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Transfer and Transformation: Leadership in a Time of Change

Abstract: This article addresses three interrelated themes: the emergence of digital libraries and the digital presence in physical libraries, the internationalization of the intellectual as well as organisational aspects of library work, and Elmar Mittler's contributions toward making both happen.

Keywords: Digitisation, internationalisation, transformation

Transfer und Transformation: Führung in einer Zeit des Wandels

Zusammenfassung: Dieser Artikel bespricht drei verwandte Themen: die Entstehung digitaler Bibliotheken und digitaler Inhalte in physischen Bibliotheken, die Internationalisierung geistiger und organisatorischer Aspekte der Bibliotheksarbeit und Elmar Mittlers Beitrag zu diesen beiden Aspekten.

Schlüsselwörter: Digitalisierung, Internationalisierung, Transformation

1 Introduction

My inaugural lecture at Humboldt-Universität zu Berlin had the title "the work that vanished". It was about transfer and transformation in the library world, and one of the reasons that I was there to give the lecture was Elmar Mittler's engagement in this transformation. He has long been an agent for change, as this article will describe. In methodological terms this is an ethnographic account of change over the last fifty years that combines some documentary sources with personal observations and experiences from a half century of interaction with research libraries, digital information, and internationalisation. Ethnographic writing typically uses the first person because the observer is a factor in how the information is gathered and presented, and I will follow this tradition.

As the observer, my background is relevant here and I will describe it briefly. I grew up largely in the United States because my father was a refugee from the Nazis. I spent a semester studying in Vienna as a bachelor student, and ultimately did my doctorate at the University of Chicago on German

history, using ethnographic methods that included a large number of interviews. A portion of my doctoral work was done in Berlin. Despite this humanities background, I have spent most of my professional life as a computing expert who worked on operating systems, database structures, assembly language programs and network resources. I have had positions in both the corporate and academic world, and those environments form the basis for most of my observations.

This article addresses three interrelated themes: the emergence of digital libraries and the digital presence in physical libraries, the internationalization of the intellectual as well as organisational aspects of library work, and Elmar Mittler's contributions toward making both happen.

2 Origins

The starting point for any historical event is necessarily arbitrary, since a good historian can find precursors for almost everything. Nonetheless a reasonable starting point for the kind of digital information that is available today in or through most research libraries could be set in the mid-1960s because of several important intellectual and organizational developments. In 1962, for example, a group of researchers at the University of Michigan created the Inter-University Consortium for Political and Social Research (ICPSR), which began storing machine-readable research data for what was arguably the first time. (Austin, [2021]) The data often came from surveys or other sources that needed some form of mathematical or statistical processing. ICPSR also began digitizing historical data a few years later, including census data.

The information was stored in punch cards, and the only available metadata were the programs that analyzed this information, which the consortium stored along with the data. These were not necessarily large datasets by modern standards, but in the mid-1960s hand-held calculators did not exist and desktop calculators ("adding machines") tended to be analog and required mechanical input. The ICPSR data were important because the data could be reused and combined without the risk of new data-entry errors. ICPSR was not alone in digitizing data. Nobel Prize winner Robert Fogel and Stanley L. Engerman began encoding data at the end of the 1960s for their book "Time on the Cross: The Economics of American Negro Slavery" (1974), which marked the beginning of the historical field called "Cliometrics".

The academic world was not the only place that began large scale digitization projects. Businesses took an early interest as well, especially Insurance companies, who were among the leaders in transforming complex contracts with customers into digital records.¹ The reason was simple: they

¹ I worked in the insurance industry on such records.

needed to be able to run an actuarial analysis of those contracts to have a clearer sense of their financial exposure and to learn what they should charge for premiums. In order to do this at a time well before scanning and optical character recognition, they encoded the contractual commitments in binary form. Because of the size of the datasets, early programs doing the analysis often used assembly language for efficiency. The companies of course retained the paper records for legal purposes, but in terms of practical decision-making, the digital versions were what mattered. This process was part of a long history of creating records that machines could sort and organise, going back to Herman Hollerith's tabulating, which was used for the 1890 US census, and by large corporations, for example: "As early as 1895, the New York Central began using tabulating equipment to track goods moved by the railroad." (Smithsonian, [2021]) The point here is that by the 1960s, digital information was nothing new.

