

Chapter 23

Digital Preservation: Technical Aspects and Frameworks for Librarians

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ABSTRACT

In recent decades, libraries, archives, and museums have created digital collections that comprise millions of objects to provide long-term access to them. One of the core preservation activities deals with the evaluation of appropriate formats used for encoding digital content. The development of science has entered the 4th paradigm, where data has become much more intensive than in the previous period. This situation raises new challenges in managing research data, especially related to data preservation in digital format, which allows research data to be utilized for the long term. The development of science in the 4th paradigm allows researchers to collaborate with and reuse research datasets produced by a research group. To take advantage of each other's data, there is a principle that must be understood together, namely the FAIR principle, an acronym for findable, accessible, interoperable, and reusable.

INTRODUCTION

Libraries, archives and museums have created digital collections with millions of objects in the last decades as the impact of technology development. Some issue arise from the transformation of the collection format is to ensure the accesibility for the long term. One of the main activities of preservation has to do through evaluating suitable formats that are used to encode digital content. The threat to the preservation of a particular file format is difficult to assess due to technological advances (Graf & Gordea, 2014).

Conway defines the long-term digital archive as the preservation of all digital materials (born digital objects and those that come from the digitization process) (Conway, 2010). This storage is intended to guarantee for a long period of time that the digital information: remains accessible, stored in a secure,

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and understandable way for future users (so that it can be used correctly in the future). These fellows can be less or more stringent depending on the conservation context: requirements of the law; Regulations; sensitive documents that can be used as evidence; Patrimonial or scientific information. The long-term aspect of digital preservation is defined by the consultative committee for space data systems (CCSDS) as “long enough to be concerned with the impacts of changing technologies, including support for new media and data formats, or with a changing user community. Long Term may extend indefinitely” (CCSDS, 2012). For instances, scientific data must be kept indefinitely so that researchers can reuse this data for further studies and experiments. Reusability of scientific data is the main idea

A survey of the SPEC kit conducted by the Association of Research Libraries in 2011 on the digital preservation shows a further differentiation in the importance of the digital preservation.

The responses from the participants indicate that digital preservation can mean: (i) the preservation of rare and brittle materials through digitization, a mechanism for reducing the direct handling or manipulation of the materials; or (ii) the preservation of licensed digital content, e.g., journal articles; or (iii) the preservation of locally digitized content, typical materials from special collections or archives; or (iv) the preservation of born-digital content, such as institutional records (Mcmillan & Skinner, 2011).

From a broader perspective, all these types of activities which create digitally born material requires digital preservation (Wilson, 2017).

BACKGROUND

Digital Preservation and Role of Libraries in Supporting Digital Humanities (Emerging Data Arise from Science 4.0)

The development of science has entered the 4th paradigm, where data has become much more intensive. This situation raises new challenges in managing research data, especially related to data preservation in digital format, which allows research data to be utilized for the long term. The force to ensure accessibility to research data in the future has the challenge that library should be face. The development of science paradigm allows researchers to collaborate and reuse datasets produced by a research group.

In order to optimize or reuse research data, there is a principle that must be implemented properly, there is FAIR principle which is an acronym for Findable, Accessible, Interoperable, and Reusable (Hey & Trefethen, 2020). Those principles have become commonplace in research to validate the conclusions that require extensive research data and an extended period. Furthermore, FAIR principles have also becoming a guideline for researchers to conduct research particularly in generating data phase. On the other hand, FAIR Principles were mandate from funding agency to enabling data sharing in several developing countries (Mason et al., 2020). Funders policy which promote data sharing activity is the most important driver to digital preservation for research data.

Moreover, research in climatology uses sensor data from one time range to a more extended period to be utilized in weather modeling (Hey & Trefethen, 2020). Another example is the social humanities field. The use of digital data for digital humanities studies requires a research dataset that is large and can be used in the future without worrying about whether the data can still be opened in the future. Digital humanity is a concept that developed from the process between theory and practice of curating

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