Information Strategy of the University - a Vice President's View

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1. Initial Situation

Supplying researchers with adequate information is an important factor for the competitive strength of our research facilities. The supply of literature and information is also a fundamental criterion for the quality of education of our students. Nowadays, this does not only include the traditional literature supply but a comprehensive information supply covering a wide range of information objects from books to multimedia information documents.

In this light, University Libraries are facing new challenges. Mastering them successfully is a fundamental aspect of a university's competitive positioning.

From the point of view of the academic administration, this means for the traditional Staats- und Universitätsbibliothek (state and university library) of Göttingen that the quality of the information supply for all subjects of our full university has to be guaranteed. In the area of natural sciences, the range of electronic journals available at the researcher's place of work will naturally be in the foreground from the users' point of view. In different areas of humanities, however, research and teaching based on books prevail. Aside of the services for research and teaching, the duties of a state library have to be fulfilled as well. Additionally, the Library's cultural heritage has to be preserved. Therefore, traditional collections have to be maintained and completed continuously in addition to the ever-changing needs of the information supply to the existing areas of science.

All of this happens in a situation of an increasing scarcity of resources for the university as a whole. In this context it has to be noted, that prices have risen exorbitantly, particularly due to the electronic offerings in the areas of journals and databases. In some areas, prices have been raised by an average of 20% for the past five years.

2. Developments in the Supply and Publication of Information

Considering the challenges ahead from our point of view, it is possible to identify at least five main subjects.

- E-Only offerings, particularly in the area of journals

  This results in the necessity of changes to the organization of library structures. Financing for online journals has to be provided and specific requirements for the design of the necessary information and communication technology have to be fulfilled.

- Different varieties of in-house publishing, including the possibility of print on demand

  In this area, organizational and technical options have to be discussed to offer services at lower costs, particularly in the area of scientific publishing. This will offer a possibility to escape the problem of ever-increasing costs caused by the dependency on scientific publishing houses.

- Multimedia offerings

  In modern forms of teaching, multimedia teaching and learning arrangements will replace transparencies, presentations and books. It has to be examined how library systems can provide access to these ways of learning in the future.

- Long-term archiving

  The question of securing the long-term availability and permanent accessibility of comprehensive online services remains largely unsolved.

- Digitization centres

  Digitizing inventories of literature as well as other media (e.g. slides and maps) allows new ways of distributing information. This includes new ways of using literature and other stocks of information in teaching.

In the following, these subjects will be treated. At the same time, we will demonstrate perspectives for universities having to deal with these challenges. On this basis, we will be able to derive comprehensive organizational, process oriented, content oriented and economical development perspectives for a university library.

3. Examples for the Development towards a modern Supply and Publication of Information

3.1 Electronic Information Provisioning

In some disciplines, e.g. in natural sciences, it has become necessary to supply information digitally to the researcher's and student's personal computers at their places of work. This means that, based on research conducted from the personal workplace e.g. via library catalogues, the search results as well as the information itself (e.g. journal articles) are displayed on the user's screen. Therefore, making electronic information supply available to large groups of users becomes necessary. Electronic journals are a typical example. This process, which is already in effect today, leads to massive consequences concerning the design of library solutions.

Integrated portal functions (e.g. as modules of a local library information system) are required for information research. They have to provide integrated access to local and national library catalogues, databases, internet repositories etc. via a common user interface. The aim is to create a one stop shopping experience for the user searching for information. Doing this, information services covering the respective topical focus have to be supplied. This way, specialized virtual libraries will emerge.

Specialized libraries will have to cooperate even more closely to respond to these challenges. In order to supply global services, it is necessary to define uniform technical interfaces and standards for the information systems in use (covering the process from search to cost allocation).

Let's have a look at the contents offered by such portals:

On the supply side, among the publishing houses, smaller publishing houses disappear from the market for these electronic offerings. This is partly due to the large investments in the required basic technology. There is a tendency towards oligopolies and monopolies. This leads to concentration effects on the publishers' side. On the other hand, the products offered are becoming increasingly audience-specific in order to skim potential revenues from different segments. For the libraries, the electronic offerings lead to substantially rising costs caused by the vendors' market power and the necessity of university-wide supply. In a situation of diminishing funding, the financing of a comprehensive library offering is problematic. Therefore, a

number of measures have to be taken on the part of the libraries and universities to assure extensive services in a situation of a constant budget.

Primarily, the market power of the demand side has to be increased by cooperations in order to achieve a better bargaining position towards the publishing houses. This implies that certain information products are no longer available at all libraries. A certain degree of specialization will lead to a networking of libraries in order to guarantee information supply for all locations.

