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The changing paradigm of document delivery – exploring researchers' peer to peer practices

Abstract

Purpose: By definition, interlibrary lending is a process involving two libraries. The digital revolution has changed the way that scientific documents are disseminated during the past couple of decades. Nowadays, researchers can exploit several software applications that enable them to upload, save and deliver their documents from one peer to another without the need for a middle-man. This article reviews this change via a study conducted in two Finnish academic universities. The aim was to determine the extent to which researchers have adopted these new possibilities for document dissemination and how this change will affect the role of the libraries in document delivery in the future.

Design/methodology/approach: The paper is based on a survey conducted with the academic professors in two Finnish universities. The results were analyzed by descriptive.

Findings: The academics mainly used digital resources when acquiring documents; ILL was the least widely used means. The majority of the academics usually transmitted their own documents to other persons by e-mail.

Research limitations/implications: Based on data from two Finnish universities.

Practical implications: Libraries should be better aware of current peer-to-peer document delivery practices and evaluate how this will impact on their inter-library-loan services.

Social implications: Libraries should be more active in document delivery implemented through the various Internet applications for academic document dissemination.

Originality/value: Peer to peer document exchange is an inadequately investigated topic, especially from a library perspective.

Keywords: resource sharing, document delivery, habits, academics, professors, Finland

Article classification: Research paper

Introduction

Dissemination of scientific ideas and research results has undergone several major changes throughout its history. In every era of scientific publishing, the technologies available for writing, printing and delivering different types of documents have determined how these materials could be disseminated. The history of writing started with manuscripts that were scarce and valued resources. This led soon to the creation of the archives and libraries; the main aim of these institutions was to preserve – often vigorously – these unique items. Furthermore, there was manual copying of these manuscripts; this represented an attempt to minimize the risk of losing irreplaceable documents.

The move from a print-dominated world to a digital universe started in 1990's. Scientific journals started to disseminate articles in a digital form, soon after that the digitization of the printed resources started and finally from 2000, the evolution of the electronic book has been rapid.

Many of these recent changes are now an everyday reality but libraries and archives still adhere to the rules and conventions evolved during the printed era: the appearance and publishing procedures still resemble those created to deal with printed material. However, new restrictions have evolved, the most important of which are the pay-walls created for protecting the interests of the copyright owners and the work done by the authors and others involved in the publishing process.

The open access movement started to evolve side by side with the appearance of the pay-walled digital science and the development of the web-technologies in the 1990's. During the past few years, open access publishing has been placed firmly on the agenda due to the decisions and policies issued by some of the major research funders and even national governments (Laakso & Björk 2012). In addition, the publishing processes have been developing so rapidly that today one can state that open access is viewed as a valid means of publishing one's research data although there still are some criticisms raised about the validity of the open access publications inside the academic community as well as by the publishing industry.

Open access publishing utilizes the same tools as the traditional publishing but its business model is very different: the publishing costs are collected from the authors and/or their parent organizations. The main difference is in the availability: when the documents are published, they are open to all and there are no fees for readers.

Digital repositories provide another way of opening publications to the general public. These are mostly organizational e.g., they allow a university and its library a means of collecting and disseminating all of their works openly. The repositories provide a so-called green way for researchers to publish or at least parallel publish their work (Nicholas et al 2012, 195).

This also means that the traditional interlending is starting to evolve and change. The digital repositories can be used where ever an internet connection is available: documents move rapidly and directly to readers. In addition, peer-to-peer exchange of scientific documents has started to change the role of the library as an intermediator between academics.

We have seen recently a growth of different peer-to-peer technologies that have started to challenge traditional interlending as well as the digital repository philosophies of academic libraries (Jackson 2004, 91). Although by far the most widely used approach is direct peer-to-peer e-mail exchange of articles, the scientific community is also exploiting social media tools and applications e.g. ResearchGate and Academia.edu that combine the dissemination, evaluation, archiving and networking of the researchers and their output. Our paper focuses on this change by analyzing how academics in two Finnish universities disseminate their own documents and obtain the documents they need for their research.

Resource sharing and its evolution

The basic idea of interlending has its foundation in the concept of a collection of printed resources and how this can be safely shared. Previously, due to the rarity of these types of resources, one needed specialized institutions i.e. libraries, to manage the logistics of maintaining the collections including bibliographic access to these resources (Muhonen, Saarti & Vattulainen 2014, 119). It is most likely that this type of activity will remain as long as printed collections exist.

