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The virtual museum: an overview of its origins, concepts, and terminology

WERNER SCHWEIBENZ, PHD
MusIS – MuseumsInformationsSystem, State Museums of Baden-Wuerttemberg

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MusIS – MuseumsInformationsSystem, State Museums of Baden-Wuerttemberg

Abstract In recent years, the virtual museum has become a prominent subject again. However, the concept and terminology have existed for a long time, even to a period before the advent of the Internet. The early years of the virtual museum were characterized by multimedia and hypermedia applications on CD-ROM and stand-alone computers. The World Wide Web offered new possibilities for the presentation of museum information online, and thus to reach outside of the museum walls. This lead to a controversial discussion about the nature and the core concept of the virtual museum. Before focusing on the terminology and the concept of the virtual museum, it is important to consider the following aspects: the relationship between object and information on the one hand, and the relationship between the real and the virtual on the other. Subsequently, this paper examines ICOM's perspective on the museum and on the virtual museum. It then continues with the foundations and the early years of multimedia, and discusses the Internet and the World Wide Web to reach the endeavor of defining the virtual museum by deducing the development of terminology and depicting the search for the core concept of the virtual museum. The last section describes controversial issues in the relationship between the real and the virtual museum.

About the Author Werner Schweibenz studied information science at the University of Saarland, Saarbrücken, Germany, and the University of Missouri-Columbia, USA. He specialized in museum information and documentation and conducted museum related projects. His doctoral thesis dealt with the extension of the traditional museum into the digital realm of the Internet. From 2004 to 2007 he coordinated a digitization project of the photo library at the Kunsthistorisches Institut in Florenz - Max-Planck-Institut. Since 2007, he has worked for MusIS (MuseumsInformationsSystem, https://www.bsz-bw.de/index.html), a service center for documentation and online exhibitions for the State Museums of the federal state of Baden-Wuerttemberg in south-west Germany. He is a member of the Competence Network of the German Digital Library (Deutsche Digitale Bibliothek, https://www.deutsche-digitale-bibliothek.de/?lang=en), the German national portal for cultural heritage. From October 2017 to March 2018, he served as a national specialist in professional training with the European Commission, contributing to the evaluation of Europeana, the cultural portal of the European Union (https://www.europeana.eu). He teaches museum related classes at the museOn academy (https://www.museon.uni-freiburg.de/), the educational network for the museums of Baden-Wuerttemberg.

"The transformation won't mean that museums lose what they have to offer as physical sites conveying knowledge through the medium of material objects. It means that the museum will get another dimension, a digital one." (MacDonald and Alsford 1997: 267f)

Introduction

In recent years, due to the growing dissemination and acceptance of virtual reality technology in general and in the museum field in particular, the virtual museum has become a prominent subject again. However, the concept and terminology extend back much further, even to a

period before the advent of the Internet. The early years of the virtual museum were characterized by multimedia and hypermedia applications on CD-ROM and stand-alone computers. The World Wide Web offered new possibilities for the presentation of museum information online, and thus outside of the museum walls. This lead to a controversial discussion about the nature of the virtual museum as will be shown later. But before focusing on the terminology and the core concept of the virtual museum, it is important to look into two aspects that have influenced its development: the relationship between object and information; and the relationship between the real and the virtual. Subsequently, we take a look at ICOM's perspective on the museum and the virtual museum. This paper then addresses the foundations and early years of multimedia, and continues with the Internet and the World Wide Web in order to define the virtual museum by deducing the development of the terminology and depicting the search for the core concept of the virtual museum. The last section of this article describes controversial issues in the relationship between the real and the virtual museum.

Object and information - a contradiction or a combination?

For a long time, the object held centerstage in museums. However, in recent decades, the unique position of the original object – which distinguished the museum from any other memory institution such as a library or an archive – seemed to be challenged by the rise of museum information. In the 1980s and 1990s, museum experts including British museologists Elisabeth Orna and Charles Pettitt (1980: 21, 48; 1998: VII), Wilcomb Washburn (1984: 14f) of the Smithsonian Institution, Jean-Louis Pascon (1997: 57) of the French Ministry of Culture, and George MacDonald and Stephen Alsford (1991: 306) of the Canadian Museum of Civilization publicized the idea of the museum as an institution that deals primarily with information. In her book "Digital Collections: Museums and the Information Age," Suzanne Keene emphasizes:

> *We used to build collections of objects. Now we can make collections of information, too. Objects were the centre of our world in museums. We collected them for their beauty and value. Above all, we collected them because of what they stand for. Events past and present, technologies, ways of working, evidence of the natural world: each museum object stands for these aspects of our experience, then or now, here or distant. The meaning of the object used to be held on catalogue cards, in files, in people's heads. (Keene 1998: 1f)*

Although this information always existed in museums, it was often difficult to access:

> *In the past, all the information associated with the object has lain hidden in files, if the museum is particularly well organized, or people's heads, or their desk drawers, until the time arrives when it needs to be exhibited or lent. Then there is a frantic search for the right bits of paper or a dredge of the organizational memory. There is no way that the information dimension of the collections can be appreciated in its own right. (Keene 1998: 23)*

Using information technology, museums were able to handle the information dimension in much more organized ways and make it accessible in digital collections that are combined with physical collections. In this way, according to Sandra Dudley (2010: 3) "an object-information package" is formed, so the museum object "is not the physical thing alone at all, but comprises the whole package - a composite in which the thing is but one element in 'a molecule of interconnecting [equally important] pieces of information.'" The advantages of this combination are evident; this led to "a current, indeed dominant, view within museum studies and practice that the museum is about information and that the object is just a part - and indeed not always an essential part - of that informational culture." (Dudley 2010: 3)

However, there are still skeptics who claim that museums deal with "a very special kind of information, based not on pure data but on real things," as Ann Mintz (1998: 20) puts it. This skepticism led to a controversial discussion about the divide between the real and the virtual.

