WHAT ABOUT OTDs? ARE THEY

GREY?

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Abstract

The term of grey literature is sometimes applied for older material and special collections, especially in the field of digitization projects of scientific heritage. The following paper will analyse this term of "grey scientific heritage" and, based on empirical and conceptual elements, contribute to a better understanding of grey literature. Special attention will be paid on older theses and dissertations (OTDs), as a main part of scientific heritage especially from universities.

Keywords

Theses, dissertations, heritage collections, scientific heritage, grey literature

Introduction

In systematic literature reviews, meta-analyses and library guidelines, grey literature is often described as unpublished material disseminated outside commercial channels, not peer-reviewed and with limited information referencing. The Encyclopaedia of Library and Information Sciences defines grey literature as material "produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers, i.e., where publishing is not the primary activity of the producing body" (Schöpfel & Farace, 2010). The Prague definition of grey literature raises awareness of its documentary nature, intellectual property rights and quality issues (Schöpfel, 2011). More recently, the 2014 Pisa Declaration on Policy Development for Grey Literature Resources¹ mentions inter alia "research and technical reports, briefings and reviews, evaluations, working papers, conference papers, theses and multimedia content" and recognizes them as an "essential resource in scholarly communication, research and policy making, (and) a key source of evidence, argument, innovation and understanding in many disciplines, (and) an important and valuable part of research and information", which generally means that this is current material with new and unpublished results. However, the term grey literature is also applied to older material and special collections, especially in the field of scientific heritage digitization projects. The following paper will analyse the term "grey scientific heritage" and, based on empirical and conceptual elements, contribute towards a better understanding of grey literature. Special attention will be paid to older theses and dissertations (OTDs) as an essential part of scientific heritage, especially from universities. We recently published a debate on whether and why electronic theses and dissertations (ETDs) should still be considered grey literature in the digital age (Schöpfel & Rasuli, 2018). Here, we will try to assess the grey characteristics of older items from the Gutenberg era. The methodological approach is twofold:

First, relevant papers on scientific heritage from the last two decades will be reviewed, with special attention paid to the definition of grey literature and to the inclusion of theses and dissertations.

Second, the paper will assess more than one hundred digitization projects from a recent French public digitization program to valorise otherwise hidden scientific heritage collections through digital libraries and open repositories. Do these projects contain grey literature? What kind of grey literature? What role is played by OTDs?

This paper will discuss these papers and projects in the light of the usual definitions of grey literature.

¹ http://greyguide.isti.cnr.it/pisa-declaration/

Grey literature and heritage - an overview

A search via Google Scholar, OpenGrey and the GreyGuide2 reveals that few papers make explicit links between grey literature and scientific or cultural heritage collections; a text-mining study of a large corpus of papers on grey literature confirmed that the bigram "cultural heritage" is rarely used (Bartolini et al., 2017). Most papers on grey literature deal with recent items, not older material.

Scientific vs cultural heritage

The meaning of scientific heritage is also a matter of discussion. The term itself is "diverse, complex, multi-layered (and) difficult to define" (Lourenco & Wilson, 2013, p.745). It is part of cultural heritage, i.e. a shared collective legacy, a corpus of material signs handed on by the past in every culture and which constitutes a source of identity and cohesion for communities, everything "we want to keep, share with others and pass on to the next generation" (idem)³. Heritage of research is one part of these tangible or intangible assets, everything researchers have produced and what is of interest for future research. In other words, "what the scientific community as a whole perceives as representing its identity, worth being passed on to the next generation of scientists and to the general public as well" (idem, p.746). Yet some ambiguities remain, for instance about the legacy character of research libraries, and if scientific heritage must be a scientific contribution or whether it can also include anything produced by scientists, for instance private materials, diaries, letters etc.

The papers on grey literature that deal with heritage collections are from very different domains, including for example Holocaust literature, urban planning, Polish underground literature, Newton's journal, computer science, Antarctic research, Iceland research publications and the Serbian cultural enlightenment. Some of these papers clearly focus on cultural heritage without any scientific legacy character, such as two studies on historical documents produced by public authorities (de Biagi & Puccinelli, 2017) and on Yizkor books (Jones & Siegel, 2006). Other examples are papers on private collections in the Prado Museum (Docampo, 2010) and on the Australian Baptist heritage collection (Burn, 2006). These items and holdings may be of interest for scientists but are not produced by scientists.

