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Digital Content Reuse Assessment: An Emerging Framework for Future Digital Library Research and Development

Abstract. This paper reports on a US-funded research project that investigates the development of an assessment framework for digital content reuse by cultural heritage organizations. Specifically, it will provides a conceptual framework for a nuanced understanding of digital object/content use and reuse and will introduce a set of ethical guidelines for the assessment of digital object/content reuse in digital, archives, and repositories.

1. Introduction

The last two decades have witnessed the emergence of large scale digital libraries and repositories such as HathiTrust, the Internet Archive, the Digital Public Library of America, Europeana and the World Digital Library, resulting in an unpreceded availability of high quality digital content. Similarly, numerous academic institutions, libraries, archives, museums and galleries have embarked on the development of large-scale digitization of content and digital research data repositories of various sizes in order to support research, teaching, learning, and engagement. These developments provide new opportunities for not only academic users, but also the public to conveniently and freely interact with and make use of a broad range of massive, open, and accessible digital collections of books, articles, manuscripts, images, photos, music, maps, software, datasets etc. These digital libraries and repositories also offer novel, individual and collective ways of using, reusing, repurposing and making sense of data/information and of creating digital content. While several studies of digital object/content use has focused largely on such quantitative and limited assessment and impact measures such as the number of views, downloads, bookmarks, etc., little research has focused on the ways in

which digital object/content reuse and repurposing is conceptualized and assessed. how often and in what ways digital repository materials are utilized and repurposed, is a key indicator of the impact and value of digital collections. Furthermore, traditional library assessment analytics focus almost entirely on access or use statistics, which do not provide a nuanced picture of how users repurpose or transform unique materials from digital repositories. It is particularly crucial to develop mechanisms and assessment frameworks that enable us to demonstrate the value and impact of digital libraries at the digital object level as well.

In this paper, we will report on an ongoing US-based research project that aims to provide a conceptual framework and an operational toolkit that addresses the nuanced aspects of digital object/content reuse and the ways in which content reuse can be assessed. It aims to develop guidelines and recommended practices for practitioners in galleries, libraries, archives, museums, and repositories (GLAMR) organizations to assess how users engage with, reuse, and transform digital content.

2. Prior Research and Context

There are competing and sometimes confusing definitions for the terms 'use' and 'reuse' of digital object and content. These two concepts have been approached from different perspectives and disciplines. Chapman et al. (2016) found that there is a growing number of studies that focus on how various disciplines, in particular humanities, reuse digital content such as images. Thompson et al. (2017) define use "as the process of accessing particular content. Often knowing that a user has "visited" or "downloaded" an object satisfies evaluation criteria for this category. Borschke (2017) defines *use* as "consumption practices" . Initial consumption of a digital object, such as downloading it, may count as *use* while incorporating that object into future projects may count as *reuse* ; for example, medical images downloaded from a repository (*use*) and then consulted to inform new product development (*reuse*). Previous research has also defined use and *Use* is the initial access of an item. Nothing is known about how that item is utilized after it is initially accessed. *Reuse* is how the item is utilized after the initial access (O'Gara et al., 2018). In a study to assess users and and reuses of images from the Library of Congress collections, Reilly and Thompson (2017) concluded that "... everyday users are repurposing digital content in ways that are meaningful to them, and they are acknowledging and fulfilling personal interests. These users are also sharing this content through a variety of environments on the Web, including popular social media platforms, blogs, and personal Web sites". In a discussion of scientific data reuse, Pasquetto et al. (2017) argues that „it is challenging to distinguish between use and reuse and defines the two terms as follows: "In the simplest situation, data are collected by one individual, for a specific research project, and the first "use" is by that individual to ask a specific research question. If that same individual returns to that same dataset later, whether for the same or a later project, that usually would be considered a "use." When that dataset is contributed to a repository, retrieved by someone else, and deployed for another project, it usually would be considered a "reuse."

For instance, Matusiak et al. (2019) studying the use and reuse of images by students in an academic context, found that there was a significant difference between use and reuse of visual resources in student papers and presentations and that student papers included examples of both image use and reuse while image reuse dominated presentations. Several recent studies have tackled the challenge of formulating analytical frameworks for assessing reuse. In "Beyond Clicks, Likes, and Downloads: Identifying Meaningful Impacts for Digitized Ethnographic

Archives" researchers devised a framework for "documenting, demonstrating, and assessing the impact of digitized ethnographic collections" (Punzalan, 2017). They formulated six topical areas of potential impact, including: knowledge, professional discourse, attitudes, institutional capacity, policy and relationships. They note that these areas can assist how "institutions and communities articulate and assess major sorts of impact that are most relevant to institutional projects to digitize and share knowledge" (Punzalan, 2017). O'Gara et al. (2018) provided the most comprehensive analyses of content reuse assessment frameworks. A previous study surveying Cultural heritage and knowledge organizations found that there was a significant gap digital content reuse assessment frameworks, methods and techniques to support digital library developers, practitioners, and researchers (Thompson et al.2019).

3. Methodology

The D-CRAFT project adopted a sophisticated, multi-method research methodology in order to develop a digital content reuse conceptual framework and an operational toolkit that addresses the nuanced aspects of digital object/content reuse assessment. Table 1 shows an overview of the key research facets, methods and tools used and the type(s) of data generated and used in this study.

