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1. What will be the role of libraries and the librarian in the future?

I think, in the immediate future, let us say for the next 10-15 years, libraries and librarians are going to continue to exist, particularly in relation to scholarly libraries, national libraries and so on, because the stocks of materials are still in those areas predominantly in print form, therefore they are going to need to be maintained and managed, and lots of materials will still continue to be produced in print form, so they are certainly going to persist. In specialised areas of information work: in business, industry, research institutes, etc. I think the signs are that the work of the special librarian and the information officer is gradually being incorporated into more organisation-wide information systems departments. This is simply because a lot of the means of access and means of delivery of information to specialised workers in those areas is done through computer-based information systems. Where special libraries fail to become integrated in that way, they are likely to disappear rather than survive, because the central role of those kinds of systems, that is information systems in business and industry, is in relation to the internal information systems, systems for the management of the organisation. Where the special library achieves integration with those systems, the librarians and information scientists and information officers are going to survive in some sort of role or another.

For the more distant future, I think that the book as an artefact for conveying information, is likely to decline because conveying information will become a predominantly electronic activity. The book as a cultural artefact and as the means for delivering entertainment, intellectual stimulation, however one likes to think of it, is likely to persist, but this will probably remain a reduced need for librarians per se, because particularly in the West we see a decline in library use and an increase in book buying. Where large library systems exist to cover both the recreational and cultural materials and the scholarly and academic materials, there will not be, in the future, the information bearing materials that you need a large system to house and manage and control.

So I think that for the more distant future the library and the librarian is likely to decline in significance as people acquire more of the information bearing materials electronically and as the book as a cultural artefact tends to be bought rather than borrowed. There still will be a role for national library systems very clearly, because you have to conserve those materials, and there may be an added role for national libraries in conserving the electronic archive because that is the obvious agency through which to attempt national conservation of electronic materials which otherwise is going to be very difficult.

2. Which are the essential knowledge and skills needed by modern information professional?

Well, I think that if "the modern information professional" includes the full range of activities involved in generating, disseminating, conserving, maintaining, and organising information in all its forms, the movement towards electronic information production, electronic information storage and so forth, means that there is now a much wider range of roles involved in the process than used to be the case, because the roles required now extend very strongly into technology areas, whereas 25 years ago they did not so extend.

And yet the traditional skills of a librarian in areas like cataloguing, classification, indexing, so forth, continue to be needed. So what has happened is, I think, a diversification of roles, so that even a library will have a systems person to manage the computer systems, even a library is likely to have, or to need, somebody with telecommunications competencies to manage the telecommunication systems, while they still need all the people that they needed before to do the information handling activities. Whether you can build all of those skills into a single individual, I doubt.

So I think that what will be needed in the future in libraries and information systems, is a diversity of people filling a diversity of roles rather than the rounded professional person who can do it all, because simply from the point of view that the knowledge required to do certain specialised things properly, it is not possible to create the rounded professional who would be able to do the entire conspectus of things.
3. How the education must change to respond to the changes?

The logical consequence of what I just said about the range of skills that are going to be needed in the future, implies that if there is no such person as the rounded professional, who is capable of doing all of the things, what we're going to see in education, I think, is a variety of different education institutions preparing different kinds of information professionals. Some will be based in computer science departments or information systems departments and their orientation will be to the hardware, the telecommunications protocols, the software systems and perhaps to an increasing degree the organisational aspects of information management.

On the other hand there will be those in business schools, where the emphasis will be on business information systems, where a lot of attention will be paid to the management of internal information resources in the way of production data, personal records, in competitive environmental scanning of the markets on those kinds of things, and you'll have a different kind of information professional coming out of business schools compared with the information professionals coming out of an information systems departments.

And you'll have departments of library and information studies, where the emphasis will be on the information content and the subject background relating to information content, problems of storage and retrieval, indexing, abstracting of the electronic information resources, with preparation of guides to electronic information resources with additional elements of training, which make them if not competent in the technical areas, at least aware of the implications of those technical areas. So they can talk to the technical specialists, who are doing the actual technical work in organisations and interact with them effectively.

So I think, that there won't be education for the rounded information professional, there will be the preparation of information specialists from a diverse range of perspectives and in any form of organisation they will be interacting in different ways, doing different kinds of jobs, coming together when they need to build information systems. For example a telecommunication specialists will be handling the telecommunication for the organisation, the information systems staff will be managing information systems for the organisation, interacting with - we'll call them librarians, but they might have another name - librarians, information managers - to help lead those systems effectively. I think the educational pattern is going to become much more diverse, just as the roles and skills that are needed in organisations, are going to become much more diverse. One is a mirror image of the other.