The real and the virtual - a complex relationship

In the museum studies literature, the discussion often focuses on the "real-virtual divide" (Chalmers and Galani 2008: 158; Schweibenz 2013: 40-42) which is attributed to Ann Mintz (1998, 28, 33). In her article "Media and Museums: A Museum Perspective," Mintz claimed:

> *The museum experience is based on reality. This is the heart of the concept of museums. Monitors may be pleasantly hypnotic, but looking at a painting on a video screen is no substitute for the real thing. The real thing is more subtle, and more powerful. The reasons are both physical and metaphysical. On a video screen, a painting has no texture; something is always lost when three dimensions are collapse into two. Distinctions of scale disappear; a tiny Renoir and a gigantic David are the same size. The electronic palette cannot perfectly match colors in the real world. The eye and brain process information from an object in one way, and information from a monitor another way.*
>
> *The metaphysical dimension is more difficult to describe, but it is very real. Many people – professionals and visitors – recount powerful personal experiences in museums. (Mintz 1998: 33)*

Therefore, Mintz concludes:

> *Media can deliver information; it cannot match the totality of the experience a museum provides. For this reason, a case can be made that there will never be a 'virtual museum' in the full sense of the word. High-resolution images, full-scale virtual reality, and rich links to other databases on the World Wide Web do not create a museum. A virtual visit to a museum is fundamentally a media experience, not a museum experience. (Mintz 1998: 28)*

Based on Mintz's claims, "some critics continue to approach such digital multimedia in museums with contempt, irrespective of their quality and scope." (Bentkowska-Kafel 2016: 19). This is very much reminiscent of the partly derogatory discussion about photography in

the decades following its invention and application in the museum context (cf. Geimer 2009: 77f). Nevertheless, digital media are here to stay. Therefore, it is important to combine the strengths of the physical museum and the virtual museum in order to "truly offer the best of both worlds." (Clough 2013: 3)

That said, it is important to take a closer look at the meaning of the conceptual pair "real" and "virtual," in particular as in the museum context "virtual" is often interpreted as the opposite of "real." This opposition is misleading, as the ICOM Key Concepts of Museology accentuates:

> *We must remember that 'virtual' is not the opposite of 'real', as we tend to believe too readily, but rather the opposite of 'actual' in its original sense of 'now existing'. An egg is a virtual chicken; it is programmed to become a chicken and should become one if nothing gets in the way of its development. In this sense the virtual museum can be seen as all the museums conceivable, or all the conceivable solutions applied to the problems answered by traditional museums. (Desvallées, Mairesse and ICOM 2010: 58)*

In a similar way, Pierre Lévy formulates his concept of "real" and "virtual" and emphasizes:

> *The virtual should, properly speaking, be compared not to the real but the actual. Unlike the possible, which is static and already constituted, the virtual is a kind of problematic complex, the knot of tendencies or forces that accompanies a situation, event, object or entity, and which invokes a process of resolution: actualization. (Lévy 1998: 24)*

However, as Lévy (1998: 27) stresses, the actualization does not necessarily happen. Therefore, Lévy explicates: "...common sense interprets the virtual as something intangible, the complement of the real, or tangible. This approach contains a significant germ of truth, however, for the virtual is quite often literally 'not there'." By way of illustration, Lévy (1998: 24) uses the metaphor of a tree that is virtually in the seed but must not come into being: i.e. the virtual has a potential, that is the potential to realize but has not yet realized and maybe never will. Moreover, the seed does not exactly tell what the shape of the tree will be as the seed will have to coproduce it together with the circumstances it encounters. This is what Lévy regards as actualization.

In addition, there is also a problem of interpreting the terms "real" and "virtual" in the different disciplines, as Sofia Pescarin (2014: 134) demonstrates: "There has been always a debate on this sector, in most of the cases because the term 'virtual' is used in different ways by experts in computer science (virtual = interactive / simulation), in humanities (virtual = digital, but also being essential), and by the common people (virtual = on-line)."

These different perspectives do not reduce the complexity in the discussion on the idea and core concept of the virtual museum. To approach the topic, we start with the ICOM perspective on the museum and the virtual museum, continue with the foundations and the early years, and proceed with the Internet and the World Wide Web to finally undergo the endeavor of defining the virtual museum.

The museum and the virtual museum from the ICOM perspective

The definitions for the museum institution are manifold: "Most countries have established definitions of museum through legislative texts or national organisations," as the International Council of Museums (ICOM) (Desvallées, Mairesse and ICOM 2010: 56f) notes. To provide guidance, ICOM offers a definition for museum that is currently under revision; a revised definition will be discussed at the 2019 ICOM General Conference in Kyoto. Meanwhile, a look at ICOM's "Key Concepts of Museology" will give some orientation. There, ICOM stated:

> *The term 'museum' may mean either the institution or the establishment or the place generally designed to select, study and display the material and intangible evidence of man and his environment. (Desvallées, Mairesse and ICOM 2010: 56)*

However, the account of "material and intangible evidence" should be extended by a third category: the digital evidence. This is especially true because in the case of intangible heritage, almost the only way of collecting materials is in digital form (Keene 2005: 153, 183). To emphasize the strong bonds between intangibles and digital objects, Ross Parry (2007) calls the latter "e-tangibles" and explains:

> *...just as a quarter of a century ago, museums grew formally to recognize 'intangibles' as valid material to collect and document, alongside their 'tangibles', so, in the past decade, museums have extended their conception of the collectable to accommodate also objects that are grasped through the intervention of a computer. These are museums' new 'e-tangibles'. (Parry 2007: 68)*

