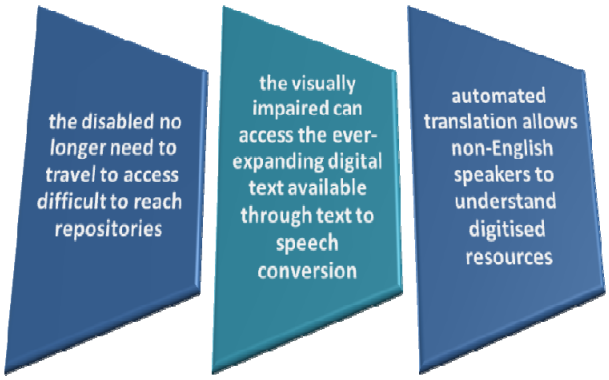
Communities (local and distributed) can cohere around digitized resources, sharing common interests and promoting a common vision. This is particularly important in areas of specialized or minority interests, where geographically-dispersed communities can be developed and sustained in a way that could never happen around physical resources.

Commenting about Caribbean Histories Revealed, an online exhibition from The UK National Archives at www.nationalarchives.gov.uk/caribbeanhistory/, the award-winning novelist Andrea Levy, best known for *Small Island*, says: it is fascinating, and very gratifying, to see the historical records of the Caribbean becoming more accessible to ordinary people. The on-line exhibition makes a great starting point for anyone interested in researching this part of Britain's heritage.

A sense of place and time: a deeper engagement with the place and area people live and their personal histories

Digitized resources can offer great support for personal participation in society. They provide information about family and ancestors, educational opportunities, medical and health information, entertainment, and a deeper engagement with the places and areas people live in through maps, historical photographs, trade catalogues, etc.

Memory institutions are also bringing their collections directly into communities to connect with those disadvantaged or isolated by circumstance from their personal memories or communities. Benefits include:



Especially for older persons, bringing collections directly into their homes enables memories to be triggered and allows them to reconnect with their community and their past. It also opens up new opportunities for shared participation and inter-generational interaction. The social benefits of personal memories within a wider context has provided comfort to early stage Alzheimer's sufferers and enabled families to interact with the older generation's memories and social context.

Community engagement through revealing content and allowing new content to be discovered

Community projects, in partnership with educational and cultural memory organizations, have helped deliver a wealth of formerly hidden material to a wide and diverse audience, both within and outside the UK. Dr David Turner at Swansea University states: Digitized resources allow me to discover the hidden lives of disabled people, who have not traditionally left records of their lives. I have found disability was discussed by many writers in the Eighteenth Century and that disabled men and women played an important role in the social life of the time. [13]

Lifelong learning and digital communities

The lifelong, voluntary and self-motivated pursuit of knowledge for personal and work gain relies considerably upon the availability of digitized resources. This not only enhances social inclusion, active citizenship and personal development, but also competitiveness and employability.

Without digitized resources, many subjects cannot be effectively engaged with and the availability of free to access digital content is addressing issues of digital literacy and the digital divide by democratizing access.

Digitized resources, especially in very specialist or relatively minority interests, provide the opportunity through the Web of developing a sense of belonging and common purpose. It is thus possible to build or sustain a community around an interest in the digitized content that could not easily be done in the physical world. For example, medieval studies is an area energised by the growing availability of digitized resources, which opens up the field to a wider community of lifelong learners and school usage. Resources such as the Digital Image Archive of Medieval Music (DIAMM) at www.diamm.ac.uk have been used in teaching even at primary school level.

As Ellen Hogan, an amateur user of the Fine Rolls of Henry III stated: What a treasure trove of information you have here, the simple details that give away the thoughts behind the monarch. I had no idea this was here... It is archives like this that reveal the rich history that this country has. [14]

Conclusion: The 5 Modes of Value for Digitized Resources

Andrew Green, Librarian at the National Library of Wales explains the fruits of big digitization as: not difficult to imagine how groups of users might respond, given the opportunities and the tools, to the presence of huge quantities of text in digital form: by annotating, translating, citing, discussing, analyzing, reusing and repackaging. [15]

Measuring and interpreting the broad impact of digitized resources remains a complex undertaking. There is a mass of extant evidence, but attempts to interpret such evidence often tended to rely on commonplace assumptions about the nature of digitization, without fully appreciating the actual way in which end users interact with such digital content. Digitization projects and programmes need to engage with the core principle of impact assessment - how does this change people's lives?