4. Which are the most important qualities to take into consideration selecting candidates for LIS profession?

We are going through a curriculum revision process in my Department currently and as one exercise we went round the table and asked almost exactly that question - what are we looking for, when we interview candidates for places on the courses, and I was the only person, who put down one particular characteristic, which I think is the most important and curiously none of my colleagues put it down and that is - imagination.

I believe that imagination is the key to all intellectual development and all intellectual activity, if we don't have imagination in the people we will train, we don't have people capable of creating, and so I believe that imagination is the key element needed certainly for the future, because people are going to have to imagine things, that are at present inconceivable, just as 25 years ago what we have now was inconceivable, but people have to have the imagination to seize upon developments and create new things.

Clearly in addition to that they need intellectual capability, they need to be intelligent, they need to be sharp, bright people. In our particular Department - because we are mainly a postgraduate department, we believe that they need subject skills in other disciplines and I think, that this is going to be increasingly important in the future. I think that undergraduate preparation is going to become a second level of preparation and is not going to be highly regarded by potential employers, who will be seeking people with an understanding of what they do at a graduate level.

And I believe that strong motivation to work in the area, enthusiasm for the notion of information service, an interest in and an eagerness to work with people and to interact effectively with people, both as members of teams and as people serving other people: information service and librarianship have always been service occupations and therefore the ethos of service is very important.

5. In Estonia the terms open learning, flexible learning, distance learning, resource-based learning, etc. are quite new at the moment, still we have started to talk about a new or modern learning environment. What is the modern learning environment in your opinion?
Well, as you know, we have a project at Sheffield of which I'm project head, called NetLinkS, and my colleagues on that project talk about the appearance of a new educational space, by which they mean that delivering of education is no longer bounded by the physical space of the classroom of the university or by the geographical space of the university classroom. Again the development of networks, development of campus networks, national education networks, international networks, the Internet, mean that the space in which you present learning materials is now cyberspace rather than physical space of a classroom - or potentially it is.

Now there is obviously going to be a very uncertain period, I think, as we move from a situation in which learning materials are delivered by a teacher standing in front of the class and using a blackboard and chalk or an overhead projector or whatever, to one in which the students have access to learning materials over the network and access to the tutors, either face-to-face or over the network or both, and I think that we are in for a very chaotic stage of development in the interim period of moving entirely from one to entirely or largely the other. Partly because not all universities have effectively developed campus networks, so the use of computer-based learning materials is going to be developing in a haphazard fashion in any institution.

Secondly the difficulty is that not all institutions, probably not many institutions, probably very few institutions, have any really strategic understanding of the way in which the changes can take place, or of the way in which they want to manage the change within the institution. If the change is not strategically managed by the institution, then one has a very chaotic, spasmodic development of the ideas depending entirely upon the individual enthusiasms of lecturers, teachers.

So those are two things that I think will inhibit the move towards the full use of this new educational space. The problem of the infrastructure, which is extremely costly, and the problem of the strategic direction of the institution.

Another problem that exists in relation to this, of course, is that it is more difficult and more expensive to maintain computer-based learning materials, than it is to continue to feed and water a lecturer, because a lecturer can establish the basis for the delivery of the course and update it every year, not necessarily on paper, but in the head. The lecturer reads all sorts of materials in the course of the year, it's not necessary for him or her to put that all down on paper and change the lectures, he or she is just going to keep it in the head. And in the delivery of the lectures, the lectures will be different from last year, but there's no paper record of the difference.

You can't do that with computer-based learning materials, you have to update the actual physical content of the record in order to keep it up to date, that is an extremely time consuming and expensive process and in order to do it effectively, the teaching staff must be released from other duties, so that they can effectively maintain the learning base. So that's another barrier in the way of moving from present based classroom teaching to the open learning or distance learning models or remote tuition models based upon networks. And I think until the strategic issue is faced by institutions, and institutions say this is the direction in which we wish to move, and these are the steps, that we're going to take in order to insure that we get there, until those strategic decisions are taken, we're going to have a period of very haphazard development of open learning systems.

6. What is the role of the educator in the new educational space and what knowledge and skills are needed by modern educator?

A question which is somewhat similar to the question about the future skills of a librarian and is also related to the issue of a strategic direction taken by the institution, because I think education institutions are going to have to realise that in the future of the open learning space, the new educational space, the role of the educator is going to have the same sort of diverse characteristics as the future role of the librarian and there is a question - as to whether you should expect one person to have all the capabilities required, or whether in fact you need a diverse range of skills and the diverse range of people.

A lecturer standing in front of a class can be the same person who studies the material, studies the subject, does the research, writes the lecture notes, delivers the lecture. Because it's all one person and it's all one technology that is used in the delivery process essentially. In the new educational space it's not necessarily the same technology and one has to ask the question, whether or not lecturers who prepare the lecture materials, should necessarily be the same people who convert those materials to a digital form and who presents them effectively digitally. Is it reasonable to expect that a lecturer should be competent in HTML coding, for example? Is it reasonable to expect, that a lecturer should have a close understanding of the nature of the
particular kind of rhetoric that is needed to present information on a screen, compared with information on a printed page?