Table 1. Methods, tools, data types used in the study

Research facets	Methods	Tools	Type of data created and used
Conceptual development of Use/Reuse matrix	Literature review Concept mapping Expert consultation Advisory group consultation	DeDoose	Qualitative & textual data
Evidence-based development of use cases	Stakeholder survey Expert consultants Advisory group consultation	Airtable Google Docs & Sheets	Qualitative & quantitative and textual data
Development of digital content reuse assessment toolkit	• Literature review • Environmental scan for recommended practices, tools, and tutorials • Advisory group consultation • Expert consultants	DeDoose Airtable Google Docs & Sheets	Qualitative & textual data Including reuse assessment method and tool tutorials
Code of Ethics for Assessing Reuse	• Literature review • Concept mapping • Environmental scan for ethical codes • Stakeholder consultation • Advisory group consultation • Expert consultants (privacy & diversity)	Voyant DeDoose Twitter	Qualitative & quantitative and textual data

4. Findings and results

In this paper, we will present a digital content reuse matrix that delineates the differences between use and reuse and the instances and examples of reuse in digital libraries and repositories. Furthermore, we will briefly present on a set of recommended ethical guidelines for the digital content reuse assessment. The following is a brief overview of use/reuse conceptual framework. Figure 1 shows distinctions and instances of use/reuse.
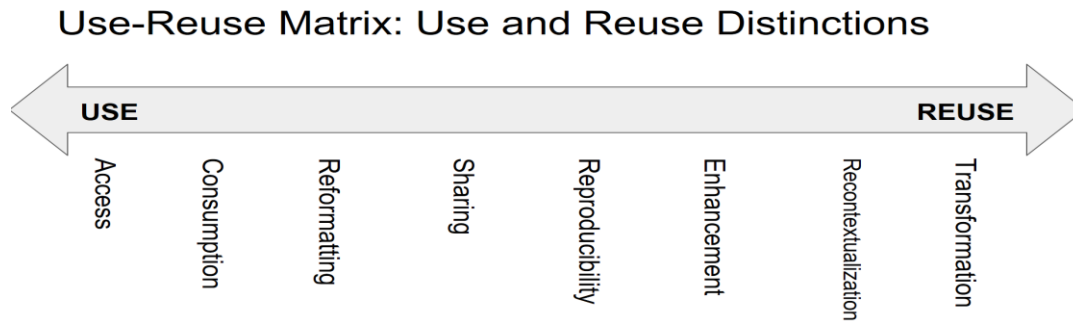

Figure 1. Digital content Use/Reuse

Table 2 Spectrum of Use/Reuse

Use, Reuse - Transform definition emphasis		**Use** *To **passively interact** with a digital object(s) **without adding substantive, interpretive, or transformative meaning to the object(s)***	**Reuse** *To **actively interact** with a digital object(s) in a way that **adds substantive, interpretive, or transformative meaning to the object(s)***
Simple Engagement	**Access** *To come into contact with a digital object*	• Browsing digital repositories for content • Clicking a link for a digital object	N/A
	Consumption *To view, read, listen, or expose oneself to the intellectual content of a digital object*	• Watch a video online • Read an article • Listening to a song	N/A
	Reformatting *To change the medium or delivery of a digital object*	• Converting a document to a new file format • Taking a picture with a camera phone	• Charting a data set in a graph • Painting, drawing, or otherwise artistically representing a digital object
Spectrum of Engagement	**Enhancement** *To add functionality or accessibility to a digital object*	• Adjust lighting or coloring of digital items • Transcribe a digital object	• Annotation of an image or document • Adding color to a black and white photos
	Sharing *To expose others to the intellectual content of a digital*	• Sharing digital collection materials on social media or email	• Synthesizing or presenting an argument in an article or publication that discusses a digital object in a substantive way

	object by distributing a means of access, such as a link or DOI	• Publishing/reposting content in online or print publication	
	Recontextualization *To alter the surroundings or space that affect the meaning, purpose, or intent of a digital object.*	• Aggregations of metadata in a discovery tool	• Curated sets of digital material, such as People of Color in Medieval European Art History https://medievalpoc.tumblr.com/ • K-12 education kits • Incorporating digital images into documentaries or movies
Complex Engagement	**Transformation** *To alter or change a digital object(s) in such a way that results in the creation of a new, distinct entity*	N/A	• Versioning, such as modifying or adapting a book from the original • Mashup of digital objects • Creation of a GIF or meme from digital objects

As part of this research project, we developed a set of ethical guidelines for assessing the reuse of digital content in digital libraries and repositories by various cultural heritage organizations, including libraries, archives, museums and galleries. The core values considered for developing these guidelines include the following:

- ○ Inclusion, Diversity, Equity, Accessibility, Social Justice (IDEAS)
- ○ Privacy
- ○ Traditional Knowledge, Cultural Heritage, and Intellectual Property
- ○ Professional Development & Training
- ○ Transparency
- ○ Impartiality
- ○

The developed ethical guidelines address a number of digital content reuse areas, including the ethical use of qualitative and quantitative methods to collect reuse data, and to know and understand digital repository users without violating privacy (as pertains to collecting user data). Further details will be provided in the final presentation.

5. Conclusion

Assessing the value, usefulness, and impact of digital content in digital libraries and repositories should not be confined to the *use* of digital object, but should also address and explore the reuse of digital content for various purposes and in various contexts, including lifelong learning, recreational experiences and activities that digital information users and searchers engage in. It is particularly timely for libraries, archives, museums and galleries to proactively conceptualize and operationalize digital content reuse and its assessment in order to demonstrate their impactful and wide-spread usefulness for not only academic and scholarly communities but also for the general public. This endeavor is in line with the fundamental mission of GLAMR organizations in supporting intellectual and artistic creativity as well as in promoting informed citizenry, social responsibility, and democracy.

Acknowledgement

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