Other studies include both types of heritage, scientific and not, like a paper on unpublished material (i.e. manuscripts, letters, photographs and sketches) by Sir Julius von Haast, a New Zealand scientist in the 19th Century (Nolden, 2017), an analysis of Polish unpublished and prohibited "underground" literature, including translations of scientific and technical items (Nahotko, 2008), or the presentation of the Virgin Islands Heritage Collection with a core collection of digitized material with funeral booklets, historical photographs and newspaper articles, but also research reports and occasional papers produced by local research units (Marsicek & Weiss, 2002).

Types and definitions of grey scientific heritage

Some papers explicitly address grey literature in terms of scientific heritage, especially scientific and technical reports, working papers, proceedings and surveys (cf. Japzon

² GreyGuide Repository and Guide to Good Practices and Resources in Grey Literature http://greyguide.isti.cnr.it/

³ Cf. also https://en.unesco.org/ By the way, the report of the Horizon 2020 expert group on cultural heritage commissioned by the European Commission and published in 2015 (Getting cultural heritage to work for Europe) simply doesn't define the term.

& Anderson, 2005; Stock et al., 2006; Juliusdottir, 2014). Less frequent grey items in these papers include technical drawings (Jackson, 2005; Biagioni & Giannini, 2010), newsletters and workshop/training materials (Ramos-Lun & Vogel, 2006), handwritten notes (Cirkovic, 2016) and materials from conferences that are not readily available (Gheen & Olmsted, 2010). Two studies mention older theses and dissertations (Costello, 2007; Biagioni & Giannini, 2010). All these items were produced by scientists, are scientific and technical information and written for the scientific community.

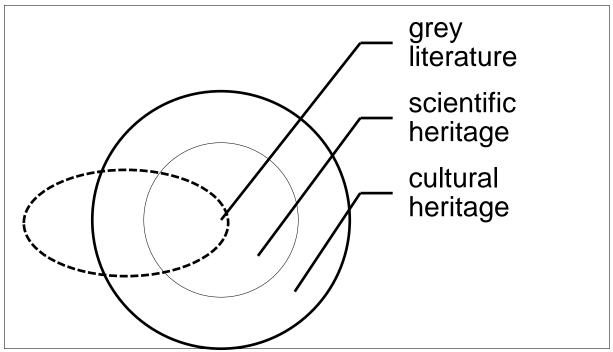


Figure 1: Cultural heritage, scientific heritage, grey heritage, grey literature

How do these papers define grey literature? Some papers just provide a typology of documents considered as grey. Ramos-Lun & Vogel (2006) cite the GreyNet Luxemburg definition of grey literature and distinguish it from "ephemera", i.e. "materials (physical or electronic) that regardless of appearance, quality or quantity, and that at some point were considered disposable and of little value or no value, through time, had become valuable in such a way that it had broadened their appeal and made them desirable to be collected and preserved by individuals, collectors and information institutions". In fact, they describe "ephemera" as a special kind of grey literature.

Rucinski (2015) comments that the ephemeral and variable nature of grey publication types, editions and formats makes them hard to describe and define. The risk of being lost if no investment is made is one of the major characteristics attributed to grey heritage items; they are considered endangered due to their small production quantities and various preservation challenges (Jackson, 2005). Another elements commonly used to distinguish grey items from other scientific heritage is the fact that they were not (or not widely) published and may even be confidential, secret or prohibited ("underground"), non-traditional materials, or writings kept away from public review (von Hofe, 2005; Ramos-Lun & Vogel, 2006; Nahotko, 2008). Juliusdottir (2014) states that these items are often "neither bibliographically accessible in catalogues open to the public nor available through traditional market publishing distribution channels", while Jackson (2005) adds that they are usually difficult to discover or obtain, often difficult to find in libraries, in online databases and on the web, (and) non-accessible.

The distinction between current items and older material (50 years or more) is not always simple. Some studies are "borderline" and do not make it clear if the main purpose is the discovery of scientific heritage or access to recent resources. For instance, one of the first papers on grey literature remains ambiguous about the wartime German research reports collected by the US Army and the UK National Lending Service (now British Library Document Supply Centre) from 1945 on (Chillag, 1994) - was this historical material, or did the US Army gather this material and ship it westward because of its value for cutting edge technology?

Preventing the risk of loss

Why is it important to invest in older grey literature? The papers provide different reasons, e.g. their historical value as "hidden treasures" (Stock et al., 2006; Biagioni & Giannini, 2010), their interest for institutional history and commemoration (Anderson et al., 2007), like the celebration of the 50th anniversary of the first Italian computer (Biagioni & Giannini, 2010). In other words, for these authors the value is the record of progress, not the information itself.

The value of older materials can be increased by making them more readily available. "The greatest challenge remaining for our library is to make our grey literature and ephemera collection available to our users" (Ramos-Lun & Vogel, 2006). A review of older material can include the retrospective enhancement of descriptive and name authority records, thus resulting in "improved documentation of the collections, thereby maximising the discoverability of historical evidence and utilisation of the informational value of a personal and scientific archive" held in library collections (Nolden, 2017). This means a systematic search and collection of resources from a variety of agencies and organizations (Costello, 2007) or digitization and dissemination on the web of collections that were previously fairly inaccessible (Gheen & Olmsted, 2010).

Another related purpose is digital preservation which, alongside dissemination via web servers, prevents grey literature "from moving further toward the black" (Ramos-Lun & Vogel, 2006). Here, various authors are in favour of centralized archives, especially of institutional repositories (Jackson, 2005; Stock et al., 2009; Lynch, 2017) but other solutions may exist.

Standards

Some grey literature, primarily older items, is poorly described in catalogues and databases. Some initiatives insist on the importance of standards to improve the findability and interoperability of heritage collections. Yet, except for a general call for standards, there is no consensus about which kind of standard – generic or not, etc. – should be applied to grey literature.

Jackson (2005), for instance, recommends a current and generic cataloguing standard such as AACR2 for the conversion of print resources to accelerate the inclusion of urban planning resources in online databases and catalogues. Kansa et al. (2010) promote a field-specific approach to primary data, i.e. "a common and highly abstracted framework for expressing archaeological observations, their descriptive properties and their contextual relationships".

Two metadata standards are generally accepted, the Dublin Core and XML. Anderson et al. (2007) developed an extension of the DC, called Goddard Core Metadata Element Set for the metadata of resources produced by the NASA Landsat Legacy Project.

In a quite different environment, namely the Cuban Heritage collection at the University of Miami, Baur et al. (2016) apply the Library of Congress Encoded Archival Description format (EAD-XML) for the conversion of legacy search aids in typewritten, MS Word, PDF, HTML and even poorly executed EAD-XML formats. Standardized and valid EAD-XML mark-up, according to the authors, is crucial to provide deep access to and interoperability of their archival description and metadata.

Legal aspects

Some papers address legal issues, but this does not seem to be a major concern for this kind of project. Of course, intellectual property rights must be assessed thoroughly before digitizing heritage collections (Blackwell & Blackwell, 2013). Yet the general idea is that older primary source and public domain materials should be freely available, without user agreements and terms of service as a precondition for content access: "(...) our cultural heritage is vulnerable, and risks becoming encompassed within a modern enclosure movement if action is not taken" (Clark & Chawner, 2014). Licensing and laws should be in favour of projects designed to foster the preservation and accessibility of hidden and rare material which may otherwise be "locked up under copyright" (Lynch, 2017).

The case of a national digitization program

As mentioned above, scientific heritage can be described as tangible or intangible assets, everything researchers have produced and what is of interest for future research. The last aspect, in particular, was a central element of a digitization program launched in 2013 and 2014 by the French Ministry of Higher Education and Research to valorise scientific heritage collections ⁴. The funding criteria were above all the collections' interest for research communities, together with the technical quality, accessibility (open access), interoperability and the added value of the service environment. The document types were not a specific condition of the program, and the participants – mainly academic libraries and documentation centres – were invited to submit proposals including all kinds of library materials such as journals, books, unpublished papers, posters, photographs, maps and so on. Also, the program was not limited to scientific documents – literary, political or business items could be part of the proposals, as well as press products or personal archives, if their value for research could be established.

123 proposals were submitted and evaluated by an expert group of librarians and scientists. Based on the expert evaluation, the Ministry selected 33 projects with a total grant of €1,296,000 for one or two years. The objective was to valorise otherwise hidden scientific heritage collections through digital libraries and open repositories in an environment of open science and new library services. 38 proposals included grey literature (31%), most of them issued by universities. Nearly all (34) involved consortia with two or more partners; seven

⁴ The digitization program was part (segment 5) of the *Bibliothèque Scientifique Numérique* (BSN) or Digital Scientific Library framework (2009-2018). The corresponding author was a member of the steering committee in charge of project selection. The call, criteria and results of the program are available at http://www.bibliothequescientifiquenumerique.fr/bsn-5-numerisation/

consortia incorporated international cooperation with institutions from Italy, Canada, Belgium and Germany.

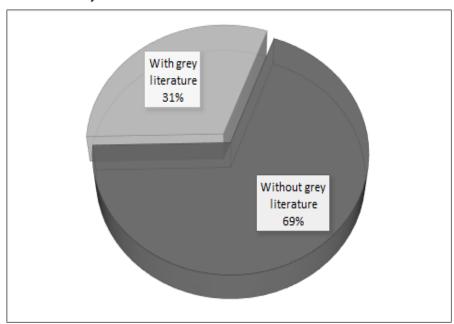


Figure 2: The share of grey literature projects in the French digitization program (N=123)

Two thirds (25) of these 38 proposals are 100% (pure) grey literature projects, with nothing else than grey items like reports, field work, memoirs, minutes or simply "unpublished work". Six projects included dissertations, such as 444 theses in medicine from the University of Lyon (19th and early 20th Centuries), about 360 theses in law from the University of Toulouse (19th Century) and about 1,000 older theses from Bordeaux. The other 13 projects included other documents than grey literature, often non-textual items like maps, drawings and photos. It is difficult to give reliable figures on the overall size of these projects in terms of volumes or pages. A best estimate of these "hidden treasures" is at least 22,500 volumes with 2.9 million pages. The theses and dissertations represented about 8,218 volumes and 1.15 million pages. Even if only a smaller part (15%) of the whole number of projects with grey literature included theses and dissertations, their real share in the grey heritage collections which academic libraries and research laboratories submitted for funding can be assessed as 35%-40%.

Older theses and dissertations

In the French digitization program, older theses and dissertations (ODTs) formed a significant part of the academic collections – outside of book and journal holdings – for which investment, digitization and valorisation through platforms, digital libraries etc. was sought. Yet what exactly does "older" theses and dissertations mean? In the six proposals, one part of the theses and dissertations was written during the 19th and early 20th Centuries, while others are from the last 50 years up to 2005. In other words, one part of these heritage collections is already in the public domain while other items are still protected by intellectual property rights.

A comparison with the figures from a union catalogue (Trove), a search engine (BASE), a portal (DART-Europe) and two repositories (TEL, NTK) reveals some interesting insights, even if these figures should be considered with caution because these tools are not really designed for older items, except the Australian Trove catalogue (Table 1).

Online service	Up to 1950	Up to 1900
Trove	6.4%	0.5%
BASE	1.5%	0.7%
DART-Europe	1.0%	0.4%
TEL	0.5%	0.0%
NTK GL Repository	0.2%	0.0%

Table 1: Share of older theses and dissertations (in %)

These figures are anything but comprehensive or representative⁵, yet illustrate two aspects: on the one hand a non-negligible part of theses in academic catalogues are ODTs, and on the other a small part of them have already been made findable and accessible in the new digital and open science environment via metadata digitization and production. In absolute figures, this small part represents more than 10,000 theses (best estimate).

Table 1 distinguishes between two categories, for two reasons: theses more than 100 years old are probably already in the public domain; theses dating from before 1950 were written by authors who have probably finished their academic (or other professional) careers. Both categories can be considered scientific heritage, and the first category facilitates valorisation through digitization programs.

Age is not the only criteria for scientific heritage. Another, even more important criteria, is the material's quality and value for the research community. Academic theses and dissertations have always been considered as the result of at least three years' original, independent and critical thinking by young scientists, subsequently validated by a commission of senior scholars representing an academic institution and the research community. Depending on the discipline, older theses may still be of interest for today's research. In any case, they represent a unique testimony on the history of science and academic life.

Grev heritage

When does grey literature become scientific heritage? The overview on published studies and papers does not provide a clear indication. Age plays a role, as well as legal status (public domain) and the real usage and interest for research in a given field. In some disciplines like medical and life sciences, scientific documents "expire" and become obsolete more quickly

⁵ For instance, we could have added the French academic union catalogue SUDOC or the catalogue of the National Library of the Czech Republic; but would the results have been very different?

than in others, like mathematics or history. In institutions which switched to ETDs many years ago, media might be another criterion, with all native print theses being considered part of the research heritage; yet this criterion makes no sense where print theses are still accepted.