The reason is that museums – as described above – do not only "work with objects which form their collections" (Desvallées, Mairesse and ICOM 2010: 20) but also with (digital) information about both objects and collections. Therefore, it seems not sufficient to state in the "Key Concepts of Museology": "These definitions cover museums which are incorrectly referred to as virtual museums (in particular those that are on paper, on CD-ROM or on the Web)" (Desvallées, Mairesse and ICOM 2010: 58). This is due to the fact that "new, alternative forms of museums will exist side by side with traditional forms as institutions in their own rights serving the audience in different ways" (Schweibenz 2013: 45). Institutions such as the Tate regarded their presences on the Web as an extension of their physical sites. Due to several comprehensive reports commissioned to evaluate Tate Online, the museum reached the conclusion that the website functioned as a fifth site adding to the Tate's four brick and mortar museums (before Tate Modern was opened in 2000) (Rellie 2004: WWW). Moreover, "Tate has recognised that the Web site is an essential component in the organisation's future and remains committed to cultivating Tate Online as a leading 21st century arts site, in its own right." (Rellie 2004: WWW). This statement emphasizes the importance of virtual museums, and recommends that they should be considered as institutions in their own rights, as suggested by Schweibenz (2013: 45). In that case, they also need a definition of their own. However, before trying to attempt one, it is important to delineate the term and the core concept.

The foundations of the virtual museum

As Anna Bentkowska-Kafel (2016: 2) points out, the "concept of virtual museum is not new. Historically, its meaning has evolved to encompass new intellectual constructs and cultural phenomena, reflecting changes influenced by technological developments in information communication." The theoretical foundations can be traced back to ideas of organizing information such as Paul Otlet's *Mundaneum,* Vannevar Bush's *Memex*, Ted Nelson's *Xanadu*. Paul Otlet (1868-1944) developed the idea of a mechanical, collective brain which was to transform speech into writing and producing copies, to retrieve information, automatically classify and mechanically manipulate it (Otlet 1990). In 1945, Vannevar Bush (1890-1974) described a tool for organizing information that was one of the earliest models for hypertext (Huhtamo 2002: 123). In the 1960s, Theodor Holm Nelson (born 1937) started a project for a computer network with a simple hypertextual interface (cf. Huhtamo 2002: 122).

In the field of art history, the French art theorist and cultural policy maker André Malraux reflected on the effects of photographical reproduction on art. In his book *Museums Without Walls*, Malraux (1978: 16) developed the idea of an imaginary museum that would bring together more works than even the greatest of museums could ever assemble within its walls. This imaginary museum would be based upon photography and its possibility to create a specific kind of style that might not be visible in the individual work, but in the mass of photographed objects (Malraux 1978: 21). In this way, a metamorphosis takes place that is based on comparing works to each other and on presenting them in new ways (Malraux 1978: 27). Therefore, Malraux is often referred to as the generator of the idea of the virtual museum (Battro 1999; Hein 2000: 86; Huhtamo 2002, 122; Schweibenz 2008, 114, 130), as he used the phrase 'a museum without walls' both in the literary sense and figuratively. However, it does not appear in Malraux's original writings (Bentkowska-Kafel 2016: 14), but was introduced into English by the translators of his writings. Nevertheless, Malraux's idea was that the role of the museum was questioned by the ever-present photographic reproductions of artworks that made art accessible to audiences who would never have entered a museum (Huhtamo 2002: 123). Antonio Battro (1999: 146) described how "the virtual museum has ceased to be a simple reflection of the real one; it has developed a life of its own." Maxwell Anderson (2008: 298), an advocate of the virtual museum, even suggested: "The 'wireless' museum is a radical variant of Malraux' museum without walls."

Apart from the philosophical discussion, debates about the socio-technical implications of the virtual museum took place. Although museums had already started to use automation technologies in the early 1960s (cf. Jones-Garmil 1995), the conference *Computers and their potential applications in museums*, organized by the Metropolitan Museum of Art in 1968, was a landmark. The participants introduced scenarios on the use of computers, for example:

- William Paisley developed a scenario describing computer-based research in museums (Paisley 1968),
- Allon Schoener coined the term "electronic museum" as a medium for the distribution of museum information (Schoener 1968),
- Donald Bitzer described the computer as a flexible guide to the museum (Bitzer 1968),

- Robert S. Lee depicted the computer as an instrument for learning (Lee 1968).

Further contributions completed the perspectives on the future development.

Nonprofit organizations for professionals with an interest in the use of computer technology for museums shared this interest. The *Museum Computer Network* (MCN) was established in 1967. Then-MCN-director Everett Ellin put the focus on automating registration records in order to organize databanks on a national basis, and later on a worldwide museum information network (Ellin 1969: 28). The reason for computerization was that museums were "confident that machine techniques will point the way to the discovery of new values inherent in their collections, which outmoded methods of record-keeping have merely obscured." (Ellin 1969: 25)

Another important aspect was the elaboration of a theory of museum communication. Duncan Cameron (1968) developed a communication model for museums based on the Shannon-Weaver model consisting of four primary parts: sender, message, channel, and receiver, with feedback playing only a subordinate role. Although it was not unchallenged (Knez and Wright 1970), this model influenced the discussion on museum communication for the following decades. Cameron's communication model was based on the museum object, the 'real thing,' that distinguishes the museum as a communication system from all other systems. According to Cameron (1968: 34), media such as "images must be considered as the adjectives which qualify and make more meaningful the nouns of the museum language, the real things themselves." Subsidiary media such as labels, recorded voice, diagrams, photographs, and film were explicitly allowed to inform the laypeople of the audience who did not understand the special language of curators. However, "subsidiary media should serve only as aids in decoding the primary message being transmitted through the artifact or kinetifact. They should aid translation, but should not be translation" (Cameron 1968: 36). Within the museum community, the discussion about communication models for museums, especially the role of the object, the inclusion of feedback from the audience, and opening up participation by various audiences, both inside and outside the museum, continues (cf. Schweibenz 2011: 5f).