A hierarchical process of information supply is required. The payment for the services provided will depend on the availability of the registered sources. The spectrum reaches from free full text access and nominal charges to full costs in the case of pay-per-view offerings. One of the problems arising in this context is the fact that the libraries' fragmented information budgets are frequently insufficient to finance a comprehensive offering. A large proportion of the institute's library budgets is still used opportunistically for subscriptions of single magazines or licences, even in natural sciences. This leads to certain publications being bought multiple times. We will not be able to afford these multi-level library structures including institute-level procurement and, in some cases, institute libraries as well as a central university library in the future. In the case of workplace-level information supply, they are only reasonable in the case of very specific requirements. We will have to aim at a bundling of budgets. The combined budgets can be used to establish an e-only supply with a centralized paper-based archive which will usually be based at the library. This subject is particularly complex, as in most cases the only authority to enforce the appropriate budget reallocation for a centralized electronic information supply is the university administration. Of course, the licensing terms have to be examined closely when choosing information products. Besides, incentives such as an improved information offering have to be found in order to make the budget reallocations attractive for the users.

As information will be provided at the researcher's or the student's individual places of work (including the student's home), the spatial requirements to the current information supply will change significantly as well. The demand for central library workplaces and lending facilities will decrease. The same is true for classical archiving tasks. It has to be examined to what extent this will lead to a reduction of central library spaces and buildings.

In order to stop the price spiral the scientific institutions are facing in different monopoly situations, the question arises whether university libraries can take on new roles as service providers. They may e.g. act as publishers of electronic information for scientists, commissioned by scientific societies. The classical functions of the publisher, including quality control (review), bearing the investment risk (which is diminished in the case of electronic offerings), and marketing (which is limited in the case of specifically targeted scientific publishing) may be fulfilled partly by the scientists themselves. Therefore, they may be taken over by the university institutions. Pre-Print servers are a current example for this. However, this development would require additional services in the area of information technology which would normally widen the spectrum of competencies of a traditional library. The question arises whether an increased cooperation and division of labour with scientific data processing centres and publishers would be appropriate in this case in order to leverage core competencies. Smaller publishing houses may even cooperate with the university in order to establish the technical infrastructure for their offerings.

3.2 Publishing Information

In the context of publishing information, we will have to provide a university server which acts as a media neutral content repository at the university level. It will have to include mechanisms to choose adequate output formats for different uses based on a sophisticated rights management. In the light of requirements such as information retrieval and worldwide documentation, it appears that this position will have to be filled by libraries which will act as information service providers. It has to be noted, though, that the technical infrastructure required may be supplied by the data processing centres, establishing a division of labour.

Even today, scientists mainly publish their works electronically. A university server may be used to make the documents created in this process available. They may be accessible to different groups of users according to specified access rights. User groups may e.g. be limited to researchers and participants of seminars. The latter may access the information via a learning management system connected to the local Intranet as well as the worldwide Internet. There tends to be a need for delivery in multiple formats, including print, download, DVD, CD-ROM and print-on-demand. The nationwide Pro-Print service, which is already operational, allows users to search all electronic resources of German universities. The required documents may be

combined to be printed on demand and delivered to the customer by professional printing service providers. It is likely that print-on-demand services will replace traditional book publishing in many areas of science. This is another example demonstrating the necessity of networking and cooperations with new partners, in this case printing service providers.

The information production and the publication have to be integrated into an efficient business process without media inconsistencies.

In order to enable rights management and effective retrieval, documents stored on the university server have to be furnished with metadata which adhere to international standards. A media neutral repository for digital contents has to be built in order to enable multiple uses on the output side. In this scenario, libraries take over some of the functions of a university's publishing house:

- Teachers and researchers provide compilations of existing documents for limited groups of users via a course management system. These documents may include teaching materials, project concepts, draft papers and parts of their own publications as well as other people's works. These may be turned into lecture notes and printed on demand as required.
- Scientific publications, such as preprints, dissertations, diploma- and master theses are made available worldwide via the internet. These prints will be produced on demand in an agreed on circulation.
- High-quality publications, conference proceedings or scientific monographs will be produced by cooperating science publishers or the university's publishing house. At the same time, they will be released online on the Intranet and the Internet.

Standardised workflows and easy-to-use modules which will be used by researchers and teachers have to be created for this kind of publication. Quality assurance mechanisms have to be integrated into the process.

3.3 Multimedia Teaching and Learning

In new kinds of courses, students are not only given traditional literature and e.g. power point slides, but digital teaching and learning environments which include a

mixture of different types of media. Courses may be published online using authoring on the fly as the cheapest and least complex kind of content creation. More sophisticated variants include studio productions and complex animations. In addition to that, courses may be broadcasted and recorded using multimedia lecture rooms. University-wide course management systems (teaching and learning platforms) are used to distribute the course information. In this context, it is important to consider access rights and study program enrolments.

Concerning the library functions, this means that such courses and course materials will partly replace traditional information. Libraries have to provide catalogue services and access to these resources.

At this point, it is necessary to consider the organization used to provide the required services. One possibility is a cooperation of the library, data processing centres and media centres. If such media centres don't exist already within the academic institutions, media competencies may be integrated into the libraries to reflect the changing fields of work.

By establishing integrated service centres, the steps of information gathering and knowledge creation have to be supported organizationally as well as by hard- and software. To do this, the teachers who want to create this kind of modern courses have to acquire the respective competencies. The students have to be educated in the use of new media offerings as well.

A multimedia service should serve as support for the creation of digital courses. Multimedia workstations which are connected to a streaming video server and archive systems will serve as a technical support for transforming texts, audio- and video data as well as graphics and animations into multimedia teaching- and learning modules. Besides, the personnel resources and competencies required to adequately support the teachers creating multimedia learning materials have to be available.

In the future, an amount of basic equipment for the institutions involved will be part of the university's basic funding. Additional financing will have to be provided by internal cost allocation.

The users of such services will need a user's account which allows them to access the course management system and e-learning environments independent of place or time. Aside of the infrastructure, Access control mechanisms using e.g. single-

sign-on (via LDAP-Structures) are required. User rights for the library, the content management system, the teaching and learning platform, the student- and the examination office will be administered centrally.

This will be accompanied by services provided by an integrated service centre which will help to improve the students' information competency in connection with the use of electronic and multimedia information.

Advisory centres will offer know-how transfer via physical and virtual helpdesks. They will provide information concerning the use of digital media, multimedia production and electronic publishing.

In the past, there was a demand for training in traditional library use. It will be replaced by trainings teaching media- and information competence in order to assist the use of databases and internet resources. They will also help to ensure adequate research techniques and the appropriate use of multimedia teaching and learning material. The libraries offerings have to be adapted to these services in cooperation with other institutions.

3.4 Digitization and Long Time Archiving

The continuous expansion of the information supply will have to be supported by the digitization of relevant scientific information. In Göttingen for example, the Göttingen digitization centre is attached to the library. The digitization centres will have to fulfill a number of tasks:

- With the aid of mass digitization, large quantities of scientifically relevant information are made accessible for data processing. They are included in document management systems.
- By high quality digitization, rare images and text documents of particular historical value become accessible to science and the general public without endangering the originals. This way, new distribution channels for such unique historical documents will be established.
- Digitization of existing course material, e.g. slides, enables teachers to use new multimedia learning arrangements

These tasks will be fulfilled by a multimedia centre as well, either within a university library or in close cooperation with the library.

There is another important challenge: permanent access to the digital information has to be assured by guaranteeing long-term availability on an organizational as well as a technical level. Requirements specified by e.g. the Open Archive Initiative have to be accounted for. I think, however, that projects dealing with such long-term archiving tasks are mostly in their infancy, particularly concerning the combination of traditional library experience and data storage technology. These archiving challenges posed by the digital age are a particularly important step if we want to preserve our scientific work and our cultural heritage for the generations to come.

4. Technical and Organizational Consequences of Changing Requirements

The cited examples of new requirements to university libraries show that the use of information and communication technology in this area will rise significantly. At the same time, it will be necessary to provide additional media competencies due to the rising use of electronic media. From this point of view it seems necessary to find new forms of organization. They will make new combinations of library, multimedia and traditional data processing know how available. It is important to assure that these solutions will not lead to institutions building up new competencies from scratch, but to an actual combination of competencies. One may consider creating new organizational units which offer the necessary know-how by using virtual organisations and project work. The respective employees from the different institutions would have to be brought together physically as well. At Göttingen University, we are aiming at this kind of solution in cooperation with the information service providers involved.

Secondly, new requirements concerning the libraries' premises appear. In the future, the expansion of classical library spaces will not be the top priority any more, due to the e-media oriented functions. The primary tasks will be offering virtual electronic libraries and multimedia production and learning centres. This will lead to a new spatial structure in this area.

In connection with these new ways of working, new structures of process organization will emerge. In particular, they will seamlessly connect information access, cataloguing and information supply. To do this, new technical and organizational interfaces will have to be discussed and harmonized with the other organizations involved.

Finally, the changes discussed herein pose a particularly large challenge to the human resources management. Employees have to be introduced to the new media and the respective new library processes on a large scale. Multimedia product offerings and content management systems have to become everyday tools of work in the same way as electronic catalogue systems are today.

5. Conclusion

The shown examples and the requirements that come along with them demonstrate the changes which will influence libraries as modern information service providers. Not only technical innovations, but also on-the-job training of employees has to be accounted for. From a business information systems viewpoint, libraries are facing a similar challenge as data processing centres were during the 80ies and 90ies, when they had to cope with the transition from mainframe architectures to client-server structures. If they master this challenge, the networked university libraries of the future will be the service provider in charge of information supply to students and researchers in spite of the existing budget restrictions.