Project Gutenberg also comes from this era. In 1971 Michael Hart received a grant at the University of Illinois that allowed him a generous amount of computer time and storage. He decided to begin by entering public domain texts such as the US Declaration of Independence. He persuaded other friends to join him in keying in works they found interesting and valuable. Since the University of Illinois was a participant in early computing networks, Project Gutenberg became available more widely. The need to key in texts word by word meant that the works had a nontrivial rate of errors, but for the first time many of these works became available in digital format. Project Gutenberg has often been called the first digital library.

3 Early Library Digitization

While libraries were aware of these early examples of digitization, this was the era of handsome wood cabinets with drawer after drawer filled with typed or handwritten index cards containing the relevant cataloging data for every book or journal in the collection. Producing and maintaining these card catalogs was labor-intensive and error-prone. Large research libraries especially had an interest in finding an automated solution. One important step in the direction of a solution was the creation of Machine-Readable Cataloging (MARC). Henriette Avram led the project at the Library of Congress in 1968, and created files using the record structure of the new IBM System 360. The data sets were large, and were transmitted on magnetic tape to libraries that subscribed to the service. In effect what the tapes did was to transform the creation of the cards in the physical catalogs. The card catalogs remained, but libraries generated new cards on computer-driven printers, and replaced older cards in the same way whenever subject headings or other important information changed.

Over time library staff could also search for books through computer terminals without having to go to the physical card catalog.

One year earlier, in 1967, the Ohio College Library Consortium (OCLC, as it is now known) began operation. OCLC allowed Libraries to have a direct electronic link to a central resource in Columbus, Ohio. The link was not a part of the Internet or precursor network systems, but a dedicated line to college libraries within Ohio and to a few others just over the border. Metadata for catalog cards was one of the early services, but lending and discovery were equally important. Arguably the OCLC catalog became the first centralized digital resource within the library community.

Two other important infrastructure developments took place within a few years. In 1969 the first test of the ARPANET took place in California. The ARPANET was the first successful packet switching network, and eventually grew into the TCP/IP network that we call the Internet today. At the same time Dennis Ritchie and Kenneth Thompson finished writing the UNIX operating system. UNIX in the form of LINUX today is a core part of most online library systems today. In the same year IBM created a tele-processing monitor system for its System 360 computers, which made it possible to design a systematic interface for digital information.

In 1967 Velma Veneziano at Northwestern University libraries in Evanston, Illinois, began working with James Aagaard, a computer scientist and professor of electrical engineering in order to create NOTIS, the "Northwestern On-line Total Integrated System". Aagaard recognized the potential of the new IBM teleprocessing monitor (called CICS) and began to use it to create one of the earliest online catalogs that enabled ordinary users to search an online database instead of looking in the card catalog. Aagaard himself had to write the system in assembly language and to use the macro version of CICS, which was also assembly language based. NOTIS was ahead of its time, and attracted other libraries over the next 10 years, with a much greater number choosing that software in the 1980s. NOTIS was open source, meaning that any library that acquired it could modify the code to meet its own needs and many did.² Venezuela was the first country outside of the United States to use NOTIS, but others followed.

Northwestern University was by no means the only place that was thinking about the development of online resources. Both the University of Chicago and Stanford University had active projects in the 1970s. The Stanford project eventually became the database for the Research Libraries Group, until it merged with OCLC in 2006. The online catalog was notable in part for its support for non-Latin encoding systems, including Chinese, Japanese, Korean, Cyrillic, and eventually Arabic. (OCLC

² I worked on NOTIS code for Cornell and later for NOTIS itself.

Research, 2020) In Europe the Dutch National Library, the Koninklijke Bibliotheek, also began work on an automation system In the later 1960s. It was called Pica, and eventually OCLC purchased it in part in 1997. Pica was widely used in German libraries in the 1990s and early 2000s.