The early years of the virtual museum – multimedia and hypermedia

From a technical perspective, the idea of the virtual museum dates to when hypertext became popular by applications such as HyperCard. Such tools enabled museums to organize their information in a non-linear way for display in exhibitions (Worden 1997: 94, 96). The idea of using hypertext was very attractive as it promised to cross-reference vast quantities of information (Pascon 1997: 62). In addition, interactive multimedia technologies were considered to provide access to images, video and sound, and therefore compensate for the limitations of textual databases (Pascon 1997: 58). The combination of hypertext and multimedia was thought to provide much easier access to cultural information and a user-friendly interface because museums are highly visual media.

Multimedia was also applied in exhibitions. An early example was the *Information Age – People, Information & Technology* exhibition presented by the Smithsonian Institution in Washington D.C., in May 1990. This show explored the evolution of information technology

and its impact on American society. To illustrate the topic, a substantial number of electronic interactives were used in the exhibit, including 56 personal computers, 4 workstations, 44 videodisc players, 2 printers, 3 video projectors, 20 video monitors and one video wall (Allison and Gwaltney 1991: 63).

Another way to apply electronic interactive media in museums were stand-alone personal computers, also referred to as information kiosks, providing information on hours of operation, staff, the building's architecture, floor maps, and collections (Johnston 1997: 102). Although these systems could not always be reliable (Oker 1991), they became quite popular. A prominent example was the so-called Micro Gallery at the National Gallery, London (Rubinstein 1992, Baker 1993). This interactive public access information system, developed by the company Cognitive Applications, was located in the Sainsbury Wing of the National Gallery in London, and provided information about the collection in a separate room. The users could select individual objects they wanted to see, plan their route through the Gallery, and print out a personalized guide. This system was also used in the National Gallery of Art, Washington D.C., where it was also published as a CD-ROM.

The CD-ROM was another technology applied by museums. In 1994, over 70 art CDs in various categories were available, and the number was rapidly growing (Trant and Large 1994: 131). The main reason for using this offline medium was that the museums wanted to share their content with users outside their institutions (Bearman 1993: 184). To do so, the CD-ROM offered advantages such as "enormous storage capability coupled with search capability and the ability to integrate text, images, and audio" (Trant and Large 1994: 131). This seemed to make CD-ROMs an ideal distribution medium (Bearman 1992: 134), especially as there were no networks available that had the capability to transfer huge amounts of data. CD-ROM productions of museum collections often had a limited scope, highlighting the treasures from the collection, providing background information, and serving as souvenirs sold in museum shops (Huhtamo 2002: 122). However, in the long run, the multimedia coup proved not to be an ideal solution as problems arose such as user-friendliness of the interface, content organization, updating, and target groups (Rubinstein 1992: 9; Kanter 1996: 71f).

The implementation of multimedia and hypermedia in museums had not only practical aspects, but also led to the development of a theoretical perspective. The more media were used inside the museum, the more parallels between them were discovered. Stephen Alsford (1991: 8f) reached the conclusion that both hypermedia and museums were information systems and continued with the provocative statement "that museums need to think of information, rather than of material objects, as their basic resource." Others such as David Bearman considered museums to be "inherently multimedia experiences" (Bearman 1993: 183). Such issues were discussed in-depth at conferences that also attended to best practice in the new field. Among these conferences (in English) were:

- *Museum Computer Network* Conferences (since 1979),
- Electronic Visualisation and the Arts (EVA) Conferences (since 1990),
- International Conference on Hypermedia & Interactivity in Museums (ICHIM) (since 1991),
- Museums and the Web (since 1997).

The conference proceedings are often available online.

Political support for museum content

Politics also contributed to the digitization of museum information by declaring these institutions as content providers for the information society. In 1995, the *Group of Seven* (G7), an inter-governmental political forum consisting of the seven largest advanced economies in the world (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States, plus a representative of the European Union) hosted a summit in Brussels that specified: "culture is a key dimension of the Information Society. The exchange of information on the world's cultural heritage will help people from different cultures around the world to understand each other better" (Pascon 1997: 57). The G7 considered culture as an integral part and an important feature of the "Global Information Infrastructure" (Siegfried 1995: 215). In the aftermath of the summit, eleven pilot projects were launched, among them one dedicated to "Multimedia Access to World Cultural Heritage." One of the goals of the pilot projects was to develop a network over which information could circulate, and to build an integrated cultural community; in the absence of other opportunities, the Internet became this network (Pascon 1997: 63).

The Internet and the World Wide Web

As early as 1993, museums started to distribute information via the text-based Internet service Gopher. Nevertheless, the breakthrough came with the World Wide Web and the user-friendly browser Mosaic (MacDonald and Alsford 1994: WWW). However, on their way into this new digital environment, museums were often outdone by cultural enthusiasts who put museum information online before the museums had a website of their own. A noteworthy example was the *WebLouvre*, created by the French student Nicolas Pioch. In March 1994, Pioch started his private online museum to make cultural content accessible to all, and to protest against the monopolization of art and culture by commercial providers such as Corbis Corporation that digitized museum content and acquired rights to the images. Soon his initiative encountered resistance from the Louvre, and finally he had to change the name of his website to *WebMuseum*. This example illustrates two important facets. First, while it is easy to verify the legitimacy of a brick-and-mortar museum activity, there are no equally clear means for verifying the legitimacy of a virtual museum (Karp 2004: 5). Second, it demonstrates how museums insisted on their "unassailable institutional authority" as Peter Walsh (1997: 69, 71) calls it, and did not readily open up to the new ways of communication and collaboration on the Web where the monological "unassailable voice" of the institutional museum was out of place. However, Walsh (1997: 71) acknowledges that museums were in a difficult situation because at that time "current search engines do not discriminate the gems from the dregs." In addition, there was the challenge to make museum content not only searchable but "findable."