Nonetheless, digitizing – permanent and customer defined, digital archiving and social peer-to-peer academic networks are starting to change this paradigm. In this type of operational environment, an individual can gain direct access to documents without any third party acting as an intermediary. The new social-media tools for this electronic means of disseminating and publishing scientific documents challenge the traditional way of interlending – we are entering an era of peer-to-peer resource sharing.

This means that there has to be a redefinition of the role of the library in the post-digital world moving from the concept of interlending to access to resource sharing. The change is depicted in table 1.

Table 1. From interlending of printed material to post-digital resource sharing

Printed interlending	Digital access	Resource sharing
• printed documents • independence • storing and warehousing documents and collections • local • postal services • storing knowledge • buying separate documents • library to library	• e-journal supplier/printed book warehousing • dependence • digitization of the printed word • national • using knowledge • e-mail and attachments • buying services • library to user	• born digital • co-operation • joint-operation • pathway to digital media • global • creating knowledge • digital workplace • co-creating services • peer-to-peer

Printed materials needed – and still need – custodianship in order to maintain and store the printed documents. This environment also requires the presence of actual people to manage the logistics of the scarce resources. The ultimate example of this is the premise-defined use of some of the most valuable and unique examples of documents housed as national treasures in a venerable institution.

The digital and digitized closed environment requires libraries to function as pay-wall managers in order to grant access to their users. In addition, the role of the digital collection and system manager becomes one part of the duties of a library. This environment sets enormous challenges on traditional interlending due to the copyright restrictions and agreement based constraints on who can use the resources, in what way and for what purpose.

Research questions and methods used

The data used in this paper was gathered via a survey conducted at the end of the spring term 2015. It was designed to be as short as possible in order to gather enough answers to allow a proper analysis. The questions are listed in Appendix 1. This paper focuses on the analysis of the access, dissemination and the impact on ILL of the documents used by the academics.

The survey was sent to all of the professors in two Finnish universities; the University of Jyväskylä (JYU) and the University of Eastern Finland (UEF). These institutions were selected based on their similar size and multidisciplinary nature. JYU has seven faculties, 15 000 students and 2600 staff members. Its budget is 211 M€. UEF has four faculties, 15 000 students and 2800 staff members. Its budget is 250 M€. (See more: https://www.jyu.fi/en and http://www.uef.fi/en/etusivu).

Table 2. The numbers of professors and the number of who responded to the survey

	Professors in total	Professors who replied	%
JYU	245	95	39
UEF	305	100	33
not given		3	
Total	550	198	36

A total of 550 professors were employed in these two universities when this survey was conducted at the beginning of the year 2015. Retired professors that were still active were also included. The response rate was rather good, altogether 36 percent of the professors replied to the questionnaire. The age profile was quite well balanced as well as the division between the different disciplines (see tables 3 and 4).

Table 3. Professors who participated in the survey subdivided by the age-group

Age	Persons	%
35 or less	23	11.6

36 – 40	10	5.1
41 – 45	20	10.1
46 – 50	32	16.2
51 – 55	31	15.7
46 – 60	33	16.7
61 – 65	41	20.7
over 65	8	4.0
Total	198	100.0

Table 4. Disciplines of professors who participated in the survey

	Persons	**%**
Science	50	25
Medicine and health	31	16
Social science	47	24
Humanistic	44	22
Other	26	13
Total	26	100

There were two main research questions:

1. How and where do professors acquire the documented resources that they need?
2. How do professors disseminate their own publications?

Results

Documented information acquisition was evaluated by asking how professors have used the following means of information seeking as the possible sources from which the participants had acquired documents during the previous six months (see also Fig 1., Fig. 2. and Fig. 3.):

- lib print - checked out printed material from the University Library
- lib electronic - used electronic materials via the library
- ILL - used ILL
- bookstore - purchased books from a bookstore
- el bookstore - purchased books from an electronic bookstore
- el document - purchased electronic documents and/or materials
- other - other means.

Respondents could choose one or more of the above options.

The results are depicted in Figure 1. It is clear that electronic resources were the most important materials for researchers. The vast majority of respondents (176 = 89%) had used electronic resources during the six month period of the survey. Printed materials checked out from library were also regarded as important being used by just over half (103 = 52%). ILL was the least important means of document acquisition being mentioned by only 33 =17%.