I don't think it is reasonable to expect those things, I think we're going to need teams of specialists who develop, produce and deliver learning materials on the screen. That is not going to be the job of one person with a diverse range of skills, it is the job of a team. This is why it's a strategic issue for education institutions, because there have to be investment in the team and there has to be the preparation of the team. Otherwise we're going to get amateur efforts in the educational process and that will be to the detriment of the teaching and learning process. So I think we need teams, rather than people with a range of skills.

7. Talking about the modern educator in LIS field, what might be the relation between research, teaching and professional activities?

This relationship between research and teaching has always varied from country to country: there are some countries, where the university lecturer is simply expected to teach and is not expected to undertake research. In the UK the opposite is true: the lecturer is supposed to be a researcher as well as a teacher, although that was not true in the case of the polytechnics that have been transformed into the new universities. The original mission of the polytechnic was that it should be a teaching institution and not a research-based institution. Now the way in which the development of national policy in the UK has gone means that those institutions are now having to become research-based institutions. And there is consequently a period of difficulty in which they make a transition from one to the other.

As to the future, if we imagine a scenario in which the delivery of higher education is predominantly a network-based phenomena, with face-to-face tutorial groups, with face-to-face interaction with tutors, with remote but video interaction with the tutors, we can imagine a situation in which again a set specialised skills is being employed and in which, perhaps, the people, the team that produces the learning materials would include researchers, who do not do any tutorial support, they will include tutors who do not do any research, they will include technical staff, who do the physical preparation of the learning materials, they will include design staff, who aid the development of the learning materials and so on. If we imagine this team structure, we can envisage the situation in which research and teaching are separated in the person but integrated in the team and that is one possible scenario.

Another possible scenario is that all educational staff are in fact research staff, rather than teachers and the technical support for the delivery of the learning materials is a team function and the tutorial support for those materials is again a specialised function. So it can go either way or the researcher can be the tutor and perhaps there will be some researchers whose abilities and competencies tend to push them into the direction of being tutorial support workers and others who do not feel comfortable in that role. Now, at present, if you get a researcher or teacher who does not feel comfortable in one or other role, you have a problem, in the future with a team structure, we can envisage the situation in which research and teaching are separated in the person but integrated in the team and that is one possible scenario.

8. What kind of research has got the priority in your Department at the moment?

We have three research groups as we call them in the Department. We have the Information Management Research Group, the Computational Information Systems Research Group and the Public Policy and Library Management Research Group and these really identify our research priorities.

These are the areas in which we want to be developed and within the Information Management Research Group for example we have two sub-specialisations: one under which NetLinkS or Network Learner Support project is being developed, the other in health information management where we are the lead department in the university-wide Centre for Health Information Management Research.

In another area, library management, we have projects, for example, that have been looking at the impact of a strike of librarians in Sheffield last year, what the impact of that was on the community. We have established a Centre for the Public Library in the Information Society and we hope to get some external funding to continue to develop that centre. We had research going on in the area of quality management in library systems and in the health information management area we have a strong orientation towards information needs, information requirements, particularly in relation to various groups in society for health information, for example the elderly, the disabled, so forth.

In the Computational Information Systems Group the strong research area there is in chemical information systems and protein structure retrieval systems with a continuing number of
projects in areas of aspects of text retrieval, a particularly strong line of research in relation to stemming algorithms in different languages, so that we've had people doing IR research in relation to Serbo-Croat, Turkish, Latin and a variety of other languages.

And in the information management area generally, a strong specialisation is in information strategies in organisations and, currently, information strategies in higher education. So we have the broad priorities defined by those three research groups and within them, there are research priorities which vary over time as the field develops in respect to those three areas.

9. In Estonia there was a discussion some months ago that our LIS curriculum is too much orientated to modern information technology and the traditional librarianship has disappeared from it. What is your opinion about traditional librarianship and its role in LIS curriculum?

If we look at the librarianship and information studies curriculum over time, it has always been a composite discipline. Librarianship is not a single discipline, information science is not a single discipline, it's a complex and it has drawn upon different areas at different times in its history in order to deliver effectively prepared people into society.

The major contributions, I think, of librarianship to the management information are probably in two areas: one is what we can generally call bibliography or the management of the information resource, in terms of its organisation, and the other is in the technical tools for that organisation in cataloguing, classification, indexing. Now, I don't see that there is any less need for a focus on those areas then there has ever been. It is simply that the nature of the information resources is changing from print to electronic production and therefore the techniques that we have used in the past for organising the bibliographic resource are going to be needed in managing the electronic resource.