In 1994, to improve the visibility of museum content, the British computer scientist Jonathan Bowen started the *Virtual Library of Museums*, consisting of a collection of links (Bowen 1995: 24f). Due to the rapid development and the high level of acceptance by users, ICOM took over management of the *Virtual Library of Museums* in 1996 (Bowen 1999: 6). In this way, virtual museums were supposed to deliver content to individual homes, literally creating "museums without walls," and serve as "a deliverance, not just a delivery vehicle," as David Bearman (1992: 126, 130) stated. However, there were also skeptics who considered the Internet to

become a permanent bottleneck, as increasing bandwidth would always compete with a continually increasing "demand for more bandwidth created by the use of sound, motion and more complicated graphics" (Shane 1997: 193). Nevertheless, the Internet was to become the favorite medium for museums with rapidly increasing numbers over the next decades (cf. Bowen 1995; Valetov 2005). While in theory, virtual museums could bring together museum content from all over the world, in practice there were and still are considerable limitations. This is due to issues such as quality of data (for example, common standards and vocabularies) (cf. Parry, Poole and Pratty 2010), multi-lingual content (especially within multi-lingual communities such as the European Union), and copyright, to name a few. In addition, there are organizational challenges inside museums such as a "lack of sustained resources, complexity of the collections, rapid changes in technology, and the need to adapt museum culture to the expectations of a digital world." (Clough 2013: 49)

Meanwhile, the museum community continued to discuss controversially what constitutes a virtual museum, and how it could be distinguished from other online museum activities. Erkki Huhtamo 2010: 122) accentuated the debate whether "straightforward museum websites merit the title 'virtual museum'," while Sorin Hermon and Susan Hazan (2013: 626) emphasize that work has still to be done "for better understanding the (perhaps sometimes subtle) difference between digital collections, online archives and virtual museums."

The endeavor of defining the virtual museum

Defining the virtual museum is not an easy task as a general agreement about the correct name does not even exist. Several terms are used in parallel such as digital museum, electronic museum, online museum, hypermedia museum, Web museum, or Cyberspace museum (Schweibenz 2004: 3). This wide range in terminology is due to the variety of involved disciplines: computer science, library and information science, museology and the museum-related disciplines such as archaeology, art, history, and natural sciences, which often developed specific and independent ideas of the virtual museum. This fragmentation also showed in Anne Laforet's statement (1999: 133): "It is very perplexing to define the term 'virtual museum', it seems to have as many definitions as there are people interested in the topic." A similar perspective was taken by the team of authors who wrote the report "Virtual Museum (of Canada) – The Next Generation" (Besser et al. 2004: 21): "The definition of the 'virtual museum' remains under practical construction." What makes this process of construction quite complex is the lack of common ground: "If 'wired' virtual museums have a common denominator at all, it is a very general one, referring to almost any kind of collection of material (supposedly of 'historical' or at least 'cultural' value) put on general display on the Internet." (Huhtamo 2002: 121). To make things even more complicated, there is no clear-cut separation from other cultural heritage organizations online such as virtual libraries or virtual archives (Huhtamo 2002: 121).

The terminology for the virtual museum – a historical perspective

Despite the variety of terms, the phrase "virtual museum," was able to establish itself because it was used in a number of publications dating back to the early 1990s. However, alternative names were and still are in use, for example "online museum" or "digital museum." One of the earliest publications was an article by Dennis Tsichritzis and Simon Gibbs presented at

the first International Conference on Hypermedia & Interactivity in Museums (ICHIM) in 1991. In the same year, Ben Davis (1991) used the term in a similar way in this article "Infra-thin multimedia," in which he described the Athena Muse Authoring System of the Massachusetts Institute of Technology. At the same time, the media artist Jeffrey Shaw created an installation for the *Zentrum für Kunst und Medientechnologie* (ZKM, Center for Art and Media) in Karlsruhe, Germany, which he described as a virtual museum. In the following year, Eric Hoffert presented a CD-ROM titled "The Virtual Museum," which allowed users to move from one exhibit room to the next, closely inspecting every object in which they were interested (Veltman 2001: 3). Also in 1992, Glen Hoptman used the term in his paper "The virtual museum and related epistemological concerns" to depict a hypermedia information system at the Smithsonian Institution. This indicates that the term was applied both to online and offline systems. In the next year, Dominique Delouis (1993: 127) used the expression in the context of the European project "Remote Access to Museum Archives" (RAMA) where "all museum collections can be viewed in the same way, just as if a single database were viewed." At the same conference, Larry Friedlander (1993) presented an interactive system that connected schools, museums, archives and research centers. In 1994, George MacDonald and Stephen Alsford of the Canadian Museum of Civilisation gave a talk entitled "Towards the Virtual Museum: Crisis and Change for Millennium 3" in which they described the virtual museum as a digital extension of the physical institution. In the same year, Maxwell Anderson (1994) used the term in his article "Perils and pleasures of the virtual museum." However, at that time the term and the concept were not yet established. In the 1994 edition of the Cyberspace Lexicon (Cotton and Oliver 1994), neither the term "virtual museum" nor "digital museum" were included. The latter was also popular at that time. Ben Davis (1994) used it in an article of the same title.

With the spreading of the World Wide Web, the term "virtual museum" grew in popularity. In 1995, the term was used in several conference presentations and publications, for example by:

- Robert Duffy, who used it in his enthusiastic speech "Magic carpets and the tools of institutional knowledge" at the *Online Information* conference where he promoted museum presence on the Web,
- Chris Yapp, who applied it in a sketch on the convergence of libraries, museums, and art galleries,
- Sue Gordon, who used it in a presentation on museums and the Information Superhighway,
- Angela Giral and Jeannette Dixon (1996), at the 1995 *International Federation of Library Associations and Institutions* (IFLA) conference,
- David Noack, in an article about visiting museums virtually, and by
- Jamie McKenzie (1995), who applied it to the transfer of a traditional collection into a digital form.

