

# Accessibility: A Digital Perspective

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1 That digitality equals accessibility is one of the great promises of the new digital world. The more we expand the digital sphere to an increasing number of sectors, and the more we digitize the analog world, the more we boost the accessibility of resources and knowledge. This is increasingly true of the humanities, which will be the reference object of my article.

2 Indeed, the changes in almost all areas of the humanities over the past decades and even in recent years have been breathtaking. This particularly applies to the exponentially increasing speed of developing tools (up to large language models), to the increase in storage space, which sometimes seems to be unlimited, to new and more complex platforms for hosting and distributing digitally generated data or digitized material.

3 And again, there is the promise that digitality equals accessibility, so that as more becomes digitally available, the more becomes accessible to an equally growing community. But is this promise true, does it correspond to reality?

## Open access

4 One example hides behind the keyword "open access", a demand that is widely made and strongly promoted and supported by the European Research Council (ERC) and the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG). After all, knowledge-driven science thrives on the fact that its results are openly accessible, that they can be critically examined and further developed by others. To this end, science claims a space of publicly funded research whose results are made available to the general public. In this respect, the question of publication and public accessibility of published research results has been and remains vital.

5 But let us briefly delve into the past with a specific example. Not so long ago, a manuscript was edited, typeset and, often after several proofreads, printed - that was the job of the publishers - before it was finally available in bookshops and public libraries. Accessibility also meant dependence on opening hours and availability. Not every book or journal was available everywhere, but there was the interlibrary loan system. This is why those analog publication processes are

often referred to as "closed". This also applies to the manuscript, which can no longer be altered after printing (except in a new edition), as well as to distribution and to availability in certain libraries - whether public or private.

6 However, the new digital open-access world also faces new obstacles, primarily in the form of payment barriers erected particularly by the relevant publishing oligopolists. This thwarts the idea of open access, as the DFG defines "open access" as "free access to scientific publications and other materials on the Internet". A scientific document published under open access conditions "can be read, downloaded, saved, linked, printed and thus used free of charge by anyone". However, this openness disappears behind the "golden" business models that make manuscripts inaccessible due to payment barriers. Authors or readers have to buy their way out by paying fees, which have eaten up an ever-increasing share of library and research budgets in recent years. In this way, the open access that "open access" is supposed to enable is in fact prevented. An alternative that is currently being increasingly discussed is known as "Diamond Open Access". Diamond Open Access as non-profit scholarly led open access model refers to scholarly texts that are published, distributed, and stored without charge to reader or author. Publication organs committed to the Diamond idea are mostly under public or academic sponsorship. However, this only addresses part of the complex "accessibility" problem and only partially solves it. Moreover, what holds true for the world of texts and books also applies to the world of objects and images. Above all, it is also applicable to digitally designed research and publication platforms.

## Three Problem Areas

7 In the following, I would like to address three main problems of digital accessibility that are closely tied to the keywords hardware, software and content.

### Hardware

8 Unlike a book in the library, which - provided you have access to the library - can be accessed immediately and without any further requirements, a digital resource requires matching hardware, without which the digital tool cannot be accessed. We are all familiar with the need to upgrade not only software, but also hardware, which must meet certain performance standards to effectively run software. Anyone who, like the author, was socialized in a 100% analog environment and first came into contact with the digital world as a research assistant at a research institute will be familiar with the rapidly accelerating cycles of technological upgrading and the associated constraints on financial, temporal and human resources. Unfortunately, most devices are replaced, not because they are defective, but because they are no longer powerful enough to support new software and extended application possibilities; therefore, a possible technical upgrade

is prevented by economic interests. However, only those who have the necessary resources can keep up with this rhythm, which is dictated by objective and economic constraints.

9 This creates several problems for accessibility. First of all, there is the accessibility of old hardware. Which floppy disk is still readable today? In most cases, the necessary device to read it is no longer available. The same applies to CDs. The storage rooms of some institutes are like museums of technological history with the intention of preserving hardware for all existing data carriers, without ensuring accessibility in this way - unlike my "Olympia Monica" mechanical typewriter, which is still ready for immediate use.

10 But do cloud solutions offer more reliable access? What is often overlooked is that cloud solutions require computing capacity that must be consistently and permanently available. This applies to all work platforms, and even more so to the long-term storage of data. The significance of this becomes clear in the context of the national research data initiative (Nationale Forschungsdateninfrastruktur, NFDI), which tries to tackle the problem of sustainable data storage and the establishment of data centers that not only continually maintain their own data repositories, but are even supposed to receive external data stocks. The question remains as to who will provide the computing capacity for this, let alone the staff to curate these data sets.

11 One final aspect should be addressed, which usually receives little attention in everyday academic life, but which poses a significant problem for quite a few: owning an adequate device that enables participation in the digital sphere in the necessary and desired manner. The whole problem became apparent during the Covid-19 pandemic. While universities were able to switch to online operations, and especially online teaching, relatively smoothly without any significant losses regarding research and teaching, the situation in schools was very different. This was particularly true for students from socially disadvantaged families. While universities could assume that both faculty and students had suitable devices - usually laptops - and that administrative staff was provided with these if necessary, the situation in schools was characterized by massive inequality. Sometimes, there was only one laptop per family, although parents and children both had to work from home. The initiative to provide all students with standardized laptops came too late and often failed due to a lack of expertise in implementation. Indeed, the example of the Covid-19 pandemic points to the fundamental problem of not only considering it as a matter of accessibility in technical terms, but also of recognizing it as a task of social participation.

## Software

12 What applies to hardware also applies to software, which both are the prerequisite for access to digital content. This starts with the decision for a certain operating system, as this goes hand in hand with the acceptance of technical specifications, which are not always compatible. Older readers will remember the Microsoft-Apple divide, which made even the conversion of simple texts an expert task. Although this problem is now history, there are many comparable cases of accessibility that are conditioned by external, often economic decisions. This applies in particu-

lar to proprietary software, which severely restricts the rights and possibilities of users and third parties to reuse and further use as well as modify and adapt the software. The practice of keeping the source code of computer programs under lock and key, and thus "proprietary" in the narrow sense, began in the early 1980s. Source code then became "closed source", protected from free access by software patents, copyrights and licenses. The problem here is the same as with the open access issue. This was countered by the Open Source Initiative, which developed the alternative model of open source software as a counter-model to the non-availability of proprietary software.

13 All of this is well known. Thus, my focus will therefore be on a crucial problem that is increasingly coming to the fore: research software, which fulfills important functions in digital research practice by enabling research data utilization as well as the reproducibility of scientific results. An internationally recognized definition is provided in a discussion paper by the ad hoc working group of the DFG Senate: "Research software includes source code files, algorithms, scripts, computational workflows and executables that were created during the research process or for a research purpose."

14 Research software was and is written for a wide range of purposes and very different contexts. Among other things, it is used for tasks such as data collection, analysis, simulation, processing, presentation and the utilization of various forms of data, including observations and measurements, or digitized texts, images, films, sounds, and objects. It is also used for controlling scientific equipment including source codes, scripts and executable files. Sometimes these are small ad hoc programs for specific applications, which then develop an unexpected lifespan until a severe issue arises, for example, when a specific application is no longer supported by an intermediary proprietary user or by the digital infrastructure of the research institution itself. In these cases, the content is often lost or rendered inaccessible. Another significant challenge is posed by research software, the development and maintenance of which often depends on short-term project funding.

15 The DFG has therefore launched a "Research Software Infrastructures" program in the domain of Scientific Library Services and Information Systems (LIS), which is intended to support the scientific community in establishing structures for the development, availability, discovery and preservation of research software. The primary focus is on ensuring that the infrastructure to be developed is not dependent on a specific or singular research question, but rather supports researchers at all disciplines in the use of research software. However, as with all current standardization processes, it must be ensured that standardization does not lead to path dependencies and the stabilization of a "standard science". The differences in specialist and disciplinary cultures must also be taken into account.

16 And finally, there is still the challenge of what to do with research software that no longer meets today's technical standards, but which is still indispensable for the accessibility of the research results produced with its help. We are all familiar with pioneering projects, for example, in the field of digital editions or databases - also in the field of philosophy -, which are often based on

software developed solely for the specific project and whose functionality depends on this software. In this case, it does not help to store the edited texts in a long-term repository based on TEI/XML. This would make accessibility considerably more difficult and severely restrict it. Maintaining the functionalities and retrievability by interested readers is a particular challenge. However, this requires resources that must not end with the time-limited funding of the relevant research projects. This task is one of the major challenges for the NFDI.

## **Content**

17 Let us be honest: most visitors of our digital research platforms or homepages are interested in the content that is provided and made accessible there. We do not want to have to familiarize ourselves with a specific presentation architecture in order to simply verify a citation or read a chapter. And we certainly do not want to install further mandatory software to access a digital resource. Our hardware and software may not even allow for this, or we might lack of experience and knowledge to deal with specific computer problems. This is an issue of accessibility and inclusivity.

18 This is particularly important in times of media change. There are also historical models for this: in the transition from stone inscriptions to papyrus, from manuscripts to printed books and from analog books to digital texts. Media changes have always been driven by the demand for greater accessibility - with far-reaching consequences for science and society. But times of media transitions have brought losses as well as gains. What makes it into the new medium? We are familiar with the losses of manuscripts that ended up in the paper vats out of which the paper for the new printed books was made. Even today, not everything is digitized - we should have no illusions about that. And not everything digitized is equally accessible. We should therefore accompany this process of digitization critically, not only with a view to the opportunities it opens, but also with a view to the inevitable losses.

19 Nevertheless, the last decade alone has brought unimaginable opportunities for research in the field of historical text studies. The digitization of manuscripts and incunabula enables easy access to library collections of highest quality, opening completely new fields of research in terms of both quantity and quality or fundamentally transforming existing ones, especially since most libraries have changed their initially restrictive access practices. This also applies to Germany, where most research libraries and digitization programs are publicly funded, and where it is incomprehensible to demand access fees from research projects that are also supported by public funding. 3D technologies also open up completely new research opportunities for the object sciences, which are being consistently exploited. For text and object sciences alike, digitization enables new approaches to research questions and - for example in comparative analyses - the co-presence of objects (according to Bruno Latour) in terms of time and space allows for answers in a way that has never been possible before.

## Conclusion

20 However, such a digital revolution presupposes that programs and content do not disappear behind paywalls. We began our considerations with this problem. The alternatives are obvious. The DFG itself advocates for institutional open access repositories. In addition, the Specialized Information Services (Fachinformationsdienste, FID) and the NFDI consortia could play an important role in enabling and guaranteeing open access to the results of research in a networked world of scientific institutions. To this end, however, we must also critically scrutinize the reputation systems associated with certain, mostly commercial, publication venues. This also means that we must read the publications - in commissions and appointment committees, for example - regardless of where they are published. But is this not ultimately the reason why research results should be openly accessible in the first place? We must take open access seriously.

21 Accessibility is not just a technical issue. Rather, barriers are created. If digitality is to correlate positively with accessibility, then fairness is required. The fairness addressed here goes beyond the so-called FAIR Principles that have now become standard requirements. Accessibility must be understood in all its dimensions. It is not just about making things accessible on a technical level, but about participation in a comprehensive sense, which also encompasses political and social participation, including the social and economic conditions required for this.