The birth of the printing press revolutionized the publishing and information industry as early as the year 1440.[1] It was not until the creation of the Dewey Decimal Classification system (DDC), first published by Melvil Dewey in 1876, that the modern understanding of the Information field took shape. This classification scheme proposed a flexible system of classifying collections according to "subject matter and various disciplines, inevitably making it a long-time standard."[2]A new revolution began in 1945 with the introduction of the computer and the computerization of information indexing and retrieval.[3] This new technology described the "mechanized computer process of storing and retrieving books and documents with higher degrees of speed and flexibility."[4] In the digital age of the twenty-first century, researchers determined that innovations in technology would shape the future of the information profession. Analyzing these advancements, through the concepts of digital curation and the ethical notion of open access as they relate to the digital museum movement, popularized in the advent of the Covid-19 pandemic, allows researchers a better understanding of the relationship between ethics and the future of the information profession.

The information field continuously transforms within the twenty-first century. Modern information professionals are defined as individuals that, "collect, record, organize, store, preserve, retrieve, and disseminate printed and digital material."[5] Additionally, the field now includes a significant variety of overlapping, similar professions like librarian, information scientist, and archivist. Through these jobs, information professionals may choose or be assigned to specific departments within their institution. And often-times, these departments will require

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1 "Chapter I: History and Evolution of the Information Professions," Foundations of the Information and Knowledge Profession, UNT, Accessed June 5, 2023, https://openbooks.library.unt.edu/information-knowledge-professions/chapter/chapter-1-history-and-evolution-of-the-information-professions/.

2 Foundations of the Information and Knowledge Profession, "Chapter I: History and Evolution of the Information Professions."

3 Ibid.

4 Ibid.

5 Roger C. Greer, Robert J Grover, and Susan G Fowler, *Introduction to the library and information professions; Second edition* (Santa Barbara, California: Libraries Unlimited, an imprint of ABC-CLIO, LLC, 2013) p. 12-15.

individuals to possess a specific background attained through either/both their undergraduate and graduate degrees. One such specialized department within the field is digital curation.

The term curate is defined: "to be in charge of selecting and caring for objects to be shown in a museum or to form part of a collection of art, and exhibit."[6] This term became a legal definition in 1966 with the creation of the federal historic preservation law, the National Historic Preservation Act.[7] In the 1990s, the Consultative Committee for Space Data Systems began development on formal standards for long-term storage of digital data generated during space missions.[8] The final draft, approved in 2002, was called the Open Archival Information System (OAIS) Reference Model, developed as an abstract model allowing for the implementation to archival repositories through customization tailored to fit the specific needs of users.[9] Following OAIS, the Research Libraries group partnered with the Online Computer Library Center (OCLC) in a collaborative effort to determine the necessary attributes for a Trusted Digital Repository (TDR). This 2002 report defined the TDR as "one whose mission is to provide reliable, long-term access to manage digital resources to its community now and in the future."[10] Following the TDR report, organizations noticed massive growth in the standardization of practical solutions towards digital curation and preservation.[11] Interpreting the history of the curation profession allows researchers the skills necessary to define the field.

Digital curation is the management and preservation of digital data and information over the data's lifetime.[12] Digital curators act as caretakers of digital information from its birth, conceptualization, to death, and disposal. Digital curation is an up-and-coming profession in the

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6 Cambridge Dictionary. "Curate," (v). Accessed June 5, 2023. https://dictionary.cambridge.org/dictionary/english/curate.

7 Sandra Hirsh and Katherine Skinner, "Curation and Preservation," in *Information Services Today: An Introduction* (Maryland: Rowman & Littlefield, 2022), p 183.

8 Erin Baucom, "A Brief History of Digital Preservation," published 2019, Mansfield Library Faculty Publications, 31, https://scholarworks.umt.edu/ml_pubs/31.