In the following year, the term "virtual museum" made its breakthrough towards official recognition. In a posting at the mailing list museum-l (October 17, 1996), Geoffrey Lewis announced an article on the virtual museum in *Britannica Online* (1996), the electronic version of the *Encyclopedia Britannica*. In this article, Lewis defined the virtual museum in a very descriptive way (see below) without putting much emphasis on the specific

characteristics. This might be the reason why this definition was not widely used despite being published in a renowned work of reference. Nevertheless, due to this publication in the *Encyclopedia Britannica*, the term "virtual museum" can be considered as being established.

Later, the term was widely used as the following examples indicate. In 2002, Erkki Huhtamo gave a talk "On the origins of the virtual museum" at the *Nobel Symposium on Virtual Museums and Public Understanding of Science and Culture* in Stockholm. In the following year, Andrea Witcomb (2003: 104, 119-121, 125-127) discussed the virtual museum in her book "Re-imagining the Museum," stressing the importance of the Web as a communication medium. In 2004, Werner Schweibenz described the term and concept in a one-pager in ICOM News (based on Andrews and Schweibenz 1998). Interestingly enough, the expression is used as an entry in the online encyclopedia *A Dictionary of the Internet* (2013), however offering only an insubstantial description: "A Web site run by a conventional museum which displays its works graphically." Much more detailed information is provided by an article in *Wikipedia, The Free Encyclopedia*, where the term "virtual museum" is used in the English, French and Spanish version, whereas in the German version, the expression "digitales Museum" is applied. Diversity in terminology still exists in museum literature: "Virtual Museums may be typically but not exclusively denoted as electronic when they could be called online museums, hypermuseum, digital museum, cybermuseums or Web museums." (Hermon and Hazan 2013: 625).

In search of the core concept - selected attempts to define the virtual museum

Not only does the terminology for the virtual museum varies, but also its definitions – and even more remarkably in a considerable bandwidth – as will be shown in this section. As there is still no generally accepted definition, some selected attempts to define the virtual museum will be presented and discussed. However, it remains difficult to identify something like a core concept of the virtual museum:

> *Much debate and discussion surrounds the concept of the virtual museum. This is not a simple issue, as what is considered virtual in the museum context actually falls on a continuum from a collection of digitized objects available online to an immersion experience utilizing high-tech equipment to make people feel as if they were in a museum.* (Latham and Simmons 2014: 14)

Nevertheless, a good starting point is the definition in the *Britannica Online* that established the term. As mentioned above, this definition was by and large descriptive, referring to the virtual museum as:

> *a collection of digitally recorded images, sound files, text documents, and other data of historical, scientific, or cultural interest that are accessed through electronic media. A virtual museum does not house actual objects and therefore lacks the permanence and unique qualities of a museum in the institutional definition of the term. (Britannica Online 1996)*

This definition lists a number of media that are applied by the virtual museum. But instead of analyzing the potential of electronic media, it restricts itself to emphasizing the obvious, that the virtual museum cannot have the physical qualities of the real institution because "[v]irtual museums exist only in cyberspace. A virtual museum does not have a physical presence; that is, it has no physical collection, no building, and no spaces with exhibits to walk through." (Latham and Simmons 2014: 80). Nevertheless, this restriction to the material aspect was quite common in the early discussions about the pros and cons of the virtual museum (cf. Mintz 1998: 28). However, the virtual museum not only "performs all its traditional functions and delivers its objectives, but using electronic means" (Keene 1997: 307). It can and should go beyond the physical limits of the brick-and-mortar museum and provide access not to real but to digitized objects and the corresponding information, as the definition by Tsichritzis and Gibbs suggests:

> In this way, a museum will deal with virtual artifacts, in a virtual setting accessible from a telecommunication network in a particular manner. Such a museum is a service not a location. It may not exist at all, other than as bits of data. That's why we call it a virtual museum. (Tsichritzis and Gibbs 1991: 18)

This definition emphasizes the aspect of virtuality, stressing that the virtual museum does not necessarily have a place or a physical equivalent as it is a digital service. This feature is important as it emphasizes that the virtual museum is not limited to the confines of the collection or walls of a brick-and-mortar museum. Morten Hertzum (1998: 127) underlines the limitations of the physical museum and accentuates the independence of these restrictions the virtual museum offers. Hertzum (1998: 127) highlights that "for the virtual visitors it is only a secondary concern whether the picture on their screen is brought to them from this or that museum" as they are *per se* interested in the content and not in the institutional affiliations of the objects. Therefore, the virtual museum – at its best – does not only "work with objects which form their collections" (Desvallées, Mairesse and ICOM 2010: 20), as the "Key Concepts of Museology" suggest, but also with digital objects from other collections and museums that fit into the context or focus. In this way, "a virtual museum extends beyond the digitization of the resources of any individual museum, into a collaboration recombining the resources of multiple institutions, as well as those of private citizens" (MacDonald and Alsford 1997: 277). Thus, Malraux's vision of a "museum without walls" might become true in the digital realm. Accordingly, the virtual museum is much more than the definitions of Lewis or Keene suggest, even if it can offer (digital) reproductions only.