Grey literature is not easy to define, and the fuzzy term of heritage adds to the confusion. Nevertheless, the analysis of recent papers and other evidence from digitization programs and discovery tools enable three aspects to be clarified:

Grey literature is usually defined as being difficult to get because of limited quantities, non-commercial dissemination etc. Yet the problem of scientific heritage is not acquisition because the items are already in library holdings, research collections etc., but are hidden, invisible and not included in bibliographic records. So the first challenge is not the identification of interesting items somewhere outside of the library or the discovery of external information sources and channels – the real challenge is the discovery of valuable material inside the library or research institutions, and the decision to invest into "digging up the treasure" and make it visible which, in the open science environment, means digitization and online publishing.

Grey literature is above all a challenge for acquisition and collection building. Yet the secondary challenge with scientific heritage is not collection building but how to improve the findability and accessibility of formerly hidden items in a new service environment on the internet. Findability means that all items must be described with rich metadata and, if possible, linked to the semantic web, applying the usual standard formats. Accessibility means that these items should be freely available on the web via digital libraries, open repositories or similar platforms, without unnecessary restrictions and without artificial enclosure, and accessible via standard protocols such as OAI-PMH.

Grey literature needs curation and conservation efforts. The third challenge for scientific heritage is similar, even if part of the hidden treasures are already well preserved - perhaps too well. In the era of open science, the preservation of scientific heritage means digital preservation in a secured environment but, at the same time, reusability with new digital tools and services, including content mining and linking to data (cf. France 2018).

Scientific heritage like ODTs, as valuable and useful textual sources of information and insofar as it needs discovery, curation and preservation, can thus be considered grey literature. The intermediary role and importance of academic and research libraries remains intact, and their skills, investment and engagement are needed to discover these hidden treasures and make them findable, accessible and reusable. However, the direction of intervention and perimeter of action are shifted from outside to inside, as these treasures are already in the holdings, waiting for discovery on bookshelves or in microfilm containers like Sleeping Beauties.

Conclusion

Grey literature is not easy to define, and the terms cultural and scientific heritage add even more fuzziness to the concept. Our findings can be summarized in three sentences:

- ETDs are scientific grey literature.
- OTDs are grey scientific heritage.
- Some ODTs are less grey than others.

There is growing awareness of the economic and social benefits of cultural heritage6. Scientific heritage is part of this cultural heritage – it is produced by scientists and is of interest for the research community. For over 20 years, theses and dissertations, "the most useful kinds of invisible scholarship and the most invisible kinds of useful scholarship" (Suber, 2012) are part of ETD programs, and an increasing number of universities and countries such as Australia, New Zealand and France, have gone 100% digital for theses. It is time to take care of the older theses and dissertations present in many academic and research libraries. The problem with ODTs is not dissemination and acquisition but findability, accessibility and reusability. They must be digitized, described and republished in a modern service environment. We recently asked the question of whether ETDs are still grey literature or not, and concluded that "if by 2020 ETDs should be completely integrated in the emerging open science infrastructures, as open as possible (and just as closed as necessary), easily retrievable and accessible, and largely reusable by content mining tools, greyness would no longer be a problem" (Schöpfel & Rasuli, 2018).

The same conclusion applies to ODTs. Obviously, as they are part of scientific output, intellectual work and valuable for scientific and historical research, they are grey literature because of their limited availability, lack of description and risk of loss. Just like all grey literature, ODTs need care and curation by information professionals, especially in the academic and research libraries in the frontline, to increase their findability, accessibility and potential reuse (Figure 3).

Findability

- identifiers
- metadata

Accessibility

- open access
- standard formats

Reusability

- open formats
- open licensing (or public domain)

Figure 3: Challenges of grey scientific heritage

The challenge of grey scientific heritage is conservation and dissemination through open access for the scientific community. However, in the digital age and the emerging open scientific age, it must be insisted that readers include not only scientists but also interested

⁶ See the 2015 report of the European Commission, cf. footnote 3.

citizens, and that they are not only humans but also machines, with a corresponding impact on decisions on how to publish and how to describe the documents.

As the number of older theses and dissertations is by definition limited, we may be hopeful that one day all or most of these documents will be searchable and available on open repositories or via academic portals as an essential contribution to global scientific heritage.

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