9 Baucom, "A Brief History of Digital Preservation."

10 Ibid.

11 Ibid.

12 "What is digital curation?," About, DCC, Accessed June 6, 2023, https://www.dcc.ac.uk/about/digital-curation.

rapidly evolving digital information field. The role of the digital curator is necessary because it allows the user a role in the active management of research data, reducing threats to long-term research values, and further mitigating any risk of digital obsolescence.[13] Various additional responsibilities within the realm of digital curation exist, such as the reduction of duplications in research data creation and the enhancement of long-term values in pre-existing data, making it available for future, high-quality research.[14] Individuals in the field create interoperable, trustworthy data.[15] Digital curation, is an ongoing process that requires considerable thoughts, and investments in time and resources.[16] According to the Digital Curation Center, in the United Kingdom alone, digital curation is publicly valued at an investment of £3 billion annually.[17] Yet the field has its challenges.

Because of such challenges, digital curation remains invisible. The need for skilled digital curators and effective curation lifecycle management across institutions is apparent.[18] Additional challenges facing the entire information profession is the rate-of-creation of new data. Research shows that technology in the twenty-first century grows at an accelerated speed. It is estimated that 2.5 quintillion bytes of data are created every day.[19] With this digital explosion, the need to digitize analog materials is apparent. But the digitization of physical materials proves challenging because of the financial and time-consuming burden of digitizing collections and digitization equipment, limiting a repository's ability to contribute records for curation. The need for interoperability throughout repositories, the evolution of storage formats, and their

13 DCC, "What is digital curation?."

14 Ibid.

15 Ibid.

16 Ibid.

17 Ibid.

18 Ibid.

19 Abby McCain, "How Fast Is Technology Advancing? [2023]: Growing, Evolving, And Accelerating at Exponential Rates," Zippia, published January 11, 2023. https://www.zippia.com/advice/how-fast-is-technology-advancing/.

obsolescence have also become cause for concern. To mitigate challenges, the information profession follows a code of ethics.

The International Federation of Library Associations and Institutions (IFLA) created this Code of Ethics and Professional Conduct in 2012.[20] This publication provides information workers with ethical propositions for guidance and the consideration of Library and Information Associations in creating or revising codes.[21] This code's functions are aimed at improving professional self-awareness, providing transparency to users and society, and encouraging reflection on principles used to form policies and handle dilemmas.[22] Within this code of ethics, there are six clauses. These clauses provide ethical propositions based on access to information, responsibilities towards individuals and society, privacy, secrecy, transparency, open access, and intellectual property.[23] The most essential ethical clause of the information profession is open access.

Access to information is a core tenant of the mission of the information profession. Because access to knowledge is a human right.[24] IFLA defines the role of the information professional is to reject the denial and restrictions of access to information and ideas, especially through the censorship of materials by any entity or institution.[25] The information profession strives to provide fair, swift, economical, and effective access to information for all users.[26] Additionally, the information field partners with authors, publishers, and other creators of copyright protected work to recognize that the intellectual property rights of both authors and

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20 Loida Garcia-Febo, Anne Hustad, Herman Rösch, Paul Sturges, and Amelie Vallotton, "IFLA Code of Ethics for Librarians and other Information Workers (full version)," endorsed August 2012, https://www.ifla.org/publications/ifla-code-of-ethics-for-librarians-and-other-information-workers-full-version/.

21 Garcia-Febo, Hustad, Rösch, Sturges, and Vallotton, "IFLA Code of Ethics for Librarians and other Information Workers (full version)."

22 Ibid.

23 Ibid.

24 Sandra Hirsh and Heather Joseph, "Open Access," in *Information Services Today : An Introduction,* (Maryland: Rowman & Littlefield, 2022), p. 445.

25 Garcia-Febo, Hustad, Rösch, Sturges, and Vallotton, "IFLA Code of Ethics for Librarians and other Information Workers (full version)."

26 Ibid.

creators are respected.[27] Open access has been a vital aspect of the information occupation for years.