This brings us back to the discussion about the relation between the virtual and the real museum because "a virtual museum' can also provide experiences that are not possible in the physical setting of the museum," as Andrea Bandelli states (1999: 21). This is due to the fact that "reproduction[s] can bring out those aspects of the original that are unattainable to the naked eye" and "can put the copy of the original into situations which would be out of reach for the original itself. Above all, it enables the original to meet the beholder halfway," as Walter Benjamin (1936: 220) emphasizes in a rarely cited section of his essay "The Work of Art in the Age of Mechanical Reproduction." In addition to such information related experiences, Bandelli emphasizes social interaction experiences because the virtual museum can act as a catalyst for starting conversations. Therefore, Bandelli asserts:

> *The key to understanding the relationship between the virtual museum and the real one is thus to understand social actions in space and time and the relevance of unique objects or reproducible and ways to explore them. (Bandelli 1999: 22)*

Bandelli's emphasis on the social aspect is important as it focuses on a weak spot of the early forms of the virtual museum: "While physical visits allow interaction between the visitors any time, interactive computer exhibits in museums most often allow only an exclusive interaction between one visitor and technical device he or she uses instead of interaction between several visitors" so while "being social is a key aspect of the physical museum visit, online visiting most often takes place as solo visitation" (Schweibenz 2013: 47). While interactive installations in exhibitions often remained in a single-user mode, the advent of the Social Web changed this limitation in favor of online communication and participation.

Since a proper definition does not yet exist, several digital cultural heritage projects sponsored by the European Union (EU) undertook the challenge to define the virtual museum as a part of the project work. Each attempt to find a definition reflected the current state of the art. This makes it interesting to take a closer look at selected EU projects and their understanding of the virtual museum.

- *The Learning Museum Network Project* (Nicholls, Pereira and Sani 2012): In this project, Massimo Negri (2012: 12, 16) described the virtual museum as "the attempt to define a new dimension of the virtual museum and an independent dimension of museum life, which finds its roots in the physical museum but it has its own logic of communication, of life and of growth" and depicted it as a "virtual dimension [that] offer[s] spaces and experiences that go beyond architectural spaces and beyond collections' limits."

- *Virtual Museum Transnational Network* (V-MUST 2014): *"A virtual museum is a digital entity that draws on the characteristics of a museum, in order to complement, enhance, or augment the museum experience through personalization, interactivity and richness of content. Virtual museums can perform as the digital footprint of a physical museum, or can act independently, while maintaining the authoritative status as bestowed by ICOM in its definition of a museum. In tandem with the ICOM mission of a physical museum, the virtual museum is also committed to public access; to both the knowledge systems imbedded in the collections and the systematic, and coherent organization of their display, as well as to their long-term preservation. As with a traditional museum, a virtual museum can be designed around specific objects (akin to an art museum, natural history museum), or can consist of new exhibitions created from scratch (akin to the exhibitions at science museums). Moreover, a virtual museum can refer to the on site, mobile or World Wide Web offerings of traditional museums (e.g., displaying digital representations of its collections or exhibits); or can be born digital content such as net art, virtual reality and digital art. Often, discussed in conjunction with other cultural institutions, a museum by definition, is essentially separate from its sister institutions such as a library or an archive. Virtual museums are usually, but not exclusively delivered electronically when they are denoted as online museums, hypermuseum, digital museum, cybermuseums or web museums." (V-MUST 2014: WWW)*

- *Virtual Multimodal Museum* (ViMM 2018): *"A virtual museum (VM) is a digital entity that draws on the characteristics of a museum, in order to complement, enhance, or augment the museum through personalization, interactivity, user experience and richness of content. Both the 'physical' museum (PhM) and the VM share a common commitment to the institutional validation of content and quality of experience through curatorial process, inherent in the ICOM definition." (ViMM 2018: WWW)*

The definitions by the selected EU projects commonly take a very broad perspective on the virtual museum in order to cover a wide range of features that characterize it. While *The Learning Museum Network Project* emphasizes experience and learning, the *Virtual Museum Transnational Network* focuses on access, experience, and content. It also tries to emphasize the connections to the traditional museum and the differences to other memory institutions. The *Virtual Multimodal Museum* stresses aspects such as interaction, experience, and rich content mediated by curatorial processes. These examples, with their enormous variety in highlighting specific features of the virtual museum, indicate that the process of identifying its core concepts is still under construction. Therefore, Massimo Negri is right in stating:

> *From the museological point of view, terminology has started (and in some sense still is) registering a permanent shifting of meanings and accents. The term 'virtual museum' in itself, which on this occasion is the focus of our discussion, has been involved in this process: from a sort of a museum showcase reproducing reality on the web or on an electronic device, to a complex independent museum dimension which lives its life in a variety of media. (Negri 2012: 12f)*

The relationship between the real and the virtual museum

Since the advent of the idea of the virtual museum, the museum community has struggled with a number of controversial aspects such as:

- the question of the aura of the object,
- the question of authenticity and experience,
- the democratization of museums by the new medium,
- the authority of museums,
- trust in virtual museums, and
- the question of whether people will still attend museums when all the content is online.

These issues will be elaborated further. However, they are much too broad to discuss them in detail in this paper; so only some outlines will be given.

The aura of the object:

This topic, that emerged from Walter Benjamin's well-known essay "The Work of Art in the Age of Mechanical Reproduction," is central to the understanding of the virtual museum. According to Benjamin (1936: 221), the sphere of authenticity is beyond the capacity of technical reproducibility and "which withers in the age of mechanical reproduction is the aura of the work of art." This statement is thought to be true also for digital reproductions of

museum objects in general. Therefore, the virtual museum, due to "its digital nature, […] cannot offer real objects to its visitors" (Schweibenz 2004: 3). From this, Simon Frank (2010: 20) concludes that adherents of an auratic perspective on museums must reject the idea of a virtual museum as the aura is bound to the object which cannot be reproduced in the digital realm, but only in part be expressed via digital media. However, there are also different views on this issue. Ruth Perlin (1998: 83) clarifies: "Looking at art and looking at a media presentation are not the same thing. Nevertheless, each experience - separate or intertwined - has its own reality and is thus an 'authentic' experience." Susan Hazan (2001: 209), goes even a step further and suggests "the emergence of a new cultural phenomenon, the virtual aura," while Bruno Latour and Adam Lowe (2011) advocate the migration of the aura from the object to the digitally created facsimile. Overall, the discussion is both complex and controversial (cf. Schweibenz 2018).