A substantial number (49 = 25%) of the participants added “other means” to their choices, with 23 of them mentioning the Internet. In practice, this meant open access journals, researchers’ own web pages, and Google Scholar.

Ten professors stated that they have asked for articles from their colleagues or from the authors themselves. AcademiaEdu and ResearchGate were mentioned only once each. However, these numbers would surely have been much bigger, had they been among the choices in the questionnaire. Now the result gives the impression that these resources are not widely known by researchers as ways of acquiring information.

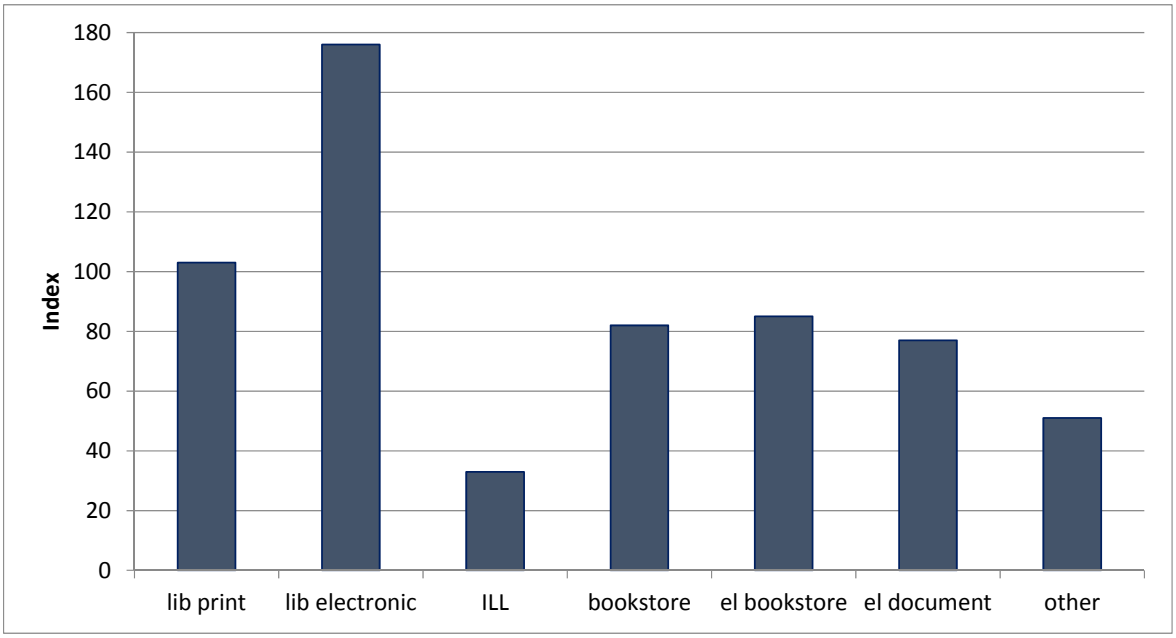

Figure 1. The sources used by the professors to acquire documents. Numbers on the X-axis are explained in the beginning of the results section.

Figure 2 depicts the information seeking behavior but with a comparison between the two universities. The general trends seem to be the same, although there are some discrepancies.

The professors at the UEF used interlibrary loans almost twice as much as their colleagues in JYU. The National Repository Library of Finland (NRL) is situated in Kuopio, very close to one of the campuses of the UEF. The UEF Library has very close connections with NRL and therefore it seems that this library has been better able to exploit the NRL resources. The JYU Library is farther away and does not enjoy this geographical benefit.

Professors at the JYU seemed to buy material for their own use somewhat more than their colleagues in UEF. The reason for this cannot be deduced from the survey; it is an interesting topic for further investigation.

