ELEPHANT
IN THE LAB

SHORT ANALYSIS

How libraries secure trust in the research process of the 21st century

Short title	How libraries secure trust in the research process of the 21st century
Long title	If researchers and librarians work together, they can secure trust in the research process of the 21st century.
Authors	Laura Rothfritz [1], Dorothea Strecker [1]
Author affiliation	[1] Information Sciences, University of Applied Sciences, Potsdam
Author bios	Laura Rothfritz is studying Information Sciences at the University of Applied Sciences Potsdam. Her main research interests are Open Science and open methods of scholarly communication as well as developments and standardization efforts in research information management. Dorothea Strecker is studying Information Sciences at the University of Applied Sciences Potsdam. Her interests are mainly focussed on research data management, Open Science and the interaction of law and the information society.
Author social links	Laura Rothfritz: Twitter Dorothea Strecker: Twitter
Date published	16 April 2018
DOI	10.5281/zenodo.1217589
Cite as (APA)	Rothfritz, L., Strecker, D. (2018). If researchers and librarians work together, they can secure trust in the research process of the 21st century. *Elephant in the lab*. DOI: https://doi.org/10.5281/zenodo.1217589

The role of libraries in the 21st century is changing. One indication is the emergence of new services and job profiles: libraries offer services to support researchers throughout the creation, publication, dissemination and discovery of their research. In countries such as the United States and the United Kingdom academic libraries create special positions, aptly called “scholarly communication librarians”. The job profile requires core competencies in publication management, funder policies and mandates, rights management for publication and the measurement of scholarly impact. This set of requirements differs considerably from traditional

library work: Nowadays, librarians get involved in the entire research process and surrounding conditions of scholarly publishing. In our opinion, the role of libraries in the research process of the 21st century is mainly to establish trust in the research process. In the following, we illustrate this new role using three examples for library engagement in trust: scholarly communication literacy, information quality and legal certainty.

Scholarly communication literacy

While the amount of published research output doubles every nine years (Van Noorden, 2014), the need for science communication and knowledge transfer to the general public is also gaining attention (Wissenschaftsrat, 2016). Part of this is a process called scholarly communication, referring to the creation, evaluation, dissemination and preservation of scholarly publications (Association of College & Research Libraries, 2003).

Librarians active in scholarly communication help researchers to find a fitting journal in which to publish their findings and maximise the impact of their publications. In fact, being literate in scholarly communication systems makes librarians the perfect ally to researchers when publishing their outcomes. Additionally, librarians have a long tradition of supporting information literacy, so they are accustomed to sharing knowledge on how to find, evaluate and use information resources.

The same increasingly applies to supporting researchers in strengthening their scholarly communication literacy—their ability to find, evaluate and disseminate their research to the community as well as understanding the different ways in which impact of scholarly output is measured. A study of job advertisements for library positions related to scholarly communication found, that “instruction” was the term mostly used in the job descriptions (Finlay et al., 2015).

Scholarly communication is not an easy field to navigate for researchers, especially concerning publishing/publishers and journals. While most librarians generally are pushing for Open Access to publications, they also work with researchers to protect them from falling prey to so called predatory publishers. These publishers take advantage of the “publish or perish” attitude prevailing in science and the need for academics to publish their work.

This harmful model exploits the payment of article processing charges (APCs) to the journal by the researcher for publishing their manuscript Open Access. Predatory journals pose as ordinary journals to the researcher, while providing none of the quality assurance that legitimate Open Access journals offer in return to the APC charges, such as peer review, discoverability and long term access. It might be confusing for researchers to distinguish quality and reputation from the business model of journals—higher APCs do not guarantee higher quality standards.

Researchers can consult with librarians before submitting a manuscript to a journal they had no personal experience with—librarians have the skills to evaluate the trustworthiness of journals. In fact, the first list of predatory publishers to keep track of non-authoritative journals was started in 2008 by a librarian at the University of Colorado Denver—Jeffrey Beall. Surrounded by much controversy, Beall eventually took down the list in January of 2017, but it has been reincarnated by an anonymous group with a project called "Stop predatory publishing" running on GitHub. Other initiatives to tackle predatory publishing librarians and information specialists are involved in are the Directory of Open Access Journals (DOAJ), which indexes high quality open access journals and the "Think, check, submit"-campaign to help researchers identify trusted journals.

Information quality

Libraries are traditionally equipped to evaluate information sources and this is still the case for digital information resources. Librarians are trained to identify and interpret metadata, which describe the information source. They can help researchers figure out, if the information actually is what it seems to be (authenticity), if it has been altered in any way (integrity) and if it has been provided by a trustworthy source (provenance).

In recent years, libraries have expanded their responsibilities to include the management of research data. The quality of datasets and their description (metadata) are essential for potential reuse. Metadata quality is ensured by the implementation of standards, such as the DataCite Metadata Schema. By offering the standardized description and versioning, the schema enables others to understand and evaluate datasets.

Preceding the publication of research outputs, including research data, several funders require researchers to write Data Management Plans (DMPs) which document the creation of datasets as well as strategies for sharing and preservation (Harting & Soßna, 2016). Libraries have developed a number of tools to facilitate writing these plans.

Trustworthy information is at the core of all scientific discovery. Still, science is experiencing a replication crisis: the inability to reproduce research results. According to a survey published in *Nature*, the vast majority of respondents failed to reproduce an experiment (Baker, 2016). Although replicability is not a universal indicator for good science, as the biggest German research funding organization DFG points out, the replication crisis sparks debates about trust in research results (Deutsche Forschungsgemeinschaft, 2017).

Libraries are important partners in supporting these productive debates. They offer services aimed at making research data openly available and have the potential to act as "data quality hubs" (Giarlo, 2013). By publishing the underlying data and linking it to the text publication, results become more transparent (Sayre and Riegelman, 2018). Researchers can encourage trust

in research results by taking advantage of these services and working with librarians during the research and publication process.

Legal certainty

Uncertainty regarding legal aspects is a significant barrier to Open Science. Libraries have a long tradition in mediating researchers‘ interests and the law. With new research practices emerging, libraries try to include current needs in this process.

In recent years, legal issues became especially apparent in the context of research data. As funders and universities increasingly advocate the publication of research data, legal concerns such as data ownership and protection of privacy emerged. German libraries are aware of these issues and are working on information material and support services for researchers.

Another source of uncertainty is „green Open Access“. Green Open Access refers to the practice of uploading a version of a work that was published in a paywalled journal to a repository and thereby making it openly available. Journal policies regarding green Open Access can be confusing. Researchers considering uploading their scholarly output to Open Access repositories may be put off by this legal gray area. In order to clarify the legal status of green Open Access, the German Bundestag enacted a secondary publication right for copyright owners under certain conditions (Bruch and Pflüger, 2014). Libraries support green Open Access by providing researchers with necessary information regarding journal policies (SHERPA/RoMEO), Open Access repositories (OpenDOAR) and secondary publication rights.

Librarians are proficient in the use of open content licenses, such as Creative Commons. Open content licenses allow the copyright owner to give others permission to share and use a work while clearly stating conditions for the (re-)use. Therefore, open content licenses are an essential tool for making research more inclusive and transparent. Libraries can help researchers choose adequate licenses for their works.

Another area with legal implications is the access to information. Right now, the access to research output is subject to major transformations. Due to rising journal subscription costs, libraries are shifting from a subscription-based model to supporting Open Access. At the same time, Sci-Hub—the largest of the so-called „shadow libraries“—offers access to approximately 70% of all scholarly literature with a DOI (Himmelstein et al., 2018).

Although shadow libraries offer convenient and almost complete access, using them is a legal gray area under German copyright law (Steinhauer, 2016).

In order to provide an acceptable and legal basis for the access to research output, Project DEAL negotiates nationwide licensing agreements with big publishers. Almost 200 libraries support the negotiations with Elsevier, one of the biggest publishers, by cancelling subscriptions. Libraries

also promote open infrastructures for Open Access, such as Open Journal Systems. By pooling financial resources and funding initiatives such as the Open Library of Humanities, libraries support the transition of existing journals to an Open Access publishing model without article processing charges in the humanities.

Conclusion

The digitization of the research process and dissemination has certainly shown positive effects, for example on the increased availability of research results and new approaches to measure impact. But it has also led to a number of problems researchers have to face. Due to the large amount of information resources available through new forms of scholarly publications, it might be difficult for researchers to assess the quality of information sources. It can also be challenging to identify high quality journals and to navigate legal implications. Trust in research results, stakeholders, infrastructures and services is a prerequisite for quality of research in general.

Although trust is difficult to measure, we argue that it can be built through continued working relationships. Trust is dependent on experiences that have been made throughout these partnerships. The more researchers and librarians work together, the better the understanding of each other's perspectives on research practices and communication of research outputs is developed.

As we have discussed above, librarians can secure a great amount of trust in different areas. Researchers and librarians can work together to improve their skills and the quality of research output.

Although these collaborations can be beneficial, it is still up to both parties to become partners. We recommend researchers to closely work with librarians—they can offer valuable assistance to the entire research process. Accordingly, librarians should also take a more active role in detecting researchers' needs, as these may change due to emerging research practices. Librarians need to communicate their skills to researchers as they may not be aware of them. We propose close collaborations with faculty members who can act as multipliers among their colleagues.

If researchers and librarians work together, they can secure trust in the research process of the 21st century.

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