Very little attempt has been made to date to provide a deeper analysis that draws evidence from a number of sources and provides a compelling account of the advantages of digitized content. When I looked at value, benefit and impact statistical measures and evaluations were seen as of primary importance to provide a sense of the scale of use and the penetration of digitization benefits into the community. However, in actuality these were mainly lacking in depth and longitudinal evidence. It is my assessment that many of the evaluations focused upon measures of numeric achievement in terms of items digitized. Most evaluations were lacking detail on usage and actual impact.

Narrative accounts and case studies were thus also seen as important factors to personalize the statistics, evaluation and literature synthesis. These narratives add clarity to those benefits and provide a sense of the way digitization actually creates and delivers changes in academic research and teaching practice. This paper has used such narratives extensively.

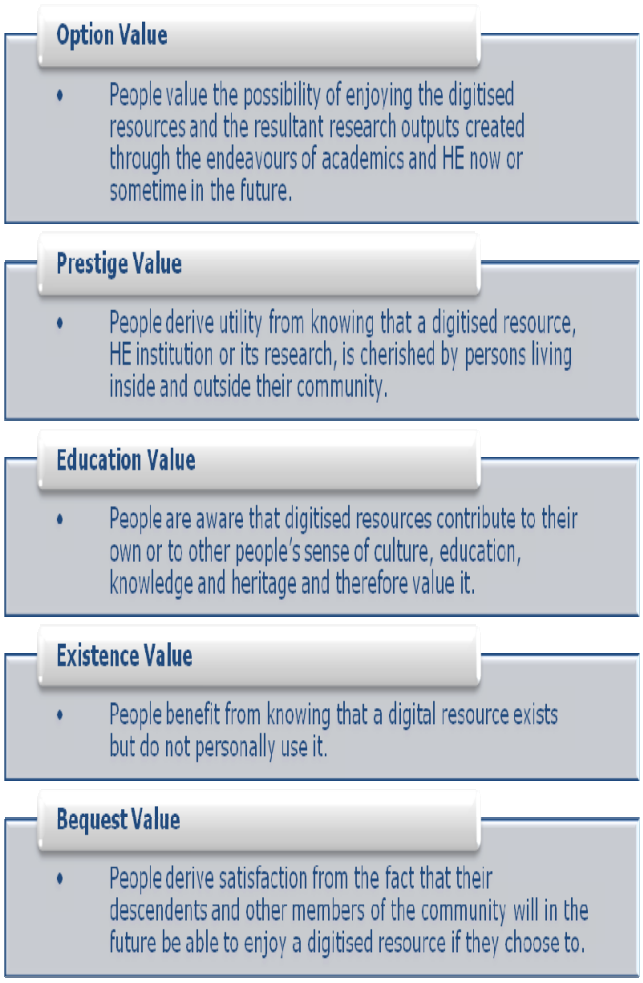
It is worth stating clearly that the evidence presented by previous evaluations has either been limited to number-crunching visitor numbers without much segmentation and analysis, or the use of anecdotal or survey evidence to try to find out about value and benefits.

We remain in a situation where the creative, cultural and academic sectors are not able to adequately demonstrate from a strong enough evidence base that they are changing lives or having a positive impact with regard to digitized content in the way that other sectors have found it possible to do for their services or products.

In short, we need better evidence of impact. How has the digital resource delivered a positive change in a defined group of people's lives? The kinds of changes to be measured are diverse, and are likely to be in the following areas: economic, social, educational, cultural, health, political, and environmental, amongst others. I see this as an important subject for further research especially if such research included a longitudinal element to extend studies beyond the confines of project funding.

5 Modes of Value for Digitized Resources

In response to the needs to better demonstrate impact I am suggesting that there are 5 basic value modes to use as a guide for future digitization impact assessment. These are inspired by measures of economics in the arts. [16] If these value models to society as a whole are satisfied then many other benefits identified in this paper will also accrue and can be measured.



Future modes of evaluation and impact assessment should include some focus upon these social factors. Digitization projects and programmes need to engage with the core principle of impact assessment "how does this change people's lives?" to succeed in an ever more competitive funding environment.

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Author Biography

Simon Tanner is a senior academic in the Department of Digital Humanities at King's College London. He is the founding Director of Digital Consultancy Services at King's (KDCS) and the co-Director of the MA in Digital Asset Management. He founded the Digital Futures Academy which has delivered training to professionals in London and Sydney, Australia with delegates from over 32 countries.

Simon authored the book, Digital Futures: Strategies for the Information Age, with Marilyn Deegan and they co-edited the book, Digital Preservation.