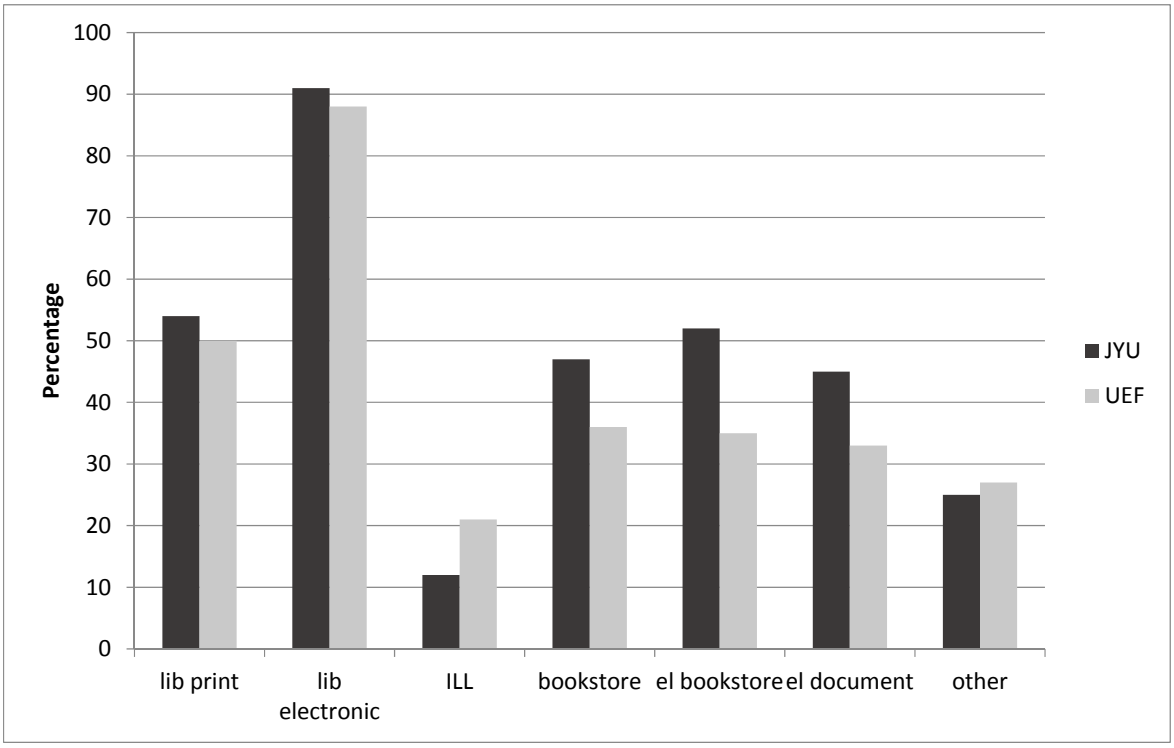

Figure 2. A comparison of how the professors in the two universities acquire documents. Abbreviations on the X-axis are explained the beginning of the results section

The professors were also asked to name the three most important means of document acquisition in descending order (1, 2 and 3). An index was calculated showing the relative importance of the different means using the formula: Index = $a_1 + a_2/2 + a_3/3$ where:

a_1 = number of times that this means was mentioned as being the most important

a_2 = number of times that this means was mentioned as being the second most important

a_3 = number of times that this means was mentioned as being the third most important.

In this relative comparison, as depicted in Figure 3, the importance of the e-materials is highlighted even more than in the numerical comparison shown in Figure 1. Interestingly, the relative importance of purchasing electronic documents and/or materials is as high as borrowing material from a library. In addition, the purchase of printed books is less important than the purchasing of their electronic counterparts.

The least important means was interlending. Its importance seems to be diminishing due to the vast amount of digital information available to the researchers, and thus the resources from other libraries are not needed as much as before.