The immediate possibility of expanding and circulating knowledge directly resulted in the open access movement.[28]As early as the 1950s, the modern movement of access traced its roots to the Paris artists collective Letterist International (LI) and Situationist International (SI). Following the merger of the two collectives, founding member Guy Debord wrote these words on the topic of open access, " All the materials published by the Situationist International is, in principle, utilized by everyone, even without reference, and without the preoccupation of literary property."[29] Since then, the movement has been growing for nearly two decades.[30] The formation of the World Wide Web in the 1980s allowed researchers and scientists access and the ability to send files and data between computers.[31] In the 1990s, the internet transformed again; and in 1998 information access became a significant tenant for change in the information organization. That year, the Association of Research Libraries developed the Scholarly Publishing and Academic Resources Coalition (SPARC) to address current crises, develop, and promote OA initiatives which the early 1990s lacked.[32] But SPARC was just the beginning of open access in the twentieth century.

And as with any beginning, challenges arise. Heather Joseph's chapter "Open Access" in *Information Services Today*, discusses the biggest challenge in the field: financial barriers. Joseph argues the primary mechanism for communicating research is always through the publication of articles in peer-reviewed journals.[33] Researchers write articles, share findings,

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27 Hirsh and Joseph, "Open Access," p. 451.

28 Hirsh and Joseph, "Open Access," p. 445.

29 Debord to Straram, November 12, 1958, in *Guy Debord, Correspondence, 1957-1960.*

30 Hirsh and Joseph, "Open Access," p. 445.

31 "The Invention of the Internet," History.com Editors, History, last modified October 28, 2019, https://www.history.com/topics/inventions/invention-of-the-internet.

32 "FAQ," SPARC, accessed June 6, 2023, https://sparcopen.org/who-we-are/frequently-asked-questions/.

33 Hirsh and Joseph, "Open Access," p. 446.

publish works in academic journals, and occasionally peer-review colleagues' work. This process remains, but the modern users' ability to access has been transformed. The cost to access presents both users and researchers at a disadvantage due to the lack of availability of published research. Lack of access to information prevents the user from finding the necessary information needed for their work; users are only able to base their work on the limited information available rather than the full scope.[34] Unfortunately, this notion has become the norm throughout the world of research.[35] But, the information field is fighting back.

Removing the financial burden alone is not enough to bridge the access gap; researchers need the ability to find that one-in-a-million article.[36] In 2001, the drafters of the Budapest Open Access Initiative (BOAI) discussed and defined the concept of OA as a "paradigm that involves the immediate, free availability of scholarly articles on the public internet, coupled with the rights to use these articles in a digital environment, without financial, legal, or technical barriers."[37] The BOAI agreed on two strategies, the first remains a crucial, ethical imperative throughout the information profession. This strategy called for the establishment of open digital repositories where authors could deposit journals, making them freely available.[38] Heather Joseph argues that when "repositories conform to interoperability standards, data is treated the same throughout, allowing for ease of location and accessibility of articles."[39] These interoperability standards, known as the Open Archives Initiative, are used throughout various information institutions today.[40] And one such institution where open access is implemented is in the museum.

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34 Hirsh and Joseph, "Open Access," p. 449.

35 Hirsh and Joseph, "Open Access," p. 452.

36 Hirsh and Joseph, "Open Access," p. 447.

37 Hirsh and Joseph, "Open Access," p. 448.

38 Ibid.

39 Ibid.

40 Hirsh and Joseph, "Open Access," p. 449.

Museums provide access to digital records through websites and databases. Technology and digital initiatives represent a significant area of growth and potential; for museum professionals and viewers alike, they have become tools of the trade.[41] But without digitally curated records, there is no capacity for open access. Following curation, content is made available in either high or low quality digital records, through free downloads, user-specific licensing fees, and 'for viewing purposes only.'[42] Objects in collections are no longer exclusively accessible on-site and can be viewed from anywhere in the world via the internet.[43] In "Responding to Open Access: How German Museums use Digital Content," Julia Wiedemann, et al., proposed the following metrics for museum access: "the level [of access] is low if the content is visible but not useable, medium if reusable under certain restrictions, and high if content is unrestricted."[44] In an ideal world, every museum would provide unrestricted access to collections. However, access provides difficulty to the museum field.

