Introduction: Museums and the History of Computing

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Digital technologies are a ubiquitous presence for billions of people around the world, shaping not only their everyday experiences but also their social lives, their access to information, and their identity (Papacharissi, 2002). As part of this process, narratives, discourses, and imaginaries about these technologies have acquired an increasingly prominent role in the public sphere. News media outlets constantly report and discuss events and issues relating to digitalization, artificial intelligence, and social media platforms. Moreover, mainstream films and television series relay stories about key figures and events within the 'information revolution'. Indeed, protagonists in computing history such as Alan Turing and Steve Jobs are celebrated as some of the most significant figures of the twentieth- and twenty-first centuries.

It is evident that we are in the process of building and defining a new range of narratives about the emergence, development and future of computing and digital media (Natale, 2016). These narratives are important for three key reasons: firstly, they help us to understand how digital media came to play such a key role in our lives and to comprehend the new directions and accompanying challenges that digital media present for society and everyday lives (Balbi & Magaudda, 2018). Secondly, narratives have practical and material effects: as a wealth of research has demonstrated (Mansell, 2012; Mager & Katzenbach, 2021), narratives about digital technologies inform public debates that in turn shape the governance of these technologies. Thirdly, such narratives help to shape our understanding of who we

are: scholars in memory studies show how cultural heritage and collective memory, as mediated through digital technologies, contribute in a crucial way to shaping people's identities and their understandings of the world (Graham & Howard, 2012).

Despite a growing focus upon these narratives and the complex social imaginaries revolving around digital media – see for example, amongst others, Bory, (2020), and Ernst and Schröter (2021) – the role of museums in constructing these narratives has been largely disregarded. Although the topic has started to receive attention within the museum studies field (see, for example, Weber, 2016), most studies about narratives and imaginaries relating to computing and the digital have continued to rely on sources such as news media and popular publications, with little or no attention directed towards the museum space. This is surprising, considering how both permanent and temporary exhibitions in museums have already been active in sharing information, reflections, and compelling stories about digital technologies to large audiences around the world. As part of a burgeoning interest in the digital, the last few years have seen numerous new museums dedicated to histories of computing and digital media established in many countries around the world. Moreover, existing institutions have made greater efforts to integrate histories of computing into their exhibitions. But this lack of attention towards museums is even more surprising if we consider the distinctive contribution museums have brought to the construction of a new cultural heritage about the digital. By presenting nuanced, dialogic, interactive stories and experiences of technological change, museums empower audiences and users by providing them with a toolbox to understand, interpret and question the trajectories and implications of technological change, and

the role of the digital in shaping societies (Blyth, 2013; Burton, 2013; Cameron, 2007).

This book examines how museums shape digital heritage, that is to say, the cultural heritage surrounding computer technology and digital media. While both theoretical and practice-based explorations of digital technology in the museum sector have largely interrogated digital media as tools for museum practice, less attention has been given to the subject of digital technologies as 'materials' for museums to collect, exhibit, and preserve for the future. *Museums and Digital Histories* contributes to address this gap, seeking to show how and why museums are playing a crucial role in preserving the rich heritage of digital technologies, and in making it relevant to the public.

Cultural heritage institutions have collected materials relevant to the history of computing and digital technologies for a number of decades. However, decisions about what must be conserved, and the approaches taken to achieve this, are far from established institutional principles and codes of practice. As Marc Weber (2016) has pointed out, choices made by cultural heritage institutions today are closely related to the historical narratives that are produced and privileged by different institutions and groups in different national and cultural contexts. Such narratives shape decisions about what counts as historically significant and what does not. This in turn influences decisions about what counts as part of the historical record. Reflecting on the dynamics and practices through which histories of digital technologies are constructed and disseminated in museums is therefore an

important issue with far-reaching implications for ongoing debates about conservation and exhibition practices in the museum.

Narratives and artefacts relating to the history of computing pose significant challenges to museums. By examining and reflecting on these challenges, this book sheds light upon how existing curatorial practices adapt to new subjects, and how innovative curatorial practices can be developed to tackle new kinds of problems and questions. Firstly, strategies adopted for the preservation and exhibition of computing artefacts need to adapt to a variety of hardware and software objects, and to changing technological standards and supports (Foti, 2018). Secondly, the complexity of technological and social change makes constructing clear narratives about computing particularly arduous (Blyth, 2013). Thirdly, actors informing technological change are manifold, including users, developers, companies, and states, and their agency is often complex and hard to capture and demonstrate (Keramidas, 2015). Fourthly, and perhaps most centrally for this book, narratives about technological change and digital media never exist in a void. As museum curators choose which trajectories to highlight and present to visitors, they have at their disposal a broad range of perspectives upon technology (such as technological determinism, for example) and work within a discursive space that is already saturated by narratives such as representations of individual 'heroes' or the stories circulated by public relation teams within the tech industry (Streeter, 2015; Natale et al., 2019).

Indeed, it is not only digital media that are constantly subject to change. The terms in which media are talked about are also in endless transformation. Consider, for

example, how a word such as 'virtual' has entered in and out of fashion across the last three or four decade. Consider also how a single corporation such as Meta recently brought to the very core of public debate the concept of the 'metaverse', and how this very same concept already started to lose credibility as it became clear that the company's strategy and execution failed to fulfil the bold ambitions that the term embodied (Roquet, 2023). As narratives about histories of computing circulate in the public domain, museums are invited to incorporate and respond to new directions that characterize the representation of computing and digital media in the broader public sphere. They provide a key space to historicize not only the technology but also the concepts and the narratives that accompany them (Balbi et al., 2021), and at the same time, serve to document the wider transformations of the ways we think, talk about, and use digital technologies.

Bringing digital media to life

As the contributions collected in this volume show, studying how histories of digital media and computing are integrated within museum environments provides a distinctive and essential entry point into digital heritage. Museums not only tell stories and explain digital technologies, they invite and stimulate audiences and users to look for new ways to think about them, and to therefore consider new ways to interact with and use media that have become a central presence – or at times an oppressive presence, as Tero Karppi (2018) emphasises – in all facets of our lives, across communication, education, work, entertainment, social activities and sex. Approaches to digital literacy have highlighted how the ability to engage with digital technologies in a competent and reflexive way can only be fostered through a deep

engagement with the technologies themselves (McDougall et al., 2018). Given that both multimedia and interactive design features are typical of the contemporary museum (Parry, 2010), exhibition spaces are ideal environments to pursue this agenda. Therefore, museums are not just one of the actors that create narratives and discourses about digital media, they have the potential to transform the very nature of these narratives, as users are brought to the very centre of the stories and trajectories presented in the exhibitions.

In this sense, it is unsurprising that the notion of the *lives* of digital objects has become central to the research presented in this collection. Rosemary Joyce and Susan Gillespie (2015) have criticized the use of the 'life' metaphor to consider material objects, contending that such a notion replicates a cultural bias that projects the dynamics of human lives onto objects. We contend, however, the idea that things have 'lives' is useful precisely insofar as it helps to illuminate how such projections and appropriations shape the ways material objects are appropriated and narrated across time. Things are inseparable from the social and cultural values that people attach and project onto them (Appadurai, 1986). People, institutions, and social groups make objects 'alive' by projecting uses, perceptions, narratives, and representations onto them (Natale, 2016). Thus, to follow the trajectories of digital objects – indeed, any kind of object – in a museum environment entails revealing the trajectories that shape our perception and engagement with them. The concept of 'lives', in this sense, accounts for the changing meanings and positions that objects assume across time, and to the close interrelationship that exists between the trajectory of objects and the experiences of people who interact and project sense onto them. These include visitors, curators, practitioners, volunteers, and other

individuals and groups that animate objects and stories about digital media through their contribution and agency in and beyond museum spaces.

The perspective of museum-based researchers, largely represented in this book, therefore provides an entry point into the relational nature of digital heritage, and how histories of computing and the objects collected in the museum take up new lives as they become entangled with the work and lives of museum practitioners. The museum functions as a laboratory in which meanings, uses, and definitions of digital media are self-reflectively negotiated and where the relational circumstances that characterize digital objects becomes manifest. An important role, in this context, is played by the productive encounters between the material character of objects related to the histories of computing, the particular character and institutional culture of each museum, and the activation of social meanings and affect that inform the experiences of curators and practitioners within the museum collection (Geoghegan & Hess, 2015). As they become part of the exhibition, digital media continue to mobilize and produce affective value through a triangle of affect between the curators, the objects and exhibitions, and the visitors.

Moreover, the relational character of digital objects emerging in museum practice resonates with the multiple ways in which visitors navigate exhibitions, engage with digital objects like those they encounter in their everyday life, and project their own previous experience and ideas about digital media. As digital media become repositories of multiple social uses, meanings, and exchanges when they are created, used, circulated, and eventually discarded within everyday life, they also establish a relational and iterative social 'circuit of meaning' within the museum

environment. Rather than diverging from the characteristics of digital objects outside of the museum, the trajectories of digital objects in museum collections and exhibitions prove in this sense to be in a relationship of continuity with the material, social and narrative trajectories of digital objects outside the museum.

The book

Bringing together leading museum and university researchers and mobilizing cross-cutting debates and approaches in areas including museum studies, cultural heritage, the history of technology, anthropology, and media studies, this book aims to challenge researchers, students, and practitioners to think critically about what 'digital' is when examined not only as a tool but as a cultural object within the museum. The book is organised into four sections, each of which engages in a different way with the metaphor of the 'lives' of digital media.

Part I, 'Lives Narrated Through Computer History', examines the capacity of museums to bring to the surface the experiences of users, technologists and other people who have contributed to shaping histories of computing technologies. As many have argued, objects have social lives of their own. However, these lives are always entangled with the lives of the people who use, own, or interact with them. The chapters collected in this first section therefore illuminate how hardware and software artefacts in museum collections function as a prism through which to understand the 'lives' of the objects as well as of their users. In Chapter 1, Joshua Bell reflects on his experience as curator of a major exhibition about cellphones at the National Museum of Natural History (NMNH) in Washington DC. Bringing

together perspectives from anthropology, natural history, and people's everyday experiences, the stories and objects displayed in the exhibition reveal how technology is a central part of humanity, and is thus situated within what the NMNH labels as nature. In Chapter 2, Simona Casonato gives an account of the biographies of specific objects in storage at the Museo Nazionale Scienza e Tecnologia Leonardo da Vinci in Milan, Italy. Far from being discarded items that remain silent in the museum's storage spaces, Casonato shows how these objects are constantly revived as their meanings emerge as part of the complex entanglements between the circumstances of their acquisition, the agency and affect of the museum's curators and practitioners, the visitors and users who encounter them during the museum's guided tours, and the social lives of the objects themselves.

Part II of the book, 'The Life Inscribed on Computer Technology', considers the role of hardware and software artefacts to narrate histories of modern computing within museums. It illuminates the material, social and discursive dynamics through which digital objects become lively repositories of evidence, narrative and affect in museums' collections and exhibitions. In Chapter 3, Martin Campbell-Kelly and Mark Priestley consider different ways to prepare artefacts related to the histories of computing and the digital for exhibition and preservation purposes. Focusing on the case of The National Museum of Computing at Bletchley Park, UK, their essay sheds light on a veritable 'community of machines' where diverse curatorial practices preserve material and technical elements that would otherwise be lost from the historical record. In Chapter 4, Natalie Kane, Corinna Gardner and Juhee Park explore as a case study the Victoria & Albert Museum's acquisition of the social

media platform WeChat. The many challenges this entailed and the responses that the curators developed to address these challenges help to reveal the process through which museum institutions develop new protocols and approaches to incorporate new kinds of objects, such as online-based software, into museum spaces.

Part III of the book, 'Living Computing History Collections', frames the history of computer technology in terms of the museum collection. It examines how the museum has responded to the challenge of the intangible aspects of computer technology such as digital materials and data itself. While it is possible for a museum to collect and exhibit digital objects, the process of archiving does not necessarily encompass digital technology's associated ecosystem. In Chapter 5, Rachel Boon and Tilly Blyth illustrate the shift from a modality of a collection based on a narrative of heroes, which tends to present scientific innovation through a select range of celebrity machines and key human protagonists, to a perspective and practice that focuses on material culture as a lens through which to explore how digital technologies and data are culturally, socially and politically constructed. In Chapter 6, Petrina Foti asks how deep changes in the essence of computing can impact on how museums narrate histories and the present of digital technologies. Taking up a momentous challenge such as the need to tell the story of the technology used in the making of quantum computing, the chapter reflects on museums' need to constantly interrogate meaning-making and human culture. It shows that making sense of something such as quantum computing is not just one element of museums' work, but an ideal example of the challenges and opportunities that shape their mission.

Part IV, 'Lived Practice with Computing History', turns to the institutional context in which computing histories are always inevitably made. As the objects of modern computing in the museum become evidence of multiple social, technical and personal narratives, they also enter a unique organisational context. Consequently, exhibitions on museum computing are also manifestations of the museum's own identity and relationship with digital technology. In Chapter 7, David Brock, Marc Weber, Dag Spicer and Hansen Hsu consider the evolution of the digital heritage collection at the Computer History Museum in California. As the institution developed frameworks and protocols to collect and exhibit software, a 'stack' for contending with digital heritage emerged within the museum, operating on different timescales, from permanent collection to ephemeral events, whilst entering into a relationship with different communities and craft practices. In Chapter 8, Lisa McGerty examines the case of the Centre for Computing History in Cambridge, UK. McGerty shows how the 'actuality of the museum', i.e. the organisational context within which CCH is situated, impacts the histories of computing that are present, performed and produced in the museum environment. Through the lens of two very different organisational contexts, the two contributions in this section of the book therefore explore distinctive ways through which computing history evolves within the 'lived' institutional environment of the museum.

The book also contains four shorter contributions from Mai Sugimoto, Andrea Lipps, Kimon Keramidas and Lara Ratnaraja. We call these sections "Provocations" and they bring to the fore some of the threads, inspirations, criticisms, and issues that this book could only just touch upon. Indeed, one of the most evident results of the research that has been developed in this project is an acknowledgment of the plural

character of narratives about the history of computing and digital media. There is no single way to talk about digital technologies, and even about any single digital technology, such as, for instance, the smartphone or the combination of software that powers voice assistants such as Alexa or Siri. The telling of these stories is always situated in specific cultural, social, national, political, economic, linguistic, and institutional contexts, which deeply inform which narratives are told about the digital heritage. Cases examined in this book are mostly based at sites within the northern hemisphere, but we hope that our reflections on their specificity and on the importance of context can work as an invitation for the sharing of diverse narratives and trajectories in museums from around the world.

The book emerged from research in the AHRC-funded project 'Circuits of Practice: Narrating Computing Histories in Museum Environments'. Running between 2019 and 2021, the project brought together researchers based at both universities and museums to interrogate how museums narrate modern computing (see Natale et al., 2022). In each individual chapter within this book, the reader will be able to find traces of the common preoccupations, ideas, and excitements that developed throughout two years of research, collaborations, and discussions, and that make this book a truly collective endeavor. In the same way that within an electronic circuit there exist electrical connections between diverse components, which enable complex operations to be performed, the 'Circuits of Practice' within this book have established intellectual, practical, and affective connections between a community of researchers and practitioners. This has enabled the production of new knowledge and ideas in a way that could never be achieved without the sum of its components.

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