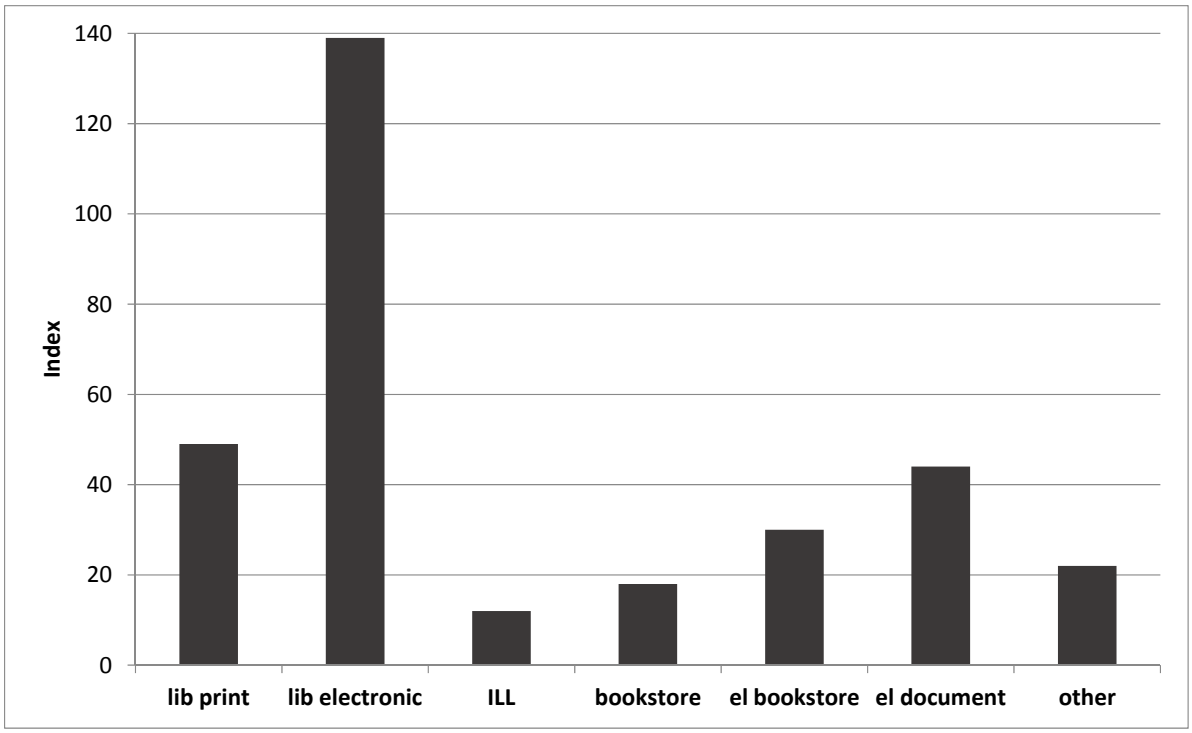

Figure 3. Relative importance of document acquisition. Abbreviations on the X-axis are explained in the beginning of the results chapter.

Another topic in the survey was the means that the professors had used for delivering their own documents to individuals who have asked for them. Professors could choose one or more means in the questionnaire. The results are depicted in Figure 4.

Only 15 persons (8%) had not disseminated their own articles during the six-month period of this survey. It can be concluded that this is now the normal routine way for a researcher to disseminate his/her own research results to colleagues when asked. Though this has happened throughout the history of the sciences, e.g. by using offprints, it is so much easier in the digital era.

Again not surprisingly, e-mail is the most common way of delivery. Almost half (48%) of the professors used websites (Researchgate, AcademiaEdu and alike) for delivery and every third (33%) still send the documents in paper form (offprints, journals, hard copies). Practically all

answers in the category “Other” were different means of web delivery: link to researcher’s own website or open repository. ResearchGate and the cloud were each only mentioned once.

It can be concluded that delivery is still highly concentrated on personal relations. New forms like ResearchGate or AcademiaEdu are still rarely utilized.