Open access challenges museums because of the ethical guidelines that govern each repository.[45] Museums are responsible for safeguarding the objects within their collections. During the digital curation process, institutions publish photographic reproductions of works with associated metadata standards; but when reproductions and other information become freely accessible, the museum loses direct control over access of third-party data.[46] And poor reproductions of popular objects within the museum have the possibility of damaging the museum's reputation.[47] To combat this challenge, museums will determine the level of access

41 Juliee Decker, *Technology and Digital Initiatives* (Rowman & Littlefield, 2015) #.

42 Julia Widemann, Susanne Schmitt, and Eva Patzschke, "Responding to Open Access: How German Museums use Digital Content." *Museum and Society* Vol 17 no. 2 (2019): #.

43 Widemann, Schmitt, and Patzschke, "Responding to Open Access: How German Museums use Digital Content," p. 193.

44 Widemann, Schmitt, and Patzschke, "Responding to Open Access: How German Museums use Digital Content," p. 194-195.

45 Widemann, Schmitt, and Patzschke, "Responding to Open Access: How German Museums use Digital Content," p. 195.

46 Ibid.

47 Ibid.

beneficial to their institution. Museums constantly adapt and develop new policies necessary for successful implementation of public access to digital materials within collections.

The notion of open access to collections within the virtual museum is perhaps the most relevant in times of crisis.[48] In March 2020, the world shut down due to the COVID-19 pandemic. All 'non-essential' profession shut their doors. This shutdown provided institutions with financial burden, leading to widespread layoffs across the information profession. Nowhere were the negative effects of the pandemic more apparent than in the museum sector. To keep doors open, museums rely heavily on revenue from ticket sales, café, and retail sales, but without visitors, funding is limited. Even operational museums faced extreme financial burden due to costly safety mandates dictated by the government. American Alliance of Museums President Laura Lott stated that, "Museums are spending money not just when people are there, but all the time to take care of their facilities, to care for their collections, to provide online services. They're spending down their savings every day, even while they're closed."[49] Whether open or not, access to collections within the museum was severely limited. Pressures related to access during the shutdown sparked conversations about ways to revolutionize how scholarly research was shared, remove access barriers, take advantage of the power of the internet, and create a vision for a new system that better serves society and optimizes the outcomes of scholarship and research.[50] As a result, institutions across the world transferred operations online.

Art museums and their cultural and historical colleagues brought much of their activity into the digital to continue their missions of lifelong learning, artistic, cultural preservation, and

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48 Bernadette Bierdermann, "Virtual Museums as an Extended Museum Experience: Challenges and Impacts for Museology, Digital Humanities, Museums and Visitors – in Times of (Coronavirus) Crisis," *Digital Humanities Quarterly, Vol. 15 (3),* (2021): p. 9.

49 Deborah, Vankin,"How Hard Has Covid Hit American Museums? A New Survey Predicts a Grim Future," Entertainment & Arts, Los Angeles Times, Published November 17, 2020, https://www.latimes.com/entertainment-arts/story/2020-11-17/aam-american-alliance-museums-covid-survey.

50 Hirsh and Joseph, "Open Access," p. 448.

community engagement.[51] New and revised digital policies were created with open access in mind. Implemented policies based on previous issues related to global attitudes throughout the museum field regarding internet access, the digitization of collections, a pre-established, minimal IT infrastructure, and a need for staff with the time and skills to perform digitization tasks.[52] Yet despite newly implemented policies, the need for digital access seemed far too arduous for museums. In a MuseumNext survey on the effects of COVID-19 on the museum, one user stated on the topic of the transition to digital programming, "It felt like the blind leading the blind."[53] It is essential to understand that digital museums and online access to museum databases existed before the pandemic, but this need plateaued at the height of the pandemic.

The challenge was bringing conventional museums into a virtual space. The new objective was to determine the best ways to communicate museum objects, their hidden histories, and contexts, by using tools of digitization in ways that had never been previously done.[54] Yet, this objective relied heavily on the need for and availability of digitally curated materials and their metadata standards. Digital curators, in turn, spent hours updating digital files and corresponding metadata standards throughout their collection for ease of accessibility in the public sector. And as a result, digital museums entered the realm of augmented, virtual reality.