Authenticity and experience:

The authentic object plays an important role in museums. However, "experience does not depend on mediation by an authentic object. The experience might be triggered by a multitude of devices, not all of which are real, or genuine, or material," as Hilde Hein (2000: 7f) points out. Moreover, Hein (2000: 37) continues: "Experience is a private affair. However produced by objects or ideas, experiences take place in and 'belong to' the creatures that undergo them." Although experience is a personal and subjective event, it follows social conventions; museums have a part in establishing those conventions (Hein 2000: 37). So, according to Lynn Dierking and John Falk (1998: 57), a built-in assumption of the museum visit is "that this is the real stuff" and "visitors believe that there is an inherent sense of integrity to the objects, ideas, and experiences presented within the museum." But no matter if visitors deal with objects or media, they want to make choices and become involved, be mentally engaged by what they see (Dierking and Falk 1998: 58). Media are an important presentation option for museums in both audience and conceptual accessibility while ways of interaction with the original object are restricted, mostly limited to the visual contact. Therefore, the direct and the mediated experience, both inside and outside the museum, should not be considered to be of different value, but simply to be different (Schweibenz 2013: 40-42). Nobody would seriously consider comparing the experience of a visit to an exhibition with the experience of reading the print catalog of the same exhibition – so why should one compare the experience in a physical exhibition with the experience of an online-exhibition?

Democratization of museums:

A major aspect in the discussion about digitization used to be that it will lead to a democratization of art and of museums, as it will either bring the objects into the hands of more people, or allow people to have more interaction with them – this is what Howard Besser (1987: 16) describes as "increased access and interactiveness." The hope was that in this way, museums will open up to new audiences and lose the elite experience because elite and access for all exclude each other (Zolberg 1994: 61f). Within a few years, it was "generally acknowledged that museums have gained significantly from the giant technological strides associated with the growth of the Internet. Nobody disputes that the widespread dissemination of information and knowledge about museum collections is an added step towards the democratization of culture" (Avenier 1999: 31). More recently, this position on

democratization was also taken by Wayne Clough (2013: 2), then-Secretary of the Smithsonian Institution.

The authority of museums:

The authority of the museum institution was questioned for several reasons (cf. Schweibenz 2011: 4f). The Internet reinforced this development:

- Democratization, as the museum is no longer the only place to view objects and will become less of a sanctified place (Besser 1987: 17)
- The inherent subjectivity of experience that weakens the museum's claim to authority over its presentation (Hein 2000: 5, 128)
- Digital technologies are subversive, they challenge the authority of the curators and the notion that there is only one way to interpret anything (Perlin 1998: 86)

Up to now, the question of authority is still under discussion and "yet it isn't always clear who does have the authority; and possibly also the professional capability to author, produce, and maintain such projects" (Hermon and Hazan 2013: 625) as virtual museums and other online activities.

Trust in virtual museums:

As "[m]ost virtual museums are based on real, physical collection objects" (Latham and Simmons 2014: 80), the virtual museum can be considered as an extension of the physical museum into the digital realm (Schweibenz 2008; Hermon and Hazan 2013: 628). Therefore, virtual museums will always have close associations to traditional museums. So, even though being "a communication product," the virtual museum is "drawing on the strength of the term museum," as Sorin Hermon and Suzan Hazan 2013: 625) emphasize, because "once the term 'museum' is stated, a sense of trust is invoked together with the impression that the content has been professionally collected, curated, and presented in the tradition of the museum" (Hermon and Hazan 2013: 626).

Will people still attend museums when all the content is online?

For decades, within the museum community there were concerns that physical museums might be replaced by virtual museums (Bowen 1999: 5). Despite the increasing number of virtual museums, this fear has not been realized. On the contrary, studies have demonstrated conclusively that a complementary relationship exists between visiting museum websites and museums, and that they are not mutually exclusive (Marty 2007: 340.) "Evidence shows that a virtual museum presence in cyberspace leads to an increased awareness of the physical museum and increased attendance" (Latham and Simmons 2014: 82). In fact, the physical museum and the virtual museum "can ultimately be mutually reinforcing. If digital linkages elevate an awareness of what museums, libraries, and archives have to offer, then the desire to actually visit them should increase" (Clough 2013: 34). Wayne Clough's supposition is not arbitrary as the following line of arguments shows: Gernot Wersig (2001) indicates that museum visiting requires action planning, something that is done more and more on the Internet; therefore museums that want to be included in the action planning process of

prospective visitors have to present the relevant information online. Studies suggest that a considerable number of virtual visitors look up information on museum websites before the visit (Schweibenz 2013: 47). As Niels Einar Veirum and Mogens Fiil Christensen (2011: 4) point out, "in our society today, visibility is inextricably linked to the Internet. We have arrived at the saturation point where we expect to find things there, and only hesitantly look for it the 'old' way by looking in papers, books, etc."

Conclusion

Even though the term and the concept of the virtual museum were created in the early 1990s, both are still under construction. Indicators include the variety of terms that still exist for the virtual museum, for instance, digital museum, electronic museum, online museum, hypermedia museum, Web museum or cybermuseum. Further, the core concept of the virtual museum has not yet been clearly identified, and the delineation of the perhaps subtle difference between digital collections, online archives, and virtual museums have to be clarified. This seems important because in the near future there will be a shift of knowledge and experience as entire generations are immersed in a world of virtual things, and are not growing up in the same world their parents and grandparents did, as Kirsten Latham and John Simmons (2014: 144) note. For these generations, the discussion about the "real-virtual divide" might seem eccentric because the future of museums is "the virtual and the real" (Latham and Simmons 2014: 144). The future museum will have a dual character, and it will be judged by a standard that was already formulated by Joseph Henry, 1st Secretary of the Smithsonian Institution: "The worth and importance of the Institution are not to be estimated by what it accumulates within the walls of its building, but by what it sends forth to the world." (Clough 2013: 21)

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