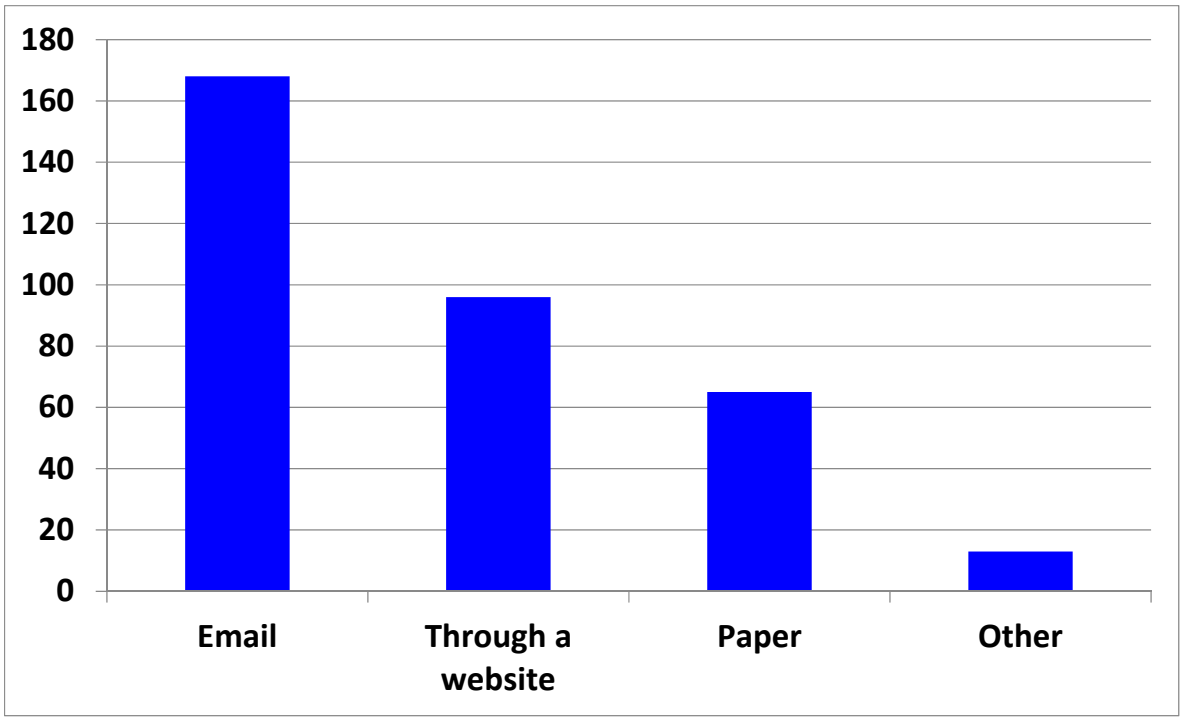

Figure 4. The ways used by the professors to disseminate their own documents to individuals who have requested them

Figure 5 depicts the delivery type divided to the age groups of the professors. Professors between the age of 46 – 55 share less documents than their younger and older colleagues and this is irrespective of the means used to disseminate the materials. It can be assumed that at that age, professors are active in running their own research groups, departments or even faculties, and they have less time for research. Interestingly, senior professors (age over 65) are at least as active as the other age groups. They are keen users of the paper format, but they also actively exploit other means.

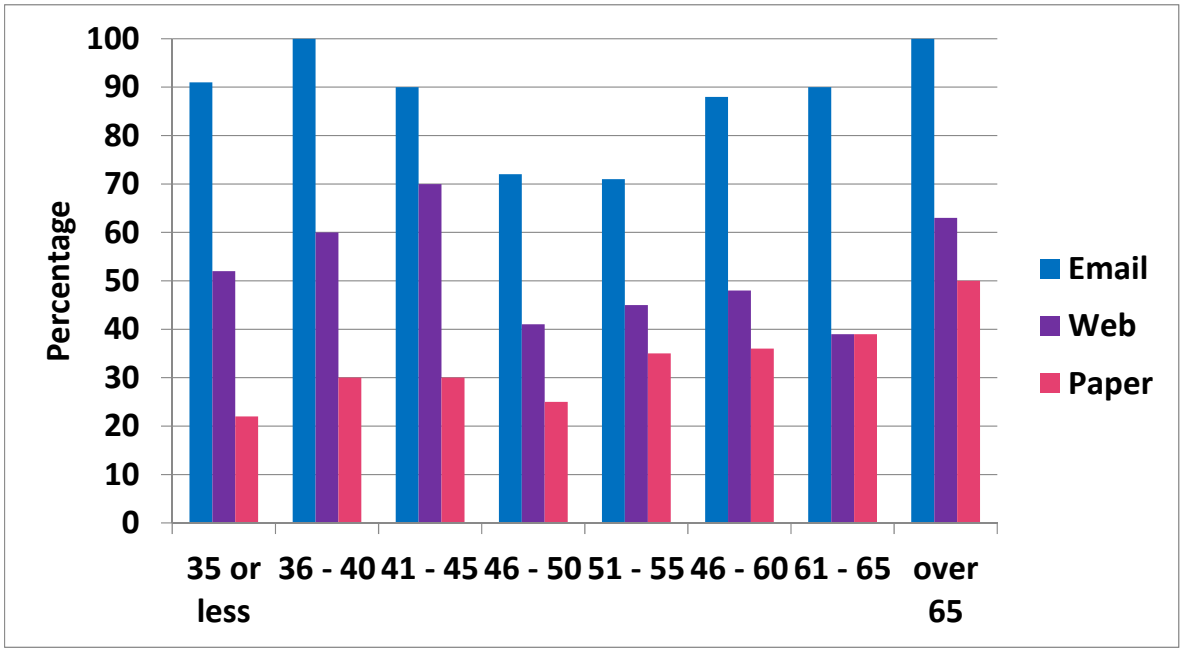

Figure 5. Means by which professors have delivered their own documents to individuals seeking these materialsby age.