4 Networked Information

Library involvement in networked information began before the World Wide Web. At Cornell University Steven Worona created an information system in 1982 called CUINFO. (Worona, 1986) It was largely an assembly language-based and captured Internet protocol packets to construct displays on computer monitors. Its original purpose was to provide an up-to-date course and examination roster. The Cornell University libraries were among the early users, both to display opening hours of the branches and to make the online catalog accessible as soon as one was available. CUINFO also offered an advice column, "Ask Uncle Ezra", that helped students with a variety of social and institutional problems. It was a precursor of some aspects of social media today.

When Germany joined the Internet in 1989, the BITNET network was already eight years old, and offered connections between the US and Europe. BITNET worked by forwarding contents from host computer to host computer, which made it vulnerable to the worm that a Cornell student had created as a joke, and which sent messages to every person in the email directory of every person who opened the message. Thousands of mainframe computers crashed as it propagated through the networks. At the same time Tim Berners Lee was working on his proposal for the World Wide Web, whose protocols eventually became the dominant way for people and of course for libraries to present and to find information online.,

Large scale digital transformation was beginning in earnest in the later 1990s, but it was not a transformation that every librarian quickly welcomed or embraced, since the quality of information online was uncontrolled und often unreliable. Nonetheless some librarians contributed to the link lists in Yahoo and to other early discovery systems. A serious problem was that the owners of the early search engines used ranking algorithms that favoured advertisers. Google's ranking was supposed to be based on a neutral page ranking algorithm, which contributed significantly to its popularity.

5 Library Digitisation

The first significant digitisation project in a major research library was the Cornell / Xerox joint study on digital preservation, led by Anne Kenney and Lynne Personius with funding from the Commission and Preservation and Access (now part of CLIR). (Kenney, 1992). The original goal of the project was

to replace microfilm as the favored medium for preserving printed works, partly because microfilm was disliked by most users. When the project began, the World Wide Web did not yet exist, and the file size for scanned images was too large for most ordinary desktop machines. Cornell picked a set of mathematics books that were particularly valuable because of handwritten notes in the margins by famous mathematicians. The books were in considerable demand and the library was reluctant to send them out through interlibrary loan. The projects set de facto standards for preservation imaging and influenced other university library digitization projects. A decade later Göttingen University created a complementary digitization project for its own mathematics books under the leadership of Elmar Mittler.

Yale's Project Open Book under Donald Waters took a complementary approach in which microfilm copies of older books were then digitized during the early 1990s. Yale had filmed an unusually large number of older works because of acid deterioration in the paper, and scanning the microfilm offered a much more efficient approach to creating digital copies because the handling did not require the same level of care as with a bound paper book. In the project report Waters noted: "Ultimately, technical processes such as optical character recognition (OCR), which convert digital images into full text, have the potential of greatly expanding intellectual access to documents in digital image form." (Waters, 1992) While the Cornell project was a collaboration between the library and the computer centre, the Yale project was more completely a library project.

A third significant digitisation project that had intellectual roots in the Cornell project took place at the University of Michigan. JSTOR, the journals storage project, began in 1990 as a way to free space on the shelves by digitising long runs of underused journals, which could then be moved to an off-site storage facility. JSTOR took an early interest in making the text searchable. Since optical character recognition had not yet reached a level where the accuracy was reliable, JSTOR investigated the possibility of using a service bureau in India to double-key the text. The accuracy was high enough for public use, when the data entry took place independently on multiple machines and could then be compared to allow staff to correct differences. JSTOR also sent staff to India to ensure that there was no labor exploitation.

JSTOR had funding from the Mellon foundation to get started, and the leadership recognized the commercial potential. They negotiated with journals to receive permission to make copyrighted materials available. Since back issues generally made little or no money for the publishers, and actually cost them money for storage, most publishers found the idea attractive. An early restriction was that JSTOR could only offer content up to the most recent three years, though over time that three year window shrank. The customer base grew quickly to include almost every academic library

in North America and soon also in Europe. One weakness of JSTOR was that it had almost exclusively English-language materials. Elmar Mittler recognized the opportunity to create a so-called German JSTOR at Göttingen. The DFG provided funding for what became DigiZeitschriften. It may be reasonable to say that no single project did more than JSTOR to facilitate the digital transformation for academic libraries. The project also had an effect on publishers, who increasingly abandoned print copy in the recognition that their customers preferred digital versions, a trend that some librarians regretted even when their users did not.

In 1997 the University library and the computing center at Humboldt-Universität zu Berlin collaborated on establishing one of the earliest institutional repositories. An early purpose for the repository was to host doctoral theses in digital form as a substitute for traditional print publication. Peter Schirnbacher was the leading figure behind this effort, and it put HU-Berlin ahead of many other well-known and well-funded universities as a leader in providing digital content. Edward Fox of Virginia Tech University had started the Electronic Theses and Dissertations project in 1991, and Peter Schirnbacher was soon invited to become a member of the board. Another project of the edoc server was the publication of open access journals, including "LIBREAS: Library Ideas", which was a project originally of students at the Berlin School of Library and Information Science (Institut für Bibliotheks- und Informationswissenschaft).

The number of other digital projects that came into being in the 2000s is too great to mention all of them. In Germany in 1997 the DFG provided funding for digitization centers at both the Bavarian State Library (BSB) and at Göttingen University. The BSB had especially rich manuscript collections that were a magnet for medievalists throughout the world, and the digitization project significantly transformed how research could be done. In the United States the Institute for Museum and Library Services (IMLS) began a series of grants to enable both University and public libraries to engage in digitization projects, and especially encouraged joint projects with museums. At roughly the same time the National Science Foundation (NSF) set up the "digital library initiative" grants. The goal of these grants was to encourage researchers to undertake high-risk projects in the digital arena. Funding for these projects ran into the millions. Not all projects were successful, since they were high-risk but some produced important results, including in the area of digital preservation.

6 Internationalization

An important part of the transformation that went on during this time was the increasing internationalization of library work and of library contacts. Email had been around for a long time, but the growth of Internet connectivity and the sheer number of librarians working at institutions

with email made closer contact and closer collaboration easier. To some degree this began with German and US librarians attending each other*s library conferences. IFLA (International Federation of Library Associations) routinely rotated the location of conferences throughout the world, and the US and German delegations were (and still are) traditionally two of the largest.

In the early 2000's Elmar Mittler together with Sarah Thomas, then director of the Cornell university libraries, received a Mellon foundation grant to develop closer ties between German and American librarians. The grant enabled Elmar Mittler to hire an American doctoral student to work as an intern in Göttingen, and help to establish the German North American Resources Project, which had three active working groups: one for collection development, one for digitization, and one for librarian exchange. The group made an effort to attend both the German Bibliothekartag and the American Library Association conference, and regularly held sessions at the meetings. The balance was never perfect since most of the American librarians were specialists on German collection development, and most of the German libraries had a greater interest in digitization, since collection development for foreign works was handled through the (now defunct) Sondersammelgebiet Program. In time the German Resources Project became part of other projects under the aegis of the Center for Research Libraries, and still exists in that form.

When the HU-Berlin faced a budget crisis in the early 2000s, it decided to eliminate its library school, partly on the excuse that it no longer did cutting edge research, and that library training programs belonged more appropriately to Universities of Applied Sciences (Fachhochschule). The decision to eliminate the only school of Library Science at a German university that was not part of another department met considerable resistance within the library community, as well as internationally. The Dean of the humanities faculty (then Philosophische Fakultät 1) pushed to have the school kept, and eventually the University agreed to set up a commission to look into keeping the school and to restructure it. Elmar Mittler was chosen to head the commission and he eventually invited two German-speaking North American academics to participate. He may not have realized at the time that both had their doctorates from the University of Chicago, and that both had close ties to the University of Michigan. As a result these external members could agree quickly and easily on recommendations, one of which was to rebuild the school along the lines of American schools of information like one at the University of Michigan.

Another consequence of the commission was a search for a new professor for a chair that had generous funding from the Krupp Stiftung. And there was a strong desire also for that person either to come from outside Germany or at least to have very strong international connections. In the end the search committee offered the position to me. I was able to bring one of the notable academic

journals with me in my role as editor, Library Hi Tech, and the school elected me as director soon after I arrived. Let me emphasize that much of this was possible because of Elmar's influence and his vision in wanting a strong international presence in the German library and academic community. In time I also became Dean of humanities and chair of the University Council at a point when the Council needed to elect a new president and new vice presidents. This meant that the Berlin School of Library and Information Science enjoyed an unusual degree of influence within the University for something over a decade.

7 The iSchools

The iSchools began in the United States as a group of Deans who talked with each other periodically in order to share concerns about the direction of their library and information science programs. The Berlin School of Library and Information Science applied to join the group in Autumn 2008. The requirements for external grant funding were high for European circumstances, partly because the North American schools account grant money differently than is typical here. Nonetheless the Berlin School met the criteria and was admitted in 2009. Over time two other library and information science programs in Germany have joined the iSchools, plus one German speaking school in Switzerland, for a total of 34, including schools in Turkey, Israel, and Uganda that also participate in the activities of the European region.

One of the most important activities in the European region has been doctoral colloquiums. These began around 2010 as a series of video conferences between Copenhagen and Berlin, and slowly expanded to include other Scandinavian schools. In the beginning not all schools had adequate video conference facilities, but the pandemic has changed that. The colloquia now take place using zoom. In 2020 the scope expanded to include all participants in the European region, and has included visitors from as far away as China. The structure of the colloquia is simple: a doctoral student from each of two member schools gives a presentation, and all those who join the video conference are welcome to ask questions. A particular advantage of these colloquia is that doctoral students in the field of library and information science throughout Europe get to know each other better, which will help to build a basis for close cooperation in the future.

Curriculum sharing has also led to an active discussion among the European iSchools, with the Scandinavian and Czech schools taking a lead in organising exchange opportunities. The Erasmus program is a good basis for building a curriculum exchange, but the legal complications from state to state remain considerable. In practical terms shared courses must also have a common language, and that is almost certainly going to be English. In Berlin and in other schools the Masters level

courses are more commonly in English, which means that the sharing may well focus on that level. The expectation is that students will take a single supplementary course from other universities, rather than enroll in a degree program. Many details remain to be worked out.

Each year the organization holds an "iConference". The conference typically attracts 400 to 500 participants from around the world. The first European Conference took place in Berlin in 2014 under the direction of Elke Greifeneder, who is now a full professor in Berlin. At this conference the leadership of the iSchool organization shifted for the first time away from the United States and to Germany. Since then it has rotated internationally on a regular basis in an attempt to treat all regions equally. The iConference rotates routinely as well, but because of the pandemic it has moved to being an entirely online event. While the ultimate effect of holding the conference entirely online has still to be determined, the reduction in air travel is good for the environment, and a reduction in the participant costs makes it more possible for younger faculty and doctoral students to take part, since there are no housing or food costs, or of course travel. Some opportunity for social interaction has been lost.

8 Conclusion

The library world in Germany and in many other countries has undergone a radical transformation in the last 50 years. No one person could be at the forefront of so much change, but Elmar Mittler has certainly played a key role in enabling many parts of it. Outwardly the library world 50 years ago was very much a paper-based world, even though the transformation was beginning behind the scenes in many leading institutions. Research libraries have always been highly international in their focus and in their collecting policies, but in the last 50 years travel and technology have both enabled much more communication and many more physical meetings.

The leading library and information science programs have been at the forefront of this change. University after University followed the example of the University of Michigan in making information a core part of the library school identity, and that name change meant that they explicitly embraced the digital world and what it means both for institutions and graduates. The program in Berlin added the word "information" to its name in the early 2000's, but explicitly chose also to keep the word library in its name to show its commitment to libraries as institutions. The internationalization of the curriculum is well advanced, and cooperation continues to grow within the European region and with partners elsewhere.

The process of enabling both the digital and international transformation is far from complete, but at this point it is likely to grow as a younger generation with excellent language skills and substantial digital experience takes over the leadership of our libraries and educational programs.

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