Just as we have guides to the literature, we need guides to the electronic resource, just as we have bibliographies, we are going to need "cyberographies" to enable people to get access to the range of electronic resources that is available. And in order to present information about those resources effectively in the future, we're going to have to adapt the skills of cataloguing and the standards of cataloguing to the new electronic resource. Because information retrieval systems are still relatively imperfect devices for the free-text information retrieval and classification schemes are still relatively good devices for organising and retrieving information whether in print form or electronically, the skills of classification are still going to be needed.

It's interesting in fact, that Yahoo on the World Wide Web is a classified structure of WWW resources rather than simply a free text retrieval system. It takes that form, because you can more effectively filter the information that is out there if you categorise and catalogue it and I think that there will be a continuing need for the skills of a subject bibliographer, for the skills of a cataloguer, the skills of a classifier in the electronic future. What librarianship and information science need to do, is to build on those traditional skills and make them more applicable to the electronic information in the future.

10. You are the editor and the initiator of the electronic journal INFORMATION RESEARCH. How did the idea of the electronic journal develop and what is the role of electronic journals at present and what it will be in the future?

This developed out of a print publication "Information Research News", which the Department had published for a number of years to produce working papers on research in the Department, and that itself developed out of another print publication called "CRUS News" when we had in the Department the Centre for Research on User Studies. And so it has something of a history as a print publication and it seemed to me that it would be useful to make that more widely available electronically, simply because we had made it available in subscription, but the number of subscriptions was very low and therefore it was not an effective publicity vehicle for the Department, since it went to so few external sources.

I can indicate the difference by instancing that the electronic version of INFORMATION RESEARCH has had more than 4000 hits since it started in a about April 1995, whereas the print publication has about 25 subscribers. So in terms of reaching an intended audience, there is simply no contest between a publication that you subscribe to or require people to subscribe to, and something that you make freely available, it has much better public relations value than the print publication.

So this is one part of the rationalisation for doing it: simply because it seemed that it would reach a wider audience and that there were reasons why it should reach a wider audience. So some of the individual papers e.g., have had more than 500 hits while they've been available in the electronic journal. Given that the average readership of a journal article is about one person
per paper if we take all journals and all readers, if you can increase the readership of the paper, you're obviously doing a much better job.

To go to the second part of your question, what is the future of electronic journals, I think that the long term future is that the scholarly journal will be electronic, full stop. There will be some that will continue to have a print version but the bigger advantage of the electronic version is that it allows the development of the form which is not possible in the physical artefact. In the electronic version of the journal idea, it's wrong to call it a journal any longer, I think, because it evolves in the something different, but in the electronic version e.g., you will not simply refer to the fact that a video show of a particular scientific experiment, let us say a chemical reaction, is available. You will be able to have the video embedded in the page. You will not simply be able to present a table of research with data, you will be able to have behind the data the database from which the table is produced. This means, for example, that in examining the data, a reader will potentially have the possibility of exploring alternative hypothesis in the data by getting direct access to the data. If an equation is shown on a basis of which results are derived, it will be possible for the reader to change the elements in that equation and see if he or she gets a different result.

So the interactivity of the form is something that will change the nature of a journal article out of all recognition and this, I think, is why the journal will become something other than a journal and something more useful in delivering information to the scientific community or a scholarly community generally.

A fact that is related to that, is that the journal article has an authorship, it has 1-2-3-5 people who are the authors of the article: there is no need for that to persist in the electronic future because an article in an electronic journal can be the stimulus to interactive debate and in effect the contributions to that debate can extend the authorship of the article. So the main feature of the documents, electronic documents, will be that they have a very diffuse authorship. Contributing to that kind of electronic debate, may well take the place of the number of journal articles that you've published as a measure of scientific productivity. So we may see the ethos of the scientific process changing from the ownership of specific documents to peer recognition in debate as the criterion by which you judge the scholarly effectiveness of people. And I think that would in fact be a very healthy development, because the first model sets up all kinds of inhibitions, of competitions of the ownership, of phenomena, whereas the second model sets up an ethos of collaboration and co-operation which, I think, is potentially more productive than the competitive ethos.

11. What is the reason you are visiting Riga?

I'm visiting Riga because Sheffield will be involved, or is involved, in the preparation of a TEMPUS proposal which involves the Baltic states and which is centred on Riga Business School and I am here simply to talk with people about the development of that project, which also involves another institution that I have connections with, which is the Faculty of Engineering of the University of Oporto in Portugal. So I'm here to liaise with the organiser of that TEMPUS submission and to meet other people, who are involved in it. [In editing the interview after the event, I might also say that I have very much enjoyed the visit - even in the depths of winter! I hope that this may be the first of a number of visits to the region to make more contacts and help to build fruitful research and teaching relationships between my own institution and those in the region.]

12. Is there something you would like to forward to the readers of INFOFOORUM?

My very best wishes for success in the information future!