Web based delivery seemed to be the most popular among researchers in the age group 41-55 compared with the other age groups. However, the difference was rather small for this type of activity. One can also assume that the researchers of that age probably have enough publications to be placed in web services and they are young enough to use them.

Discussion

Although it could be argued that electronic resources are the most important materials for researchers, it is clear that printed books checked out from a library are still being used extensively and printed journal articles are scanned and copied. Thus, especially in a multidisciplinary university, one cannot rely only on the digital resources (see more Talja & Maula 2003).

Especially from the point of the libraries, one important aspect of this study was that ILL was the least important means of information acquisition by academics. It was evident that there were some differences between the two universities, probably due to local cultures and types of services that

the libraries were offering. Nonetheless, the overall conclusion was that professors in all of the disciplines use digital resources.

The personal delivery of one's own documents can be seen as a part of the professor's daily routines: 92% of professors send their own publications to other persons, mostly by e-mail but about half of the professors were exploiting websites for delivery

Professors in the social science and humanistic disciplines use more diverse means of delivering their documents than their colleagues in science, medicine and health. It also seems that those professors who have published open access papers are somewhat more active in delivering their own documents than their colleagues who have not used this publishing format.

Conclusions

The emerging post-digital environment holds the promise of a world of academic freedom in its most idealistic sense: science and its results would be open to everyone. At the present, this is more a dream than a reality, perhaps a never-to-be-realized fantasy, since the digital environment also needs an infrastructure that must be funded. In addition, there is already some evidence that especially the long-time costs of digital environment are not less expensive or more sustainable than those of its print counterpart (Goleman & Norris 2010, Pinfield & Salter & Bath 2015).

The most challenging task for libraries is to analyze their present services, to determine how these are being utilized and how the academic community actually acquires and disseminates documented material. It seems that these aspects of a professor's work are more and more based on digital resources and on the personal dissemination of her/his own scientific results and achievements. There is a danger that in the future the library is going to be side-tracked and neither needed nor used by the academic community.

Given that the survey results show academics are increasingly accessing and disseminating electronic resources, libraries will need to acquire new types of collection and access management tools, especially new networked tools and innovative ways of disseminating scientific documents:

- Digitizing the printed resources and making them available openly when possible
- Developing the digital document repositories when possible

- Promoting open access and open publishing in a sustainable way – i.e. ensuring long time preservation and preserving well-documented collections
- Networking
- Teaching researchers and students critically to utilize and use new software tools for peer-to-peer document dissemination
- Enabling data mining and other techniques through which digital science can exploit digital resources

This means that libraries and their staff need to adopt a more active role and tackle more diversified tasks. It also means that libraries will need to acquire new types of collection and access management tools, especially new networked tools and innovative ways of disseminating scientific documents.

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Appendix 1

Questions of the questionnaire

Background information

1. Age

2. University

3. Field of science

Information seeking and distribution

4. During the past six months I have

- checked out material from the University Library
- used electronic books via the library
- used interlibrary lending to get material from other libraries
- purchased books from a bookstore
- purchased books from an electronic bookstore
- purchased electronic documents and/or materials
- used other means to obtain source materials, what

5. Please, number three most important means mentioned above in descending order (1., 2. and 3.)

6. During the past six months I have delivered my own documents to persons who have asked for them

- via email
- through a website (Researchgate, AcedemiaEdu etc.)
- in paper format (offprints, journals, hard copies etc.)
- in some other means, namely

7. If you have any comments on information seeking and distribution, please, do add them here:

Parallel publishing and networking

8. How many joint articles have you published with person(s) from a foreign university or universities during the past six months?

9. How many international co-operation research projects have you worked in during the past six months?

10. How many research papers have you published in an Open Access journal during the past six months?

11. How many of your research articles have been placed in the digital repository of your University during the past six months?

12. If you have any comments on parallel publishing and networking, please, do add them here: