The Museum as a Platform for Sound Culture

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Abstract

In the twenty-first century, museums are in the midst of a paradigm shift. Digital revolution has introduced new spaces, practices, types of heritage, as well as ways to conceive the museum itself. This PhD research investigates the role that sound culture could have in this evolution. After two centuries of primacy of visual and material culture, sound has received growing attention both as an element of the collections and means of designing experiences, disrupting previous assumptions and requiring new ways of thinking. This thesis explores if the variety of ways through which sounds are consumed, shared and created in the contemporary society can be a catalyst for the adoption of a new museum conceptualization: the 'Platform-Museum'.

In the first stage of the research, a case study approach was applied, to investigate the strategies and practices in sound curation on digital platforms developed by two world class heritage organizations: the British Library and the Science Museum Group. The results of this qualitative research then informed a design experiment in a museum context, where Platform Thinking was applied to the co-design of a sonic practice. As a result, a collaborative online project - #SonicFriday - was developed in summer 2020 at the National Science and Media Museum in Bradford, which involved museum curators, volunteers and social media users in the creation of sonic narratives and digital memories.

The findings reveal how the solutions adopted to answer the challenges posed by sound can accelerate the adoption of the Platform Model. The sonic practices experimented in the research have prompted a shift to a more emotional, personal and participatory approach to curation, showing how sound can offer a new philosophy, as well as tools and practices, to orient museums in the contemporary society. The thesis ultimately demonstrates how the new conceptualization of the 'Platform-Museum' can open new, thriving perspectives for the practices of collecting, curating and engaging in the twenty-first century, so inaugurating a new chapter in the history of heritage institutions.

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Chapter 1: Introduction

1.1 Ouverture

I was about 10 when the first Personal Computer made its entrance in our living room. A bulky machine with the early version of Windows95 installed. I still remember the sounds of switching on and off, and the first CD-ROMs with games and encyclopaedias. None of us could imagine that this new machine would have opened a completely different window to the world and to the human knowledge. At the exact same time as many families, like mine, were familiarizing themselves with this new technology, the British Library shared its first audio file online. A song of a nightingale recorded in Hampshire in 1973 made its appearance in the first website, together with the images of ancient manuscripts and miniatures.

25 years later, sound became one of the most pervasive multimedia contents of the World Wide Web. A whole new generation of music-sharing platforms made its appearance, revolutionizing the way we listen, share and create music. In 2015, inspired by these new opportunities of connecting and interacting with sound, the Mario Rimoldi Modern Art Museum in the Dolomites invited Facebook users to suggest a song inspired by five paintings of the collections. More than 100 YouTube links were shared on the museum's Facebook page, together with the stories and experiences of the individuals that shared their emotions and interpretations of the artworks.

Both experiences, belonging to different times and context, signal a new dimension for cultural experiences. What we hear from these examples is not only the research of new ways to share collections and engage audiences online, but also a growing awareness of the importance of sound culture. Material and visual culture have always been at the core of heritage practices, but the world we inhabit today is completely different to the world in which the first museums and libraries were born. Before the technological disruptions of the nineteenth century, the only way to preserve the memory of the past was through tangible objects, physical buildings, written documents. Today, the memories of our world are increasingly digitized, intangible, and sonic. Every day, billions of people share digital fragments of their lives on the immaterialized space of the web, and our phones have become personal temples of memories.

It is time, for museums, to ask themselves a series of radical questions. If we should create a museum today, what shape would it have and what kind of heritage would we collect? Are material objects still the only form that can encapsulate the way we live, interact, experience the world? What about the myriad of digital, audio visual and sonic fragments that we spread in the ether? Should museums collect these memories? And if we decide to collect them, where are we going to host and display them? Would it still be a physical institution made of bricks and walls the right shape to experience culture in the future?

These questions formed the basis of my PhD journey. A journey that led me to discover how sound culture lives today inside and outside the museum sector, and how it is created, shared and experienced in the immaterial spaces of the web. In the past five years, I have explored how museums and cultural institutions have gradually recognized the importance of sound both as an element of their collections and as a medium for engaging audiences. I have met inspiring museum professionals that have placed sound at the centre of their practices, overturning what was considered a traditional way of curating objects of culture. I have investigated how sound culture lives in the ecosystem of digital platforms that dominate our society, discovering a whole world of sharing and co-creation. I have learnt how cultural institutions have been inspired by how this platform ecosystem works, imagining entirely new ways of conceiving their collections and the museum itself. And, starting from these insights, I discovered that a new generation of museums (platform-based, sound-ready, distributed) is about to come, opening a new chapter in the story of heritage institutions.

This thesis tells the story of this journey.

1.2 Research Questions

This PhD research investigates the role of sound culture in the evolution of museums in the post-digital age, a moment when 'platform' emerges as the main model around which not only the Web is organized, but also organizations and sociality are developed (Van Dijk, 2013; Parker et al., 2016).

In the 21st century, the traditional museum conceptualization - a physical institution devoted to the collection and display of objects of material culture – struggles to accommodate the new spaces, practices and experiences of the new post-digital society (Parry, 2013). We live

in a world that is different from the one in which the museum institution originated: today, digital sounds, images, videos, platforms, online interactions are a substantial part of our experience of the world. The evolution of our society requires museums to change not only at practical level – exploring new spaces, reimagining their curatorial practices, designing new cultural experiences – but also at ontological level – rethinking their shape, their boundaries, the relationship with their audiences, and the way they conceive heritage. In this evolution, sound culture is flourishing. Sound is, for its own nature, intangible, without boundaries, an intimate and, at the same time, shared experience, and it is a key element of our hyperconnected platform ecosystem. The aim of the research is to investigate if sound, in the variety of forms and ways through which it is consumed, shared and created in the digital world, can support museums in their evolution, fostering both a practical and ontological shift. In particular, I assume that the new practices of sound curation can be a catalyst for the adoption of the new Platform Model, that is acting on museums as a new metaphor, organizing principle and way of thinking.

As a result, my thesis addresses the following research question: *Can the new practices of sound curation in a platform world help museums to evolve into post-digital institutions that adopt platform as conceptual model?* Answering this principal research question required a series of secondary questions, to better understand the two phenomena under investigation.

> *1. What challenges sound culture pose to museums at both practical and conceptual level? What kinds of new practices and ways of thinking the curation of sound in the platform world is introducing?*

> *2. How is the Platform-Model affecting the cultural sector? How the use of platforms and their functioning is leading museums to change?*

These questions guided a research process that, over a five-year span, led me first to careful examine existing literature and previous studies on sound culture and digital transformation in museums; then to conduct a research fieldwork to investigate the practices of sound curation developed by two world-case cultural organizations; and, finally, to develop a design experiment in a museum context.

The research findings show how sound culture challenges many of the core assumptions that have shaped museums. It challenges the idea that museums are primarily physical institutions that collect material objects. Sound suggests that museums can have a different shape: intangible, dynamic, interconnected and open to participation, as most of the platforms we

use nowadays are. Therefore, the museum conceptualization delineated in this thesis – a digital, interconnected infrastructure where heritage is co-curated and co-created - can help museums not only to accommodate sound culture, but also to fully adapt to the post-digital society. What is shown in this research is that embracing sound in museums goes far beyond the introduction of sonic elements in the collections or in the design of cultural experiences. It opens the way to a whole new shape for the museums of the future. This thesis ultimately demonstrates how 'platform' can be not only the form by which the museum can evolve in a place for sound – and not only visual – culture, but also the new paradigm of the 21st century museum.

1.3 Research Context

This thesis fits within the intersection among four key academic fields which are represented in Fig. 1: museum studies; digital humanities; management; and sound studies. The investigation of the two main contemporary phenomena addressed by the PhD research – the growing presence of sound in museums and the emergence of a new Platform Model for the cultural sector – requires, in fact, an interdisciplinary approach to explore different areas of knowledge and their emerging interconnections.
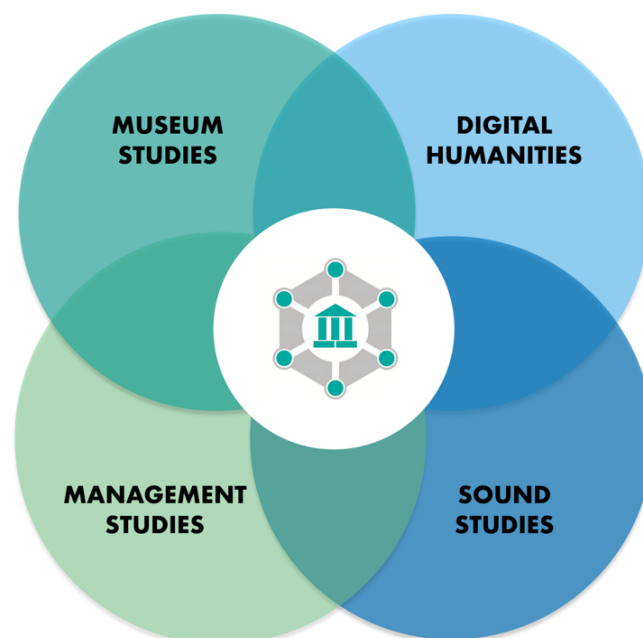
Fig. 1 The four academic fields explored in this thesis and their intersection. © Stefania Zardini Lacedelli

This section describes two key research directions to which this thesis aims to contribute: the museological interest on the 'multisensory turn', which is connected to the studies around emotional engagement in museums, and the theoretical reflections on the platformisation of the cultural sector, with the emergence of new forms of heritage and 'digital memory'.

1.3.1 The Multisensory and Emotional Turn in Museums

A significant amount of literature has theorized the comeback of the senses in the museum experiences after two centuries of primacy of sight and 'spectatorship', signaling a 'multisensory turn' in museums (Howes, 2014a; Feldman 2006). These studies highlighted how public museums in nineteenth century were conceived as places for silent contemplation, underestimating the role of the senses in the transmission of knowledge. A role that, in the last 30 years, has regained its relevance, also thanks to the spread of multisensory technologies which allow museums to design interactive and immersive experiences where all the senses are engaged (Jones, 2006; Schwartzmann, 2011). Within this new awareness, the role of each sensory channel has been studied also in light of recent developments in neuroscience (Arnott & Alain, 2014; Levent and Pascal-Leone, 2014) which highlighted the importance to consider the complex interaction among the senses.

To fully understand the growing importance of sound in museums, my research has also explored the emerging cross-disciplinary field which established sound as a subject of study: Sound Studies. The foundation of this new vibrant academic area has been the recognition of the so-called 'Opthalmocentrism' of western philosophy. Starting from the second half of 20th century, a series of key contributions explored how, following the invention of print and under the influence of Renaissance and Enlightenment, vision came to dominate Western thinking (McLuhan, 1962; Jütte, 2005). Scholars like Hans Jonas investigated the consequences of the hierarchization of the senses in favor of the eye, looking at how visual perception shaped specific ways of knowing and thinking (Jonas, 1954). Drawing upon these theories, the growing awareness of the sonic dimension in museums can be understood within a wider revolution in thinking that recognises the value of sound and hearing as means of knowledge and a whole new way of understanding the world. As a result, new disciplines emerged in the 1970s: acoustic communication and acoustic ecology (Schafer, 1973, Truax, 1978), anthropologies of the senses and sensorial ethnography (Stoller, 1989; Howes, 1991). One of the key theoretical contributions of this field of study has been to highlight that this

perceptual revolution is intrinsically bound to the evolution of technologies, as well as habits and practices, which are driving our society toward a new sonic era (Sterne, 2003).

Drawing upon these key contributions in Multisensory Museology and Sound Studies, I have investigated the growing importance of sound in museums from a twofold perspective: as multisensory and multimodal medium for designing engaging, immersive and evocative experiences (Bubaris, 2014; Cortez, 2022), and as object of collection and curatorial care (Kannenberg, 2017; Kannenberg, 2019). The first part of the literature review (Chapter 3) explores these two thriving areas of practice, combining the studies around sound heritage and sound archives (Ranft, 1997; Hoffmann, 2015; Lobley, 2018) with the experimental research around sound design (Zisiou, 2011). Particular attention has been given to the evolution of sonic practices in the platform world, so connecting this new sonic awareness with the broader discourse around the digital transformation of heritage institutions and museum technology.

It should be acknowledged that my reflection on the role of sound has been developed from the perspective of Western culture. Despite the auditory system is an innate characteristic of human beings, the way people hear and understand sounds is highly influenced by our cultural, geographical and social context. To this regard, my approach to sound and the senses has been inspired by the work of the anthropologist Constance Classen and the historian Mark M. Smith who highlighted how sensory perception is a cultural, as well as physical act, and the senses are 'historically and culturally generated ways of knowing and understanding' (Classen, 1993, p.1). Key contributions in anthropology of sound have explored the role of sound in non-Western cultures, highlighting how different societies assigned specific values to sound (Classen, 1997; Classen & Howes, 2006). It is by observing the Kaluli people in Papua New Guinea and the way they used acoustic information to orientate themselves in the forest that Steven Feld coined the term 'acoustemology', to indicate an 'experiential knowledge in and through sound' (Feld, 1996).

This diversity in the sonic experience can be influenced not only by culture, but also by the specific qualities of each individual sensory perception and to what we consider to be the boundaries of hearing. To this regard, my approach to sound has been inspired by the reflections around 'Sonicity', a broader perceptual field which includes vibratory phenomena that we cannot hear through our auditory system. These non-audible phenomena have been studied from different perspectives by acousticians, media theorists, Deaf scholars and avant-garde musicians such as Alvin Lucier and Pauline Oliveros. New concepts like

'Phonomnesis' and 'Deep Listening' have been introduced to describe how the creation of sound can be also a mental activity in the absence of a sound signal (Augoyard & Torgue, 2005), and how listening can include both audible and non-audible phenomena including thoughts, imagination and dreams (Oliveros, 2005). These studies and experimental practices fostered a rethinking of 'hearing' as a spectrum of diverse experiences, opening a new perspective to approach sensory disabilities in museums. In this extended concept of sonic perception, both visually and hearing disabilities can be addressed not as something to be 'adjusted for', but key starting point to understand 'Aural Diversity' and design more inclusive experiences in sensorial terms (Drever & Hugill, 2023).

This thesis has been also inspired by (and hopes to extend) the growing body of literature around the 'emotional turn' in museums (Tarlow, 2012; Watson, 2016). Any research which looks at sound as object of study is, in fact, deeply connected with the development of thinking around emotions and affects, which is an area of growing interest in museums (Watson, 2018; Smith et al., 2018). One of the major trends in visitor studies of the last 30 years has been to reflect on how cultural experiences engage not only the mind, but also the body and the feelings of visitors (Watson, 2015). An extensive body of studies have reflected on the impact of emotions in the encounter with museum objects (Dudley, 2012) and heritage sites (Gregory & Witcomb, 2007; Crang & Tolia-Kelly, 2010), on museum learning and meaning-making processes (Witcomb, 2013; Schorch, 2014), in community engagement and interpersonal relationships with the museum staff (Munro, 2014) and, more recently, on the development of social inclusion and wellbeing practices (Morse, 2020). A key concept emerged to understand the interconnection between sensorial and emotional engagement is 'embodiment' (Dudley, 2010; Pallasmaa, 2014). An 'embodied' experience includes not only the involvement of all senses, but also the emotions and feelings of the visitors. This concept resonates with what Salomé Voegelin defines 'Aural Intimacy', the ability of sound to 'physically invade our body' (Voegelin, 2012) and to touch us, both physically and emotionally. This is why, in this emerging attention towards emotional dimension in museums, sound has been interpreted as a powerful medium.

The ability of sound to arouse emotions, imagination and memories have always been a key area of academic interest in a wide range of disciplines, especially in relation to music (Scherer & Coutinho, 2013). This is a thriving area of interdisciplinary research that connects sociology, psychology, musicology, neurobiology, anthropology and, more recently, cultural studies. A fascinating parallelism that can help to understand the emotional impact of sound in museums is represented by the relationship between sound and vision in cinema (Chion,

1994). An extensive body of literature has investigated how soundtrack adds not only a further level of meaning, but also an emotional and affective layer to the experience (Cohen, 2010). This ability of sound to act on both cognitive and affective levels has been acknowledged also in museum studies. Despite the first use of sound in museums had been to provide additional information on the objects and exhibits mostly through the use of audio guides, in the last 30 years museums have started to acknowledge sound as a powerful means to stimulate visitors' feelings and emotions (Schulze, 2013; Mannion et al., 2020). The emotional impact of sound in exhibitions has received growing attention in museum studies (Cortez, 2022), also thanks to the immersive experiences developed by sound art. However, the emotional impact of sound on the wider range of museum practices is still to be fully explored. This thesis, in particular, contributes to recent studies on the intertwined relationship between sound, digital technologies and emotions. The enrichment of sensory engagement has been a key area in the development of museum technology and recent studies have shown the importance of understanding the impact of digitally created environment in terms on the emotional responses of the visitors (Falk & Dierking, 2008; Peng, 2019). This thesis tries to address this relatively new area of museum research, looking at the role of sound and music in the shift towards more inclusive and participatory experiences both onsite and online, and exploring how the emotional approach to heritage prompted by sound can also help to reimagine not only the display, but also museum collections and collecting practices.

1.3.2 The Platform Model and the Advent of New Forms of Heritage and Memory

To explore the emergence of a new museum conceptualization, the thesis draws upon the research on the evolution of cultural practices within an increasing digital world, so locating within the academic discourse around post-digital maturity (Parry, 2013). The concept of 'post-digital', introduced by Ross Parry, highlighted the process of 'normalization' of digital technologies in the museum structure and practices, signaling how they are increasingly becoming part of 'what the museum considers itself to be'. This thesis contributes to this line of thinking, by highlighting the role that digital platforms have in this conceptual evolution. In our digitized society, most interactions are carried out via digital platforms that influence how we work, how we learn, how we develop relationships, and how we spend our time (Van Dijck, 2013). This phenomenon was first observed in management studies under the definition of 'platform revolution' (Parker et al., 2016) and 'platformisation' (Helmond, 2015), signaling how 'platform' is a transformative concept which is changing the economy

and society at large. Together with a new business model based on co-creation, these tools are also introducing new social and cultural practices which are gradually penetrating also in the museum sector. The second part of the literature review (Chapter 4) explores the practical and ontological impact of the use of platforms in museums, combining the museum studies on digital transformation and digital curation with the management studies around the platformisation of cultural production (Nieborg & Poell, 2018; Busacca, 2019).

In observing the practical impact of platforms in museums, the thesis draws upon the existing literature observing how museums have used third-party platforms to share their collections and engage audiences in more active and collaborative ways (Kidd, 2011; Giaccardi, 2012), but also how they have created their own platforms (Simon, 2008). From the first sections of museum websites displaying online collections and the early virtual museums, the 2010s has seen the rise of interactive, learning and participatory cultural platforms where different types of audiences can interact with different collections, discover learning resources, enrich their records, and upload new sources (Gorgels, 2013; Milligan et al., 2017; Stimler et al., 2019). This new generation of 'heritage platforms' have shown how the use of platforms goes beyond the introduction of new tools, but foster museums to rethink their practices and traditional curatorial forms (Zardini Lacedelli et al., forthcoming, 2023) as well as the shape of the institution itself. To observe this conceptual level, particular attention has been given to how the Platform Model is influencing the perception of the museum space, the relationship with audiences and the concept of heritage (Parry, 2007; Proctor, 2010; Puhl & Mencarelli, 2015). In this area, the thesis draws inspiration from the growing body of studies around digital heritage and digital curation: a vibrant interdisciplinary field which investigates the extension of the practices of curation and collection outside the physical space of the museum and the realm of material objects (Cameron, 2010; Zuanni, 2021). These studies have observed the museological impact of a wide range of experimental projects and activities designed around the co-curation of digital narratives and the co-creation of new digital-born resources with a range of different audiences and communities (Ridge, 2017; Popple & Mutibwa, 2016; Duffy & Popple, 2017; Szabo et al., 2018). This process of digital co-curation and co-creation is, in fact, leading museums to interact with non-traditional forms of heritage and new practices of collecting public-generated content (Galani & Moschovi, 2015), so fostering museum practitioners to rethink the boundaries of their collections. Experimenting with new curatorial practices in the platform world encourage museums to embrace not only new types of digital sources, but also new voices and levels of interpretations, rethinking the curatorial authority in favor of a distributed, open, participatory

approach to the interpretation of the collections and the development of narratives (Phillips, 2013).

Combining these key theoretical contributions and experimental case studies, my thesis attempts to delineate the traits of a new museological concept, the 'Platform Museum': a post-digital, community and participatory institution where heritage and collections are constantly co-created. My reflection on this concept is deeply influenced by the research on the penetration of the Platform Model in the cultural sector, but also acknowledges how this is the most recent step of a wider participatory shift which began before the digital revolution. In so doing, my theoretical contribution situates within 60 years of participatory museology that has challenged the traditional concept of museum: from the emergence of ecomuseums (Rivière, 1985; Davis, 2011; De Varine, 2017), to the conceptualization of the 'post museum' and polyvocality (Hooper-Greenhill, 2000), until the participatory museum inspired by the functioning of Web 2.0 (Simon, 2010). These key contributions signal a shift in the conception of museum not only as an institution that disseminates knowledge, but as an open platform where everyone can contribute to enrich the collections with their memories and personal experiences.

In exploring this model, particular attention has been given to the role of personal memories. In this context, the reflection on the 'Platform-Museum' is deeply connected with an emerging area of research, which is looking at the evolution of memory in the digital age. In the last century, the concept of memory and its evolution has been studied from cultural, social, political, cognitive perspectives, giving rise to a new transdisciplinary field: Memory Studies. One of the most thriving debates in this sector concerns the relationship between the personal and collective way of remembering (Halbwachs, 1980; Yerushalmi, 1989). The concept of 'memory' has always been connected with a lived experience of an individual or community, whereas 'historical recollection' has been used when this connection with the living experience was broken. Thanks to the preservation of cultural artifacts, museums, archives and libraries have functioned, for centuries, as sites of collective remembering, allowing us to reconstruct the connection with a 'lost' historical past (Crane, 2000). However, the way we create memories has profoundly changed in the last century, affecting the way memory institutions interpret the value of personal, living memories. A variety of formats and media allow us, today, to record our life experiences. Thanks to the domestication of new recording technologies, we have started to document our personal and family life with an increasing number of photographs, sounds and videos. With the advent of digital revolution, these new forms of memory evolved in what is described as 'Memory Boom' (Huyssen, 2003)

and 'Mediatisation of Memory' (Hoskins, 2009; Van Dijck, 2007). The mobile phone has become our personal and social machine of memories (Reading, 2009). Social media platforms allow us, today, to navigate in the world of others' life memories, entering a dimension that was previously reserved for the closest networks of friends and family. Within this evolution, a new concept emerged, prompting memory institutions to rethink the relationship between the personal and the public, as well as the present and the past: 'Digital Memories' (Garde-Hansen et al., 2009). A new form of memory, digitally created and shared online, represents a hybrid form of private and public remembering, where the present is remembered alongside the past. Collective memory practices developed by museums and archives are now intrinsically linked with personal memory practices. The possibility of creating and making autobiographical memories instantly accessible has taken away the power from the traditional 'one to many' forms of information dissemination, leading to a more shared, distributed approach based on personal experiences and individual knowledge (Merrin, 2008). Consequently, social media platforms have begun to be used by museums not only as spaces for engage audiences with the collections, but also as places to interact with these new forms of collective remembering (Burkey, 2019). The collection of digital memories situates within the experimental practices of contemporary collecting and collecting social media, an area which has received increasingly scholarly attention in museum studies (Rhys, 2011; Ride, 2013; Zimmer, 2015; Boogh et al., 2020; Arrigoni & Galani 2021; Rees, 2021; Arrigoni et al., 2022). This thesis attempts to contribute to this thriving debate, by reflecting on the value of personal memories for enriching the collections and creating more powerful, profound, emotional connections with cultural heritage.

1.4 Theoretical Framework

A series of key theoretical assumptions are underlying my research.

The first includes the theories on organisational change, which have informed my methodological choices. My thesis explores the process of change of one of the key actors of our society: the museum. Change is a complex, challenging and inevitable phenomenon for both living beings, individuals and organizations. For its centrality, this phenomenon has been investigated from different perspectives and several theories have been developed in management, psychology and natural studies. This thesis draws upon an evolutionary perspective on society and organization represented by transformational theories and organisational change. These theories affirm that change is an essential process in any

organization: as reality changes, organizations need to change to remain relevant (Junginger, 2008). The technological disruptions of the last century have given a key demonstration of this principle, leading to the disappearance and reconfiguration of entire industries.

Embracing change, however, is all but an easy process. It involves going outside the consolidated knowledge and assumptions of the world, and the comfort zone. And if it is difficult for an individual, it is even more complex at organisational level, where there is a complex interaction of physical assets – places, spaces, tools – practices – activities, processes and ways of doing – but also values and assumptions underlying the whole organisational culture (Quinn 1988; Junginger, 2008; Davies, 2013). Different methodologies in the social sciences have emerged precisely to promote change through action: the most famous is Action Research, which is widely adopted when a practice needs to be changed (Herr & Andersen, 2015). New methodologies emerged in the field of design research emphasize the role of collaborative prototyping to foster the exchange and the internalization of new knowledge in the organization (Nonaka & Takeuchi, 1995; Mason, 2015). In these studies, it is emphasized the role of design approaches in fostering an exchange between the internal and external environment and in promoting reflection on the values and assumptions underlying the organisational culture. The methodology adopted in this thesis and fully described in Chapter 4 has been informed by these theoretical assumptions on the role of collaborative design in promoting organisational change. As a result, the research combined the observation in the field and the co-design of a new practice together with the insiders of a museum organization with the aim to develop new theory. Developing a new conceptual model for museums was, in fact, one of the key objectives of this research. The 'Platform Museum' is a conceptual framework that can help to embrace sound culture at a practical level, but also to imagine the museum of the future. This theoretical model is rooted in participatory museology and on the platformisation of culture, as explained in Chapter 4. Initial thoughts on the potential of a theoretical concept of this kind were proposed in the article 'The Platform-Museum: practical implications and conceptual revolutions' (Zardini Lacedelli, 2018). The model was then developed throughout the PhD research thanks to the case studies analyzed and the design experiment within a museum context.

In the theoretical reflection on the process of change, a key role in this research was played by the theories on the acoustic revolution of our society analyzed in Chapter 3, which highlights how sound suggests a new 'ontology of flow'. These theories, anticipated by the philosophers Jonas and Carpenter and by the media scholar Mac Luhan, underline how the categories of objectivity and representation that dominated our interpretation of the world

and knowledge making derived from visual perception (Jonas, 1954; Carpenter & McLuhan, 1960; McLuhan, 1987). Sound, instead, offers an alternative ontology which emphasises change over static reality, cyclicity over linearity, and processes over objects. A new 'ontology of flow' which resonates with the Heraclitan Panta Rei and with Deleuze's ontology of becoming and virtual potentialities: sound reminds us that everything is a constant becoming (Cox, 2017; O'Callaghan, 2007). Connecting with this, recent study in digital economy (Kennedy, 2015) highlighted how this new ontology offered by sound can offer alternative ways of interpreting and engaging with the contemporary mediascape, which seems to resist to the ontological 'visual-oriented' categories of being, objectivity and representation. The nature of our digital ecosystem calls for a more sonic way of approaching knowledge (Herzogenrath, 2017), reflecting the advent of a new sonic era (Sterne, 2003).

This dynamic, ever changing, processual interpretation of the world is also connected with my theoretical reflection on a concept which is at the heart of the cultural sector: heritage. Throughout the thesis, I reflect on how sound challenges museums to rethink not only spaces, practices and technologies, but what can be collected and considered cultural heritage at a wider level. From this perspective this thesis locates, and hopes to contribute, to the wider international reflection on the definition of heritage. In the last 20 years, the cultural sector has gradually recognised new forms of heritage that have been described and officialised in a series of international documents: from the Convention for the Safeguarding of Intangible Heritage (UNESCO, 2003) to the Charter on the Preservation of Digital Heritage (UNESCO, 2003), until the revolutionary Faro Convention for the Value of Cultural Heritage for the Society (Council of Europe, 2005). These documents signal a shift from a material-based concept of heritage - which informed the practice of collection, preservation and display of physical objects in museums -, to a more intangible, subjective and processual interpretation which settles no limits to what heritage can be. The Faro Convention, in particular, placed, for the first time, people – and their 'constantly evolving values, beliefs, knowledge and tradition' - at the centre of the heritage definition, stating that heritage is defined by the value that individuals and communities assign to places, objects, practices and experiences (Council of Europe, 2005). Heritage is increasingly being recognized as a socially constructed process rather than an object that can be collected and preserved (Byrne, 2008). This theoretical shift strongly resonates with the intangible, processual nature of sound and sound experiences, showing how sound can lead the way to a wider conceptual revolution in the heritage sector.

1.5. Thesis Structure

This thesis comprises of eight chapters and four appendices. It is modeled on the structure of a musical opera in four acts: the beginning of a journey (Chapter 2, 3 and 4); the exploration in the field (Chapter 5 and 6); the climax with the research experiment (Chapter 7) and the lessons learned, when I draw the conclusions of the research (Chapter 8).

Act 1, *The beginning of a journey,* describes the origins and the first phase of my PhD, which brought me to clarify my methodology and to locate my research in the contemporary academic landscape, drawing upon museology, digital humanities, management and sound studies. This phase comprises three chapters. Chapter 2 describes my methodology, explaining how the different methods employed in the different phases of the research worked together to answer my research questions. The chapter starts with a reflection on my position as researcher, explaining how my background and complementary research projects have shaped my methodological choices, as well as my change of role in the research (from observer to participant actively involved in the design of a practice together with the museum team). I then describe the methods of data collection and analysis employed in the case study research applied in the first stage of the project, and in the design research employed in the second. The chapter also describes the Research Ethics that guided the overall project, explaining the ethical issues raised by working in a platform environment.

Chapter 3 and 4 are dedicated to my literature review, exploring in depth the two main challenges addressed by the overall research question: the growing presence of sound culture in museums (Chapter 3) and the emerging of a new Platform Model for the cultural sector (Chapter 4). Chapter 3, in particular, investigates the challenges that sound culture poses to museums, by exploring two different dimensions where sound has acquired value. The first, *Sound Heritage*, looks at the recognition of sound as cultural object starting from the advent of sound recording, and explores how heritage institutions have started to collect, preserve and share sounds. The second, *Sound Design*, encompasses all the practices where sound has been used to engage audiences and create a multi-sensory environment. In both of this fields, the chapter shows how the different ontological nature of sound requires cultural institutions to explore spaces, systems and technologies, as well as cultural forms and practices that are different from the ones originated around visual and material-based objects. The literature review continues in Chapter 4, which explores how the platform business model is affecting the museum sector from two different perspectives: practical and ontological. Drawing upon the management studies on the platformisation of cultural production on one side and the participatory museology on the other, the chapter describes how museums have used and

create their own platforms to expand their curatorial practices and involve audiences in the creation of content. The chapter concludes starting to delineate a new conceptual model for the cultural sector: the 'Platform-Museum', a digital interconnected infrastructure which reflects the evolution of museum towards a post-digital, community and participatory institution.

Act 2, *Into the field,* describe the subsequent phase of the research process, which brought me to observe the challenges encountered and the practices developed by cultural institutions in the curation of sound in an increasingly digitized and interconnected society. This phase comprises two chapters, each one dedicated to my two case studies which allowed me to explore two different perspectives in sound culture. Chapter 5 focuses on the curation of sound recordings in the platform world, with the example of the British Library Sound Archive. This chapter presents the result of a 6-month research fieldwork in 2018 where I interviewed the curators of sound collections and the members of the digital team in charge of the development of a new website dedicated to sounds within the *Unlocking Our Sound Heritage* project. Drawing upon 25 years of experience with sound online, the chapters describe the platforms adopted by the British Library curators to share their collections and to engage new audiences with sound heritage, so reflecting a progressive institution with a mature platform thinking. Chapter 6 is dedicated, on the other hand, to the curation of sound objects, with the example of the Sound Technologies collection at the Science Museum Group. In this Chapter I present the results of the second fieldwork research in 2019, which brought me to interview eleven members of the Science Museum Group. Drawing upon the experience of curators, as well as the digital and communication team, the chapter shows the challenges in preserving, curating and engaging audiences with this kind of objects, as well as the new opportunities introduced by the digital dimension to bring their sonic nature alive and involve audiences in new participatory ways.

Act 3, *The Research Experiment*, describes the practice I developed in a museum context, drawing upon the insights from the fieldwork research to respond to my original research questions. This act comprises a single chapter dedicated to the design, implementation and evaluation of the practice. Chapter 7 offers a detailed overview of the #SonicFriday project which was designed within a Midlands4Cities AHRC-funded research placement in the first months of the UK pandemic lockdown in 2020. The project, which invited online users to share personal memories on sound technologies, received two GLAMi Awards in 2021. The chapter presents the insights from the main three phases of the research process. The first section presents the insights from the preliminary design phase where I adopted the platform

thinking to guide the curatorial and communication team in the reflection around six design elements: the space of the intervention; the participants; the type of engagement; the objects/themes involved; the outputs of the activities; and the temporal dimension of the practice. Secondly, the chapter then describes how the practice was implemented, the platforms adopted, the different engagement strategies employed, and the sound-based narratives developed: the curatorial playlist, the sound map of lockdown sounds and the sound memories board. In its third and last section, it ends by showing the findings from the final focus groups with the museum team and the volunteers, which allowed me to assess the impact of the project on three key areas of museum practice: the curatorial dimension, the relationship with audiences and the interpretation of collections and heritage.

Act 4, *There and back again*, presents the conclusions of the research journey and highlights the new future directions opened by this thesis. In the concluding chapter I return to my original research questions, providing new insights from what I experienced, learnt and discovered in the PhD journey. The chapter summarizes the key findings of the thesis, which show how there is a cross-fertilized interaction between the new sonic practices in the platform world and the evolution of museums in the post-digital age. The solutions adopted by the cultural institutions to answer to the challenges posed by sound can accelerate the adoption of new practices, assumptions and ways of working that belong to the Platform Model: the multiplication of the experiences outside the museum, a different relationship with audiences as co-curators, an extended interpretation of heritage which includes sonic and digital elements. The conclusions also signal two main shifts in museum practice: a shift from a predominantly cognitive to a more emotional and personal approach to cultural experiences; and the emergence of a new post-digital form of heritage represented by the digital memories shared by online users in response to the Sound Technologies collection. These findings also shed a new light on the role of social media platforms, which have been mostly used by museums as audience engagement tools and less for the co-creation of new interpretations. The chapter then continues by showing the original contribution of the thesis, which opens a unique perspective on the study of sound culture by connecting museology and digital humanities with management and sound studies. The chapter also explores the methodological contribution of the thesis, which offers an example of new research methods and ways of collecting data in the platform world, as well as providing a practical application of design research. Ultimately, the chapter also opens the way to new directions for research on both the future of museums and their collecting practices. A key contribution of this thesis, in fact, is to provide a theoretical framework that can help heritage institutions to embrace

sound culture and evolve into post-digital institutions. Drawing upon the model envisioned in this research, new exciting directions of research emerge to apply platform thinking in different institutional and geographical contexts and in relation to different types of heritage.

Act 1

The Beginning of a Journey

Sound 1. This 1860 phonautogram by Édouard-Léon Scott de Martinville is believed to be the oldest known intelligible recording of the human voice. It reveals a man's voice, presumably Scott de Martinville's, singing the song "Au clair de la lune". Source: Wikipedia.

Chapter 2. Methodology

2.1 Introduction

This thesis represents *practice-led, theory driven* research where I was involved as a practitioner in the design of a new museum practice, with the aim of building new theory. My primary aim has been to offer practical guidance to museum professionals wanting to embrace sound in their collections and develop new practices of engagement and curation that could respond to the challenges of the platform world. In doing so, I also wanted to build a theoretical ground that could be useful for students and other researchers in museum studies, digital cultures, digital humanities, to understand the evolving presence of sound in the cultural sector.

This research adopted an *exploratory research design* consisting in two main phases (see Fig. 2), where the result of the first method (*case study research*) helped to inform the second method (*design research*).
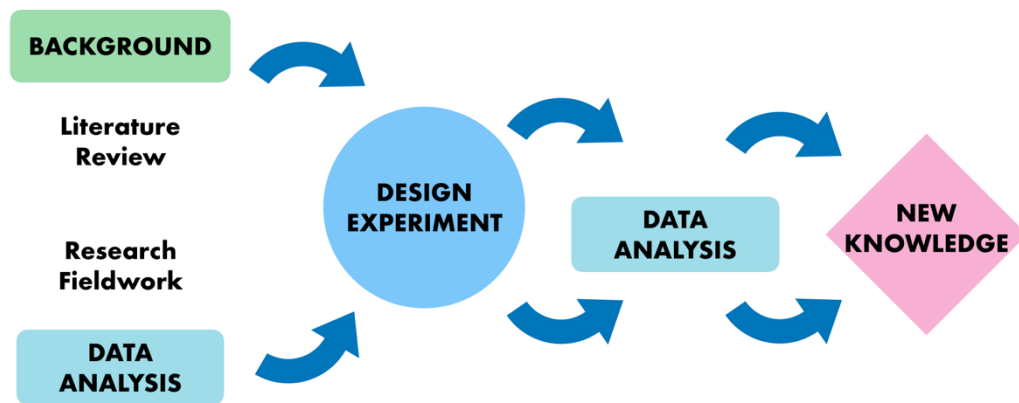
Fig. 2 The different phases of the research process. © Stefania Zardini Lacedelli

In the first phase (2018-2019), I employed case study research to investigate the practices of sound curation developed by two world case cultural organizations: the British Library and the Science Museum Group. Overall, 17 heritage professionals have been involved in semi-structured interviews aimed to understand their practices, perceptions and beliefs. The choice

of the case studies, the instruments of data collection and the analysis procedures employed in this research phase are detailed in section 2.3. In the second phase of the project (2020), I applied *design research* methods to design, implement and evaluate a sonic practice in a 'real-world' museum context together with the members of the National Science and Media Museum. The tangible output of this experiment was the #SonicFriday project which, in the Summer of 2020, invited online users to share their memories and stories on sound technologies, experimenting with new practices of sound curation and digital engagement. The project, which was designed during the first UK pandemic lockdown, explored a variety of online sonic practices to engage audiences with sound – thematic playlists, sound maps, twitter exhibitions, memory boards – leading to the collection of 248 sound-related digital memories from social media users and museum volunteers. Thanks to this design experiment, I was able to evaluate the impact of the use of digital platforms on sound curation, assess the emergence of platform thinking across the museum team and explore what kind of museum practices it favored.

The subject of investigation – the new sonic practices in the platform world - required to explore new ways of collecting and analysing data, which are of utmost importance for any study around contemporary society. As a consequence, the design experiment combined traditional qualitative methods – interviews, group discussions and focus groups – with a variety of digital methods which, today, are available for social and humanities research, such as social media analysis and the analysis of social media contributions (Hardey, 2011). The whole range of instruments adopted are fully described in section 2.4. The space of the design experiment – social media and online platforms – also raised new challenging ethical issues about recruiting, consent, confidentiality and copyright, all of which have been carefully considered in the design experiment and are explained in section 2.5.3.

This chapter provides a detailed explanation of the methodological choices adopted in the different phases of the project alongside the methods of data collection, analysis procedures and the research ethics that guided the whole process. I will begin with a critical reflection on how my own position as both researcher and practitioner, as well as my involvement in complementary research projects, have informed my research approaches, as well as my ontological and methodological positions.

2.2. My Own Position as Researcher

My methodological journey starts by acknowledging my position as researcher. This section situates within a reflexive practice that helped me to understand how the story of my relationship with museums, as well as my own assumptions and ways of understanding the world, have informed not only my research questions, but also my methodological choices and the ways I interpreted the data and the research findings (Finlay & Gough, 2003). In my case, my twofold nature of both museum practitioner and researcher, as well as the decision to undertake my PhD part time to continue developing complementary research projects, has prompted a mutual exchange which only the process of thesis writing has made visible.

I started working and doing research in museums in 2013, first in the field of Museum Education and then in Digital Curation. The very first intuition of my research questions originated form an experimental sonic practice I designed at the Modern Art Museum of my hometown, when I involved online audiences in sharing their musical associations to five different paintings, so creating a co-created playlist that was shared by the local radio broadcasting.

When I started my PhD journey in 2016, I continued undertaking complementary research projects, that allowed me to apply platform thinking in different cultural, geographical and social contexts. In particular, in the last 5 years I coordinated a major research project which represented a fundamental inspirational ground for the conceptualization of the 'Platform-Museum'. This experimental project began in 2016 when I co-founded the first 'platform-museum' of the Dolomites landscape. The core principle of this museum is the co-creation of digital resources with different community groups (students, Dolomites inhabitants, online users, cultural professionals, historians, geologists, anthropologists) using a variety of different platforms. This experimental museum practice culminated in a three-year research project funded by the Dolomites UNESCO Foundation which involved 30 museums of the Dolomites and 50 participants in the co-creation of 12 online galleries dedicated to the Dolomites heritage (Zardini Lacedelli et al., forthcoming, 2023).

Although studying the process of creation of a 'Platform-Museum' is beyond the scope of this thesis, this research experience allowed me to identify the emerging characteristics of a new museum conceptualization, to critically reflect on how 'platform-thinking' is acting on a cultural context, and what elements of this new thinking could be brough into the design of new heritage practices. A series of academic publications published during my PhD testified the development of this reflection (Szabo et al., 2018; Zardini Lacedelli, 2018; Zanetti et. al.,

2019) and had a fundamental role in the writing of Chapter 4, where Museo Dolom.it is described as an experimental prototype of the 'Platform Museum'. The experience and reflections from Museo Dolom.it have also contributed to inform the Platform-Museum Roadmap, which was the design tool adopted in the research experiment developed in the thesis and it is described later in this Chapter.

Alongside this complementary research project, in the last 5 years I had the opportunity to accompany a new generation of cultural professionals in the co-design of new sonic and digital practices. In 2018, I designed, coordinated and conducted a training course for museum professionals promoted by the Veneto Region, within a funding programme aimed to update the digital skills of the cultural workforce. The course 'Museums and new Digital Cultures' allowed me to interact with 80 cultural professionals from 33 institutions of Northern-Italy, and to guide them into key emerging areas of museum practice: digital curation, online engagement, digital co-creation in museum education, digital heritage and sound design. A quantitative and qualitative study was conducted at the end of the course to assess the impact on both individual and institutional level, and resulted in an academic publication which reflected on the role of co-design of digital practices to foster institutional change (Zardini Lacedelli et al., 2019). This experience reinforced my choice to apply design methods to the PhD research, and allowed me to further reflect on the role of sound in the digital evolution of heritage institutions. Within this course, in fact, sound has emerged as a key area of experimentation within the design of digital practices, with 8 sonic narratives developed by the participants. Chapter 3, dedicated to Sound Culture in Museums, critically reflects on these new narratives alongside a range of national and international case studies which result from my exploration of the field and from my personal experience of visiting museums and exhibitions. Between 2019 and 2021 I could further consolidate my theoretical and practical knowledge in sound design practices thanks to the participation in the Master module 'Engaging Audiences' at the School of Museum Studies, where I curated a lecture on Sound Culture in Museums and supported MA students in the development of Sound Exhibitions both in the campus and online.

The implicit knowledge built within these experiences constitutes a theoretical and practical ground on which the PhD research developed. Writing this thesis allowed me to activate this implicit knowledge that I have built up over a decade of working within the museum sector. A tacit knowledge which complemented the understanding of the extensive body of literature around the emerging areas of platformisation and Sound Culture in museums, the interpretation of the results from the research fieldwork at the British Library and at the

Science Museum Group, as well as the design experiment undertaken in 2020 (#SonicFriday). The experience gained in the Dolomites specifically informed the development of the design tool adopted in the planning phase of the #SonicFriday project, which will be described in Section 2.4. On the other hand, the reflections and findings from the PhD research also informed my own practices.

My twofold nature of practitioner and researcher also facilitated my transition from outsider to insider in the different phases of the research project (Herr & Anderson, 2015). My change of role was particularly evident in the design experiment. This phase of the project took place within the framework of a research placement funded by the Midlands4Cities Doctoral Training Partnership, which allowed a deeper immersion within the National Science and Media Museum in Bradford. During the design phase, I was the facilitator and external designer: my role was to guide the design sessions and participate in the generation of ideas. In the implementation phase, I assumed the role of project manager: I personally developed the content for each social media prompt, I created the introductory narratives to publish on the museum blog and supported the Communications officer in managing the interactions. The placement framework within which the project was developed, as well as the experience gained in the last 10 years as museum consultant in digital curation and online engagement facilitated my integration with the museum team. Finally, in the evaluation phase, I assumed again the role of the researcher/observer: I implemented a series of tools to assess the impact of the practice and I facilitated the two final focus groups.

This mutual exchange – between the position of outsider and insider, and between practical experience, reflection and theorization - represented a key element of my research. Since the beginning, I was motivated by developing a thesis that could 'bring together the insights from academic studies with the practical work of museums' (Macdonald, 2011). My aim was to contribute to the development of academic thinking on sound culture in museums, but also to support heritage professionals in the design of more sonic, inclusive and participatory practices.

2.3 Case Study Research

The first phase of my PhD involved a case study research fieldwork in two major UK institutions which are distinguished worldwide for their extensive collections and their role in the history of knowledge: the British Library and the Science Museum Group. These institutions were chosen to explore the two different perspectives emerged from the literature

review (Yin, 2014; Yin, 2018): the perspective of museums, which mainly collect sound objects; and the perspective of sound archives, which collect sound in its intangible and digital form. In the historical overview on the development of Sound Heritage and Sound Design, these had emerged as two dimensions to fully understand the challenges of sound curation in a platform world, and the interwoven relationship between the intangible nature of sound and its material and technological dimension.

As the literature review had shown, this relationship could not be understood looking only at museum institutions. In the increasing awareness of the cultural value of sound, a key place is occupied by sound archives and this was a fundamental criterium for the choice of the first case study. I needed an institution that could allow me to explore the process of transformation and challenges faced by contemporary institutions in the curation of sound recordings. The choice of the British Library was guided by its extensive experience in the collection, preservation and curation of sound recordings, as well as the opportunity to closely observe the practices developed by one of the major sound archives in the world. The Sound Collections cover an entire range of recorded sound – oral history, wildlife sounds, music, drama, literature - allowing me to explore the cultural value of sound from multiple perspectives. Furthermore, when I started my PhD, this institution was also undertaking a major national project aimed to expand the digital access to audio recordings throughout the UK: *Unlocking Our Sound Heritage project*. The University of Leicester was one of the project partners, so facilitating the access to the project manager, who then introduced me to the curatorial team of the Sound Archive.

To explore how the intangible nature of sound challenges the materiality of space and objects, I needed to find an institution that was experimenting with sound in the context of physical galleries and collections of material culture. This is how I selected the second case study, the Science Museum Group. The UK leading group of science museums is an organization that continues to develop specific expertise on sound curation in the post-digital context through a range of different projects: exhibitions around Sound Culture and Sound Technologies, engagement practices on social media, sound-based participatory projects and a new permanent gallery dedicated to Sound and Vision at the National Science and Media Museum in Bradford. In 2017, I participated as a speaker at the Science Museum Group Research conference, which was dedicated to the role of sound and listening in museums. At the conference I met Annie Jamieson, the Curator of Sound Technologies at the National Science and Media Museum, who shared with me the challenges she was facing in the curation of her collection, and I envisioned the opportunity to conduct an in-depth study.

In both cases, the main method of data collection consisted in semi-structured interviews, which were complemented by online research.

2.3.1 Data Collection: Semi-Structured Interviews

Between the British Library and the Science Museum Group, I conducted 13 semi-structured interviews aimed to explore the challenges of sound curation and the new sonic practices experimented in the platform world. Each interview lasted from 1 to 1.5 hours and was audio recorded with the written consent of the participants (see section 2.5, Research Ethics).

Between 2018 and 2019, I interviewed overall 16 heritage professionals, six at the British Library Sound Archive, and ten at the Science Museum Group. Participants were chosen to represent the different areas of practice addressed by my research question: consequently, the interviewees came from the curatorial (8 members), communication (3 members), web and digital team (5 members). In the case of the Science Museum Group, the interviews were held in multiple locations: the research fieldwork was undertaken between the National Science and Media Museum in Bradford and the central digital department in London, but I also interviewed two members of the Science and Industry Museum in Manchester.

I began with an explanation of my PhD research and the purpose of the interview in relation to my research questions. The interviews were semi-structured, each one following a pre-prepared questioning route built on my own reflections from the literature review and the data previously collected (see the full interview Plan in the Appendices). The approach to the questioning route, however, was left flexible to be responsive to the issues raised by the interviewees (Bryman, 2001). My approach to the interview was further inspired by the *active interviewing* approach, acknowledging that interviews are active, meaning-making occasions where respondents are constructors of knowledge in collaborations with the interviewers (Holstein & Staples 1992; Holstein & Gubrium 2003). Recognizing the interactional nature of the interview allowed me to bring my own experience and knowledge in the conversation as well as to share, in each new interview, the themes and reflections emerged in the previous conversations.

In the case of the British Library the interviews questions moved from a practical level –what platforms have been adopted to share audio recordings online, what challenges and opportunities each instrument introduced, what new practices have been developed and how they have affected the development of the British Library Website - to a more conceptual

level: the impact of these new practices on the evolution of the curatorial role and on the relationship with audiences, how the concept of Sound Heritage was changing, the new assumptions emerging from the interaction with the contemporary sound culture. I was also interested in investigating the impact of the use of platforms in the design of the new Sounds Website, to assess the evidence of 'platform thinking' in this process.

The interviews at the Science Museum Group built on the knowledge acquired in the first part of the fieldwork at the British Library and continued to explore both the practical and conceptual dimensions of sound curation. The different nature of the collections – sound objects instead of audio recordings – and the specific institutional context of the Science Museum Group, however, allowed me to explore also other aspects, such as the peculiar challenges in the curation of Sound Objects both in terms of acquisition, preservation and display, how online engagement was interpreted within the overall digital strategy, and the curatorial potential of online spaces in relation to the exhibition narratives. Particular attention was also given to identifying potential areas of intervention in the digital domain to further develop in the design experiment.

The main themes explored in the two research fieldworks are summarized in the table below.

The main themes explored in the semi-structured interviews	
British Library	**Science Museum Group**
1) Historical development of the Sounds website 2) Platforms adopted to share sounds recordings and new practices experimented online 3) How the use of platforms informed the design of the new website 4) The role of online users 5) How the notion of Sound Heritage is changing in the digital domain 6) Evolution of the curatorial role	1) Challenges in the curation of Sound Objects (acquisition, preservation, display, story-making) 2) The role of online platforms within the digital strategy of the group 3) Curatorial potential of online spaces and experimental practices 4) New forms of audience engagement and the role of the volunteers 5) Exploring potential areas of intervention in the digital domain

Table 1 The main themes explored in the semi-structured interviews.

Throughout this thesis quotes and extracts from the interview material are referenced by the unique code number of each interview, as reported in the interview plan in Appendix II, alongside the full name and the job role of the participants. If the interviewee asked to remain anonymous, only his/her job role is reported.

After the interviews, I also collected screenshots of online pages, blog, social media posts related to the projects and practices mentioned by the interviewees. This triangulation allowed me to further explore the themes emerged in the conversation and strengthened my understanding and critical analysis. In the case of the British Library, this online search also included the Wayback Machine from Internet Archive to explore the evolution of the online presence of sound collections described in the interview with the Web team.

2.3.2 Data Analysis

Each interview was transcribed with the support of Nvivo software for transcription. A choice was made to edit the transcription to make sure they were comprehensible and grammatically correct. In this process I did not change the content and intent of the participants' speech, nor did I put words in their mouth (Liamputtong 2011).

In analysing the interviews, Content Analysis was applied. This method is pivotal in extracting themes and sub-themes from the qualitative data and going from analysing to theorising (Tesch, 1990). To analyse this type of data, the following steps were followed:

- I commented on the transcription documents to keep track of my own reflections leading to the coding frame (see Fig. 3).
- A Code Book was built for each interview series (one for the British Library and one for the Science Museum Group). I adopted an 'open coding' approach, which consisted of assigning codes (labels) to specific pieces of data (quotes). I did choose not to use computer software for assisting coding, but I assigned manually a coding frame to the data. The codes reflected the different categories suggested by Creswell (2018): codes on topic that I would expect to find, emerging codes not expected at the beginning of the study, and unusual codes that are of conceptual interest.
- The codes were grouped into categories and subcategories. In choosing the main categories, I applied a deductive approach using the main themes explored in the British Library interviews (evolution in the curation of sound recordings online, sonic practices in the platform world, design principles of the new website) and the Science Museum Group fieldwork (curatorial challenges, audiences, Digital Strategy,

experimental practices). Whereas in selective subcategories, the inductive approach was followed, which allowed me to generate new themes from the data. At this stage, I shifted from more descriptive to more analytic codes that could help me to respond to the research questions.
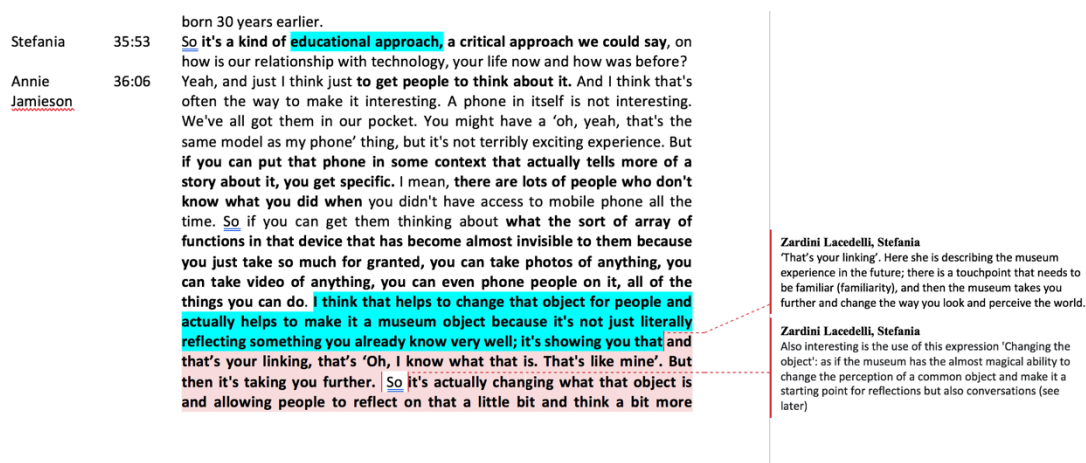
Fig. 3 A transcribed and commented section of the fieldwork interview with the Curator of Sound Technologies at the National Science and Media Museum.

2.4. The Design Experiment

The qualitative research applied in the case studies research allowed me to gain a thorough understanding of the challenges of sound curation, complementing the literature review with the unique insight of heritage practitioners. From the analysis of the curation of sound recordings and sound objects developed by the British Library and the Science Museum Group, it was evident how the digital dimension has offered several practical solutions to these challenges, but also a different logics and ways of operating inspired by the ways in which digital platforms work. As Chapter 4 has shown, platform thinking can offer museums not only new practices, but a whole set of values and assumptions that overturn their traditional antecedents. Firstly, the fact that museum is not just a physical institution, but it also lives in multiple spaces, both physically and online. Secondly, the assumption by which heritage is not only made up of tangible objects but also of intangible elements which are both digital and sonic. Thirdly, the idea that audiences are not only passive receivers of knowledge, but they can contribute to development of the narratives and the collections themselves.

Once I identified the specific challenges introduced by sound in museums, and I gained initial evidence that platform-thinking could provide some of the answers, it was now necessary to answer to the fundamental questions laying at the heart of this research. Can the new assumptions, values and mindset introduced by platform-thinking help museums to respond to the challenges of sound? What new practices do these assumptions favor? And can these assumptions, as well as these new practices, foster the evolution of museums into post-digital institutions?

To answer these questions, I needed to observe platform-thinking into action. The qualitative research methods - applied in the first phase of the research - allowed me to gain a thorough understanding of the challenges faced by the curators, but then I needed to 'act' in the environment and observe how a new thinking could introduce an organisational change at both practical and conceptual level. In the literature of research methodology, there are many approaches that value 'reflection on action' and 'reflection-in-action'. This section describes the methodology that I decided to adopt, the different role I assumed and the new context in which I and all the members of the museum found ourselves working. This phase of the research, in fact, was conducted between March and October 2020, thus coinciding with the COVID-19 emergency. In this unprecedented period, all museums around the world had to close their doors and could only interact with audiences through online spaces. This exceptional situation introduced new elements for reflection and, in some cases, accelerated some processes of change that were already underway.

2.4.1 Fostering Organisational Change through Action: Methodologies in Comparison

Organisational change has been extensively studied in management and business studies as an essential process in any organization: as reality changes, the organization needs to change to survive (Junginger, 2008). Such studies have shown how this process of change involves the whole organisational culture, which includes products, practices and services, but also behavioral norms, values and assumptions (Quinn 1988; Junginger, 2008) from which these products, practices and services originate. This is anything but a small challenge, especially for museums that, due to their very mission of preserving the past, tend to be conservative institutions, and this is reflected in their resistance to change. Yet a very necessary challenge, not only to embrace sound cultures, but also to adapt to a society which is quite different from the one where the museum, as an institution, was born.

Both the literature review (see Chapter 3 and 4) and the research conducted in the field (see Chapter 5 and 6) revealed that in order to embrace sound in a platform society, museums need to change. These preliminary findings suggested that this process of change involved the whole organisational culture, as sound challenges not only previous practices but also some the key assumptions around which the museum was born and developed as institution. Consequently, I needed a research methodology that could act at both levels, allowing the museum team to practically experiment with new spaces and activities, and at the same time to reflect on the different mindset, values and assumptions that the use of sound favors.

In social sciences, Action Research is widely adopted in situations when there is a dilemma or problem to be solved or a practice needs to be changed (Cohen et al., 2000). A key feature of this methodology is its collaborative nature: action research takes place together with the insiders of an organization with which the researcher actively collaborates by acting both internally and externally (Herr & Andersen, 2015). Another important feature of the action-research process is the fact that it takes place through iterative cycles of planning, action, observation, and reflection within a systematic and documented study (Kember & Kelly, 1993). This iterative approach of *planning-action-observation-reflection* is familiar to another methodology that has recently gained increasing attention in design research: Research through Design (RtD). Recent studies have highlighted the similarities of these two approaches (Swann, 2002; Zimmerman et al., 2010), pointing out that the first focuses on the reflection and rigorous documentation of the process, while the second emphasizes the implementation of an artifact, which can be a product, a service or a system. Another key element of this approach is the explicit involvement of the researcher in the design, which stimulates researchers to become more active and intentional constructors of the world they desire (Zimmerman et al., 2010).

The ability of an experimental object to foster organisational change is also connected to an important reflection in management studies (Junginger, 2008). Here, the focus is on 'product development', which refers to 'anything that is offered to a market for attention, acquisition, use and consumption and which can satisfy a need or desire' (Kotler & Armstrong, 2003). This definition can include the practices and activities developed by museums to involve audiences, both in physical and digital spaces. According to these studies, the development of new products stimulates a change in the organization only when a process of research and reflection on the assumptions and values underlying the organisational culture is activated. A new product (or practice) allows to embody new assumptions, but only if these assumptions are made explicit (Junginger, 2008).

Also in this case, design research offered the methodological answer, by offering a range of design strategies and tools, such as prototyping (Buchanan, 1999; Dorst, 2008). Recent studies have shown that collaborative prototyping can be extremely effective in fostering an exchange of experiences among museum members, thus integrating different perspectives and externalizing and subsequently internalizing new knowledge in the organization (Nonaka & Takeuchi, 1995; Mason, 2015). Mason suggests that 'knowledge does not only move from an individual to the entire team, but also the other way round: that is, knowledge externalized by a prototype can be embodied by a member of the team and, in turn, be the base for new knowledge for further iterations of a design' (Mason, 2015, p. 419).

All these distinctive features of design research (the focus on the output of the design practice, my active involvement in the design, and the use of prototyping as a mean of exchanging and externalizing knowledge within the museum team) informed my research experiment. The prototype consisted in a new practice of engagement with sound on digital platforms which was designed, implemented and evaluated together with members of different departments of the Science Museum Group. The research process followed the three main phases of the design practice (*planning-implementation-evaluation*).
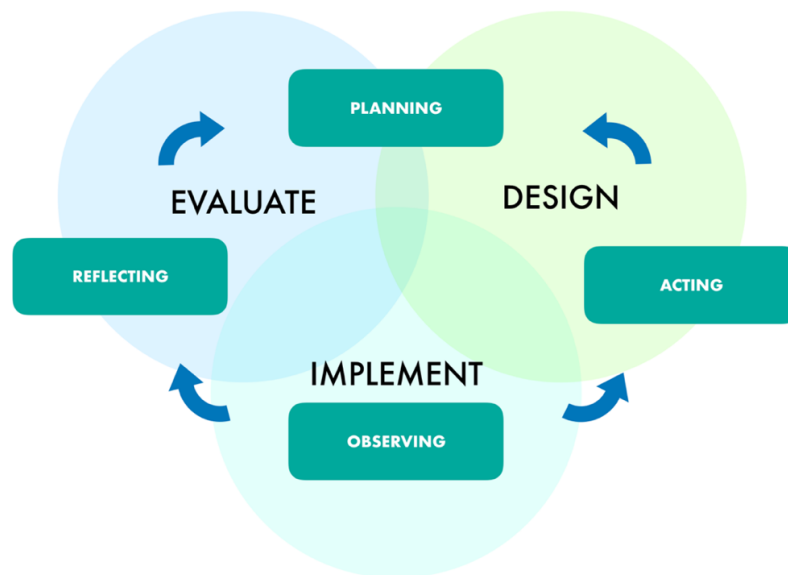
Fig. 4 The process of the design experiment. © Stefania Zardini Lacedelli.

For each phase of the project, Table 2 shows the additional research questions formulated.

DESIGN	IMPLEMENTATION	EVALUATION
What are the elements we need to take into consideration if we apply platform-thinking in the design of a sonic practice? What is the new vocabulary we need to use, the actions we need to think of, the actions we need to plan, the assumptions we need to make?	What are the practical implications of the practice? What are the reactions of the participants? How does the relationship with the museum change? What kind of new narratives emerge?	How did practice change the concept of heritage, the role of the collections and the relationship with audiences? Has the practice consolidated the initial assumptions or introduced new ones? What are the further reflections that the implementation of the practice has stimulated?

Table 2 The research questions formulated for each phase of the #SonicFriday project.

2.4.2 Data Collection

This research experiment was conducted over 9 months between March and October 2020. Overall, nine types of instruments of data collections were employed combining quantitative, qualitative, and digital research methods (see Table 3). This section presents each instrument adopted following the three main phases of the design experiment (Design, Implementation and Evaluation).

Research Phase	Instrument
PLANNING/DESIGN	1. Design Sessions
	2. Presentations
	3. Hashtag Search
	4. Questionnaires
IMPLEMENTATION	5. Social media prompts
	6. Group Discussions
EVALUATION	7. Collection of online contributions
	8. Social Media Insights
	9. Focus Groups

Table 3 The instruments adopted for each phase of the research

The data collection involved different categories of participants:

- **Museum professionals:** 11 members of the Science Museum Group were involved in the design, implementation and evaluation phases.
- **Volunteers:** 4 museum volunteers and 1 PhD student were involved in the implementation and evaluation phase. Their age and areas of expertise are summarized in Table 14, Appendix I.
- **Online users:** 215 online users were involved in the implementation phase of the practice. This category includes only the users who actively responded to the museum prompts, by commenting and sharing their memories. The online participants for each platform are detailed in Table 15 and 16, Appendix I.
- **The Researcher:** This research project was conducted in the framework of a placement funded by the Midlands4Cities Doctoral Training Partnership. The placement allowed me to work as an internal member of the museum for a period of nine months in close contact with the curatorial, digital and communication team, to develop a new practice of engagement through sound.

2.4.2.1 Design Phase

Design Sessions

The heart of the planning phase consisted of a series of collaborative design sessions with different members of the museum team, which allowed us to focus on various aspects of the engagement practice. This approach turned out to be particularly effective in the case of experiences that integrate digital and physical interactions, which introduce complex design elements, including the upskilling of the museum workforce (Royston & Parry, 2019). Each design session was attended by 3 to 5 museum members reflecting different areas of expertise (curatorial, web and digital, marketing and communication, participatory). While the first two sessions took place in the museum, once the museum closed, they were transferred online to the video conference software Microsoft Teams. This change made it easier to involve more members from different departments, an element that enhanced the multidisciplinary exchange.

Each session invited the museum team to reflect on specific elements of the engagement practice (see Fig. 5): the participants of the activity (WHO), the objects and themes (ASSETS), the engagement strategies (HOW), the platforms to engage participants and host their contributions (WHERE), the temporal framework of the activity (WHEN) and the output of the engagement (WHAT).
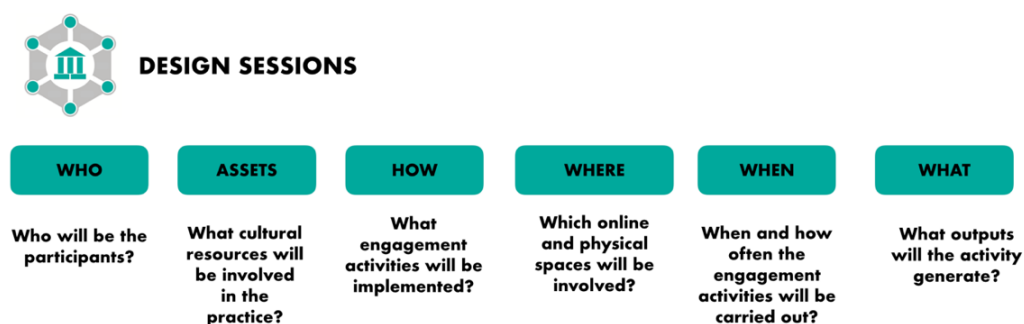
Fig. 5 The elements of the engagement practice which have been discussed during the design sessions with the museum team. © Stefania Zardini Lacedelli

The Platform-Museum Roadmap

To guide these sessions, I employed a design tool which was specifically designed to allow participants to interact with the new assumptions of the platform thinking: the 'Platform-Museum Roadmap' (see Fig. 6). In design practice, and especially in the design of digital media and activities, a significant role is played by design tools such as *visitor journey map*, *experience flowchart*, *wireframes*, *personalizing scenarios*, *digital engagement framework*. These tools function as 'conceptual maps' that help the team involved in the design to understand the design context, think through the problem, stimulate the visualization of concepts and the exchange of ideas (Lim et al, 2008; Mason 2015; Vavoula & Mason, 2017; Mason & Vavoula, 2020).

The inspirational model for the 'Platform-Museum Roadmap' was the *digital engagement framework* developed by Jasper Visser and Jim Richardson (2015), which focuses on the concept of engagement and co-creation of value with audiences. This design tool was adapted to the purpose of my research experiment, drawing upon the preliminary findings from the literature review and the case study research. The 'Platform-Museum Roadmap' was also built on the knowledge acquired in the development of the Platform-Museum Dolom.it, from which the name originates, and within which was firstly tested[1].

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[1] A first version of the 'Platform-Museum Roadmap' was developed between 2018 and 2019 to guide a group of heritage professionals of the Veneto Region in the design of participatory virtual museums. The tool was then adapted drawing upon the findings of the PhD research.

The framework was based on the following assumptions:

- *The museum is not limited to the physical building, but it extends its presence also on online and digital spaces* that can host different kinds of narratives. Digital platforms, thus, are not only places to promote physical activities but they are also spaces to design a museum activity on their own.

- *The narrative provided by the museum is not completed when it is offered to audiences, but it is continuously implemented and co-created with the audiences.* In so doing, the museum narrative will be fragmented and polyphonic to include more voices, perspectives and level of interpretations (Hooper-Greenhill, 2000)

- That *audiences are not passive receivers of information but actively contribute to the creation of knowledge.* They are not invited to visit a space, whether physical or digital: what they are asked to do is to interact with the narrative of the museum and contribute to its development If the action identifies what they are asked to do, we will call them '*participants*' instead of '*visitors*'.

- That *the heritage is not only made only by the physical objects stored in the collection* but is also enriched by intangible elements such as sound, music, memories that the interaction with the objects continuously stimulates.
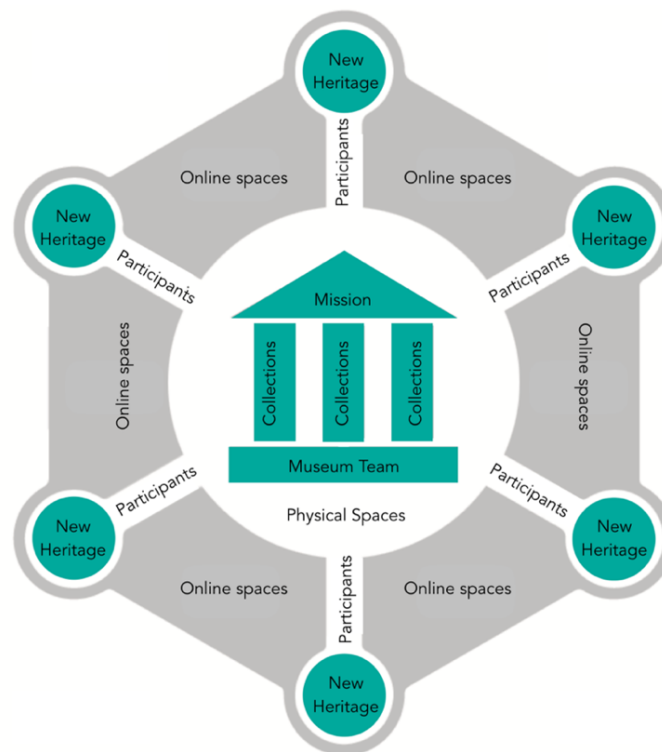
Fig. 6 The Platform-Museum Roadmap. © Stefania Zardini Lacedelli.

The framework was structured around six main dimensions, designed around the assumptions of the platform-thinking: *Where* (which physical and online spaces to consider), *Who* (which participants to involve), *Which* (which cultural resources to involve in the practice), *How* (what kind of engagement activities to imagine), *When* (when and how often to carry out the activities), *What* (what the outputs of the activity will be). Each of these dimensions presented a series of options coming from the specific design context in which the research project was situated. These options changed throughout the research project, due to the fundamental changes that the National Science and Media Museum, like all the other museums in the world, faced in 2020. Originally the design of the practice was aimed at increasing the audience engagement around the 'Sound Season' programme, the first two exhibitions dedicated to the collection of Sound Technologies. Sound Season was supposed to be launched in April 2020 targeting young adults and independent adult Trend-Aware, with a light refresh in the summer to connect to mixed age family groups. In this way, the research project aimed to respond also to the museum's need to experiment with how digital platforms could extend the ways of engagement through sound as well as the audiences, involving not only physical visitors but also online users.

WHERE	WHO	WHICH	HOW	WHEN	WHAT
Which online and physical spaces will be involved?	*Who will be the participants?*	*Which cultural resources will be involved in the practice?*	*What engagement activities will be implemented?*	*When and how often will the engagement activities be carried out?*	*What outputs will the activity generate?*
The physical galleries of the exhibition 'Sonic Boom' Museum Website Social media platforms	Exhibition visitors Online users Volunteers Local communities	The objects of the Sound Technologies collection in the exhibition display.	Collaborative workshop Online engagement sessions	Before and during the exhibition	Digital sonic narratives created by curators Digital sonic narratives created by the different participants

Table 4 The design dimensions inspired by the platform-thinking framework and the options being considered by the museum team at the beginning of the design phase, in February 2020.

The museum closure due to COVID-19 has further enhanced these elements. The restrictions imposed by the emergency functioned as additional design constraints, which are summarized below:

- The physical museum was closed, and *the only way the museum team had to interact with audiences - as well as to work together - was through online platforms*
- *The activity was designed for online audiences and online participants exclusively*, and not with physical visitors in mind
- *In the online dimension, the museum could only offer an interaction with the digital and sonic dimensions of the objects*. This shifted the attention on the intangible elements - not only the image of the objects, but the sounds they produced, the music, the stories that were part of it - and on the themes they represented – namely, the evolution of audio formats, people's relationship with sound and music, the advent of digital sampling.
- Due to the economic difficulties arising from the museum closure, a considerable proportion of the museum team was furloughed. Despite the lack of resources, this also *increased multidisciplinary collaboration across the museum*. Throughout the different phases of the design, different members from different departments were involved, increasing the exchange of different perspectives and expertise.

These additional contextual elements introduced a series of changes in the options available for each design dimension. While on the one hand the museum closure forced the museum team to imagine narratives, engagement activities and interactions that could only be undertaken online, on the other hand this changed context has loosened a series of design constraints deriving from the 'Sound Season' exhibitions. One of the most evident changes was the opportunity to include in the practice any object and not only the ones planned to be on display. This wider range shifted the focus from the objects to the themes that they could raise, so including 'themes', as well as 'objects', in the design options.

WHERE	WHO	WHICH	HOW	WHEN	WHAT
Which online and physical spaces will be involved?	*Who will be the participants?*	*Which cultural resources will be involved in the practice?*	*What engagement activities will be implemented?*	*When and how often will the engagement activities be carried out?*	*What outputs will the activity generate?*

Museum Website	Volunteers	Any object and theme inspired by the Sound Technologies Collection.	Online engagement sessions	During the summer, on a regular basis	Digital sonic narratives created by curators
Social Media Platforms	Online users				
Other digital platfomrs					Digital sonic narratives created by the different participants

Table 5 The new options considered by the museum team for each design dimension, once the museum closed in March in response to the pandemic emergency. These alternatives emerged and were discussed in the online design sessions in April and May 2020.

Another interesting reflection emerged in the temporal dimension. Without the connection with the 'Sound Season' exhibitions, the museum team needed to assign a frequency to the engagement activities (Poell, 2020).[2] The opportunity to repeat the activity on a regular basis on social media emphasized an essential element of the design process: repetition, which transforms an activity into a practice (Pentland et al., 2010).

Despite these changes, one of the essential elements of the design framework has remained unchanged: the possibility to consider as output of the activity not only the narratives created by the curators before the launch of the activity, but also the narratives co-created with the participants as an 'ongoing' by-product of the practice itself.

Presentations

For each design session I created a presentation on Keynote, a software that allows the inclusion of different types of multimedia inputs. These presentations were aimed at presenting the objectives of each session, exchanging ideas around the design framework of 'platform-thinking' and sharing reflections from the previous sessions. The presentation format also made it possible to include examples of interactions from the online environment, so stimulating the museum team to reflect on the new behaviors and activities which took place on the web, which I had previously collected online. Visual tools such as blackboards,

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[2] This cyclical repetition of the engagement activities was also reflected on the title of the project: #SonicFriday (see Chapter 7).

images and concept maps are widely adopted in design practices, allowing the visualization of concepts, relationships and behaviors more effectively than with only a verbal description (Mason, 2015). This tool was particularly effective in the sessions that took place online on Teams, allowing to quickly circulate ideas from one session to another and among participants. This material also functioned as a 'researcher's diary' in visual form (Bryman, 2001), to capture the highlights of each design session and collect my reflections after each meeting. Sharing participants' responses as well as my interpretations helped to stimulate the generation of new ideas.

Hashtag Search

The design phase also included a preliminary collection of Instagram posts dedicated to sound technologies. Social networking websites are defined as 'sites where users can create a profile and connect that profile to other profiles for the purposes of making an explicit personal network' (Lenhart & Madden, 2007). This 'natively digital' data include both personal information of the users of the platforms - provided at the registration -, as well the content published by the users – text, images and other multimedia content, and quantitative data provided by the services themselves to capture users' behavior. This huge amount of data is systematically collected by the platforms themselves to capture and analyse user personal information, behaviors, tastes and preferences for commercial purposes, in order to develop and improve their services. Recent studies in different disciplines have highlighted the increasing opportunities to use these data for social and cultural research, thus contributing to the development of a methodological approach for social research with the web (Jones, 1999). A key concept underlying this approach is what has been called 'online groundedness' or 'grounded web' (Rogers, 2013, p. 19), which considers the Web not only an object of study but also a source of data about society and the public. The motivation behind this theory is the fact that the Internet is employed as a site of research not only to study online culture, but 'to diagnose cultural changes and societal conditions by means of the Internet' (Rogers, 2013, p.21).

In the case of the design experiment, social media platforms were the main environment chosen for the project, but also a key source of information on how sound cultures and sound technologies are experienced in contemporary society. Consequently, a dedicated search was implemented on Instagram using a series of hashtags related to the themes discussed in the design sessions (#VynilMemories, #Walkman, #CassetteMemories, #iPod). This platform

was chosen for its ability to provide visual culture and the opportunity of retrieving data using hashtag search. This small dataset of Instagram posts was presented to the museum team during the design sessions, in order to stimulate a discussion on potential sound-related prompts for the campaign. These examples (see Fig. 7) also helped the museum team to familiarize with the type of contribution expected by the online users, and to reflect on the main elements of a digital memory.
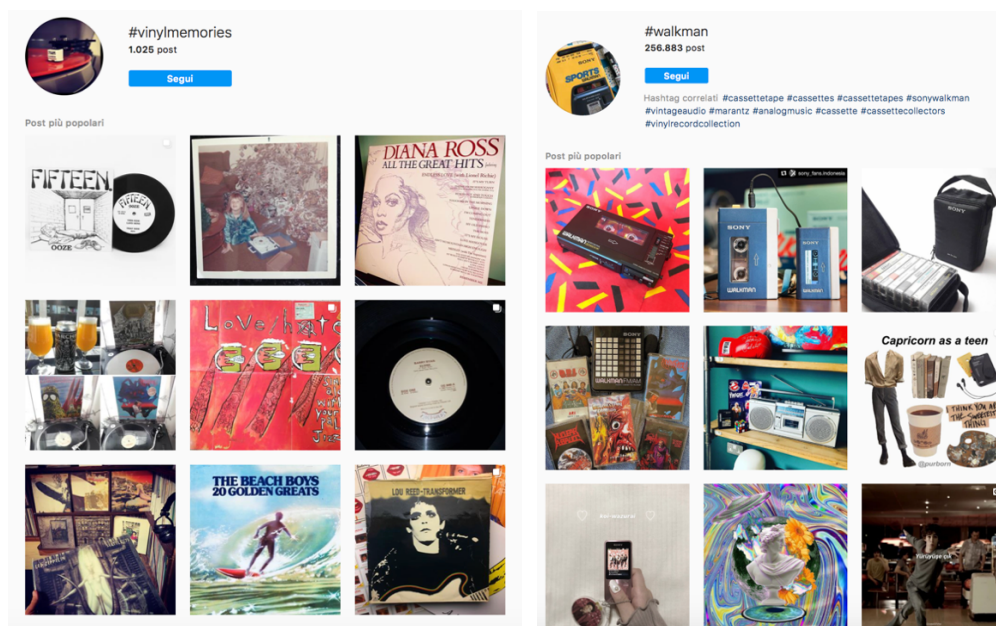
Fig. 7 The results of two hashtag searches on Instagram: #VinylMemories
(https://www.instagram.com/explore/tags/viniylmemories) and #Walkman
(https://www.instagram.com/explore/tags/walkman). Accessed on 15 May, 2020.

2.4.2.2 Implementation Phase

Questionnaire

At the end of the design phase of the #SonicFriday project, a questionnaire was devised to explore how the volunteers imagined their contribution to this practice, as well as collect their willingness to participate (see Fig. 8). The questionnaire was delivered online and included both open and closed questions (Wilson, 2013). At this stage, the curators had already identified the main themes to launch in the online campaign, but the questionnaire made it possible to identify the themes of greatest interest to this group of participants. The

questionnaire was divided into two main sections. The first aimed at investigating the areas of activity of each volunteer and their relationship with digital platforms. The second aimed at exploring their relationship with the themes identified and investigating which ways of engagement they felt more appropriate. The questionnaire was sent by email by the volunteer coordinator on 15 June, in the weekly newsletter, announcing the launch of the new project and the possibility of taking part.
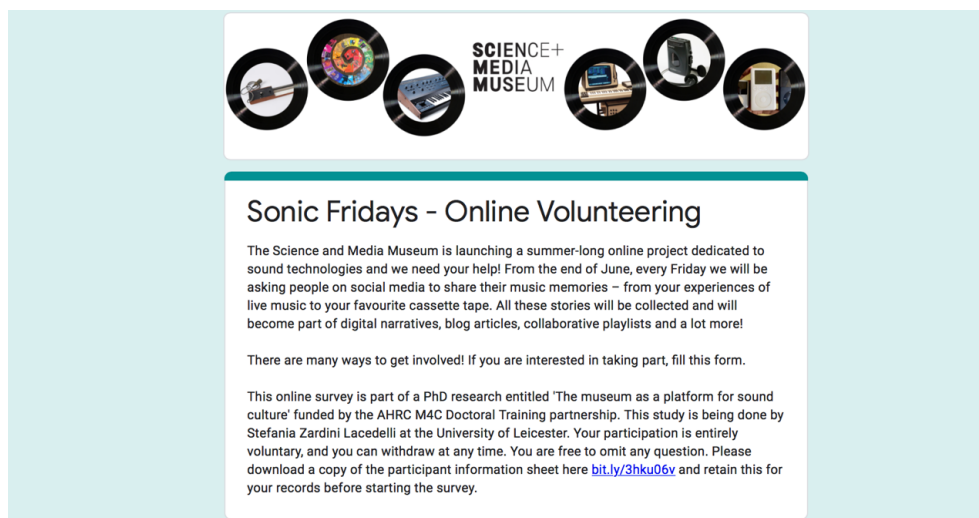
Fig. 8 The online questionnaire sent to the volunteers in June 2021.

Social Media Prompts

The social media prompts were a specific element designed in the planning phase to involve online users and were also part of the data collection of the implementation phase. As explained in Chapter 7, the 8 prompts of the #SonicFriday project were published on different social media platforms and a screenshot was taken and collected for each of them for future analysis (see an example in Fig. 9). The digital memories shared in response of each prompt were instead subsequently collected in the evaluation phase (See 2.4.2.3).
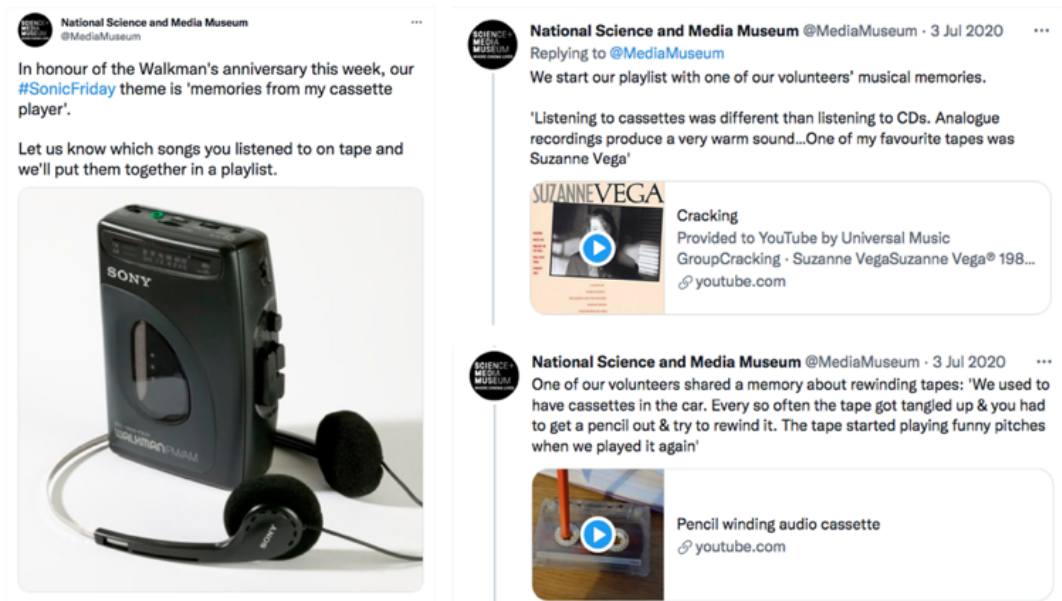
Fig. 9 The 'Memories from my cassette player' prompt published on Twitter on 3rd July 2020 (https://twitter.com/MediaMuseum/status/1278978187238785024, accessed on 30 March 2022). This was one of the 8 prompts launched in the #SonicFriday project.

Group Discussions

Group Discussions were used in the implementation phase of the #SonicFriday project to involve museum volunteers in sharing their memories related to the themes of the online campaign.

Group discussion is a method of collecting data in one go from several people who usually share common experiences (Payne & Payne, 2004). In this case, I offered a series of inputs drawing upon the themes of the campaign (live music, sounds of quarantine, cassettes, CDs, iPod) to stimulate the exchange of different experiences related to sound and music. These discussions took place concurrently with the launch of the #SonicFriday campaign, once the themes had already been defined by the curators. The group discussions took place within the 'Online Coffee Morning' series, organized by the Volunteer Coordinator on Teams platform, with the aim of maintaining a space for interaction and engagement of volunteers (see Fig. 10). Overall, 5 morning coffees hosted the group discussions, involving a total of five volunteers.

Fig. 10 A screenshot of one of the group discussions with volunteers.

2.4.2.3 Evaluation Phase

Social Media Insights

The use of social media metrics in the heritage sector has gained increasing attention in the last years (Arvanitis et al. 2016). In museum studies, an innovative framework to collect and analyse social media data have been developed by Villaespesa (2016) and several research projects have investigated the potential of the use of this data in the perception of cultural heritage and the past (Bonacchi, 2017; Zuanni & Campbell, 2018). In this research, the main aim in using social media metrics was to understand the level and type of engagement stimulated by the #SonicFriday project. In particular, I was interested in discovering how many users responded to the prompts launched by the museum, what kind of behavior the prompts had stimulated, and if the level of engagement changed comparison with the overall social media posts published over the summer.

To answer these questions, a social media analysis was implemented using the social media insights of the three platforms adopted in the #SonicFriday project (Twitter, Facebook and Instagram) from June to October 2020. These data were provided by the marketing team accessing the museum's profiles on Twitter, Facebook and Instagram. Each service provides insights around specific key performance indicators (KPI) and metrics. To understand in depth the response of the online audience, the following indicators have been taken into consideration: 1) *the total Reach*, i.e. the number of users who viewed the museum prompts;

2) *Impressions*, i.e. the number of time the prompt was viewed; 3) *Share/Retweet*, i.e. the number of time the prompt was shared; 4) *Likes*, i.e. the number of likes to the prompt; 5) *Comments*, i.e. the number of comments/responses to the prompt; 6) *Engaged users*, i.e. the number of users actively engaged by commenting, sharing or liking the post; 7) *Engagement rate*, i.e. the relationship between the number of engaged users and the overall users reached by the prompt.

The Collection of Social Media Contributions

Throughout the #SonicFriday project, I curated the systematic collection of all the contributions that have been published by online users on the different platforms adopted. This includes the comments to the 11 prompts of #SonicFriday on Twitter, Facebook and Instagram, as well as the contributions shared in the other digital platforms adopted in the practice (Learning Toolbox and Padlet). This dataset was fundamental to reflect with the museum team on the value of digital memories and explore the new narratives created in the online spaces.

Twitter	Facebook	Instagram	Padlet	Learning Toolbox
Twitter insights from June to September 2020	Facebook insights from June to September 2020	Instagram insights from June to September 2020	Contributions to the Sound Map 'Sounds of my Quarantine'	Contributions to the e-poster Sounds of my Quarantine
The #SonicFriday prompts published by the museum	The #SonicFriday prompts published by the museum	The #SonicFriday prompts published by the museum		
Individual tweets answering the museum's prompt	Comments to the museum's prompt	Comments to the museum's prompt		
Retweets	Comments in the Facebook Groups where the museum post was shared by the researcher.	Hashtag search #SonicFriday		
Hashtag search #SonicFriday				

Table 6 The data collected for each social media platform

A data sheet was created for each platform, containing the link to the original post published by the museum, the responses of the users and the type of media (picture, video, sound or musical link) which was eventually shared. In the case of Twitter, the links to the individual responses tweeted by the users were also collected, in order to make it always possible to track the original tweets, as shown in Fig. 11.

Fig. 11 The data sheet of the Twitter contributions. A different sheet was created for each prompt of the #SonicFriday campaign.

Owing to the complex architecture of these environments, the data collection might have missed some contributions (i.e., comments shared outside the museum post, as well as other content visible only to a private circle of 'Facebook friends'). Despite the limitations of this dataset, the range of sources analysed responded to the aim to give evidence of the global reach and type of engagement stimulated by the practice. Furthermore, as suggested by Bruns and Burgess, the data collected in any netnographic investigation should be considered 'as a reasonably representative sample rather than a comprehensive dataset' (Burgess & Bruns, 2012).

Focus Group

The focus group format was specifically adopted to investigate the impact of #SonicFriday on the museum team. In particular, two focus groups were organized at the end of the project to investigate if and how the practice had changed two fundamental areas of the museum practice:

1) what value was assigned to people's contributions and how does this affected how collections are interpreted and what is considered 'heritage' (Focus Group Nr 1)

2) the quality and specific features of the online engagement and how do they changed the way in which the relationship with audience is conceived (Focus Group Nr 2)

The focus group is a powerful method for evaluating the impact of a practice, because it has the advantage of gaining insightful information from more people, while facilitating the exchange of ideas and group brainstorming (Baldry, 2007; Morgan, 2012). In addition, it also responded to the need to externalize and socialize the new assumptions introduced by the practice among the members of the museum team, fostering the internalization of new knowledge, which is one of the benefits of the collective reflection around prototypes (Mason, 2015). The two sessions involved seven museum team members, two volunteers and one doctoral student. The diversity of experiences and background of the participants allowed a wide range of ideas, feelings, and insights to emerge from the discussion.

I developed the questioning route following three distinct categories of questions (Krueger & Casey, 2014), with an introductory question at the beginning, to get people to start thinking about their connection with the main subject of the discussion; key questions driving the study to which I dedicated the main part of the discussion and ending questions with final reflections and the opportunity to add further thoughts.

The questioning route of the Focus Groups		
	Focus Group nr 1, 7th September 2020 The re-use of the contributions	Focus Group nr 2, 18th September 2020 Online Engagement
Introductory Question	1. What gallery/galleries impressed you the most and why?	1. What aspect of the online engagement in the #SonicFriday campaign surprised you the most and why?

Key questions	2. Each digital memory is made of different components: the text is very often accompanied by a song/or YouTube video to which the memory is referred, sometimes a picture and, more rarely, an audio/video. Which combination did you find more interesting? 3. What value can these digital memories have for the museum and the sound technologies collection in particular? 4. How do you think these contributions can be used by the museum in the future?	2. What impact do you think the use of sound and sound-sharing platforms such as YouTube has had on online engagement? 3. Thinking of the contributions and interactions of online users and expert online communities, how do you think their role was different in comparison to physical visitors?
Ending questions	5. From your perspective, what challenges/changes should the museum face to collect these memories? 6. Is there anything else that you would like to say or add?	4. What elements of this online experience would you transfer in the physical museum experiences? 5. Is there anything else that you would like to say or add?

Table 7 The questioning route of the two Focus Groups at the end of the #SonicFriday project.

Due to the persistence of the museum closure in September, both focus groups were conducted online, via videos and online platforms. The online focus group is a variation of a traditional focus group that employs digital technologies to access and interact with participants in different parts of the world (Tuttas, 2015). To help participants familiarizing with this method, each participant was provided with a document containing the ground rules for the Focus Group, explaining the role of the facilitator, the modes of exchange and the specific features of the online environment.

While online focus groups remove temporal and geographic constraints, they also complicate the role of facilitator, especially in keeping participants engaged (Lijadi & Schalkwyk, 2015). To respond to this challenge, I combined the synchronous discussion was combined with an asynchronous method, using the Learning Toolbox platform and a shared Google Document. These online spaces were extremely useful in extending the reflection and exchange both before and after the focus group. In particular, I used Learning Toolbox to collect a selection of digital memories and online interactions that could be explored by participants before the discussion, as well as to anticipate the introductory question in the forum space and start collecting initial thoughts. Following the suggestion of Tuttas to keep an online discussion

board open after the focus group (2015), I also provided a Google document where participants could check the transcriptions afterwards and provide further comments or material.

Throughout the thesis, quotes and extracts from the Focus Groups are referenced by their unique code number, as reported in the Focus Group plan in Appendix II, alongside the full name and the job role of the participants. If the interviewee asked to remain anonymous, only his/her job role is reported.
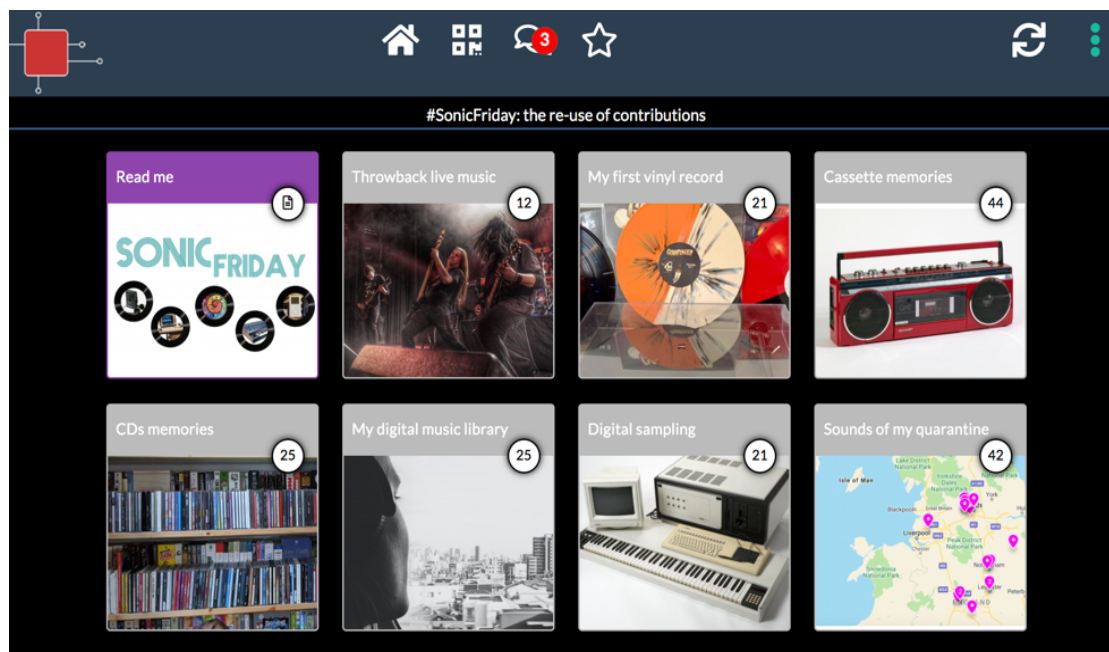
Fig. 12 The e-poster created for the first focus group on the Learning Toolbox platform (https://my.ltb.io/#), displaying a selection of digital memories.

2.4.3 Data Analysis

This section describes the procedures used in the evaluation study to analyse the data collected in the different phases of the #SonicFriday project. The different nature of the data– qualitative, quantitative and web data – required the employment of a combination of methods, drawing upon traditional qualitative methods and new digital methods emerged in netnographic research (Rogers, 2013).

The analysis of social media data, in particular, required a preliminary reflection on their specific features, as suggested by Rogers (Rogers, 2013):

- They are of multiple nature, including both qualitative and quantitative data (textual information, multimedia content, statistics).
- They are *unstable object of study*, due to the ephemerality of most website and social media platforms, that might change their terms and conditions as well as the tools provided to access this data.
- They contain traditional demographic information such as gender, age and location, but also 'post demographic' information such as interests, tastes, preferences, favorites, groups.
- They can include both personal information but also depersonalized, in the case of aggregated data which analyse users' behavior (social media insights).
- They are 'messy data' which claims for data cleaning.

To develop a fully and comprehensive analysis, these elements were carefully considered in the choice of the methods adopted.

2.4.3.1 Content Analysis

Content Analysis was applied to analyse the qualitative data from the the design sessions, the group discussions with volunteers, and the focus groups. For this type of qualitative data, I followed the same process described in 2.3.

The approach to the coding frame was adapted according to the different questions I wanted to answer in the three main phases of the process – design, implementation or evaluation – and the different methods adopted – design sessions, group discussions, focus group.

In analysing the design sessions, the focus of the coding was to identify a list of keywords which could respond to the first research questions: what new vocabulary we need to use, and what new spaces, elements, and actions we need to think of if we design a sonic practice based on the assumptions of platform thinking. In reporting the analysis, I also combined the codes with the visual input used in the design session.

A different approach was adopted in analysing the group discussions with volunteers, which were part of the implementation phase. In this case, the coding was developed in relationship with the themes of the campaign and was then integrated into the coding of the social media contributions. These data were collected from the different platforms adopted in the practice and added new themes to respond to the specific research questions of this phase. In this case,

the overall coding was developed once the first level of coding of social media contributions was completed. Because of the specificity of this type of online data, an extended approach to Content Analysis was applied and is explained in section 2.4.3.2.

In the analysis of the focus groups, particular attention was given to the themes that were jointly constructed by the participants (Liamputtong, 2011) and if they were confirming the original assumptions or introducing new assumptions. In so doing, a series of analytical themes were selected which then led to the research results.

2.4.3.2 Netnographic Analysis

To analyse the digital memories shared by the participants on different platforms in the #SonicFriday project, I applied an expanded approach to content analysis, following Herring's suggestion to combine different methods to make sense of the multimodal dimension of any web environment (Herring, 2010). The complexity of social media data, in fact, introduces the need to combine different methods in the analysis, drawing from social science methods like textual analysis, geospatial analysis, social network analysis (Marres, 2017), as well as from sentiment, semantic and content analysis (Iglesias & Moreno eds., 2020).

Since this type of data came from different sources and platforms, a first dataset was created on Microsoft Excel collecting all the social media comments as well as the contributions shared in other platforms[3]. A different file was created for each platform adopted in the practice, each one including all the comments divided for each theme of the campaign. Drawing upon the coding systems developed by Courtin et al. (2014) and Zuanni & Campbell (2018), I categorized this material according to five different categories:

1. Music sharing-only (contributions including only links to music)
2. Sharing a textual memory (contributions including only text)
3. Sharing a multimedia memory (contributions including text and music-sharing)
4. Sharing a multimedia memory (contributions including text and picture)
5. Interacting between accounts (conversation)

---

[3] Two prompts in particular were also launched in two different platforms: Learning Toolbox and Padlet Map (see Chapter 7).

Each contribution was assigned to a unique category.

Once this first level of analysis was completed, a database of digital memories was created selecting only categories 2, 3 and 4. Categories 1 and 5 were not considered, because the sharing of a link without explanation as well as a conversation did not respond to what the museum team considered a full 'digital memory'. These contributions were then combined with the memories shared by the volunteers during the group discussions. The overall digital memories collected for each theme are summarized in the following table.

Theme	Twitter	Facebook	Instagram	Other sources	Volunteers	TOT.
Throwback live music	4	5	0	0	2	9
Cassette Memories	41	35	5	0	5	86
Sounds of my quarantine	12	6	0	47		65
I love digital sampling	14	5 14 (Facebook Groups)	3	0	0	36
CD Memories	7	6 3 (Facebook Groups)	1	0	6	23
My first vinyl record	19	0	0	0	3	22
My digital music library	16	1	0	0	5	22
Electric stories of music	3	0	0	0	0	3
					TOTAL	267

Table 8 The digital memories collected for each theme of #SonicFriday.

In analysing the whole dataset, different methods were combined from linguistic, semiotic and sociology to include the analysis of images, themes, features, links, exchanges and languages, all of which can communicate meaning (Herring, 2010). 'Narrative analysis', in particular, was particularly helpful to identify the most recurrent themes and patterns in the participants contributions, as well as understand the storytelling generated by people on social media (Page, 2012). This extended approach to content analysis turned out to be particularly effective in understanding sound as a linguistic element in the sharing of memory (Page et

al., 2014)[4]. One of the most recurring features of the contributions was, in fact, the sharing of a link from audio-platforms such as YouTube, SoundCloud and Spotify.

In the narrative analysis, I took into account different dimensions suggested by linguistic researchers in analysing 'small stories' on social media (Georgakopoulou, 2007; Page, 2012): the temporality of the story shared, the grade of intimacy of the memory, and the subject. Following these dimensions, the digital memories were further classified in the following categories:

- Memories sharing personal audio-related objects
- Memories sharing sounds/music
- Memories describing the functioning of an audio device
- Memories expressing emotions
- Memories related to childhood/adolescence

After this first level of analysis, an additional approach was adopted. The content analysis highlighted how sound-related objects and themes were capable to stimulate a high level of emotional and personal involvement, and a recurring sense of nostalgia, reminiscence and affection to the participants' individual past emerged across the different contributions. To gain a deep understanding of this emotional level, I applied sentiment analysis which has become a key technology in social media analysis to understand opinions and emotions related to an event or a product (Iglesias and Moreno eds., 2020). In the sentiment analysis, the following methods were adopted:

- I created a word cloud to capture the most recurrent words used by participants to express their relationship with the sound themes proposed
- I clustered the comments with their associated emotions (joy, surprise, affection, attachment, excitement, fun, wonder, gratitude, proud, trust, relief, closeness, introspection, sadness, nostalgia, homesickness, melancholy, loneliness, estrangement, disappointment, bewilderment, anxiety, fear, disgust, anger, upset)

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[4] The linguistic approach to social media places the understanding of 'language' in a 'wider semiotic system that also involves images, sound and kinetic resources found typically in digital interaction' (Page et al., 2014).

2.4.3.3 Social Media Analysis

To analyse the quantitative data from the metrics provided by the different platforms – Twitter, Facebook and Instagram Analytics, Social Media Analysis was adopted. These metrics are extremely rich and there can be various levels of reporting and presenting information. Villaespesa highlighted the need to interpret the metrics to respond to the reporting need of the museum staff (Villaespesa, 2016). In this case, the data was interpreted to respond to the specific research questions of the evaluation phase. In particular, the metrics were interrogated to understand the reactions of the participants and analyse in depth the type of engagement stimulated by the practice. To investigate these dimensions, 5 key indicators and metrics were taken into account and are summarized in the following table.

Indicator	Description	Twitter Analytics	Facebook Analytics	Instagram Analytics
Reach	The number of users who viewed the museum post.	x	x	No
Impressions	The number of times the museum post was viewed.	x	x	No
Share/Retweet	The number of people who shared/retweet the museum post.	x	x	No
Likes	The number of people who liked the museum post.	x	x	No. Manually calculated
Comments	The number of people who commented on the museum post.	x	x	No. Manually calculated
Engaged users	The number of users actively engaged by sharing, liking, or commenting.	x	x	No
Engagement Rate	The percentage of people who engaged with the post (by sharing, liking or commenting) on the overall number of people who viewed it.	x	No. Manually calculated	No

Table 9 The indicators analysed in the social media analysis.

Considering the variety of the platforms adopted in the practice, I conducted a 'media-specific analysis', taking into account the specific terms and conditions, the available tools for accessing metrics and information, and the different ontological elements of these environments (such as links, tags and hashtags).

To analyse each indicator in detail and understand the overall online engagement of the practice, the following steps were followed:

- Values were reported corresponding to these selected metrics in Microsoft Excel. I created a different file for each platform's insights. Whereas both Twitter and Facebook Analytics provide a comprehensive overview of these metrics, the insights

provided by Instagram were less comprehensive and I could collect only the values of two metrics (number of likes and of comments)

- Only the metrics related to the #SonicFriday project were considered. In the case of Twitter, for each prompt the museum published a thread with an average of 7/8 tweets, so I aggregated the individual tweets related to each individual prompt and calculated the average.

- The metrics related to the selected prompts were reported in a chart to analyse the engagement over time.

- The metric calculated for the #SonicFriday prompts were compared with the average value of each metric of the overall posts published by the museum over the summer.

2.5. Research Ethics

The PhD research complied with the Code of Research Ethics of the University of Leicester, and clearance was received to pursue both the research fieldwork and the design experiment. Throughout all the phases of the project, great attention was given to complying with the key ethical principles of any social research, especially the issues that arise in relations between the researcher and research participants (Bryman, 2001). I made sure that the research did not cause any harm to participants, to make participants aware of the aims of the research, of how their personal information and data would be treated and how confidentiality would be assured. Equal importance was given to report and analyse data in an ethical manner, keeping a balance between the safeguard of the identity of participants and the need to carry out an honest and comprehensive investigation.

2.5.1. Recruiting

Different methods of recruiting have been applied in the different phases of the research project.

At the British Library, participants were recruited with the support of the Project Manager of the 'Unlocking the UK Sound Heritage' Project, who arranged a preliminary meeting in January 2018 in which I could present my research to the curatorial team of the sound collections. Once I obtained the formal approval to conduct the research fieldwork and my interviews plan, I sent an email invitation to the Head of Sound and Vision department, the sound curators, and the Web Manager.

At the Science Museum Group, a proposal to undertake the research fieldwork was sent to the Digital Director John Stack and the Curator of Sound Technologies Annie Jamieson, who then become the main reference contact to identify the members of the digital, curatorial and communication team to interview. Once I obtained formal approval, participants were recruited through an email invitation in which I explained the aim of the fieldwork.

As regards the design experiment, the members of the museum team have already been identified in the placement proposal, which was developed within the M4C placement framework. The M4C placement application with the project brief and expenditure plan was sent 3 months in advance in collaboration with the host organization and approved by the M4C Placement Manager. To assure the exchange of knowledge and perspective and interdisciplinarity among the museum department, different members were recruited to represent the three main areas of the activity: curatorial, communication and digital. The museum closure and the furlough of some of the members affected the participation throughout the design phases, with the result that some members could not take part in the implementation phase and some others were subsequently introduced to expand the participation to other museums of the group. The museum volunteers were recruited through a questionnaire and an email invitation from the volunteer coordinator, which explained the aim of the project. Once the group of interested volunteers was identified, they were invited to take part in a series of online group discussions and a final focus group to capture their opinions and perceptions regarding their experience. The involvement of online users was part of the engagement practice, and the specific challenges in relation to consent will be explained in section 2.5.3.

2.5.2. Consent and Confidentiality

In each method of data collection employed, different criteria were adopted to address the issues of consent and confidentiality of participants.

Each participant was provided with a Participant Information sheet and an Informed Consent Form. All the information that I have collected about participants during focus groups or interviews has been kept confidential accordingly with the Data Protection Act (1988) and its GDPR (2018) extension. All the semi-structured interviews, design sessions, online group discussions and focus groups were audio recorded with the written consent of participants. All the audio recordings produced in the research have been kept on a security-code encrypted laptop and returned for confidential and safe-keeping on the secured University of Leicester's

server, where it will be retained for a period not exceeding 6 years after which they will be destroyed. I did not record all the meetings I had with the museum team during my placement, but only the sessions aimed at collecting data for research purposes. The members of the museum were aware that I was not collecting data all the time: when a session was recorded, they were informed at the beginning of the sessions. As regarding the aggregated data, I received consent to have access to the insights from Twitter, Facebook and Instagram of the period when the practice took place (June-October 2020): these data were provided by the marketing team with the formal approval of the Communication Manager.

While in the qualitative methods – semi-structured interviews, design sessions, group discussions and focus groups – was possible to apply traditional approach and tools to comply with the issues of consent and confidentiality, the online nature of the intervention required to explore carefully how each of them can be treated in an online environment (Johns et al., 2004). The characteristics of digital platforms raise a series of ethical issues related to anonymity, consent and privacy that have been carefully considered for each ethical principle, following the recommendation of the two ethics guides published by the Association of Internet Researchers (AoIR, 2002 and 2012).

2.5.3. Ethical Challenges in a Platform Society

The data collection from the Web was a key part of the experiment, aimed to analyze the participation of social media users and the re-use of some of the online contributions by the museum team. Any research project which involves the analysis of social media users, as well as the collection and re-use of online contributions, needs to take into careful consideration the ethical issues related to consent, anonymity, and privacy which originate from these specific environments (Zimmer, 2010; Ahmed et al., 2017). The data shared on these platforms are regulated at first instance by specific terms and conditions that each platform develops. These terms and conditions might vary depending on the platform, but they always regulate both personal information provided at the registration and the copyright associated with the content shared by users. Both Facebook and Twitter terms of conditions - that any user of the platforms accepts when creates an account - specify that any published content and personal information will be collected and can be used by third parties, including the research and academic sector.

According to the ethics guides published by the Association of Internet Researchers (AoIR), depending on the nature of these data and the terms and conditions of the platform in use, the

need to ask consent varies. In case of the authors of content intended to be made public, the obligation to protect privacy and confidentiality is lower. The social media user that publicly answers to a Facebook post or to a Tweet of a public organization (such as a museum), can be considered in this category. In addition, the museum declared in the #SonicFriday prompts the intention to re-use these contributions to create digital narratives such as playlists or sound maps, so the online users were aware that they were proactively contributing to a public call out.

Even taking into account all these considerations, the collection of these data might not fully respond to the ethical principle of 'informed consent', because the social media users are not aware, when they participate in the museum activity, that their data and information provided will be used in a research project. The use of 'disguised observation' and 'covert methods' – when participants are not aware of the presence of the researcher -, however, are justified in certain ethnographic research where the awareness of the presence of the researcher might impact the behaviours, actions and attitudes of the participants (Gans, 1968), as in this case. As suggested by the British Sociological Association, in such studies 'is important to safeguard the anonymity of research participants' and to obtain the informed consent post-hoc.

Consequently, particular attention was given to assure the anonymity of the social media users in the analysis and report of the data. The social media insights provided by Facebook and Twitter already aggregate the data and display the information in anonymised form. However, anonymity is lost in case of publication of social media messages, since they are searchable through Google (Hardey, 2011; Fiesler & Proferes, 2018). Considering the relevance of the individual comments and user contributions for the purpose of this research, to reduce any ethical issues, some additional safeguards were taken:

- I quoted in the thesis only the comments that have been published in 'public online spaces' (public Tweets, responses to the public Facebook post of the museum or in public Facebook groups), giving priority to those that had been already re-published in the museum blog, where a privacy policy allows the re-use of this content for research purposes[5].

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[5] As Chapter 7 will show, the collection and re-publication of the contributions of online users was part of the practice. An important part of the research was, in fact, to analyse to what extent the museum team transferred these social media contributions in its digital domain, what issues and reflections this process raised and what meaning was assigned to this re-publication.

- In case a comment was of particular significance and was not already collected by the SMG website, I asked to the online user the permission to quote the content in the thesis, providing the Participant Information Sheet and a dedicated Online User Consent Form. This Form was specifically developed to ask the written consent of online users to quote any comment/material published by their individual social media accounts.

- In all cases, when a social media contribution has been used for analysis purposes in this thesis, the identity of the online user has been anonymised.

- I collected a dataset of public Tweets and Facebook comments, each of them including a hyperlink to the original tweet. By collecting the link of the original post, it will be always possible to track them back: if an online user deletes one of those tweets, the tweet can also be deleted from the dataset.

In terms of sensitivity of the content, the data collected in the practice was not sensitive because the engagement activity was designed around the relationship with sound and sound technologies. However, particular attention was given to not report in the analysis any comment that could be considered sensitive according to the General Data Protection Regulation. To assure that no vulnerable participant was involved, the Online User Consent Form required also to declare to be over 18 years of age.

2.6. My Approach to Writing

Writing my thesis has been, for me, a reflective and transformational process by which I could find, refine, and strengthen my own academic voice.

My writing style reflects a journey of personal growth and professional development not only as a researcher but also as author, which has been supported by the participation in three writing workshops promoted by the Midlands4Cities Doctoral Training Partnership. This experience had a profound impact on my writing style. It made me realize that the best way to tell the story of my research is to narrate my journey of discovery and make this the reader's journey as well. I have also understood that any obstacle in the writing process can be a creative opportunity to expand ideas and use a different perspective.

In these workshops we reflected on the evolution of academic writing, and we experimented with formats that challenge the traditional writing styles and thesis structure. These innovative approaches have informed specific elements of my thesis writing. The personal anecdotes at the beginning of each chapter originated from the free writing exercises, that helped me to enter the creative state of mind where thoughts can emerge fluently. They also give a personal, reflective perspective on the scope of each chapter which, I hope, will help the reader to feel deeply immersed in the narrative. The very structure of the thesis was inspired by a musical opera in four acts. This unconventional way to interpret the structure of the chapters looking at non-academic genres allowed me to express how the different phases of the thesis have also been a journey of personal discovery, and they also strengthened the narrative and connective tissue between the different chapters. The choice of including a sound at the beginning of each 'Act' is also aimed to support this musical structure, signaling also in my writing how sound suggests a different language. Throughout the thesis, I also decided to treat all quotes as blockquotes, regardless of their length. This approach diverges from usual academic norms, but I felt it could help me to emphasise the different voices of both other scholars as well as research participants.

2.7. Conclusions

This Chapter has provided an overview of my methodological choices, the research methods adopted in the different phases of the research and the ethics which guided the whole research project. I started with a reflection on my own position as researcher, recognizing the influence that the implicit knowledge acquired in 10 years of work in museums had on my methodology (Finlay & Gough, 2003). My personal experience with museums of different types, sizes and geographical context had strengthen my belief that, in order to evolve into post-digital institutions, museums need to change and embrace new practices, and that sound can have a key role in this evolution. The choice to adopt a mixed-methodology approach originated from the desire to bring together my twofold nature of researcher and museum practitioner, developing a research project that could have an impact on both museum studies as well as on heritage practices.

I came to this methodological choice after a careful literature review around the two key phenomena addressed by my research: the growing presence of sound culture in museums, and the platform revolution in the cultural sector. Both areas of investigation gave me the opportunity to refine my research questions, starting to identify the key challenges in the

curation of sound and what kind of practices and ways of thinking the use of digital platforms was introducing.

My decision to conduct case study research originated from the need to undertake an in-depth exploration (Yin, 2014; Yin, 2018) of the two principal areas of sound curation identified in the literature review: the perspective of museums, which have mainly collected sound objects, and the perspective of sound archives, which have been collected sound recordings. I decided to start from the intangible and digital dimension of sound culture at the British Library, one of the first cultural institution to share sounds online. The research fieldwork at the Science Museum Group allowed me to return to physical objects and understand how museums embrace the intangibility of sound in their physical collections. In both dimensions, I wanted to explore if digital platforms could offer not only practical solutions to the challenges of sound, but also a different logics and ways of operating.

To understand if 'platform-thinking' could help museums to respond to the challenges of sound, though, I needed to make the new assumptions, values and mindset of 'platform-thinking' visible and to explore what kind of sonic practices they favor. After a careful comparison of research methods that favor 'reflection in action', I decided to co-design a sonic practice with the museum team which could be informed by the assumptions of 'platform thinking'. This research experiment was informed by design research approaches which have received a growing attention in museum studies (Mason 2015; Mason & Vavoula 2020). This method allowed me to apply the iterative approach of *planning-action-observation-reflection* typical of action research, with more emphasis in the creation of a product/activity. Through the collaborative design, prototyping and evaluation of a new practice with the internal members of the museum team, I could observe 'platform-thinking' in action, understand its impact at both practical and conceptual levels and at the same time foster the internalization of new knowledge in the organization. Furthermore, the output of the design practice - the #SonicFriday project – could be considered, in itself, a research outcome, the tangible representation of embodied 'platform thinking' in the museum. In design research, the creation of an experimental object is made to gain knowledge (Bang et al., 2012) and it is considered in itself a tangible output of the research: 'a research proposition to change reality' (Press, 1995). Archer says that 'There are circumstances when the best or only way to shed light on a proposition, a principle or material, a process or a function is to attempt to construct something, or enact something or test it' (Archer, 1995). This quote beautifully expresses why I chose to undertake practice-based research, as well as my overall approach to the role that design research can have in the museum's evolution.

Chapter 3. Museums and Sound Culture: a Journey

3.1. A New Sonic Age

The eye points outward, the ear draws inward.

<div align="right">(Schafer, 1977, p. 11)</div>

Sound in all its forms – spoken words, music, natural soundscapes, auditory imagery – is a fundamental part of the human condition: it influences how we perceive the world, how we remember, and how we socially interact. But yet, from the nineteenth century and until fairly late in the twentieth century, sound had very little place in museums. The development of museums as public institutions, alongside the mission of extending access to human knowledge, also consolidated the predominance of visual and material cultures (Bennett, 1995). Silent contemplation became a prerequisite for the transmission of knowledge. Prior to this, early privately owned collections and Wunderkammers provided a much more multisensory experience with objects that could be touched, listened, and smelled (Edwards et al., 2006; Classen, 2007; Howes & Classen, 2013) In the last 50 years, as part of a trend to encourage more engaging, inclusive and immersive experiences with the collections, the senses are making a comeback in museums, and the attention towards sound has grown accordingly. The digital revolution further contributed to this shift, changing forever our cultures of listening, creating, and consuming sound. Consequently, museums have not only found themselves interacting with a less familiar medium – sound - but with new spaces, systems, and technologies, as well as cultural forms and practices, different from that cognate with visual and material objects.

The chapter will explore the growing presence of sound in museums, together with the practical and conceptual revolutions that it conveys, from two different perspectives: first as intangible object of culture, to be collected and preserved - as *Sound Heritage*; and second, as sensorial medium for designing cultural experiences - *Sound Design*.

The history of *Sound Heritage* is a history that museums share with other cultural institutions such as libraries and bottom-up archives which contributed to establishing the awareness of sound as object of curatorial care. Starting from the invention of sound recording, this chapter will follow the journey of sound inside and outside the museum context, discovering what different sounds have acquired cultural value. By revealing this history, this section will

ultimately highlight how sound challenges the logic of objects and the very concept of heritage itself.

The section dedicated to *Sound Design* will look at the birth of this holistic interdisciplinary practice, drawing upon innovative curatorial experiences as well as theoretical reflections developed by sensorial museology. By over-turning the concept of places for silent contemplation introduced with the advent of public museums, in the last century sound has been gradually recognized as a powerful medium to convey information in a sonic form and to enhance the visitor experience by creating immersive environments. The evolution of Sound Design will show how sound has constantly broken the boundaries of the traditional spaces and approaches, by introducing innovative practices that extend the museum outside its walls and actively involve audiences in the creation of narratives.

Each of these dimensions will be observed in strict conjunction with the main technological revolutions that changed forever our practices of listening, creating and consuming sounds. The journey of sound in museums, in fact, is intrinsically bound to the evolution of technologies, as well as habits and practices, which are driving our society toward a new sonic era. It is precisely from this multi-sensory turn that this chapter will begin. After all, this growing awareness of the sonic dimension in museums belongs to a wider revolution in thinking that recognises the value of sound as means of knowledge, paving the way not just for the birth of new disciplines but for a whole new way of understanding the world.

3.1.1 Sound as a Means of Knowledge

> Sound is intrinsically and unignorably relational: it emanates, propagates, communicates, vibrates, and agitates; it leaves a body and enters others; it binds and unhinges, harmonizes and traumatizes; it sends the body moving, the mind dreaming, the air oscillating. It seemingly eludes definition, while having a profound effect.

(LaBelle, 2012, p.468)

Sound is a disrupting medium in the museum. Unlike objects, it cannot be 'seen' and displayed in a gallery, and it can only be perceived by our auditory system in a temporal dimension. Consequently, its very nature challenges the two main elements around which museums have shaped their experiences: sight and materiality.

If we look at the organization of the museum space, the way in which objects are displayed and knowledge is made accessible, the activities offered to the visitors, the vocabulary we use to describe the spaces and the experiences, we understand they are all an integral part of visual - and material - cultures. 'Exhibiting', 'showing', 'display', 'objects', 'galleries', are all elements that come from a visual and material-based concept of heritage and experiences.

The primacy of visuality and materiality in museums goes beyond their history as institutions. As Classen and Smith highlighted, the role of the senses is culturally and historically situated, and has changed over time (Classen, 1993; Smith, 2007). Starting from the second half of 20th century, a series of key contributions have highlighted how, following the invention of print and under the influence of eye-centred Renaissance and Enlightenment, vision came to dominate Western thinking (Jütte, 2005). Marshall McLuhan and Walter Ong, major contributors of what has been called 'the great divide theory', highlighted how this visual hegemony characterized Western society from the Renaissance until fairly late in the twentieth century, marking the separation from the 'oral-aural societies', guided by a more synesthetic sensorium (McLuhan, 1962; Ong, 1982). According to these theories, the hierarchization of the senses in favor of the eye – the so called 'Ophtalmocentrism' and 'Ocularcentrism' – shaped specific ways of knowing and understanding the world. The philosopher Hans Jonas in his essay 'The Nobility of Sight' (1954) identifies specific categories and metaphors that humans derive from visual perception. According to him, the sense of 'being' and of a 'static present' comes from the simultaneity of sight, the objectivity originates from the complete detachability of the image, the idea of infinity has its birthplace in the unbounded depth of perspective. Murray Schafer describes seeing as analytical and reflective, whereas sound is active and generative (Schafer, 1977). Similar reflections were developed by Edmund Carpenter and Marshall McLuhan, who discussed the qualities of the acoustic space as an alternative diffuse 'earpoint' in their edited magazine 'Explorations':

> Auditory space has no favored focus. It's a sphere without fixed boundaries, space made by the thing itself, not space containing the thing. It is not pictorial space, boxed-in, but dynamic, always in flux, creating its own dimensions moment by moment. It has no fixed boundaries; it is indifferent to background. The eye focuses, pinpoints, abstracts, locating each object in physical space, against a background; the ear, however, favors sound from any direction.

> (Carpenter & McLuhan, 1960, p. 67)

These studies outlined how the intrinsic characteristics of sound perception can offer alternative categories and modes of thought that might challenge our perception of reality. Sound as means for experiencing and understanding the world is the starting point of a thriving multidisciplinary field that has grown increasingly over the last 20 years: Sound Studies. The foundations of this fascinating discipline date back in 1970s with the work of composers and acousticians Murray Schafer and Barry Truax. In their exploration of the sound environment, acoustic communication and acoustic ecology, they overturned the aesthetic and visual approach on the study of places and landscape, opened the way to a sonic way to understand the environment (Schafer, 1973; Truax, 1978). With his book '*The Tuning of the World*', Murray Schafer introduced a key concept which contributed to establish sound as a subject of study: soundscape[6]. Another key contribution was made in the 1990s by the anthropology of the senses and sensorial ethnography (Stoller, 1989; Howes, 1991; Feld, 2004). By applying a cultural approach to sensorial perception, anthropologists explored how different societies assigned specific cultural values to sound (Classen, 1997). The anthropologist Steven Feld coined the word "acoustemology" to indicate this experiential knowledge in and through sound. Drawing upon his words, this concept affirms 'the potential of acoustic knowing, of sounding as a condition of and for knowing, of sonic presence and awareness as potent shaping forces in how people make sense of experiences' (Feld, 1996). This is also sustained by neuroscience, that has shown how the way in which the brain processes information and creates mental images is different depending on different sensory inputs (Pascual-Leone & Hamilton, 2001; Berger & Ehrsson, 2013).

Interestingly, this attention towards sound appeared in a specific moment of human history, one of the most disruptive in terms of technological innovation and societal change. In his book 'The Audible Past' (2003), Jonathan Sterne dates back this perceptual revolution to the introduction of sound recording and the practices that rendered the world audible in entirely new ways. This theory resonates with the reflections on the acoustic structure of the mediascape developed by Carpenter and Marshall McLuhan (Carpenter & McLuhan, 1960; McLuhan, 2004). Reflecting on this 'acoustic turn', recent study in digital economy noticed how sound can offer alternative ways of interpreting and engaging with the contemporary mediascape that seems to resist to the ontological 'visual-oriented' categories of being, objectivity and representation (Kennedy, 2015). Sound offers an alternative 'ontology of

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[6] The soundscape is, for Murray Schafer, any acoustic environment that is perceived by humans, including both the physical acoustic environment and the way of perceiving this environment through our auditory system (Schafer, 1973).

flux', which affirms the primacy of becoming over being, dynamic processes over objects, change over static reality.

Despite recognizing the role of sound in offering new ways of interpreting our world, both in physical and digital spaces, other studies have also highlighted the importance of avoiding an audio-visual dichotomy. In his essay 'Listening and Voices', Don Ihde offers a well-informed criticism against the audio-visual divide, calling for a re-evaluation of all the senses from the standpoint of their interplay (Ihde, 1976). The study of aural-oriented cultures has shown how sound is always used in interaction with the other senses (Feld, 1996), and neuroscience has confirmed how our internal representations of reality are intrinsically multisensory (Pascual-Leone & Hamilton, 2001; Nanay, 2017).

This line of thinking is at the basis of the multisensory turn in museum and sensory museology, within which the embrace of sound culture is located.

3.1.2 The Multisensory Turn in Museums

> In the museum of the twenty-first century, the senses are making a comeback.
>
> (Howes, 2014, p. 264)

The idea of museums as places to discover new knowledge through silent contemplation of objects is deeply rooted in our culture, but museums were not born this way. The sensory history of museum dates back to the earliest Wunderkammer, where an exclusive group of visitors were invited to handle artifacts for the purpose of learning and enjoyment (Classen, 2005; Howes & Classen, 2013). The development of the public museums in the nineteenth century, together with the educational role of museums, also brought along the idea of silent contemplation as the prerequisite for the transmission of knowledge. Consequently, the multisensory experience of the objects was reserved for curators, while audiences were expected to walk quietly in the galleries, without touching, smelling or hearing objects.

After two centuries of primacy of sight and 'spectatorship', the senses are making a comeback in the museum. A starting point of reflection on the multisensory turn in museum is the article 'Introduction to Sensory Museology' by David Howes (2014). As part of a general trend to make museums more interactive and engaging (Hooper-Greenhill, 2000), Howes describes the museum of the twenty-first century as a 'sensory gymnasium', where to exercise a new

sensorium. Starting from the rehabilitation of the role of touch as a means of learning and the introduction of 'handling sessions', museums are increasingly recognizing the social, inclusive and therapeutic value of all the senses. The development of new multisensory and digital technologies has played a key contribution to this sensory turn. Thanks to technology, multisensory immersion has taken the place of the silent contemplation in museum experiences (Jones, 2006; Schwartzman, 2011) and several artists have started to incorporate nonvisual senses in their creation (Cluett, 2014; Voegelin, 2014b; Groth & Schulze, 2020). To use Howe's words, 'the progressive technologization of the sensorium has generated other possibilities for the transformation of the museum and art gallery into sites where visitors can exercise their senses, instead of holding them in check'. In their book *The Multisensory Museum*, Nina Levent and Alvaro Pascal-Leone connect this sensory turn in museums with the recent development in human neuroscience. By analysing the expanded role of touch, sound, smell and taste, the authors offer a cross-disciplinary framework for the future museum, exploring the role of each sensory perception in the internal representation of reality.

> The museum experience will be multisensory, whether we want it or not—thus it is better to pay attention to achieve desired effects rather than allowing for incidental and potentially undesirable effects.

(Levent & Pascal-Leone, 2014, p. xviii)

All these studies highlighted the need to consider the complex interaction among the senses to design inclusive experiences. The attention to sound fits within an evolving approach that sees the museum as a sensorium where all the senses are equally valued.

Despite this wave of transformation, the multisensory museum is still far away. The primacy of sight in Western philosophy has deeply forged practices and assumptions in heritage institutions. The very concept of the museum as a place to visit and see material artifacts of culture is rooted in this tradition. The multisensory shift necessarily requires a rethinking of how we collect heritage, engage audiences, and conceive the museum itself.

The studies, reflections and experiences collected in this chapter will show how sound can lead the way to the multisensory turn in museums. As the reflection on sound as ontology has demonstrated, sound can offer not only new experiences, but also conceptual revolutions that can help museums in this transition. Furthermore, the digital revolution has further increased the presence of sound in our life, introducing platforms and spaces where we can manipulate and share sounds in ways that were not conceivable before. The following sections in this chapter will illustrate how the interaction with sound culture and the contemporary sonic

practices is introducing fundamental changes in two key areas of museum practice: the concept of heritage, and the design of cultural experiences.

3.2 Sound Heritage

The first dimension explored in this chapter looks at the theories and practices that consider sound as an object of culture, and explores how sounds can be collected, studied, preserved and shared for scientific and cultural purposes (Lobley, 2015). As shown in the previous section, sound does not respond to the logic of the physical objects and requires museums to expand their vocabulary, spaces and practices, as well as to rethink their meaning of heritage itself.

Despite the growing importance of sound as an object of study, this field has not been systematically mapped by museologists. The reflections and studies around the multisensory museums of the last 20 years have tended to focus on the experiences that museums offer to visitor – namely, how museums can design with sound and introduce more sensorial inclusive activities – and less attention has been given on how sound can be itself an object of collection and curatorial care. This is why, after having explored the origins of Sound Studies, I decided to start my investigation into sound in museums exactly by analysing this perspective. It was my belief that considering sound as heritage could have an even stronger revolutionary impact on museum practices. By drawing upon the literature in this area I discovered an incredibly rich interdisciplinary field, in which sound as object of culture has examined from different perspectives: in the relationship between museums and popular music (Edge, 2010; Leonard, 2014; Bendrups, 2015; Cortez, 2016; Baker, 2016; Baker et al., 2016), in the study of aural history (Sterne, 2003; Smith, 2004), in the development of sound archives (Landau, 2012; Hoffmann, 2015; Franzen, 2016; Bulut, 2017), in the investigation around Sound Art (Voegelin, 2014a; Cluett, 2014; Cox, 2015), in the studies around audio technologies (Bijsterveld & Van Dijck, 2009). These studies, which have their roots in the early theories on Sound Studies of 1970s, gained momentum over the last 20 years, thanks to the contribution of a series of cultural institutions and projects that put sound at the centre of their heritage practices.

This section will offer a first overview of this evolving field, and the related challenges and tensions that this concept has raised in the cultural sector.

3.2.1 Evolving Concept, Evolving Practices

> For most of our history we have used artifacts, architecture, pictures and words to create a vision of our past. It's only in the last ten seconds or so on our historical clock that we've been able to capture and archive sound. Almost all our sonic heritage has passed by completely unrecorded.
>
> (Coulam, Soundlandscape Website, n.d.)

This quote from Des Coulam, field recorder and author of the project Soundlandscape, captures a key aspect regarding the history of Sound Heritage. The very existence of this concept was allowed by the introduction of sound recording and sound reproduction. These revolutionary technologies, which started to appear in the second half of the nineteenth century, made it possible to do what was not even conceivable before: isolate a sound from its source, transfer it to a reproducible form and preserve it over time.

This is why *Sound Heritage* is a relatively new concept in the history of cultural institutions. When the first museums were born, it wasn't possible to record, store, and preserve sounds. The emergence of recording technologies has not only created a new interest in the sonic dimension, but by making sound repeatable has allowed its preservation as an object-like. This is the starting point of the book 'The Audible Past', in which Jonathan Sterne relates the interrelated transformation of technologies, practices, and habits of listening, sharing and creating sounds to the largest perceptual revolution of the last century.

Since *Sound Heritage* is a relatively new concept, there is not an official definition or a clear agreement on its denomination. The British Library defines 'Sound Heritage' its extraordinary collection of 6.5 million recordings of speech, music, wildlife and the environment from the 1880s to the present day. The Swiss National Sound Archive considers 'audio heritage' all the audio documents related to Switzerland culture worthy of acquisition. To express this concept, many other terms have been used: 'sonic heritage', 'auditory cultural heritage', 'acoustic heritage' (Bjesterveld & Van Dijck, 2009; Sterne, 2012). Even though practices and institutions dedicated to sound collection have existed for more than a century, an official definition still does not exist. It is telling that the online encyclopedia Wikipedia does not report any article related to 'Sonic' or 'Sound Heritage', despite there are many of its components – such as sound recordings, soundscape, sound object, sound maps – and areas of study.

Yet, the sensitivity towards intangible forms of heritage has made headway inside cultural institutions. At the European level, the *Convention on the Safeguard of Intangible Heritage* in 1972 acknowledged the value of intangible elements such as language, music, gestures, rituals, performances, oral knowledge in the transmission of heritage. Despite including many auditory-based forms of intangible heritage, the convention does not refer to 'sound' as a category. Only recently, the UNESCO General Conference adopted a resolution on the importance of sound in today's world (2017), starting to include acoustic elements in the online map of the Heritage sites. However, the awareness of sound heritage is still in its infancy. The Website of the Swiss National Sound Archives, acknowledging this gap between definitions, recognizes that this form of heritage '*need to be defined more precisely*' (Swiss National Sound Archives, n.d.).

Over the last century, thanks also to the further development of sound technologies, Sound Heritage has become a wide and fascinating field of practice, as well as research. The theoretical reflections developed by Sound Studies researchers in different areas of human knowledge have introduced new cultural practices in both official and non-official contexts.

The history of collecting sounds, in fact, is a history that museums share with other cultural institutions and independent archives. The first sound archives were born in the 1920's to preserve sounds that can have artistic, ethnographic, historical, scientific, archeological, and therapeutical value. The first sound archive born for cultural purposes was the Phonogramm-Archiv at the Austrian Academy of Sciences, followed shortly by similar archives in Berlin, Paris and London. The power of sound as archival medium was soon recognized by broadcasting companies, which since the 1930s started to record sounds for commercial purposes and future use (Brooks & Rust, 1999). Since the late twentieth century, other forms of unofficial archives emerged around sound culture. The increased interest in popular music led to the development of grassroots archives run by enthusiasts who have no experience as archivists, curators or heritage managers (Bennett & Janssen, 2015). The development of the Web gave further input to these 'do-it-yourself archives' where independent communities spontaneously collect sound heritage in digital forms (Baker, 2015; Baker and Collins, 2015; Van Hoeven & Brandellero, 2015). In a similar way, the development of a new sensibility toward environmental sound led to the creation of online participatory archives dedicated to urban and city soundscapes, where local communities decide which sounds to preserve and make accessible (Bijsterveld, 2013).

These experiences both within and outside the institutional context show how sound heritage is a thriving multidisciplinary field, which have been studied and experimented by number of different disciplines: Ethnomusicology, Aural History, Bioacoustic, Archaeoacoustics, Acoustic Ecology, Sound Art, to name only a few. Some areas are well-established, others are emerging; some practices are developing very fast, others are deeply transforming; some typologies are very clear, for others it is difficult to map the borders. In the following section, I will attempt to map this thriving field.

3.2.2 From Preservation to Creation: a Historical Perspective on Sound Heritage

The sensibility towards the cultural value of sound has changed over time. If we look at all sounds that have been recognized as 'cultural sonic objects' from the end of the nineteenth century, two different approaches emerge.

The first approach considers sound something that needs to be preserved for future generations. In this approach, cultural institutions have applied the same logic that they have always applied for material objects. Since its introduction, sound recording has been regarded as a mechanical form of preservation: a technology that allows us to 'fix' something that might otherwise disappear. With this aim in mind, different kinds of sounds have been recorded and preserved for future generations.

The first sounds recognised as worthy of being recorded and to be part of a sound collection were the voices of public people. The oldest sound collections are composed by the speeches of dying 'great people' - such as 'living kings, queens, statesmen, composers, artistis and novelists or extract spoken version from some of their great work' (*The Phonogram* Magazine, 1891). With the same conservative aim, sound recording was employed by ethnographers to preserve information about cultures that were disappearing. Ethnography was one of the first disciplines to integrate sonic equipment in field research, with the aim of capturing and storing the music and language of dying populations and making them available for future study.

In contemporary ethnographic research, field recording is still widely used, but with a greater awareness of how sound can reveal multiple aspects of a specific culture far beyond music and language (Stocker, 1994). Fig. 13 shows an anthropologist using sound recording to collect and study legends, proverbs and oral history of the Dolomites.

Fig. 13 The anthropologist Daniela Perco in one of her first audio interviews in the 1970s to record legends, fairy tales, proverbs and oral history of the Dolomites. © Ethnographic Museum of the Dolomites, Cesiomaggiore.

The advent of social history in the 1970s marked a change in the field of 'aural history'. With the emergence of the 'history from below' (Moore, 1997; Perks, 1998; Smith, 2004; Flinn, 2007) historians have started to record 'ordinary people who have stories to tell, and experiences to relate are part of the history of our time which is worth preserving in sound' (Slocombe, 1972).

A similar approach brought to the birth of radio heritage, a peculiar form of sound heritage made possible by broadcasting technology (Mortensen, 2012; Birdsall, 2016). From the 1930s, broadcasting stations such as BBC have started to store their broadcasting material, which has recently been 'remediated in digital form and repurposed as cultural heritage in their historical archives' (Mortensen & Vestergaard, 2013, p.23). Radio records can have cultural significance as a social insight on the everyday life of people or as record of 'unique moments' - such as the memorable speeches that Winston Churchill made during the Second World War or live broadcasting of musical and theatrical performances (see Fig. 14).

"I speak to you for the first time as Prime Minister in a solemn hour for the life of our country, of our empire, of our allies, and, above all, of the cause of freedom." So began Winston Churchill's radio broadcast of 19 May 1940. Although the Nazis were seemingly unstoppable in France, Churchill was resolute and inspiring. The speech is known as Be Ye Men of Valour for the use of a passage from the Book of Maccabees, with which he finished: "Arm yourselves, and be ye men of valour, and be in readiness for the conflict; for it is better for us to perish in battle than to look upon the outrage of our nation..."

Fig. 14 Image capture from the BBC Website of the audio recording of Winston Churchill speaking on BBC radio on 19 May 1940. (https://www.bbc.com/historyofthebbc/anniversaries/october/winston-churchills-first-wartime-broadcast, accessed on 30 March 2022)

Together with sound recordings of human voices, at the very beginning of sound recording another kind of information was considered worthy to be preserved by heritage institutions in a sonic medium. Natural sounds - voices and calls of animals, birdsong, atmospheric sound effects - were very soon recognized as a scientific resource to be preserved and collected because they are representative of different habitat and species and may help to preserve disappearing wilderness. The interest in the sonic dimension of nature led to the introduction of a new cross-disciplinary science, Bioacoustic, that investigates acoustic signals produced by animals, their interpretation and relationship with the environment (Ranft, 1997; Sueur & Farina, 2015; Farina & Gage, 2017). The first ever wildlife sound recording was made in 1889 in Germany by Ludwig Koch (see Fig. 15), who became an expert in recording animal sounds. His collection was acquired by the British Broadcasting Corporation, most of it bequeathed to the British Library Sound Archive.

Fig. 15 Ludwig Karl Koch, field recordist of animal sounds and pioneer of Bioacoustic. His recordings are preserved in the British Library Sound Archive. © Wildlife Sound Recording Society.

Also, in the field of environmental sounds, a new sensibility emerged in the 1970s. The introduction of the concept of *soundscape* (Schafer, 1977) extended the study of the acoustic environment to sonic elements deriving from human presence. Murray Schafer proposed a clear terminology to identify different sonic elements of a soundscape: *keynote sounds* - sounds that remain in the background, and we do not listen to them consciously -, *signal*s - foreground sounds that are listened to consciously - and *soundmarks*, which are 'unique or possesses qualities which make it specially regarded or noticed by the people in that community'. Schafer is considered the father of Acoustic Ecology, a thriving area of study that investigates the sonic relationship between human and environment and the preservation of cultural sounds. From soundscape of cities to the sounds of our daily life, the sounds of a culture and are largely recognized as powerful symbols of cultural identity and of the acoustic life of a community, that deserve protection (Yelmi, 2016). As shown in Fig. 16, a place can be distinguished through the sounds it contains and this aural experience can stimulate our senses and evoke memories.

Fig. 16 During the summer, the mountain valleys of the Alps were filled with particular sounds that derived from the seasonal activities of haymaking. © Museum Ladin de Fassa.

In the 2010s, another cultural element of the sonic environment has been considered worthy of protection: the acoustic environment of the ancient spaces (Suárez et al., 2015). The last technological development - virtual recreation, 3D modeling, and acoustical engineering - made it possible to virtually reconstruct the overall spatial identity of these spaces. Within this context, a new discipline arose: the Archaeoacoustics, through which we can recreate the grandiose sensory sound experience of disappeared religious spaces and the mystical aural experience that they permitted (Till, 2010; Suárez et al, 2016; Goh, 2017; Katz et al., 2020).

In parallel with this preservationist approach, the technological breakthroughs of the second half of the nineteenth century have led to the emergence of a different perspective. This approach does not look at sound as an object to be preserved through technology, but as a form of cultural and artistic expression mediated by technologies. Here the origin of the 'sound object' is not the preservation of something that is disappearing but is the desire to create entirely new forms of heritage through the medium of sound. This approach is strictly connected with the new possibilities introduced by the new sound technologies in nineteenth century. The possibility to manipulate, create and broadcast sound gave rise to whole new forms of music, theatre, sound art which were further multiplied with the introduction of digital music and audio-streaming platforms. As Bijsterveld and Pinch noticed in the introduction of the Oxford Handbook of Sound Studies, 'today sound is no longer just sound;

it has become technologically produced and mediated sound' (Bijsteveld & Pinch, 2012, p. 4) And this has consequences in the way we conceive sound heritage.

We can trace back this approach in the very essence of music. Musical instruments are the first example of the use of sound as a medium of creative and cultural expression. Despite its key role in human life, historically popular music has been ignored by museums both in terms of collection and display (Leonard, 2012). The report on music collections displayed by museums in the UK revealed that, except for musical instruments, museums had not systematically collected other music-related items such as recordings. The increased interest from museums in popular cultural forms - linked to the need to develop practical ways to encourage participation and social inclusion and to engage new audiences - has brought new attention to this form of sound heritage, and popular music has increasingly been rendered into a heritage object both through the organization of temporary exhibitions and the inclusion in the collections themselves (Cortez, 2016; see an example in Fig. 17).

Fig. 17 *Play it loud*, exhibition dedicated to musical instruments of Rock & Roll held in 2019 at the Metropolitan Museum of Art (MET). © Alcina Cortez.

Over the last century, the field of music has expanded with the experimentations of avant-garde musicians and sound artists, that expanded the boundaries of what was conceived as 'music'. With the advent of sound recording and digital synthesis, technologically produced sounds and environmental sounds fully made their way into the musical composition process (Boon, 2016; Harkins, 2019). The iconic work of John Cage 4'33" (1955) - that consists only of the sounds of the environment heard during the duration of the piece – marked a key stage

in dissolving the boundaries between sound and music. And together with music, new forms of art experimented with sound as artistic medium. From the first sound poetry of the Italian Futurism in 1920s (see Fig. 18), to the artistic experimentations of Fluxus, Happenings and Conceptual Art, until the emergence of Sound Art, which will find its full definition and museological recognition at the end of the century.

Fig. 18 Zang Tumb Tumb, Bombardamento di Adrianopoli. Sound poetry by Filippo Tommaso Marinetti, 1914.

As artist Max Neuhaus stated:

> With our now unbounded means to shape sound, there are an infinite number of possibilities to cultivate the vast potential of this medium in ways which do go beyond the limits of music and, in fact, to develop new art forms.

(Neuhaus, 2000)

Today, sound occupies a component position in the contemporary curation and production of artistic works, in combination with other artistic expressions: from painting and drawing to installation and web-based works (see an example in Fig. 19). Sound installation, Sound poem, sound performance, sound video, sound sculpture, are all different manifestations of what we can define 'Sonic artistic heritage'. To be recognised as a sonic form of art, the work does not need to be about sound directly but might make or engage sound as part of a multimodal whole (Cluett, 2014).
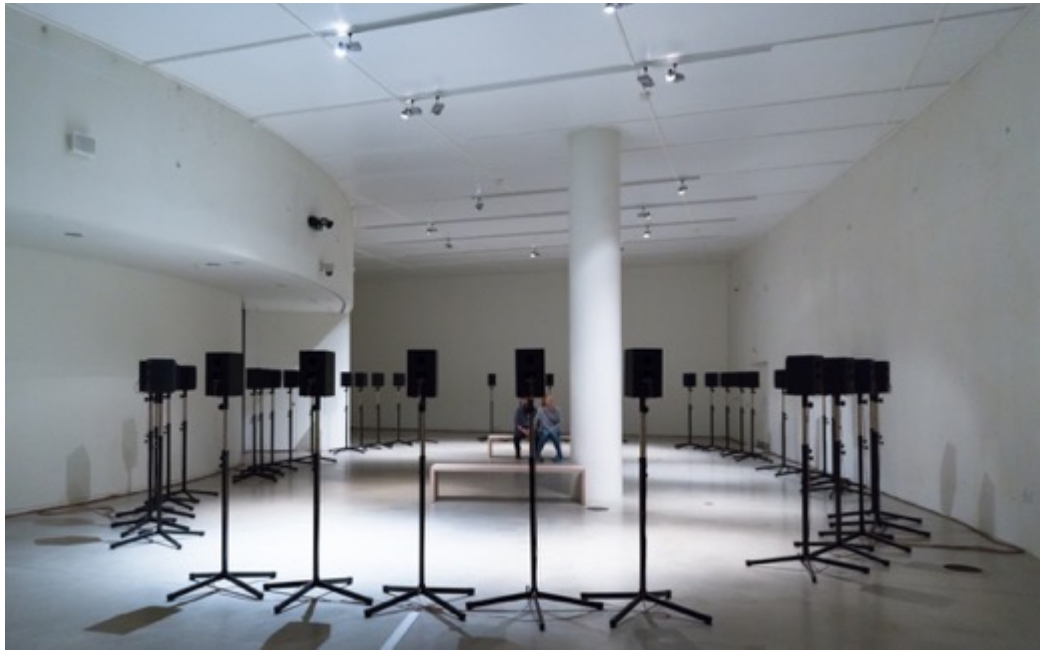
Fig. 19 Janet Cardiff's *Forty Part Motet* (2001) in the ARoS Aarhus Kunstmuseum, Denmark. Photo credits: Villy Fink Isaksen (CC BY-SA 4.0).

With the development of mass-media production, new experimentations emerged around broadcasting. Intrigued by the potential of this new medium, artists and musicians have given rise to whole new theatrical and performative practices, such as sound documentary or auditory theater (Madsen, 2005). A key example was 'Solitude Trilogy', a sound documentary created by Glenn Gould who applied the contrapuntal method to the radio medium, creating multiple layers of ambient sound, voices and music. These experimentations have continued until today, with contemporary artists playing with the new possibilities offered by audio-streaming platforms, sharing and co-creation.

All these forms of sonic expressions produced and mediated through technologies, are all part of this new sensibility towards the heritage itself: not only a tangible (or intangible) object to be preserved and exhibited, but a process that need to be continuously fostered and co-created. This alternative way to look at sound heritage is part of a wider conceptual revolution introduced by sound, which is deeply affecting three key elements of museum practice: the meaning of objects; collections; and heritage.

3.2.3 Expanding the Language of Sound as Cultural Object

> In order to make sound "speak", to compare sounds, to delimitate the tiniest differences, knowledge makers need a sound vocabulary and a sound language: a way to talk about sound.

> (Bijsterveld & Pinch, 2012, p. 15)

Karin Bijsterveld and Trevor Pinch (2012) have discussed the necessity of establishing a new vocabulary in sound studies. They advocate the development of a 'sound taxonomy', that can reflect the specific qualities of sound and contribute to the development of new sonic practices. Acoustic object, object sonore, sound events, sound souvenirs, sound objects, audio documents, sonic artifacts are some of the names coined in the last century to define cultural sounds and the practices originated around them (Novak & Sakakeeny, 2015).

A new vocabulary is even more significant to embrace sound culture in museums. When cultural institutions start to include sounds in their collections, they need to deal with a series of challenges related to the specific nature of sound. The words, language and vocabulary that have been used to describe objects and that have shaped a whole set of curatorial practices, struggle to adapt to the quality and nature of sound. This section will highlight how sound is introducing a conceptual revolution which involves the basic elements around which curatorial practices are shaped: cultural objects.

The qualities of sound heritage, in fact, require rethinking previous assumptions on what is an object of culture, and how it can be collected and displayed. The very meaning of 'object' struggles to adapt to the behaviour of sound. An object is static, fixed, it lasts over time. An object can be touched, can be seen, it occupies a definite space. On the contrary, sound is dynamic, transient, invisible and travel across space. Furthermore, it can only be perceived in its temporal dimension. We need time to experience a sound in its existence, whereas objects just remain where they are even if we stop to perceive them. This is why, in the field of philosophy, sound was often interpreted as secondary quality of objects (Locke, 1689). However, in the last 40 years new philosophical theories affirmed the independence of sound and its different behaviour. In this context, a new definition of 'sound as event' emerged. Casey O'Callaghan highlighted how sounds are different than ordinary objects in their way of extending through time: 'We intuitively think of objects […] as being wholly present at each time in which exist. Sounds, instead, are things that occur over time. […] Sounds are particular events' (O'Callaghan, 2007, p. 27). The same concept resonates with the thinking of Barry Truax, who defined sound event a sound or sound sequence in its spatial and

temporal context (Truax, 1978; Truax, 1984). This idea was further developed by Christoph Cox, who considers sound an event independently from its source (Cox, 2011; Cox, 2017).

However, sound technologies have altered some of these unique characteristics of sound, making it repeatable, reproducible, and preservable. To draw upon Bijsterveld and Pinch' words, today sound can be controlled, 'materially mediated in a whole host of novel ways, it becomes more 'thinglike' (Bijsterveld & Pinch, 2012, p. 5). This is well expressed by the concept of *Sound souvenirs,* which defines all the everyday sounds that were once meaningful to us and that have been captured by recording technologies (Bijsterveld & van Dijck, 2009). In some way, technology has given to sound some of the qualities of the objects. It is not by chance that the concept of 'sound object' originates in the wave of technological revolution. The term 'object sonore' was firstly coined by Pierre Schaeffer in the field of electronic music, referring to non-musical sounds recorded on magnetic tape (Schaeffer, 1966).

An interesting answer to this debate between 'sound object' and 'sound event' was given by the researcher and curator John Kannenberg. In his article *Towards a More Sonically Inclusive Museum Practice: a new definition of the 'Sound Object',* he proposes to expand the language of 'objects', which are key elements of the museum practices, with the new unique characteristics of sound. For Kannenberg, it is 'the act of sound being heard, received and acknowledged by a museum visitor, to be considered an object-like in a museological sense' (Kannenberg, 2017, section *Defining a museological 'sound object'*). This is an extremely interesting perspective for museums that can still think of sounds as objects but recognising that they behave differently and respond to a different logic. In his definition, Kannenberg highlights an important feature of sound as museological object: 'In order for a sound to be collected, and exhibited by the museum, the sound must be able to be repeated' (ibid.). It is the technological mediated sound that, for John Kannenberg, has the quality of object-like. The ability to be repeated is what makes a 'sound event' a 'sound object' that can enter a museum collection, because it can be stored, preserved, made accessible to future generations.

John Kannenberg has also applied his thinking in his curatorial practice, experimenting with innovative solutions of collecting and displaying sounds (Kannenberg, 2020a). Kannenberg is, in fact, the Director of the Museum of Portable Sound, a museum that collects and display sound as objects of curatorial care. The main peculiarity of this museum is that it is not hosted in a building.

I have been thinking about museums and sounds for many years before I created the Museum of Portable Sound. At the beginning, I just assumed that it would be a building. But then I asked myself: 'What if that sound was the museum itself? What if we took away the visual component and focused on listening as a museum experience?' So I realized that, in order to do that, all I needed was a way to deliver sound recordings to an audience. And I just happened to have an extra iPhone way around.

(Kannenberg, 2020b)

In the Museum of Portable Sound, sound and listening are not functional to the understanding of material objects and visual experiences, but they are the very centre of the experience and even of the museum structure, as shown in Fig. 20.

Fig. 20 The evolution of the Museum Portable Sound's collections. © John Kannenberg.

By shaping the experience around a collection of sound heritage, John Kannenberg has rethought traditional practices and categories: galleries, labels, maps, museum guides have been adapted to the specific features of sound as museological objects. In his museum, the collections are transformed into 'mixtapes of mixtapes', or 'playlists of playlists' that can be listened in person or online, by booking an appointment with the Director (see a visitor experience in Fig. 21).
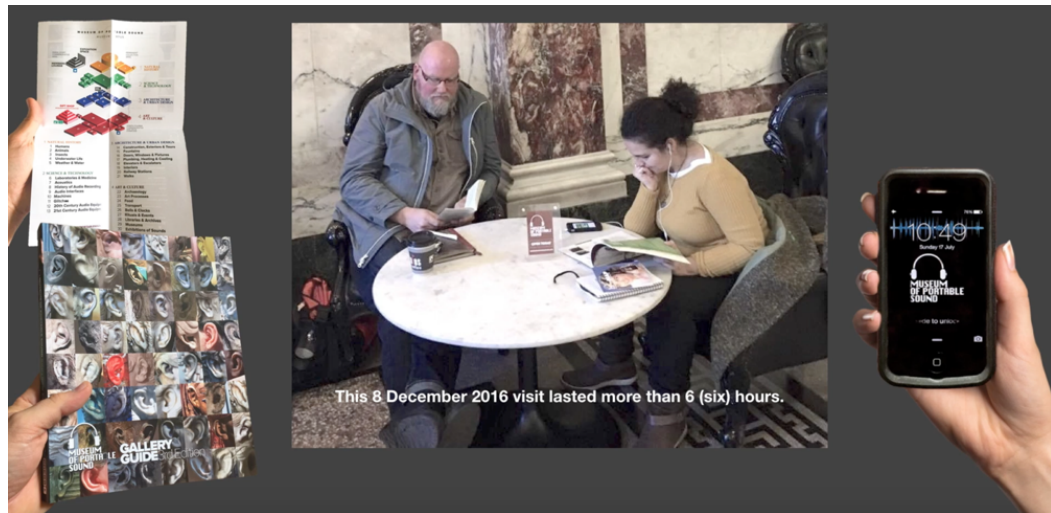
Fig. 21 The visitor experience at the Museum of Portable Sound. © Museum of Portable Sound.

3.2.4 Towards a New Meaning of Heritage

The innovative example of the Museum of Portable Sound shows how, in order to embrace sound heritage, museums need to be ready not only to expand the language and evolve their practices, but also to rethink at the very meaning of heritage. The historical evolution of sound heritage described in section 3.2.2 has clearly shown how sound fostered an evolution from a concept of heritage as object to be 'fixed' and preserved over time, to a more dynamic concept of heritage which is constantly created and re-created by people, in response to social, cultural and technological transformations.

A further push towards this dynamic concept of heritage was given by Sound Art. Following an exhibition on Sound Art that was held in the museum in 2015, MOMA's wanted to acquire the piece of sound art 'I am sitting in a room' by Alvin Lucier. This is an experimental music performance where the artist reads a text into a microphone and then played back into a room combined with the sonic frequencies of the space. The curators faced the challenge of 'what' they could acquire, as there was no physical object, but only a recording of the artist performing the piece – not even the original version - and the instructions for future performances (Joseph, 2015). Therefore, what the museum ultimately acquired and stored in its collections were a digital born recording, and a series of permissions and instructions to replicate the performance. The very nature of this work, and the opportunity to recreate it as we can do with a musical score, subsequently stimulated multiple interpretations that crossed the boundaries of MOMA. In 2021, the National Science and Media Museum in Bradford hosted a new version of the work as part of the 'Sonic Boom' exhibition (see Fig. 22).

Fig. 22 'I am standing in a museum', performance inspired by Alvin Lucier's 'I am sitting in a room' recorded in the Science and Media Museum Galleries in 2020 by the students of Leeds Beckett university and University of Leeds. © Stefania Zardini Lacedelli.

This example clearly shows how sound requires a conceptual shift in museums: the concept of heritage as something to be 'preserved' needs to be expanded with the concept of heritage as something to constantly 'recreate'. Cultural heritage is alive if it is acted, 'performed', if it is experienced by an individual. Just like a technologically mediated sound, which can only be listened and perceived in the moment of its reproduction. Also, the example of the Museum of Portable Sound, despite reproposing some of the 'static' categories of the traditional museum - galleries, labels, museum guide - puts at the heart of the experience the 'performative' relationship between the visitor and the curator of sound objects. As shown in Fig. 23, the museum exists when it is interacted, enters a relationship, stimulates a conversation between the two protagonists of the experience - the curator who collected the sounds and the individual who listens to them - changing the perspective of both.

> It is in this encounter that I think that my museum actually becomes a museum. So, I curate exhibitions, that are received by a visitor, and each person gives me immediate feedback which offers a new perspective. We ended up having long conversations, and these conversations became central to this project. I think that is where the meaning is made by this museum.

(Kannenberg, 2020b)

THE VISIT ENCOUNTER PERFORMING THE MUSEUM

1. VISITOR   2. GALLERY GUIDE & MOBILE   3. CURATOR

EXHIBITION   PERSPECTIVE   FEEDBACK   CURATION
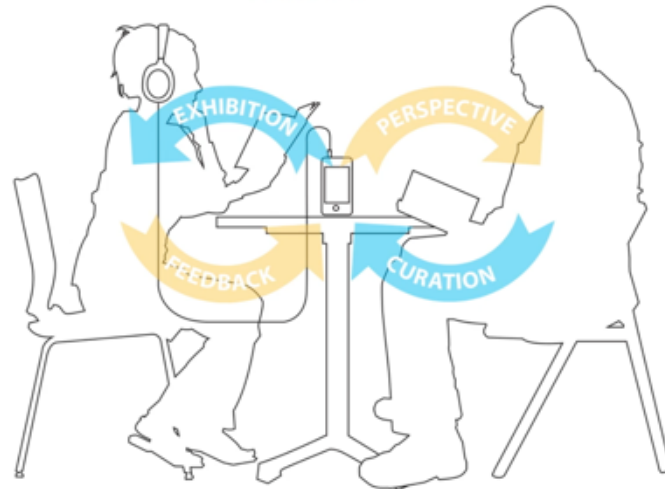
Fig. 23 The representation of the relationship between the visitor and the curator at the Museum of Portable Sound. © John Kannenberg.

A series of questions arise from these examples: is heritage something static that must be collected and preserved over time, or is it heritage what is constantly experienced and reinterpreted by people? Are collections to be understood as fixed, or can they change over time? Recent studies on the practices of disposal in museums (Besterman, 1992; Davies, 2011; Vecco & Piazzai, 2014) seem to suggest an evolution towards a more fluid idea of collections that evolve in relation to different communities and the evolving social and cultural needs.

These are key question for contemporary museology, and they fit within a wider international debate around the definition of heritage and museum itself. The Faro Convention on the Value of Cultural Heritage in the Society, in 2004, introduced a challenge that is still open today, outlining the centrality of people in the definition of heritage. Museums are still struggling to assimilate the new concepts introduced by the convention - heritage communities, shared responsibility, democratic participation - in their practices and in the very definition of what a museum is today. The overview on the evolution of the sound heritage, from the first sounds recorded for cultural purposes to their gradual assimilation within cultural institutions, made it even clearer how these are key themes for the museums of the twenty-first century. Today museums have the great opportunity, and at the same time the duty, to embrace new types of heritage, which are of sonic and digital nature. And this type of heritage cannot be integrated

into museum collections and practices without a deep reflection on what is heritage today and how the museum, as an institution, can evolve in response to these challenges.

The next section will show how these changes also involve the design of the experiences, giving the birth to a whole new set of museum practices.

3.3 Sound Design

The interaction with sounds as objects of culture was not the only dimension by which museums have approached sound. Sound entered the museums long before the sensibility for sound heritage was born. Despite their long tradition of silent institutions of knowledge, sound has always been used as mean of communication and interpretation, and its employ has grown considerably in the last century. Thanks to the development of new technologies to create, reproduce, control, diffuse sounds and personalize the experience of listening, sound has increasingly been recognised as a powerful medium to support the understanding of the objects on display, convey information in a sonic form, and create a multisensory environment.

As a result, Sound Design has emerged as a key museological practice that received a growing attention over the last 30 years. Museologists and designers such as Nigel Frayne, Nikos Burbaris and Michael Stocker have strongly contributed to establishing this thriving interdisciplinary field which brings together museology, interaction design, sensory architecture, acoustic engineering, digital and media studies, visitor studies. Recently, Alcina Cortez (2022) proposed a theoretical framework to understand how sound has been used in museum exhibitions. In her article *Museums as sites for displaying sound materials: a five-use framework*, she looks at five different ways in which sound was employed in museum settings: to convey meanings (*sound as lecturing*), to create immersive environment (*sound as ambience*), to display objects of sound culture (*sound as heritage*), in the curation of artworks where sound is used as artistic medium (*sound art*), and to involve audiences in the collaborative creation of new interpretations (*sound as crowd curation*).

These studies show how sound design is a holistic practice that goes beyond the use of sound to emit cultural information and support the visual experience (Zisiou, 2011; Bubaris, 2014). Sound is not only an effective tool for conveying messages: it also has the power of triggering emotions, feelings and memories (Cochrane et al., 2013; Scherer & Coutinho, 2013), it enhances the sense of intimacy as well as of sharing (Voegelin, 2012; Crawford, 2009b), and

it can contribute to the creation of multimodal and immersive environment (Cluett, 2014). Last but not least, as the previous section has shown, sound can also be a cultural object in its own right, to put at the centre of the display. This is why Nikos Bubaris advocates the need to think of sound design as a disrupting and transformative practice that has the power to convey institutional changes. In his paper *Sound in Museums, Museums in Sound* he invites museums to look at what changes in organizing cultural information the use of sound favours, and how they challenge the very nature of museum practices. Designing with sound in mind might lead to abandon traditional practices and rooted cultural forms, such as the exhibition, to embrace a whole new set of practices. To approach sound design in museum, museums need to be prepared to break previous boundaries.

This section will look at this evolving field of museum practice. It will analyse the practice of sound design and its evolution looking at three essential design components: the aim of the intervention (Why), the spaces of the intervention (Where), the approaches employed in the engagement (How). These design elements can help us to understand the wealth of new sonic practices that museums, cultural institutions and independent researchers are developing around sound.

But before looking at each component in detail, it is important to understand how sounds are created, consumed, shared in our post digital society. Sonic practices are developed in relation to specific technologies with which they are inseparably intertwined (Bijsterveld & Van Dijck, 2009; Kassabian, 2016). This is particularly relevant for the last century, which has seen the advent of many technological revolutions that reshaped our relationship with sounds and introduced new sonic practices around the production, recording and consumption of sound.

3.3.1. The Evolution of Listening Habits and Sonic Practices

This section will highlight the listening habits and sonic practices that have been consolidated over the last century, following the introduction of new technological possibilities in the sonic domain. As shown in Fig. 24, the invention of sound recording was, in fact, only the first step of a rapid technological evolution that transformed deeply our relationship with sound and listening. A series of disrupting technologies such as broadcasting, sound manipulation, portable music devices, and more recently, digital music and online sharing, have changed forever he ways we produce, consume, share sounds, introducing new perceptual habits as well as an entire set of cultural practices. According to domestication theory, each technology

embodies in a physical form particular habits and tendencies that may change the ways in which people 'are used to doing things and commonly attribute meanings to these routines' (Bijsterveld & Van Dijck, 2009, p. 16). By normalizing new sound technologies, each new generation introduced new cultural practices of remembering, sound making and listening. These phenomena have been widely studied in Sound Studies. A number of key authors such as Murray Schafer, Michael Bull, Jonathan Sterne, Trevor Pinch, Karin Bijsterveld, Anahid Kassabian, Michel Chion have substantially contributed to define the main features of our contemporary listening cultures (Schafer, 1977; Bull, 2003; Sterne, 2012; Pinch & Bijsterveld, 2012; Kassabian, 2016; Chion, 2016; Quiñones, 2016).
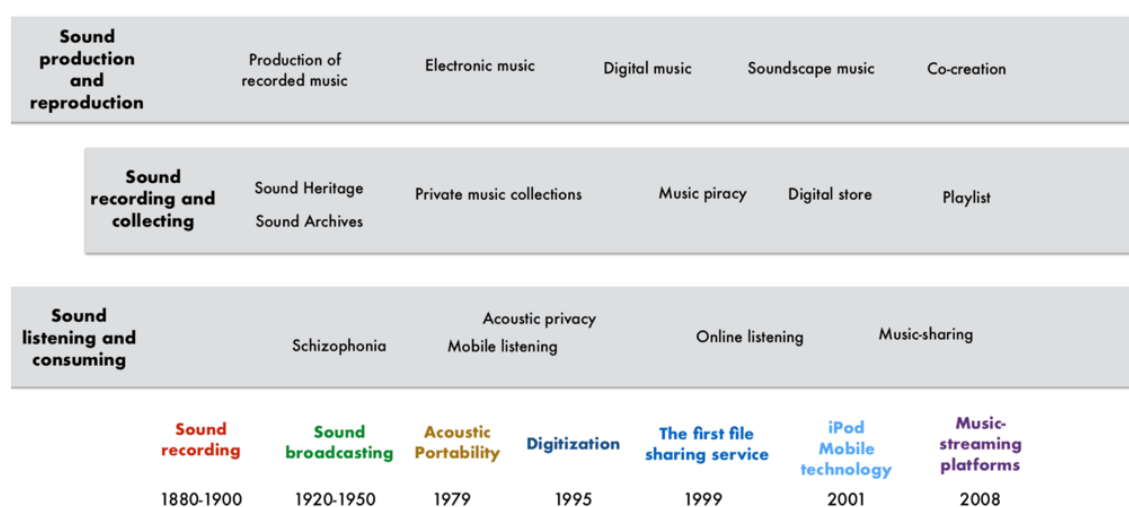
Fig. 24 The evolution of sound technologies and sonic practices in the last century. © Stefania Zardini Lacedelli

The awareness of these phenomena is key to understanding how to effectively engage people with sound in a museum context. Designing with sound means to interact with all these new technologies and understand the new practices that they have generated.

The previous section has shown how sound recording was a revolutionary technology which has marked the beginning of the practice of collecting and archiving sound in cultural context. The wider availability of sound recording devices (around 1960s) extended this practice also in a family context: as expressed by Fig. 25, technologies such as tape recorders became an intrinsic part of our individual and collective acts of remembrance, allowing new forms of sound personal memories and creating a sense of 'auditory Nostalgia' (Bull, 2000; Van Dijck, 2009; Weber, 2009).

Fig. 25 My Fisher Price player and part of my cassette collection, including recording of family moments during my childhood. Image taken for the #SonicFriday project developed at the Science and Media Museum in Bradford as part of this thesis. © Stefania Zardini Lacedelli.

The rise of broadcasting technologies allowed another key phenomenon which Murray Schafer calls *Schizophonia*, which is the dislocation between a sound and its source (Schafer, 1977). The possibility to broadcast sound at a distance made it possible to transform any sonic environment into another sonic environment. The introduction of portable devices has further enhanced this ability, encouraging the emergence of a new habit: the ubiquitous and distracted listening. Walkmans in 1980s, followed by contemporary iPods and mobile phones in the last 20 years, allowed us to listen to sound and music in the background of our perception, when we want to be distracted by other activities. In a museum context, this possibility to create sonic environments has generated a whole set of new practices that add a sonic layer to exhibition (Cortez, 2022), at the same time encouraging a debate on the role of attentive listening in museums (Kannenberg, 2016).

The portability of sound and mobile listening has also consolidated another phenomenon which is still one of the fundamental components of our listening experience. The use of headphones connected to portable music devices has given us the opportunity to create our private auditory soundscape, separated from the acoustic environment of the external world. Karin Bijsterveld and Jonathan Sterne call 'acoustic privacy' the control over which sounds enter and do not enter their private space (Sterne, 2003; Bijsterveld, 2010). This phenomenon has been called in various ways - sonic envelope, mobile capsule, acoustic cocooning - and is connected with the rise of a new set of cultural practices such as soundwalks (see Fig. 26).

Fig. 26 A soundwalk in Belluno (Dolomites), conducted by the theatrical company La Piccionaia. © Museo Dolom.it

Interestingly, an apparently opposite phenomenon to acoustic privacy has emerged with digital revolution: what has been called the acoustic of sharing (Kaplan, 2004; Crawford, 2009a; Crawford, 2009c). Music has always been part of our social life, but never like today we have the opportunity to share sounds with others. Audio-sharing platforms, streaming services, and online music stores allow us to create music together, to listen together, to sing together. In our contemporary society, the boundaries between listening, creating and sharing have blurred (Kassabian, 2016; Papenburg & Schulze, 2016). The biggest audiovisual public library available today – YouTube – is an online platform that has been entirely created by its users through the mechanism of remediation (Burgess & Green, 2009; Gehl, 2009). And like YouTube, many other platforms have adopted this new business model that turns consumers into co-producers and consolidates emergent new practices like making playlists (Liu & Reimer, 2008; Hagen & Lüders, 2016). Recently, new musical and audio-based platforms like SoundCloud and Tik Tok have emerged in this spirit, enabling their users to create and distribute their music without entering the traditional production systems. This recent wave of transformation completely revolutionized the entire music industry (Sterne, 2012; Prior, 2018) and its impact on cultural practices still awaits to be fully explored: museums have just started to enter this new sonic online world, as shown in Fig. 27. The next

sections will show how the sound design practice in museums evolved over the last century in response to these deep revolutions, creating new experiences that were not even imaginable before.
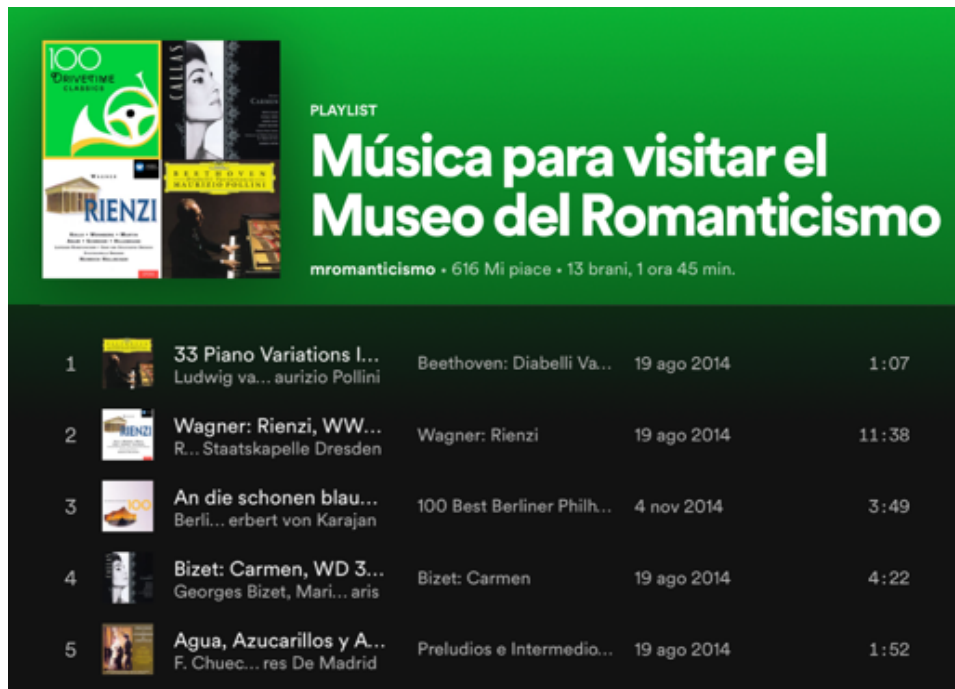
Fig. 27 The Spotify account of the Museo del Romanticismo offers a series of musical playlists to accompany the visitor experience (https://open.spotify.com/user/mromanticismo, accessed on 30 March 2022).

3.3.2 Designing with Sound

Nigel Frayne defines sound design as the activity to design sound into a space where the creation of the content - the sound objects - is intrinsically mapped to the performance of the sound - the sounding space (Frayne, 2004). As the previous section has shown, these elements – the sound objects and sounding space – have been profoundly transformed by the technological revolutions of the last century. The sound object can be manipulated, reproduced, created in entirely new ways. Any sound can be separated by its original source and can become part of an entirely separate acoustic environment. Sonic spaces have multiplied: we can diffuse sounds on the open air or create acoustic bubbles that encourage private and intimate listening. Not only physical but also virtual spaces can be part of a sound design intervention. Finally, the creation of sound can be a participatory process which actively involve audiences, and not only curators, in the sonic intervention.

With these new possibilities in mind, this section will describe an evolution of sonic practices in museums looking at three different elements of the design process. Section 3.3.2.1, 'Objectives', will explore the multiplication of objectives in the use of sound, highlighting an evolution from a cognitive and didactic to a more emotional and sensorial approach. Section 3.3.2.2, 'Spaces' will explore the expansion of sonic interventions from internal museum galleries to the outdoor spaces and the online domain. Section 3.3.2.3, 'Approaches', will explore how the design of the sonic intervention moved from an authorial to a more collaborative curation, involving audiences in the production of sounds.

3.3.2.1 Objectives: from Cognitive to Emotional Approach

In the last two centuries, the approach towards the role of sound has changed considerably. With the advent of public museums of the nineteenth century, the assumption that silence was a necessarily requirement for effectively absorbing knowledge led to consider sound as disturbing element (Bennett, 2006; Bubaris, 2014). When it was not deliberately removed as part of a visual and silent epistemology, in the first half of the nineteenth century sound was primarily used to convey knowledge, by employing voice and different audio technologies. In the last 50 years, the growing importance of the sound dimension has led museums to recognize many other functions: sound has been used to create immersive experiences, to make objects come alive, to offer musical interpretations of collections and exhibitions (Kelly, 2017). This section offers a historical overview of the evolution of this sensitivity, showing a shift from a more cognitive and informative approach to a more emotional and immersive one.

The use of sound to convey information on objects on display emerged in the late 18th century and remained present also today. The voice of the museum guide was the first means to convey information about the history of objects in a sonic form. Cortez describes this as *sound as lecturing*, to emphasise the use of different sound technologies to replace a live lecture (Cortez, 2022). This educational function of sound emerges clearly in this declaration of Dr. Ant Fritsch, one of the first curators to recommend the use of phonograph recordings in exhibitions: 'The time may not be far distant when we shall be able, by dropping a cent into a phonograph by the side of interesting objects in the museum, secure the pleasure of a short discourse on the exhibit' (Fritsch, 1904, p. 252). The technological revolution of the last century has introduced several possibilities to use sound to provide contextual information about objects and exhibitions.

The first technology used to provide audio commentary on exhibits were gramophones, which were firstly employed in 1908 by the American Museum of Natural History in an exhibit about tuberculosis, followed in 1930 by the 'automatic gramophones' in the Deutsches Museum in Munich (Griffiths, 2013; Pavement, 2014). Over the years, museums have developed more advanced narratives and technologies to convey sonically contextual information in the museum: electronic tools included in the overall exhibition design - audio kiosks and listening points equipped with headphones, handsets, directional speakers, sound showers, as shown in Fig. 28 - or mobile devices existing separately from the exhibition – audio guides devices or applications. Thanks to the development of broadcasting and digital technologies, this use of sound has expanded also beyond the museum wall, with radio talks, podcasting and multimedia tours dedicated to the story of the objects (Wasson, 2005; Maculan, 2008; Griffiths, 2013; Bonacini, 2018).

The lack of standardized models in audiovisual format opened the way to experimentations. In addition to innovating content delivery, museums started to innovate the content itself: the emergence of experimental audio guides created by artists (Fisher, 1999; Fisher, 2004) reveals the research for different perspectives and languages. Innovative approaches in presenting information in a sonic form appeared also in the field of accessible design. For a specific portion of museum visitors, sound is the only way to make cultural information accessible to blind and visually impairs people. Nevertheless, non-visual sensory stimulation can also benefit all visitors more generally, because it adds a new dimension to the museum experience.
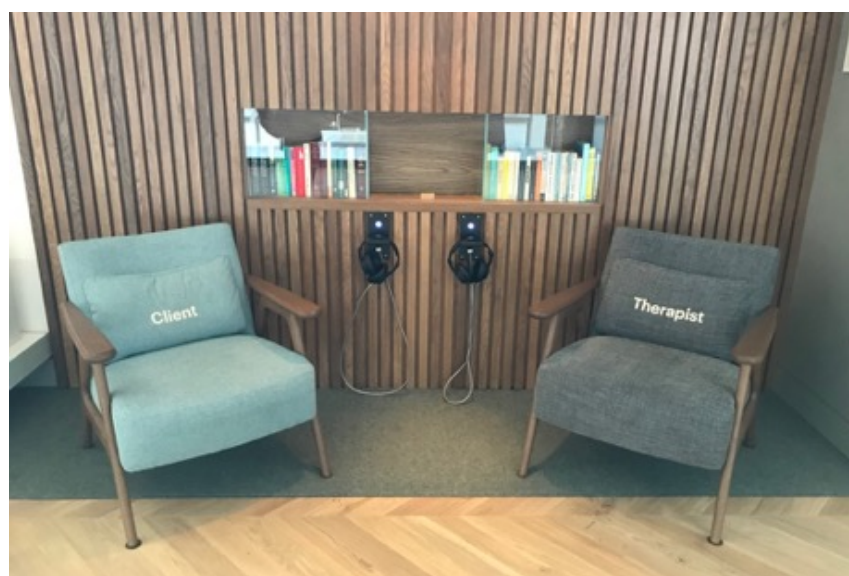
Fig. 28 An audio-based system at the Medicine Galleries, Science Museum in London, 2019. © Stefania Zardini Lacedelli

In this context, a different use of sound emerged in museums over the last 30 years. This second approach starts from the recognition that sound can be a powerful medium not only to convey information, but also to provide a multisensory experience which deeply encourages our emotional involvement (Chia-Li Chen & Chen-Gia, 2015). This approach encompasses all the practices where sound is used to provide a thematic, affective and emotionally evocative layer. A key concept for the development of this approach in sound design has been 'immersiveness' described by Stephen Bitgood as 'the experience of feeling engrossed, absorbed, or deeply involved in an exhibit' (Bitgood, 1991, p. 283). Cortez defines these practices as *sound as ambient*, to highlight the ability of sound to build immersive spaces where visitors feel absorbed and deeply involved at multiple levels (Cortez, 2022).

A key contribution in the creation of these immersive environments was given by artists, musicians, soundscape composers, sound designers and sound anthropologists (Bijsterveld, 2015). In 2012, the Pitt Rivers Museum invited the composer-in-residence Nathaniel Mann and ethnomusicologist Noel Lobbey to create a sonic gallery to immerse visitors in the sound and music from the Central African Republic. As a result, the museum was transformed into a rich forest soundscape, which was explored in the dark (see Fig. 29). A similar experience was created in 2009 by the anthropologist Hein Schoer with the 'Sound Chamber', which described as a place 'to bring the soundscape of North America's indigenous peoples to the museum visitor, without the distraction of visual or other sensual channels where the experience of sounds of a culture brings an immediacy and intimacy, an immersive quality, that the usual object-focused approach of classical exhibition design was lacking' (Schoer et al., 2014, p. 18).

Fig. 29 Video trailer of the Sound Galleries experience at the Pitt Rivers Museum in 2012 (https://vimeo.com/55035411, accessed on 30 March 2022).

This functional shift has been observed also in the field of audio guides and audio-based narratives, where there has been a shift from a cognitive to a more emotional approach that employs sound to evoke feelings and stimulate synesthetic perception (Baxandall, 1991; Marshall et al, 2015). A key example of this experimentation was the 'Voices from the Trenches', an evocative audio trail at the Historical National Museum of War in Italy designed to convey multiple voices of the War. The aim – explain the authors - was to create an embodied interaction that 'takes visitors beyond the traditional view of heritage as a source of information toward a sensorial experience of feeling the past' (Marshall et al., 2015, p. 27).

From this emotional approach emerged an entire set of new practices to offer musical interpretations of collections and exhibitions: from live concerts inspired by the artworks and the gallery themes (see Fig. 30) to the creation of soundtracks and playlists to accompany the visit (Chia-Li Chen & Chen-Gia, 2015). Bubaris, drawing upon the vocabulary of films and videogames, calls these types of sound 'non diegetic', to indicate how they act in the background of visitor's acoustic experience, while having profound emotional influence (Bubaris, 2014).

Fig. 30 A music laboratory at the Modern Art Museum 'Carlo Rizzarda' in Feltre where the participants are invited to freehand draw inspired by the combination of the artworks and the violin music. Activity designed for the 'Museums and the new Digital Culture' course in April 2018. © Museo Dolom.it.

The possibility to create new musical interpretations to objects often fostered a collaborative approach. In 2015, the Museum of Fine Arts in Houston involved the members of the museum community in the creation of a Spotify playlist that guides visitors in the discovery of the museum campus (see Fig. 31). Each song is inspired by a different installation and offers a unique musical atmosphere, conveying different feelings and emotions.

Fig. 31 Songs for Art: the Spotify Playlist created to explore the campus of the Museum of Fine Arts, Houston. The map is available at: https://www.mfah.org/education/adult-programs/spotify (accessed on 30 March 2022).

3.3.2.2. Space: New Sonic Practices between Physical and Digital Dimension

Another interesting phenomenon accompanied the evolution of sound design practices over the last century. Together with a reflection on the role of sound, there was a rethinking of the spatial dimension of the intervention. For its ability to overcome physical barriers, sound fostered museums to think of alternative spaces to encounter audiences. Along with the traditional space of the gallery, the outdoor spaces as well as the virtual spaces of the web became increasingly adopted to design sonic practices. And interestingly, the exploration of new spaces brought to the emergence of new formats.

As the previous section has shown, the first interventions that employed sound were designed within the physical spaces of the museum: from sound exhibitions and sound installations to the audio guides and music soundtracks that accompanied the visit. These practices were in line with the idea of sound as medium that could support the visitor experience, by conveying sonic information or by increasing the feeling of immersion. However, the peculiar nature of sound has fostered to break the boundaries of the traditional formats.

This experimental approach emerged clearly in one of the most widespread curatorial practices: the exhibition. Stemmed from the desire to display the wealth of sound culture in physical spaces, sound exhibitions have introduced new design solutions which challenged the traditional conception of the visitor experience.

In the second half of the last century, the flourishing of Sound Art exhibitions gave an important contribution to establish the role of sound as a curatorial theme, by establishing a new vocabulary and new display strategies (LaBelle, 2006; Cox, 2015). In his article *Ephemeral, Immersive, Invasive. Sound as a Curatorial theme 1966-2013,* Cluett counts 350 sound-theme exhibitions from 1966 to 2013, offering an overview of how they challenged the boundaries of the spaces - with installations positioned outside the museum – and the relationships with audiences – inviting audiences to listen and interact with sound material (Cluett, 2014).

In the last decade, other aspects of sound culture have been explored in exhibitions. Popular music in particular has become a topic of increased interest in museum display, iconic temporary exhibitions such as *David Bowie is* and *Pink Floyd: their Mortal Remains* at the Victoria & Albert Museum (Leonard, 2010; Cortez, 2019; Bailey et al., 2019). In her research, Alcina Cortez has explored the development of this genre over the last 10 years, showing the strategies adopted by curators to overcome the spatial constraints of the galleries and offer a whole listening experience of songs through headphones and loudspeakers (Cortez, 2022).

Fig. 32 Listen: 140 years of Recorded Sound at the British Library. © British Library.

The same challenges have been encountered also in the development of exhibitions dedicated to Oral History, that made an extensive use of sound recordings, such as 'Listen: 140 years of Recorded Sound' held at the British Library in 2018 (see Fig. 32).

Despite the on-site exhibition is still a popular medium used by museums to display the wealth of sound culture (Kelly, 2017), new practices emerged outside the museum space. From the very beginning, audio technologies showed the potential to extend the museum space, also by projecting museum outside its walls. Half a century before the advent of Internet, a 'distance learning' tool was invented: 'Roto Radio Talks', 'Radio Photologues' or 'illustrated radio' allowed people to listen to a lecture about a museum object on radio while looking at its pictures printed on local newspapers (Wasson, 2005; Griffiths, 2013). This format evolved in contemporary podcasting, often employed by museums to stimulate new engaging perspective on works and to involve new audiences (Maculan, 2008).

The new virtual spaces introduced by digital revolution offered entirely new ways to share sound by distance, so developing new sonic practices such as participatory sound archives, virtual exhibitions dedicated to sound, sound mapping (Breaden, 2006; Zardini Lacedelli et al., 2021). In the last two decades that saw museums and cultural institutions multiplying their effort in designing new digital activities, sound turned out to be a particularly effective medium for engaging audiences online.

The first cultural institutions to explore the potential of the web for sound sharing were sound archives. The British Library, home of one of the greatest sound archives in the world, has started to share sound recordings online since the very first version of their Webiste in 1995, subsequently experimenting with different audio-sharing platforms such as SoundCloud or AudioBoom. Together with the British Library, other sound archives and museums devoted to sound culture started to experiment with the new formats introduced by digital platforms, developing immersive virtual exhibitions that make extensive use of sound. Sound had a key role also in the development of online interactives such as *Experience the Night Watch* which offer a deep immersion in the sounds, voices, stories surrounding the creation of the Rembrandt's masterpiece (see Fig. 33).
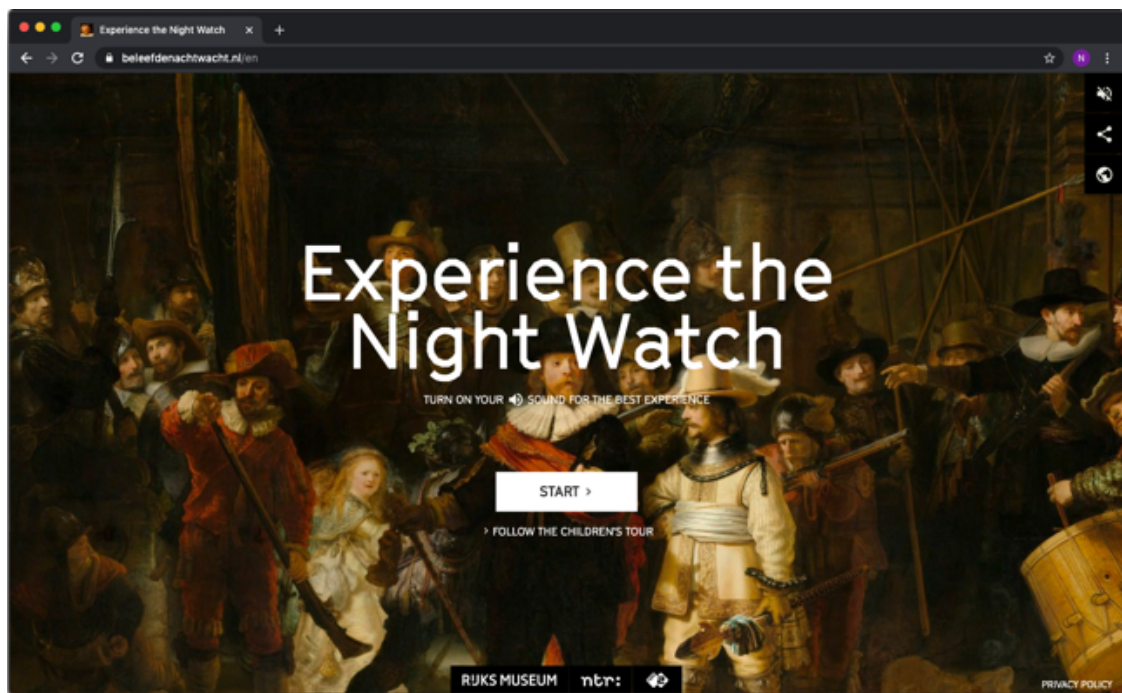
Fig. 33 *Experience the Night Watch*, the online interactive developed by the Rijksmuseum which allows to immerse in the Rembrandt's masterpiece (https://mw20.museweb.net/glami/experience-the-night-watch, accessed on 30 March 2022).

Among the various online formats, sound mapping has become a well-established means for exploring sound in its geographical context, promoting attentive listening and engaging audiences in the preservation of sounds that are disappearing.
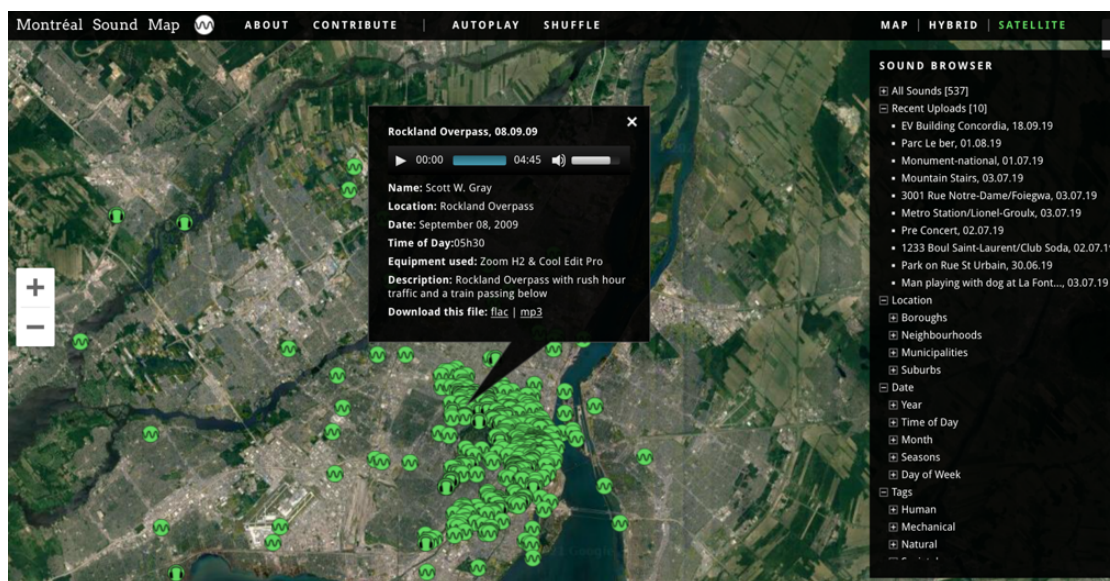
Fig. 34 The Montréal Sound Map, a web-based soundscape project which allows users to upload field recordings to a Google map of Montréal (https://www.montrealsoundmap.com, accessed on 30 March 2022).

The development of online sonic maps in the last decade (see an example in Fig. 34) generated a thriving debate on the educational value and the participatory potential of these practices (Waldock, 2011; Voeglin, 2014; Anderson, 2016; Droumeva, 2017; Tourle, 2017). Mostly generated outside the museum context, sound maps have started to be explored by museums as a means to engage audiences and promote a culture of listening in the museum space.

Deeply connected with sound mapping are soundwalks, the new listening practices emerged in outdoor spaces as a result of the new sensibility on sonic environment brought by Acoustic Ecology. The practice of soundwalking is described by Voegelin as 'walking the landscape with a focus on listening to one's environment' (Voegelin, 2014b, p.120). Originally introduced by Murray Schafer and used by experimental soundscape artists such as Annea Lockwood, these practices of active listening have been applied to the museum world quite recently to promote a new active relationship with the acoustic environment of the museum, which includes also the sound making of visitors (Kannenberg, 2016). As Voegelin highlights, soundwalks are, in fact, 'generative', since the experience of the museum 'is produced in the activity of walking around it and through it' (Voegelin, ibid., p.128).

Fig. 35 A participant of the Silent Play 'The Secrets of Lagole', which was performed for the first time in September 2019. © Museo Dolom.it

A further development of this practice has been experimented in Italy by the theatrical company *La Piccionaia*, which has applied the soundwalk format to bring people to discover the outdoor cultural heritage. This practice, which was defined by its inventor Carlo Presotto *Silent Play*, is a performative soundwalk where a performer guides a group of participants using radio headphones that transmits sounds, stories, music, and at the same time gives indications, often inviting them to act in the space (see Fig. 35). This practice employs the Silent System, a technology developed for the Silent Disco, which allowed the acoustic intimacy provided by headphones with the sharing experience of the 'sonic bubble', allowed by the wireless system. In so doing, the Silent Play creates an active, playful and shared experience where cognitive, sensorial and emotional levels are connected.

All these new sonic practices flourished on digital platforms and in outdoor spaces not only extended the spaces of the museum experience, but also introduced a fundamental change in the relationship with the public. The next section will look at the evolution of curatorial approaches.

3.3.2.3 Approaches: from Transmission to Co-Creation

The wealth of sonic practices described in the previous sections show us how museums can create various kinds of sound narratives in their physical and virtual spaces. However, this approach on the creation of content originates from the assumption, deeply rooted in our culture, of the museum as 'temple of knowledge' where content is transmitted by a group of expert curators in order to educate the wider public. This conception comes from a visual metaphor of knowledge coming from Enlightenment, where sound is a disturbing element in the learning experiences and the knowledge institutions – museums, libraries, archives - are 'silent places' par excellence (Howes, 2014). However, sound shows us a different metaphor of knowledge creation. Firstly, because it requires a deeper immersion on multiple levels: not only cognitive, but also emotional and sensorial dimensions are involved in a sonic experience. Secondly, because any sonic environment is created with the contribution of listeners, even unconsciously.

This idea of visitors as active soundmakers firstly emerged in the early practices of sound walking in museums. Sound researchers such as Salomé Voeglin and John Kannenberg, reflecting on their practice of sound walking, highlighted how the museum soundscape, as any acoustic environment, is collaborative created by all the individuals that walk the space, talk to each other, and acoustically react to the environment (Voeglin, 2014; Kannenberg,

2016). Consequently, the sonic behavior of visitors is intrinsically part of the museum soundscape. The reflection on the sonic environment as co-created leads to embrace a new approach in the creation of knowledge: instead of considering visitors as silent listeners, waiting to receive information in a sonic form, museums started to think of audiences as actively involved in the creation of knowledge (Bubaris, 2014). This has led to the emergence of a new set of practices that invite audiences to contribute to the creation of the sonic intervention: from participatory sound archives and sound maps to the collaborative creation of playlists, to interactive installations that involve audiences in the creation of sounds. All the practices that have been described in the previous sections can be collaboratively created with the contribution of audiences.

The first experiments were developed by sound artists. The experimentation of sound as artistic medium often brought to make audiences directly interact with the sound installation, and in some cases invite them to produce the sound content. The development of *Sonic interaction design* further explored these opportunities (Franinović & Serafín, 2013). This interdisciplinary practice shifted the focus from a reception-based approach toward a more active, embodied and emotionally engaging use of sound. Several installations have been designed to make visitors touch and interact with pre-recorded sounds, or even to activate the sonic space through their movement. Two key examples have been the installations *Audio Grove* (1997) developed by the architect Christian Moeller and *Son-O-House* (2004) created by the architect Lars Spuybroek and the sound artist Edwin van der Heide.

> The structure is both an architectural and a sound installation that allows people to not just hear sound in a musical structure, but also to participate in the composition of the sound. It is an instrument, score, and studio at the same time.
>
> (Spuybroek, in Franinović & Salter, 2013, pp. 64-65)

In some cases, auditory feedback took the form of a personal vocal action. One of the first examples of including visitors' speaking in the exhibition design was *The Memory Machine*, an interactive sound installation created by Cathy Line and Nye Parry in collaboration with The British Museum in 2003. Through a 1950s-style telephone in the exhibition area, visitors heard a changing mix of layers of spoken word material to which they were invited to contribute with their own personal reminiscences. Part of a research project into sound, history and memory, the aim was to stimulate recollection and sonic remembering in the listener (Lane & Parry, 2005).

Fig. 36 The Memory Machine. Sound installation as part of the British Museum's 250th anniversary exhibition 'The Museum of the Mind: Art and Memory in World Cultures' in 2003. © Cathy Lane (https://cathylane.co.uk/works/the-memory-machine-2/, accessed on 30 March 2022)

Co-creation approaches have been extended to the development or even the foundation of an entire sound collection. In 2011, the British Library launched the first project to collect people's favourite coastal sounds using an audio-based platform. An entire range of new bottom-up online archives was born this way (Baker, 2013; Baker, 2015; Baker & Collins, 2016). The last 10 years saw the flourishing of creative projects where musicians, film makers, artists are invited to include archival sound recordings in their works (see an example in Fig. 37).
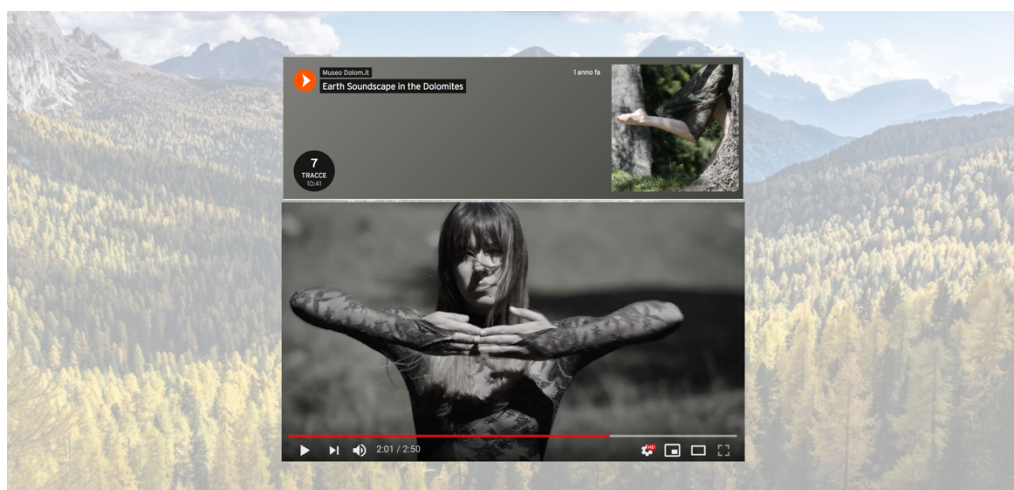
Fig. 37 A video performance inspired by a sound composition created using the sounds of the participatory archive of the Dolomites soundscape, hosted in Museo Dolom.it (https://youtu.be/kev3icVpYIQ, accessed on 30 March 2022). The archive was entirely created with the contribution of online users and Dolomites inhabitants.

Another practice that went through this shift has been the audio guide. Museums started to incorporate new voices in their audio narratives. The first experiments involved specialized groups such as artists or musicians in the creation of the audio guide (Fischer, 1999). In the last 10 years, the emergence of storytelling platforms such as izi.TRAVEL further expanded this participatory opportunity, building an entire new generation of storytellers. A key project in this area is izi.TRAVEL Sicilia, which since 2016 has involved students, researchers and inhabitants of the region in the creation of 356 audio guides of Sicilian heritage (Bonacini, 2019). The participants are often involved not only in the creation of the story, but also in the recording of their own voices, so making the audio guide a polyvocal narrative (see Fig. 38).
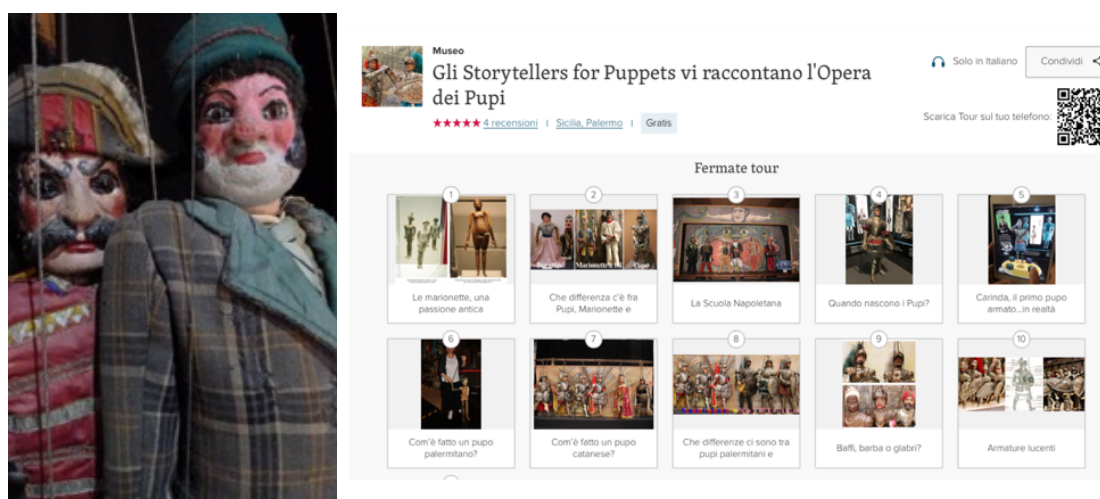
Fig. 38 The Storytellers for Puppets audio guide on izi.TRAVEL tells the story of the ancient Sicilian tradition 'Opera dei Pupi', which was inscribed in the list of the Intangible Cultural Heritage of Humanity in 2008. The narrative was created by the Antonio Pasqualino international Puppet Museum in Palermo involving more than 120 voices from puppets enthusiasts all over the world, including Argentina (https://izi.travel/it/150a-museo-internazionale-delle-marionette-antonio-pasqualino/it, accessed on 30 March 2020).

In some cases, artists actively collaborate with audiences to guide them in new creative approaches. This is the case of the innovative format of the Silent Play developed by La Piccionaia, where the performers coordinate a wide creative process which involves, at different stages, multiple subjects: musicians, cultural operators, institutions, citizenship (see Fig. 39).

Fig. 39 The artistic director Carlo Presotto working with a group of cultural operators and Dolomites inhabitants in the creation of the Silent Play 'The Secrets of Lagole' in 2019. © Museo DOLOM.IT.

A flourishing area rich of new experimentations has been the development of new musical interpretations of collections. As the previous section has shown, the introduction of music offered the opportunity to add new meanings to objects and exhibitions, so stimulating the creative engagement of musicians but also the sonic imaginations of audiences. A key project in this new direction was *Musical paintings*, developed at the Mario Rimoldi Modern Art Museum and in other museums of the Dolomites between 2015 and 2016 (see Fig. 40).

Fig. 40 The *Musical paintings* project in 2014 stimulated the collaborative creation of musical playlists inspired by five paintings from the Mario Rimoldi Museum of Modern Art in Cortina (Italy). The Museum invited social media users to suggest their musical associations on Facebook (https://www.facebook.com/Museo.Mario.Rimoldi/posts/788264121229582, accessed on 30 March 2022) and then collected all the songs in a dedicated multimedia space (https://www.regole.it/mquadro/Ita/Rimoldi/Explora/visGalMusic.php?galleryMu=1, accessed 30 March 2022).

Through the publishing of a series of artworks on Facebook, online users were asked to share a YouTube link with a song they associated with the image and explain their musical association. The effectiveness of this online activity was proven not only by the quantity of interactions, but also by the wealth of different interpretations that it was able to arise.

This participatory turn in museology has not been observed only in sound design. A whole range of new practices directly involve audiences in the creation of content and in the interpretation of collections (Proctor, 2010; Giaccardi, 2012; Ridge, 2013). The wide spreading of crowdsourcing projects, social media campaigns, heritage co-creation shows a fundamental shift in the conception of museum not only as an institution that disseminates knowledge, but as an open platform where everyone can contribute to enrich the collections with their memories and personal experiences. The very nature of the sound experience, as well as the availability of platforms and tools to share, transform, and create sounds, can support museums in their post-digital evolution. The transformation requested in designing with sound can transform the museum into a fully multisensory, participatory and polyvocal institution.

3.4 Conclusions

The recent virtual immersive exhibition *Kid A Mnesia* created by the Radiohead based on their songs, was originally conceived as a physical exhibition to be hosted at the Victoria & Albert Museum. Commenting the evolution of the idea, the songwriter Thom Yorke says that they changed the format once they realized that it 'couldn't fit at the museum without part of the building collapsing' (Yorke, quoted in Murphy, 2021). Despite this strong image relates with their ambitious concept of a giant spacecraft featuring hallways of music, this sentence reflects one of the effects of sound in museums.

Sound is a disrupting force in the museum. When it enters cultural institutions, both as an object of culture and a means of design, it challenges previous assumptions and requires to exploring new spaces as well as to developing new practices.

As intangible object, sound pushes museums to rethink the logic of the objects themselves which, for two centuries, has shaped the practices collecting and displaying. To accommodate sound recordings in their collections, museum cannot use the same spaces and procedures that allow to preserve and display tangible objects. They are challenged, instead, to develop

a new vocabulary, as well as new infrastructures and technologies to curate sound culture. Last but not least, the concept of sound as heritage calls for a rethinking of the very meaning of heritage itself, not as an object to be preserved, but as a dynamic process to be constantly experienced, interpreted and co-created.

As means of design, sound conveys the idea of the museum as a place to listen, and not only as a place to see. This concept has the potential to deeply transform traditional formats like the exhibition, by introducing new practices where audiences are actively involved in emotional, multisensorial, shared experiences. Designing with sound naturally extend the museum presence outside the museum itself, shaping new practices to experience heritage outside the gallery spaces, both outdoor and in the spaces of the Web. Sound, as dynamic force, also transformed the traditional approach of knowledge transmission, enhancing the idea that knowledge itself is much more powerful when is co-created and generates multiple interpretations and meanings.

The experiences and reflection described in this chapter suggests a further shift. The transformations brought by sound raise some key questions on the way we conceive the museum itself. The idea of physical buildings that collect, study and display tangible objects, is this still a good shape to accommodate the wealth of sound culture, and the variety of ways and platforms through which they are shared today? Or do we need to start thinking of a museum as a post-digital infrastructure, where heritage is a dynamic process of knowledge co-creation?

Exploring this evolution, which is deeply connected with the digital transformation of museums, will be the focus of the next chapter.

Chapter 4. The Platform Museum: a New Model for the Cultural Sector

4.1 Museums in a Platform World

> The museum has – as we can document – its pre-forms and this is not a single given form, but it will continue changing and in the future it will have eventually completely new forms.
>
> (Stransky, 1981, p. 21)

Whenever we evoke the word 'museum', the mind and imagination immediately go to a building that offers paths of knowledge through the objects of the past. Nevertheless, the form that museums has assumed throughout the centuries is historically determined and it continues changing depending on the society the museum lives in. The idea of museum as a building is strongly rooted into a tradition where the transmission of culture has been possible thanks to the preservation of material objects of the past, that were carefully selected by expert curators and made accessible to the wider public. These objects needed dedicated physical spaces where they could be preserved for future generations, as well as spaces where they could be displayed. The educational value of these objects, as well as of the role of curators in developing narratives and interpretations, has received a growing attention over the last century, so shaping what are, today, consolidated cultural practices such as exhibitions, galleries, as well as educational activities.

In the last 30 years, however, museums have changed (and are continuing to change) their shape. The contemporary world differs from the one in which most museums were born. The digital revolution introduced new spaces and tools for access, enjoyment and interaction with the collections. In the web, new practices but also new museums are emerging which do not have a physical counterpart but offer the exploration and discovery of new forms of digital heritage. The journey through sound and sound culture has shown that the shape and practices museums have developed in the last centuries is not the most appropriate to accommodate the new ways in which today we participate in cultural life. Sounds are only a part of a whole world of data, images, videos, which form a substantial part of our digital culture. From this, a key question arises: if museums were born today, in this hyperconnected society, with these new opportunities of access, interaction and participation, which shape would they have? The physical building is not the first infrastructure that comes to mind to accommodate the wealth, complexity and messiness of data, items, networks, interactions of the digital world.

And yet, museums need to have a shape. The shape is not only a physical infrastructure that identifies the institution, but a substantial model that affects the system of values and behaviors, the nature of relationships, the type of activities that a museum can develop. As institutions, museums need to rely on a model around which they can conceive themselves as well as to forge activities, spaces, professional roles. In the world that we inhabit, there is a prominent model which is shaping economic activities, personal relationships, social structures, knowledge discovery. This model is the platform: an open, participative, digital architecture designed to organize interactions. This chapter will explore how this emerging model, which is profoundly impacting the cultural sector, introducing entirely new practices as well as conceptual revolutions that are changing the way we conceive museums.

4.1.1. The Platform Society

The amount of data, content, information exchanged in one minute of the day was unimaginable only 30 years ago. Fig. 41 reflects how we spend time, how we work, how we learn and interact in today's hyperconnected digital society. We watch movies and listen to music on streaming platforms, we share the moments of our lives on social media, we participate in online meetings, we attend online courses. And all these activities happen on different digital platforms, which forms what Van Dijck calls 'platform ecosystem' (Van Dijck, 2013).

Fig. 41 One minute of Internet in 2020. © Domo.com

These instruments are all but neutral; as with any other technology invented by humanity, they create a world with specific features that we cannot avoid inhabiting; and by inhabiting it, we develop habits that inevitably transform us (Galimberti, 2000). Online platforms come with specific norms and values inscribed in their architectures, which are gradually penetrating in the organisational structures, as well as in the social and cultural practices (Van Dijck et al., 2018). In their study 'Platform Revolution', Parker et al. define 'platform' as a transformative concept that is radically changing business, the economy and society at large (Parker et al., 2016). To emphasize this inextricable relation between online platforms and society, Van Dijck coined the term 'platform society': a society where most interactions are carried out via the Internet and platforms produce the social structures we live in (Van Dijck et al., 2018).

The 'platform revolution' is a phenomenon that has been widely studied from different perspectives. The term 'platform' carries a semantic richness that originates from its computational, architectural, figurative and political meanings (Gillespie, 2010). From the sociotechnical point of view, the platform is a relational infrastructure, a facilitator that shapes the performance of social acts (Latour, 2005). In political economy and management studies, the platform represents a new business model that creates value by facilitating exchanges between two or more player groups (e.g., consumers and producers).
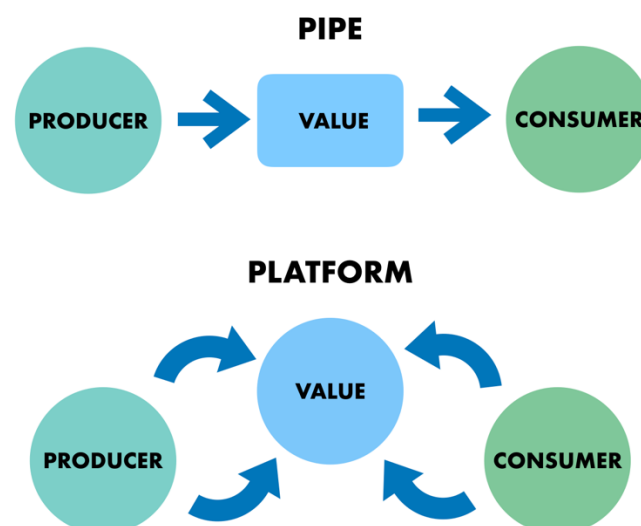
Fig. 42 How the Platform Business Model works and the difference with the 'Pipe' business model. © Stefania Zardini Lacedelli.

These studies (Negoro & Ajiro, 2013; Junic, 2016; Kim, 2016; Parker et al., 2016; Moazed & Johnson, 2016) have shown how the platform business model subverted the traditional linear business model which created value through the creation and sale of good and services, so introducing new participatory perspectives in value creation, as shown in Fig. 42. In media studies, the emergence of social media platforms and Web 2.0 was the starting point to discuss the emergence of the participatory culture (Jenkins et al., 2013), as well as to reflect on the underlying power of platforms in shaping information policies that can lead to misinformation, group polarization, intellectual property and privacy issues (Grimmelmann, 2007; Quattrociocchi et al., 2014; Faris and Donovan, 2021).

All these approaches are important to understand the features of our platform society, which has the most visible manifestation in a few giant worldwide platforms, each one dominating a particular niche of the marketplace: Google for browsing, YouTube for video-sharing, Facebook for social networking, Instagram for photo-sharing, Spotify for music-sharing, Twitter for microblogging, Amazon for e-commerce, Wikipedia for open knowledge. But the platform revolution has also led to the foundation of an endless number of smaller platforms that served different purposes in different sectors: from journalism, health and urban transport to education and culture. And this ecosystem is continuously in flux: every year new platforms emerge; others disappear or are acquired and integrated into other services.

However, the platform ecosystem as we know today is only the latest phase of an evolution that started long ago and that contributed to creating a society which is profoundly different from the one that originally shaped museums. This is why it is extremely important, from a museological perspective, to understand where this process originates and what new habits, social practices and cultural norms dominate our platform society.

4.1.2. The Webevolution: from Access to Sharing and Co-Creation

The rise of digital platforms was enabled by one of the most technological disruptions introduced by humankind: the World Wide Web. This invention had and continues to have a profound impact on how we produce and exchange services as well as create and share knowledge (Tapscott & Williams, 2007; Shirky, 2009). Analysing the evolution of the Web, Karl Kapp and Tony O'Driscoll have identified three main evolutive steps that marked the introduction of different online services (Kapp, O'Driscoll, 2010). The first Webevolution wave was driven by the opportunity to make information accessible as never before, so fostering the emergence of the first search engines. But it is only with the second evolutive

wave that the first services built on the platform business model appeared. Driven by the idea of sharing, tech companies began to conceive platforms where users could not only access but also collaborate in the creation of content and products. With the first streaming services – Napster in 1999 and, after, YouTube in 2003 – the Web started to transform into an architecture for participation and sharing and entire industries have been completely reconfigured. Music industry has been one of the most impacted sectors of this phase: streaming platforms replaced the physical ownership of music – represented by the physical formats such as vinyl, cassettes, CDs - with the right to access to it, as well as allowing entirely new and democratized way to create and share music outside traditional channels (Prior, 2018).

The third Webevolution consolidated this trend, extending the opportunity of collaboration to the creation of content. This wave marked the beginning of social media, places where people can connect with each other, forge new relationships, create online communities, share, and create content[7]. These platforms have been the breeding ground for what Jenkins defines as Participatory Culture: a culture where anyone is invited to participate in the creation and distribution of content (Jenkins et al., 2013). The spread of the collaborative creation of content has subverted the traditional authoritative sources of information: in a world where everyone can share content, journalism and news organizations had to rethink the way through which information are shared and distributed, embracing a more fragmented, heterogeneous, and participatory communication (Van Dijck et al., 2018).

The impact of these waves of transformation can be traced in the development of the digital presence of museums and cultural institutions. In 2004 Werner Schweibenz proposed an interesting analysis of the different evolutionary phases of the virtual museum, that in some way mirror the Webvolution waves proposed by Kapp and O'Driscoll (Schweibenz, 2004). He describes the first phase as 'Brochure Museum', a website that contains the basic information on the physical museum. The 'Content Museum' is the second phase, which presents museum's collections and invites users to explore them online. With the third phase, the 'Learning Museum', the content became more interactive, and users are invited to establish a personal relationship with the collection. The Virtual Museum is, according to Schweibenz, the last phase, where the museum itself is conceived as a digital infrastructure

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[7] Alex Moazed (2016, pp. 118-119) proposes a distinction between *exchange platforms* that enable users to optimize connections (e.g. social networking platform such as Facebook) and *maker platforms* that generate value by enabling users to create and share content (e.g. content platforms such as YouTube).

that joins different online collections. In his preliminary analysis, however, there is still no mention of the opportunity of participation and co-creation who became prominent values in platform society and that are at the core of the platformisation of the cultural sector.

4.1.3. The Platformisation of the Cultural Sector

The platform revolution has fundamentally changed the economic and institutional configuration in which cultural production takes shape. Furthermore, the Platform Model is expanding beyond the boundaries of digital companies, becoming the prevalent model for cultural production (Busacca, 2019). The whole cultural sector is becoming increasingly platform dependent (Nieborg & Poell, 2018): while certain cultural commodities have adapted to this new environment, others – like digital games – emerged in response to the platform society. In recent years, Nieborg and Poell applied the concept 'platformisation' (introduced by Helmond, 2015) to the cultural sector, to highlight 'the penetration of economic, governamental and infrastructural extension of digital platforms into the operations of cultural industries', as well as the process by which they actively organize cultural production around platforms (Nieborg & Poell, 2018, p. 4276). The platformisation of the cultural production has been mainly studied from the perspective of business studies, political economy and software studies, which have provided key insights in the economic mechanisms and managerial strategies underlying the platform world. However, these approaches fail to provide a theoretical framework to study the far-reaching cultural implications of the platforms. As Nieborg and Poell highlighted, it is important to understand what motivates cultural organizations 'to contribute to platforms, what strategies do they develop, and how do platform support, ignore or bar them' (Nieborg & Poell, 2018, p. 4278; McIntyre & Srinvasan, 2017). To answer these questions, each cultural industry needs to be observed individually, because it is characterized by its own set of assumptions and practices that are challenged by the platform metaphor.

For a museum, entering the platform ecosystem goes beyond the mere introduction of new tools, but implies the embrace of a full set of new mindsets that affect previous assumptions on audiences and heritage. The values of sharing and co-creation of the Platform Model have challenged key areas of museum practice: the curatorial authority (Proctor, 2010; Phillips, 2013), the relationship with audiences (Puhl & Mencarelli, 2015), the processes of cultural production (Davies, 2010), and the creation of new heritage (Giaccardi, 2012). These challenges originated in parallel with the development of the Web and are still at the core of

digital transformation of the cultural sector. To evolve into post-digital institutions, museums need to understand the platform revolution as a profound change in society and culture, which they are expected to address. As the major digital literacy research project 'One by One' has demonstrated, "this means moving from museums considering their digital challenge as being simply about how they must react to changing hardware and software systems, to more strategically examining how they remain relevant to audiences who are operating within a changing digital culture" (One by One, 2018)[8].

4.2. The Practical and Conceptual Impact of Digital Platforms

Museums have been deeply affected by the platform society. On the practical side, the use of platforms is introducing a complete set of new curatorial practices, engagement strategies and processes of cultural production. From the conceptual perspective, the metaphor of the platform is profoundly influencing the way in which curators conceive the relationship with audiences, the curation of the collections and the concept of heritage itself. Combining both dimensions leads to a new theoretical concept that I define as the 'Platform Museum': an entirely new infrastructure that can help to conceive the museum of the future. The next section will explore each dimension – practical and conceptual - in detail: firstly, I will analyse how museums have used digital platforms to extend their online presence and engage audiences in new ways; then I will look at how they have started to create their own cultural platforms to share their heritage; and, ultimately, I will reflect on the conceptual implications introduced by the use and creation of platforms. The theoretical concept of the 'Platform Museum' will be described in Section 4.3.

4.2.1. The Use of Platforms: Online Engagement, Audience Research and Crowd-Curation

Platforms have permeated every aspect of everyday life, including cultural experiences. Even if a museum does not have any account on digital platforms, its visitors can share photos, videos, and comments on the museum experience on their personal accounts. As a result, the

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[8] The 'One by One' project aimed to develop new organisational mindsets in museums to help support their digital transformation needs. The project, funded by the Arts and Humanities Research Council (AHRC), was led by the University of Leicester in partnership with Culture24, together with a range of museum and academic partners.

museum's presence is distributed on a variety of different platforms, sometimes under the museum's control (the platform that museums choose to use), and sometime not (platforms used by visitors).

In the last ten years, museology, media, and management studies carefully explored the potential of platforms for the museum sector. Firstly conceived as powerful communication and marketing tools that could harness the potential of the Web (Hausmann, 2012; Padilla-Meléndez & Águila-Obra, 2013; Suzić et al., 2016), digital platforms gradually permeated other aspects of the museum life: museums started to use them to engage audiences in new ways (Giaccardi, 2012; Kidd, 2014), to involve online users in crowdsourcing projects (Ridge, 2017; Hedges & Dunn, 2017) and to experiment with new curatorial practices (Parry, 2007; Cameron, 2010). This trend was further accelerated by the pandemic emergency during the COVID-19 lockdown. Forced to close their physical doors, museums explored how digital platforms can be valuable tools to interact with the collections and make heritage more accessible (Samaroudi et al., 2020; Agostino et al., 2020; Dominique Orlandi, 2020; Galani & Kidd, 2020; Zardini Lacedelli et al., 2021).

The use of digital platforms is anything but neutral for the museum. The intrinsic mechanism of each microsystem – including specific rules of behaviour, social practices, and modes of interaction – shapes the way in which museums make content accessible and build relationships around it. Recent studies have demonstrated how the use of platforms, if accompanied by a wider reflection on the museum's values and beliefs, can also have a significant organisational impact (Tamma et al., 2019). Drawing upon extensive literature in this multidisciplinary field, I identified three main levels of use, which have opened entirely new fields of research and practice.

The first level is *audience engagement*. Digital platforms stimulate museums to engage audiences in new collaborative ways. In the traditional 'broadcasting' mode of communication, people 'consume' content which was previously created by a group of expert curators. But in a platform system there is always a further level of interaction: online users can act simultaneously as consumers, distributors, curators, and creators of content (Puhl & Mencarelli, 2015; Fois, 2015). Any museum content published on a digital platform can be further commented, shared and re-contextualized by users in a variety of new ways. According to Nina Simon, the museum can design the various levels of interaction depending on the modes of engagement that the platform enables (Simon, 2010). New practices of participatory communication and online engagement have been born this way. In Italy, the

project *Digital Invasions* – which ran from 2012 to 2018 - invited audiences to be active promoter of their local heritage, by sharing on social media pictures of their local museums and cultural sites (Bonacini et al., 2015). In the same spirit, a series of museum-oriented social media campaigns were launched to involve online communities in the participatory narration of heritage. Some of these initiatives, such as the Museum Week, extend internationally, involving museum professionals from all over the world (Zuanni, 2017). A deeper level of participation is crowdsourcing, where people are asked to collaborate in museum's research and curatorial projects by tagging, commenting, or transcribing digital content (Ridge, 2017; Hedges & Dunn, 2017).

The second level is *audience research*. Museums can use platforms as archives of Big Data. The shift from connectedness – the ability of social platforms to enhance human relationships – to connectivity – the opportunity to exploit behavioral and profiling data generated within the platform system – is intrinsic in the development of the platform ecosystem (Van Dijck, 2013). Thanks to social media insights and APIs[9], researchers can collect and extract substantial amounts of data to analyse the circulation and consumption of digital content. The potential of this rich tapestry of data for the heritage sector is yet to be fully explored: digital heritage researchers are starting to address these enormous web archives to understand audiences, analyse the public perception of heritage, and study new spontaneous forms of cultural engagement emerged in these social spaces. Recent research has demonstrated how Facebook can be a potential ethnographic archive for testing the public perception of the past (Bonacchi et al, 2018); how Twitter can function as a precious dataset to evaluate the quality of cultural participation in social media campaigns (Zuanni, 2017); how Instagram or Flickr can enable a deep analysis of the visual imagery of the heritage experience (Budge, 2017); and how TripAdvisor can be a useful source for analysing the visitor experience (Mandarano, 2014). To leverage the potential of these 'big web archives', museums need to adopt new computational methods,[10] while remaining aware of their limits: the entire dataset is not always accessible, data are often decontextualised and there could be ethical implications in using personal data (Bonacchi, 2017).

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[9] The Application Program Interface (API) is a set of codes that specifies protocolized relations between data, software and hardware.

[10] Big Data analysis includes, among others, text mining, topic modelling, sentiment analysis, visual content analysis.

The third level is *curatorial*. In the past two decades, a growing body of literature has examined the narrative and interpretative shift in digital curation (Parry, 2007; Cameron 2010; Giannini & Bowen 2016) and the emergence of new cultural practices on online platforms. These studies have shown how in the digital domain, the narratives are fluid and objects are open to multiple interpretations, fostering museums to embrace a polyphonic, fragmented, and constructive conception of knowledge making (Hein, 1998; Hooper-Greenhill, 2000). Cameron suggested how this novel approach is transferring into the design of online collections, which are liberated by the hierarchical linearity of the physical spaces so becoming polysemic and exhibiting a wide range of meaning, voices, and subjective interpretations (Cameron & Kenderdine, 2007; Cameron, 2021). Examining this emerging and thriving field, a growing scholarly attention has been given on the emergence of co-creation in the design of exhibitions (Davies, 2011; Simon 2010), in the creation of online archives and new digital heritage (Szabo, et al., 2018) and in the wider cultural production (Tamma & Artico, 2015). These new opportunities of involving audiences in crowd-curation have also raised new significant challenges to the traditional concept of curatorial authority, which will be analysed in paragraph 2.3. Interestingly, it was precisely the experimentation of new practices of digital curation to have fostered museums to explore not only existing platforms, but to shape their own online environments.

4.2.2. The Creation of Heritage Platforms

In the past museums have contributed to shape spaces and practices for culture in the physical dimension: galleries, exhibitions, interactive displays were all conceived to make audience discover material objects of our past, that were made accessible through a physical visit in a building. Today, museums are challenged to shape the new 'hybrid spaces' of our post-digital society. By experimenting with different platforms and tools to make their heritage accessible online, cultural institutions started to conceive their own platforms, with specific features and interfaces that could respond to their unique content and mission. As shown in Fig. 43, starting from the early 2000s, a new type of platform emerged on the Web: online spaces created to give access to the wealth of digital heritage coming from cultural institutions. Functioning as digital extension of physical museums, libraries, and archives, '*cultural platforms*' gave access to a whole new type of heritage: historical photos and videos, images of artworks, drawings, historical maps, 3D reproductions of artefacts and buildings, audio recordings, either already part of museums' physical collections or not.
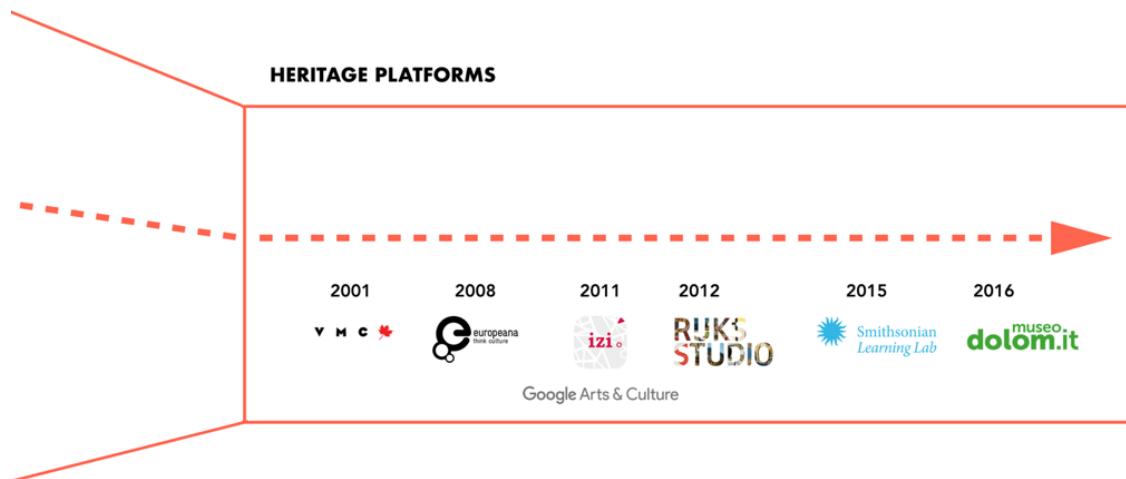
Fig. 43 The emergence of a new generation of heritage platforms. © Stefania Zardini Lacedelli.

Drawing upon the extensive body of studies which observed the extension of the museums on the Web, three main categories of cultural platforms can be observed, each one originating from a specific need.

The first type of cultural platforms emerged to give access to the museum's digital collections and offer new ways to interact with them (Hackney & Pickard, 2018). The main aim of these platforms is the personalization of the user experience. They allow 'to harness, prioritize, and present the diversity of voices around a given object, exhibit, or idea' (Simon, 2008), by offering highly personalized and interactive interfaces. This type of platform, which is often the extension of a pre-existing website, is predominantly created by large museums capable of sustaining the investment of highly customized digital infrastructures. The most advanced level of personalization is to give audiences the opportunity to create individual accounts and curate personal collections, following the example of successful visual platforms such as Pinterest. Rijkstudio was born in this spirit (Gorgels, 2013). Launched by the Rijksmuseum, the platform interprets the digital collection as a resource for public creativity, inviting users to collect their favorite masterpieces in personal boards, as shown in Fig. 44. To further develop this potential, in 2015 the Rijksmuseum conceived Rijkstudio Award, an international design competition that invites members of the public to download images from the platform and create their own artwork, without limit to the imagination.
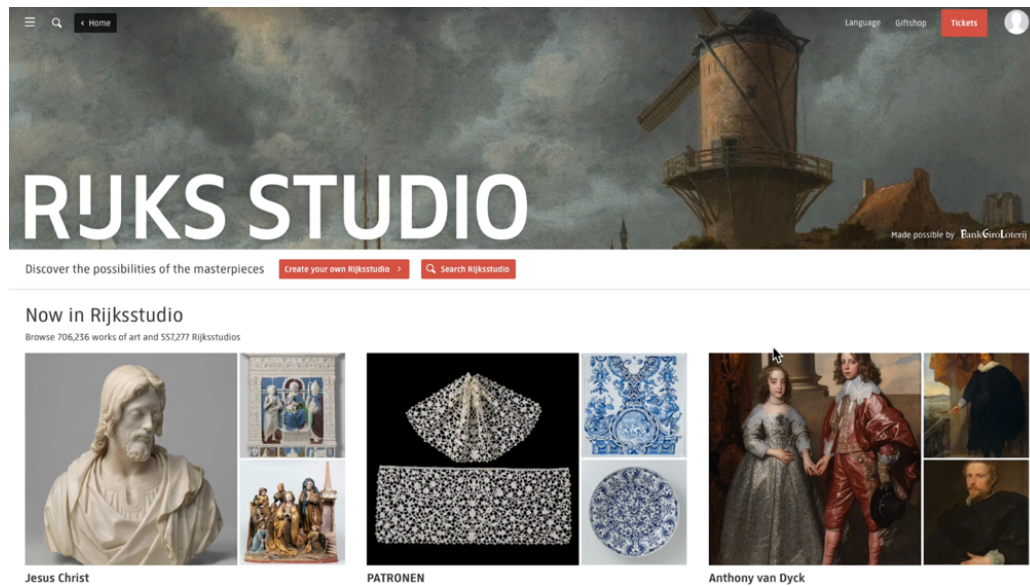
Fig. 44 A screenshot from the Rijkstudio Website (https://www.rijksmuseum.nl/en/rijksstudio, accessed on 30 March 2022). This image shows the opportunity to create a personal account and thematic boards, a feature in common with other curatorial platforms, such as Pinterest.

A second type of cultural platform emerged from the need to connect different digital repositories and enrich the cultural resources that can be accessible online. The main feature of these platforms is the collaborative approach to the creation of heritage: they are dynamic participatory archives, which foster the involvement of different stakeholders – museums but also libraries, bottom-up archives, independent researchers, and online communities. Often promoted by a main aggregative institution, these platforms address the need for small archives and local museums to make their heritage accessible and create interdisciplinary narratives that overcome geographical borders. An early example was the Digital Museums Canada (DMC, former Virtual Museum of Canada), born in 2001 to foster Canadian museums and heritage community to create new engaging online narratives. In 2010, Europeana made its first appearance, aiming to give free access to the European heritage via a single Web portal (Angelaki et al., 2010; Simou et al., 2012). Heritage platforms soon attracted the interest also of the giant tech companies. In 2011, Google launched Google Art Project - now Google Arts & Culture, see Fig. 45 – to make people explore high-resolution images of artifacts all over the world (Stimler et al., 2019).

Heritage platforms have often been the outcome of an increasing number of European projects dedicated to a specific theme or to the preservation of a particular typology of digital heritage (Jannsen et al, 2013). Sound and audiovisual heritage, in particular, has been the subject of major projects on national and international level such as *Europeana Sounds* and

Unlocking Our Sound Heritage (Simou et al., 2012; Janssens et al., 2013). These are, today, the most numerous categories of platforms, with several projects at smaller scale aimed to connect digital resources spread across local institutions and at the same time foster new interdisciplinary and participatory approaches in the promotion of heritage (Zardini Lacedelli et al., forthcoming, 2023).
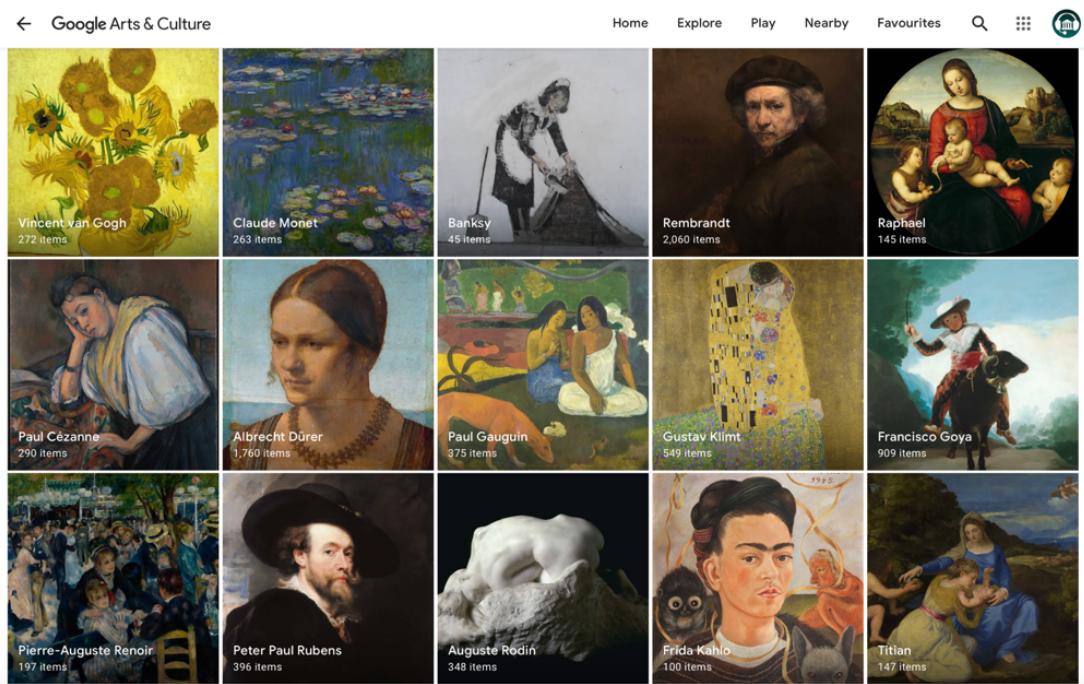
Fig. 45 The section dedicated to artists on Google Arts & Culture
(https://artsandculture.google.com/category/artist, accessed on 30 March 2022).

The third type of platform originated from the need to actively involve audiences in the creation of new educational, research or narrative content. This category includes various kinds of platforms. *Educational platforms* were born to explore the educational potential of digital heritage and became dynamic environments of virtual learning where the learning resources are co-created with an expansive community of teachers, students, and museum educators (King & Lord, 2016). A pivotal project in this field is the Smithsonian Learning Lab, an educational platform launched in 2016 by the Smithsonian (Milligan & Wadman, 2015; Milligan et al., 2017) where educators can access millions of digital items and then create and share their learning resources (see Fig. 46). A similar approach fostered the emergence of *crowdsourcing platforms*, where people are engaged in research projects or specific museum tasks which allow curators to discover new meanings and interpretations to

collections (Ridge, 2013; Stack, 2013). Last, but not least, a new generation of *storytelling platforms* has enabled museums, heritage communities and travelers to share stories about cities, local heritage and cultural sites. One of the most adopted by heritage communities is izi.TRAVEL, a platform and smart-phone app for the collaborative creation of multimedia guides and audio tours, which was employed in a growing number of participatory heritage projects (Gasparotti, 2014; Bonacini, 2018; Fazzi, 2021).
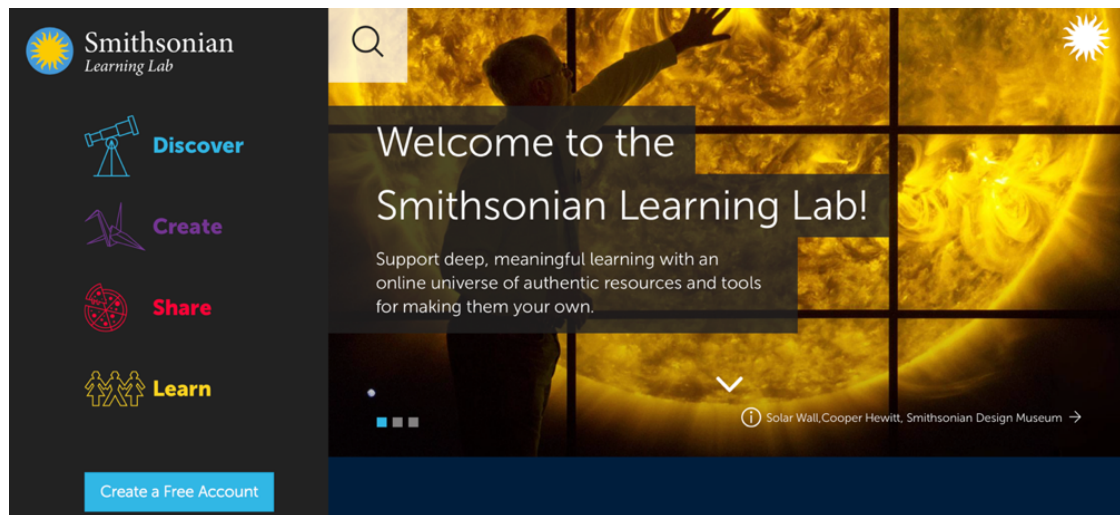
Fig. 46 A screenshot of the Smithsonian Learning Lab (https://learninglab.si.edu, accessed on 30 March 2022). The image shows the multiple levels of interaction and participation offered by the platform: discovering online collections, creating and sharing learning resources, interacting with a worldwide community of educators.

4.2.3. The Conceptual Revolutions of the Platform Model

More or less consciously, museums are embracing the platform revolution. The more they employ platforms for cultural purposes, the more they are impacted by how these systems work. The Platform Model, in particular, is challenging the system of beliefs and mindsets that have served museums since their origin. Co-creation, connectivity and open authority are the new values of our post-digital society and are all part of the platform business model. Drawing upon the studies on management and digital museology, I identified three primary areas of museum practice in which the 'platform' metaphor is modifying previous rooted assumptions.

First, platforms are affecting the perception of the shape and boundaries of the museum. For a long time, the museum conceived itself as a physical institution that attracts visitors thanks to its top-down linear model of cultural production. With the advent of the Web, physical galleries and exhibitions became just one dimension of the museum presence. Extending

themselves in the Web, museums became distributed digital infrastructures with multiple access points (Parry, 2007; Parry, 2010). This new concept has a series of profound implications. Firstly, the museum is starting to be perceived as a diffused entity rather than a single centralised place. The growing number of ecomuseums, virtual museums and open-air museums signal this ontological shift (Li et al., 2012; Bruttini et al., 2017; Zanetti et al., 2019). Consequently, the museum entrance is not defined by a physical act anymore, but new experiential and relational thresholds are emerging (Parry et al., 2014). Furthermore, in the interconnected ecosystem of platforms, 'no longer can museums operate as they exist in isolation' (Falk & Sheppard, 2006, p. 14): rather than a single institution with clear boundaries, the museum is acting as a microsystem of relationships that interact with other stakeholders at both local and global level. A networking dimension represented by the increasing role of museum networks and cultural districts (Bagdadli, 2001; Camacho, 2004; Sacco et al.; 2013; Cerquetti, 2019). Ultimately, this interconnected and relational conception of museums is also replacing the 'visitor' model with new models based on affiliation: museums are increasingly relying on membership and crowdfunding to attract new donors and enhance their financial sustainability (Riley-Huff et al., 2016; Magliacani, 2020; Kędzierska-Szczepaniak, 2021).

Secondly, the Platform Model is also challenging the curatorial authority, fostering a re-interpretation of the role of museum in knowledge making. In a world where everyone can create, remix, and interpret content messages on their own, also museum digital collections can be recombined, shared, and contextualized in a variety of different ways (Parry, 2010). Being an authoritarian temple of knowledge does not address the contemporary audiences' needs: the platform society fosters museums to be not only knowledge providers, but also facilitators of the creation of new cultural content, acting as platforms for further creations and recombination (Simon, 2008; Cui & Vavoula, 2021). This is a new model that Phillips calls 'Open Authority': 'the coming together of museum authority with the principles of the open Web, a mixing of institutional expertise with the discussion, experiences, and insights of broad audiences' (Phillips, 2013, p. 222). In renouncing controlling the content, museums are not abandoning their expertise, but they are employing it to rally, manage and curate a plurality of voices on the subject they choose, following the interaction rules they set. In this way, they can continually improve the content, also opening to the opportunity of connecting with the 'expert web' (Proctor, 2010). According to Proctor, 'in the new cultural economy, the curator's expertise will be judged not just by the depth of his or her subject- knowledge, but also by the extent, diversity, and richness of the network that is engaged in active

conversation with the curator, thereby ensuring the ongoing quality, relevance, and future of the discourse' (2010, pp. 41).

Thirdly, the platform metaphor also affects what is at the very core of the museum practice: the understanding and meaning of heritage. The first shift has been the emergence, in the digital connected world, of new heterogeneous kinds of heritage which do not have necessarily a physical counterpart: maps, images, videos, 3D models, audio recording. A whole new heritage category that was identified as digital cultural heritage. Furthermore, the new cultural practices of the participatory society (Jenkins, 2009; Giaccardi, 2012) are showing how heritage values and meanings are constantly co-created, rather than attached to artifacts and places. Today access rather than ownership defines the relationship with objects and content, that we share and combine in the online world to build what Belk defines our 'digital self' (Belk, 2013). Cultural institutions, in response, are recognising heritage as a socially constructed process rather than an object that can be collected and preserved (Byrne, 2008). This paradigmatic shift has been internationally recognised by the Faro Convention on the Value of Cultural Heritage for the Society (2005) that, for the first time, placed people – and their 'constantly evolving values, beliefs, knowledge and tradition' - at the centre of the definition of heritage. The Convention states that heritage is about individuals, communities, and the value that they give to places, objects, and cultural practices, thus setting no limits to what heritage can be.

However, the adoption of platforms is not enough to foster these conceptual revolutions. Recent studies have shown that despite the use of digital platforms is a growing trend in museums, this does not always translate in or lead to a real innovation in the organization (Gombault et al., 2016; Tamma et al., 2019).[11] The disruption brought by the pandemic emergency in 2020 has made clear that abandoning the 18th century ontology – and abandoning many of the assumptions that have been associated to museums – is the prerequisite for evolving museums into post-digital institutions (Parry, 2013). This is why it is important to understand platforms as the carriers of a new model for the museums of the future.

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[11] A recent study in southern Europe showed how the majority of heritage organizations have a conservative attitude and often fail to integrate ITC into their mission (Digital Innovation Observatory of the School of Management of Politecnico di Milano, 2017 and 2018).

4.3. Thinking as a Platform: the Platform-Museum

As Stransky wrote in 1981, the form that museum has assumed throughout the centuries is historically determined and it continues changing depending on the society the museum lives in. In the interconnected world we live today, museums require a new post-digital infrastructure that can reflect the overlapping between the physical and digital dimension. In this new context, the metaphor of the museum as a platform has gradually started to penetrate in both academic and non-academic context (Proctor, 2010; Simon, 2012; Stack, 2013). As highlighted in the previous sections, 'platform' is not just a digital space: it is a whole new business model that can determine the way in which museum is conceived, heritage is created, museum activities are designed, and people are involved. In other words, 'platform' is both an infrastructure (where), but also a way of organizing relationships (who) and processes of knowledge creation (how), and, ultimately, a content aggregator (what).

In the 'Platform-Museum', platform acts as the founding model of the museum of the future. This section will present the traits of this new museological concept, highlighting its theoretical foundations in participatory museology and then describing one first museum prototype which was shaped around this new model.

4.3.1. The Foundations of a New Participatory Museum Model

> The museum of the future is not just a place where objects related to cultural heritage are cared for and displayed. It is not just a place where the stories of these objects and their significance are presented. It is a place where visitors (real and virtual) can interact with those objects and those stories, with the museum's staff, and with each other. Through these activities, the museum of the future is a platform where new ideas and meanings are generated, exchanged and preserved.

(Stack, 2013)

Describing the Art Maps project on Tate Blog, John Stack (then as Head of Digital) expressed the core features of the Platform-Museum: the overlapping between digital and physical dimension, the interaction among participants and museum staff, that can happen both online and onsite; and the co-creation of new meanings as well as stories that can themselves been preserved for the future.

Despite the introduction of these concepts in the museological theory and practice has been fostered by the advent of Web 2.0, the values of participatory culture date back long before

the digital revolution. In the 1960s, the role of communities in museum life were part of wider debate, which marked the beginning of the New Museology (Vergo, 1991; Desvallés, 1992; 1994). Within this context, in France in the 1970s a new emerging paradigm began to deconstruct previous museum conceptualization: the 'ecomuseum' or 'community museum'.

This new museum category proposed by George Rivière and Hugues de Varine places community participation at the centre of the mission. This particular kind of museum is not designed to be 'visited' by audiences, but to be created with members of the community. According to Rivière, the ecomuseum, each member 'could be moving from the role of consumer to that of actor, and even author of the museum' (Rivière, 1989, p. 164-165). This paradigm challenges the single curatorial interpretation with a plurality of voices that would have been recalled by others key museological contributions in the following years. In 2000, Eilean Hooper-Greenhill advocates the advent of a 'post-museum' that becomes multi-vocal and relational, describing an open institution that welcomes different interpretations and offers fragmented narratives. Together with the deconstruction of the curatorial authority, the ecomuseum has further contributed to deconstruct the idea of the museum as a exhibition centre, by delineating a museum which is dispersed in the territory - a "musée éclatée", exploded into space (Rivière, 1980). According to de Varine, an ecomuseum must be based on the entire heritage of this community, on this territory, instead of building and/or managing a collection (De Varine, 2005).

In the past decade - which has seen the establishment of platforms as social structures (Van Dijck, 2013) - participatory museum models received renewed attention. In 2010, Nina Simon published 'The Participatory Museum', advocating the advent of a fully participatory institution inspired by the functioning of the Web 2.0. According to Nina Simon, the participatory engagement will be the main vehicle of visitor experience of the future:

> Imagine a place where visitors and staff members share their personal interests and skills with each other. A place where each person's actions are networked with those of others into cumulative and shifting content for display, sharing, and remix. A place where people discuss the objects on display with friends and strangers, sharing diverse stories and interpretations. A place where people are invited on an ongoing basis to contribute, to collaborate, to co-create, and to co-opt the experiences and content in a designed, intentional environment. A place where communities and staff members measure impact together. A place that gets better the more people use it.
>
> (Simon, 2010, p. 350)

Starting from the 2010s, the metaphor of the platform began to make its way, providing a new post-digital infrastructure that could offer a concrete response to the people's need to actively participate in cultural life.

Today this debate is more alive than ever, when the whole museum community has been reflected on a new museum definition[12]. Despite the definition proposed in the ICOM 2019 Conference was not officially adopted, it emphasized many of the values of the participatory museology, stating that museums are 'democratizing, inclusive and polyphonic spaces for critical dialogue about the pasts and the futures'; as well as they 'work in active partnership with and for diverse communities to collect, preserve, research, interpret, exhibit, and enhance understandings of the world' (International Council of Museums, 2019).

Drawing upon these contributions, in 2016 I co-founded a digital museum that merged the ecomuseum paradigm with the functioning, practices and spirit of the platform world. Even if this museum is not a case study of this present thesis - whose aim is to investigate how museum can be a platform for sound culture - it has been a fundamental part of my research journey and has contributed to give shape to the traits of the Platform Museum.

4.3.2 The First Prototype: Museo Dolom.it

Museo Dolom.it (www.museodolom.it) is a participatory virtual museum dedicated to the Dolomites landscape. It is a digital born museum which does not originate from a previous collection, nor does it have a physical counterpart. The museum is a collaborative, open platform which creates its digital content together with different communities: students, cultural professionals, researchers, Dolomites inhabitants and lovers, online users. In the last 5 years, the platform has involved over 50 cultural institutions and more than 1000 participants in the creation of online galleries, virtual exhibitions, interactive maps, multimedia tours, sound archives. In so doing, the museum overturns the top-down process of cultural production, in favor of a bottom-up approach on collaborative creation (Zardini Lacedelli, 2018; Szabo et al., 2018), proper of the platform business model.

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[12] In 2018, ICOM launched a series of consultations to reflect on the museum definition. A first proposal was discussed during the Extraordinary General Conference (ICOM Kyoto, 2019), but the General Assembly decided to postpone the vote and expand the international committees involved. A new museum definition was approved in 2022 (ICOM Prague, 2022).

The first version of the platform was launched in 2016, thanks to an educational project which involved 10 classes of secondary school students in the Belluno Province and 10 museums of the Dolomites. With the guidance of museum educators, students created 9 virtual exhibitions dedicated to the Dolomites landscape. 560 digital resources were created in this first project and displayed using MOVIO, a Content Management System developed with the support of the Italian Centre Institute for the Union Catalogue of Italian Libraries (see Fig. 47).

Fig. 47 The first version of the Dolom.it platform, when it was launched in 2016. © Museo Dolom.it.

In the following years, the museum extended the type of participants and the areas involved: thanks to the organization of participatory projects and social media campaigns, the platform involved local communities, cultural professionals, researchers, and online users coming from all the Dolomites valleys. In 2019, the platform became the home of the *Museums of the Dolomites*, a community of more than 50 cultural institutions promoted by the Dolomites UNESCO Foundation. Within this project, museums work together with researchers and inhabitants to create a dynamic archive of stories of the Dolomites heritage. As a result, the museum currently hosts more than 2000 digital resources, combining pre-existent archival records from other museum collections, items specifically created for the platform, and digital memories related to the Dolomites which are collected from social media platforms.
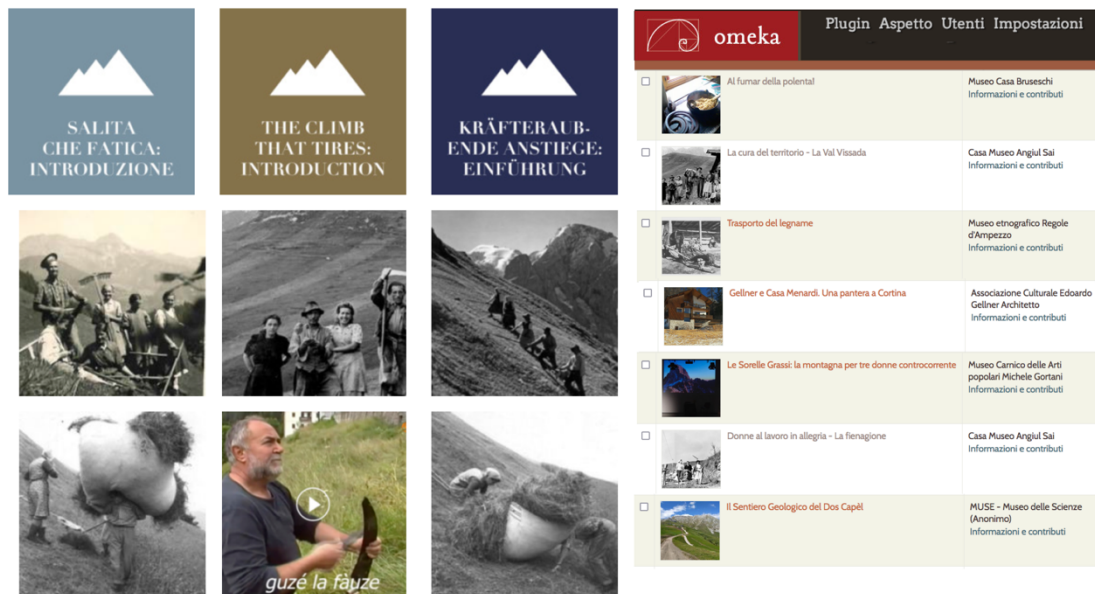
Fig. 48 Laboratory of Stories, the collaborative digital space of the Museums of the Dolomites on the Museodolom.it platform. © Museo Dolom.it.

In parallel with the development of the content and the stakeholders involved, the museum improved its digital infrastructure. The digital archive is implemented and managed through Omeka, an Open Content Management System designed for cultural institutions, which allows the collaborative creation of digital archives and virtual exhibitions (see Fig. 48). Thanks to the participatory nature of this system, the platform currently hosts 80 contributors who regularly upload their stories and digital content. In 2021, the museum launched its new user-friendly interface that invites to enter in the museum through two main experiences: by exploring, from home, the digital archive, the online galleries, and the stories on the platform; and by experimenting onsite the multimedia tours that connect the digital resources to the places they refer to. A key element of the museum experience is the section 'Participate', which invites students, inhabitants, researchers, museum operators and various stakeholders to join this collaborative platform by uploading their personal memories and stories related to the Dolomites (see Fig. 50).

Fig. 49 A tableau vivant of a Church fresco in Belluno city, performed by a group of students for the creation of a multimedia tour. © Museo Dolom.it.

In the development of Dolom.it museum, the Platform Model turned out to be a successful infrastructure to experience heritage and participate in the cultural life of the Dolomites. Museums found a space for experimenting new practices in the post digital age, inhabitants and Dolomites lovers found a new way to be involved in the promotion of their heritage (see Fig. 49), and a real, bottom-up community was created, and it continues growing through the platform. For this innovative approach, Dolom.it became a new model for experiencing culture in the digital age, inspiring other cultural platforms and innovative projects such as the digital museum Altovicentino[13]. The platform was the case study of several academic studies in different disciplines (Szabo et al., 2018; Zanetti et al., 2019; Zardini Lacedelli et al., 2019) and in 2021 its cultural and social impact was recognized by the Digital Innovation Award Giulia Antonia Pizzaleo.

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[13] The digital museum Altovicentino (http://collezioni.museialtovicentino.it) is the collaborative platform promoted by the Altovicentino Museum Network, which was inspired by Museo Dolom.it and the Platform-Museum concept.

Fig. 50 The new interface launched in 2021, including a dedicated section for uploading memories. ©
Museo Dolom.it

4.3.3. Governance and Power in the Platform-Museum

The reflection on the Platform-Museum cannot be complete without considering two key criticalities of the platform society: the theme of governance and power. These are fundamental issues for understanding the functioning of what Klonick called 'the new Governors of the digital age' (Klonick, 2018). Platforms such as Google, YouTube, Facebook and Twitter, in becoming curators of public discourse, play a key role on the one hand in promoting free speech, freedom of expression and participation, but on the other hand in amplifying certain voices and in silencing others (Klonick, 2018; Faris & Donovan, 2021). As Gillespie pointed out, the dominant position in their market niche and their profit-oriented nature have led to the emergence of key questions about their responsabilities 'to their users, to key constituencies who depend on the public discourse they host, and to broader notions of the public interest' (Gillespie, 2010, p. 348). This inevitably leads to a series of tensions "between user-generated and commercially-produced content, between cultivating community and serving up advertising, between intervening in the delivery of content and remaining neutral" (Gillespie, 2010, p. 348).

While profit and commercial interests do not apply to a non-profit, cultural, local and experimental platform such as Museo Dolom.it, the theme of governance, control and power have been central to its development. As Nina Simon pointed out, there are four different

forms of power in platform management: (1) the power to set the rules of behavior; (2) the power to preserve and exploit user-generated content; (3) the power to promote and feature preferred content; and (4) the power to define the types of interaction available to users (Simon, 2008). In creating and managing an infrastructure for co-creation, a museum creates its own rules and conditions for applying them. In Klonick's view, the platform is first of all a governance system with a complex self-regulating structure, which, although oriented towards free expression - in the case of Museo Dolom.it, the free interpretation of the Dolomite heritage and participation in its promotion and co-creation - exercises a form of content moderation (Klonick, 2018). This is evident in how the museum curate users' content through the design of digital activities, by launching themes for the co-creation of digital galleries and configuring the online spaces where contributions are made accessible. Within Dolom.it, this curatorial function is ensured by two mechanisms. At the organisational level, the presence of a centralized body that has taken the form of a non-profit cultural association, which is also the owner of the website. In terms of content management, the development of specific 'Terms and Conditions' that regulate the upload of digital resources and limit the museum's liability in terms of any violations of intellectual property rights[14]. The terms and conditions are a regulatory feature of the platform ecosystem, which allow service providers to 'inhabit the middle, rewarded for facilitating expression but non liable for its excesses' (Gillespie, 2010). In the case of Museo Dolom.it, the terms have been adapted to the specific objectives of the museum: they inform potential contributors of the licenses applied to the use of content (in the case of Dolom.it, the content is published by default according to the Creative license Commons Attribution-Share Alike 3.0 International) and invite them to make sure to have obtained all the necessary authorisations and rights for publication.

Beyond the creation of a digital space and the rules governing the co-creation of content within it, the issues of governance and power also apply to museum activities inspired by Platform Thinking. The development of participatory projects that give voice to individual stories and experiences are clearly oriented to the values of co-creation and polyvocality, but these contributions are often classified by museums as 'User-Generated content' or 'community stories' (Shahani et al., 2008; Rahaman & Tan, 2011). Even in distinguishing these contributions from the institutional forms of knowledge creation, in deciding when and how to use them within physical or virtual spaces, museums exercise a form of power. The platform metaphor, therefore, does not eliminate the exercise of power over the production

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[14] The Terms and Conditions of Museodolom.it can be accessed here: https://museodolom.it/termini-e-condizioni/

of knowledge, but, as Klonick points out, it increases the responsibility in ensuring that the values of freedom of expression, democratic and participatory culture promoted by the platform society are actually respected (Klonick, 2018).

4.3.4 The Platform-Museum: towards a Definition

The experience of Museo Dolom.it has been fundamental to reflect and identify the main traits of a Platform-Museum.

In conceiving the museum, the ecomuseum model had a strong influence in imagining people not as 'visitors' but as active members of the heritage process. Consequently, the development of the museum was not measured by the number of people who experienced the content, but by those who participated in its creation. Another key resonance with the ecomuseum paradigm has been the involvement of a diffused area: the museum acted as a network of individual places and institutions related to the story of the Dolomites. Furthermore, a series of peculiar features emerged from the digital nature of the museum. The use of digital platforms has been the main driver of the participatory process: storytelling platforms such as Omeka and izi.TRAVEL for the collaborative creation of stories, social media for promoting a wider engagement of online users. And digital was also the material stories were made of. The heritage itself was co-created in digital format, embracing a variety of different typologies: historical images and videos, video interviews, sound recordings. Last but not least, the digital platform has replaced the physical building in being the main access point to the cultural experiences: it is a platform, in this case, to guide people to discover the stories that the museum tells and to invite them to take part in the polyvocal story.

From this experience, I started to identify what can be defined the main traits of a 'Platform-Museum': the co-creation of digital heritage with different participants, the development of a museum community including individuals and institutions, the distributed structure which connects separate locations, the adoption of a range of online platforms for the creation of cultural experiences (Zardini Lacedelli, 2018). Thinking of the museum as a platform means to conceive it as a distributed and interconnected organization which fosters a system of relationships, both physical and virtual, around cultural heritage. These relationships contribute to create different communities around the museum as well as new forms of heritage: not only objects, but also digital resources that are created and shared using different platforms. In so doing, the museum is a dynamic entity extended in the space - both physical and virtual - and extended in the relationships, with a knowledge exchange that goes from the

museum to people and from people to the museum. Its physical dimension embraces the building(s) where material heritage is conserved or displayed, but also the landscape and geographical context to which heritage is related. Its virtual dimension includes all the digital platforms and online spaces where the digital resources are shared, experienced and co-created. The communities developed around the museum can be of different nature and all share a common interest in relation to a particular aspect of its tangible, intangible or digital heritage and contribute to its curation, communication, and development. This participatory process ensures that cultural heritage always maintain its cultural, scientific, educational, and social value, while generating new meanings depending on the evolution of human society.

In Museo Dolom.it these traits appear simultaneously. However, the 'Platform-Museum' is not a strict categorization, but rather an inspiring model, an alternative way of thinking, that can foster an evolution of the museum practice. Some of these traits have already emerged in other museums which have started to embrace a new way to conceive their relationship with audiences or their collections. A museum can apply Platform Thinking to a dedicated project or in the development of a digital space. We might find evidence of Platform Thinking in a participatory project, in a community-based archive, in a cultural platform launched by a museum or a network of institutions. All these examples signal a new way of conceiving museums and cultural experiences, which is making its way in the cultural sector. In their evolution towards this new model, each cultural institution can adapt Platform Thinking on its own mission, history, geographical and social context, so developing its own way of being a platform for culture.

4.4 Conclusions

Platform is a revolutionary concept for museums. It holds a transformative power, capable of transferring all the new practices introduced by the digital revolution. In our contemporary society, the skills, mindsets, expectations and needs of people are different. Technological opportunities and infrastructures are different. The cultural and social challenges are different. And they will continue to evolve. Museums cannot anticipate future revolutions, but they can adapt themselves in order to be ready for them. Drawing upon the words of Falk and Sheppard, they 'need to fundamentally rethink for whom they exist and how they exist to build new business models appropriate to this new age in which we now live' (Falk & Sheppard, 2006, p.14). As this chapter has shown, the Platform Model offers a post-digital

infrastructure, an alternative way of conceiving cultural experiences, and a whole new range of practices that can help museums to respond to the new challenges of the contemporary age.

The Platform Model does not replace the previous museological dimension. It adds further layers of spaces, experiences, relationships. Alongside the museum as a physical institution, a new dimension surfaces: the museum as a platform. A 'Platform-Museum' is a way of interpreting the cultural mission, by involving people in the cultural life, creating new heritage and forging new communities (Crooke, 2011), so contributing to development of the society (Knell et al., 2007). This is the main contribution the Platform Model can offer to museums. Not only from a practical level, as a new set of tools that museums can adopt, but as a metaphor, organisational structure, and inspiring method. The Platform-Museum enshrines the principles, the instruments, the practices, and the processes that can launch the museum into the future.

Act 2

Into the Field

Sound 2 Song from an individual Nightingale perched unseen in thickets, recorded by Richard Ranft in 1988 in the Northwood Hill reserve, Kent. Source: British Library Sounds

Chapter 5. Curating Sound Heritage in a Platform World: the British Library

5.1. Collecting Sounds

This chapter tells the story of an Archive. But it is not an archive like the others, with dusty shelves, long corridors full of boxes, labels, and folders. This is a different type of archive. You can experience it from the comfort of your home. Because the elements it is made of are not tangible. They do not occupy a specific space like a book or a statuette does. They are sounds.

At the beginning, sounds were encapsulated in ribbons rolled into wax cylinders. With the evolution of audio formats, they became increasingly imperceptible. Our experience of sound was mediated by small objects like cassettes and CDs, until they began to disappear too. Sounds became digital files. They still exist in a tangible form, but it is so microscopic that we cannot perceive it. Today we interact with sounds by clicking on an icon on a screen, or a button on our phones. If we cannot touch sounds, how can we collect and display them? What shape does a contemporary sound archive have? Is it physical? Is it intangible?

These questions guided the first part of my research fieldwork, which allowed me to immerse myself in one of the biggest sound archives in the world. This chapter is dedicated to the first case study of my PhD research: the British Library Sound Archive. As the literature review has shown, sound archives occupy a key place in the history of sound heritage and are key starting point to understand the challenges of sound curation in a platform world. The British Library Sound Archive hosts over 6.5 million recordings collected over the last century which cover an entire range of recorded sounds: oral history, wildlife sounds, music, drama, literature. Since its foundation, the Sound Archive has gone through all the evolutions in sound technologies, living the last transition between analogue to digital sound recording. With the advent of the web, the British Library was one of the first institutions to share sounds online, so beginning to reflect on the new challenges introduced by this medium. All the strategies developed by sound curators in the last 20 years have been led by this question: how can we make this wonder accessible to people, in a digital, platform world?

The investigation at the British Library was aimed at answering to this question. The fieldwork conducted between July 2018 and March 2019 allowed me to explore this extensive experience and the new practices experimented on different digital platforms through a series

of semi-structured interviews which the members of the Sound Archive. The interviews involved the Head of the Sound and Vision Department, four curators of the sound collections and two members of the web team of the British Library, allowing me to track the history of the development of the website dedicated to sounds, the experimental activities designed to share sound recordings on digital platforms, the new challenges and opportunities offered in these spaces and their influence on curatorial practices. In this chapter, excerpts of the interviews are referenced by the unique code number of each interview, as reported in the interview plan in Appendix II, alongside the full name and the job role of the participants. If the interviewee asked to remain anonymous, only his/her job role is reported. The full interview plan and list of participants is provided in Appendix I (Participants) and Appendix II (Data collection - Activity Plan).

5.1.1 An Evolving Archive of Sounds

> The Web completely changed the way organizations like ours work. It has transformed what we do as sound archivists. The Web dictates everything we do all the time.
>
> Richard Ranft, Former Head of Sound and Vision, IN01

The British Library Sound Archive is one of the world's foremost extensive collection of sounds, with over 6.5 million audio recordings from 1880s to present days. These come from all over the world and cover the entire range of recorded sound from music, drama and literature to oral history, wildlife, and environmental sounds. The origin of this impressive national resource is fascinating. It dates back to 1930, when a teenage music fan went to a record shop seeking a recording of a particular violin sonata he had read wonderful things about.

> To his disappointment he was told that production of the recording had been discontinued and it was no longer available to buy. After contacting various libraries and institutions, including the British Museum, he found there was nowhere he could hear the record and so resolved to create a national archive of sound recordings that would be available for public consultation.
>
> (Linehan, 2018)

The name of this teenager was Patrick Saul, who persisted in his vision and in 1955, with the help of Decca Records and a Quaker trust fund, opened the British Institute of Recorded Sounds (BIRS). Although his first interest was classical music, he started off an omnivorous

collection including every aspect of sound recording, from oral history to environmental sounds, to any type of music. Many years later in 1983, the British Institute of Recorded Sounds became the British Library Sound Archive.

Most of these sound recordings came from a pre-internet era, and entered the British Library as wax cylinders, discs and tapes. This is why, when the World Wide Web appeared, one of the major efforts that the curators had to face was the digitization of this huge material, to make a selection of sounds available online. This digitization process has gone through different evolutionary stages: a pre-digitization phase when a first selection of sounds were showcased in the first British Library Website together with images and text; a series of early mastered digitization projects funded by JISC (Joint Information Systems Committee) which ran from 2004 to 2009 and led to the birth of the first Website dedicated to the sound archive; and the major five-year audio preservation project funded by the National Lottery Fund within the *Save Our Sounds* programme.

These three stages reflect the evolution of the Web, from the first Web browsers to the advent of the platform world. But they also reflect an evolution in the institution itself, that did not simply adopt the new technologies available but tried to understand what implications they had for the collection and display of sounds. From the beginning, the curators of the sound archive immediately realized how the Web could change how cultural organizations worked and started to carefully reflect on the new opportunities but also the challenges that it was introducing. In the following sections, I will guide you into the major steps in this evolution, describing how the British Library has used the Web to share sounds from the very beginning, constantly innovating and finding innovative solutions to share, collect and acquire new sounds. And, at the same time, changing forever their relationship with audiences and their concept of what, today, is the heritage to be preserved.

5.1.2 Ode to a Nightingale

Bird songs occupy a special place in the history of British Library Sound Archive. As we saw in Chapter 3, natural sounds were the among the first forms of sounds to gain attention from researchers and field recorders, and the British Library is home of one of the earliest libraries of wildlife sounds, thanks to the acquisition of Ludwig Koch's collection. It was all to natural, then, that the song of a nightingale also had accompanied the first appearance of the British Library to the World Wide Web in 1995 (see Fig. 51).
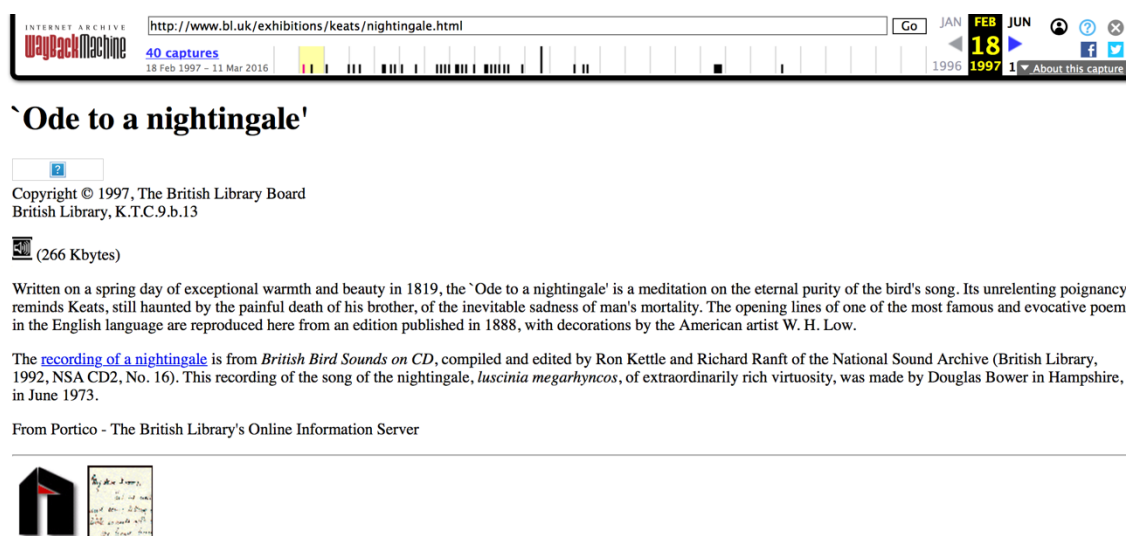
Fig. 51 Image Capture of the first British Library Website in 1997. Source: Internet Archive (https://web.archive.org, accessed on 30 March 2022).

One of Keats's most famous poems, written on a spring day in 1819, was juxtaposed to the song of a nightingale, recorded in Hampshire more than 150 years later. We can imagine the wonder of those first online users, browsing the British Library website in search of the treasures of the collection, who immersed themselves in what the poem itself celebrated: the eternal beauty of birdsong. And those users should be a number that was unexpected, as Richard Ranft remembers:

> I can remember uploading a few sound clips on the World Wide Web and they got a lot of traffic: there were more listeners to these two tracks in a few months than they have ever had in 50 years or more at the British Library.

> Richard Ranft, Former Head of Sound and Vision, IN01

For a cultural institution, sharing sounds online was exceptional at that time. Not only because in 1995, very few museums had a website (Bowen, 2010), but also because people all over the world were struggling to add images to the text, and sound had yet to become one of the most pervasive multimedia contents of the World Wide Web. Hence the British Library, in addition of being an early adopter of this new revolutionary technology, had also understood how the web was a perfect medium for consuming sound. A reflection that has always been at the centre of the development of the digital presence of the institution for the following 25 years.

We have been involved with audio on the Library Website all the way through. Because audio is key element of the British Library collections, it has been an important element of the British Library Website throughout its history.

<div align="right">Adrian Arthur, Former Head of Web Services, IN02</div>

5.1.3 The Birth of the Sounds Website

After the first sounds were shared online on the British Library website, the Web team and the curators of the sound collections continued to reflect on the possibilities of this new medium not only to increase the access to the sound collections, but to reach a different public that was different to the one that traditionally used to go to the reading rooms. Until then, the users of the sound collections had always been mainly researchers or scholars who were already aware of the role of the sound heritage in their different fields of study (Ranft, IN01). The Web had opened up opportunities to imagine a different use of the collections not only for research purposes.

Access to heritage changed completely. Before it was the privilege of the elite in society to have access to this material, it required at least a visit to an institution. We realized that there is a lot of potential users of our collections we did not know existed, but they quickly appeared when we started to open up.

<div align="right">Richard Ranft, Former Head of Sound and Vision, IN01</div>

It was therefore the need to extend the access to the collection the driving force behind the major effort in digitization, that involved all the British Library collection in the early 2000s. In the case of the sound collections, this effort led to the development of thematic microsites to showcase the new digitized audio content, up to the creation of the first platform entirely dedicated to the Sound Archive.

The first version of what was called, at first, the Archive of Sound Recordings Website went live in September-October 2006 with about 12.000 recordings on it. At the time it was quite extraordinary for an institution like the British Library to publish such amount of audio content, as Richard Ranft notes: 'It was wonderful to make so many recordings available, not the sort of sounds you find on Spotify or iTunes' (Ranft, IN01).
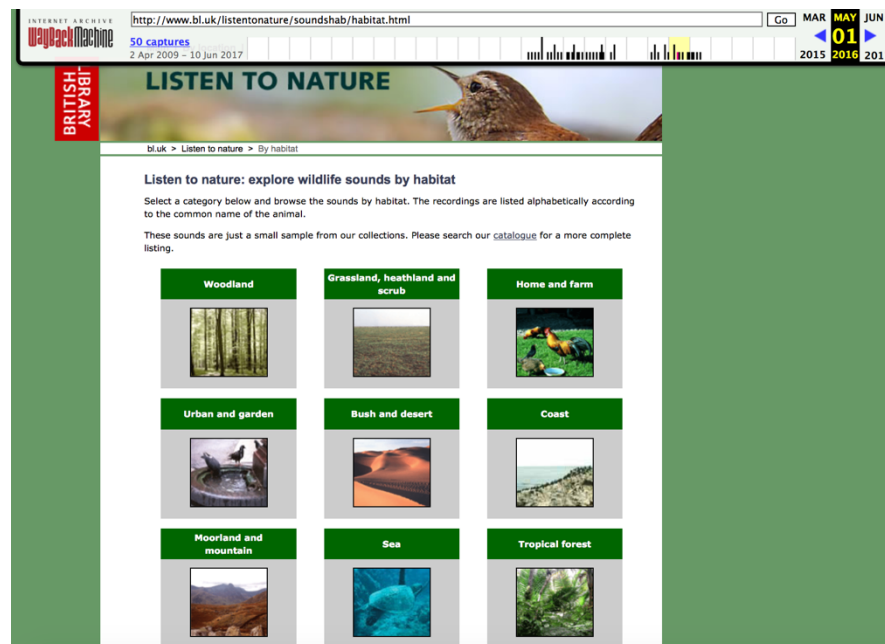
Fig. 52 Image Capture of the British Library's Sounds Website in 2016. Source: Internet Archive (https://web.archive.org, accessed on 30 March 2022).

Despite the new website being designed to increase the accessibility of the collection to the general public, the Head of Web Services Adrian Arthur points out that the number of sounds digitized made the website interesting also from a research perspective:

> There was enough material there for a researcher to dig into and it covered the full range of the collecting areas within the Sound and Vision Team so Oral History, Classical Music, Popular Music, World Music, Accents and Dialects, etc.

> Adrian Arthur, Former Head of Web Services, IN02

From the screen capture from the Wayback Machine shown in Fig. 52, we can immediately perceive the variety of the content available and the innovative ways through which users could search different sounds and discover the richness of sound culture: you could explore an interactive map of accent and dialects, search different wildlife sounds by habitat, location or animal group, discover the history of sound recording in a dedicated page.

Over the last 15 years, the website has continued to grow: from 12.000 recordings in 2006, to 44.000 in 2010, 60.000 in 2016 and today it has more than 95.000 recordings. To introduce users to the richness of this audio content, the Website in 2010 tries to quantify the duration of the overall listening experience: "If you were to listen to all the recordings on this site for eight hours each day, every day, it would take you around four years to hear them all!".

But what changed was not only the number of sounds made available online. The website was completely redesigned in 2012, to respond to a rapid transformation in the way people consumed digital and audio content.

> There had been some development in functionalities between 2006 and 2012. The most significant aspect of that was around essentially Web 2.0, as was known then. In the Library we recognized that the interactive elements of the Web experience were important and that we should be paying attention to it.

<div align="right">Adrian Arthur, Former Head of Web Services, IN02</div>

To understand these changes and what kinds of interactive elements were transferred into the website, we need to take a step back from the British Library website and look at what was happening in other territories of the Web. Around 2010, in fact, a new, disruptive revolution completely transformed the online landscape. A revolution that changed forever the way we interact with digital content online and people's expectations. At the time, this revolution had a name: Web 2.0. Now it is known as the platform revolution.

5.2. Using Platforms for Sound

As we have seen in Chapter 4, the so-called 'Web 2.0' introduced new key challenges in the ways cultural institutions conceive their digital presence. These new channels have opened new important opportunities for engaging audiences, inviting them to actively interact with the collections and open a two-way dialogue with the institution. Actions like commenting, liking, interacting, discussing have become the norm not only in the social media landscape, but also in other platforms specifically dedicated to the sharing of sounds.

Audio-streaming platforms such as YouTube, SoundCloud and Spotify, which soon established themselves as mainstream, early began to set the norms of behaviors and user expectations on the interaction with audio content, transforming our practices of listening, creating and consuming sounds.

The curators of the British Library Sound Archive approached these new channels with an open mind: since their first appearance, they started to use different services not only to share sounds of their collection, but also to experiment with the new possibilities these platforms were introducing. In the early 2010s, the Sound and Vision team explored different channels trying to understand how they can help them to reach specific goals: to extend the audiences of the collections, to enrich information about the recordings, to acquire new sounds from the

online users and to nourish more personal relationships with audiences and online communities. Each platform adopted introduced fundamental changes in how the curators conceived their relationship with the public and the collections themselves.

5.2.1. Extending Audiences: SoundCloud

The British Library opened its first profile on an audio-sharing platform in 2011. The platform was SoundCloud, one of the largest audio sharing services that contributed to revolutionizing the music industry. Launched in 2008 as a platform for musicians to distribute their music outside the traditional channels, SoundCloud has become a multifaceted and diverse space where users can upload, promote, and share any kind of audio material: from independent music to field recordings, from podcasts to sound art. In so doing, SoundCloud has diverged significantly from Spotify, which gives access to recordings mostly produced by the music industry.

In opening of a SoundCloud profile, the British Library intended to respond to the same need that led to share sounds on the Website: extending the audiences of the sound collections. But in this case, a different logic was applied. While on the website the main question driving the design was 'how to get people in', the adoption of these platforms naturally led to a different direction: going where people already are.

> There are some fantastic platforms out there dedicated to sound and there are already people there, millions of people there. We cannot pretend that they are going to leave there and come over here. So, the argument is: go to where the audience is, to some extent.

> Richard Ranft, Former Head of Sound and Vision, IN01

Despite the British Library Website has millions of users per year (half a million for the Sounds Website, as recalled by Adrian Arthur in IN02), the scale of these other platforms is incomparably different. In 2015, SoundCloud was reported to be reaching 150 million registered users, and 250 million listeners per month (Dhillon, 2022). The opportunities offered by this reach was noticeably clear to the curators of the British Library already in 2011, when they decided to upload the first sounds on the platform.
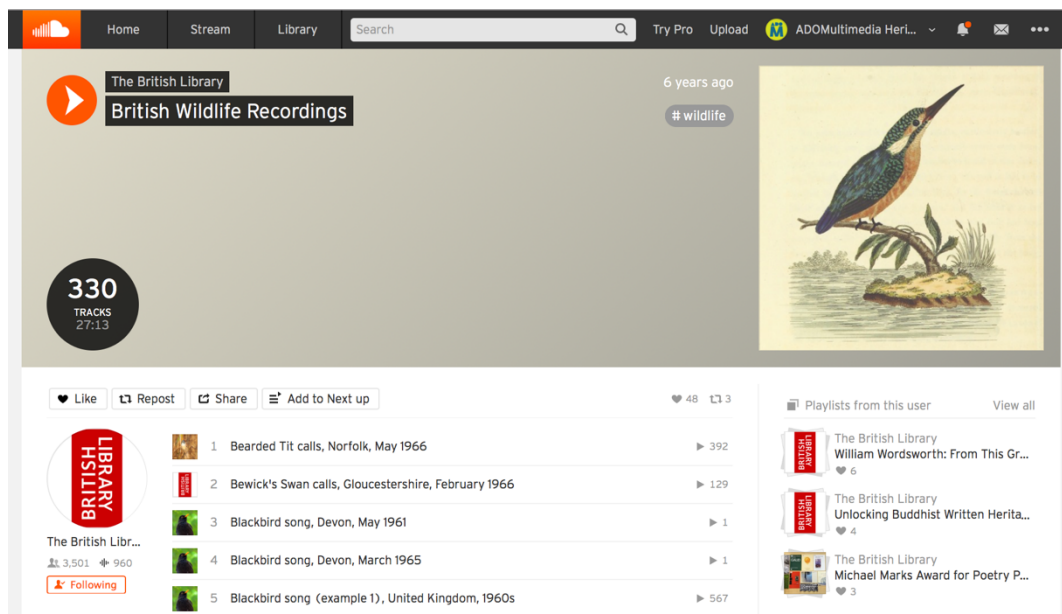
Fig. 53 Image Capture of the 'British Wildlife Recordings' playlist in the British Library's profile on SoundCloud (https://soundcloud.com/the-british-library, accessed on 30 March 2022)

In 2019, the British Library account on SoundCloud displayed a thousand sounds. The majority are events and podcasts from the British Library, but there are a few hundred recordings from the Sound Archive. Thanks to a dedicated feature of the platform, these sounds are often presented into thematic playlists, which display highlights of the collection, recordings of classical music, oral history, wildlife (see Fig. 53) and tracks selected for a videogame competition that invites designers to get inspirations from the collection.

The use of SoundCloud was, for the Sound and Vision team, also an opportunity to reflect on how to improve the audio experience on the British Library website, learning from how this platform enables users to share, listen and interact with the material. As highlighted by Richard Ranft (IN01), because the mission of these services is to provide the best audio experience, they have lots of developers working on specific audio features.

One element that sound curators immediately noticed was the opportunity to share SoundCloud files on social media, a feature that the British Library player lacks. The sharing of actual sounds is still a gap in the social media landscape: both Facebook, Twitter and Instagram allow users to upload images, text and videos, but not sound files as they are. The only way to share and listen to a sound on social media is to embed a file from another audio-visual platform that allows that.

> I cannot embed a British Library audio clip from our own Website in Twitter, we do not have the range of tools that a dedicated service such as SoundCloud have. That is partly why a lot of people use SoundCloud, to share sound clips on social media.

> Richard Ranft, Former Head of Sound and Vision, IN01

Together with the capability to embed sound files, SoundCloud has developed another essential feature. Inspired by the interactivity of social media, this platform offers users the opportunity to comment on sounds in a very peculiar way. Because sound is a linear experience, there might be different parts of the audio clip a user might want to react to, and the platform allows to comment distinct parts of the sound duration. This feature is particularly interesting from the perspective of a sound archive, which displays recordings that might include ancient languages, or sounds not immediately recognizable. If we look at some of the sounds from the British Library collection on SoundCloud, we can see people asking, 'What is he saying?' or reacting to a particular moment in the audio file, as shown in Fig. 54.
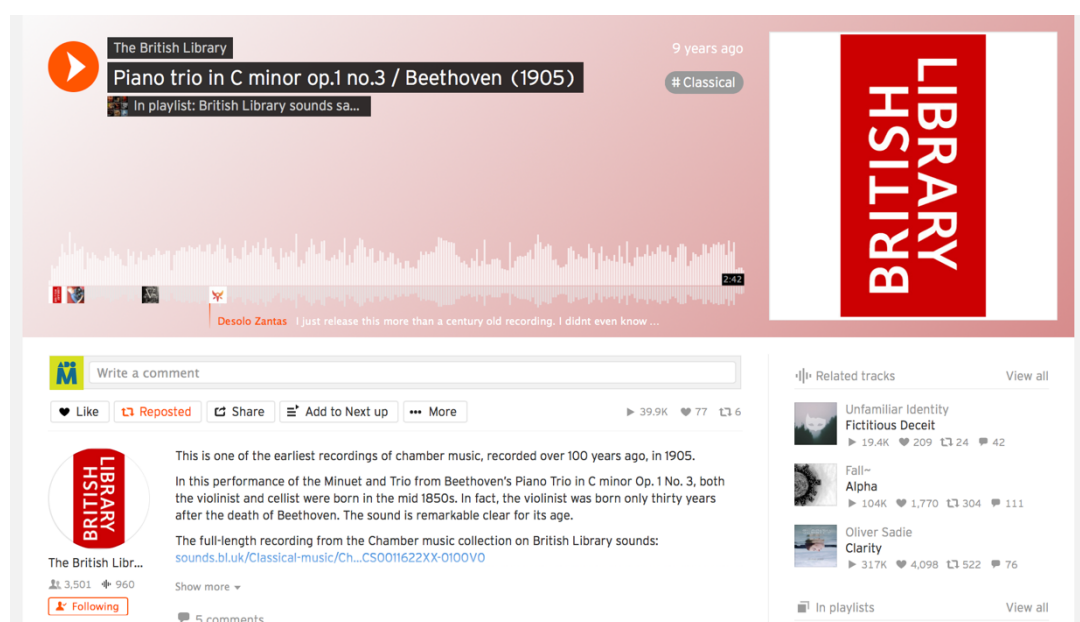
Fig. 54 A sound recording from the Classical Music collection, available on the British Library's profile on SoundCloud (https://soundcloud.com/the-british-library, accessed on 30 March 2022).

The ability to comment on the audio track was very soon transferred to the Sounds website, which was redesigned in 2012 including new interacting tools inspired by the audio platforms.

Together with an exploratory and open approach toward SoundCloud to extend its audiences and the ways to interact with the material, the British Library has always been extremely cautious in the use of this service. The complexity of the copyright issue, in particular, is one of the main obstacles to the sharing of sounds on SoundCloud. All the audio-sharing platforms, in fact, develop their own terms and conditions that shift the liability on copyright content on users and often state that the material can be re-used by third parties. Conditions to which archival material cannot always respond to, because copyright-protected and also because most of the recordings were created before the Internet was even invented.

> Because everything that is audio has copyright, the rights issues around building a website with 100.000 recordings is really complicated. That is the reason some of the material can be published on third-party platforms and some will not.

> Adrian Arthur, Former Head of Web Services, IN02

Therefore, the curators of sound collections are clearly aware of the fact that, on these services, they have less control on their own material: platforms could modify their terms and conditions, they can change rapidly their design, adding new features and removing others, and most importantly they can also disappear and be not available anymore.

> Things change so rapidly: certain platforms emerge and appear to be mainstream platforms. We, as an institution, must be careful not to overcommit our resources to one platform and to make sure we pick the right ones.

> Andy Linehan, Curator of Popular Music, IN04

5.2.2. Enriching the Collection: YouTube

There is another characteristic of the platform world that led the British Library to use these channels: the opportunity to acquire new material for their collections. By giving everyone the opportunity to create and upload content, platforms have completely revolutionized the way we consume music, movies, and audio-visual content, in many cases reshaping the processes of production, distribution and consumption. Cultural institutions have not been immune to this wave of transformation. In particular, a fundamental question emerged around the boundaries of what must be collected. In a world where everyone produce content at a speed never seen before in human history, and digital entities have assumed the same value of physical items, platforms have become, for cultural institutions, also spaces for collecting and acquiring new forms of heritage in digital form (Ride, 2013; Zimmer, 2015; Rees, 2021).

This is particularly significant in the case of the pioneer of the audio-sharing platform: YouTube. Founded in 2005, YouTube has established itself as market-leader in the field of video-sharing platforms, becoming over the years a giant participatory online archive. To use Simon Reynolds's words, YouTube is, today, 'a public library of recorded sounds (albeit a disorganized, messy one)' (Reynolds, 2011, p. 60). A huge resource to dig in for museums that want to expand their collection with new audio-visual content, and a fundamental source for an institution like the British Library that has the mission to acquire any published material. The curator of popular music collection realized very soon the importance of YouTube for acquiring new recordings:

> Increasingly people are using YouTube as their platform. I am seeing increasingly new material on YouTube. There are commercial releases available on certain platforms, but there are still things that will not be there.
>
> Andy Linehan, Curator of Popular Music, IN04

In the past, the British Library acquired what was commercially released from the record labels, that acted as filter of quality. But today most artists do not go through this process: they just self-publish their music on independent platforms and 'there might be some fantastic quality material there' (Linehan, IN04). As the Former Head of Sound and Vision Richard Ranft noticed, 'We cannot just ignore that, because they are choosing a different way to share their creativity. They are producing heritage, but it is not going through the traditional channels' (Ranft, IN01).

This is a massive challenge for cultural institutions. Once the British Library finds an audiovisual content on YouTube that might be interested in acquiring, this content cannot simply be downloaded from the platform. Downloading is not legally permitted and there is no guarantee that this material will be permanently available and accessible. As Andy Linehan points out, the increased accessibility to audiovisual heritage thanks to giant archives such as YouTube, does not correspond to the easy in the acquisition and preservation of this material, that needs to be found, selected, and reached out.

> We need to be aware that people are releasing things that, even in the new digital world, are not that easy for us to either know about or collect. I think that is going to be our challenge. It is finding out what people do. Even acquiring what is on YouTube or SoundCloud.
>
> Andy Linehan, Curator of Popular Music, IN04

Even in the case YouTube is used to publish archival recordings from the collection, the active participation of the YouTube community might lead to discovering new material and

enriching the information of existing recording. Exemplary is the case of the British Library YouTube channel. Opened in 2009, it is mainly used to publish curatorial insights, lectures, and video-recordings of events. The channel includes only one single playlist that displays a selection of videos from the Sound and Moving image collections. In particular, there is one video recorded in 1955-56 dedicated to Nepal traditional music (see Fig. 55). This video, like the others of this playlist, have received many comments of appreciation, especially from inhabitants and connoisseurs of Nepal. One of them recognized the context of the recording – a traditional celebration named 'Balalchare Jatra' - and posted a link to a video documentary that describes how the same ceremony is experienced today, so enriching the original recording with a comparison between the past and the present.
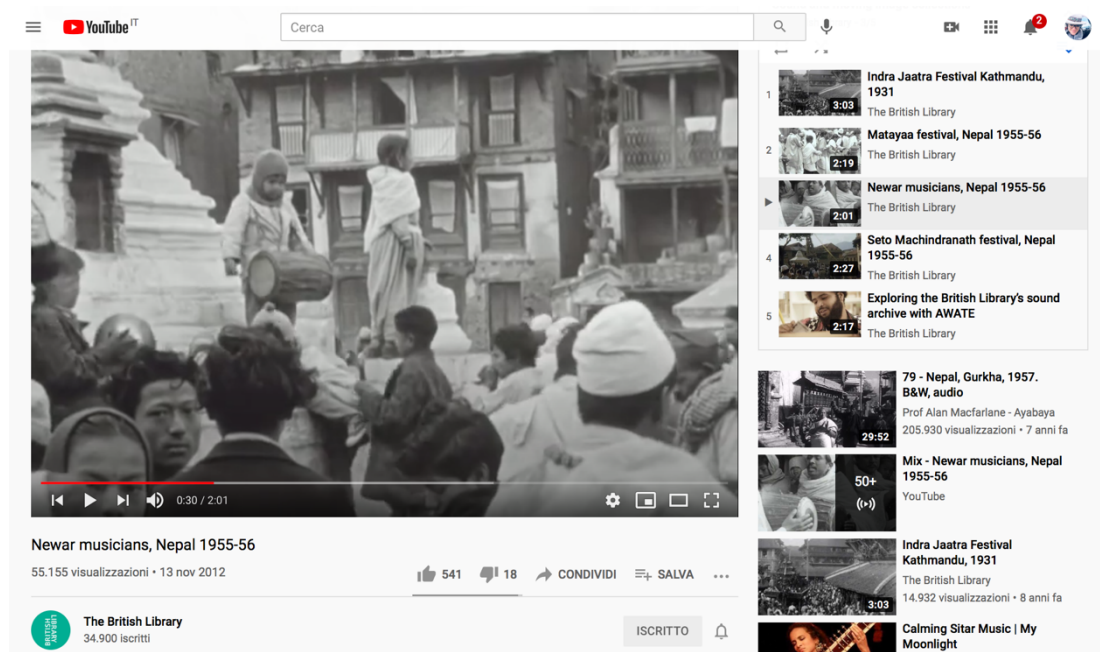
Fig. 55 An archival video recording from the World Traditional Music collection, available on the British Library's YouTube channel (https://youtu.be/tRuFuw5ltl4, accessed on 30 March 2022).

Another key example showing how the work of the curators of the sound collections is becoming increasingly intertwined with the digital world and the platforms for sharing and creating sounds.

5.2.3. Create new Heritage: AudioBoom

As well as being places to discover and acquire new sound heritage, online platforms can also be extraordinary channels to stimulate people to create new digital born heritage. The British Library was aware of this opportunity already in early 2010s, when experimented with a series of participatory projects in partnership with new audio-based platform called AudioBoom. Founded in 2009 as an audio version of Twitter, the platform was first used by the Guardian and by the BBC as a way of both uploading content on their own and getting audio contributions from readers and listeners. And this feature was exactly what the British Library was searching for in its project *UK Sound Maps*, born from the idea to crowdsource recordings from the environment made by users with their smartphones (Pennock & Clark, 2011).

> We knew we could use Google Maps as the platform for displaying the results of the project, but what we did not have was a technology for allowing people to upload the audio that they recorded to the Library. And then the solution presented itself, which was a new platform which then was called AudioBoo.

<div align="right">Adrian Arthur, Former Head of Web Services, IN02</div>

The British Library had already involved people - mainly volunteers - in the development of its collections, using a crowdsourcing approach. However, this was limited to enriching the metadata of existing sounds, for example by including transcriptions to speech recordings or adding keywords to increase their searchability. The emergence of a technology that allowed to upload audio files directly from people's smartphones extended this approach, opening the way to a different opportunity: the creation of new contemporary, digital born sounds that could permanently be integrated into the sound archive. This was the aim of the crowdsourcing projects *UK Soundmaps* and *Sounds of Our Shores* which invited people to send their favorite coastal sounds through AudioBoom, as shown in Fig. 56.

This inevitably introduced a reflection on which sounds a national sound archive needs to collect. Until then, it was the curators who decided the relevance and importance of a sound, based on its historical, naturalistic, or social value or a specific criterion (for example, all the sounds that were officially published). But the sounds shared by the people in this first project overturned the conventions that, until then, had guided the selection of materials. The curators of the sound archive began to understand that there were strong personal, intimate, and emotional connections with sounds that make them relevant and meaningful for people. And that it is difficult to define an objective criterion, outside the subjective experience of people.

Each sound, regardless how trivial it might seem, can express life stories:

> What was interesting for us was what people chose to record. There were sounds of people going to the seaside, people that lived in the country but went to the coast for their holidays when they were kids. Or the sound of the clock in the local church. That is quite an interesting collection, to study in its own right.
>
> Richard Ranft, Former Head of Sound and Vision, IN01
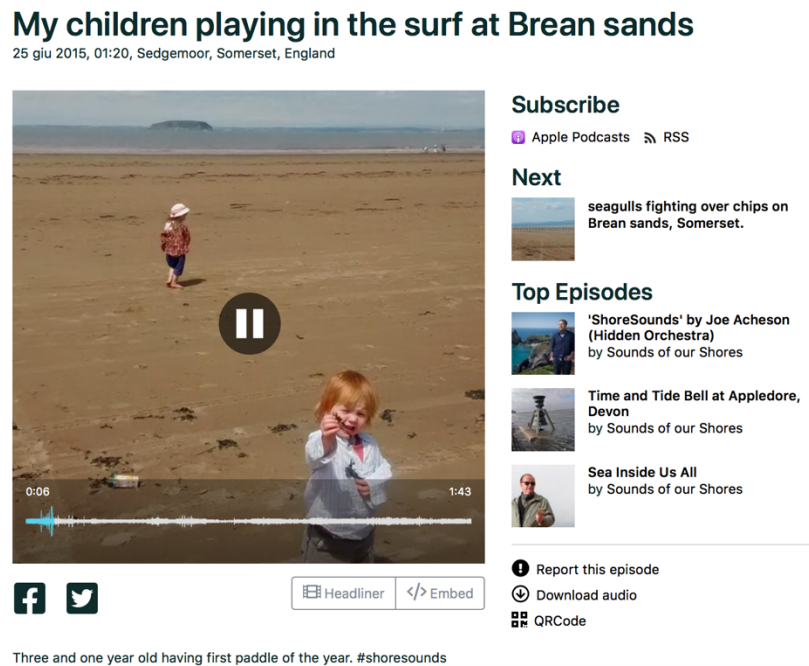
Fig. 56 A crowdsourced recording from the *Sound of Our Shores* project, available on the British Library's AudioBoom channel (https://audioboom.com/channel/soundsofourshores, accessed on 30 March 2022)

The British Library extended this approach to international audiences with *Map Your Voice*, a similar project around speech and accents, as part of the exhibition *Evolving English*. Between November 2010 and April 2011, the curators asked people to record themselves reading a children's story and to upload their recordings on AudioBoom with the location of where the recording came from. The response was broad and diverse: as shown in Fig. 57, the sound map displays a thousand recording from all over the world, from America to South Africa.

Fig. 57 Image capture of the *Map your voice* project, available on the British Library's Evolving English website (https://www.bl.uk/evolvingenglish/mapabout.html, accessed on 30 March 2022).

The curators realized that offering a perfect technical service that allows participation is not enough to receive contributions. As Adrian Arthur noticed, 'Just having an interactive tool at disposal on a website doesn't mean that people will use it: the efforts need to be more around campaigns' (Arthur, IN02). These three projects succeeded - collecting a thousand items each - because they were part of a greater effort to communicate this call to action at both local, national, and international level. *Sound of our shores*, in particular, was conceived as a wider national campaign which was able to involve local communities in the recordings of the sounds of their lives, as shown in Fig. 58.

Sounds of our Shores

685 posts

What does the UK coastline sound like during the summer of 2015? What are the distinctive sounds of Scottish estuaries, Cornish beaches, the Pembrokeshire coast or a busy seafront? In what ways do these sounds fascinate us, move us or seem important to us?

Sounds of our Shores is a community-led, interactive soundmap which asks members of the public to upload their favourite seaside sounds and help build a permanent digital resource of UK coastal recordings.

This coastal soundmap project, organised by the British Library, the National Trust, the National Trust for Scotland and audioBoom Ltd, co-incides with the 50th anniversary of the National Trust Neptune Coastline Campaign. Launched in May 1965 the Trust now owns 775 miles of in England, Wales and Northern Ireland Including the White Cliffs of Dover, much of Gower in south Wales and the Giant's Causeway in Northern Ireland.

Sounds of our Shores is about the whole coastline of the UK. It could be the sounds of a seabird colony, the sounds of a popular seaside resort or the sounds of one of our busy ports. We want to gather as many sounds as possible to reflect the diversity of the coastline and the important role that it plays in our lives.

Fig. 58 The Sound of Our Shores channel created by the British Library on the AudioBoom platform (https://audioboom.com/channel/soundsofourshores, accessed on 30 March 2022).

5.2.4. Online Communities and Sub-Cultures: Social Media Platforms

The curators of the sound archive realized very soon the potential of social media to make audiences interact with their collections online. The presence of sounds in the social media profiles of the British Library increased between 2020 and 2021, also as a result of the major effort in communicating the digital collection online due to the pandemic emergency, that fostered new experimentations. While until 2019, sounds on social media were mainly shared by embedding a SoundCloud link on the posts, from 2020 the British Library started to publish interactive videos displaying an animation of the audio wave together with the image of the original source. This reflects a broader development of the possibilities for sharing audio content online, of which the appearance of platforms such Pitter Pattr is an example. The most shared sounds of the archive come from the Wildlife collection, which was also the subject of a dedicated hashtag - #WildlifeWednesday - in the spring 2021 (see Fig. 59).
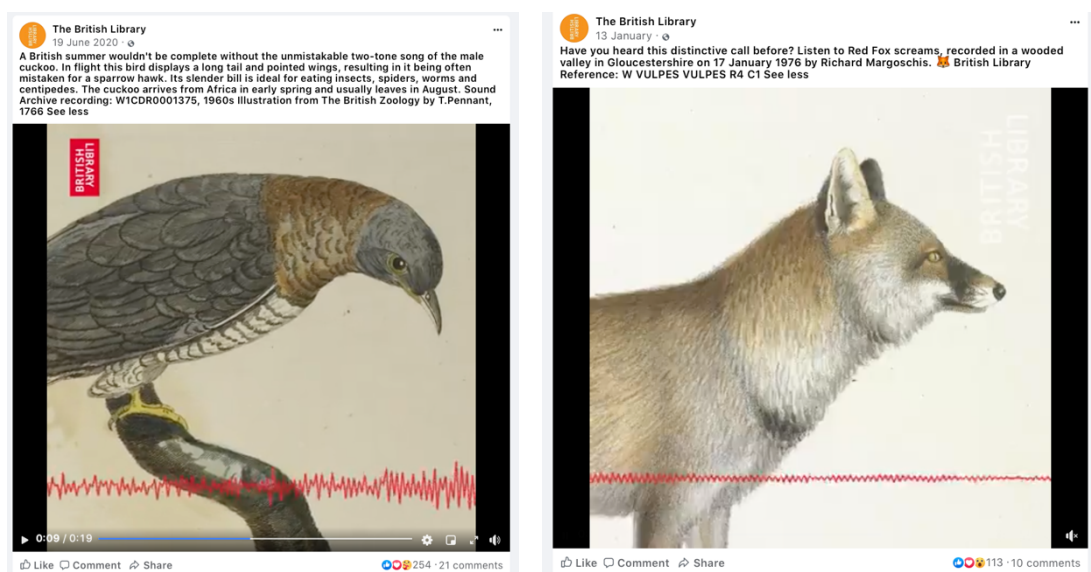
Fig. 59 Two interactive videos from the Wildlife sounds collection, published on the British Library's Facebook profile (https://www.facebook.com/britishlibrary, accessed on 30 March 2022).

The most used platform to share sounds was Twitter, where there are 8 sound-related profiles created by the different departments and project teams of the British Library over the years (see Fig. 60). Two are the accounts specifically dedicated to the sound archive: @BLSoundArchive and @BLSoundHeritage, the latter opened within the *Save Our Sound* project. These accounts reflect the overall digital strategy of the Sound Archive, sharing insights from the different collections and communicating the various projects that involve archival recordings, such as new online exhibitions or engagement activities. Most of the insights come from the blog which hosts a successful narrative format: *Recording of the Week*, where curators weekly share a backstory of a particular recording of their collection. Together with these two profiles, there are six other Twitter accounts dedicated to individual collections.

The peculiarity of these sound accounts is that they are directly managed by the curators of sound collections. Where there is not an official profile, it is the curator who communicates the collection through the personal profile, as in the case of the Wildlife Sounds collection (see Fig. 61).

Fig. 60 The Twitter profile of the British Library Oral History https://twitter.com/BL_OralHistory),
World & Traditional Music (https://twitter.com/BL_WordlTrad), Classical Music
(https://twitter.com/BL_Classical) and Drama & Literary Sound (https://twitter.com/BL_DramaSound)
collections.

The reason behind this diffused Twitter presence is explained by Richard Ranft:

> Our sound curators have their own Twitter accounts which reflect their field of interest.
> We very much encourage them to do so: they can interact with their own community,
> nourish the strongest relationships, use their special vocabulary.

> Richard Ranft, Former Head of Sound and Vision, IN01

This is an unusual approach for a big institution like the British Library. According to the
Phase 1 report of the 'One by One' project, in larger and structured organizations staff have
clearly defined roles and responsibilities (Parry et al., 2018b). In such centralised model,
social media in museums are usually delegated to communication experts who know very
well the strategy and language of these channels but do not necessarily have the same
expertise of the curators on the collections. The British Library realized that every collection
is connected with a different subculture that each curator needs to be part of, in order to
interact with the contributors, amateurs and scholars of that specific subculture.

Fig. 61 Tweets curated by the Curators of Wildlife Sounds (https://twitter.com/CherylTipp) and the Curator of Classical Music (https://twitter.com/BL_Classical).

The importance of subcultures is evident also in the use of Facebook. In this platform, interaction with online communities is maintained through the use of Facebook Groups, a key feature which allows people to come together and discuss a specific subject.
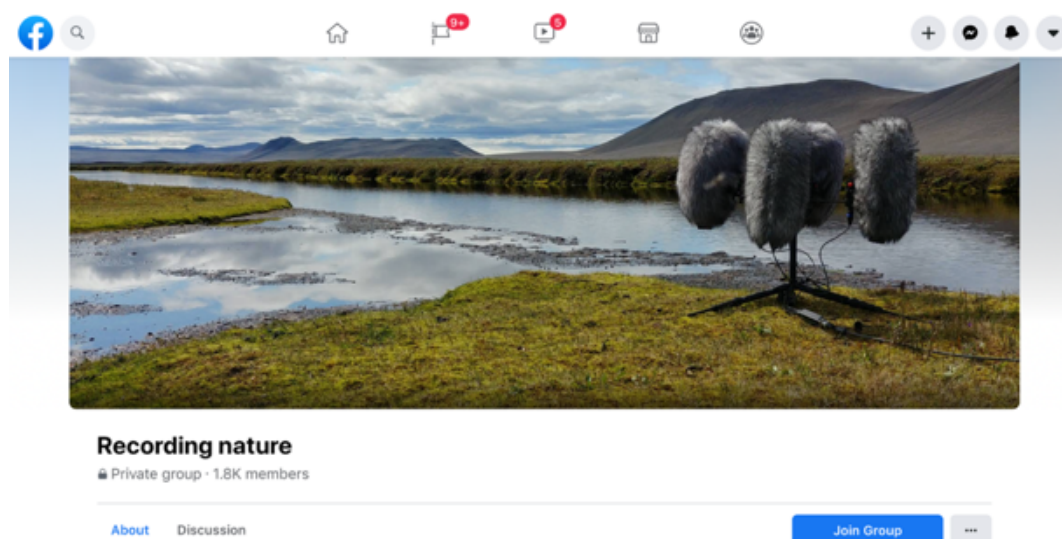
Fig. 62 The Facebook Group *Recording Nature* cover
(https://www.facebook.com/groups/289868461199542, accessed on 30 March 2022).

There is often more than one Facebook Group connected to various aspects of each sound collection (see an example in Fig. 62). The curator of Wildlife Sounds identified highly specialistic groups dedicated to bioacoustics and soundscape, as well as more general ones,

such as a group of field recording enthusiasts. These groups can be effective places not only to share information but to find specialistic contributions:

> I often use Facebook groups to share information with people I know would be interested in a specific project or they would be able to help. You can go more to the artistic side, or the amateurs, or scientific side: you know exactly which group to go to.

> <div style="text-align:right">Cheryl Tipp, Curator of Wildlife & Environmental Sounds, IN03</div>

From the different strategies adopted by the sound archive on social media, three key learnings emerged. Firstly, the curators interviewed outlined the importance of being personally involved in these channels to develop innovative ways to make people interact with sound collections. From the British Library's example, a strict collaboration between the curatorial and communication department seems to be a prerequisite for designing an effective online engagement. Secondly, the interviews show how these platforms can help to imagine a more personal and individual relationship with online users, who can contribute themselves to share and enrich the collections. Thirdly, the involvement of online communities who present a direct connection to the curatorial field of expertise appears to be a promising direction for cultural engagement with sound.

5.3. Towards a Platform for Sound: Applying Platform Thinking

As the previous sections has shown, the British Library has developed a reflective approach on the digital platforms employed to share sound, trying to understand how each of them works, what are the cultural behaviors of their users, continuously testing novel solutions in an experimental way. This process introduced changes at many levels.

While designing new practices in these external digital environments, the curators were at the same time changing their approach to their collection and their own digital spaces. This is evident if we look now at the subsequent development of the website in the decade 2010-2020. When I interviewed the Web Team and the curators on this topic, it emerged clearly how the interaction with the platform world had deeply affected the way they conceive the website dedicated to sounds. They started to imagine and design new features as well as new opportunities that could meet the new expectations of the users. This is evident in Tom Miles' words:

SoundCloud, Flickr, and YouTube are driving new kinds of cultural behavior that, I think, we may have to reflect on our website as well as the Rijksmuseum are doing.

Tom Miles, Metadata Coordinator, IN03

The qualitative analysis of the interview has revealed the emergence of a new thinking on three different dimensions: on the ways sounds are described and catalogued for the web search, on the opportunity to interact with the collection online and, finally, on the concept of re-use of the material. The reflections matured by curators in these three different dimensions reveal an innovative Platform Thinking in the institution. As we have seen in Chapter 4, this way of thinking has implications not only at practical level, but also at conceptual level: the impact of the new practices of sharing sounds on digital platforms, therefore, went beyond the introduction of new practices. That is why in the following section I will analyze each dimension both from a practical perspective – showing what new features were added to the website and what new activities have been designed around it – and from a more conceptual level, trying to understand how platforms are changing the way in which curator conceived their sound collections, the relationship with audiences and the very mission of the institution.

The analysis of these dimensions also shed light on the challenges faced by the curators. This process of mutual adaptation, in fact, was anything but simple. Because of the different nature of sound as cultural heritage, the curators of the sound archive had to imagine solutions that joined together the new cultural behaviors driven by platforms with their specific cultural needs. The new way of thinking that emerged from this encounter is rather unique.

5.3.1. New Ways of Describing and Searching for Sounds

One of the main characteristics of any archive is the ability to search for content. This is also the reason why the users of the archives have always been primarily researchers, students and people who have a specific interest in this type of resource or a given topic. The web has revolutionized this sector, multiplying the opportunities for access but also introducing new types of online and participatory archives. Today the cultural institutions that publish their digital collections find themselves in competition with many other platforms or websites that share similar content, even if in a less systematic, organized and structured way. However, we have seen that even a disorganized and bottom-up archive such as YouTube can contain

extremely rare historical materials, which can be reached out from a simple Google search. However, the way in which search engines allow us to find content is anything but random: it is governed by specific algorithms and mechanisms that are quite different from the traditional search methods an archive is used to. And this is something the curators of the sound collections immediately realized:

> A lot of our recordings are catalogued and described in a way that anticipates online use. We want to make material available and easily findable by people who may be interested in some completely different aspect we have not thought of.
>
> Richard Ranft, Former Head of Sound and Vision, IN01

> There is a serendipity about sharing things on a platform, which means you get to see things that you would not normally see alongside each other.
>
> Cheryl Tipp, Curator of Wildlife & Environmental Sounds, IN03

By observing people interacting with sounds online, curators realized that, today, the way content is reached does not respond to the traditional cataloguing systems based on scientific and disciplinary categories. Digital platforms introduced new aesthetic and emotional criteria:

> Nowadays people want also to find something by mood: they maybe do not even know the name of a particular composition; they just want to find something that is a bit darker than the last piece they heard. Spotify or Netflix already have developed algorithms to do this, but these tools are not used in archives like ours. I believe they will be, one day.
>
> Richard Ranft, Former Head of Sound and Vision, IN01

This reflection is mirrored in the first appearance of tags on the Sounds website, dating back to 2010 (see Fig. 63). Here is how the new functionality was described to the users:

> Tags are words you can use to describe what is in a recording or what it is about (e.g., train, kenya, CND). You can add any tag you want (255 characters maximum). The 'tag cloud' on the home page shows what people are listening to now. The biggest tags are those that most people are using. You can click a tag to go to associated recordings (From the Sounds website in 2010. Source: Internet Archive).

It is extraordinary that in 2010, when the major social platforms were yet to achieve their greatest success, the British Library had already technically adapted its website to include new ways of searching sounds, directly involving its users. But what kind of reflections led to the introduction of tags? And how did this functionality change the approach to the collection?
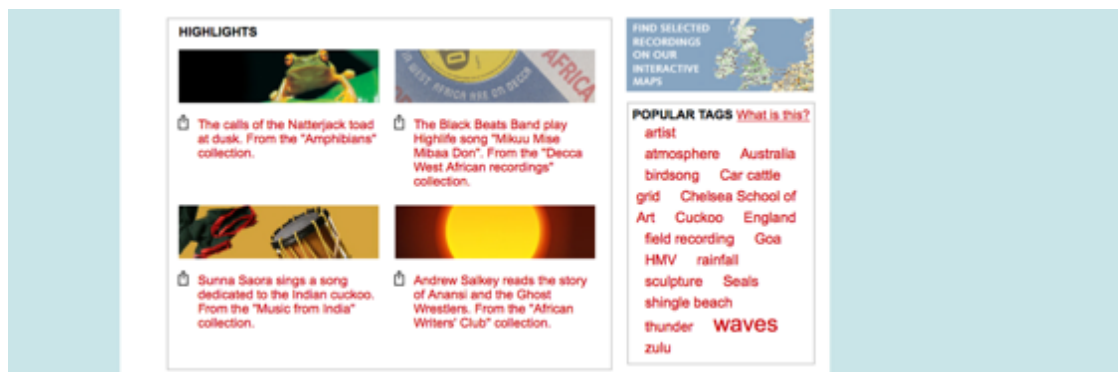
Fig. 63 Image capture of the British Library's Sounds Website in 2010. Source: Internet Archive (https://web.archive.org, accessed on 30 March 2022).

If we look at the first tags added by users in 2010, we immediately notice how these words were different than the ones used by curators to describe the sounds.

> There is a difference between categorizing and tagging. People could describe the Beethoven Pastoral Symphony with a whole list of words that do not correspond to the categories that we have on the Website. They could just say 'sweet, dancing, scary'.

> Tom Miles, Metadata Coordinator, IN03

The curators not only legitimized their use within the online context of the website, but also reflected on the added meanings that could enrich the collection and open new, unusual perspectives. This reflection has continued to grow within the institution, leading the curators themselves to review the language they used in describing their collection and to imagine new ways in which sound heritage could be used. They realized that they could make sounds accessible not only for research, study and education purposes, but also for enjoyment, pleasure, artistic inspiration. Just like any other platform dedicated to sound culture.

> Our website is not just for researchers, it is for everybody. I had to change some of my categories and titles because they were aimed at the researcher and not at a regular person. If you are not a researcher, you might just listen to the sound and enjoy.

> Cheryl Tipp, Curator of Wildlife & Environmental Sounds, IN03

Along with the tags, other features added to the Sounds Website in the same years have pushed this reflection further.

5.3.2. New Levels of Interaction with Sounds

The re-design of the Sounds website in 2010 included the addition of a series of functionalities to allow users to actively interact with sounds. These functionalities were described as 'Web Tools' by Richard Ranft:

> On our website there are lots of what we use to call 'web tools': tagging, commenting, the like button, the ability to create your own playlists, and all that kind of thing. We must go this way, there is no question about it.

> Richard Ranft, Former Head of Sound and Vision, IN01

All the functions described – tagging, commenting, liking, creating a playlist - represented entirely new ways to interact with sounds: until then, the interaction was limited to the opportunity to listen online and, in certain cases - when the rights allowed - to embed a sound clip in a different website for educational or research purposes. But digital platforms had opened the way to new levels of interaction and curators were quick to follow this path, making these tools available on their website.
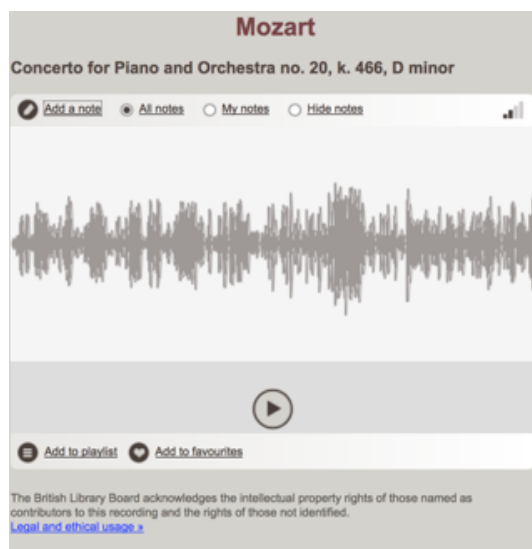
Fig. 64 Image capture of the playlist feature available in the British Library's Sounds Website (https://sounds.bl.uk, accessed on 30 March 2022).

Starting from 2011, new opportunities began to appear: once created a profile, users could add tags or notes to the recordings and organize them in their favorite lists of sounds (as shown in Fig. 64). However, the response of the audience was below expectations. The functionality had been lived on for nine years, and most days there was no note or tag added to the recordings. The reason for this relatively low level of participation might be partially

due to the limited access to these functionalities, which at the beginning were available only for scholars and researchers in the UK Higher Education. Furthermore, according to the curators, this specific type of user would need the same functionalities to be applied among different systems dedicated to sound heritage.

> The researchers want to use tools that allow them to aggregate content from different research platforms rather than tools which are specific to individual platforms, because that means that they can extend their research across different institutions.

<div align="right">Adrian Arthur, Former Head of Web Services, IN02</div>

The British Library was able to explore the potentials of an integrated cultural platform within the *Europeana Sounds* project, which ran from 2014 to 2017 with the aim to aggregate the European audio heritage and increase its discoverability. Within this major international project, a work package was dedicated to improving the user experience of the audio content in the Europeana platform. In particular, the project team designed a thematic channel dedicated to audio heritage: Europeana Music, which also included a dedicated radio station (see Fig. 65).
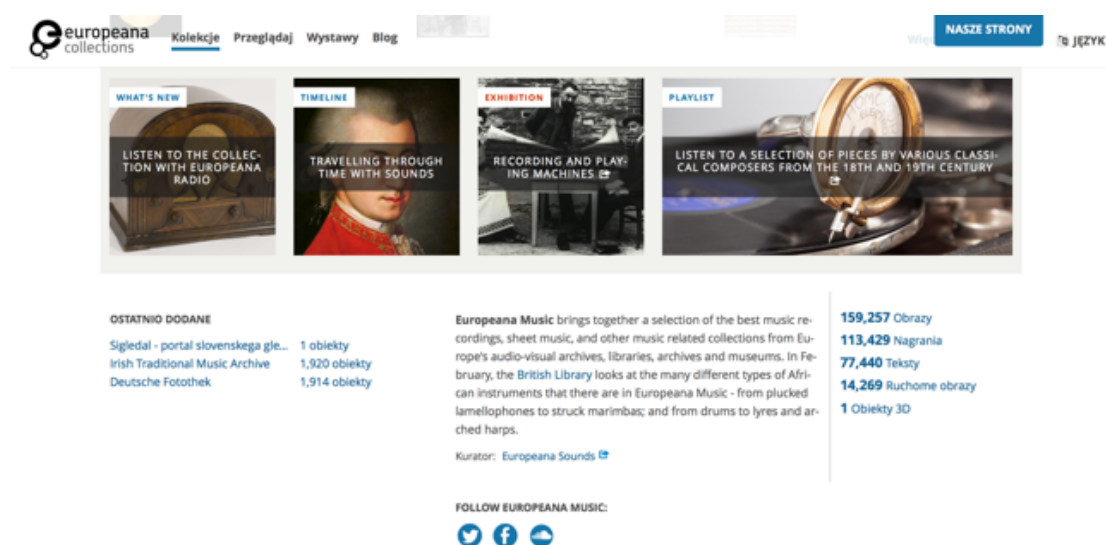
Fig. 65 Image capture of the Europeana Music Channel in 2017. Source: Internet Archive (https://web.archive.org, accessed on 30 March 2022).

Of all the different possibilities of interaction, one in particular has captured the attention of the curators and the web team and was at the heart of the discussions on the future development of the website: the possibility to create a playlist of people's favorite sounds.

Despite the relatively low usage of this functionality in the first version of 2011, data from subsequent user research confirmed the value of this feature for the audiences. A value that is clearly perceived also from the curators of the sound archive:

> The playlist is a nice way for people to engage with the collections, because they are not just going to the sounds and listening to them, but they curate, they put together their own sound collections and then share them with others. This would be a really useful way to discover new content, and it is also useful for us as curators, because we do not have the time to make millions of nicely curated packages, we can get the users to do it.

> Cheryl Tipp, Curator of Wildlife & Environmental Sounds, IN03

The playlists created by users, therefore, are not just ways of interacting with the collection, but become small collections themselves that reflect different perspectives and points of view, very often unusual and completely new. In recognising this intrinsic value, the curators started to conceive the users' playlists having the same right to be preserved and made accessible in the long term, just like the sounds themselves:

> For some people, the playlist can be a short-term thing, but a lot of our users such as teachers want to know that the playlist is going to work at least for a year, maybe for several years. So, the playlist needs to be sustainable and perpetuated through time.

> Richard Ranft, Former Head of Sound and Vision, IN01

5.3.3. Misuse or Creative Re-Use?

One of the core missions of the sound archive is to give access to sounds and allow people to find them. But there is another fundamental aim. The curators of the sound collections also wanted to make the collections available for use. To this end, digital platforms have opened an entire new way of thinking that had the power to lead the development of the collection in different directions. Before the first sounds appeared on the web and on different platforms, the use of the collection was confined within a restricted group of users (students, researchers, scholars), for a specific context: education and research (Ranft, IN01). And this use was well-known by curators, that knew very well who might asked to have access and use their collection: historians often asked to include an oral history recording in their research, linguists requested to study a particular accent, scientists wanted to enrich a documentary on a specific habitat or species. When the online users started to emerge as a formalized target group, together with them, unexpected types of 'use' of the collection emerged. Some of them caught the curators by surprise.

When we went online, suddenly people wanted to use our collection in unexpected ways. We realized that the ways we curate a collection are not necessarily the way people could be using it.

Richard Ranft, Former Head of Sound and Vision, IN01

This created a challenge for curators, because it implied a change in their approach to the collections. At the beginning, these unexpected ways to use the archival sounds were perceived as a 'misuse' of the collection. An emblematic example of this change of attitude is an anecdote told by Richard Ranft:

When I was curator of the collection of animal sounds, a sound artist was really interested in the collection. Up to then, I was normally dealing with scientists and zoologists who were studying animal sounds. He was, instead, studying the announcements we put on the recordings before the animals played, because he thought they were very unusual. At first, I was disappointed. I thought 'That's a misuse of the collection'. But afterwards I realized 'Actually no, it is just as legitimate as any other study'.

Richard Ranft, Former Head of Sound and Vision, IN01

Seeing how users interacted with sounds on platforms had a key role in the introduction of new possibilities for uses, which gradually started to be 'normalized' within the institution. Curators began to design projects that explicitly promoted the creative reuse of the collection, to use sounds 'out of context, in the most inappropriate way' (Ranft, IN01). One of the most successful initiatives was the *Sound edit: Wildlife* competition (2012-2013) in association with the art organization IdeasTap. The British Library published 10 natural sounds on SoundCloud and invited animators, filmmakers and photographers to create a short film inspired by the Wildlife collection. The most innovative use would have got the prize.

The results were extraordinary. The winner, *Dave's Wild Life*, is a short which tells the story of Dave, an amateur naturalist struggling to have his show on TV (see Fig. 66). The sounds of the collections create an immersive soundtrack that accompanies the narrator (who parodies David Attenborough's style), giving voice to inanimate objects such as cranes.

Fig. 66 *Dave's Wild Life* short, available on Vimeo (https://vimeo.com/60401313, accessed on 30 March 2022)

Another finalist, *The Natural Habitat*, located the short in a library, displaying a choir of voices that 'perform' the wildlife sounds (see Fig. 67). Each component of the choir represents a different animal and interacts musically with the others, developing an incredibly beautiful symphony. A fascinating example of how natural sounds can be interpreted as musical material.

Fig. 67 *The Natural Habitat* short, available on Vimeo (https://vimeo.com/120313843, accessed on 30 March 2022)

These creative works had an impact on how curators conceived their collection, introducing new interpretative possibilities and levels of meaning. They realized that a more emotional, artistic and creative perspective does not impair the scientific interpretation, but could instead complement and enrich it:

> One of my own sound recordings was completely misused from the scientific perspective, out of context, but in a very interesting way, which I would have never thought of…I liked that. It just felt creative.

<div align="right">Richard Ranft, Former Head of Sound and Vision, IN01</div>

In the following years, this approach was applied also to other digital items across the British Library's collection. The *Off the Map* competition, for example, challenged UK Higher Education students to create videogames inspired by different collection items, such as maps, images, texts, sound recordings (see Fig. 68).
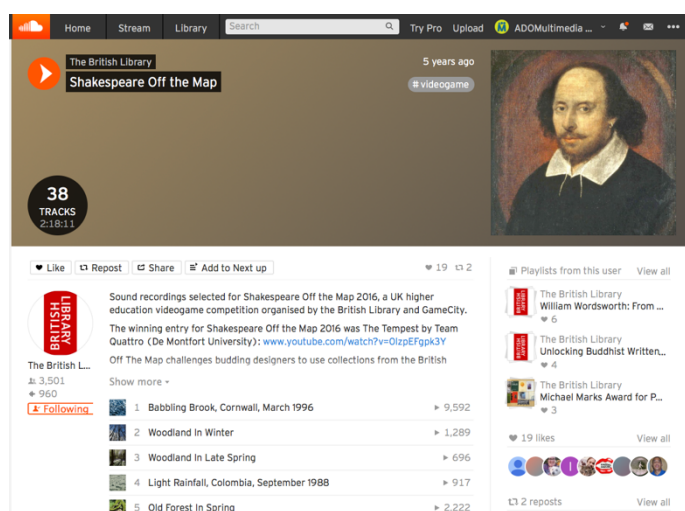
Fig. 68 One of the *Off the map* playlists, available on the British Library's SoundCloud channel (https://soundcloud.com/the-british-library, accessed on 30 March 2022).

The creative reuse of sounds was one of the elements that inspired the re-design of the website. In 2019, the curatorial and web team were exploring ways to make available on the website a selection of sounds for creative re-use, and also to create a space where people could publish their contributions. Previous experiences made curators realize how important it was to allow people to use the collection in as many ways as possible, and how many lessons they could draw from these creative reuses.

It is very useful to see how people are using the content. It also helps you in the future because it can inform the development of your collection. If you do not know what people are interested in, it is just up to you then to decide what to focus on.

Cheryl Tipp, Curator of Wildlife & Environmental Sounds, IN03

5.3.4. The Design Principles of the New Platform

It is now clear that all the elements discussed in the previous sections – tagging, commenting, the creation of playlist, the possibility to re-use the material – are not mere technical features, but convey a full set of conventions, behaviors and practices that came from the platform ecosystem. After ten years of reflection around these tools and several experimentations to integrate them in the British Library Website, the model for the *Sounds* Website had changed. The curators had no longer in mind a traditional website where users could search and listen to sounds online, but a real platform on which they could actively interact with the material.

And a platform for sound was what the curators had in mind, when they started to discuss the re-design of the sound archive's website. The opportunity came within the *Unlocking Our Sound Heritage,* a five-year project funded by the National Lottery Heritage Fund aimed to extend the British Library approach to the nation's sound heritage, establishing a network of audio preservation centers. An important part of the project was dedicated to improving the user experience of the sound recordings online, designing new engaging websites. My fieldwork research at the British Library took place in the middle of this journey, when the curators and the web team had already begun to reflect on the design principles of the new website. From the analysis of the interviews, three key design principles emerged.

The first element was familiarity. Curators are fully aware that audio-sharing platforms such as SoundCloud, Spotify, YouTube have not only changed our relationship with sound, but also introduced specific conventions that people expect to find in any website dedicated to audio content.

We should not be developing our sort of conventions for delivering and interacting with audio on the Web, we should be using conventions established by other platforms that people are familiar with. So, if our page looks a bit like Spotify that is not a bad thing, because people will be able to recognize what is going on and how they can navigate further.

Adrian Arthur, Former Head of Web Services, IN02

This reflection reveals how audio-sharing platforms such as Spotify or SoundCloud are increasingly becoming important spaces to understand how people listen today: they influence our audio experience, constantly innovating the way people interact with sounds.

A second design principle was the integration of sound with other digital content. Just as the sound of a nightingale appeared on the first Website, in couple with Keat's poem, the new platform aimed to offer an integrated digital experience. Instead of experiencing sounds within the specific context of an independent site, sounds become a fundamental part the British Library Website, enriching the knowledge of a specific topic or adding new levels of meanings to the digital collections.

> An important aspect of the user experience will be the integration of the audio experience within the whole British Library website user experience. We have to look at not just what we are producing in the Sounds site in its own context, but how it interrelates with the other elements. If you have a recording of a famous author, you can also reference the actual book or manuscript.

> Mark Whiting, Web User Experience Manager, IN02

The third – and most interesting - element that guided the design was the multi-curatorial perspective. Curators realized that a cultural platform for sounds needed multiple levels of curation. The first level belonged to curators who, through a series of 'curatorial showcases', could provide users a way into the thousands of sounds around a thematic framework.

> In the new Website people can create playlists, but then we have also got the curators' point of view, with curated sections where the recordings are contextualized, and they are brought together to create a nice package based around a theme.

> Cheryl Tipp, Curator of Wildlife & Environmental Sounds, IN03

A wonderful example of this curatorial showcase in action is the online exhibition *Coast*, launched in 2020 (see Fig. 69 and 70). Developed around a theme – stories around the shores - and divided into different subthemes – fun besides the sea, beneath the waves, danger at the sea, working coast, superstitions – the exhibition features different sound recordings, images and insights from the collections curated by the curators of the sound archive. In this online exhibition, each recording is connected to its collection item where it is indicated in which other thematic framework the item is featured in.
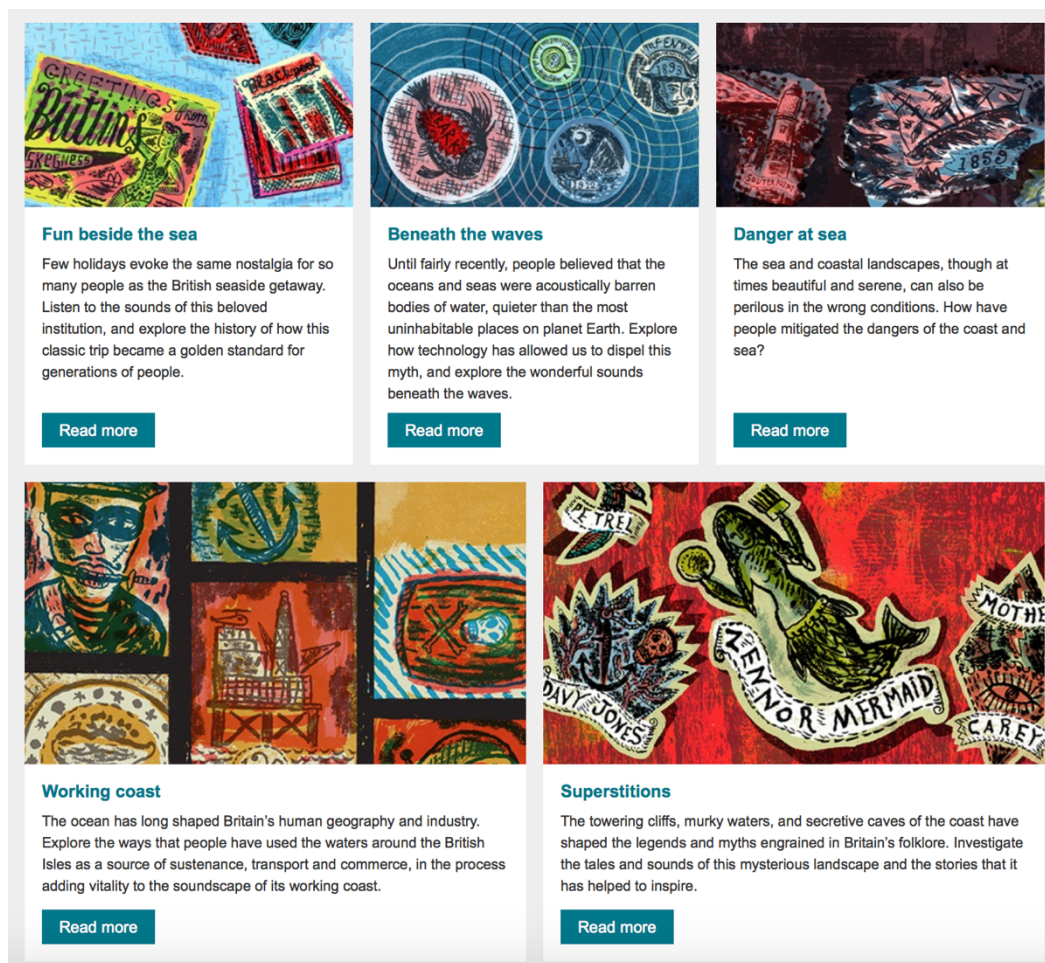
Fig. 69 The sub-sections of the *Coast* online exhibit available on the British Library's Website (https://www.bl.uk/coast, accessed on 30 March 2022).
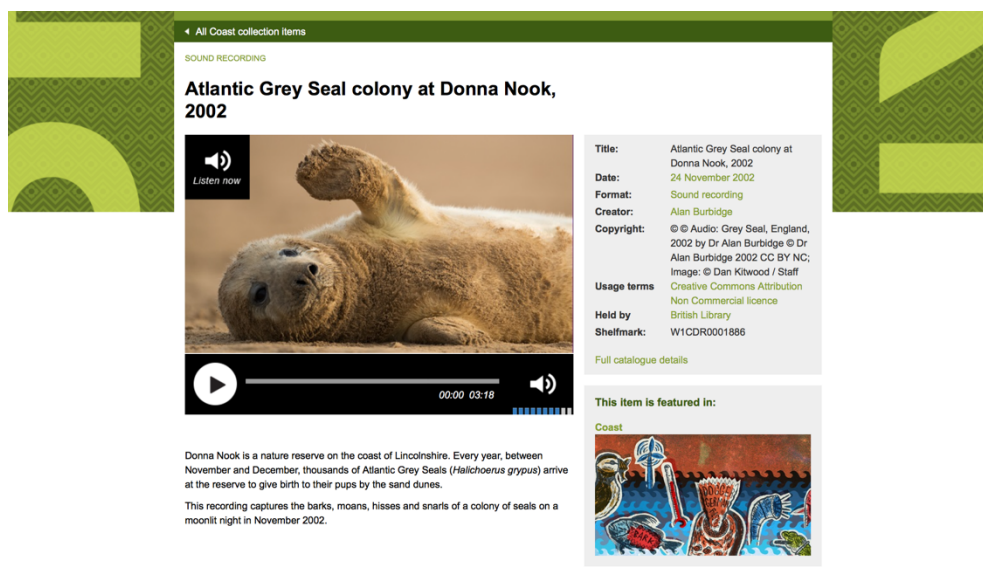
Fig. 70 One of the *Coast* collection items, displayed in the British Library's Website (https://www.bl.uk/coast, accessed on 30 March 2022).

In addition to this level, directly managed by the curators of the sound archive, the new platform will also invite people to have an active role and collaborate in the curation of sounds. Through the creation of a personal profile, users will be able to create their own personal playlists of sounds to share with others and to enrich the information of the recordings, directly interacting with the curators.

> People will be able to access the recordings and maybe correct us, because we are not always right. I have a lot of recordings in my collection that are not identified, and it would be great if users would be able to help us as well.
>
> Cheryl Tipp, Curator of Wildlife & Environmental Sounds, IN03

The new platform so conceived will assign a new role for the online users, who will be invited not only to discover and enjoy one of the greatest audio archives in the world, but to act as curators themselves, actively contributing to its promotion and development.

5.4. Conclusions

The relationship of the British Library with the Web first, and the platform world after, has been a journey of discovery, mutual adaptation, and transformation. In addition of being an early adopter of the most disruptive technology of all time, it also was one of the first cultural institutions to reflect on sound culture from the beginning of the Web, constantly experimenting with new ways of sharing sounds online. There are several learnings that we can draw from this story.

The first is about time: cultural heritage institutions have been reflecting on sound culture from the beginning of the Web. Despite the predominance of visuality in museums, the reflection on sound and sound culture has been at the beginning of the digital transformation of the cultural sector. Already in 1995, one of the most important cultural organizations in the world hit the Web, sharing sounds online. And this is rather surprising. Previous studies have shown how, in the web evolution of museums, sound came at a later stage, after text and images. The story of the British Library demonstrates that, instead, sound and sound culture were at the centre of the digital expansion of cultural organizations from the very beginning. It shows us that the history of museums on the web and the history of sound culture in museums are intrinsically connected.

The second discovery is about development: there has been a rapid evolution in the way cultural organizations acquire, collect and share sounds. The British Library team is aware of the different phases they went through since the beginning: from the early digitization projects to the interaction with the platform world, to the post-digital evolution in which they began to apply Platform Thinking to the design of their spaces and activities. This clear phasing shows us that the practices in collecting and displaying sound culture have evolved together with the Web, which changed very quickly over the last 20 years.

The third discovery relates to innovativeness: the history of sound culture online has constantly fostered innovations. The curators of the sound archive have been genuinely experimental and continuously came up with new innovative practices to share and collect sounds: from the collection of mobile phone content in 2010, to the addition of the playlist feature on their website in 2012. In some way, the displaying and collecting of sound online has required them to adopt tools and approaches that were totally different than the ones that they were used to. This also shows that sound culture has always challenged cultural heritage organizations to think differently about their ways of working but also of conceiving their mission. Sound can help museums to imagine the future because it has always done that.

The fourth discovery, the most relevant in terms of my main research question, is that sound favors the development of Platform Thinking. There is evidence of Platform Thinking in the way the curators of the sound archive conceive their relationship with audiences, imagine their digital spaces and design their activities. As the journey of this major sound archive has shown, to fully embrace sounds, cultural institutions need to think of themselves as platforms. It would appear, from this key case study at least, that platform thinking has the potential to be an ideal response to the challenges of sound culture in museums.

This case study led to the emergence of new, thrilling questions. How can these learnings work for museums as well, who have been on a slightly different journey? Can platform thinking help them to embrace the wealth of online sound culture? And what might be an appropriate way to apply Platform Thinking in a museum context?

Chapter 6. From Sound Objects to Sound Culture: New Digital Frontiers at the Science Museum Group

6.1. Objects of Sound Culture

On 30th April 2020, the National Science and Media Museum in Bradford joined the #MuseumFromHome campaign, inviting people on Twitter to share the media technology, memorabilia and objects they have at home as part of their life or family story (National Science and Media Museum, 2020). 18 people answered, most of them sharing objects used to reproduce sounds: a Sony Walkman; a portable radio; the first original iPod from 2001; a LaserDisc. And together with them, an entire world of memories and life stories surfaced: these technologies came to life thanks to the words of the people who had used them. Many of these objects, today, lie in drawers and shelves of many houses as a tangible testimony of the past, but they can also be found in the museums dedicated to science and technology. However, in a museum glass case the object is usually silent, it has lost its function. It no longer transmits sounds, it no longer accompanies moments of life. When sound technologies become part of a museum collection, they stop working and disconnect with their sonic nature. And yet, the Twitter conversation prompted by the National Science and Media Museum demonstrates how they are still capable of evoking memories and life stories.

The second part of my research fieldwork led me to discover another dimension of sound culture, through the experience of a museum institution that has been collecting and exhibiting sound technologies over the last century: the Science Museum Group. Its curators have developed extensive experience in the curation of sound objects, and in the challenges they originate, through a range of different projects. Returning to museums and returning to physical objects, after having thoroughly investigated the intangible and digital nature of sound at the British Library, allowed me to answer some important questions that had guided my research since the beginning. How can museums, institutions devoted to preserving and exhibiting objects, embrace the intangibility of sound? How can they activate the sonic dimension of the objects? And what role can digital platforms play in this, in a world where sounds are consumed, shared and created within these spaces?

The different nature of the collections – sound objects instead of audio recordings – allowed me to explore the peculiar challenges in the curation of Sound Objects in terms of acquisition, preservation and display, and to understand if the online dimension could offer not only practical solutions, but also a different logic and ways of operating. Particular attention was

given to identifying potential areas of intervention in the digital domain to further develop a subsequent design experiment. This chapter collects the findings from the research fieldwork which took place from July to November 2019 in different museums of the group. In particular, I conducted 9 semi-structured interviews involving 10 members of the digital, curatorial and communication team of the Science Museum in London, the National Science and Media Museum in Bradford and the Science and Industry Museum in Manchester. As in the previous chapter, excerpts of the interviews are referenced by the unique code number of each interview, as reported in the interview plan in Appendix II, alongside the full name and the job role of the participants. If the interviewee asked to remain anonymous, only his/her job role is reported. The full list of participants, together with the interview plan, is provided in Appendix I (Participants), II (Data collection: Activity Plan).

6.1.1 A Museum Group for Science and Technology

The Science Museum Group is the UK leading group of science museums, holding a collection of 7.3 million items from science, technology, engineering, medicine, transport and media, dating back from the 1851 Great Exhibition. Part of this extraordinary collection can be visited on display in one of the five museums of the group or accessed on a dedicated collection website that gives access to over 350.000 items – objects, photographs, and archiving material (see Fig. 71).
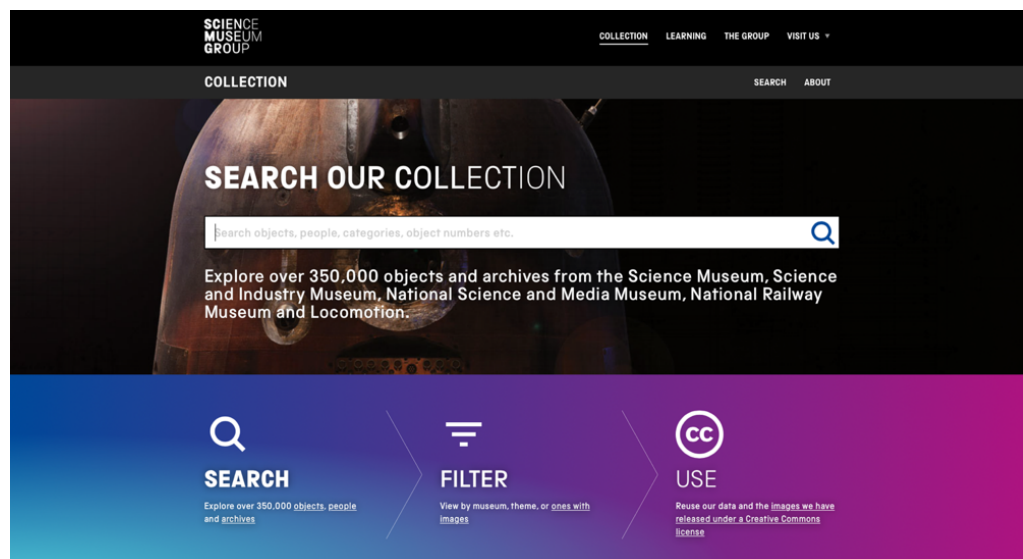
Fig. 71 The homepage of the Science Museum Group online collection website, which displays over 350,000 objects and archives (https://collection.sciencemuseumgroup.org.uk, accessed on 30 March 2022).

These five museums today share a common vision – to celebrate science, technology and engineering and their impact on our life – strategic priorities and shared values. In 2018, the Science Museum Group has undertaken a major strategic project to unify also the different physical collections through the creation of a National Collection Center.

Since 2015, the group has also developed a common digital strategy that was updated in 2018, reflecting the will to respond to the changes in the audience experience introduced by the digital revolution. The implementation of the digital strategy is headed by a central digital department, which since 2015 has been leading the digital transformation of the group by adopting a 'Hub and Spoke' model.[15] The crisscrossing collaboration among the teams is one of the characteristics of the Science Museum Group: each department has periodic meetings and, despite each museum is quite different internally, they do share practices, approaches and ways of working.

My fieldwork research at the Science Museum Group is located in this group dimension, involving different departments that deal, in particular, with digital engagement and the curation of sound-related collections. The aim was, in fact, to investigate the presence of sound in the collections, and the role of sound in the audience engagement on digital platforms, focusing in particular on the new Sound Technologies collection at the National Science and Media Museum.

6.1.2 The Collection of Sound Technologies

It is not just a new collection, but it is a new priority for the museum.

James Mansell, SMG Research Associate, IN05

In 2017, a new collection was born at the National Science and Media Museum to explore the impact of Sound Technologies in our lives. The new collection opened a new perspective on the role of sound in the museum. Before the birth of this collection, sound was not a

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[15] More information about the 'hub and spoke' model of managing digital teams in museums can be found in the Phase 1 report of the 'One by One' project (Parry et al., 2018b)

priority. Since the establishment of the museum in 1983, sound objects such microphones, speakers, and broadcast consoles have been collected only as complementary equipment for television and cinema.

> Collections at the NMeM have not previously highlighted sound in its own right; this technology has been treated as an adjunct to cinematography and television and there are a relatively small number of objects relating to sound in these specific contexts incorporated within the Television and Cinematography collections.

SMG Collection Development Policy, 2016

The Collection Development Policies in 2016 highlighted this gap; the creation of the new role of Curator of Sound Technologies followed shortly. The new collection is intended to cover both domestic and professional recording, capturing, reproducing, manipulating, and creating sound in technological ways, including the emergence of digital sound technologies.

This was not, however, the first sound technologies collection of the group. The Science Museum in London already holds three sound-related collections: a sound reproduction collection; an Acoustic collection including scientific instruments and equipment; and a radio-communication collection covering the historical development of wireless telegraphy and radio transmission and reception. Most of the objects of these collections were collected between the 1920s and 1960s and represent an historical perspective on the development of sound technologies before the pre-digital and digital era.

This is where the new collection in Bradford added a contemporary dimension to the evolution of sound technologies, acquiring pre-digital and early digital sound technologies from the 1960s onward. The first object specifically acquired for this new collection was the Fairlight CMI, the first digital synthesizer and commercially available digital sampler (see Fig. 72). The personal interest of the curator in live music was also an opportunity to broaden the collection scope from reproduction and creation of sound to the social and live dimension of sound and music experience. This is where the Midas XL3 desk came from: a mixing console, which has toured the UK with some of the world's biggest bands and artists (see Fig. 73).

Fig. 72 The Fairlight CMI Series 3 from the Science Museum Group collection.
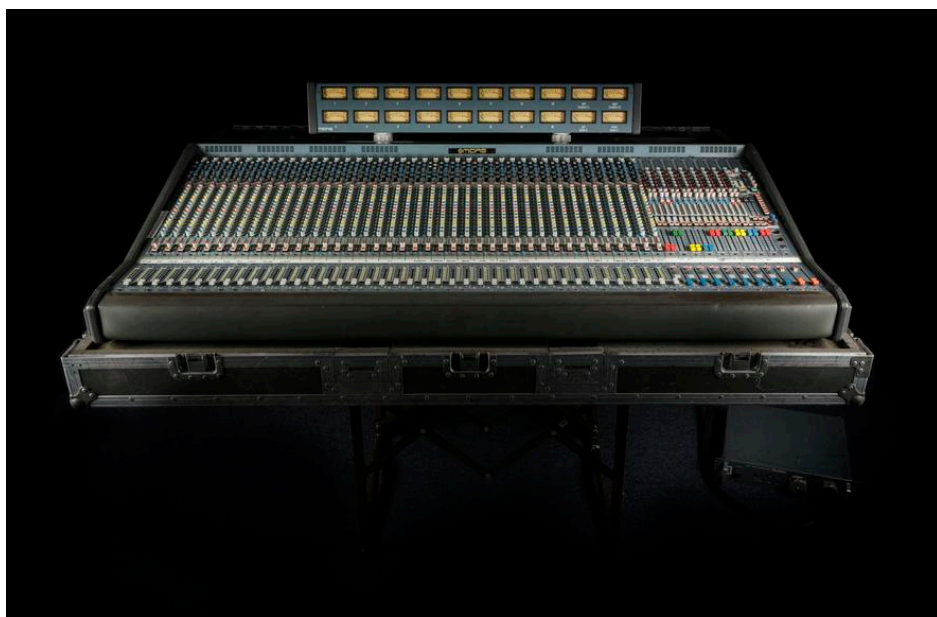
Fig. 73 Midas XL3 Live Performance Mixing Console from the Science Museum Group collection.

Beyond the Sound Technologies collection, the sonic dimension of the objects has started to be investigated by other curators of the museum. The collection of Television and Broadcast, established with the birth of the museum in 1983 to complement the collection of radio and telecommunications at the Science Museum, is also gradually abandoning a predominantly visual focus to embrace a more holistic approach in the understanding of these media.

I think for a very, very long time the academic field that addresses audiovisual media has put the emphasis on visual culture. Where our museum can make an intervention is in making sure that the audio is understood fully as part of audiovisual culture as much as the visual is.

<div align="right">Elinor Grooom, Curator of Television and Broadcast, IN11</div>

The birth of the Sound Technologies collection, then, did not simply fill a gap in the collections. It marked a seminal moment in the development of a wider awareness of the role of sound in the museum, which is also connected to a series of research projects, exhibitions, and engagement activities that put sound at the centre.

6.1.3 Designing with Sound: Exhibitions and Engagement Activities

The presence of sound objects in the collection gave rise to a series of exhibitions dedicated to sound and music in the second decade of 2010. These exhibit projects turned out to be inspirational spaces to understand how to display sound objects in the galleries and experiment with new approaches, thus stimulating a profound reflection on the role of sound and listening in the museum.

The first exhibition dedicated to sound technology was *Oramics to Electronica: Revealing Histories of Electronic Music*, which was held at the Science Museum in 2014. Inspired by the recent acquisition of the Oramics machine, a unique electro-mechanic prototype conceived and co-designed by the British composer Daphne Oram, the exhibition aimed to explore the intersection between music and technology. As highlighted by the Lead Curator Tim Boon, Head of Research and Public History, this exhibition was conceived as a polyphonic narrative: six distinct categories of audiences were invited to develop different stories based on their own understanding and responses to the Oramics machine (Boon et al., 2014).

The first two groups involved by the museum team were the 'experts', at various levels, of the theme of the exhibition: original participants who worked at the BBC Radiophonic Workshop and Electronic Music Studios in the 1960s, and present-day music enthusiasts. After them, two other groups of 'non-experts' were involved, to explore a more subjective and individual perspective: young students from the National Youth Theatre and a group of women writers (see Fig. 75). A third category was the online participants, who were invited to create a remix of the Oramics samples in a SoundCloud competition (see Fig. 74).
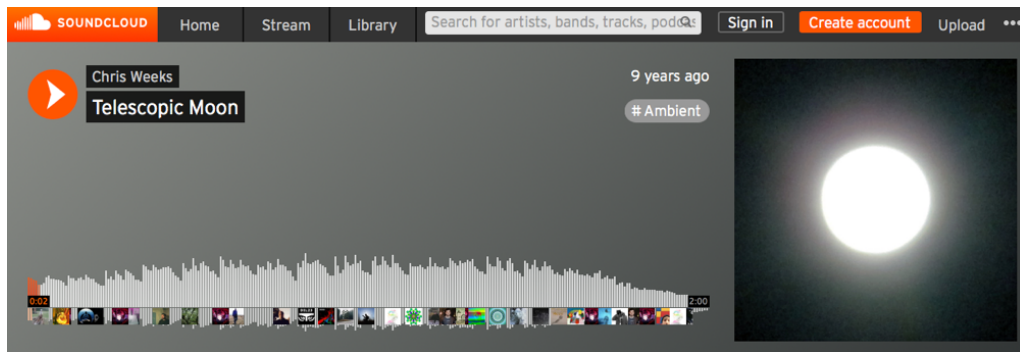
Fig. 74 Winner of the the Science Museum OraMIX Competition. An experimental, exploratory & melodic ambient piece, compiled from elements of stems from the music of Daphne Oram (https://soundcloud.com/chrisweeks/telescopicmoon, accessed on 30 March 2022).

Fig. 75 The National Youth Theatre's 'In Search of Pioneers', which was performed to the public in the Museum's Flight Gallery in April 2011. © Science Museum/Science & Society Picture Library

Following this first experiment, the Science Museum expanded this participatory and multidisciplinary approach in the workshops organized by the AHRC research network *Music Noise and Silence* (Boon et al., 2017). The overall aim of this project was to bring together different expertise to reflect on music alongside other sonic categories, such as noise and non-musical sounds. The workshops involved participants in recording sessions and live discussions on the role of these sonic categories in the museum experience, as shown in Fig. 76.

Fig. 76 Participants at the workshop 'Noise and Silence' at Nottingham University on 27 March 2015 were invited to make a 78rpm noise record. The crowd noises were directed by Jean-Philippe Calvin, disc recording by Aleks Kolkowski, video recorded by John Kannenberg.

Despite the ideas and findings from the *Music Noise and Silence* network did not reaching the stage of a real exhibition, the participatory approach was replicated in subsequent projects that again put sound at the centre of the design. When I started my fieldwork in June 2019, an experimental participatory activity was running at the National Science and Media Museum, which drew some ideas from previous research projects. Over the summer, the museum organized three *Listening Sessions* where audiences were invited to reflect with curators, experts and researchers on how to display sound in a museum context. Also in this case, the challenges posed by sound objects and sonic dimension fostered a participatory approach to curation. The outputs of these listening sessions, in fact, were intended to contribute to the design of a pivotal sound exhibition aimed at indicating the new mission of the museum in collecting Sound Technologies.

> We are planning to leave part of the gallery open for changing elements, so a technology company could demo its newest piece of equipment, or participants of the Listening Sessions could demo an interactive they have created.

> Annie Jamieson, Curator of Sound Technologies, IN07

A culmination of this reflection around sound is represented by Sound and Vision, a new permanent gallery at the National Museum of Science and Media which will see light in 2023.

In this gallery, sound will play a central role not only from the perspective of the objects presented but also in terms of the relationship with audiences:

> One of the strands we are looking at is collecting authentic stories. The idea that the object would not be just interpreted by curators, but that we would be going out there to collect stories from different communities.

<div align="right">NSMM Volunteer Coordinator, IN09</div>

These experiences in the curation of sound that interested the Science Museum Group over the last 5 years signal not only an increasing awareness of the role of sound in museums, but also of the challenges that originate.

6.2 Four Key Challenges in the Curation of Sound

Through the collection of sound objects, their display within physical spaces and the creation of narratives for the public, curators started to confront a series of interrelated questions. How might we preserve not only the physical integrity, but also the sonic nature of the objects? Should these intangible elements also be collected as part of the museum heritage? And how might we transmit all these 'sonic elements' to the public? Are the curatorial practices developed in the physical spaces adequate for this type of collection? What approaches, activities and spaces are best suited to engage people with the sonic nature of objects? And how does the very concept of 'engagement' change when it is mediated through sound?

Interestingly, the challenges that originated around the collections of sound objects of the Science Museum Group are not different from those museum faces, in its attempt to unleash the intangible dimension surrounding the material culture. Every object, even if it appears silent in the gallery, was part of a wider context that included sensory elements: smells, sounds, voices, which then became memories and feelings. One of the biggest challenges of the museum is to give voice to these elements, allowing new stories, emotions and memories to flow. Sound can open the way to a wider rethinking on four key areas of museum practice: *preservation* - how to maintain objects over time; *collection interpretation* - how the museum interprets its collections; *heritage meaning* - what the museum recognizes as heritage to be preserved for future generations; and *engagement* – what does it mean 'engage' audiences with collections.

6.2.1. Keeping the Sonic Nature Alive: a New Concept of Preservation

> The default position across most museums is that objects do not work. You do not attempt to operate them, you do not turn them on. You do not handle them, you do not do anything.

> Annie Jamieson, Curator of Sound Technologies, IN07

When we go to a museum, we expect to see objects well-maintained and displayed in glass cases. We are usually not allowed to touch any of them, and if there is a story or explanation in sonic form, it is usually delivered through a digital screen or an audio guide. The reason we cannot interact comes from the very nature of museums, whose aim is to maintain the physical integrity of these objects in order to make them accessible for future generations. But can this concept of 'preservation' be valid also for objects that are born to be touched and played, like the objects of the Sound Technologies collection? How can we understand their role and functioning, if we cannot operate them, and make their sonic nature audible? How can we engage visitors with their actual essence?

Fig. 77 Participant in the Listening Session (June 2019) listening to an 'Augmented sound reality' app which explores ways to bring historical sound technologies and radio archives to life. © Stefania Zardini Lacedelli

This is exactly the challenge that the curator of Sound Technologies has faced: the traditional conservational practices are not appropriate to express the story of sound technologies and make people understand their sonic nature. And this is because the culture of preservation has been shaped around different types of objects that were not designed to be played on and touched. As long as the external integrity of the object is not affected, the object is considered preserved.

> If you are collecting Roman statues or 18th century porcelain or paintings, you want them to remain static, you want to preserve the fabric. But if you have objects that actually have an internal function, then you need to be thinking about how you can maintain it.
>
> Annie Jamieson, Curator of Sound Technologies, IN07

Since the traditional practices of preservation do not work for the objects of Sound Technologies collection – and even allow electronic to come to harm -, Annie Jamieson started to ask a very important question: what does 'preservation' mean, for this kind of objects? How can we preserve and display them in a way that maintains their internal sounding function? The answer to this question led to rethink the meaning and practices of preservation, introducing a new perspective that she defines 'functional preservation':

> With sound technologies, the electronic circuitry and components degrade if you leave the object alone and never turn it on. My proposal is that if a new object comes in and it is in working order, then we set up a maintenance program to keep it in working order.
>
> Annie Jamieson, Curator of Sound Technologies, IN07

This is a rather different approach from the traditional preservation practices, because it implies considering the object alive and not frozen in its past. Rethinking a concept that is rooted in centuries of practice and has been applied to all distinct kinds of physical objects, is anything but simple. But this change is sorely needed, and not just for museums of sound technologies. All objects, not the ones created to produce and consume sounds, have a sonic nature. They have been part of people's lives, with their memories and stories, they were surrounded by a specific soundscape. They can evoke sonic imagery. In the Maori culture there is a specific word to indicate this concept: Taonga, which is a 'treasure object' (Proctor, interviewed by Panzarin, 2017).

How to bring museum objects alive and recreate the entire world of stories, memories and sounds that surround them: this is the question raised by the Sound Technologies collection, but also a challenge that every museum faces. In trying to answer, the curators at the National Science and Media Museum have also started to ask another question: are these elements, themselves, part of our heritage?

Fig. 78 The Fairlight CMI, like any other object of the collection, relates to many people and stories: the designers who created it, the musicians who used it to include new sounds in their music, all the people who listened to and enjoyed these songs. © Stefania Zardini Lacedelli

6.2.2. 'Content' and 'Hardware' Heritage: a Disappearing Dichotomy

In the case of the Science Museum Group, the interest around sound did not originate around the content (the actual sounds produced by the machines), but around the technological objects that allowed people to reproduce, study, consume, create and share sounds. However, when curators try to engage people with the history of these technologies, they immediately face a twofold challenge. On the one hand, the actual practices of conservation do not allow us to listen to the objects of the Sound Technologies collection in the way they would have traditionally been encountered. On the other hand, the collection policies tend not to include this audio content as part of the collections. As a result, the museum does not systematically collect the equivalent audio content that was once attached to sound technologies. An important question arises:

> To what extent can you tell the story of audio technologies if you do not have any audio?
>
> James Mansell, SMG Research Associate, IN05

This question, raised by James Mansell reflecting on the Sound Technologies collection, can also be applied to all the other collections of the group. Despite some exceptions such as the collection of videogames or photographs, the focus of the museum is to collect hardware, objects and technologies, as clearly stated by the collection development strategy of the Science Museum Group.[16]

This focus on objects, as we have analyzed in Chapter 3, is deeply rooted in the history of museums, which were born to collect and preserve the material artifacts of our culture and transmit their history to the public and future generations. Any culture, however, is not represented only by objects, but also by a variety of intangible elements that, thanks to technology, we can record, reproduce, and share. As the British Library archive has amply demonstrated, these intangible elements involve all fields of human knowledge: science, nature, history, anthropology, art. The challenge faced by the National Science and Media Museum, then, does not only concern its mission and the scope of its collections, but involves a broader reflection on what are, today, the elements of any given culture:

> If the museum's aim is to be a museum of science and culture of light and sound, the big question is what the culture of light and sound is.

> James Mansell, SMG Research Associate, IN05

In this process of rethinking, museums find in their way another set of institutions which, instead, have always been focused on the collection and preservation of the 'content'. In the case of sound culture, sound recordings and audiovisual media have been safely preserved within two types of institutions: on the one hand, libraries and historical sound archives such as the British Library; on the other hand, radio and television producers that have begun, in the last century, to create their own archives to keep a copy of all the content produced. As a result, the curation of sound culture is shared by two different types of entities: the ones that collect the content – libraries and archives - and the others that collect the objects and technologies that make this content accessible - museums.

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[16] From the collection development strategy (Science Museum Group, 2018, p. 3):
    The SMG collection will contain:
    - icons (highly significant objects) of continuing scientific, technological and industrial change, with particular emphasis on those developments in which Britain has played a leading role
    - Objects that represent working lives and the everyday practice and products on science, technology and industry, especially in Britain
    - Artefacts and records representing the impact of science and technologies on people and on the planet
    - records and archives of individuals and organizations in science and industry

Emblematic is the case of the Television and Broadcast collection at the National Science and Media Museum (see Fig. 79):

> We collect objects for the BBC. They maintain their archive of programs, but we take any significant technologies, cameras, editing equipment, sounds, lighting, occasionally props if they represent something innovative in the field of technology and how television is produced.

> Elinor Groom, Curator of Television and Broadcast, IN11
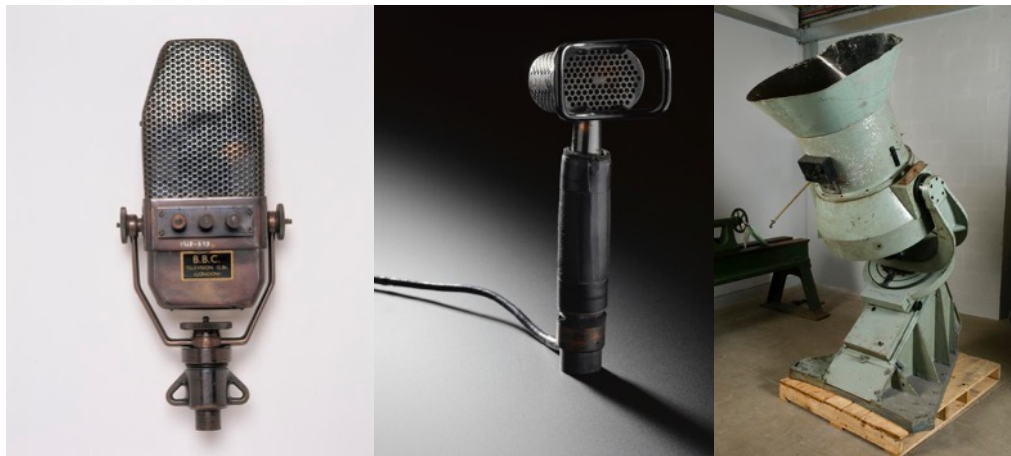
Fig. 79 Microphones and a television spotlight used by the BBC, hosted in the Science Museum Collection.

In this case, the museum has developed a long and fruitful relationship with the BBC, which is described by Elinor Groom as a complementary archive of 'content heritage' connected to audiovisual technologies. A relationship that is based not only on the exchange of materials, but also on the exchange of expertise, because the preservation of sound heritage requires specific skills, practices, processes, spaces, as the previous chapter outlined:

> Archives like the BFI or the BBC or other film archives, they have the processes, the expertise and the service space to collect content. We do not have that.

> Elinor Groom, Curator of Television and Broadcast, IN11

However, if it is true that the TV and radio industry has acknowledged the importance of this material and has learnt how to preserve it over time, they have not necessarily developed practices to disseminate it, to engage people with it, to develop new narratives around it. And the same can be said for libraries and archives, which are predominantly focused on preservation. Public engagement is mainly the scope of a museum.

> The original sound archives all the way through the UK usually act more like libraries than museums. They are dedicated to collecting and storing and they tend not to be well set up for dissemination or engagement.

> James Mansell, SMG Research Associate, IN05

The British Library, with all the wealth of practices developed to make its huge sound archive accessible, constitutes an exception. However, it does also suggest a trend: that perhaps, in the wave of digital transformation, the boundaries between these institutions are blurring. An archive can develop practices to engage audiences with its content, just as museums can also include sound heritage in their collections. The challenge faced by the curators of the Science Museum Group suggests that the dichotomy between 'content' and 'hardware' needs to be resolved in a holistic understanding of heritage, which includes both.

> We collect the things that actually matter to people: the things that they have had in their homes or in their pockets, the things that they used to take photos, to make videos. Not having the sort of intangible heritage, whether it is software, whether it is recordings, whether it is content …I feel its absence sometimes in our collection. I think curatorially we really have to remember that what we have collected is just one steppingstone in the wider picture about the media world.

> Elinor Groom, Curator of Television and Broadcast, IN11

This new perspective is even more significant in consideration of the specific nature of the content with which the museum is increasingly interacting: the online sound culture.

6.2.3. A Content Heritage at Risk: Online Sound Culture

In 2017, the collection of Television and Broadcast at the National Science and Media Museum gained a special acquisition: the early studio equipment used by The Yogscast, a British entertainment company that produces video gaming-related videos on YouTube and Twitch (National Science and Media Museum, 2017). With 7 million subscribers in 2021, The Yogscast channel was the first to reach one billion views in the UK and the world's second most-watched channel on YouTube. The curators negotiated to collect some of the kit that the members of The Yogscast used to create their videos at their first permanent studio in Bristol: computers and microphones, the desk and chair and the homemade sound insulation panel that they put on the walls, including the piece of green fabric that they used when they filmed themselves (see Fig. 80).

Fig. 80 Yogscast studio suite including PC, camera, microphone, desk, chair and complementary material used by members of Yogscast for internet broadcast at the Bond House studio location in Bristol. Science Museum Group collection

Elinor Groom, the Curator of Television and Broadcast motivates the acquisition highlighting how this equipment marks a fundamental change in the history of gaming and broadcast:

> We were collecting it thinking this could be a time capsule of this point in time for YouTube, where it was becoming increasingly professional and very, very popular.

> Elinor Groom, Curator of Television and Broadcast, IN11

This acquisition recognizes the role of sharing and streaming platforms in the evolution of broadcasting technologies, but what the museum acquired was the material culture of these emerging online media. The technical equipment used to create some of the most popular gaming videos is just one part of the activity of a contemporary entertaining company: it does not capture the wealth of their YouTube channel (see Fig. 81) which includes more than 5.000 videos, but also the feedback of the millions of enthusiasts who watch them, comment, share, interact, talk about videogames and their lore. A whole burgeoning culture which was born and flourished around video gaming. All these elements were not collected by the museum and are not currently collected anywhere else.
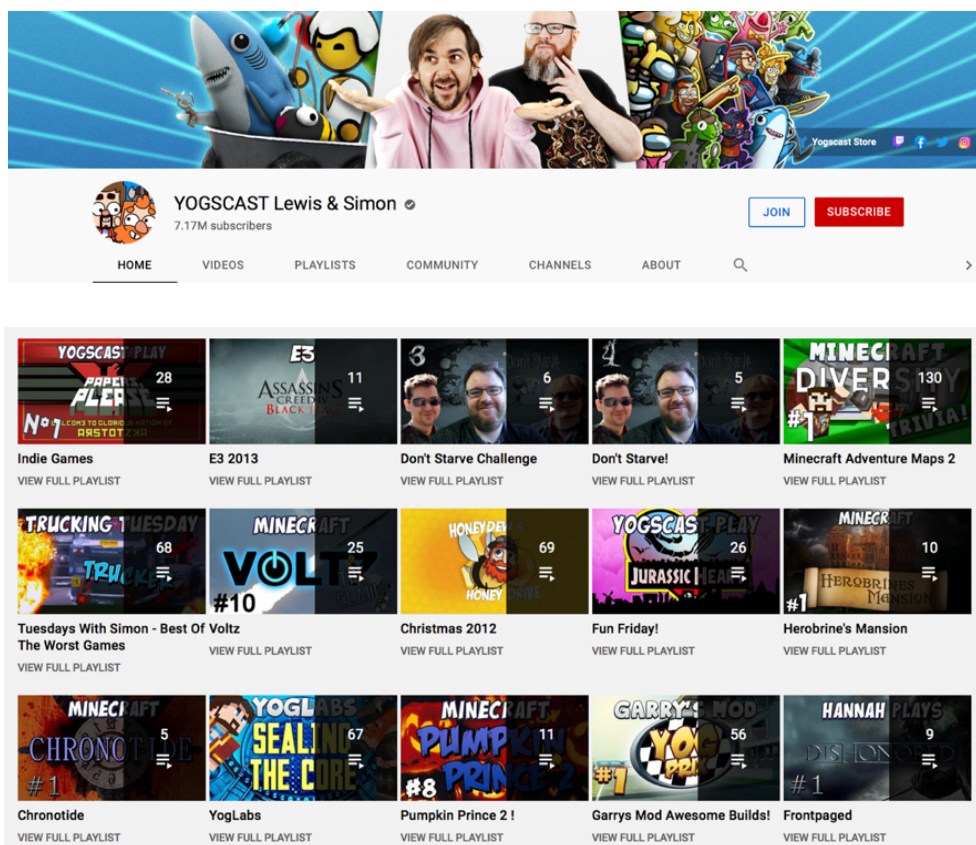
Fig. 81 The Yogscast YouTube channel (https://www.youtube.com/c/yogscast, accessed on 30 March 2022)

When interviewed, the curator of Television and Broadcast expressed an awareness of the need to collect from the platform world, together with the challenges that this implies.

> When it comes to people producing music and sharing it, when it comes to YouTubers, there is no way for that to be safe, deposited in the public interest. Or at least you would have to be a very, very progressive creator to even think about it. And the perception that the online world is just open and available for anyone at any time masked the growing issue of the digital dark ages that we are going to deal with.

Elinor Groom, Curator of Television and Broadcast, IN11

The first challenge faced by curators is the need to consider what is contemporary, alive and of actual cultural value. This requires a change of perspective on what museums have traditionally considered worthy of preservation and conservation: the past. Despite the Science Museum Group is dedicated to the role of science and technology in our lives, and it includes digital technologies in its collections - a whole gallery at the Science Museum in London is dedicated to the Information Age – the curators still struggle to consider a common everyday technology as heritage. The museum usually acquires contemporary everyday

technology when there is a temporary exhibition, but these objects are rarely officially included in the collections.

> It is not just the public that necessarily thinks these everyday modern things are not museum objects; we kind of do as well.

<div align="right">Annie Jamieson, Curator of Sound Technologies, IN07</div>

And even when the curators acknowledge the importance of contemporary online media, they apply an historical perspective to something that is still daily consumed and evolving. For a commercial enterprise like Yogscast, one of their videos is a consumer item. For the museum, the same video represents an intangible heritage resource that has historical importance.

> To a music producer or to a YouTuber an acquisition is a business thing. It is buying something. Whereas for us it is a civic responsibility. Acquisitions are things that have been donated to the public and making them available is what qualifies us as a museum. It is what qualifies us as a historic collection.

<div align="right">Elinor Groom, Curator of Television and Broadcasting, IN11</div>

Connected to that is a second challenge, which concerns the audience engagement with these new technologies. As we have seen in section 6.2.1, when they are collected as museum objects, technologies lose their function and, with it, their life. If this is true for pre-digital technology such as polyphonic synthesizers, it is even more true for digital platforms. While recognizing their value, museums struggle to understand their nature. Not only because they are not made by the elements curators are most familiar with - physical objects - but because they are a dynamic, ever-changing space that is nourished by the interactions and content created by people. Engagement and participation are the very essence of the platform world, and this essence is difficult to reproduce in a traditional museum space:

> We can collect the material culture of online media. but I do not think we are yet able to really respond to what our audiences want from that and how they want to engage with it. Right now, what we are able to collect is not necessarily as implicitly engaging as just being online with this material.

<div align="right">Elinor Groom, Curator of Television and Broadcast, IN11</div>

What changes, then, is not only the perspective on what the museum should collect – the 'what' - but the very concept of engagement – the 'how'. Another dimension in which the interaction with sound has stimulated a series of key reflections.

6.2.4 Engaging with Sound: a New Route for Participation

In the previous sections, I have explored the challenges that sound objects pose to museums and the questions that they pose in terms of preservation, curation and display. I have analysed these issues from the perspective of curators who search for new ways to convey the sonic dimension of these objects and try to reflect the wealth of contemporary sound culture in their collection. But what happens when an individual – a museum visitor or an online user – encounters these sounds and these objects, either in person or online? What kind of experience does the sound dimension stimulate, and what happens at perceptual, emotional, sensorial, intellectual levels? Are the meanings, perceptions and interactions different than the ones generated around traditional objects and experiences in museums which are not sound based? These are the questions that have guided the *Listening Sessions* organized by James Mansell and Annie Jamieson in the summer of 2019.

The main aim of this activity was to understand the complexity of the act of listening from the perspective of audiences, overturning the interpretation of the museum visit as a predominantly visual and silent experience.

> Listening is quite a difficult thing to do in a museum for a lot of people. We were interested in exploring the audience's perspective. How does a visitor encounter sounds? What meaning do they make of them? What sorts of situational help and guidance might they need to engage in a more detailed listening?
>
> James Mansell, SMG Research Associate, IN05

The *Listening Sessions* opened a dialogue with a group of people on their sonic experience, exploring ideas on how museums can tell stories, create experiences, generate insight about the world through listening rather than looking. The starting point of these sessions was the challenges faced by the curator of Sound Technologies in displaying the objects of the collection: how to make these objects alive and recreate their sounds? The *Listening Session* invited participants to think about the best way to present these objects and create experiences around them. As shown in Fig. 82, the participants were guided to discover the collection in the storage, and then invited to give their personal ideas and suggestions.

Fig. 82 Participants during a Listening Session in June 2019. Annie Jamieson presents the objects of the Sound Technologies collection in the museum storage. © Stefania Zardini Lacedelli

This exploratory approach led the museum to imagine new horizons. Interestingly, reflecting on sound as a means of interaction with objects and galleries naturally led to thinking of different spaces and platforms where these experiences can take place. Spaces and platforms where people are co-creators of the content. During the listening sessions, participants were invited to experiment with a series of participatory activities both in online spaces – like sound mapping – or outside the museum walls – like walking in the city with a pair of headphones.

> We thought of it as a way of starting to think about engagement beyond the walls of the museum to help people think about listening as an activity that happens everywhere.
>
> James Mansell, SMG Research Associate, IN05

From this experience, sound seems to have highlighted two different routes to curators. The first is that it is not possible to conceive the listening experience in a museum context only in the physical spaces of the galleries. As well as listening is an act that can happen anywhere, the museum, inspired by the dynamic nature of sound, is led to go beyond its walls and inhabit new spaces, both digital and physical.

Fig. 83 Participants during a Listening Session in July 2019 were invited to share the sounds of their lives on an East Midlands map. © Stefania Zardini Lacedelli

The second is that it is necessary to re-think the way in which museums have always designed their experiences. The participatory approach of the *Listening Sessions* was not intended just to generate audience interaction, but to collaboratively involve them in the creation of exhibitions, galleries, and digital content. A participatory process that was intended to start from these sessions and then develop a listening group regularly involved in the design of the museum listening experiences, as explained by James Mansell:

> If we want to think about what role listening might play in exhibitions, we probably should not just do it on our own as expert curators and researchers. The way to go is to generate dialogue, to move away from the broadcasting model and to use the tension towards sound as an opportunity for a two-way dialogue, for a discussion about the intersubjectivity potential of listening.

> James Mansell, SMG Research Associate, IN05

6.3. New Digital Frontiers

After having fully explored the challenges that sound objects and sound design have risen in the Science Museum Group, I wanted to understand if the digital dimension could unleash some of the constraints that curators encountered in the physical spaces. A series of questions

guided the second part of my investigation: can the digital dimension bring objects to life, connecting them with all the intangible elements that surround them? How does the level of engagement with the collection change in an online space? Can digital platforms be a space to foster a collaborative approach on sound curation?

To answer these questions, I explored how the museums of the group interact with digital platforms both at *practical level* – which spaces, activities and processes have been activated - and at *conceptual level* – what kind of reflections the interaction with platforms has stimulated. I started my investigation with the Digital Director John Stack, and then I interviewed members of the departments that, at various levels, create digital content for audiences: the web team, the marketing and communication department, and the curatorial team.

In this section, I summarize three main areas in which digital, conceived as a spatial and operational tool as well as a new way of thinking, can contribute to respond to the challenges analyzed in the previous section.

6.3.1. Bringing Objects to Life: Digital as Storytelling

The first challenge curators encountered with sound objects is the need to activate their intrinsic sonic nature. A necessity that, as we have discovered, is shared also with the curators of non-sound related collections. Museums have always told stories in a variety of different ways, but in the last 20 years the digital revolution has opened new opportunities to unleash this wealth of content. And this is fully acknowledged in the digital strategy of the Science Museum Group, which recognizes digital as a powerful tool for storytelling:

> Here at the Science Museum Group, a lot of the digital is focused on trying to work out the best way of bringing the collection to life, because many of the things in the collection are difficult to comprehend. Digital is one of the ways we can position those objects in a richer history, tell their stories very well and show that the object is just a point on a larger journey.

John Stack, SMG Digital Director, IN06

The first level in which the Science Museum Group explored the potential of digital technology for storytelling was the use of digital media in exhibitions. The Science Museum in particular is a leader in this field, with almost 30 years of experience in researching, testing and prototyping digital media exhibits (see an example in Fig. 84). The findings of the

Audience Research Department have been shared over the years in a series of papers and reviews, which draw upon the research conducted from 2001 to 2019 and assess the evolution in terms of visitor expectations and attitudes, as well as the usability, motivation and level of comprehension provided by digital interactives.

Fig. 84 Young visitors experiencing a digital media interactive in the Science Museum. © Science Museum Group.

From the last internal review on digital media exhibits in 2019, the most appealing digital interactives are the ones that bring objects to life: by illustrating the objects in motion and being operated, by revealing hidden details or internal mechanisms of objects in display, by showing them in their original context, or by providing personal testimonies of people who contributed to their invention or were part of their story.

Whereas the use of digital media represents a substantial part of the exhibition offer - with digital labels, interactive games and audiovisual display fully integrated with objects and graphics - less research has been done around mobile digital technologies such as audio guides and smartphone apps, and online storytelling. However, despite the main focus on digital has been paid to fixed installations on permanent and temporary exhibitions, the digital strategy of 2015-17 and 2018-21 clearly defines as a priority to develop digital narratives on the website, 'becoming a significant online publisher of STEM content and building and go-to destination for our subject areas'.

The digitization project is part of this ongoing development, which led to the creation of the group's website dedicated to online collections. The aim of the Science Museum Group Online Collection is to make all objects and digital items from the various collections accessible in a single space. The website currently hosts over 350,000 items, collected into thematic collections and searchable by type, place of origin and time period. The information provided for each object, however, does not exhaust the wealth of stories, memories and information that are usually developed and shared when a temporary exhibition is created. To capture these powerful narratives and make them also available online, a new section was added between 2017 and 2018 to all museum sites: *Objects and Stories*. This is a collaborative curatorial space, where curators work closely with the web team to create engaging stories around the objects (see an example in Fig. 86).

The stories in this section are often created in connection with a specific exhibition, to make accessible part of the narrative in the online dimension. However, this extended space allows to differentiate audiences – whereas an exhibition is more family focused, for example, a story in this section might be targeted to adults, students and researchers – and, most importantly, the content remains even after the exhibition.
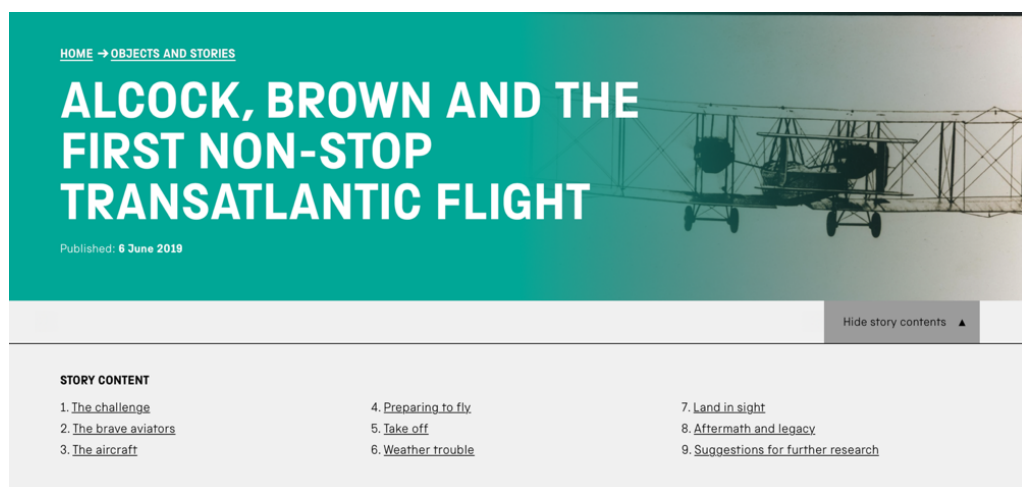
Fig. 85 The introduction of the story dedicated to the first non-stop transatlantic flight on the Science and Industry Museum Website (https://www.scienceandindustrymuseum.org.uk/objects-and-stories/alcock-and-brown, accessed on 30 March 2022).

Connecting objects with their stories in the same space also allows the curators to overcome the dichotomy between 'hardware' and 'content' heritage. Together with the images of the objects, the stories created in this section feature many audiovisual materials which are already published on the Web. The ability to embed pre-existing content such as a YouTube

video on the webpages – a type of content which should be more difficult to make accessible in a physical exhibition - makes it easier to develop connections with other objects, contexts and stories. Interestingly, this opportunity was fully explored in a story dedicated to a sound-related collection: the British TV advertisement (see Fig. 86). In online storytelling, the distinction between 'content' and 'hardware' dissolves, in favor of a rich and engaging narrative that reconnects the technology with the content it gave life to.

While fully exploring the opportunities for interconnection, interaction and multimodality provided by digital technologies, this approach to storytelling does not differ so much from the way museums have always told stories in the galleries, where it is the curator who develops narratives for the public. As happened in the British Library, the interaction with other external platforms has stimulated a rethinking on what it means, today, to engage people in a deep and meaningful way.
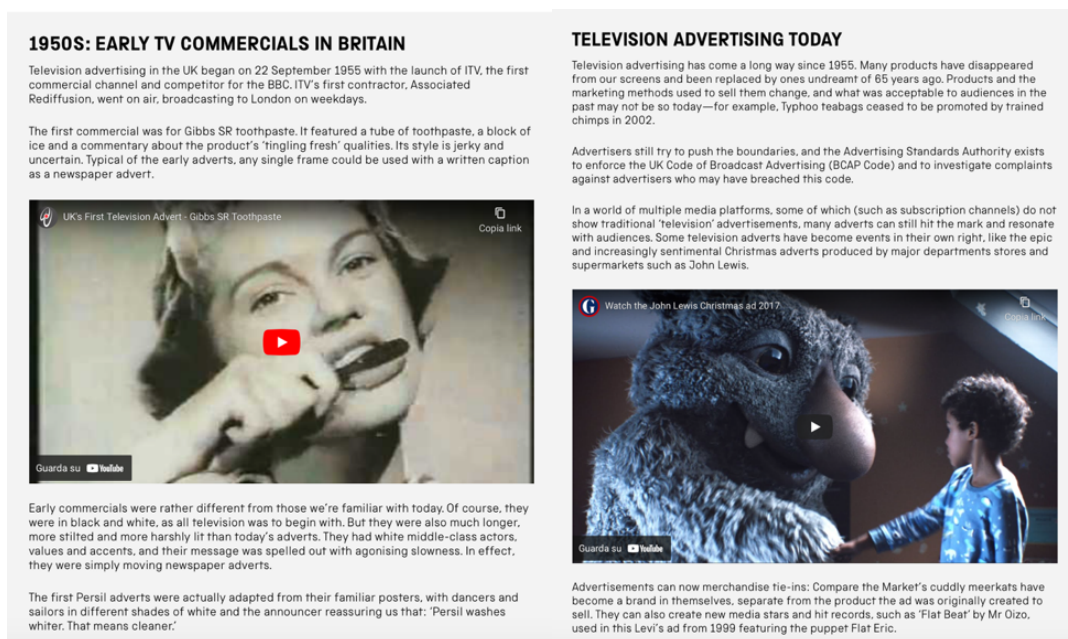
Fig. 86 Extract from the story 'A short history of British TV advertisement' published on the National Science and Media Museum website (https://www.scienceandmediamuseum.org.uk/objects-and-stories/short-history-british-tv-advertising, accessed on 30 March 2022)

6.3.2. Exploring New Ways of Engaging with the Collection

The growing importance of digital to tell stories about museum objects has expanded the possibility to access and engage with the collection. It was clear that the engagement with the

collection did not end in visiting a physical exhibition, but also included discovering the collections online, reading a digital story, and many other opportunities of interaction allowed by the platform world. To explore how many ways the museum could interpret 'engagement', a new role was conceived: Keeper of Collection Engagement. This role was created in connection with the major project of the National Collection Center, to find new ways in which audiences could interact with two categories of objects not on display: the digital items in the online collection and the stored collections.

> Whilst the core of curatorial work is about looking after the collection and thinking about how the collection is displayed in the museums, collection engagement is about the rest of the collection and all the ways that we can open up access to those objects. So that includes writing online stories, developing videos, developing podcasts and using social media to tell more of those stories that resonate with people who are not coming in.

Jessica Bradford, Former Keeper of collections engagement, IN12

These increased opportunities for interaction are also connected to an expansion of the public: not only the people who visit the physical galleries or the museum website because they are already interested in the experiences offered, but all those who, spontaneously, can get curious when encountering an online object and remain fascinated by the stories that the museum holds. A type of online audience that is defined by the museum team as a 'spontaneous', as opposed to the one driven by a specific motivation:

> Our biggest online audience are people who are coming to the museum website with a question in mind, looking for an authoritative voice about a particular subject area. We call them our 'inquiry led' audience. Then there is also what we call the 'spontaneous audience': people who see our content on a social channel and they are not thinking of the Science Museum, but that they might be interested in a particular story or a particular object.

Jessica Bradford, Former Keeper of Collection Engagement, IN12

How to bring these stories to life not only for those who already know the museum and visit the website, but for all those who may not necessarily think about the Science Museum Collection as having any relevance to them, is one of the core parts of the collection engagement. One of the ways which has been explored to connect audiences to these stories is to use the collection to respond to meaningful, contemporary issues that have an impact on people's lives (see an example in Fig. 87).
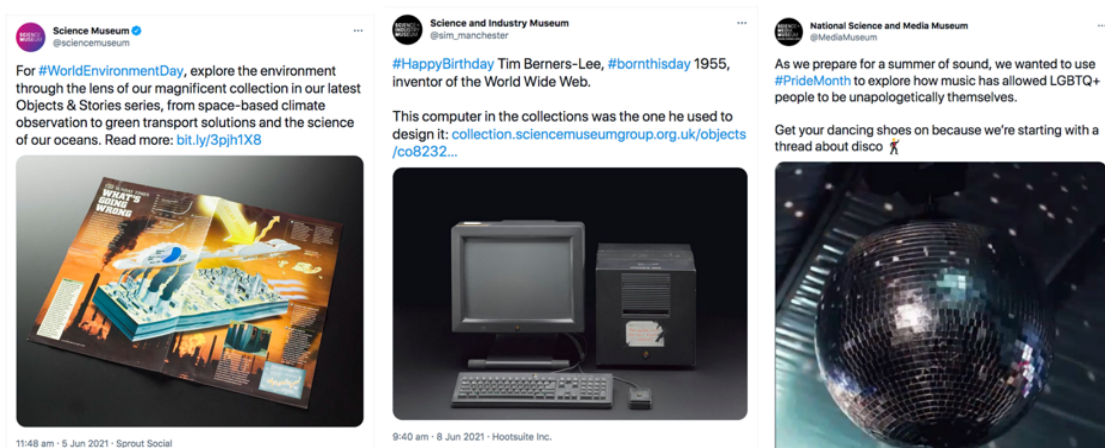
Fig. 87 Three tweets created by the Science Museum, Museum of Science and Industry and National Science and Media Museum to respond to anniversary or contemporary issues.

> We look for opportunities connected to news stories, to anniversaries, to events going on in the outside world and try to use those as a hook to display more of our digitized collection. So, finding ways that are where people are already thinking and what is really going on in culture and society and pushing our collection out to make it relevant.

<div align="right">Jessica Bradford, Former Keeper of Collection Engagement, IN12</div>

This expanded concept of engagement involves a combined use not only of the museum's online spaces - the museums' website, the online collections website - but also of many other external platforms that people use to get information, comment, discuss, interact, create content. Although digital platforms are often mentioned in the interviews as highly effective in sharing museum content, they were often described as promotional tools to convey information and broaden the audience reach (see Fig. 88). These platforms did not seem to be employed to their full participatory potential.

> I think we are probably more focused on bringing stories to life. We are still in a kind of broadcast mode.

<div align="right">Jessica Bradford, Former Keeper of collections engagement, IN12</div>
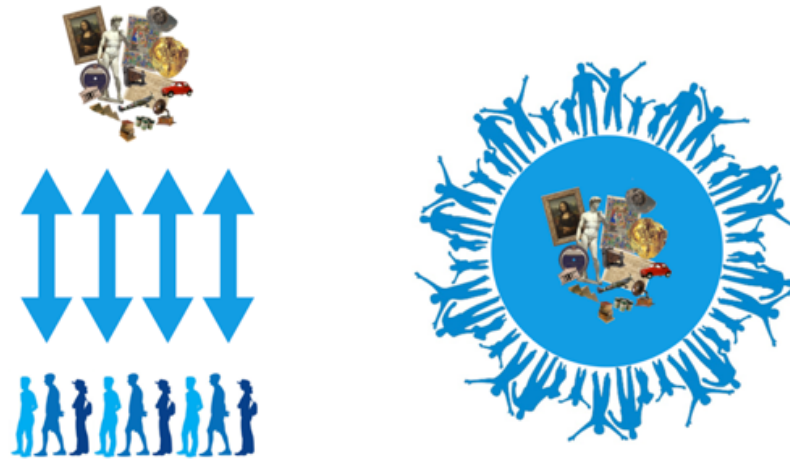
Fig. 88 A visualization of two different 'engagement' approaches: the broadcast model and the participatory model. This graphic was used in the semi-structured interviews with the museum team, in order to stimulate a discussion on the approaches adopted on the different platforms. © Stefania Zardini Lacedelli.

The online analysis of social media content published by the five museums of the group, conducted during my research fieldwork in spring and summer 2019, confirmed this trend: most of the content published was related to the promotion of events and exhibitions, focusing on the idea of the museum as a physical space to visit. Even when the content was related to the collections and stories - the 'Objects and Stories' section and the Blog – it was delivered using a broadcast approach: the post on social media usually shared the completed content, not necessarily stimulating a discussion around it, or inviting to share personal memories.

One of the main reasons for the predominance of the broadcasting approach is the predominantly promotional function assigned to these channels, also reinforced by the lack of involvement of the curators in their management, as the Digital Director points out:

> Social media platforms are largely managed by the marketing and communications team. The thing that is driving their use is campaigns to promote a visit to the museum, and so we tend not to be how can we use these tools for wider engagement with the public.

> John Stack, SMG Digital Director, IN06

The interviews with the curators confirmed the overall low level of involvement in the creation of content and activities for social media, at the same time highlighting an increasing interest in these platforms and a mature awareness of their potential from a curatorial perspective.
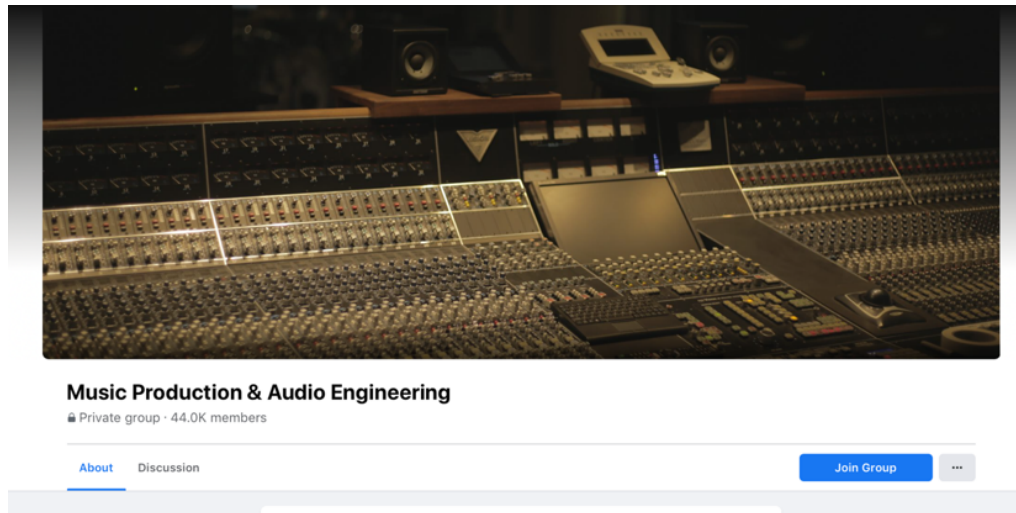
Fig. 89 One of the Facebook Groups of which the Curator of Sound Technologies is a member.

The curator of Sound Technologies, in particular, described her personal use of the Facebook and Twitter profiles of significant help for her work as curator, because it allowed her to interact with communities of experts on topics related to her collection, find information on specific technologies, and acquire new objects:

> I use Facebook more curatorially than from a visitor engagement point of view. When I started doing research into sound engineering four years ago, I started a Facebook account so I could join some of the groups of sound engineers. I could get a lot of contacts and information that way, and I have continued to do that.

<div align="right">Annie Jamieson, Curator of Sound Technologies, IN07</div>

The online community created by the curator of sound technologies through her personal Facebook profile is a 'specialist bubble' of passionate experts in the field and sound technologies enthusiasts (see an example in Fig. 89). A relatively small group of people that 'none would notice if they came to the museum' (IN 07), as she highlighted in the interview. However, they are different from the traditional visitors who go to the museum to enjoy its offer. More similarly to volunteers, they can make a fundamental contribution to the knowledge of the collections and their enrichment.

This difference between how museum communicate through the 'official' social media profiles and the personal relationships established by the curators through their personal accounts, underlines the need to introduce new metrics to evaluate the relationships that the museum is able to create, not only from a quantitative point of view - the number of visitors - but also from a qualitative perspective - what types of relationships can be established. The passive consumption of content - traditionally associated with the physical visitor - seems to be just one of the many possibilities that digital has made even more evident.

> To broaden your reach online. This is how a lot of museums understand the benefits of social media. But are we truly broadening our reach because are we actually providing spaces that people want and need online? Or are we just trying to make ourselves look bigger and more popular?

> Elinor Groom, Curator of Television and Broadcast, IN11

The museum closure all over the world due to the COVID-19 pandemic has reinforced this need. No longer able to convey their main offer in physical galleries, museums have developed new digital-only experiences. While some museums have merely transposed physical experiences, many others have taken the opportunity to explore new ways of engaging audiences with their collections. The Science Museum Group also developed a series of campaigns and projects to involve audiences in a participatory way during the lockdown. Nevertheless, this approach had already been explored in a polyphonic, collaborative and dynamic space, which was born exclusively online.

6.3.3. Enhancing Participation: the Blog as a Polyphonic Space

> Museums present objects. Historically, these objects have been presented largely in a one-way, broadcast mode. In the digital age, the presentation of these objects is two-way, interactive and participatory. Through digital SMG will enable audiences to learn in an active, interactive way; build on our content and intellectual output; engage audiences in a dialogue around STEM and the collections; and invite audience contribution to the museums' work.

> (Science Museum Group, Digital Strategy 2018-2021, section 3)

As the previous section pointed out, audience participation is a key element in the work around sound at the Science Museum Group, and it is also one of the priorities of the group digital strategy. The new possibilities of interaction introduced by digital platforms

stimulated a broader reflection on the role of active learning and personal engagement, and the need to transfer this approach to the museum at many levels.

The interviews with the web and communication team revealed an extremely thriving space where the museum experimented with participation and co-creation at a practical level: the Blog. In each museum's website, this is a dedicated section which regularly publishes articles and insights from a variety of different authors (see an example in Fig. 90). The main characteristic of this space is its polyphonic and participatory nature:

> The blog is the voice of the museum. The voices of the museum, I usually say, because it gives different people an opportunity to speak about aspects of the museum that mean something to them.

> Eleanor Mitchell, NSMM Web Manager, IN10
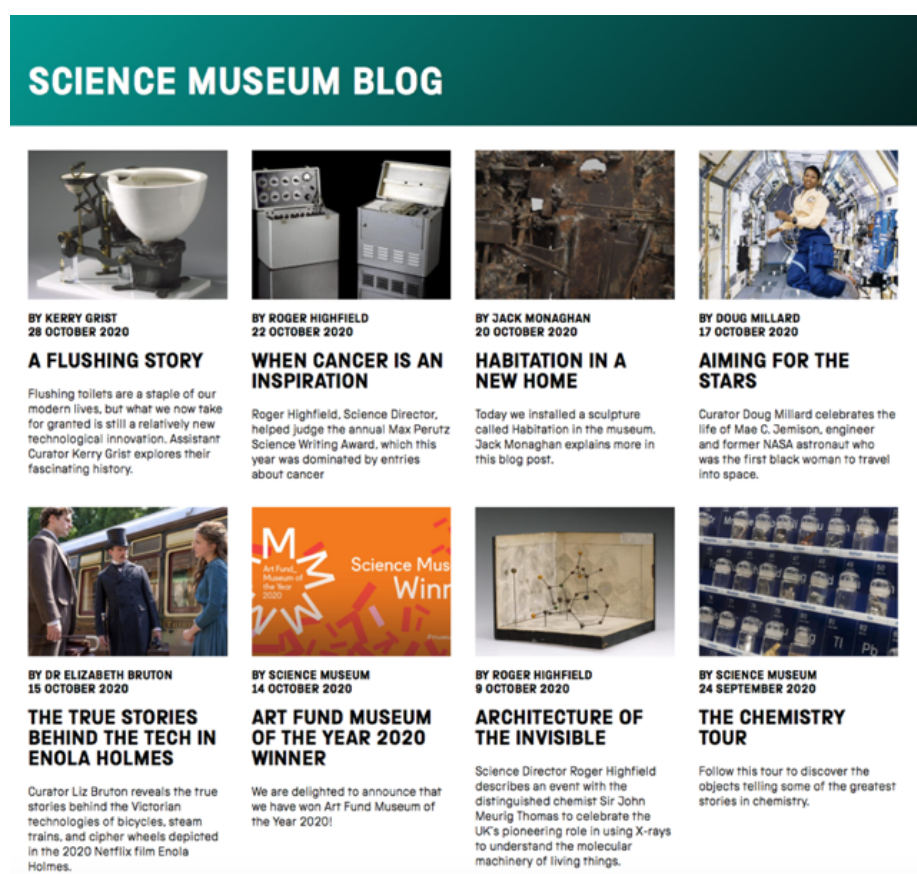
Fig. 90 The Science Museum Blog Homepage (https://blog.sciencemuseum.org.uk, accessed on 30 October 2020).

Whereas the *Object and Stories* section is curated by the curatorial team, the blog is an inclusive, polyphonic and collaborative space where all the members of all the different teams can write: the blogs of the five museums feature articles from curators as well as archivists, learning team, the explainer team, the volunteers.

> It can be anyone that is working in or with the museum. And it gives them a place where they can speak about their work or their activity or whatever it is that they are doing. And it is a bit more of an individual voice.

Eleanor Mitchell, NSMM Web Manager, IN10

In all the museums of the group, the blog has evolved over the last few years, with an increase in terms of participation. Whereas initially the most involved team was the curatorial, the opportunity extended to everyone who wanted to make a personal contribution from their own work and expertise.

> The blog has grown organically. People know that it is there, they know that they can contribute.

Mike Perry, SIM Web Manager, IN13

At the Science and Industry Museum, the blog also gave the opportunities to open new collaborations with external people and institutions, such as the People's History Museum and the National Football Museum in Manchester.
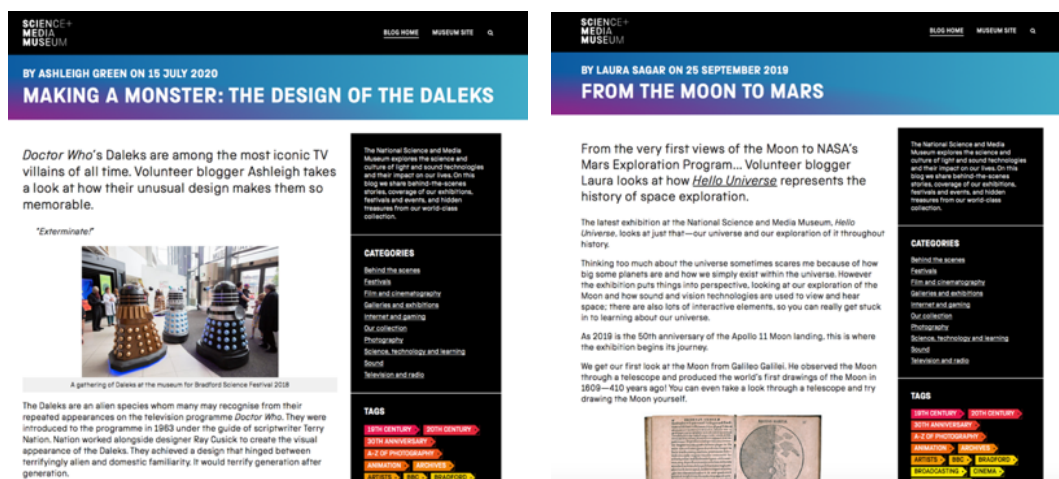
Fig. 91 Two blog posts curated by volunteer bloggers on the National Science and Media Museum Blog (https://blog.scienceandmediamuseum.org.uk, accessed on 30 March 2022).

At the National Science and Media Museum in Bradford, opening this space to volunteers led to the development of a group of bloggers who regularly write for the museum (see Fig. 91). In January 2018, the exhibition team was struggling to create blog content and invited volunteers to write a personal contribution to exhibitions or special events, starting from something they are passionate or interested about. This opportunity turned out to be a successful way to broaden the participation of volunteers, opening new routes for online participation.

> It is a more flexible way for people to volunteer. They do not have to come into the museum, which is good for people who have not got time to do that or maybe physically not able to do that. It is a different way for them to contribute.

> Eleanor Mitchell, NSMM Web Manager, IN10

The involvement of volunteers allowed the museum to publish blog content more regularly, and it also brought new perspectives and different voices to the museum.

> We thought it was a good opportunity to also change the tone of voice, because if you asked members of staff to write reviews on what they worked on, we are likely to maintain a much more official tone. The volunteers write about whatever they want, whether it is the whole exhibition or an object that particularly grabs their attention.

> NSMM Volunteer Coordinator, IN09

The different language introduced by the blog is a common feature across the museums of the group. The blog seems to have a unique tone of voice that clearly differs from the one of the *Object and Stories* section. 'Lighthearted', 'playful', 'informal', 'plain speaking' is some of the words used to describe the blog content. These are not usually adjectives associated with the official language used in the exhibition gallery, or even in a digital narrative curated by curators. It is interesting how the museum team describes the *Object and Stories* section as the 'curatorial voice' of the museum, in opposition to the more personal and individual tone of the blog. A unique tone of voice that is also adopted by curators when they write for this space.

> Curators know the language is a bit more informal and switch the tone of voice for the blog. They know what the tone of voice is meant to be.

> Kate Campbell Payne, SIM Communication Officer, IN13

Fig. 92 Extract from Let's talk Makaton, a blog post curated by the Explainer team dedicated to a new signing language called Makaton (https://blog.scienceandindustrymuseum.org.uk/lets-talk-makaton, accessed on 30 March 2022).

This more personal, informal and lighthearted approach is also capable of generating multiple perspectives on the topics of the articles. Whereas the *Object and Stories* section is more object-centered, and tends to develop around the collections, the blog gives the opportunity to talk about different themes related to the museum experience, opening new perspectives on what stories a museum should tell (see an example in Fig. 92).

Another interesting dimension of the blog is the interaction with the online users, who often comment, start conversation and share their stories. Emblematic in this sense is the article '*Can you help us with a spectacular collection find?* curated by the archivist Jan Shearsmith who shared his discovery of a set of extraordinary fabric samples of more than 200 years old (see Fig. 93). The collection was purchased by the museum in 1999 but very little was known about them: the blog post invited to help the museum to have more information about these fabrics. The invitation to contribute and the mystery around this extraordinary collection generated a lot of insights from online users, who commented the blog post revealing the language of one of the labels, and also shared information on other museums that collect similar fabrics.

The text within the figure reads:

This last one is particularly intriguing—the centre panel appears to depict a specific place, and the floral garland is beautifully printed with very accurate illustrations of the flowers.

I would love to do more research on this amazing collection, and it might well be an entry that I come back to, but in the mean time we thought we'd ask you to help.

Do you have any information on the Williamson Brothers company? Do you know what the flowers are in the patterns or the garland? Do you recognise the place or the monument in that central panel? What is the language on the label and what does it say?

Any of this would improve our catalogue description and help inform researchers, the public and ourselves about this spectacular set of samples, so please leave us a comment below.

Marie 4 MARCH 2019 AT 18.38 — REPLY

Beautiful textile patterns – and that they are over 200 years old is an amazing test to how they have been preserved. Not that I'm an expert, but the writing looks as if it might be Hebrew to me.

Kate Campbell-Payne 6 MARCH 2019 AT 11.06 — REPLY

Thanks Marie. Jan asked me to pass on the below:
Thank you for your response. I do have to say that we are continually surprised at the variety of colours we find in some of the earlier collections we have here, even samples of textiles produced during the Victorian period can be astonishing. It has been suggested that the language on the label is Bengali, however we shall bear yours in mind.
Thanks again.
Jan

Animesh Chatterjee 6 MARCH 2019 AT 14.07 — REPLY

The whole collection is beautiful. The label in Bangla reads: "Robert Barber and Brother", and "Coloured (produced) in a factory in Manchester".

Mr James Buchanan 4 APRIL 2019 AT 23.01 — REPLY

The National Archives at Kew have some Board of Trade (BT 44) Design Registers of printed fabrics – patented designs, registered in the 1840s, made by many well known printers operating in Lancashire, Yorkshire and in Scotland, that I looked through a few years ago. The samples you have displayed, remind me of some of the samples that I was very interested to be able to view, when I spent a couple of afternoons at the archives.

Fig. 93 An extract from the blog post *Can you help us with a spectacular collection find?* and some of the comments of the online users (https://blog.scienceandindustrymuseum.org.uk/can-you-help-us-with-a-spectacular-collection-find, accessed on 30 March 2022).

All these different experiences show how the blog has become a truly thriving space where the museum team could experiment a new relationship with online audiences, who are not only passive receivers of the content but can become themselves active contributors and content creators as well, just as happens on social media. A new category of audiences that do not necessarily have to be or become physical visitors:

> The blog has a lot more of an international audience as well, because it may not be people who are in a position to come to this museum; it might be people who just happen to be interested in some particular topic that we are experts on.
>
> Eleanor Mitchell, NSMM Web Manager, IN10

The way the members of the Science Museum Group conceive and describe the blog suggest a new conceptualization of the museum itself, not only as a space to display collections and share curatorial knowledge, but as a platform to exchange ideas, host new voices, stimulate new perspectives on the collections and create a community around the museum who contribute to share and enrich its heritage.

> The museum is a kind of platform for the exchange of ideas - a campfire around which everyone gathers. And digital is obviously there, because one thing digital does really well is creating communities.
>
> John Stack, SMG Digital Director, IN06

6.3.4. New Sonic Practices: the Playlist as a Crowd-Curation Tool

Browsing the blog posts of the museums of the group, one in particular captured my attention. It was a playlist co-created with Twitter users. To celebrate the return of the Rocket locomotive in Manchester, the museum invited Twitter users to share their favorite locomotive-inspired songs, and 30 people answered. All the musical suggestions were collected in a Spotify playlist, and some of the tweets were embedded in the blog post, showing the breadth of the musical inspirations (see Fig. 94).
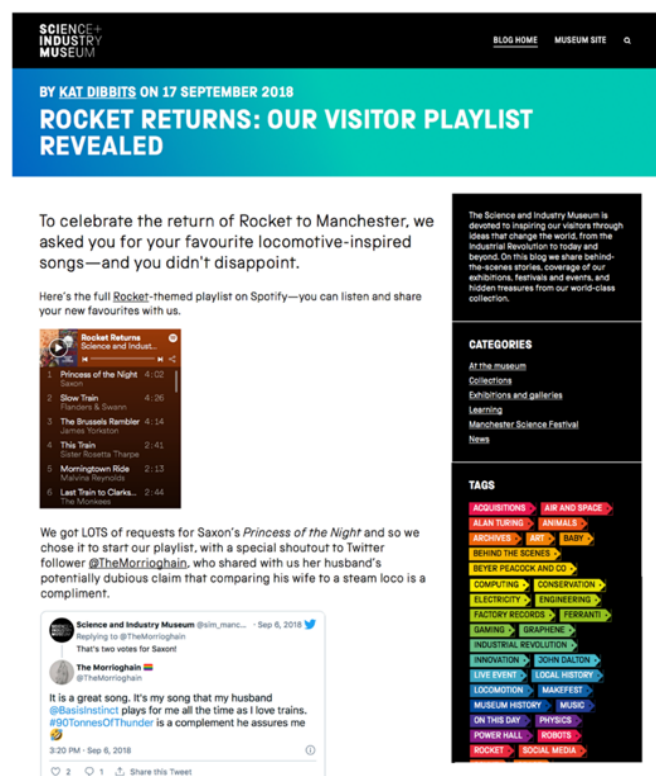
Fig. 94 Extract from the blog post 'Rocket Returns: our visitor playlist revealed', published by the Science and Industry Museum in September 2018 (https://blog.scienceandindustrymuseum.org.uk/rocket-playlist-blog/, accessed on 30 March 2022).

The musical suggestions and the related motivations were ironic, sentimental, creative, and imaginative. They revealed connections with personal memories, life stories, and bonds with loved ones. And most of themes suggested mental images, atmospheres, feelings, without using words. All aspects that do not usually emerge in the narratives around an object of a scientific collection.

Exploring the motivation behind this experiment with the communication team in Manchester, I discovered that this activity was born within the internal museum team as a way to share and enjoy music during the working breaks. Spotify was already used in the museum office to co-create playlists, and the exhibition team started to launch themes from the exhibitions to inspire the music suggestions. Having personally tested the potential of musical sharing to suggest new themes and ideas, as well as the enjoyment and fun associated with it, the communication team proposed to share this activity with audiences, to stimulate interaction.

> That is what we wanted: interaction. Why keep all the fun to ourselves?
>
> Kate Campbell Payne, SIM Communication Officer, IN13

The return of the Rocket locomotive in Manchester was the starting point to collect songs inspired by trains and locomotion. The response of online audiences was immediate, with 29 songs collected from Twitter and many more suggested in the blog post itself, which collected another 15 comments, making this one of the most commented blog posts of the Science and Industry Museum website (see Fig. 95).
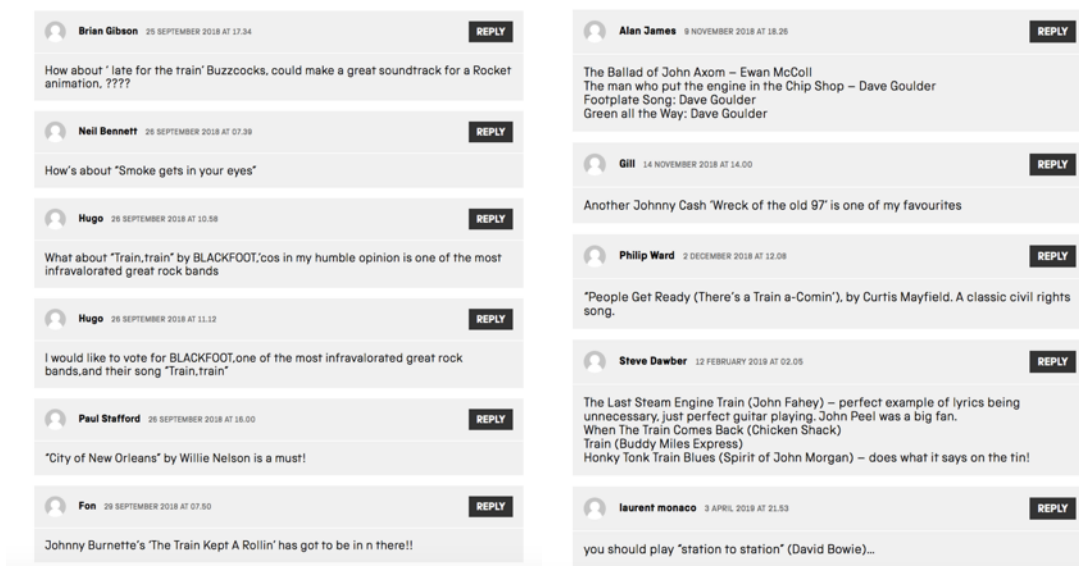
Fig. 95 The comments to the blog post 'Rocket Returns: our visitor playlist revealed' (https://blog.scienceandindustrymuseum.org.uk/rocket-playlist-blog/, accessed on 30 March 2022). Online users have continued to suggest musical associations, responding to the call to action at the end of the article.

The interviews revealed how sound was a key element in making this activity so engaging and successful. Music, in particular, was recognized as the 'bridge' to connect any object of the collection with the personal life of visitors, because it is a fundamental part of everyone's life.

> Everyone listens to music, everyone has their own opinions and passions for music. So, if you can tie in with either steam trains or spaceships or the sunshine, all of which have plenty of music written around…There is an opportunity to get a lot of interaction with people.

Mike Perry, SIM Web Manager, IN13

Another element emerging from the interviews was the ease of this activity. The communication team outlined how associating music with any topic it is 'easy, immediate and simple' and a diffuse practice outside the museum context. One of the inspirational models mentioned in the interview was the BBC radio program 6 Music, which every Sunday collected songs throughout the week around a different theme and then published the user-generated playlist.

> If you have a strong enough theme, it is really easy. People will just respond to it, because music is so embedded in us, and we all have that catalogue of music in our heads. So as soon as you see something, you can associate some kind of music with it quite easily.

Kate Campbell Payne, SIM Communication Officer, IN13

The immediacy of this activity was compared to the complexity of participation in other kinds of call to action launched by the museum on previous occasions. The Web Manager, in particular, mentioned the collection of stories for the fiftieth anniversary of the institution. On that occasion, audiences were invited to email stories from the past, or children's memories of the museum: but only four stories were collected.

> I think of the complexity of asking people to tell a story on email vs just name a song on Twitter with your explanation. It is so much easier to just tweet your song. Whereas people have to stop and think, open the computer, write 200 words, email and maybe try to find a photograph from 10 years ago...

Mike Perry, SIM Web Manger, IN13

Despite the success of this activity, it was not repeated in subsequent occasions, nor did it become a structured approach in online engagement. No further co-created playlist was made after the Rocket Playlist. One of the reasons was the lack of resources: despite the immediacy of the response, the museum team invested a great amount of time and effort in communicating this call to action on different channels. And, after that, the communication

team collected the responses in a blog post: this engagement activity evolved into an online narrative curated by the museum.

The interviews with the other museums' communication departments revealed how the lack of resources to manage all the stages of an online engagement activity is a common issue. The crowd-sourced and participatory activities on social media tended to be sporadic, not structured, and they usually did not collect the responses of the audiences in the online space of the museum, as the Rocket playlist did. Despite the blog being a highly collaborative space, the approach on social media channels appeared to be less experimental and participatory.

> There is some interactivity. But it tends to be for fixed periods of time, so we might do one thing for a day. And that is probably a resourcing issue.

John Stack, SMG Digital Director, IN06

In addition to this, this experiment did not stimulate a reflection with the curatorial department on how this method could be applied in the collection of memories. The involvement of people in the creation of new testimonies seemed to have been confined in Oral History projects. The use of digital in expanding the range of people involved and the type of memories collected turned out to be a quite exciting area worth exploring:

> Although we do oral history projects involving people in the creation of heritage, they tend to be quite small scale. Using digital tools to start to engage the public with areas where we are not actually strong would be really interesting. One of the things digital does well is scale.

John Stack, SMG Digital Director, IN06

Interestingly, the playlist format was again adopted by the curatorial team to give a musical interpretation of two different exhibitions: *Electricity: The spark of life* and *The Sun* (see Fig. 96). These two curatorial playlists show an evolution in terms of the depth and breadth of the musical descriptions, with one of the two articles explaining the thematic connection of each song embedding the YouTube videos in the article.

The co-created playlists experimented by the Science and Industry Museum show two different ways to respond to two key challenges in sound curation. The first one is the opportunity to use sound and music to increase the engagement with the collection and stimulate powerful emotional connection with the museum objects. The second is the ability of sound and music to expand the curatorial insights around the objects and exhibitions, connecting them to different sonic elements and content already published on the web. Both directions deserved to be further explored.
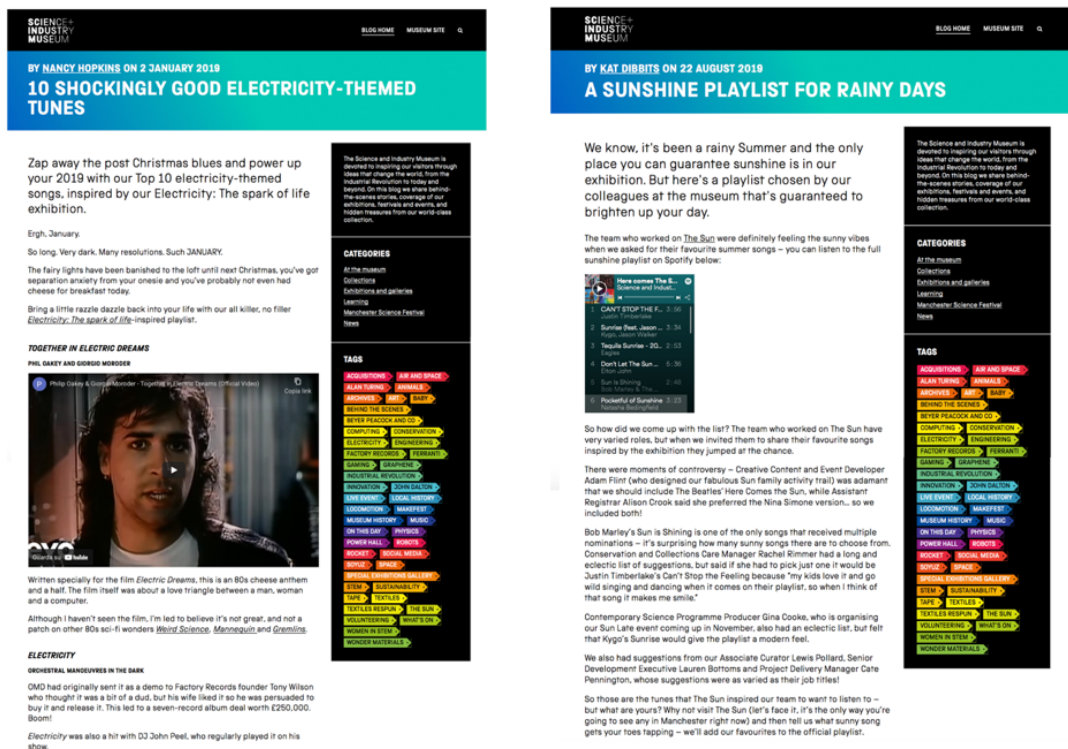
Fig. 96 Extract from the blog post 'A Sunshine playlist for sunny days' and '10 Shockingly good Electricity-themed tunes', which were both internally curated by the Science and Industry Museum (https://blog.scienceandindustrymuseum.org.uk/top-10-electricity-tunes/, accessed on 30 March 2022).

6.4. Conclusions

The data collected at the Science Museum Group shed new light on the specific challenges in the curation of sound-related objects. Two were the key findings of this fieldwork research.

First, the interviews highlighted the growing importance of sound also in the physical collections. Whereas the fieldwork at the British Library helped to understand sound in its intangible and digital dimension, the example of the Sound Technologies collection highlighted the material aspects of sound culture. Our relationship with sound is embedded in a web of objects, technologies and practices that are intrinsically sonic. The specificity of Sound Technologies objects raised new, intriguing issues in terms of preservation, collection and engagement, which the previous museum practices are not able to address. A new thinking is needed.

Second, the findings outlined the role of the digital dimension in addressing these challenges. From the interviews with the curatorial and digital team, online spaces such as the blog or

social media evidently have the power to connect the objects with their sonic nature, offer new ways to conceive the engagement with the collections and foster a participatory approach to curation. This was the starting point of the following research phase at the Science Museum Group, where I was actively involved in the design, implementation and evaluation of a sonic practice in the online spaces. The next two chapters are dedicated to this design experiment.

Act 3

The Research Experiment

Sound 3 Bohemian Rhapsody (1975) is Queen's most popular song, and it is considered one of the greatest rock songs of all time, paving the way to the musical video format. This song was shared by one of the online participants of the #SonicFriday project, who remembered endlessly listening to it on the cassette during the car journeys. Source: Youtube, Queen's official channel.

Chapter 7. #SonicFriday: a Collaborative Story of Sound

> I remember spending hours writing down the lyrics of The Dirty Dancing cassette, relentlessly turning the tape over and pressing fast forward then turning it back all over again.
>
> Social media user, #SonicFriday

> I went into Bradford town centre two times. So quiet. It was kind of scary, because silence can be deafening. It was the lack of sound. That was the strange thing.
>
> Nigel, Museum Volunteer (GD 02)

In the summer of 2020, the #SonicFriday project transformed the National Science and Media Museum's relationship with sound and its audiences. Through three months of creative online engagement with sound, audiences found their voice at a time when the United Kingdom was in pandemic lockdown and all museums in the country had to close their doors.

Inspired by its worldwide collection of Sound Technologies, the museum invited social media users to share memories and stories around their personal relationship with sound culture: from cassettes, CDs and mp3s to digital sampling and lockdown sounds. Each Friday from 26th June to 28th August 2020, the museum's social media channels published an introductory online narrative dedicated to an object or a theme from the collection of Sound Technologies and invited online users to share their musical memories and personal stories.

The response of audiences was unexpected: up to 2,000 users actively involved and 248 sound-related digital memories collected throughout different platforms. These memories not only enriched the collection, giving birth to YouTube playlists, multimedia galleries and sound maps, but they gave life to the objects that, until then, remained silent in the physical galleries. The project allowed the museum to continue engaging audiences during the museum closure resulting from the COVID-19 pandemic, but also offered the opportunity to explore a new relationship with online users and volunteers, who become curators of a collaborative story on sound technologies.

In this chapter I will present the development of the project, following the three main stages of the design process: design, implementation and evaluation. The first section illustrates how the project was designed by the museum team during dedicated design sessions, by showing the reflections and choices for each design dimension. The second section describes how the

project was practically implemented through summer 2020: the engagement activities that have been carried out and the digital narratives that have been developed. The third section highlights the impact of the project on three key areas of museum practice: the new curatorial practices introduced, the change in the relationship with audiences and the emergence of new interpretations of the collection as well as a new concept of heritage.

7.1 Project Design

I will begin by presenting the analysis of the data collected during the five design sessions with the museum team. In particular, I will describe the themes that emerged from the different dimensions under investigation. Each session explored more than one design dimension: however, I guided the participants to focus on specific aspects throughout the process. The first two sessions were mainly dedicated to reflecting on the spaces of the intervention (*Where*) and the type of engagement (*How*). The group then moved on to talk about the participants (*Who*) and the cultural resources to involve (*Which*). The last two sessions were mainly focused on the outputs of the activity (*What*) and the temporal dimension (*When*).

The participants of the sessions were members of curatorial, communication and digital team of the National Science and Media Museum, plus one member of the Science Museum in London who coordinated the overall social media strategy of the Science Museum Group. These three areas – curatorial, communication and digital – were considered key in the practice, and the presence of members of the three departments allowed for interdisciplinary conversations around collections, online engagement and the publication of narratives. The participation of different members and different departments was part of the design methodology, which advocates the exchange of different perspectives and backgrounds, but was also given new attention by the challenging situation the whole museums of the group were facing. Starting from May 2020, in fact, part of the museum team was furloughed to respond to the challenges of the museum closure. Consequently, other members of the museum team were involved to maintain the exchange of perspectives, and at the same time enhanced the role of the researcher. My role in the project, in fact, shifted from 'Facilitator' to 'Project Coordinator' over the design process, in response to the need of the project to be flexible.

7.1.1. Where: the Spaces of the Intervention

One of the first dimensions discussed in the design sessions was the space of the intervention. The experiment was already conceived as having a digital format: the idea was to 'extend' the content of the *Sound Season* exhibitions and explore new opportunities to make people interact with the objects of the Sound Technologies collection.

The opportunity to design the practice as an online extension of the exhibition raised some interesting reflections on the relationship between online and physical spaces. The physical galleries were perceived to have more space constraints and rooted assumptions about what visitors expect from an exhibition. On the other hand, the online dimension showed a greater flexibility, so allowing the museum team to think in more 'experimental' terms.

> Online you can be more experimental. But when you are in the gallery, people want to know what the object is, what it sounds like. So, we are sticking to that.

> Sarah Rawlins, Interpretation Developer, DS 01

In the first design session with the Exhibition Team, it became clear how the online dimension could offer new opportunities to overcome some of the challenges posed by sound. First, the curators immediately recognized that digital platforms could provide the space and time to extend the experience of listening. This was an important need in the section of the exhibition dedicated to synthesizers. In this section, the curators designed a listening post alongside the object aimed at discovering the songs featuring the synthesizers of the collection. While in the gallery space constraints as well as copyright issues limited the listening experience, the related online section could instead have allowed visitors to listen to a full playlist of songs.

> There will be a panel near the listening post that effectively says, 'If you want to hear more, go here' and then they can go to the website and whether it is a YouTube channel or anything else we want to offer them, will be available there.

> Annie Jamieson, Curator of Sound Technologies, DS 01

The extended time for listening was not the only advantage of designing in the online dimension. Together with the possibility of including a greater number of audio and video content related to objects, a further opportunity emerged to involve the online users in the continuous generation of new content.

> Because online is more flexible, we can absolutely create new playlists when we need them, generate user content for those and upload it.

> Sarah Rawlins, Interpretation Developer, DS 01

In physical space, the same participatory dynamics raised instead a series of concerns connected to the lack of space as well as to the complexity of managing visitors' contributions and the fear of confusing them. Interestingly, in the physical gallery the experience of listening and the experience of contributing were conceived as two separate actions, to be designed in different spaces. Whereas in the platform world the boundaries between these actions are clearly blurred: users can listen an online audio content and, at the same time, share a comment or a musical link.

The dichotomy between 'physical' and 'digital' seemed to gradually disappear after the museum closure for the pandemic emergency. While at the beginning the online dimension was conceived as a secondary space, at this later phase it became the only dimension where the museum could design experiences for audiences. This change in context affected the way the museum team conceived digital platforms. From being mainly 'virtual channels' to promote the activities and the collections, they became 'experimental tools' to imagine new ways to interact with the museum and its heritage:

> The first couple of weeks were all about telling people we are closed, do not come to visit us. Then we switched to talking about the ways that you can still interact with the museum, but online, through the online collection, blog posts, videos and online stories.

<div align="right">Will Stanley, Collection Communication Manager, DS 03</div>

The constraint of designing online-only activity thus turned out to be an opportunity to explore new ways to use digital spaces already employed by the museum - the social media platforms and the museum website – and also experiment with new platforms that could extend the participation.

7.1.2. Who: the Participants

The reflection around participants initially re-proposed the same dichotomy between physical and digital dimension. The museum team was used to designing physical activities for physical visitors, and online narratives (such as digital stories and blog articles) for its online audiences. This clear separation between these two dimensions is reflected also in the low degree of interactions among museum departments: in the development of online engagement activities, the digital team did not necessarily work closely with the exhibition team. The highly interdisciplinary nature of the design sessions helped these two teams to connect, stimulating the contamination of different expertise.

In the first design sessions, there was a clear understanding of the opportunity to reach, through the project, the people who could not come to the museum and therefore were not included in the primary audience category, the visitors:

> It also engages people who cannot come, which I think is really important. A lot of our followers are not able to come in the museum and see the exhibition. I think it is a nice way to engage with them, so they do not feel left out.
>
> Cathie Pilkington, Communications Officer, DS 02

However, the nature of the activity challenged the museum team to imagine both dimensions as interconnected and even overlapped. The museum closure during the lockdown in spring 2020 made this challenge even harder, as it was no longer possible to imagine 'physical visitors' from one side and online users on the other. This obstacle turned out to be, in the end, an opportunity to rethink the overall museum audience focusing not on the place of the experience – physical museum vs digital platforms – but on the level of interaction with the collections and the degree of participation.

The participatory nature of the activity encouraged by Platform Thinking discussed in Chapter 4, in fact, challenged the museum team to conceive 'audience' not only as passive recipients of content but as active contributors. This new perspective opened up new opportunities to engage audience groups that, until then, remained marginal. The first group identified by the museum team was the community of sound experts and technology enthusiasts who already supported the curator of Sound Technology in new acquisitions or in deepening the knowledge of the objects. The members of these expert communities were already gathering around thematic groups on social media, and the project offered new ways to involve them and to extend this specialized community. But the activity had also the potential to reach a much wider range of people: the immediacy of interaction through digital platforms and the involvement of sound and music as prompt for conversation could also attract other people who, despite not having specialized knowledge on sound technologies, were willing to share their musical memories online.

> If you ask people about sound technology, you only get hardcore enthusiasts because everyone else does not think about it. This project is a good way to get to a wider range of people, because we are just asking them, what is your favorite song or your best memory?
>
> Annie Jamieson, Curator of Sound Technologies, DS 04

This discussion led to identifying another key group of potential participants: the volunteers. While in the case of social media users, online platforms were functional to reach a new

audience, in the case of the volunteers they offered an alternative way of engagement of an existent group at a time when the traditional modes of volunteering had been curtailed.

> In terms of volunteering, at the moment we are not offering much for them to do. We started to think about developing new opportunities online for people to contribute to and get involved with us. And this project is perfect.
>
> <div align="right">Volunteer Coordinator, DS 05</div>

Although some of the volunteers had already begun to collaborate remotely by authoring a series of blog posts, these contributions were mainly connected to exhibitions and physical activities, whereas the project offered the opportunity to extend their contribution to the collection of new stories inspired by the museum objects. And it is precisely reflecting on the role of the participants that an important reflection arose. The museum team realized that the main benefit of the project could be not only to extend the range of audiences beyond visitors and users who were already following the museum's social media channel, but also to introduce new voices that could enrich and also rethink existing narratives:

> What I find really interesting is this idea of bringing new voices in which are not part of the curatorial or the wider museum team. Those voices need to be brought into the museum.
>
> <div align="right">Volunteer Coordinator, DS 05</div>

7.1.3. How: a New Route for the Engagement

Since the first design sessions, it became clear how this project offered a new way of conceiving the engagement with the collections, which was different both from the type of interaction offered both in the museum and in digital platforms. One of the first differences noted by the museum team was the degree of involvement. Sound was immediately identified as a powerful vehicle of emotional engagement, capable of evoking deep personal feelings, especially considering the delicate situation that the entire world was living.

> Sound is so emotive right now. I think it would be an important means of engagement at this time.
>
> <div align="right">Katie Cunning, PR and Press Manager, DS 04</div>

Music, in particular, is part of the daily experience of everyone: it is a universal language that can help to express feelings and evoke powerful memories:

> I think music is the way to get people in, it is the thing that people recognize and engage with.

> Annie Jamieson, Curator of Sound Technologies, DS 04

For this reason, despite the activity was initially conceived around the collection of Sound Technologies, in the first design sessions the museum team reflected on the opportunity to include also other museum collections, that could be brought to life by sound:

> There is something quite nice about sound tracking photographs, how we can bring the past to life by giving it a soundscape. It is going against the grain.

> Sarah Ledjmi, Associate Curator of Sound and Vision Gallery, DS 02

Evidently, the museum team were attracted to the possibility of using sound and music as a new language not only to tell the story of the objects, but also to invite participants themselves to offer their own musical interpretations.

> On Twitter sometimes people put a picture and then challenge people to caption this, and people make different captions. This would be a kind of musical caption.

> Sarah Ledjmi, Associate Curator of Sound and Vision Gallery, DS 02

Designing with sound in mind seemed to have unleashed an unconscious desire to overturn traditional practices, to rethink what was taken for granted, and even to criticize some of the existent interpretations.

> It would be a way of seeing how people interpret our objects through music. There could be different meanings for the same thing.

> Cathie Pilkington, Communications Officer, DS 02

The curiosity and interest around this new perspective raised an important question about the value of people's contributions to the museum. And it is reflecting on the opportunity to collect and preserve people's musical interpretations, that the museum team realized that this new way of engagement involved two key areas for the museum: the collection and curation of new heritage.

> There is something really interesting about this engagement activity having value in and of itself. This is collecting. This is curating. This is engaging people.

> Sarah Ledjmi, Associate Curator of Sound and Vision Gallery, DS 02

Digital platforms could offer a more 'informal', spontaneous and unstructured way of collecting people's stories. An opportunity that, until then, was reserved for dedicated participatory projects, with a specific aim in mind (for example, collecting oral history

recordings for an exhibition), and which were regulated by specific procedures. It was while discussing what could be the best way to stimulate online users to share their stories that a new design element arose: the prompt. Inspired by the mode of interaction of digital platforms, the prompt was described by the museum team as 'a question-based sentence that people can answer'.

> What we can reasonably do is just break it down into a simple kind of question-based things that people can just answer. What we are looking at is a kind of prompt.

> Elinor Groom, Curator of Television and Broadcast, DS 05

Consequently, the last design sessions were thus dedicated to defining a list of prompts to launch on social media. These prompts, inspired by the objects of the collections and the themes discussed with the curators, turned out to be a key element of the practice. As well as being the key medium of online engagement, these prompts were also adopted to stimulate conversations with volunteers during the weekly coffee mornings, so demonstrating their effectiveness also outside the online environment. To define the prompts, the reflection around cultural assets was pivotal.

7.1.4. Which: from Objects to Themes

The reflection on the emotional power of sound and music raised a comparison with the collections of the museum. Compared to sound and music, the objects on display appeared much less capable of involving at a deep personal level:

> I think the reason so much of our kit is so unlovable is the fact that we just collected examples of all big developments in sound technology. But it is just not tied to people, it is not tied to use.

> Sarah Ledjmi, Associate Curator of Sound and Vision Gallery, DS 02

The concept of 'history of use' was introduced since the earliest design sessions and gradually affected the way in which curators conceive the narratives. The Science Museum Group collects objects and technologies that represent fundamental evolutions in science and technology. Consequently, the narratives emerging from the objects were mainly focus on the story of their invention. The introduction of music in the narrative, instead, offered the opportunity to create a profound connection with these technologies which, at different times, were part of people's lives.

> I had a Walkman, you had a Walkman, we all had a Walkman. And then our memories of the Walkman with a big W are part of our heritage and they are just as valid information as the history of this specific object we have in the collection. Because the stories of usage are just as important as the stories of invention, which are the stories that we have always told.

Sarah Ledjmi, Associate Curator of Sound and Vision Gallery, DS 02

Collecting and displaying stories of usage was a challenge that the museum was already facing in the design of the new Sound and Vision Gallery. The curatorial team was trying to identify new ways to bring life to objects by collecting people's memories of usage. The opportunity to employ digital platforms opened up entirely new ways to gather this kind of material. This is why the first objects suggested to be used in the project were precisely the most popular audio technologies, from cassettes to the Walkman, to CDs and the first mp3 players. The wide use of these technologies could stimulate the memories of different generations and express the evolution in the consumption of music.

> I have some songs that connect to the Walkman because I used to listen to them on tapes.

Volunteer Coordinator, DS 02

The focus on what objects could be closest to people also raised the theme of live music. In this case, the prompt could be obviously connected with series of object in the Sound Technologies collection – digital mixer, microphones, amplifiers – but the museum team realized that it could also spark key discussions on the economic crisis that the sector was facing and on the emergence of alternative ways to create and listen to music together.

> With Glastonbury being canceled this year, this may be a nice time to launch this theme. I imagine a lot of people being quite nostalgic about gigs.

Katie Canning, PR and Press Manager, DS 04

The importance of themes over objects was a fundamental step in the design process. Starting from the third design session, the curatorial team together with the communication team started to identify a series of themes that were in some way connected with the collection but not necessarily represented by a specific object. The most significant example of this changed perspective was the suggestion of a theme that could stimulate memories around personal relationships with sound:

> I would also like to include something about sound more generally, to get people thinking outside of just music. What is the most comforting sound you have ever heard, is the sound of your grandfather's clock, all this kind of thing.

Annie Jamieson, Curator of Sound Technologies, DS 04

Interestingly, this focus on themes appeared to work very effectively with the means of engagement through 'prompts'. The physical collections were not the focus of the activity but became prompts to stimulate the sharing of memories.

> We could think about whether we can pull something from collections into the weekly call for contributions. Just showing how these things are connected to collections.

Annie Jamieson, Curator of Sound Technologies, DS 04

The wide range of themes proposed by the museum team between the third and fifth design sessions represent a good mix of more technologically grounded themes – such as digital sampling and electronic music – to more general experiential themes – such as the *Sounds of my Quarantine* or music on the train. The following table summarizes the 10 themes discussed during the design sessions: eight of them were then refined and selected for the project.

Categories	Themes	Connection with the SMG collection	Connection with a specific museum
Music and sonic experience	Throwback live music	Midas XL3 mixing console	NSMM
	Music in Quarantine	No specific object	All museums
	My favorite Train soundtrack	No specific object	Railway Museum
	My everyday sounds	No specific object	All museums
New sonorities	Electric stories of music	Oberheim OBX-a	NSMM
	I love digital sampling	Fairlight CMI	NSMM
Audio formats	Best on vinyl	One of the vinyls of the collection	SIM
	Memories from your tape player	Walkman	NSMM
	My first CD	CD player	NSMM
	Most played song on my iPod	iPod	SM

Table 10 The themes for #SonicFriday suggested in the design session.

7.1.5 What: Sonic Narratives and Digital Memories

The reflection on the outputs of the activities focused around two main dimensions: the creation of new sonic narratives of the objects to be published online, and the collection of people's memories to enrich the existing collections and future exhibitions.

The first dimension had, from the very beginning, a strong curatorial direction. The idea was to extend the content of a specific section of the *Sound Season* exhibitions, by creating thematic playlists to publish on the blog. The articles were intended to tell the story of the pieces of music composed using the synthesizers of the collection, embedding YouTube videos directly into the web page.

> One of the things that always frustrates me is that most of our objects do not work anymore. They are switched off. You do not hear the sounds that they make. So being able to include videos of the sounds that these objects would make, when you can see a picture of the objects as well, it would be really interesting.
>
> Will Stanley, Collection Communication Manager, DS 03

Initially these curatorial playlists were only conceived within the blog space. After the museum closure and the subsequent decision to adopt social media as the main engagement channels, the communication team reflected on the opportunity to create a shorter version of the playlist narrative on social media, by publishing a series of Twitter Threads:

> I have been doing some experiments with threads on Twitter, just to tell stories. I did one last week for women photographers for the International Women Day. And I just literally tweeted different women photographers work, and it did really well. People engaged with that.
>
> Cathy Pilkington, Communications Officer, DS 04

Regarding the second dimension, the collection of people's memories, the participatory nature of the activity required a thorough reflection on the value of these contributions and the opportunity to collect them for future use. Both the curatorial, communication and digital team were all convinced that the project would have produced a sizable amount of user-generated content, which the museum could use to enrich the narratives of the collection.

> One thing to bear in mind is that collecting activity will definitely stop during this period of furlough. So, if we have a sort of collecting activity of these memories from people, we could think about incorporating it into the collections and connect to that in the exhibition next year.
>
> Annie Jamieson, Curator of Sound Technologies, DS 05

At the same time the museum team seemed to be deeply aware of the complexity of dealing with this kind of contribution. Despite the communications team being familiar with the conversations that a museum post might stimulate, they were less confident with the process of collecting social media content. The first issue they focused on regarded copyright: the invitation to share a memory, in fact, did not authorize the museum to use it in a different context. The curatorial team was already exploring this emerging issue in another project aimed at collecting a social media dataset:

> We need to maintain baseline ethical best practice, which is just we do not presume that people know that we are taking their reminiscences and using them for something else.

<div align="right">Elinor Groom, Curator of Television and Broadcast, DS 05</div>

A further complexity dealt with the nature of the contributions. While the format of an oral history was well known by curators – an audio or video recording – this type of content was an uncharted territory:

> What sort of format do we think we are collecting? What are we inviting people to give us?

<div align="right">Annie Jamieson, Curator of Sound Technologies, DS 04</div>

To answer this question, a fundamental step was the analysis of a small dataset of social media posts collected between the second and third design session. Using the hashtag search on Instagram (see Fig. 97), I collected a series of posts connected to the objects and the themes that the museum team had started to consider – Walkman, cassette players, live music, music in quarantine – and I shared them during the third design session.

The collective discussion around these examples saw the early emergence of a key concept that the implementation phase contributed to shape in its final form: the concept of digital memory. A type of memory shared by an online user in the form of a comment or a social media post and made of different digital elements: a textual description, an image and, in the case of this project, also a musical link.
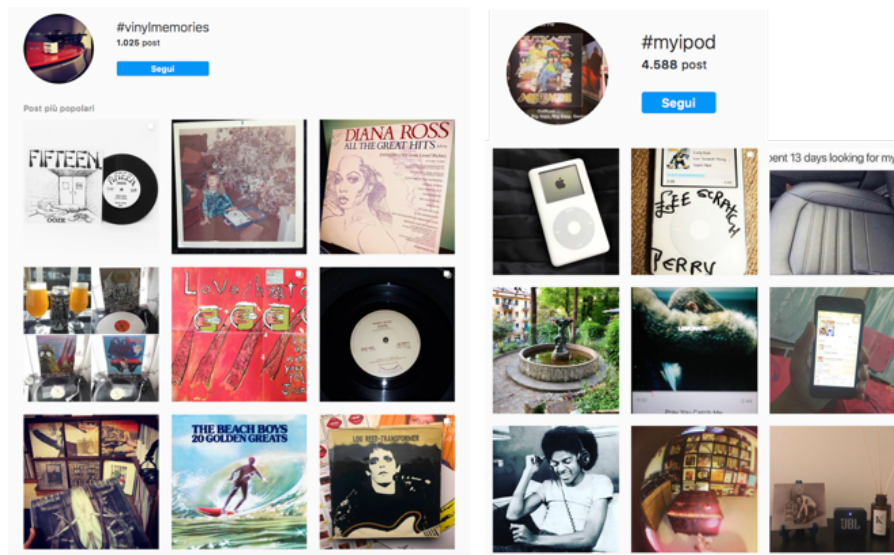
Fig. 97 The hashtag search undertook in May 2020, between the second and third design session (https://www.instagram.com/explore/tags/viniylmemories; https://www.instagram.com/explore/tags/walkman, accessed on 15 May 2020). The hashtags used (#walkman, #myipod #vinylmemories, #cassettememories) were connected with the themes identified by the museum team.

The sonic nature of the memory, in particular, stimulated a fascinating discussion around the value of the audio element. If from one hand some of the participants conceived the musical interpretation as having value in itself, others outlined the importance of the memory connected to the songs: only by reading the comment of the user one could understand the story and the feelings enclosed in that particular music.

> It is just going to be a playlist of just like songs. But how do we bring the stories behind the songs…
>
> Sarah Ledjmi, Associate Curator of Sound and Vision Gallery, DS 02

In light of this, the digital team identified the blog as the most suitable space for hosting not only the curatorial playlists, but also people's contributions. In the same way the web page could describe the story connected to a particular YouTube video, it could also be used to publish the description of a sound, or a music shared by a social media user:

> In terms of having a web page to bring all these elements together, I definitely think the blog is the right place.
>
> Eleanor Mitchell, Website Manager, DS 05

7.1.6 When: #SonicFriday

The timing of the overall project depended on the agreed schedule of my funded research placement, which took place in seven months between March and October 2020. The summer season was thus identified as the most suitable period for the implementation phase.

When the *Sound Season* exhibition was postponed, the museum team reflected on the importance of modeling the project on the specific temporality of social media. During the fourth and fifth design sessions, examples of social media challenges and online campaigns were brought into discussion for their ability to articulate different themes in a specific range of time. The museum team immediately realized how this specific format allowed different themes of the project to alternate at regular intervals, and also to 'tune' the audience towards a different form of interaction.

> I guess the key thing would be to get people used to the idea that there will be something about sound and music once a week and so they are primed to expect that at regular intervals. We hope that they can come back and engage with whatever it is.
>
> Annie Jamieson, Curator of Sound Technologies, DS 04

Social media challenges tend to take place over a short time frame (usually a week or, in certain cases, a month, as shown in Fig. 98). The museum team, however, decided to publish a different 'prompt' on a weekly basis during the summer season, to give audiences time to get used to this new way of interaction.

> We can put a shout out on Twitter or other social media channels once a week on a different theme each week with a couple of hashtags.
>
> Elinor Groom, Curator of Television and Broadcast, DS 05

Fig. 98 Examples of sound and museum-related social media challenges (#9dayvinylchallenge, #MuseumWeek, #DolomitesMuseum). These examples were shared with the museum team in the fourth design session to discuss the timing of the activity.

The same weekly call of contributions was adopted also in the conversations with the volunteers, which already took place once a week in the form of 'online coffee mornings'. In this case, the prompts were anticipated in order to collect the first memories from volunteers to launch on social media the week after.

Reflecting on what was the best day of the week to launch the prompts, the museum team agreed on Friday: the last working day before the weekend, when usually the desire to join interactive and fun activities grows.

> I think that if you did it on a Friday, it would be like a fun thing.

> Cathie Pilkington, Communications Officer, DS 06

And it is precisely from Friday that the campaign got its name. A fundamental element of any online campaign is the presence of an overall hashtag as the main umbrella under which all the content published during the campaign could be identified. That is how #SonicFriday was born: a unique hashtag which could immediately express the sonic nature of the activity as well as the day of the week when the museum would have invited users to participate.

7.2. Sonic Friday in the Making: Implementation

#SonicFriday was officially launched on Friday 26 June 2020 - the day the Glastonbury Festival should have taken place - and continued throughout the summer until 28 August 2020. During these months, the museum was closed due to the COVID-19 pandemic emergency (it reopened on 19th August 2020), so the project was brought to life within and thanks to a series of digital platforms, some of them already known by the museum, others which were firstly adopted specifically for this occasion. In addition to the common social platforms - Twitter, Facebook and Instagram - the museum team has, in fact, experimented with other multimedia platforms that allow the listening, sharing and collaborative creation of sounds. The table below summarizes each platform adopted and how it was used in the project.

Platform	Description	Use in the project
Twitter	An American microblogging and social networking service. Registered users can post, share and interact with messages known as 'tweets' and unregistered users can read those that are publicly available. The app allows 'threads' to be created, which are	It was used to share the #SonicFriday prompts through the National Science and Media Museum's profile and invite users to comment on the thread with their memories. The 'thread' function was used to publish

	a series of individual tweets that provide additional content.	playlists and short stories around the objects and themes of the project.
Facebook	One of the first social media and social networking services. Users can create a profile and publish content both publicly and with a restricted group of 'friends'. Users can also join dedicated common-interest groups, communicate with each other with a chat application and follow public pages.	It was used to share the #SonicFriday prompts through the National Science and Media Museum's profile and invite users to comment on the posts with their memories. The platform was also used to intercept dedicated 'Facebook Groups' to involve in the project.
Instagram	Photo and video sharing social networking service owned by Facebook. The app allows its users to upload media and browse users' content by searching hashtags and geographical locations.	It was used to share the #SonicFriday prompts through the National Science and Media Museum's profile and invite users to comment the posts or share their memories using the hashtag of the project.
YouTube	The most popular video-sharing platform owned by Google. It allows users with a Google account to upload their own videos, comment on videos, create playlists and subscribe to other users' channels.	It was used to create thematic playlists dedicated to two synthesisers of the collection. This platform was also used by users to share their musical memories.
Spotify	The world's largest music streaming service provider. It offers digital copyright restricted recorded music and podcasts from record labels and media companies.	It was used to collect musical memories shared by users to create a collaborative playlist.
Learning Toolbox	A platform for the creation of e-posters and collaborative multimedia galleries. It is used in two main contexts: events & conferences and education & training.	It was used to collect lockdown sounds from the AHRC PhD community during the M4C Digital Research Festival. It was also used at the end of the project to collect and share the digital memories with the museum team.
Padlet	A platform that allows for the creation of collaborative boards and maps where online users can upload any kind of multimedia content (links, video, audio files, etc.).	It was used to give social media users the opportunity to upload their own sounds based on their location, and to collect all the other sounds shared on the other platforms.
Pitter Pattr	A platform that allows the sharing of short audio clips (Sound Snippets) on social media, that can be generated from an original recording but also from existing audio/video content on YouTube, SoundCloud and TikTok.	It was used at the end of the project to share on social media a selection of the sounds previously collected.

Teams	A videoconferencing platform which also offers workspace chat and file storage. It increased its popularity during the COVID-19 pandemic, where many meetings have moved to a virtual environment.	It was used to involve volunteers in a series of thematic conversations around the themes of #SonicFriday.

Table 11 The digital platforms adopted in the #SonicFriday project.

The combined use of these platforms allowed the museum to respond to the main objectives of the project: to stimulate and allow the active contribution of participants around the collection of Sound Technologies, and to unleash the sonic nature of the objects, by experimenting with new ways of telling their story.

The following sections describe both dimensions. The first section (7.2.1) describes a series of engagement activities to involve the participants identified in the design phase - online users and volunteers. In the second (7.2.2) I will illustrate the creation, in parallel, of digital sonic narratives that were inspired by the themes defined by the museum team. In both dimensions, the use of sound sharing platforms opened new, unexpected opportunities.

7.2.1 Engagement Activities

Three were the main types of engagement activities undertaken in the project: the launch of eight different social media prompts which involved Twitter, Facebook and Instagram users respectively; the online conversations on Teams attended by small group of museum volunteers; and the involvement of dedicated Facebook groups which gathered a series of communities of interest connected with the #SonicFriday themes. Each engagement activity is described in the following sections.

7.2.1.1 Social Media Prompts

The social media prompts were a fundamental element of #SonicFriday engagement. The project team wrote eight 'prompts' to launch on the three social media platforms chosen for the project – Twitter, Facebook and Instagram. To adapt the prompt to the language of social media, the text was conceived to be engaging, short, and question-based: each one was

composed by an image from the collection or an animation representing the theme of the week, and it contained an invite to share personal memories.
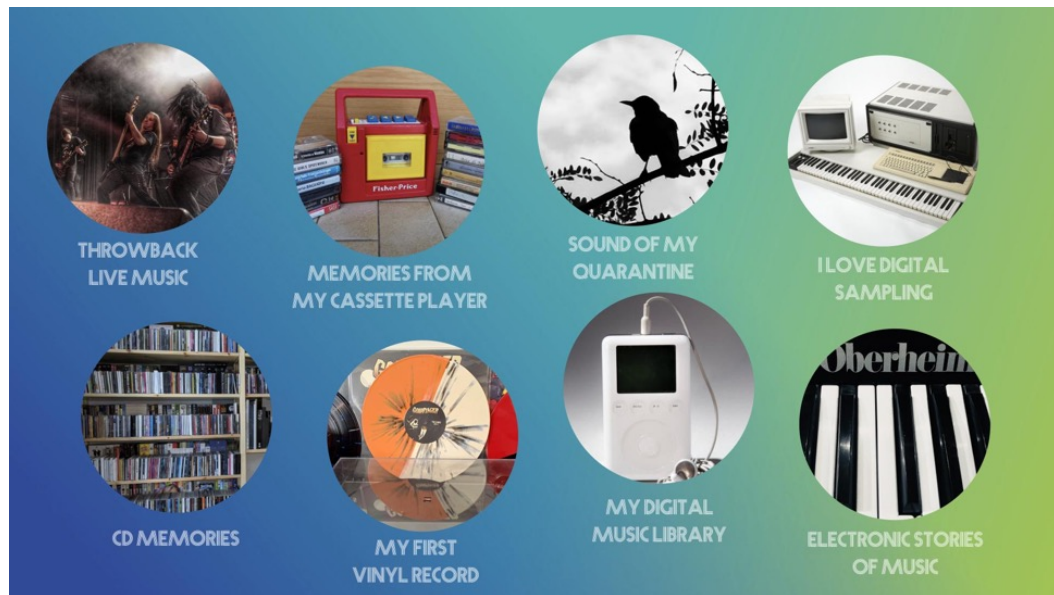
Fig. 99 The eight themes of the #SonicFriday project. © Stefania Zardini Lacedelli

The prompts were developed around eight themes that were identified during the design sessions. To stimulate participation, the museum team chose the themes that could be closest to people's life experience and tried to identify a connection with specific events or anniversaries.

The cancellation of the Glastonbury Festival – which should have taken place on 26th June 2020 - gave the hook to start from the memories of live music, a theme around which people were particularly sensitive and nostalgic. To express the museum's desire to give space to people's experience, the image chosen for the prompt was not an object of the collection, but a picture of a music festival taken by the social media manager, as shown in Fig. 100.

This first invitation to share evoked incredibly detailed and nostalgic memories: seven online users responded to the prompt across the different platforms, sharing anecdotes from their first festivals and publishing images of gigs and memorabilia.

Fig. 100 The Throwback Live Music prompt published on 26th June 2020
(https://www.facebook.com/nationalscienceandmediamuseum/posts/10164011275245551, accessed on
30 March 2022).

The Walkman anniversary, the week after, offered the opportunity to launch one of the themes dedicated to the evolution of the audio formats: the cassette. In this case, the prompt was shaped around the musical memories connected to tapes, Walkman and cassette player. To stimulate users to share, on Twitter this prompt was followed by a series of memories from the volunteers, which were shared in the thread (see Fig. 101).
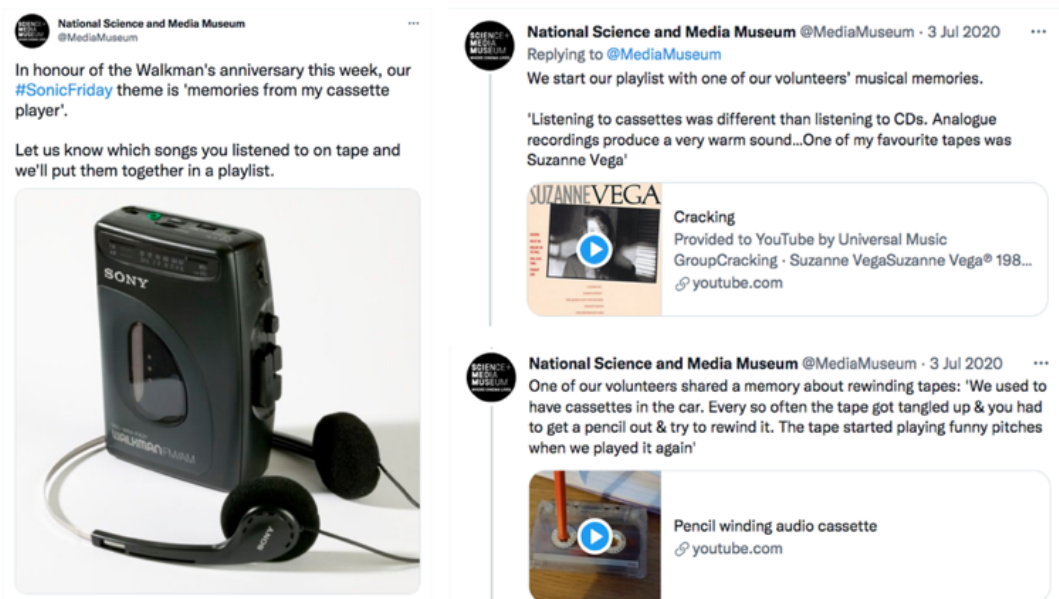
Fig. 101 The 'Memories from my cassette player' prompt published on 3rd July 2020. The screenshot includes two excerpts from the volunteers' memories shared in the Twitter thread (https://twitter.com/MediaMuseum/status/1278978187238785024, accessed on 30 March 2022).

This prompt received a large response from online users: 90 musical memories were collected from the different platforms. Most of these contributions included a YouTube link to songs that people originally listened to on cassettes, which the museum team re-published in a Spotify playlist at the end of the day, as shown in Fig. 102.
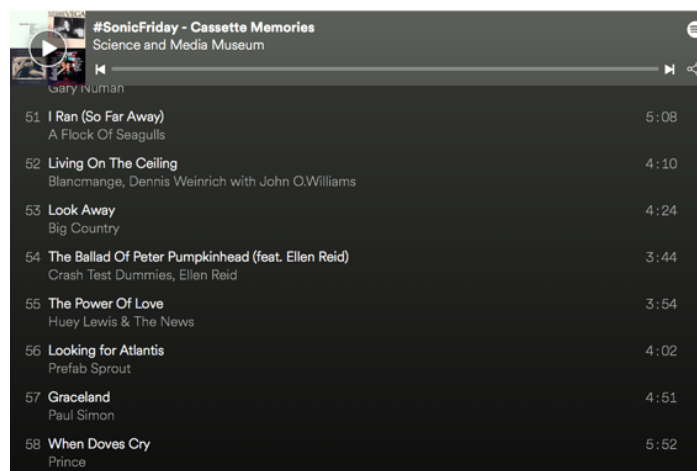
Fig. 102 The Spotify playlist dedicated to cassettes memories including 58 songs (http://spoti.fi/2ZSCCJT, accessed on 30 March 2022).

The third theme was inspired by the World Listening Day, an international celebration of listening promoted by the World Listening Project and inspired by the work of the Canadian composer Murray Schafer. This worldwide invitation to pay attention to the sounds of the environment offered the museum the opportunity to launch one of the most delicate themes emerged during the design sessions: the sounds of my quarantine, an invite to record and share the sounds of people's personal lockdown (see Fig. 103). From domestic sounds to the sounds of the surroundings, to the music listened to at home.

Fig. 103 The 'Sounds of my Quarantine' prompt, published on 17th July 2020
(https://www.facebook.com/nationalscienceandmediamuseum/posts/10164124424045551, accessed on
30 March 2022).

This theme added a level of complexity to participation, since the sharing of audio files is not currently available on the social media adopted in the project. To allow users to share mp3 files, a collaborative Padlet map was published in the thread, inviting them to upload their sound files directly on this platform. Despite this further complexity, audiences found their way to share their sonic experience: some of them using the map, some others sharing YouTube links to songs they listened during quarantine, or simply describing sounds in their words. Three users who were more confident with audio recording shared a link to their SoundCloud profile where they previously uploaded their own recordings.

After three weeks of #SonicFriday, the audience got already used to this kind of engagement. The museum was ready to launch one of the most technologically grounded themes, putting on stage one of the 'Stars' of the Sound Technologies collection: the Fairlight CMI synthesizer. To introduce this iconic object, the museum team shared a playlist dedicated to the songs composed with this synthesizer, which was previously published on the blog, as shown in Fig. 104. Despite the Fairlight CMI was used only by a limited circle of musicians and sound engineers, it marked a seminal moment in the story of digital synthesis and opened the way to digital sampling: this was precisely the focus of the collection of memories. This prompt acted as a trigger for memories on other digital samplers like Atari or EPS, that in some cases were present in the museum collection.

Fig. 104 The 'I love digital sampling' prompt published on 31st July. The screenshot includes two excerpts from the playlist shared in the Twitter thread (https://twitter.com/MediaMuseum/status/1286588939281805312, accessed on 30 March 2022).

The fifth and sixth and seventh prompts invited users to share memories around three other popular audio formats: the CD (see Fig. 105), the vinyl and the first mp3 players (see Fig. 106). This was, again, the opportunity to share in the thread a series of anecdotes related to their invention as well as stories shared by the volunteers. These audio formats stimulated overall other 80 memories of usage, which were often accompanied by photographs of their own CD and vinyl collections, together with images of the first mp3 devices which people still conserved, turned off, in their drawers.

Fig. 105 The CD memories prompt published on 31st July. The screenshot includes two excerpts from the short story shared in the Twitter thread (https://twitter.com/MediaMuseum/status/1289132134184222720, accessed on 30 March 2022).
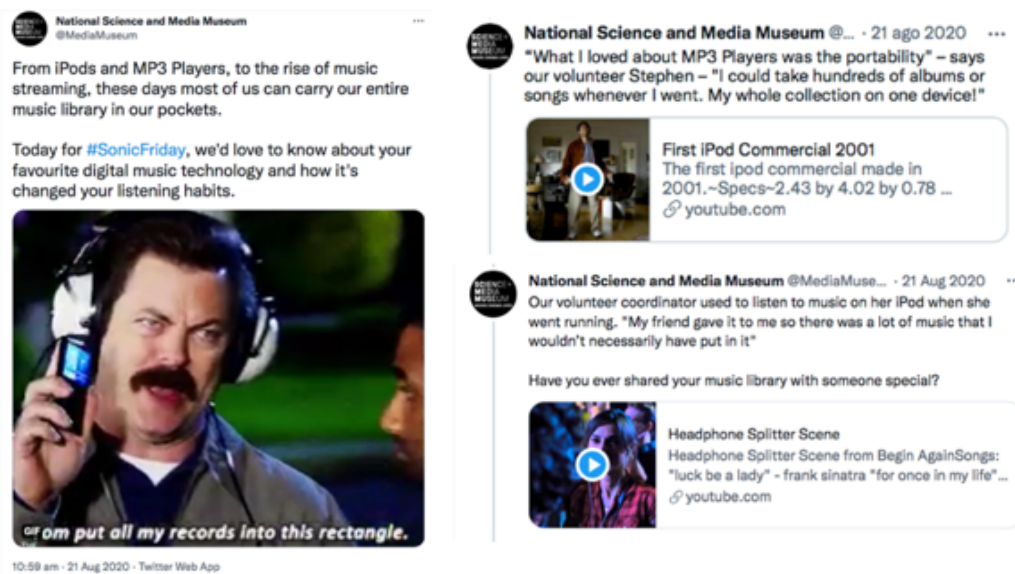
Fig. 106 'My Digital Library' prompt published on 21ᵗʰ August 2020. The screenshot includes two excerpts from the volunteers' memories shared in the Twitter thread (https://twitter.com/MediaMuseum/status/1296733715360612353, accessed on 30 March 2022).

#SonicFriday ended with another iconic object of the Sound Technologies collection, the Oberheim OB-Xa, one of the first polyphonic synthesisers. Also in this case, another curatorial playlist was created to introduce the history of this synthesiser and its influence on popular music, and it functioned as a prompt to celebrate the advent of electronic music (see Fig. 107).
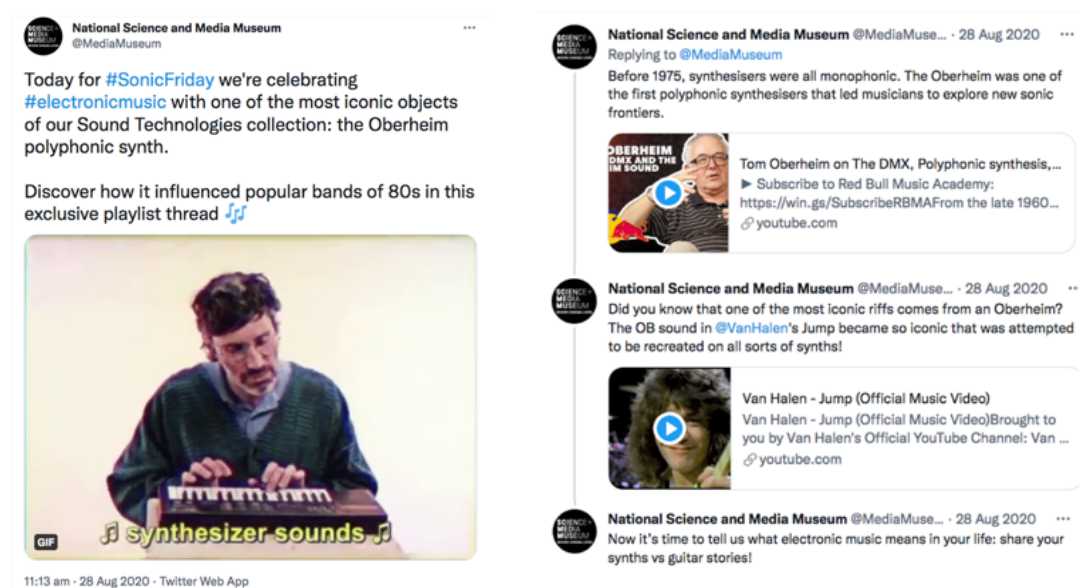
Fig. 107 'Electronic Music' prompt published on 28ˢᵗ August 2020. The screenshot includes two excerpts from the playlist shared in the Twitter thread (https://twitter.com/MediaMuseum/status/1292737771824668673, accessed on 30 March 2022).

7.2.1.2 The Volunteers Memories

The project also proved to be an effective way to involve the museum volunteers remotely during the museum closure. Parallel to the social media launches, in fact, the #SonicFriday prompts were the starting point for a series of online conversations with the volunteers, which took place on Teams in July and August 2020. The aim of these sessions was to foster conversations around objects and themes of #SonicFriday. During these online conversations, the volunteers helped the museum team to focus the prompt before the official launch on social media, as well as provided their own memories to share in the threads, as shown in Fig. 108.

Fig. 108 Screenshots from the volunteers' conversations.

Although the interaction tool was still digital – via a videoconferencing platform - the engagement in this case was much more similar to the participatory workshops that were usually organized in the museum. These sessions, in particular, were compared to the reminiscence sessions monthly organized by the Learning team: also in this activity, the objects of the collections were used to evoke memories and prompt conversations. However, the aim of the reminiscence sessions was to stimulate social interaction among groups of older adults and the focus was not the collection of memories. In the #SonicFriday conversations, instead, the volunteers were aware that their contributions would have been recorded and transcribed, and then transformed into 'small stories' that would have been shared on social media.

> We used to have cassettes on car journeys. The main thing that I remember is that every so often the cassette got tangled up and you had to get a pencil out and try to rewind it. And then of course the tape started stretching and when you played it you began hearing funny pitches.

> Museum Volunteer 03, VS 01

> I remember buying my iPod in a dedicated Apple retail store here in Bradford. I had 10% education discount on it. I think it was a fourth generation Click wheel iPod. At that time there was a new one in which you could actually store digital photographs. And I thought 'Who the hell wants to store photographs on some kind of digital machine?'.

<div align="right">Museum Volunteer 02, VS 05</div>

Over the summer of 2020, five volunteer conversations were organized around five different themes of #SonicFriday: live music, the memories related to cassettes, CDs and iPod and the sounds of quarantine. The order of the topics was chosen in conjunction with the prompts to be launched the following week on social media. A selection of the volunteers' memories was then published in the Twitter threads to encourage users to share their own stories. Four volunteers took part in these conversations, participated with great interest and were keen to share their experiences with sound technologies. In addition to telling their memories, in some cases the volunteers presented their objects by showing them on the camera - CDs, cassettes, gramophones, iPods - and subsequently sent the images so that the museum could publish them in the #SonicFriday prompt, as shown in Fig. 109.

Fig. 109 The picture of the CD case sent by one of the volunteers and shared in the Twitter thread dedicated to CD memories (https://twitter.com/MediaMuseum/status/1289132134184222720, accessed on 30 March 2022).

7.2.1.3 The Facebook Groups

Some of the prompts were also shared in dedicated Facebook Groups which were thematically related to the themes of #SonicFriday. Since only the members of Facebook Groups can share content, once I scouted for the most interesting groups, I asked to become a member of them through my personal Facebook profile. Overall, I identified 15 groups; see Table 3.

Name of the Group	Members (September 2020)	Public/ Private	#SonicFriday prompt shared
UK and Ireland Soundscape Community	1.100	Public	Sounds of my Quarantine
Listening across disciplines II	2.100	Public	Sounds of my Quarantine
World Listening Project	2.600	Public	Sounds of my Quarantine
Sound Art from Field Recording	3.400	Private	Sounds of my Quarantine
Sound Practice Research (SPR)	2.100	Public	Sounds of my Quarantine
A quiet position: the act & art of listening	6.100	Public	Sounds of my Quarantine
Synthesizers and Drum Machines	49.500	Private	I love digital sampling, Electric Stories of Music
Fairlight CMI	788	Public	I love digital sampling
Oberheim Synthesiser appreciation group	1200	Private	Electric Stories of Music
The other vinyl Record collectors Club	14.500	Public	Vinyl memories
Audio Cassette revival	5.000	Public	Memories from my Cassette Player
WALKMAN Cassette Player	1.700	Private	Memories from my Cassette Player
Compact Disc Digital Audio	2.500	Private	CD Memories
CD collectors & and music lovers	6.300	Private	CD Memories
iPod Classic	4.200	Public	My digital library

Table 12 The Facebook Groups involved in the #SonicFriday project.

The size of these groups varied from 788 members (Fairlight CMI) to 49.500 (Synthesisers and Drum Machine). Despite it was the smallest group in terms of participants, the Fairlight CMI group was the most responsive in terms of contributions. The sharing of the Fairlight's post triggered expert conversations among synth enthusiasts who shared themselves their knowledge and their Fairlight-related music projects. In particular, two members of this group proactively shared their own projects: a blog with stories from ex-users of the Fairlight and a Facebook page that collects vintage synth advertising (see Fig. 110).
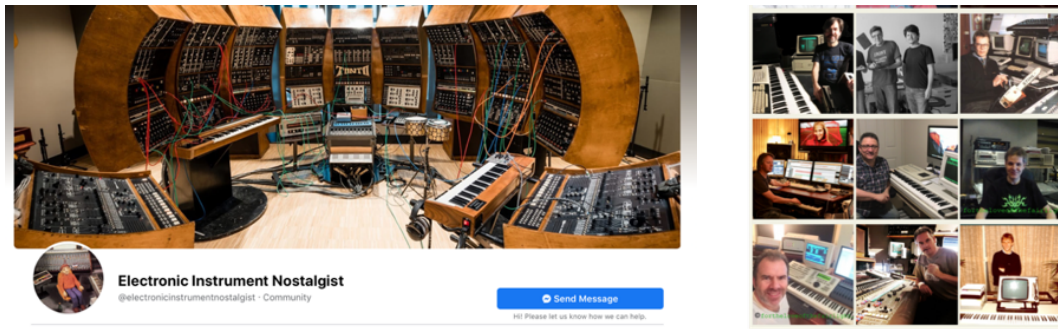
Fig. 110 The Electronic Instrument Nostalgist Facebook page
(https://www.facebook.com/electronicinstrumentnostalgist, accessed on 30 March 2022) and the blog
'For the love of the Fairlight' (https://www.instagram.com/fortheloveofthefairlight, accessed on 30
October 2020) . Both authors were members of the Fairlight CMI Facebook Group and contributed to the
'I love digital sampling' prompt.

Another group that actively responded to the prompt were the UK and Ireland Soundscape
Community and World Listening Project (see Fig. 111), two groups that attract members
particularly sensitive to the practices of listening and field recording. The sharing of the
'Sounds of my Quarantine' prompt stimulated the interest of a field recorder and a sound
artist who were already working on the theme of lockdown sounds, and who subsequently
commented the museum's post sharing their recordings.
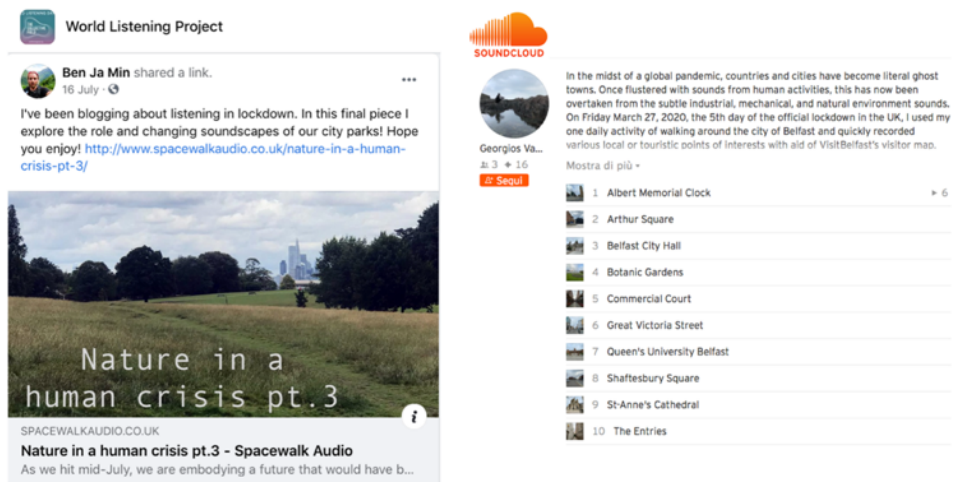
Fig. 111 These contributions to the Sounds of my Quarantine theme were possible thanks to the sharing
of the prompt in two Facebook Groups dedicated to acoustic ecology, soundscape and field recording.
This image shows a contribution in the World Listening Project Facebook Group
(https://www.facebook.com/worldlistening/, accessed on 30 March 2022) and one of the sound artists'
contribution on his SoundCloud profile (https://soundcloud.com/georgiosvaroutsos, accessed on 30
March 2022).

7.2.2. Sound-Based Digital Narratives

One of the aims of the project was to experiment with new sonic ways to tell the story of the objects, exploring the curatorial potential of the audio-sharing platforms. Extending the curation of the collection online required the museum team to familiarize themselves with the new sonic practices born within the ecosystem of platforms which, today, offer many new ways to interact with sound. Each #SonicFriday prompt gave therefore the opportunity to experiment with new sonic narratives such as curatorial playlist, collaborative sound maps, Twitter exhibition and sound memories boards. In some cases, these narratives were created before the launch of the prompt to introduce a specific object of the collection – as in the case of the two playlists dedicated to synthesisers – in other cases they were developed afterwards, to display the contributions of users.

This section will present three main formats experimented in the project: the curatorial playlists, the sound map and the sound memories board.

7.2.2.1 The Curatorial Playlists

The playlist was the first format explored in the project. This narrative was conceived since the first design sessions, in strict connection with the exhibition *Sonic Boom*. The curatorial team recognized in this format the opportunity to connect the synthesisers of the collection with the music they contributed to creating. Each synthesizer collected by the museum, in fact, represents a stepping-stone in the evolution of music: they introduced new sonorities in the musical landscape, revolutionized the way music was created and opened the way to new musical genres. Their story could not be told without music. However, the traditional display of the objects in the physical galleries did not allow to express all these sonic stories, and the creation of a thematic playlist online was identified as the solution to overcome both spatial and copyright constraints.

The platform used to create these thematic playlists was YouTube. Until then, the adoption of YouTube was limited to archiving the video content internally produced by the museum team. The project instead gave the opportunity to explore this platform as a curatorial tool to tell music-related stories. As already experimented by the Science and Industry Museum in 2017, a YouTube video could be embedded in a web page, allowing the museum to describe each song in detail and provide a curatorial insight on how the synthesiser was employed.

Two were the objects of the collection chosen for the experiment: the Oberheim OB-Xa and the Fairlight CMI. These playlists were not intended to be exhaustive, but to offer an overview of the influence of these synthesisers on the evolution of music. The Oberheim playlist (see Fig. 112) shows how the polyphony allowed by this synthesizer led musicians to explore new sonic frontiers and opened the way to new musical genres. The playlist features famous bands such as Queen, The Police, Van Halen, as well as iconic musicians like Prince, Gary Newman and Miles Davis. It also highlights the Oberheim presence in the soundtracks of unforgettable movies such as *The Terminator* and *The Breakfast Club*.
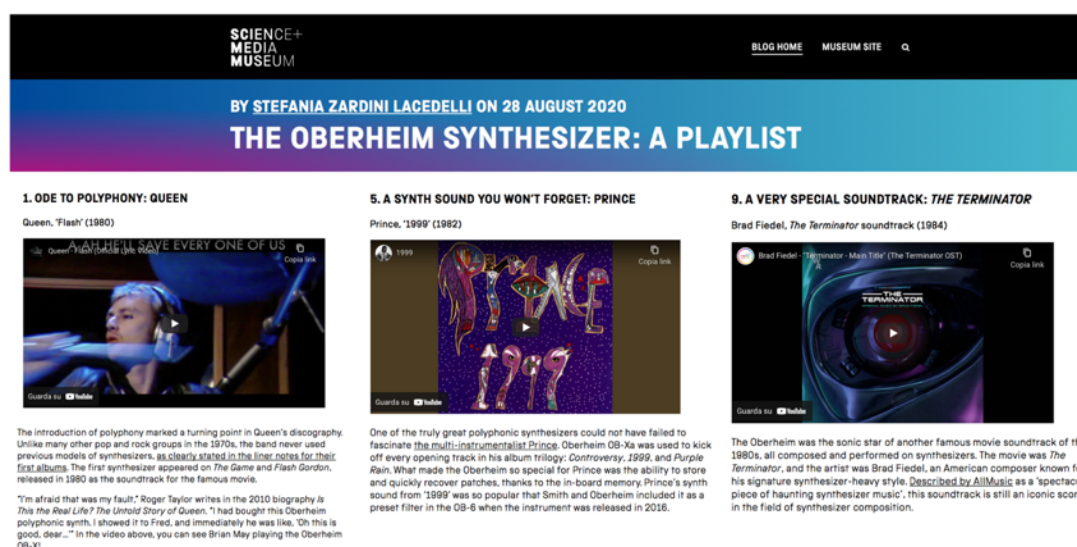
Fig. 112 Three songs featured in the playlist dedicated to the Oberheim, published in the museum blog (https://blog.scienceandmediamuseum.org.uk/the-oberheim-synthesizer-a-playlist, accessed on 30 March 2022).

In a similar way, the Fairlight playlist (see Fig. 113) shows how the two main functionalities of this synthesizer changed forever the production of music: in particular, the opportunity to reproduce any acoustic instrument and the ability to transform any sound into music, paving the way to digital sampling. These new frontiers open by the Fairlight are presented by iconic songs of Peter Gabriel and Kate Bush, as well as in the experimentations of BBC Radiophonic Workshop and Art of Noise. The playlist also tells the story of the famous 'Planet Rock' by Afrika Bambataa, who contributed to making Orchestra Hit - one of the samples available in the Fairlight library – one the most ubiquitous sounds of pop, dance and hip-hop songs.
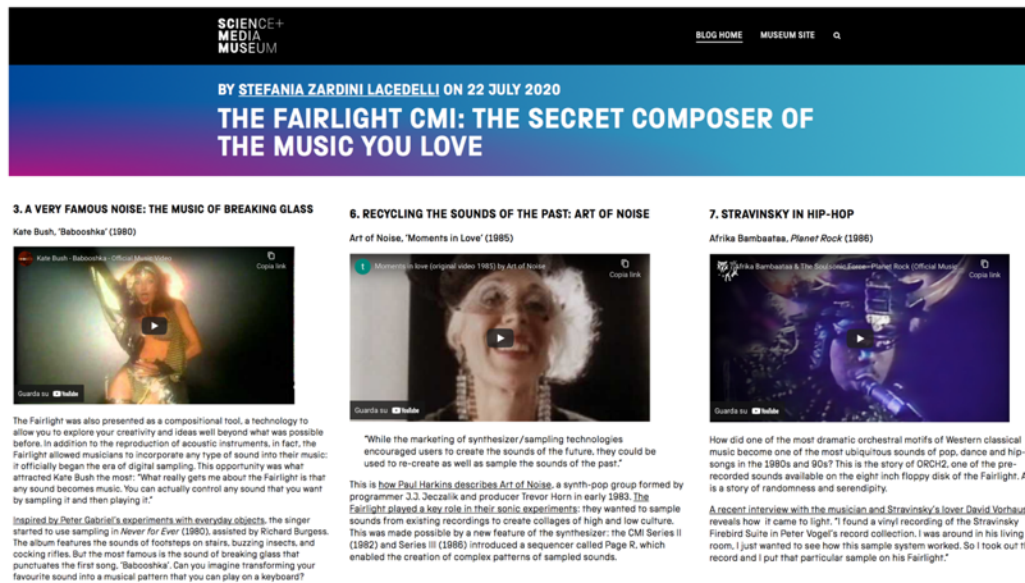
Fig. 113 Three songs featured in the playlist dedicated to the Fairlight CMI, published in the museum blog (https://blog.scienceandmediamuseum.org.uk/fairlight-cmi-playlist, accessed on 30 March 2022).

These two playlists were first published on the museum blog, and then shared on social media in conjunction with the related prompt - "I love Digital Sampling" and "Electronic Stories of Music". The sharing on social media gave the communication team the opportunity to publish a shorter version of the playlist, so experimenting with the format of Twitter exhibitions, as shown in Fig. 114.

Fig. 114 An excerpt from the Twitter thread dedicated to the Fairlight playlist (https://twitter.com/MediaMuseum/status/1286588939281805312, accessed on 30 March 2022).

Both the playlists on the blog and the related versions on Twitter received a great response from online users, stimulating comments and interactions from both synth experts and a broader audience, as shown in Fig. 115. These responses show how the YouTube playlist turned to be an inclusive tool, able to involve people who already knew these technologies, but also people who did not know their story and their significant impact on popular music. This format also gave the opportunity to involve the expert community of synth enthusiasts who already collaborated with the Curator of Sound Technologies: the two playlists published in the project were created involving Dr Paul Harkins and Rob Puricelli, two experts in the story of synthesis and digital sampling.
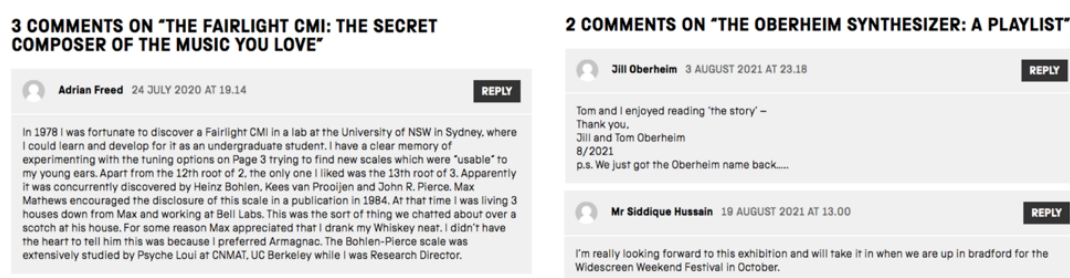
Fig. 115 Online users' comments at the end of the blog posts dedicated to Fairlight CMI and Oberheim playlists. One of the comments is by the inventor of the Oberheim synthsisers (https://blog.scienceandmediamuseum.org.uk/the-oberheim-synthesizer-a-playlist, accessed on 30 March 2022).

7.2.2.2 The Sound Map

The Sound Map was another sonic format experimented in the project. In this case, it was not designed since the beginning, but it was the response to a specific need that emerged during the preparation of one of the prompts. As mentioned earlier, the 'Sounds of my quarantine' theme added a level of complexity to the engagement: the museum team expected to receive, in response to the prompt, not only comments and YouTube links, but also sounds representing the personal sonic experience during the lockdown. Since the sharing of actual audio files was prohibited on any social media platform, the project team chose to use a Padlet map to allow users to upload their own recordings.
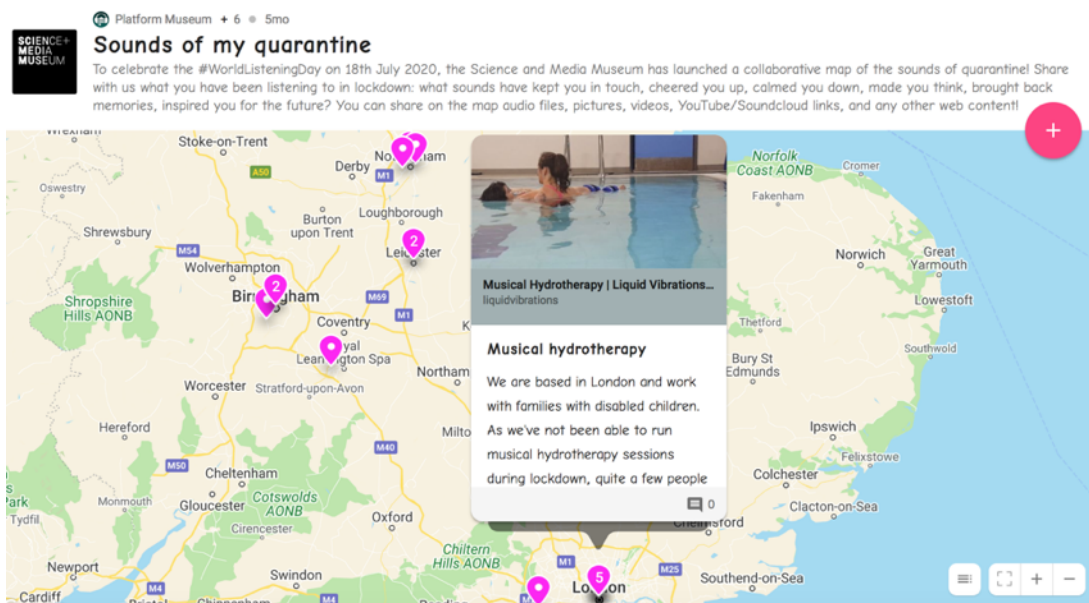
Fig. 116 The collaborative sound map on Padlet (https://padlet.com/platformmuseum/q9unei4soco98xu8, accessed on 30 March 2022)

The Padlet platform (see Fig. 116) allows the creation of collaborative maps where also unregistered users can upload multimedia content – audio, video, images, web links - adding the geolocation. As explored in Chapter 3, sound maps are a well-established means for exploring sounds in their geographical context, and to involve audiences in the creation of new audio heritage. However, this tool has come under some criticism which doubted its real participatory potential, advocating the need to work at community level beyond the technology (Waldock, 2011). The #SonicFriday project responded to these challenges by including the sound map in a larger participatory process which also adopted other methods to collect sound content. In addition to the memories shared by the volunteers in the online conversations, 20 other sounds were collected using Learning Toolbox, a platform for the creation of e-posters. The e-poster 'Sounds of my quarantine' was published the week before the social media launch, during the M4C Research Festival on 13th July. As shown in Fig. 117, the e-poster invited the M4C students and professors attending the online conference to give their contribution to the project, by uploading their sounds directly online.
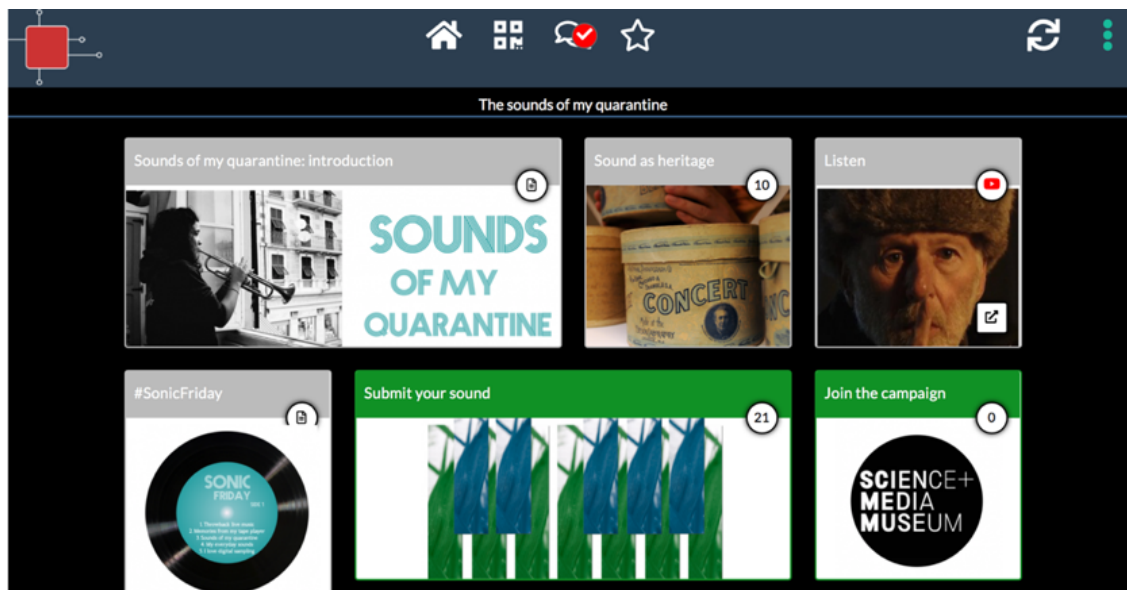
Fig. 117 The e-poster "Sounds of my quarantine" presented in the M4C Digital Research Festival (https://api.ltb.io/show/BHORQ, accessed on 30 March 2022).

The Padlet map then served multiple functions: as a collaborative tool to allow social media users to upload their audio-files, as an archive to host also the other contributions shared on external platforms and, ultimately, as a virtual space to display all the geo-located sounds. The map collected overall 52 sounds which represented, together, a variety of sonic experiences shared by people in different places of the world: the unusual silence of cities; birds and natural sounds emerging from the background: domestic noises; the alarming sound of the ambulance sirens; the clapping sound to thank the NHS workers; and the sounds of home schooling and the music performed on the balconies all over the world. Impressed by the variety and depth of the contributions collected on the map, the museum team decided to re-publish a selection of these sounds and create a digital narrative to describe all these different experiences. Three weeks later the original prompt was launched, the article 'Sounds of my Quarantine' was published on the blog, inviting people to continue to share their sonic experiences (see Fig. 118).
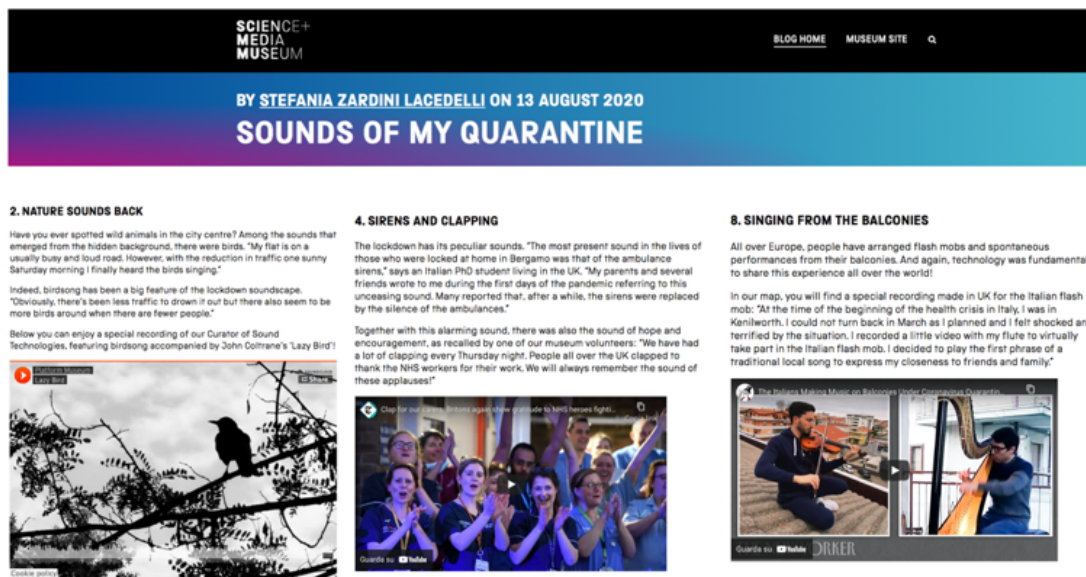
Fig. 118 Extracts from the article 'Sounds of my Quarantine' published on the blog on 13ᵗʰ August 2020 (https://blog.scienceandmediamuseum.org.uk/sounds-of-quarantine/, accessed on 30 March 2022).

To present the selection of sounds on social media, a further format was explored: the sound snippet. Since the majority of the sounds were not previously uploaded on audio-sharing platforms like YouTube or SoundCloud, the project team employed the new app Pitter Pattr. This platform, for the first time, allows actual audio files to be shared on social media by publishing videos of the sound wave. A selection of sounds from the map was then transformed into sound snippets and shared in the Twitter thread, as shown in Fig. 119.

Fig. 119 An excerpt from the Twitter thread dedicated to the sounds of quarantine, including audio clips created with the Pitter Pattr app (https://twitter.com/MediaMuseum/status/1294207321653075968, accessed on 30 March 2022).

7.2.2.3 Sound Memories Board

The Sound Memories Board was the third format explored in the project. Also in this case, this sonic narrative was not conceived in the design sessions, but it emerged at the end of the project from the need to collect all the sound-related digital memories shared throughout the campaign in a single digital space.
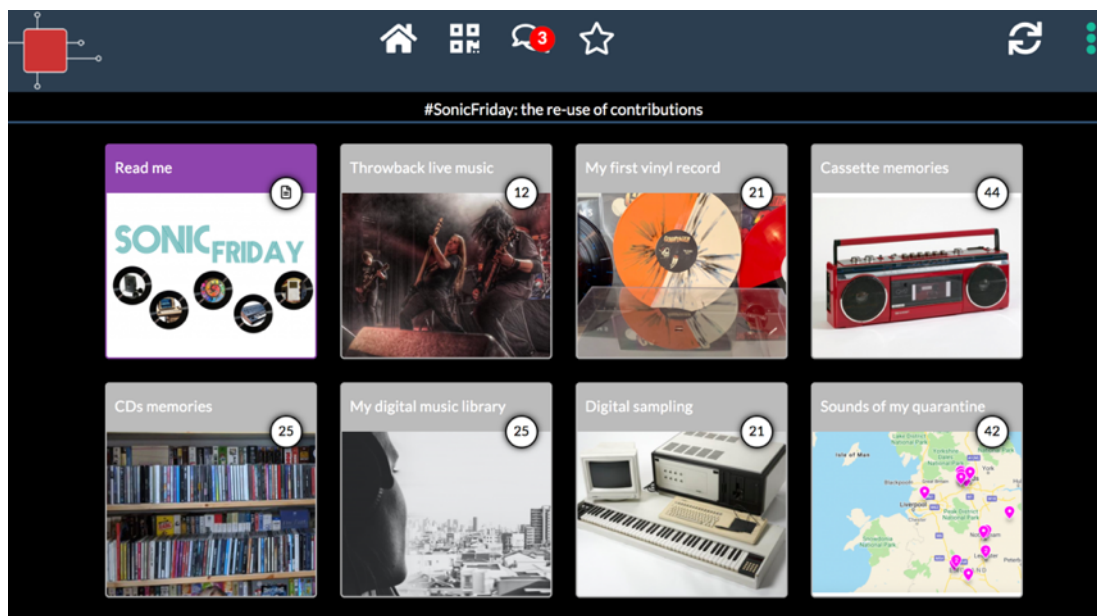
Fig. 120 The e-poster created for the first focus group on the Learning Toolbox platform (https://my.ltb.io/#), displaying a selection of digital memories.

The communication team was aware of the sizable number of contributions shared each week, but the speed of publication on social media did not allow for a detailed overview of all the memories shared in the different platforms to be gained, as well as of the different meanings and interpretations that each theme had stimulated. It was therefore necessary to collect them within an interactive space that offered the possibility of exploring different types of multimedia content accompanied by the comment of the participant. Among the different digital services available for this purpose, the project team opted for Learning Toolbox platform, which had already been used to collect the lockdown sounds. The platform, in addition to the ability to create collaborative boards, also offered the opportunity to create online collections of multimedia content (see Fig. 120). This function turned out to be particularly effective for presenting the digital memories, including a title, a different type of multimedia content - images, sounds, YouTube videos and original audio and video content - and a description. For each #SonicFriday prompt, a different board was created, in order to display the content thematically, as shown in Fig. 121. The galleries hosted both the

contributions shared by social media users and the memories from the conversations with the volunteers. The dimension of each board varied according to the number of contributions collected for each prompt: the most numerous were the Cassette Memories board, which hosted 44 digital memories – and the Sounds of my Quarantine board, with 42 contributions.
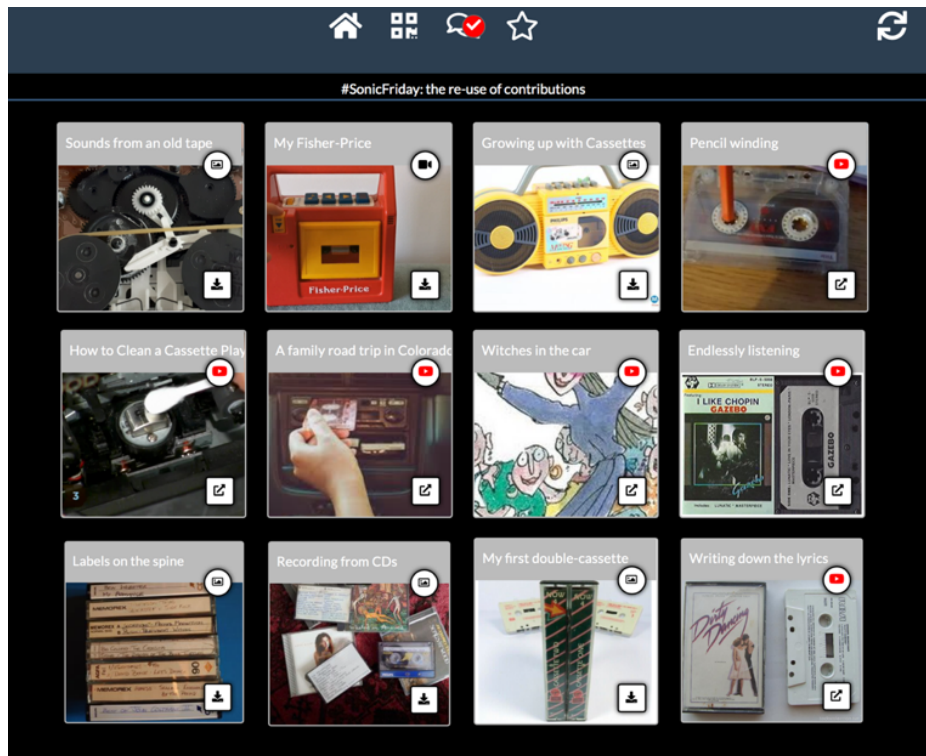
Fig. 121 The sound memories board dedicated to the cassette prompt on the Learning Toolbox platform (https://my.ltb.io/#).

The contributions are the most varied and evoke both physical and intangible elements of our relationship with sound: some memories present the images of personal listening devices - cassette players, Walkman, the first mp3 players – others describe the actions connected to each specific audio format - recording songs from the radio, rewinding the tape, creating compilations of songs, copying music from vinyl. Most of the memories, however, were shaped around a song, which was often only mentioned through a YouTube link and, in some cases, is shown in its tangible form of a CD or a vinyl. As shown in Fig. 122, the variety of the content of each gallery shows how profound, intimate and evocative a sound memory can be.
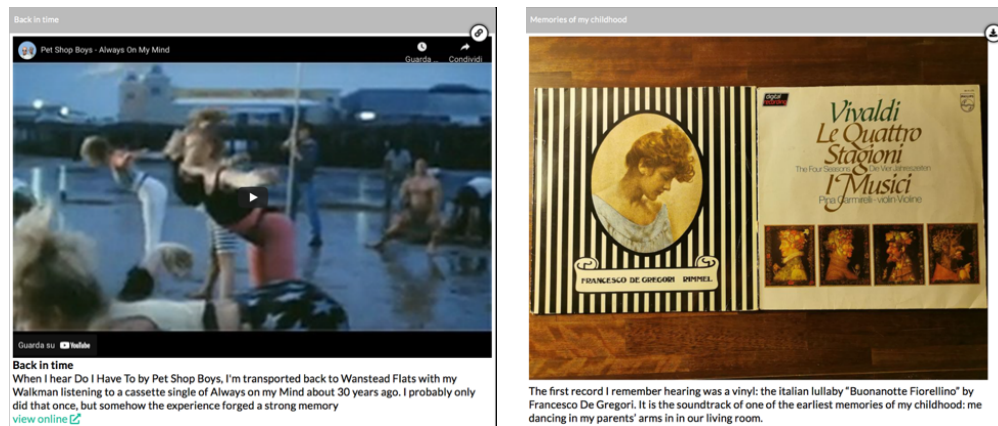
Fig. 122 Two digital memories from the Cassette memories board created on the Learning Toolbox platform (https://my.ltb.io/#).

The end of the placement in September 2020 did not allow the museum team to publish this Sound memory board, which remained a prototype. However, this space was fundamental in stimulating the museum team to reflect on the value of these memories and the possibility to collect and re-use them to enrich collections and narratives both in the physical and digital spaces.

7.3. Evaluate the Practice

As part of the design process, an evaluation study was conducted at the end of the implementation phase to explore if the new assumptions of the Platform Thinking and the new practice of engagement with sound had introduced an organisational change at both practical and conceptual level. In particular, organisational change was observed in three key areas of museum practice: curation, audience engagement, and collection interpretation. As a consequence, the study aimed at responding to these specific research questions:

1. What new curatorial practices did the project introduce? And how have these new practices affected the way the museum team interpret its curatorial role?
2. How did the participants react to this different way of engagement? And how did the audience responses influence the way the museum team conceive the role of the public?
3. What new narratives emerged from the practice? How did these new narratives affecte the way the museum team interpret its collections and the concept of heritage itself?

To answer these questions, I employed a mix of qualitative and quantitative methodologies presented in the previous chapter, combining more traditional research methods – namely, the focus groups - with new digital methods and netnographic analysis. In particular, to answer Research Question 1 (exploring the change at curatorial level), I combined the analysis of the new sonic practices with the qualitative analysis of the focus groups with the museum team (FG1 and FG2). To answer Research Question 2 (exploring the change in the relationship with audiences), I combined the social media analysis with the qualitative analysis of the focus groups with the museum team (FG1 and FG2). To answer to Research Question 3 (exploring the change in the collection interpretation and heritage meaning), I combined the narrative and sentiment analysis of the digital memories with the qualitative analysis of the focus groups with the museum team (FG1 and FG2).

The following discussion presents the themes that emerged from each category. The presentation of the themes will be supported by a meaningful selection of quotes extracted from participants' data sources – members of the museum team, volunteers and social media users. Participants' ID numbers will be used for the responses of social media users.

7.3.1 Curatorial Practices

This level aimed to identify what kind of practices of sound curation the project introduced, as well as to investigate whether it promoted a change in how the practice of curation is conceived. To get a deep understanding of this dimension, it was fundamental to combine the analysis of the new practices experimented in the #SonicFriday project with the data coming from the focus groups (FG1 and FG2), representing the perceptions and attitudes of the museum team towards these new formats. Four different categories emerged from this combined analysis: the perception of digital platforms as new spaces for sound curation, the ability of online sonic practices to bring objects to life, and the importance to adopt a participatory approach to curation.

7.3.1.1 Platforms as New Spaces for Sound Curation

As described in section 7.2.2, the project stimulated the creation of new sonic narratives around sound technologies that were published on the web space of the museum and on third-party platforms. In doing so, the project extended the curation of the Sound Technologies

collection online, experimenting with new sonic formats such as curatorial playlist, Twitter exhibitions, sound memories board and collaborative sound maps.

Digital narrative	Number	Platform
Blog post	4	National Science and Media Museum Blog
Twitter Exhibition	11	Twitter
Curatorial playlist	2	YouTube
Collaborative playlist	1	Spotify
Sound Map	1	Padlet
Sound Memories Board	9	Learning Toolbox

Table 13 The new sonic practices introduced by the #SonicFriday project

These new practices not only showed the museum team new opportunities to use online platforms, but also to imagine new ways of curating sound. Before the #SonicFriday project, the main format conceived for engaging audiences with sound was the exhibition. The online engagement activities were conceived as complementary to this main format: social media in particular were devised as promotional tools to invite people to visit the exhibitions. The wealth of the practices experimented in the project has shown the curatorial potential of digital platforms and the value of new online sonic practices.

This awareness is reflected in the new attitude of the museum team towards the audio-sharing platforms adopted in the project. YouTube in particular stimulated a fruitful discussion among the curatorial and communication team around the opportunities that this platform could offer. The curatorial playlist was regarded as an effective tool both to innovatively present the story of sound technologies and to actively involve online users in conversations around their impact and legacy.

> It gives people that reference for them to connect to. It is a way for people to grab onto something which makes whatever that thing that is being discussed is relatable to them.

> Eleanor Mitchell, Website Manager, FG2

Similarly, Pitter Pattr has proven to be a promising tool for sound curation. The platform was used to share the audio files from the 'Sound of my Quarantine map' on social media, using the technology of sound snippets. Reflecting on the use of this platform, participants highlighted how effective the ability to share actual sounds on social media was.

> We uploaded the actual sounds to Twitter in the thread and that was really nice to get people actually hearing the sounds. We haven't really done that before, just uploading sounds. So, that was a nice experiment as well for us on social media.
>
> Cathy Pilkington, Communications Officer, FG2

These extracts reflect a new perspective on the online dimension, as well as a shift in conceiving curation itself. After having experimented with the curatorial potential of digital platforms, the museum team felt the need to align the traditional curatorial practices to the new behavior, languages and format that happen online. And to do this, they started to reflect on how people communicate and interact in the platform world:

> So many people communicate that way. I do it all the time, just sharing what I am listening to at the moment. It is about that immediacy of sharing: here is the song right now. I can give it to you immediately. I think there is an attraction for people in that.
>
> Annie Jamieson, Curator of Sound Technologies, FG2

> It is a lot more reactive social media. Somebody could say something and that could inspire a meme or a whole different conversation. Whereas the museum is a lot more static. The interpretation is not going to change. The objects are not going to change.
>
> Cathy Pilkington, Communications Officer, FG2

The reflection around the immediacy and dynamism of the platforms in contrast with the static nature of the physical display and the objects has led to the emergence of a second theme.

7.3.1.2 Bringing Objects to Life

As shown in Chapter 6, bringing the objects of the Sound Technologies collection to life was one of the most important needs of the curatorial team. The #SonicFriday project responded to this challenge by using social media and audio-sharing platforms to make people listen to the sounds produced by the objects and the music composed using sound technologies from the collections.

All these sonic elements gave objects their life back. Online sharing allowed for connection between, for instance, an object like the Fairlight CMI, with the songs it contributed to create, as well as the words of the musicians and engineers that used it. Reflecting on this opportunity, the comparison with the same object which remained silent in the physical galleries immediately surfaced.

> You feel the history, but not only "the History", like "this is what has been", it is just the life of the object, of an experience. It just feels like the object magically comes alive again.
>
> Volunteer Coordinator, FG2

The museum team realized that the use of music in particular to describe an object adds another level of meaning. In addition to being an effective means of engagement, the musical interpretation of the collections can also have a curatorial value in itself. As a consequence, they started to devise how this approach could be transferred in the physical exhibitions as well:

> Being able to hear the songs that were associated with the object also in an exhibition... It just gives you another level of meaning.
>
> Cathy Pilkington, Social media officer, FG2

Together with the sounds and music produced by the objects, other intangible elements came alive: people's memories, stories of use, feelings and emotions attached to a song. These elements were not necessarily part of the 'official story' of the object told by the museum, but they emerged from the background of memories and stories that the object was able to unleash in everyone. It was precisely the personal level of the stories shared in response to the museum prompts that generated a powerful sense of connection, closeness and empathy:

> Loads of the stories shared had a lot of resonance. It felt I could have started a long conversation with some of those posts. It made me feel connected with other people.
>
> Volunteer Coordinator, FG1

This is the same kind of resonance that the volunteers experienced in the object handling sessions. One of the volunteers highlighted how the sense of wonder that people feel for an object comes not only from the understanding of its function, but also from feeling a personal connection with it:

> When people ask 'How old is this? What is this thing for? How does it work?', you can say 'It is a recorder, just press the button and speak' but also 'Your Grandad might have

experienced this'. Then you get that 'Wow', that 'wonder', that curiosity that can inspire them.

The curiosity and interest aroused by people's stories completely overturned the perspective on curation, and a new approach began to surface.

7. 3.1.3 A Participatory Approach to Curation

Traditionally, any curatorial practice in museums stems from the interaction among museum curators, subject matters experts and designers that develop the best way to tell the story of an object. In the #SonicFriday project, the museum did not present a completed narrative, but invited people to become authors of a collaborative story. The museum started this story by sharing some information about an object, but then it was the online users who shared what the objects meant or evoked in them.

> I felt the life and the interest was in that space with everybody contributing their personal things. And I think that it is hard to make that connection with the objects in the museum.

Volunteer Coordinator, FG 1

The museum team recognized two main benefits of this participatory approach to curation. First, it could help the curators to understand how the objects were perceived and to present them in a way and in a language closer to people's interests and feelings:

> The project allowed us to see what value visitors see in the collection. It gave us a perspective on what a cassette player means for a lot of our visitors, or what vinyl means.

Annie Jamieson, Curator of Sound Technologies, FG1

Secondly, it also gave the opportunity to involve people in the creation of a polyvocal narrative composed of different multimedia elements, which was interesting to explore in its own right:

> That ability to add links, images, embed video, audio, as well as text, has meant that the sharing becomes not only valuable as a list of thoughts but also as a crowd-curated resource of content which is fun and interesting to explore in its own right.

John Stack, Digital Director, FG2

Impressed by this more dynamic and inclusive way to collect and present stories, the curators started envisioning how this approach could be applied in the physical space of the museum:

> We could present a range of people's personal stories around an object in a gallery. I am envisioning you have an object, but you have all these things to find out around it, like stories and people's individual sounds or pictures. It might give the people who come to the museum a touchpoint for their own experiences.

> Eleanor Mitchell, Website Manager, FG2

As explored in Chapter 3, sound and music are among the most powerful sharing experiences and might have favored a more collaborative approach to curation. However, this reflection did not end within the Sound Technologies collection. The museum team agreed that crowd-curation could have the value as a method, a way of thinking that could also be applied to other collections:

> I think that definitely there are things we can learn from the approach of making that connection between objects and past experiences, getting that kind of personal input from people. And it's brilliant that we can now think about this in terms of other subject matters.

> Phil Oates, Communication Manager, FG2

7.3.2. Audience Engagement

The second level of investigation aimed to explore what changes the project introduced in the relationship with audiences. This change was explored from a double perspective: by observing how participants reacted to the #SonicFriday prompts and by analysing how these responses affected the way the museum team conceive the role of audiences. To get a deep understanding of both perspectives, the analysis of the social media insights of the #SonicFriday project was combined with the content analysis of the participants' answers from the focus groups, specifically the one dedicated to online engagement. Three main categories emerged from this combined analysis: the ability of online sonic practices to extend the museum audiences, the power of sound and music to foster a more personal and emotional involvement, and the perception of audiences as contributors.

7.3.2.1 Extending Access to Collections

The first indicator analysed to understand the audiences' reaction was the number of participants. However, the features of social media engagement make this calculation complex. The social media insights provided by each platform offer a series of quantitative

indicators which show different levels of participation. In particular, two were the main indicators selected for this analysis: *Reach*, which calculates how many online users have been reached by each post - and *Engaged users* – how many users have been actively involved by commenting, sharing or liking the post. For both indicators I calculated the average, since the same online user might have responded to different prompts. I combined these two indicators with the number of digital memories, which represents the number of contributions effectively collected from different platforms.

	Reach (average)	Engaged users (average)	Digital Memories
Twitter	3050	61	129
Facebook	2631	69	59
Instagram	not provided	44	9

Table 14 The indicators employed in the quantitative analysis to define the different levels of participation: reach, engaged users, and digital memories.

By combining these data, three different categories of online participants emerged: the 'Listeners': online users who just read the #SonicFriday prompt on their feed, without interacting with it; the 'Players': online users who interacted with the prompt, by sharing, linking or commenting it; the 'Active Contributors': online users – including volunteers - who gave their contribution by sharing a digital memory. These categories suggest how the #SonicFriday project extended the very meaning of 'participant', by offering various ways to interact with the project.

A further level of analysis aimed to understand the demographics and typology of these participants, as shown in Table 15. The first benefit noticed by the museum, in fact, was the ability of the project to extend access to the collections going beyond the traditional audience - family groups. In particular, the Curator of the Sound Technologies collection was impressed by the diversity of audiences reached by the project:

> It is really good that the project has reached a wide range of audiences and degrees of interest in sound technologies. There are really geeky synth sample people down to people just remembering a childhood book that was on cassette and everything in between.

> Annie Jamieson, Curator of Sound Technologies, FG1

Category	Description	Total
Sound & digital technologies experts/enthusiasts	Sound engineers, Musicians, sound technologies enthusiasts, digital creators	20
Student/Academics	Post-Graduate and PhD Students, Researchers, Teachers, Professors	13
Museum and Cultural Professionals	Members of the Science Museum Group or other cultural professionals.	17
Other (Not categorized users)	Other kinds of online users who already followed the museum on different social media platforms.	46

Table 15 Analysis of the Twitter users' profiles.

This variety was later confirmed by the analysis of the Twitter users' profiles, which provided an overview of the main typologies of participants. As shown in Table 10, the first group includes technologies enthusiasts which responded to the most 'specialistic' themes – 'I love digital sampling' in particular. The participation of this group was further stimulated by the publication of the prompt in dedicated Facebook Groups. The second category is represented by students and academics: some of them were involved during the Research Festival but then continued to respond to the museum prompts. A third category includes cultural professionals and museum people: the majority of them working or in some way connected with one of the five museums of the group who actively contributed to share the prompts. The fourth category includes different types of users who felt a connection with the themes of the project and were keen to share their memories.

Reflecting on the reason for this audience variety, the choice of the themes of the prompts was described as key. The museum team noticed how all the themes were able to strongly resonate with people's lives, and how this direct connection is often more difficult to create with objects from the past:

> We choose things that people on social media would talk about. We did not say 'Send us a memory of this wax cylinder from the eighteen hundred'. We did choose things that were within people's living memory and things that resonate with them on social media.

> John Stack, Digital Director, FG1

In particular, the prompts dedicated to audio formats – cassettes, CDs, vinyl, mp3 players – allowed to engage people of all ages who might have experienced different sound technologies in their life. Among these, the cassette fostered the highest number of intergenerational conversations:

> I wonder if people have remained more familiar with cassettes. Maybe there was always a Walkman around the house or things like the Fisher Price cassette player.

<div align="right">Annie Jamieson, Curator of Sound Technologies, FG2</div>

The Sound of my Quarantine was another extremely inclusive theme, which reached out people from all over Europe. The sound map features sounds from England, Ireland, Italy, Spain, and Netherlands, extending the predominantly national reach of the museum. The importance of listening during the pandemic was universally shared and felt across geographical borders.

> The project seems to have quite international contributions. It felt like across boundaries, we are still connected. I really loved that.

<div align="right">Volunteer Coordinator, FG 1</div>

7.3.2.2. The Personal and Emotional Dimension of Sound Engagement

The new sonic practices experimented in the #SonicFriday project not only changed the range of people involved. It was the very nature of the relationship with the museum that was different. The communication team immediately noticed how the #SonicFriday prompts had stimulated a higher level of involvement in the online users:

> The cassette prompt was the most engaged post we had during the museum's closure. It was great to see a collaborative project working so well on social media.

<div align="right">Cathy Pilkington, Communications officer, FG2</div>

This result was then confirmed by the analysis of the insights. To measure the level of engagement, another indicator provided by social media insights was employed, the *engagement rate*. This indicator calculates the rate between the number of users reached and the users actively involved through sharing, likes or comments. As shown in Fig. 123, the engagement rate was almost always over the average of the overall posts published during the summer.
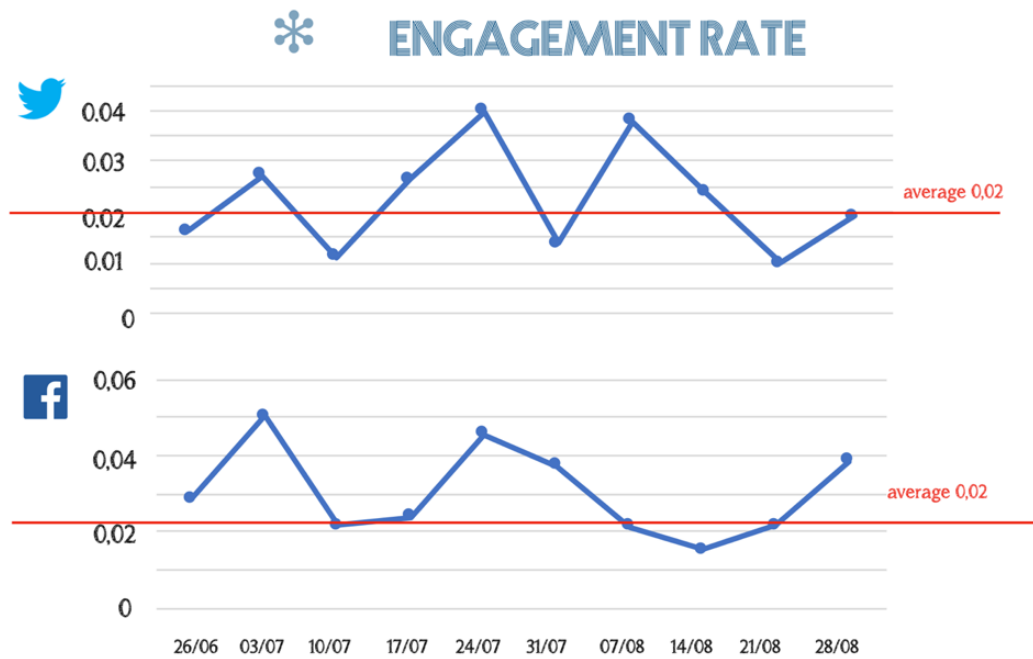
Fig. 123 The engagement rate of the #SonicFriday posts on Twitter and Facebook

The quantitative analysis, however, is not sufficient alone to describe the level of engagement stimulated by the #SonicFriday prompts. It is by reading the comments of the users that it becomes clear how personal and emotional their responses are.

> It is really interesting to see people's memories. It is that personal element of being the thing that the person actually has or actually uses and having a connection with that.

> Eleanor Mitchell, Website Manager FG1

Music, in particular, was key to bringing personal memories to the surface, as well as to evoke deep-rooted feelings and stimulate introspective reflections on people's personal lives, as shown in the two examples in Fig 124.

> There is a nice story in the cassette strand. The person said 'I stole the Poison cassette from my sister. I thought it was very deep at the time, and so was I'. I thought there is something nice about getting people to reflect on themselves.

> John Stack, Digital Director, FG1

Fig. 124 Two Twitter users sharing their musical memories on cassettes (https://twitter.com/MediaMuseum/status/1278978187238785024, accessed on 30 March 2022).

Interestingly, people not only shared their personal memories with the museum, but also started personal conversations with other online users. Participants in the focus group noticed that social media makes people more inclined to interact with others, and even to respond in a more personal way to strangers:

> People are more likely to respond in a more personal way on social media, because there is a sort of barrier. You are just typing or sharing something online rather than having to put yourself forward as you would in a physical space.

<div align="right">Katie Cunning, PR and Press Manager, FG2</div>

One side the social media environment intrinsically favoring personal interactions, sound sharing was, again, key to bring these interactions at an emotional level. Whilst on the other hand, musical memories shared by users were able to arouse strong feelings of empathy and nostalgia, together with the desire to share their own memories in turn.

> I was about six years old and the first record I ever bought was a bagpiper playing Amazing Grace. Someone put the YouTube video and it was like going back to the old days. It was a real nostalgia moment. I loved that.

<div align="right">Museum volunteer 01, FG1</div>

> People shared videos and pictures of Festivals I have been to. It brought back a lot of memories, it reminded me of a lot of stuff I have kept from gigs that I would have shared.

<div align="right">Volunteer Coordinator, FG1</div>

The museum team realized that this deep level of involvement and active participation is usually difficult to create with museum objects and reflected on the role that a more emotional and personal approach can have to encourage people to explore and discover the museum collections.

7.3.2.3 Conceiving Audiences as Contributors

Looking deeper into the analysis of the engagement rate, a value caught the attention. By looking individually at the different types of interaction – shares, likes and comments – the highest value which stands out above the average is the number of comments and replies. The museum team associated this result with the quick and easiness of sharing offered by the prompt:

> It is very undemanding. It is not asking a lot of time or commitment from people to contribute: they do not have to read a lot, they can just have a look on Twitter every so often through the day, take a picture of what is in their collection and they likely come back and post it on their account.

> Annie Jamieson, Curator of Sound Technologies, FG1

This ability of social media platforms to offer museums more direct ways to collect memories changed how the museum team interpreted the objectives of the project. During the design phase, #SonicFriday was conceived in the engagement activities, as a way to make people interact with the Sound Technologies collection in a more participatory way. In the evaluation phase, they associated the project with the Oral History interviews aimed at collecting memories from people. #SonicFriday moved from being an engagement project only, to a collecting heritage project. These quotes in particular signal this shift:

> You could have done the same project as an oral history project, going out, identifying people, sending out the researcher with a digital recorder. One of my thoughts is just the volume of stuff here, I think it is a very interesting opportunity.

> John Stack, Digital Director, FG1

> I liked the fact that it was really quick. Rather than an oral history interview, which would be incredibly interesting with lots of details, but this gave me a lot of prompts where I could decide to respond to.

> Volunteer Coordinator, FG1

The comparison with Oral History was marked and was one of the main themes of discussion. The museum team identified three main benefits of this new way of collecting memories. The first is the different type of memories collected: digital memories are shorter and might also include multimedia elements such as a picture, a video or a YouTube link.

> The variety, I do think that kept my interest on when I have looked at it afterwards. the fact that there were different types of things that you see, there was a picture, there was the video, there was the music.

> Volunteer Coordinator, FG2

The second is the volume of memories that can be collected from people, that can be incredibly higher than an oral history project. And thirdly, thanks to the interactions allowed by social media platforms, it also favors the creation of a community around the museum:

> There is something interesting about using digital to get large numbers of memories. If you think about what digital does well, it does reach well, it does scale really well, it does community really well. And those were all part of this project.

> John Stack, Digital Director, FG1

This new way of conceiving audiences was not limited to online users. The participation of the volunteers, who gave a fundamental contribution in the collection of memories, was interpreted as a way to involve other kind of people who are not necessarily online and might still be willing to share their stories using other methods.

> It was really good to be able to connect the volunteers to this. It was a way to connect people that wouldn't otherwise have contributed online and to still include them in the bigger conversation.

> Volunteer Coordinator, FG1

Another evidence that this shift in thinking was not related to online users only is the reflection of the museum team on how to transfer this method of asking input from audiences could be applied in the physical galleries as well.

> I guess online it is much easier to do that: in an exhibition, there is not an opportunity for a visitor to feedback with "Here is mine. Here is the one I used to use". Maybe this is something we can think about, whether there are effective ways we could build a bit more of that into some displays.

> Annie Jamieson, Curator of Sound Technologies, FG2

> You could open up a gallery and extract more voices as you go.

> John Stack, Digital Director, FG1

These extracts show how the perception on the visitors' role changed throughout the project: in the design sessions, the exhibition was conceived as a completed narrative where the feedback section was interpreted as a way to make people interact with the content on display. Inspired by #SonicFriday, the feedback section was seen in a new light, as a way to keep the exhibition's narrative open and to collect new input from visitors that can enrich the collections.

7.3.3 Collection Interpretation and Heritage Meaning

The third level of investigation aimed to identify if the new narratives emerging from the #SonicFriday project changed the way museums interpret their collections and the concept of heritage itself. As the analysis of the previous levels has shown, this emerged as one of the key dimensions of the project, the one that stimulated the broader debate. To explore the changes happened in this dimension, a fundamental step was to analyse in detail the digital memories collected throughout the different platform and to provide the museum team with a space to explore them carefully – namely, the Sound Memories Board described in section 7.2.2.3. Consequently, two were the main methods adopted: a qualitative analysis of the digital memories – which combined narrative and sentiment analysis – and the analysis of the focus group, specifically the one dedicated to the value of the contributions (FG1). Three different categories emerged from this combined analysis: the ability of crowd-curation to enrich the interpretation of the collections, the value of collecting digital memories, the shift to a multimodal and more subjective concept of heritage.

7.3.3.1 Enriching the Interpretation of the Collection

Throughout the project, 248 sound-related digital memories were collected. 183 of them were also included in the Sound Memories Board, which was precisely created to stimulate the museum team to reflect on the value of these contributions. Both the reflections of the museum team and the narrative and sentiment analysis revealed multiple levels of use of these memories.

The first value recognized in the focus group was the opportunity to enrich the interpretation of the collections. Of 248 memories, 56 describe various aspects of the story of sound technologies and can help curators to understand the perspective of their users, as well as how they affected people's habits, behaviors and expectations around the consume, creation and sharing of sound and music.

> I'm definitely a teen of the CD age! This digital format still seems shiny compared to analogue and that's because it is. CD format favors the higher frequencies whereas tape/vinyl adds a nice warm distortion to the lower end of the frequency spectrum. I find it interesting music can sound with different formats.
>
> OU 188

mp3 compression technology deserves a mention on its own - before this, you couldn't fit many WAV files on the small ROMs that were available at the time - one CD! The changes were unimaginable then - I never thought I wouldn't know whether I own something I'm listening to or not.

<div align="right">OU 82</div>

Not surprisingly, this type of memories appears more frequently in relation to the common audio formats – cassettes, CD and mp3 predominantly – but there is also a high number of memories about the story of the synthesisers which enriched the curators' expertise on more specialistic technologies of the collection. The *I love digital sampling* prompt in particular attracted a lot of contributions from people who still compose music with these old technologies, as well as synth enthusiasts who showed expert knowledge of the subject.

> Working with old analog drum machines or glitchy toy drum synths; patterns are too cheesy or boring, and there is no midi clock or trigger to sync with DAW / Sequencer. Or the toy is faulty. Sampling allows these weird obsolete sounds to be used in modern productions & new contexts.

<div align="right">OU 09</div>

The curators in particular realized how these digital memories could be precious to increase the understanding of the objects and improve the way they are presented in the gallery. This was evident in the case of the memories around the cassette. The level of attention, curiosity and interest generated by this prompt made the curators reflect on the role that this technology could have to understand contemporary music culture more deeply. The curators realized that the cassette represented the stepping-stone to the portability of music and the personalization of music experience, so anticipating the digital music era.

> The cassette was the first time you could record your own music, and you could pirate things, you could copy things, and you could make your own recording. I guess that is a large part of the reason people come to them so much; come to the memories, at least.

<div align="right">Annie Jamieson, Curator of Sound Technologies, FG1</div>

Recording music from the radio, copying cassettes from vinyl, doing mixtapes were, in fact, among the most frequently mentioned actions remembered by the users. All actions that resonated powerfully with the contemporary way of personalizing the music experience: making playlist.

> In my teens, I didn't have a turntable, but my older brother did, so I bought vinyl and recorded it on to cassette on his music centre to listen to on my boom box.

<div align="right">OU, 22</div>

I was not old enough to be doing mixtapes, but making a playlist feels like that same kind of experience.

Cathy Pilkington, Communications Officer, FG2

The narrative analysis revealed another key category of memories, which includes the mention of personal objects. 47 users shared audio devices from their personal collections, often including an image and a description of their bound with the object:

A friend gave the iPod nano to me: it was great because there were a lot of songs on it. There was music I would not necessarily have put on it, that reminds me very much of spending time on the kind of stuff she listened to.

Volunteer Coordinator, VS 05

Growing up this Philips Cassette Player was everything to me. From taping the Top 40 from RadioOne91FM to listening to #TheHobbit audiobook going to sleep.

OU, 49

These memories led the museum team to reflect on how differently an object is presented in a museum. In a gallery, the object is separated from its original context. The evocative power of these memories showed how important it was to keep the contact with its previous life and use:

It is actually quite nice to see objects and collections that are used. You can see that they actually have a purpose, that you can interact with them. When I collect on behalf of the museum, I do feel sometimes it is like tearing something away from the home that really loved it and appreciated it, to put it on a shelf somewhere.

Annie Jamieson, Curator of Sound Technologies, FG1

7.3.3.2 The value of collecting Digital Memories

Reflecting on the value of digital memories, the museum team realized how there was an additional level of value. The personal stories evoked by participants started to be considered as important as the objects themselves. The digital memories were described as enjoyable and worthy to be experienced as they are:

I enjoyed the cassette memories so much, as it was so full of personal stories: winding with a pencil, recording from the radio, handwritten labels, mixtapes. I love the story about stealing the tape from the sister.

John Stack, Digital Director, FG1

Impressed by the ability of life experiences to describe an object and at the same time to create an emotional connection with the listener, the museum team suggested how these memories could be juxtaposed to the physical collections, to enrich their discovery:

> Personally, I think that it would be nice to have the object and have at the same time the opportunity to explore these things digitally.
>
> Volunteer Coordinator, FG1

This gradual recognition of the value of these memories arose a series of reflections at multiple levels. Firstly, participants agreed that these digital memories should be part of the museum display: as a hook to get people interested, but also as stories that can add meaning to the collection and stimulate a more personal and emotional connection with the objects.

> We could use these quotes as interpretation, so you would have the labels with what people said about how they used it.
>
> Annie Jamieson, Curator of Sound Technologies, FG 1

> They could work as a visual hook, something that stimulates your interest first. These memories can provide a hook to get people interested and then go more in depth into what the memory is.
>
> Eleanor Mitchell, Website Manager, FG1

As a consequence, the museum team raised a key question: should museums be collecting these memories? In this case, the collection of contributions was part of the project itself, but a lot of the time people share their memories also spontaneously on social media and museums do not collect these responses:

> I guess there is a question about should museums be collecting all of these responses? Because generally we don't, and I think that museums have not yet worked through the fact that there might be something valuable in this in the future.
>
> John Stack, Digital Director, FG 1

> I think there is a question here about how to make these memories accessible in various ways and what they can bring to people.
>
> Eleanor Mitchell, Website Manager, FG1

This question appeared to overturn the museum perspective on collecting practices. The museum team realized that people's contributions could not only help to understand the collections, but could enrich the collections themselves. They could record stories of use, but also provide information on how people's attitudes towards their own past change over time.

The digital memory can be considered a new, post-digital form of heritage to be preserved and transmitted to the future generations, just like material artifacts.

> Approaches to interpreting objects have really changed over the years and decades. And the museum should be able to collect those responses, to store them permanently, because those responses and attitudes would change over time.
>
> John Stack, Digital Director, FG1

This new awareness was not without implications. It raised intriguing questions about the challenges that collecting this type of memories might pose to the museum. From the challenge of what to collect (the content of the digital memory or also the context where it was shared?), to the challenge of how to do it: the resources, activities and ethical procedures that need to be activated to collect digital memories.

> I personally feel this kind of work should be much more core to our roles, but I am not sure we are currently in a position to do this regularly.
>
> Volunteer Coordinator, FG1

Together with these practical implications, the recognition of the value of digital memories had also fundamental implications at conceptual level. The following category will focus on how the very meaning of heritage changed throughout the project.

7.3.3.3 Towards a Multimodal and Subjective Concept of Heritage

The combined analysis of the digital memories and the museum team's reflection in the focus group revealed how the concept of heritage had been deeply affected.

The project seems to have shifted the focus from the tangible aspects of the collections (namely, the objects) to other intangible elements which surround them. The very nature of the digital memories (text, images, video, sounds) was intangible, as well as the space of the intervention (the ether), and very often users did not even mention any physical object. The narrative analysis highlighted how 60% of the memories mention sound and music. In most cases, a song was the hint to evoke and present a story, in some cases also sharing a personal interpretation of the music itself:

> When I hear Do I Have To by Pet Shop Boys, I'm transported back to Wanstead Flats with my Walkman listening to a cassette single of Always on my Mind about 30 years ago. I probably only did that once, but somehow the experience forged a strong memory.
>
> OU, 03

Sound was ever-present in Quarantine, although it was often perceived as silence. What was absent was the cacophony, the merging of the constant din and rattle of the city. Individual sounds survived. I heard birds. And sirens. Lots of them, sadly.

<div align="right">OU, 92</div>

This was also confirmed by the WordCloud analysis of the digital memories (see Fig. 125): the most frequent verbs are actions related to the sonic experience (Listen, Play, Use, Record, Collect, Copy, Love, Buy) and there is a combination of intangible elements and physical supports (Music, Sound, Album, Songs, Gig, Band, Cassette, CD, Walkman, Vinyl).

Fig. 125 WordCloud generated from the 248 digital memories shared during the #SonicFriday project.

The curatorial team was deeply impressed by the quantity of intangible elements evoked by these memories, and to what extent they meant for people:

> When you look at this sort of response there is very little sort of material interest. People are not really talking about 'the objects' but what they did on it, what they heard on it, what they played on it and this kind of thing.

<div align="right">Annie Jamieson, Curator of Sound Technologies, FG2</div>

If sound played a fundamental role in this recognition, it also revealed how complex and interrelated the relationship between the tangible and intangible dimension is (Bennett & Rogers, 2016). Audience responses demonstrated that the acoustic experience is just one of the elements of sound culture, that includes sounds but also physical objects and other types of intangible elements such as images, video, personal memories.

> If you ask about your listening experience, some people's minds will go to the technology. Some people's minds will go to the medium and some people's minds will just go to the music. There is clearly a sort of different subsets of people who have different kinds of relationships with music via either the objects to play it, the sort of physical media or just the sound itself.

<div align="right">Annie Jamieson, Curator of Sound Technologies, FG2</div>

This reflection shed light also on one of the challenges that the previous research fieldwork had revealed. It suggested an answer to the dichotomy between institutions that collect the material aspects of sound culture (such as the National Science and Media Museum) and the institutions which collect the intangible elements including sound recordings – namely, the sound archives. The #SonicFriday project has made evident how sound culture is made of different elements and it is not possible to focus only on just a specific part of that array. To express the wealth of sound culture, all of these dimensions need to be acknowledged and connected. Indeed, the Curator of Sound Technologies, was self-aware of the museological implications of this new approach:

> I guess it is interesting when you think about exhibitions and displays. You are always going to probably have those sorts of broad categories that you would need to satisfy in whatever display you did.

<div align="right">Annie Jamieson, Curator of Sound Technologies, FG2</div>

The shift from a predominantly tangible to a multimodal concept of heritage was not the only change. Another key element of discussion was the level of emotional involvement expressed by the memories. As shown by the content analysis of the memories, 64 participants expressed emotions and feelings, 33 mentioned beloved ones, and 33 others described meaningful moments of their childhood and youth.

> My strongest memory is endlessly listening to the tape of "I like Chopin- Gazebo". It was in a car after dinner with parents in a restaurant, my buddy and I being seven or so years old. I moment that I remember fondly ever since.

<div align="right">OU, 92</div>

Sound of my quarantine in particular was the theme with the highest rate of contributions which contain an emotional description of the sound. The sentiment analysis highlighted a great variety of emotions and feelings that users attached to the sound: from sadness, loneliness and bewilderment provoked by the unprecedented situation to the sense of closeness with family and friends despite the distance, to the sense of relief that listening to music could give.

> I went into Bradford town centre two times. So quiet. It was kind of scary, because silence can be deafening. It was the lack of sound. That was the strange thing.
>
> Museum Volunteer 01, VS 01

> I recorded this little video to try to virtually take part in the Italian Flash mob. I decided to play the first phrase of a traditional local song to express my closeness to friends and family.
>
> OU, 198

> I am a very basic pianist – I learned as a child and then stopped playing for many…many years. However, during lockdown, I found it very relaxing and helpful to try to play again. The concentration required diverted my mind from other worries.
>
> OU, 201

This discussion has attempted to analyse the emotional dimension from the perspective of audience engagement, showing how sound and music could forge a strong connection with the collection. However, the reflection on the value of these memories stimulated another important shift. The criteria for the recognition of cultural heritage have always been predominantly objective and guided by the historical, scientific, and social importance of the object. However, the #SonicFriday project has highlighted how there might be a more subjective approach, driven by the personal, emotional and profound connection with objects, people and life experiences. Another perspective can lead the museum to adopt an emotional approach not only to engage audiences with the collections, but also to choose what is important to collect, exhibit and preserve for future generations:

> It sounds like sometimes our stuff is a bit clinical. We say: 'This has to be in a museum, where there is the board of acquisitions that makes a formal decision if and why to collection something.' Whereas other people are like 'Oh that's mine...I can't take it away'. So, in a sense, we are doing the same thing, but it seems like that one comes from the head, the other comes from the heart.
>
> John Stack, Digital Director, FG1

7.4 Conclusions

This Chapter described the design, implementation and evaluation of the #SonicFriday project, which was designed together with the museum team during the pandemic lockdown in 2020 to find new ways to make people interact with the Sound Technologies collection.

Each phase of the research experiment offered key insights on the practical and conceptual shifts required to design a sonic practice in the platform world.

The design phase applied Platform Thinking in the co-design of the practice, allowing the museum team to rethink previously assumptions on six fundamental dimensions: the spaces of the intervention (Where), the participants (Who), the cultural resources (Which), the processes of knowledge transmission and the ways of engagement (How), the output derived from the activities (What) and the temporal dimension (When). Each dimension was reinterpreted in the light of the new way thinking aligned to (and made possible by) the Platform Model.

The implementation phase offered the opportunity to experiment with a combination of digital platforms exploring not only new modes of engagement with the collections, but also new processes of crowd-curation. Key elements of #SonicFirday were the sharing of memories and stories around the personal relationship with sound and Sound Technologies, and the creation of new sonic narratives inspired by the themes of the project.

Finally, the evaluation phase assessed the impact of the project on three different areas of museum practice – curation, audience engagement and collection interpretation -, showing a shift towards a more subjective, emotional and participatory approach to curation, collection and engagement, dissolving the boundaries between the three. The reflection on the value of digital memories was a fundamental step in this process and allowed to internalize this new knowledge in the museum team.

Ultimately, the project demonstrated how extending sound curation on digital platforms can offer not only the spaces and tools to overcome the challenges of sound but can also introduce approaches and ways of thinking that can help museums to evolve in post-digital institutions.

Act 4

There and Back Again
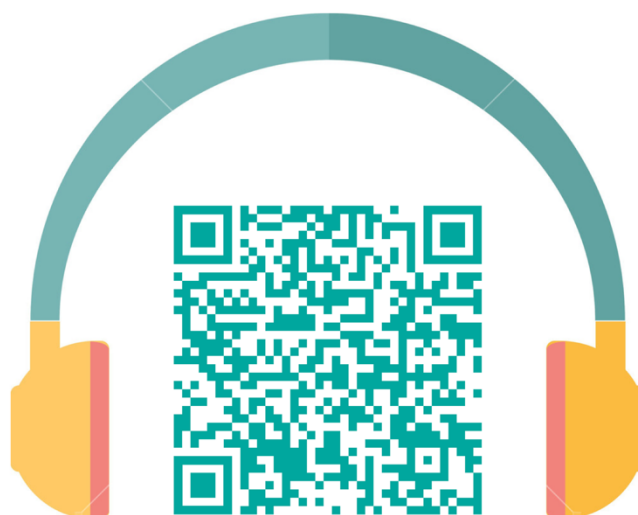
Sound 4 A soundscape composition inspired by the Dolomites landscape, created by the sound anthropologist Lucio Santin in 2017. The soundscape was created by mixing the audio files recorded by Dolomites inhabitants and enthusiasts and hosted in the participatory sound archive of Museo Dolom.it. Source: SoundCloud, Museo Dolom.it channel.

Chapter 8. Conclusions

8.1 Summary

This thesis explored the role of sound culture in the evolution of museums into post-digital institutions. In the twenty-first century, the traditional museum conceptualization (a physical institution devoted to the collection and display of objects of material culture) struggles both to accommodate the wealth of sound culture as well as the spaces, practices and ways of working of the new digital ecosystem. The aim of the research was to ask if the embracing of sound, in a variety of forms and practices introduced in the digital age, can be a catalyst for the adoption of a new 'platform' model for the museum. After a careful examination of the existing literature and previous studies, the research adopted qualitative methods to investigate the practices of sound curation developed by two world class cultural organizations, and then applied design research to develop a research experiment in a live museum context.

Chapter 2 described the methodological choices adopted in the different phases of the project. I explained the motivation behind the choice of conducting case study research in the first phase of the project, and of applying design research in the second, co-designing a research experiment in a museum context. For each phase of the project, I described the methods of data collection, analysis procedures and the research ethics that guided the whole process, explaining the ethical issues raised by involving online participants in a platform environment. The chapter also reflected on my position as researcher and on my approach to writing.

Chapter 3 explored the first challenge addressed by the research: the emerging presence of sound in museums, a medium which has always been underrepresented in a predominantly visual and material system. Drawing upon the interdisciplinary field of Sound Studies, the chapter has examined the multi-sensory turn in the sector and the academy, by exploring two different dimensions where sound has acquired value. The first, *Sound Heritage*, looked at the recognition of sound as cultural object starting from the advent of sound recording, and explored how heritage institutions have started to collect, preserve and share sounds. The second, *Sound Design*, encompassed all the practices where sound has been used to engage audiences and create a multi-sensory environment. In both fields, the chapter attempted to provide an overview of the evolution of sonic practices over the last century, looking at the intertwined relationship between practices and technologies. In particular, the chapter

focused on how sounds are created, consumed, shared today in the ecosystem of platforms and the new opportunities of sound curation for cultural institutions.

Chapter 4 investigated a second challenge that museums are facing: the emergence of a new museum conceptualization that can help museums to adapt to a highly digital and hyperconnected society and evolve into post-digital institutions. Drawing upon management studies, and new ideas on 'platform' business models, as well as the recent research on the platformisation of cultural production, the chapter explored how this new business model is affecting the museum sector from two different perspectives: practical and ontological. From the practical level, the chapter set out how the use of platforms has led museums to expand their curatorial practices on digital spaces and to involve online audiences in the creation of content. The chapter then showed the ontological implications of the Platform Model on the museum conceptualization: how it is influencing the perception of the museum boundaries, the role of audiences and the concept of heritage. The chapter concluded by proposing a theoretical framework for the Platform Museum, that can be used to encourage Platform Thinking in the organization.

The thesis then moved to present the two main case studies of the research: the British Library (Chapter 5) and the Science Museum Group (Chapter 6). Together these chapters were intended to present the challenges encountered and the solutions developed by these two world class institutions in their extensive experience in the curation of sound. Chapter 5 introduced the challenges of curating a digital collection of sounds, drawing upon the data collected during the fieldwork research at the British Library's Sound Archive in 2018. The chapter offered an overview of the sonic practices developed by the British Library from the beginning of the Web to curate sounds on different digital platforms, showing how sound constantly fostered innovations and the introduction of Platform Thinking. Chapter 6 looked at the specific challenges in the curation of sound-related objects, by focusing on the new collection of Sound Technologies founded in 2017. Drawing upon the data collected during the fieldwork research at the Digital and Curatorial Department of the Science Museum Group in 2019, the chapter considered the growing importance of sound in the collections and the role of digital platforms in activating the sonic dimensions of the object and fostering a participatory approach to curation.

The next Chapter of the thesis (Chapter 7) then described the research experiment, developed at the National Science and Media Museum in Bradford as part of a placement funded by the Midlands4Cities Doctoral Training Partnership. This chapter presented the design

implementation and evaluation of the #SonicFriday project, which was designed together with the museum team during the first UK lockdown to find new ways to make people interact with the Sound Technologies collection, experimenting with new practices of digital curation and online engagement. The chapter concluded by presenting the evaluation study conducted afterwards to analyse the impact of the project on the museum team from three different perspectives: the curatorial practice; the relationship with audiences; and the interpretation of collection and heritage. The chapter attempted to show how extending sound curation on digital platforms can offer not only the spaces and tools to overcome the challenges of sound but can also introduce approaches and ways of thinking aligned to (and made possible by) the Platform Model.

8.2 Key Findings

The aim of the research was to explore if sound culture and the variety of ways through which sounds are consumed, shared and created in the digital world, can be a catalyst for the adoption of the new museum conceptualization emerging in the post-digital age: the Platform Model. Consequently, this thesis is rooted in previous studies around two academic fields that, until now, have proceeded independently: the growing presence of sound in museums on one hand, and the digital transformation of museums on the other. This research for the first time connects the key findings of these relatively new fields of knowledge, exploring the relationship between these two contemporary phenomena, but also investigating whether the interaction with sound and the introduction of new sonic practices in museums can accelerate this process of transformation.

Answering the preliminary research question required a series of secondary questions, to better understand the two phenomena under investigation.

1. What challenges sound culture pose to museums at both practical and conceptual level? What kinds of new practices and ways of thinking the curation of sound in the platform world is introducing?

The thesis explored the role of sound culture in museums, trying to understand how sound challenges traditional practices, mindsets and ways of working. The thesis has demonstrated that sound poses specific challenges to museums and leads to the adoption of spaces, practices and processes that are different from the ones originated around material and visual objects. These results build upon previous studies that explored the multisensory turn in the cultural

sector from two different perspectives: *Sound Heritage* (where sound is recognized as a cultural object), and *Sound Design* (where sound is used to engage audiences in immersive experiences). The thesis offers further insight to the challenges of sound by an in-depth analysis of the experience on sound curation developed by two key British institutions: the British Library and the Science Museum Group. These institutions, in particular, allowed me to focus on a specific area of practice: the interaction – and mutual adaptation – among heritage institutions, sound culture and the platform ecosystem. A series of key findings emerged from this fieldwork research. First, sound was at the centre of the digital transformation of cultural institutions from the very beginning, challenging cultural institutions to design new innovative digital practices to display sound objects, share and collect sounds. Secondly, the innovations fostered by sound lead to the development of Platform Thinking in the organization. The journey of these institutions with sound has shown that, after two decades of innovations, there is evidence of Platform Thinking in the way the curators conceive their relationship with audiences, imagine their digital spaces and design their activities. Sound struggles to fit within previous infrastructures and calls for a new model.

2. How is the Platform Model affecting the cultural sector? How is this new conceptualization leading museums to change?

The thesis took a close look at the Platform Model, and how this new conceptualization is acting in museums in the wider transformation that is leading the sector (Parry, 2013). The research demonstrated that 'platform' can be a powerful organisational model which leads to a more participatory approach to collection and curation, to a more diffused concept of museum and to the embrace of new types of heritage. The research shows how the impact of digital platforms in museums goes beyond the mere introduction of new tools for communicating and engaging audiences, but is acting as metaphor, socio-technical system and business model. Through an in-depth analysis of the platformisation of cultural production, the thesis shows how the adoption of the Platform Model is an evolutionary process that starts form the emergence of Platform Thinking within the organization. A key research finding of this phase was the development of a theoretical framework that highlights the elements of Platform Thinking at both practical and conceptual level. This theoretical framework identifies the museum as a microsystem of relationships, a facilitator of co-

production processes, a place where heritage is socially constructed, and people act as curators.

The findings from the research experiment show how the design of the sonic practice introduced key changes at both practical and conceptual level. From a practical level, the analysis revealed changes in the curatorial practices, with the introduction of new formats and activities to tell the stories of the objects, but also in the relationship with audiences, fostering a more engaging, emotional and participatory approach. From a conceptual level, the practice changed previous mindsets and assumptions on three key areas of museum practice: the way in which curation is conceived, the role of audiences, the interpretation of collections and, more broadly, of the heritage itself. All these dimensions belong to a new conceptualization of the museum as a platform.

These fascinating research findings have four key implications, all of which are important for understanding the future development of the museum sector.

8.2.1. Platform as the New Metaphor for the Museum of the Future

The research has confirmed the hypothesis of this thesis, showing how there is a cross-fertilized interaction between the new sonic practices emerged in the platform world and the evolution of museums in the post-digital age. The solutions adopted by the cultural institutions to answer to the challenges posed by sound can accelerate the adoption of new practices, assumptions and ways of working that belong to the Platform Model (see Fig. 126). The thesis has also shown how the new conceptualization of museum as platform can not only help museums to embrace sound culture in our contemporary society, but also to fully evolve into post-digital institutions.

Also, at a practical level, the thesis has shown how Platform Thinking can be adopted and operationalized in a museum context, by providing a theoretical framework that can be adapted to different organisational settings. The theoretical framework articulates around six dimensions, which correspond to the key variables in any museum practice: the spaces of the intervention (Where), the participants (Who), the cultural resources (Which), the processes of knowledge transmission and the ways of engagement (How) and the output derived from the activities (What) and the temporal dimension (When).
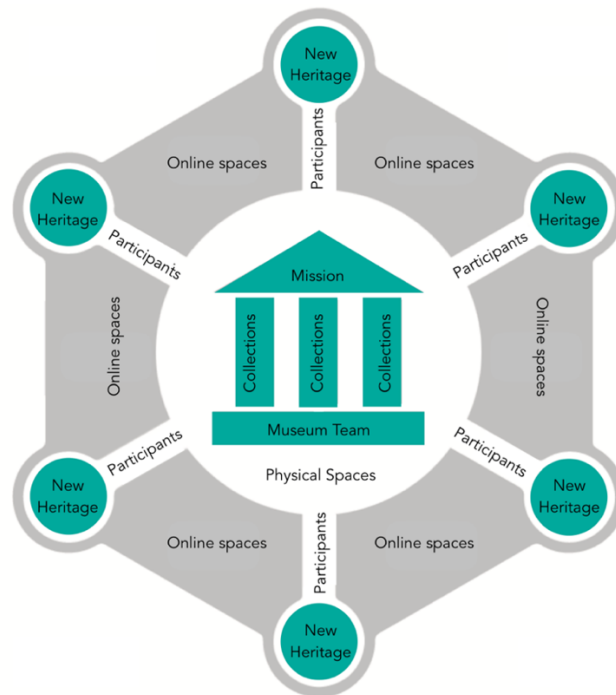
Fig. 126 The Platform-Museum Roadmap. © Stefania Zardini Lacedelli.

Where (the spaces)

In a post-digital and hyperconnected society, the museum is not limited to the physical building, but it extends its presence also beyond the walls in the digital world (Parry et al., 2018a; Drotner et al., 2019). The Platform Model calls for a more diffused and hybrid conceptualization of museums, that is essential when museums design with sound (which is intrinsically intangible and travels across space), but is also valid for any other medium as well. This leads to a change in the conception of both physical and digital spaces. Physical galleries are not the centre of design anymore, but are part of a broader system which embraces both external locations and online spaces. Digital platforms, on the other hand, are not only channels to promote physical activities but they are also spaces to design a museum activity on their own.

Who (the participants)

In a platform conceptualization, audiences are not passive receivers of information but actively contribute to the creation of knowledge. They are not invited only to experience a narrative, whether physical or digital: what they are asked to do is to interact with this

narrative and participate in its development by sharing their personal contributions. This shift requires a change in the terminology that we use to describe and identify audiences. Museums have a long, rooted tradition in interpreting audiences as '*visitors*', but the Platform Model suggests thinking of them as '*participants*'. Community has become another key word in describing the audience perspective: by adopting this participatory approach, museums can identify and create different communities around various themes emerging from their collections.

How (processes of knowledge transmission and ways of engagement)

The participatory approach also extends to the way knowledge is transmitted and participants are engaged in museum activities. In the Platform Model, the narrative provided by curators is not completed when it is offered to audiences, but it is continuously implemented and co-created. In so doing, the museum narratives will be fragmented to include more voices, perspectives and level of interpretations, so fulfilling the polyphonic turn advocated by Eilean Hooper-Greenhill. Crowd-curation, co-creation and co-production are fundamental approaches in a platform museum. These new practices in their turn offer new fascinating opportunities to conceive the relationship with audiences and the heritage itself, as well as to embrace sound culture, as the research findings demonstrate.

What (cultural heritage)

From their centenary interaction with material culture, museums have developed a well-defined concept of heritage represented by tangible objects, giving rise to physical collections that represents the development of human thinking in art, science, technology and society. In the last 20 years, the cultural sector has gradually recognised other forms of heritage that have been described and officialised in a series of international documents: from the Convention for the Safeguarding of Intangible Heritage (UNESCO, 2003) to the Charter on the Preservation of Digital Heritage (UNESCO, 2003), until the revolutionary Faro Convention for the Value of Cultural Heritage for the Society (Council of Europe, 2005). However, these conceptual revolutions struggle to adapt to the museum culture, which still focuses their practices of acquisition, preservation and curation around material objects. Sound heritage shows clearly to museums that they need to evolve their collecting practices in order to embrace different forms of heritage. In a platform conceptualization, cultural heritage is a

broad concept that embrace tangible, intangible and digital born forms of heritage, and include both visual and sonic elements. First and foremost, it is a dynamic concept that can change over time, according to the different attitudes, interpretations and values emerging in the society.

What (what the outputs of the activity will be)

This is an entirely new dimension introduced by the Platform Model. The participatory approach to museum practices leads to a noteworthy outcome: people's contributions. These contributions can be of a different nature depending on the specific focus of the activity, but need to be carefully managed, collected and preserved for the long term. The research has shown the potential of these contributions to better understand the collections, improve the interpretation in the galleries, as well as create new polyphonic narratives that can be displayed in both physical and digital spaces. This new dimension is not without implications. In a platform museum, the boundaries between engaging and collecting are blurred. Any engagement activity can also lead to collecting and acquiring new stories. This has key implications in terms of the distribution of competences across the staff. Traditionally, curatorial and communication departments have always been two distinct areas of practice. In a platform conceptualization, curatorial and communication competences need to be strictly interconnected, in order to manage two interrelated aspects: the communication and engagement on the one side, and the collection and curation of new heritage on the other.

When (the temporal dimension of the activities)

The Platform Model also affects the way museums conceive the temporal dimension of their practices. Any activity that involves participation and builds relationship with audiences is a long, complex process that requires time, constancy, and repetition. The online dimension itself has a different temporality: on platforms, time is extended. Sound, temporal medium par excellence, accentuates even more this dilation of experiences. As a result, in a platform museum the diffused conception of space is also accompanied by an expanded conception of time. As the research has suggested, instead of finished products designed and experienced in a determined time frame, the museum needs to be prepared to design and manage open processes, which are cyclic and can be adjusted over time.

8.2.2. Sound Culture Calls for New Curatorial Practices

The research has demonstrated how museums cannot embrace sound culture using the same spaces, practices and way of working that have been shaped around material culture. The data from the fieldwork have clearly outlined how well-rooted practices in museums such as exhibitions and physical galleries struggles to adapt to new intangible, dynamic and sonic forms of heritage. Thanks to an experimental and design approach, the research provided also practical solutions, showing future directions for curation, collection and audience engagement. The practices explored and experimented in the research (sound mapping, thematic playlist, sound walks, online exhibitions, sound memories boards) represent new ways to present the objects, to make people interact with collections, as well as to collect new stories. These practices signal two important shifts in curation. Firstly, they reflect an evolution from a material-based conception of curation which is articulated around spaces, objects, and tangible interactions, to a more intangible and diffused conception, structured around hybrid spaces, stories, online interactions and sonic interpretations. Secondly, they offer a response to the crisis of the curatorial authority which has been outlined in recent studies around digital transformation (Proctor 2010; Phillips, 2013), showing how the practices of collecting, curating and engaging are strictly interrelated. From their origin, museums have been responsible for collecting and preserving material forms of heritage, and developing from these objects well-informed, structured and engaging narratives that allow audiences to discover and understand the past. In a world where everyone is invited to comment, share, create content, there is another fundamental role that awaits museums and cultural institutions. They have also become platforms for discussion, dynamic and interconnected spaces that help us to understand our contemporary society. Objects of the past can become a prompt to stimulate reflections around the present. Instead of designing completed narratives, museums also need to create open journeys that will be enriched by each new individual that interact with them. They need to provide questions and be ready to collect the answers. And they are also called to apply the same curatorial expertise to people's contributions, to transform them into polyphonic narratives that embrace different perspectives, interpretations and cultural approaches.

8.2.3. Sound Leading the Emotional Turn in Museums

Connected with the introduction of new curatorial practices, the research also highlighted a fundamental shift from a predominantly cognitive and objective to a more emotional and

subjective approach to the cultural experiences. This emotional turn was observed in different areas of the museum practice. First of all, in the engagement with audiences. The relationship between sound, music and emotion has been largely studied in ethnomusicology, musicology, psychology, neurobiology, sociology, and anthropology (Gabrielsson, 2011; Juslin & Sloboda, 2012; Clarke, 2012) and one of the main benefits of sound design has been to enhance the sensorial and emotional engagement. The use of sound in the online environment further strengthens this ability, showing the audiences' underlying need of being more personally and emotionally connected with the objects and the stories presented. Together with the mission of educate and transmit knowledge, contemporary museums are called to design activities able to evoke feelings, bring memories to the surface, stimulate introspective reflections, involve multiple senses, stimulate empathy, make people interact at a personal level.

But there is also a further dimension where this shift was observed. The research shows an emotional turn in the practices of collecting and acquiring. The findings from the focus group reveals how museums are rethinking their system of values that lead to the recognition of a resource as cultural heritage. Historical, scientific and social importance are not the only criteria that a museum might adopt to define what can be considered worthy to be collected, exhibited and preserved for future generations. A more subjective approach is emerging, which recognise that our relationship with heritage can be extremely profound, personal and emotional. This subjective approach can offer a response to the challenge launched by the Faro Convention on the Value of Cultural Heritage for Society, that shifts the focus from the heritage objects to the meanings, uses and values that people attach to them. This research shows that, in this process of recognition, emotions can have a fundamental value, and can profoundly connect an individual to heritage independently by its ownership, geographical provenance or cultural background.

8.2.4. Digital Memories as a new Post-Digital Form of Heritage

Another key research finding emerged from the thesis. The prototyping practice revealed the potential of Digital Memories for the future of museum collecting, so contributing to the contemporary debate on the evolution of heritage and memory in the digital age (Garde-Hansen et al., 2009; Burkey, 2019). Social media content has recently received scholarly attention in the fields of social science and humanities for its value in understanding societal issues, analysing audience's behaviors and also exploring people's perception of the past

(Weller et al. 2013; Zuanni, 2017; Bonacchi et al., 2018). Different types of digital memories are continuously and spontaneously shared on social media but are rarely systematically collected by museums and heritage institutions (Ride, 2013; Zimmer, 2015; Rees, 2021). The memories collected throughout the #SonicFriday project were at the centre of a thriving debate which highlighted their value for creating a more powerful connection with the sonic nature of the objects, enriching the understanding of the collections, as well as providing new interesting interpretations of the role of sound technologies in people's lives. These memories caught the museum team attention for the variety, immediacy and the volume of the contributions collected. Compared to oral history, digital memories represent a more direct way to research and collect data, and they can also include multimedia elements such as videos, hyperlinks and audio files. On the other hand, this new type of memory raises new intriguing challenges for museum practitioners. Although digital objects can be easily copied, they need preserving and managing, and museums need to be mindful of where and how they can be stored and displayed for the long term. Unlike material objects, digital memories are much more dynamic and can be continuously implemented, so raising issues in terms of how this process might be managed and who might be in charge of it. Furthermore, the platform context in which they are generated requires museums to carefully consider the terms and conditions of each different service and adapt their ethical procedures accordingly. A whole new dimension for the cultural sector that requires further investigation and experimentation.

8.3 Original Contribution

This thesis has explored the role that sound culture could have in the evolution of museums into post-digital institutions, showing how 'platform' can be the paradigm of the twenty-first century museum. The museum advocated in this thesis is an institution that embraces sound and digital cultures, together with visual and material ones; offers new hybrid, emotional and multisensory ways to interact with the collections; and involves audiences and online communities in the creation of a new type of heritage, which is sonic and digital born. Generally stated, this research makes key contributions from three different perspectives: to the academic fields of Museum Studies, Sound Studies and Management Studies; to the museum and cultural sector; and to the cultural organizations involved in the research.

From an academic point of view, the research contributes to the field of Museum Studies by opening a unique interdisciplinary perspective on sound culture which connects museology with the thriving fields of Sound and Digital Studies. The thesis fits into a growing body of

literature that, in the last two decades, has highlighted the emergence of a multisensory turn in museums and the need to recognise the role of sound as carrier of knowledge, powerful means of engagement, as well as form of heritage itself (Sterne, 2003; Bubaris, 2014; Cox, 2015; Kannenberg 2017; Cortez 2022). However, the majority of these studies has tended to focus on the role of sound in traditional design practices such as exhibitions and physical galleries and does not explore how this evolution fits within the wider process of digital transformation in the cultural sector, with new emerging practices and ways of interacting with cultural heritage. This thesis fills this gap, showing how the different ontological nature of sound requires cultural institutions to explore spaces, systems and technologies, as well as cultural forms and practices introduced by the digital revolution. In particular, it highlights how sound on the one hand, and digital technologies on the other, naturally lead to a collaborative, participatory and emotional approach to curation and collection of heritage.

In so doing, the research also offers a key contribution in the body of literature in Management Studies that has been focused on the new platform business model, showing how it can be practically applied in the cultural context. In the last decade, several studies have outlined how 'platform' emerges as the main model around which not only the Web is organized, but also organizations, sociality and new economic models are developed (Van Dijk, 2013; Parker et al., 2016). Recently, a new research area has emerged in management studies exploring how this model led to the so-called 'platformisation' of cultural production (Nieborg & Poell, 2018; Busacca, 2019), where audiences actively contribute to the creation of content. The pandemic emergency raised from COVID-19 further stressed the need for cultural organizations to change in order to adapt themselves to an entirely new post-digital society, where co-creation, sharing and online communities are the norm (Galani & Kidd, 2020). The thesis illustrates the value of Platform Thinking in museums and offers a detailed case study of its application in a museum context. The research proposes a theoretical framework which draws upon the case studies of the thesis as well as from complementary research conducted in Italy that led to the development of a Platform-Museum in the Dolomites area (Zardini Lacedelli, 2018; Zanetti et al., 2019). In the case study experiment, this framework has been adapted to a pre-existing museum - the National Science and Media Museum - showing its validity to introduce organisational changes at both practical and conceptual level.

The research also contributes to the growing field of Sound Studies more specifically, by offering a unique perspective on how the variety of ways through which sounds are consumed, shared and created in the digital world can offer a whole set of new cultural

practices. In the last decade, relevant scholars have investigated how the new digital and sound technologies have completely revolutionized our sonic world, introducing new habits such as mobile listening, acoustic privacy, online sharing, co-production of music (Bull, 2000; Bijsterveld & Pinch, 2012; Kassabian, 2013; Papenburg & Schulze, 2016; Hagen & Lüders, 2016). Less scholarly attention has been paid on how these new habits have generated themselves new sonic ways to interact with historical and cultural heritage: from sound maps, online sound exhibitions and collaborative playlists to sound walks and audio tours that extend the museum outside its walls (Gasparotti, 2014).

A further key contribution of this thesis in academic terms is methodological. The subject of investigation required to explore new research methods and ways of collecting data, which are of utmost importance for any study around contemporary society. The digital revolution has introduced new methods of research (Jones, 1999; Marres, 2017; Burgess & Bruns, 2012; Rogers, 2013), and even if digital phenomena are not the main subject of investigation, any researcher can now approach these tools as new way of collecting, observing and interrogating data about society and publics. The platform world also raised new challenging ethical issues about recruiting, consent, confidentiality and copyright that needs to be carefully considered before using web data (Hardey, 2011; Ahmed et al., 2017). The research has combined traditional qualitative methods – interviews and focus groups - with digital methods - netnographic and social media analysis -, and carefully explained the issues encountered and the solutions adopted in each of these methods. It has also explored new ways of interrogating these data, combining quantitative, narrative and sentiment analysis (Herring, 2010; Page, 2012; Villaespesa, 2016; Zuanni & Campbell, 2018; Iglesias & Moreno eds., 2020). For the relevance and novelty of this methodological approach, an entire chapter was dedicated to discussing the research methods and the ethical issues of the platform world. In so doing, the thesis has offered a detailed overview of the new challenges as well as incredible opportunities that any humanities scholar encounters today.

This thesis offers also a series of key contributions to the museum and cultural sector. The research question stems from the author's ten years of professional experience in museums, as Head of Education, Digital Developer and professional consultant. What clearly emerged from this field experience is the need of the sector to introduce new curatorial practices, formats and activities to face two contemporary challenges that museums are facing: the digital transformation on one hand, and the emerging role of sound on the other. Chapter 3 and 4 have clearly evidenced the limitations of a predominantly visual and material-based system in a post-digital world and the need of the sector to embrace sonic and digital elements

in the collections and in the design of cultural activities. A first key contribution of this thesis is to offer a design framework as well as a whole range of new digital and sonic practices that can complement the traditional ones in the physical spaces of the museum. The fieldwork research at the British Library offered a newsworthy insight on the new directions in the curation of sound on digital platforms experimented by one of the largest Sound Archive in the world. The research experiment at Science Museum Group allowed me to test some of these approaches in a museum context and explore how it can complement traditional practices such as exhibitions and galleries. The impact of the #SonicFriday project for the cultural sector was officially recognised in the GLAMi Award competition, a prestigious prize which every year celebrates the best digital projects in galleries, libraries, archives and museums all over the world (see Fig. 127). In April 2021, the GLAMi Jury assigned to #SonicFriday two GLAMi Awards[17] - *Pandemic Pivot* and *Interactive and Immersive* – recognising the ability of the project to create powerful connections with the collections in an innovative way, allowing audiences to be active and using music and sound as a mean to create a sense of closeness during a particularly challenging time. In 2022, #SonicFriday was chosen among several hundred projects which have won awards in 2021 to be presented as a success story in the Best in Heritage Conference organized by ICOM and Europa Nostra (see Appendix III).
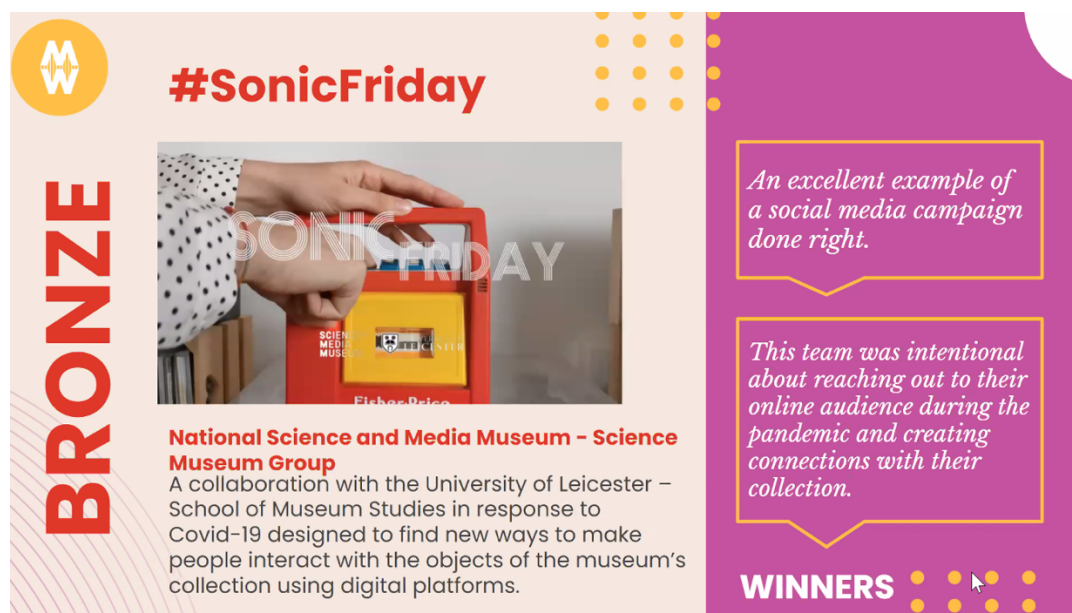
Fig. 127 Screenshot from the GLAMi Award cerimony announced on 24th April 2021 at the MuseWeb 21 conference (https://mw21.museweb.net/glami-award-winners/index.html, accessed on 30 March 2022).

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[17] #SonicFriday is listed in the GLAMi Awards Winners 2021 Webpage in the two categories of *Interactive and Immersive* and *Pandemic Pivot*: https://mw21.museweb.net/glami-award-winners/

The research has also contributed to the movement (professional and scholarly) towards more inclusive and participatory approaches to collections and heritage. Participation in museums and galleries has been a key theme of the new museology and a large and growing body of literature has stressed the importance of crowd-curatorial practices where audiences became active contributors (Simon, 2010; Giaccardi, 2012; Ridge, 2017; Puhl & Mencarelli, 2015; Parry, 2019). However, put participatory practices into practice is a complex process that requires profound changes in approaches, attitudes and ways of working, as well as the use of spaces, languages and technologies which are not traditionally rooted in the museum practice (Tamma et al., 2019). This research has demonstrated how the use of platforms and the adoption of Platform Thinking can support museum professionals in the design of participatory practices, offering new ways to actively contribute to the museum narratives and opening the way to the involvement of non-traditional audiences. The #SonicFriday project stimulated a wider participatory process which was able to include social media users, museum volunteers and a series of online communities passionate about sound and technologies. The research has shown that digital platforms can have a key role in stimulating a more active, collaborative and inclusive approach to collections and curation, if their use is complemented by a careful rethinking of the role of audiences in the museum and the value of their contributions.

The research also contributes to the recent signalling of an 'emotional turn' in the use of technology in museums. One of the key findings of the #SonicFriday project is the emerging need of people to interact with heritage in a more emotional and personal way. What people search in a museum experience is not only the acquisition of new knowledge, but also the opportunity to live deeply immersive and emotional experiences, feel profound connections with the objects in display and the stories that are told, and also respond with their own memories. This emotional turn has recently received a growing attention (Munro, 2014; Maholo & Peng, 2019; Frost, 2020), and requires a change in both curatorial and collecting practices where sound can have a key role, as this thesis demonstrated. The research findings have highlighted how sound and music are powerful emotional media, and their introduction can help museums to stimulate a more personal and emotional response to the collections. The research experiment showed how sound can be applied both to create more engaging narratives – with the example of the thematic playlists where music is a mean of emotional connection - as well as to stimulate personal responses can have a fundamental value in themselves. The discussion around the value of digital memories at the end of the project was

one of the liveliest of all the focus groups and has stimulated a thriving debate around the possibility to permanently store these contributions and re-design the gallery experiences in order to make them accessible also in the physical spaces.

A last contribution of this research to the cultural sector is in the way it has provided a practical application of design thinking in museums. Design research a relatively new approach in museum practice and recent studies have demonstrated its value in the design of digital activities (Mason 2015; Mason and Vavoula 2020). The thesis contributes to this growing field of practice, showing the importance of design techniques such as collaborative prototyping in the creation of new museum practices. In particular, the research has highlighted how prototyping is particularly effective in the design with sound, a relatively new medium that require to explore a whole new set of spaces, approaches and technologies. In the design of #SonicFriday, as shown in Chapter 7, a key role has played the exchange and integration of different perspectives and experiences in the preliminary design phase. The participation of different members from the curatorial, communication and web team in the design sessions stimulated interdisciplinary conversations around the role of sound in the collections, in the online engagement and in the creation of new digital narratives. The implementation and subsequent collaborative reflection around the practice has further consolidated this new knowledge, fostering its internalization in the organization. Furthermore, the output of the design practice - the #SonicFriday project – can be considered, in itself, a research outcome, the tangible representation of embodied Platform Thinking in the museum.

The third level of contribution regards the direct impact of this research to the organisational evolution of the cultural institutions involved. The two main case studies of this thesis are two key British organizations, which are distinguished worldwide for their extensive collections and their role in the history of knowledge. The immersive research fieldwork conducted at the British Library in 2018 and at the Science Museum Group in 2019 contributed to write part of the institutional history of these outstanding organizations. In particular, this thesis tells the story of their curatorial journey around sound, a story that was not written before and that can be of great relevance for the cultural sector. This story highlights two different perspectives, represented by each of these institutions: the perspective of museums, which mainly collect sound objects; and the perspective of sound archives, which collect sound in its intangible and digital form. Both perspectives give rise to two specific challenges of sound curation: how to make objects alive through sound, and how sound can open the way to new intangible e digital forms of heritage, which are not

embedded or manifested in material objects. The practices and the experience described in this thesis can offer essential guidelines and practical tools to cultural organizations that want to embrace sound culture in a platform world, so supporting their evolution into post-digital institutions.

A further level of contribution derives from the research experiment at the National Science and Media Museum, which directly contributed to a wider organisational change toward a more sonic approach to the collections. As the analysis of the focus group has shown, the project has stimulated a wide reflection in the museum team on different levels. Firstly, #SonicFriday fostered a rethinking on the use of digital platforms as powerful curatorial tools for engaging audiences with sound. Whereas before the research project the museum tended to use online platforms mainly for the communications of event and activities, #SonicFriday has opened the way for a new innovative use of platforms for experimenting new ways of curating sound and engaging people with collections. This is demonstrated by number of platforms adopted in the project, both social media platforms and specifically audio-based services, and the variety of the formats explored – thematic playlists, sound map, twitter exhibitions, sound memories board. The impact of the project continued beyond the end of the #SonicFriday campaign: the format and the hashtag were adopted again in October and November 2020, for the launch of three sound interactives created as part of another project promoted by the museum, *Sonic Futures*[18]. Over the course of 2021, the social media team continued to launch similar interactive posts, inviting users to share their memories on specific objects of the collection.

The project has also had an impact on the physical display. Part of the narratives developed in the #SonicFriday project contributed to the physical display of Sound Season, a programme of two exhibitions dedicated to sound technologies which took place between July and December 2021 in Bradford[19]. In particular, the project contributed to expand the section dedicated to the synthesisers, by connecting it with an online interactive space where visitors

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[18] The Sonic Futures project (2020-2021), promoted by the University of Nottingham within the UKRI funding, aimed to deliver an interactive public engagement programme involving audiences in the creation of new approaches to curating sound technologies at the National Science and Media Museum. In response to the museum closure caused by the COVID-19 emergency, the project was adapted to the online context, so developing three online interactive exhibits (Echo machine, Photoponic and Sound Postcards).

[19] Sound Season was a series of exhibitions and event launched by the National Science and Media Museum, both onsite and online, to explore how sound fills our world, how it is created, and how we can experiment and play with it. The programme was planned to be launched in spring/summer 2020 but was postponed to spring/autumn 2021, in response to the COVID-19 emergency.

were invited to listen to thematic playlists and to contribute with their own musical suggestions (see Fig. 128). The museum team also started to reflect how to integrate the digital memories collected in the #SonicFriday campaign in the permanent display. In particular, the project offered a key contribution to the design of the Sound and Vision Gallery, the new permanent gallery which will be opened in 2024 with funding from the National Lottery Fund. Collecting and displaying stories of usage was one of the aims of this new permanent space and #SonicFriday showed new ways to gather this kind of material, using digital platforms to expand the volume and the type of memories. In so doing, the project stimulated the museum team to work with a new post-digital form of heritage, favoring a more intangible and subjective interpretation of the collections.
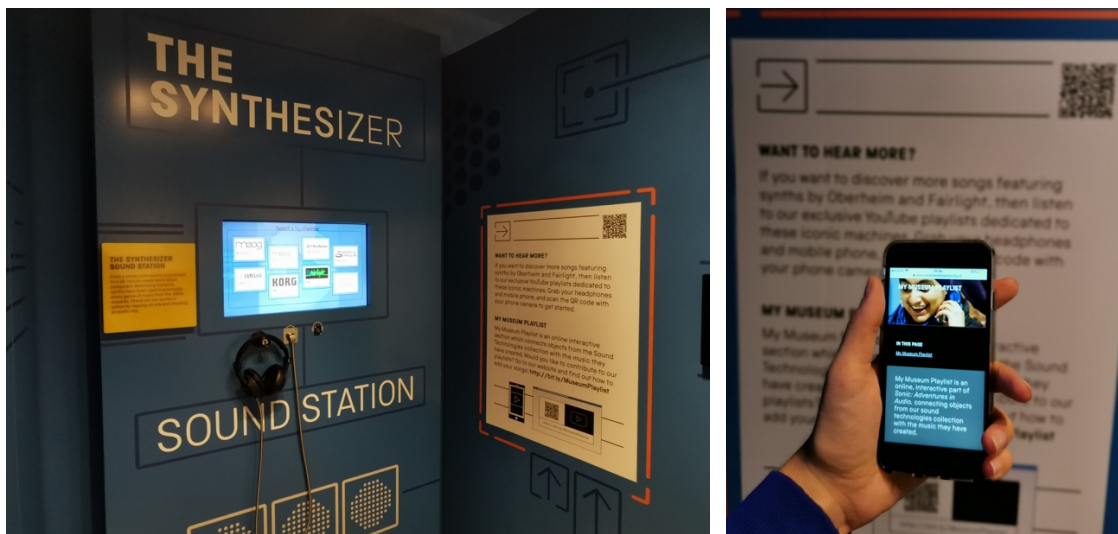
Fig. 128 The Synthethiser Sound station and the *My Museum Playlist* interactive in the *Sound: Adventures in Audio* Exhibition at the National Science and Media Museum, November 2021. © Stefania Zardini Lacedelli

8.4 Limitations of this Research

These promising results need to be contextualized, also considering some specific limitations faced during the research, that open the way for future studies.

The first limitation regards the type of the organizations where the research was situated. The two main case studies of this research are two world case British organizations, with an extensive experience on sound curation and a significantly high level of digital maturity. The British Library is the national library of the United Kingdom, and it is one of the largest libraries worldwide. The Library's collection includes one of the most extensive sound archives in the world, with over 6.5 million sound recordings. The Science Museum Group

is is the UK leading group of science museums, established with the National Heritage Act in 1983 for the management of the outstanding national collection of 7.3 million items from science, visual and sound technology, engineering, medicine, transport and media. Both organizations have outstanding resources, capacity, brand, visibility, and level of digital maturity which are harder to find in museums of smaller size. From one side, situating the research in this exceptional context allowed to deeply understand the challenges of sound curation in a platform world, and to explore if Platform Thinking could respond to them. However, there are also a series of limitations that come from the peculiar context of these two case studies. What happen when the research is applied in museums of different type, size, digital maturity and experience with sound culture? Is Platform Thinking a valuable framework also for smaller museums, with less resources, capacity and level of digital maturity? And what happen if we applied the research in other geographical and cultural context, such as North and South America, Asian or African countries, and outside a Global North context? To assess if Platform Thinking can be a universal framework for the museum sector despite these fundamental variables, further research is needed.

A further reflection regards the specific context the research experiment. #SonicFriday was developed in a very challenging time, a moment where a worldwide pandemic deeply affected the way we live, work and operate. Despite the digital nature of the experiment was not a result of the COVID-19 emergency and was part of the research itself, with platform being the main dimension of investigation, the way in which the experiment was developed and was given attention was naturally impacted by the exceptional situation the museum was living. Chapter 7 has highlighted the new challenges faced by the museum, which had to close its doors for six months, to furlough key members of the team, as well as to pay more attention to online spaces as they became the only channels to communicate with audiences. None of these would have happened with the museum traditional activities normally in place. As a consequence, some limitations arise from this research as the experiment was conducted in very exceptional situation, where the working conditions as well as the cultural offer were deeply impacted. If the same research experiment had been designed and carried out with the museum open and the physical activities in place, would the findings have been different? Would people's responses have been the same, and would sound has been the same emotional significance? Future research is needed to explore the role of sound culture and Platform Thinking in a post-COVID context, where the museum can again offer both physical and online activities in a wide range of hybrid spaces.

During the field experiment, new fascinating implications of Platform Thinking emerged in the focus group, but these could not be practically implemented in the museum. One of the major outcomes of the research experiment was to highlight the value of digital memories and, as a result, to outline the emergence of a new type of heritage, which is sonic and digital based. However, due to the limited timeframe of the placement and the lack of dedicated resources in the museum, the officially acquisition of these contributions was not feasible. This posed some limitations in assessing the impact of Platform Thinking when it comes to practically collect people's contributions and decide where and how to display them. Should museums collect these memories? How this process might be managed and who should be in charge of it? Where they can be hosted and preserved in the long term? Further steps need to be undertaken to complement this work, in order to understand how this new type of heritage can be hosted and made accessible in both digital and physical spaces of the museum.

The research experiment has focused on the design, implementation and evaluation of an innovative sonic practice inspired by Platform Thinking. The research findings have answered to the fundamental question at the basis of this PhD research, confirming that Platform Thinking can offer the tools and the conceptual framework to embrace sound culture, but also to lead the museum into the future. However, the research also raised some new thrilling questions that awaits to be answered. As the #SonicFriday project has shown, the curation of sound strongly challenges previous assumptions, mindsets, and ways of working, which are deeply rooted in the centenary history of museums as institutions. Platform Thinking offers an answer, but at the same time requires a fundamental change in the way museums operate and conceive their collections and heritage. Further research is needed to guide museums in this evolution and explore where this new thinking can lead.

8.5 Future Research

One of the most exciting aspects of research is that it is an open process with no definitive end. Any research project is a fascinating journey beyond the limits of what is known, to discover more. At the same way in which reaching the top of a mountain opens new horizons, also at the end of a research project there is always a new chapter waiting to be written. This thesis has offered fundamental answers, and at the same time has generated new, intriguing research questions, opening further directions that await to be explored.

8.5.1. New Sonic Practices in the Cultural Sector

This thesis has contributed by delineating a series of practices that can be used in museums to embrace sound culture and design with sound in innovative ways. As shown in the thesis, Sound Studies is an incredibly rich interdisciplinary field that only recently has received a growing attention in the museum sector, and further studies are needed to explore the new opportunities opened up by sound in a post-digital world. As the literature review has shown, experimental sonic practices are emerging outside the traditional institutional, physical and in-gallery context, introducing a new vocabulary, tools and ways to conceive sonic experiences. Examining the opportunities opened by sound outside the museum context is still an open field of research. The evolution of the web and of contemporary sonic culture, in particular, suggests new intriguing research directions in the collaborative curation of sound, an area that this thesis has contributed to develop. The #SonicFriday project has offered an in-depth study of the potential of co-created sound mapping, thematic playlists and memory boards, but it is only a start to exploring the revolutionary impact of these practices in the museum sector. Future research is needed to examine the opportunities and challenges opened by each form, as well as offering a similar in-depth study to other revolutionary practices such as sound walks. In particular, a key question emerged at the end of #SonicFriday project, which awaits to be answer: how can museums extend the collaborative curation of sound beyond online spaces?

In conceptual terms, the 'Sonic narrative' was one the most intriguing concepts emerged from of the research and can offer a new perspective to study sound in museums beyond the boundaries of existing practices. Sound exhibition is a well-established practice in museums, and a recent framework has been developed to map the ways in which sound materials have been deployed in museum exhibitions (Cortez, 2022)[20]. However, the very concept of 'exhibition' struggles to adapt to the medium of sound, as seems to focus on the visual relationship with objects (to be 'exhibited' is to be 'shown', 'seen', 'displayed'). Furthermore, this concept is being also challenged by emerging participatory practices which place sharing and co-creation of stories at the centre of the experience (Zardini Lacedelli et al., forthcoming, 2023). The concept of 'sonic narrative' emerged in this thesis can provide

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[20] In her article 'Museums as sites for displaying sound materials: a five-use framework' (Cortez, 2022) Alcina Cortez suggests five categories of exhibition practices - *sound as lecturing*, *sound as artifact*, *sound as ambiance*, *sound as art*, and *sound as crowd-curation* – to understand the use of sound in museums. This thesis directly contributed to the shape of the category *sound as crowd-curation*, which was coined together with Alcina Cortez and John Kannenberg within the scope of discussions around the organization of the international conference Sound in Museums.

museum practitioners with a more sensorial, polyvocal and participatory way to conceive the use of sound, open to embrace multiple perspectives and levels of interpretations. It would be worth exploring the possibilities of using this concept both to analyse existing sonic experiences but also to design new practices. By focusing on 'sonic' rather than on 'sound', this concept can also foster museums to explore new fascinating areas of research on other forms of 'hearing' which does not necessarily imply the presence of audible phenomena. This is a promising future direction that has been opened by Deaf Studies scholars and avant-garde musicians but needs to be expanded and experimented in museum practice. New exciting questions await to be answered: can we imagine a 'Sonic narrative' in absence of a sound signal? How the concept of 'Sonicity' can expand the way we design sensorial experiences in museums? Is there a sonic way to conceive collections, the relationship with audiences, the museum itself, and how does it change the assumptions but also the vocabulary we use in museum practice?

Future research awaits also to expand the understanding of the type of engagement offered by sound. This thesis has also demonstrated how sound increases the emotional and personal engagement with the collections and museum objects, through an analysis of the contributors of the #SonicFriday participants and a shared reflection with the museum team. This is a fascinating and promising area of research which connects with the latest development of machine learning. The analysis conducted in this thesis applied a manual categorization of the emotions expressed by online users in the #SonicFriday project, but new computational techniques can offer deeper insights into the emotional expressions of the contributors in a sonic practice. For future research, it is worth exploring the possibilities of using computational methods to analyse bigger datasets and expand the knowledge of the emotional dimension of museum experiences.

The intersection between technology, sound and cultural experiences is one is one of the most promising directions for future research. As shown in the literature review, this is an intrinsic relationship which shaped the development of sound in museums. The introduction of new digital and multisensory technology has favored the gradual attention towards sound, expanding the possibilities to design new practices but also to imagine an entirely new way of conceiving collections. The synergy between the technological workforce specialized in audio, sound designers, artists, curators, researchers and heritage professionals can foster further innovations not only in how sound is used in museums, but also how we experience and value sound in the society, so informing future technological developments. This thesis, in particular, has revealed a gap in the social media platforms landscape in terms of displaying

and sharing sounds. This is an extremely fascinating field of practice, which would enormously benefit from the collaboration among tech companies and cultural institutions, to enhance the power of cultural sounds to be shared, created and used in creative ways. In 2020, new services emerged providing solutions in the display of sound on social media. Among them, the Pitter Pattr platform developed a special feature to display interactive videos of sound waves that can be directly shared on social media. This can be a promising direction to be explored, to see how this functionality can be used and further adapted by cultural institutions devoted to the promotion of sound heritage.

8.5.2. The Evolution of Collecting Practices with New Forms of Memory and Heritage

This research contributed to the on-going debate around new collecting practices and post-digital forms of heritage. The thesis offered a comprehensive approach to sound culture which includes the new opportunities offered by sound in the design of cultural experiences, but also as an object of curatorial care. As the literature review has shown, the revolutionary impact of sound goes beyond the practice of design and lies at the very core of museum practice: the collection of cultural objects. The fieldwork research at the British Library and at the Science Museum Group offered two different perspectives on Sound Heritage exploring two different typologies: sound recordings and sound objects. However, the #SonicFriday project suggested a further category: sound-related Digital Memories. This concept can enrich the understanding of Digital Memories, an exciting research area which signalled a shift from collecting objects to collecting memories and stories from everyday people (Gabi & Galani, 2021). Within this thriving field, museums and cultural institutions started to use social media as collecting tools, for their ability to reach a wide number of people and the variety of multimodal elements and levels of meanings involved. The memories collected in the #SonicFriday project raised key questions on the value of emotions, feelings and sensorial experiences for museum collections, showing a tension between a more emotional vs cognitive approach to acquisition policies, but further research is needed to understand and how this will shape the future direction of collecting practices. Furthermore, the reflection on the personal memories at the end of the #SonicFriday project raised key questions in practical terms – which processes, competences, spaces and tools museums need to collect this material - and also in conceptual terms – what can be the value of people's contributions and how they can expand the boundaries of the collections. Future research awaits to explore the challenges posed by these practices: how they can contribute to close the gap between the experts and the audiences, how they can foster the collection of new

sonic forms of heritage, and how they can support the evolution of museums into fully inclusive institutions that look towards the future, and not only towards the past.

This is connected to another key direction of future research, which can expand our understanding of how the evolution of the heritage definition is transforming museum practice. The concept of Digital Memories is intrinsically connected with a shift from a material, static, objective interpretation of heritage to a more dynamic, processual, subjective interpretation. Memories and stories, together with sounds, oral testimonies and music, are not any more complementary sources to understand the objects and places but are recognised as the essence of what heritage is. A conceptual shift which was anticipated by the Faro Convention for the Value of Cultural Heritage for the Society (Council of Europe, 2005) but whose revolutionary impact on museums and cultural institutions still awaits to be fully understood.

8.5.3. Towards the Platform-Museum

The research has just started to show the potential of Platform Thinking in museums, proposing a model that can both help to embrace sound culture, but also lead museums into the future. When I started my research in 2016, Platform Thinking had predominantly been explored in management studies (Van Dijck 2013; Parker et al., 2016; Moazed, 2016). Over the last 5 years, the model received an increased attention in the cultural sector with studies on the platformisation of cultural production (Nieborg & Poell, 2018; Busacca, 2019), showing the need to rethink the way museums and cultural organizations operate and even conceive themselves. However, the research on Platform Thinking and Platform Model in the cultural sector is just at its infancy. This research has developed and applied a theoretical framework, showing what is possible when Platform Thinking is operationalized in a museum organization, but future research is needed to adapt this model to the specificity of museums. The framework was applied in the design of a sonic practice at the National Science and Media Museum and, in parallel with this PhD research, to a group of museums and museum networks situated in the Northern Italy[21]. Future research is needed to further develop this

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[21] The first experiment was the foundation of the digital-born museum Dolom.it, the first prototype of a museum entirely designed around the Platform Model which is described in Chapter 4. In 2019, this framework was further applied outside the Dolomites area to the Altovicentino Museums, a network of 40 cultural institutions encompassing ethnography, geology and art collections. In this project I could guide museum professionals to discover and adapt the

framework and assess its validity in museums and institutions of different type, size and level of digital maturity, as well situated in different geographical and cultural backgrounds. Is this model to understand the post-digital evolution of non-Western museums? What happens when Platform Thinking is applied beyond sound culture? Are there some specific elements to be considered in the interaction with material culture, in physical spaces?

This thesis contributes to the ongoing reflection on the evolution of the museum conceptualization, by offering an in-depth insight on the Platform-Museum, but future research is needed to explore how new models can shape new museum forms. Contemporary experimental practices such as the Museum of Portable Sound and the Museo Dolom.it have been discussed in the literature review, showing how museums are no longer defined by the existence of a physical building and material objects. Future studies can expand this thriving area of research, enriching the understanding not only of the new practices, but also of the new forms of the museums of the future.

8.6 A New Chapter in the History of Museums

This thesis was written in a specific moment in history, when the whole museum community is interrogating on the role of museums. The International Council of Museum has been struggling to find a new definition, and professionals from all over the world are debating on what should be the new objectives, features and areas of practice that define a museum institution.

We live in a hyperconnected and highly digital society, where sounds are consumed, shared and created in an increasing variety of new ways. Digital sounds, together with images, messages, videos, have become a substantial part of our life. They represent digital extensions of our memory. But they are at great risk. The giant platforms that sustain this new digital ecosystem are not heritage institutions, they have no mission to preserve any content for cultural purposes. Furthermore, they have no commitment to guide people in interacting with these new ways of discovering the world and creating new knowledge. Museums, libraries, archives, are the only institutions that can have this role. To contribute to a better society,

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'Platform'Model' to their specific context, creating a new platform dedicated to past and contemporary heritage of the Altovicentino area.

they need to evolve. To maintain the cultural, educational and societal relevance that have always had since their origin, they need to change.

This thesis has shown that, to do this, museums need to be prepared to change their fundamental assumptions. The same assumptions from which they originated. They are asked to embrace sound and digital culture, as well as visual and material ones. They are asked to look not only into the past, but also to help us to understand our present. They are asked not only to present collections in meaningful ways to audiences, but to build new stories with them. And finally, they are asked to give emotions, feelings, everyday stories, the same importance given to objects and events of historical and scientific importance.

This research has laid down a first beat into this new world, offering guidance for responding to these critical challenges, and showing only some of the incredible opportunities that await us. This is only a first step of the new journey of museums in the sound and digital culture.

Appendices

Appendix I. The Participants of the Research

This research project involved, in its different phases and across the different methods of data collection, three key groups of participants: 20 heritage professionals from the British Library and Science Museum Group, 4 museum volunteers and 215 online users.

A) Members of the British Library

Role	Department
Head of Sound and Vision Department	Sound and Vision Department
Metadata coordinator	Sound and Vision Department
Curator of Wildlife & Environmental Sounds	Curatorial Team
Curator of Popular Music	Curatorial Team
Head of Web Development	Web Development Team
Web User Experience Manager	Web Development Team

Table 16 The Members of the British Library who participated in the research.

B) Members of the Science Museum Group

Role	Department	Museum
Digital Director	Digital Team	Science Museum Group
Web Manager	Digital Team	National Science and Media Museum, Bradford
Web Manager	Digital Team	Science and Industry Museum, Manchester
Curator of Sound Technologies	Curatorial Team	National Science and Media Museum, Bradford

Curator of Television and Broadcast	Curatorial Team	National Science and Media Museum, Bradford
Associate Curator of Sound and Vision Gallery	Curatorial Team	National Science and Media Museum, Bradford
Volunteer Coordinator	Curatorial Team	National Science and Media Museum, Bradford
Interpretation Developer	Curatorial Team	National Science and Media Museum, Bradford
Research Associate	Research Department	University of Nottingham
Communication Manager	Communication & Marketing Team	National Science and Media Museum, Bradford
PR and Press Manager	Communication & Marketing Team	National Science and Media Museum, Bradford
Collection communication manager	Communication & Marketing Team	Science Museum, London
Communications Officer	Communication & Marketing Team	National Science and Media Museum, Bradford
Communications Officer	Communication & Marketing Team	Science and Industry Museum, Manchester
Keeper of Collection Engagement	National Collection Centre	Science Museum, London

Table 17 The Members of the Science Museum Group who participated in the research.

C) Volunteers

Volunteer Code	Age	Area of expertise
V1	40-60	Talking to the general public
V2	Over 60	Object Handling research
V3	Over 60	n.c.
V4	40-60	Events

Table 18 The age and area of expertise of the museum volunteers participating in the research.

D) Online users

Platform	Users
Twitter	OU 1-96
Facebook	OU 97-184
Instagram	OU 179-197
Learning Toolbox	OU 192-208
Padlet	OU 208-215

Table 19 The online users divided for each platform adopted.

To capture the breadth and diversity of online users, a specific categorization was developed on Twitter, basing on their public biographies.

Category	Description	Total
Institutional organizations	Museums or other institutions responding to the prompt.	5
Museum and Cultural Professionals	Members of the Science Museum Group or other cultural professionals.	12
Sound technologies experts/Digital Creators	Experts or enthusiasts in sound and digital technologies.	20
Students/Academics	PhD students or academics. This group was specifically involved during the M4C Research Festival where they could contribute to the 'Sound of my Quarantine' e-poster, but then they also responded directly to the museum social media posts.	13
Other (Not categorized users)	Other kind of online users who already followed the museum on different social media platforms.	46

Table 20 The categorization of the Twitter users based on their public biographies.

Appendix II. Data Collection: Activity Plan

A) Semi-Structured Interviews Plan

Date	Place	Participants	Code
25 September 2018	British Library	Head of Sound and Vision Department	IN01
5 December 2018	British Library	Head of Web Development and Web User Experience Manager	IN02
17 January 2019	British Library	Curator of Wildlife & Environmental Sounds and Metadata coordinator	IN03
6 March 2019	British Library	Curator of Popular Music	IN04
12 July 2019	National Science and Media Museum	Visiting Researcher	IN05
18 July 2019	Science Museum	SMG Digital Director	IN06
19 July 2019	National Science and Media Museum	Curator of Sound Technologies, NSMM	IN07
20 September 2019	National Science and Media Museum	Communications Manager, NSMM	IN08
27 September 2019	National Science and Media Museum	Volunteer Coordinator, NSMM	IN09
27 September 2019	National Science and Media Museum	Website Manager, NSMM	IN10
30 October 2019	National Science and Media Museum	Curator of Television and Broadcast, NSMM	IN11
7 November 2019	Science Museum	Keeper of Collections Engagement, SM	IN12
14 November 2019	Science and Industry Museum	Web Manager and Communications Officer, SIM	IN13

Table 21 The list of the semi-structured interviews conducted in the first and second research fieldwork between 2018 and 2019.

B) Design Sessions Plan

Date	Place	Participants	Code
11 February 2020	National Science and Media Museum	SMG Digital Director	DS01

Date	Place	Participants	Code
		Curator of Sound Technologies, Communications Officer, NSMM	
		Interpretation Developer, Communications Officer, NSMM	
11 March 2020	National Science and Media Museum, Bradford	Volunteer Coordinator, Communications Officer, NSMM	DS02
		Associate Curator of Sound and Vision Gallery, Communications Officer, NSMM	
		Communications Officer, Communications Officer, NSMM	
24 April 2020	Online on Teams	Collection communication manager, SM	DS03
07 May 2020	Online on Teams	Curator of Sound Technologies, NSMM	DS04
		Volunteer Coordinator, NSMM	
		PR and Press Manager, NSMM	
		Communications Officer, NSMM	
20 May 2020	Online on Teams	Curator of Sound Technologies, NSMM	DS05
		Curator of Television and Broadcast, NSMM	
		Associate Curator of Sound and Vision Gallery, NSMM	
		Volunteer Coordinator, NSMM	
		Website Manager, NSMM	
03 June 2020	Online on Teams	Communications Officer, NSMM	DS06
		Collection communication manager, SM	
		Website Manager, NSMM	

Table 22 The list of the design sessions conducted to co-design the #SonicFriday project with the museum team in 2020.

C) Group Discussions with the Volunteers

Date	Place	Participants	Code
23 June 2020	Online on Teams	Volunteer Coordinator, NSMM Curator of Sound Technologies, NSMM V01	GD01

		V02	
2 July 2020	Online on Teams	Volunteer Coordinator, NSMM V01 V03	GD02
6 July 2020	Online on Teams	Volunteer Coordinator, NSMM Curator of Sound Technologies, NSMM V01 V03 V04	GD03
21 July 2020	Online on Teams	Volunteer Coordinator, NSMM V01 V02	GD04
11 August 2020	Online on Teams	Volunteer Coordinator, NSMM Curator of Sound Technologies, NSMM V01 V02	GD05

Table 23 The list of the group discussions conducted with the museum volunteers during the #SonicFriday project in 2020.

D) Focus Groups Plan

Date	Place	Participants	Code
8 September 2020	Online on Google Meet	SMG Digital Director Curator of Sound Technologies, NSMM Website Manager, NSMM Volunteer Coordinator, NSMM Museum Volunteer V1 Museum Volunteer V2 PhD student	FG01
18 September 2020	Online on Zoom	SMG Digital Director Curator of Sound Technologies, NSMM Communications Manager, NSMM Press and PR Manager, NSMM Communications Officer, NSMM Website Manager, NSMM Volunteer Coordinator, NSMM	FG02

Table 24 The two Focus Groups conducted at the end of the #SonicFriday project in September 2020.

Appendix III #SonicFriday Project: Documentation

A) Social Media Prompts

Date	Theme	Twitter	Facebook	Instagram
26 June 2020	Live Music	https://twitter.com/MediaMuseum/status/1276443515468369921?s=20	https://www.facebook.com/nationalscienceandmediamuseum/posts/10164011275245551	https://www.instagram.com/p/CB5NlvrKD4j/
3 July 2020	Cassette Memories	https://twitter.com/MediaMuseum/status/1278978187238785024	https://www.facebook.com/nationalscienceandmediamuseum/posts/10164055362875551	https://www.instagram.com/p/CCK16-zKXu0/
17 July 2020	Sounds of my Quarantine	https://twitter.com/MediaMuseum/status/1284053430437384193	https://www.facebook.com/nationalscienceandmediamuseum/posts/10164124424045551	https://www.instagram.com/p/CCvV-X5qhvk/
24 July 2020	I love digital sampling	https://twitter.com/MediaMuseum/status/1286588939281805312	https://www.facebook.com/nationalscienceandmediamuseum/posts/10164153379780551	https://www.instagram.com/p/CDA5rSWqt5V/
31 July 2020	CD Memories	https://twitter.com/MediaMuseum/status/1289132134184222720	https://www.facebook.com/nationalscienceandmediamuseum/posts/10164186278730551	https://www.instagram.com/p/CDS7ILlqu0R/
7 August 2020	My first vinyl record	https://twitter.com/MediaMuseum/status/1291663456278589447	https://www.facebook.com/nationalscienceandmediamuseum/posts/10164223159645551	https://www.instagram.com/p/CDla0AnqO7Q/
21 August 2020	My Digital Library	https://twitter.com/MediaMuseum/status/1296733715360612353	https://www.facebook.com/nationalscienceandmediamuseum/posts/10164282185570551	https://www.instagram.com/p/CEJO_nRK-SY/
28 August 2020	Electronic Stories of Music	https://twitter.com/MediaMuseum/status/1299273771824668673	https://www.facebook.com/nationalscienceandmediamuseum/posts/10164313556765551	https://www.instagram.com/p/CEbYLcxqw5t/

Table 25 The list of the #SonicFriday social media prompts on Twitter, Facebook and Instagram.

B) Blog Posts

Date	Title	Link
8 July 2020	#SonicFriday: join our collaborative story on Sound Technologies	https://blog.scienceandmediamuseum.org.uk/sonicfriday-story-of-sound-technologies/
22 July 2020	The Fairlight: the secret composer of the music you love	https://blog.scienceandmediamuseum.org.uk/fairlight-cmi-playlist/
13 August 2020	Sounds of my Quarantine	https://blog.scienceandmediamuseum.org.uk/sounds-of-quarantine/
28 August 2020	The Oberheim synthesizer: a playlist	https://blog.scienceandmediamuseum.org.uk/the-oberheim-synthesizer-a-playlist/

Table 26 The blog posts created in the #SonicFriday project on the National Science and Media Museum blog.

C) Additional documentation

Title	Link
Project page on the Science Museum Group website	https://www.sciencemuseumgroup.org.uk/project/sonicfriday/
The online interactive section of *Sonic: Adventures in Audio* created in the project	https://www.scienceandmediamuseum.org.uk/my-museum-playlist
Interview about the use of Learning Toolbox in the #SonicFriday project	https://ltb.io/2021/12/08/guest-interview-stefania-zardini-lacedelli/
Published paper on #SonicFriday on the MuseWeb Archive	https://mw21.museweb.net/paper/curating-sound-in-a-platform-world-insights-from-the-sonicfriday-project/index.html
Project trailer created for the GLAMi Awards	https://youtu.be/c7K20Xfl4HA
List of GLAMi Awards 2021 winners on the MuseWeb website	https://mw21.museweb.net/glami-award-winners/index.html
Interview with Ciprian Melian for Best in Heritage	https://youtu.be/t922PxXMGTA
Project page on the Best in Heritage Website	https://presentations.thebestinheritage.com/2022/sonic-friday

Table 27 The list of additional documentation for the #SonicFriday project incuding the official project page, papers, interviews and awards.

D) GLAMi Awards and Best in Heritage

2021 GLAMi BRONZE AWARD

FOR

Interactive and Immersive

PRESENTED TO

#SonicFriday

National Science and Media Museum –
Science Museum Group, in collaboration with the
University of Leicester - School of Museum Studies

Presented at the MuseWeb Annual Conference, April 2021

GLAMi 21 BEST IN DIGITAL FOR CULTURE BRONZE AWARD

2021 GLAMi SPECIAL JURY AWARD

FOR

Pandemic Pivot

PRESENTED TO

#SonicFriday

National Science and Media Museum –
Science Museum Group, in collaboration with the
University of Leicester - School of Museum Studies

Presented at the MuseWeb Annual Conference, April 2021

GLAMi 21 BEST IN DIGITAL FOR CULTURE SPECIAL JURY AWARD

Fig. 129 The GLAMi Awards received for #SonicFriday.

Fig. 130 The certificate of participation in The Best in Heritage Conference for #SonicFriday.

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