This new museum phenomenon quickly became popular during the height of the pandemic. Institutions created guided/unguided virtual reality walk-throughs and videos of their collections. One such museum that entered the sphere of virtual reality was the Mütter Museum

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51 Caroline Elizabeth Fresh, et al., "Museums in Lockdown: How Digital Media and Remote Offerings Saved the Museum from Covid-19," (Ma diss., Drexel University, 2021), 1-2.

52 "UNESCO report: museums around the world in the face of COVID-19," UNESCO Digital Library, UNESCO, published 2021, https://unesdoc.unesco.org/ark:/48223/pf0000376729_eng.

53 "Survey Effect of Covid-19 Pandemic on Museums?," News, MuseumNext, published February 16, 2021, https://www.museumnext.com/article/survey-effect-of-covid-19-pandemic-on-museums/.

54 Biedermann, "Virtual Museums as an Extended Museum Experience: Challenges and Impacts for Museology, Digital Humanities, Museums and Visitors – in Times of (Coronavirus) Crisis," p. 6.

of the College of Physicians of Philadelphia, a museum dedicated to medical history and science. In May 2020, the Mütter Museum added a new feature to its website, dubbed Mütter@Home.[55] This website page brought forward new and pre-existing interactive features to at home users; visitors also had the option to take a virtual tour.[56] Throughout the pandemic, programming of thematically relevant exhibits and programs were emphasized at the Mütter.[57] Exhibits such as, *Spit Spreads Death*, which focused on the impact of the 1918-1919 influenza pandemic, were popularized.[58] Mütter's website additionally allowed users the ability to download coloring pages, access the museum's online catalog, and partake in a virtual escape room "inside" the museum.[59] Educational videos and animated slideshows informed users about the infectious spread of disease.[60] Programs like the Mütter's allowed users the ability to openly access digitally curated materials from anywhere in the world. On March 25th, 2020, the J. Paul Getty Museum issued the #GettyMuseumChallenge on social media.[61] The challenge: choose a favorite piece of artwork, find three items around the house, recreate the artwork, and share the image.[62] This challenge added a unique contribution to the concept of the digital museum. Because followers were able to post a myriad of re-created images across social media thanks to the availability of accessible, digitized, and downloadable artwork. During a time in modern history where everyone felt the effects of isolation, open access to digital materials in museums provided a sense of connectedness across the globe.

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55 Fresh et al., "Museums in Lockdown: How Digital Media and Remote Offerings Saved the Museum from Covid-19," p. 56.

56 Ibid.

57 Ibid.

58 Ibid.

59 Ibid.

60 Ibid.

61 Getty (@GettyMuseum). "We challenge you to recreate a work of art with objects (and people) in your home. Choose your favorite artwork. Find three things lying around your house. Recreate the artwork with those items. And share with us." *Twitter,* March 25, 2020. https://twitter.com/GettyMuseum/status/1242845952974544896.

62 Ibid.

The information profession, which includes digital curation, has been advancing for years. And curation history, existing as early as the 1960s, proves the necessity of digital curators because of their responsibilities to the conceptualization and disposal of digital records. But challenges like the rate of data creation exist. Combating these challenges, IFLA set the ethical precedent, The Code of Ethics, for the information profession. One such precedent, open access, is a quintessential principle of the information profession. SPARC created the first initiatives leading to the OA movement. But financial barriers affected momentum. As a result, standards presented by OAIS provides institutions with guidelines for access policies, lessening these burdens. One field where open access is implemented is the museum. Museums provide public access to information through their database. But in times of crisis like the COVID-19 pandemic, the conventional museum had to transform. The financial burden from the pandemic played a role in the decision to move museum operations online. Repositories like the Mütter and Getty Museums developed and provided ways to bridge the gap between the public and access through virtual-museum programming. Although the future of the information profession remains unknown, one notion that the COVID-19 pandemic did was to ensure that the future of the information profession lies within the ethical concept of open access.

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