ELECTRONIC INFORMATION: 12 YEARS OF PROGRESS; WHAT WILL HAPPEN IN THE NEXT 12 YEARS?

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1 Introduction

When I was asked to review the 12 years of development of electronic information I tended to think of on-line as the main development. It was not until I started to think about the content I realised that the «electronic» element now covered a lot more than on-line and so I decided to look more closely at what it really meant now that virtually all information is electronic and that the next 12 years would see further more dramatic developments.

I also decided that it was important to ask whether there had really been progress. We tend to think of technological developments as being progressive, but sometimes they create further difficulties.

Therefore, this paper is not so much a review of the past and a forecast of the future but a somewhat sceptical review of where we have been, where we are and where we might be in the future.

2 12 years ago

In 1984 there was on-line information, mainly for the professional information users and even then, only for those who had money. The access was via less than reliable telecommunications networks —the Eusidic surveys in those days showed more than 30 % of the calls to data networks failed. CD-ROMs were still a rarity, there were few titles and the drives were expensive. The idea of hyperconnections, hypertext, or hyper anything was unknown. SGML was an arcane art known only to a select few developers, most people did not have even their own word processing packages and those that did exist were rather rudimentary. HTML had not been invented. Document Delivery was an unknown term, people still talked about inter-library loans and even the big on-line services had only minimal arrangements with document suppliers for the delivery of items identified in searches. The Web was also unknown, except to spiders.

3 12 years of progress?

If we divide this question into six parts we can examine who benefited from the progress and who did not.

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3.1 Information Professionals

Here it is hard to decide. Some information professionals have undoubtedly benefited from the changes but many have not. The beneficiaries tend to have been those in the private sector, public sector information units have been slower to adopt the technologies. Equally the younger, more flexible, people working in more «information» oriented tasks have progressed, the more traditional library roles have not changed as much.

3.2 Computer professionals

Here it is obvious that there has been significant professional progress. However, there has been an equally significant widening of the field of computer professions. It has opened up what was once a field which was populated by devotees to a much wider section of the user community. This has coincided with improvements in the usability of software and hardware. The information community seems to have been invaded by computer people, at least in the view of some library professionals, who bemoan the fact that most of the new information tools in the Internet, for example, are provided by computing interests. My reaction to this sort of complaint is that the information profession has only itself to blame if this has happened, they, more than most, know what is wanted, so they should be able to supply the requirements.

3.3 Libraries

Undoubtedly there has been much progress in the functioning of libraries and of the services provided. This progress has been uneven, some have moved much more quickly than others. The Universities, with their early access to the Internet, were leaders but private sector corporate libraries have made rapid progress. These latter have probably suffered more from «downsizing» than any other sector so they have been forced to move towards greater use of technology to substitute for personnel reductions. Libraries generally have suffered from budget reductions which has forced them into cooperative purchasing arrangements, the use of document delivery on demand services and shared cataloguing.

3.4 Publishers

In many ways the publishing community has changed least. The «newer» publishers, those who concentrate on CD-ROM and electronic publishing, of course, have been at the forefront of developments, but there are relatively few in that category. The «traditional» publishers, especially those serving the academic sector, have been relatively slow to change. They have seen the threat presented by the new networking arrangements but have not felt secure enough to try more than some experiments. Their major fear is loss of control of their material due to the ease of copying and distribution on the networks and the lack of means of getting paid and protecting their materials. They have, in recent times, launched a number of experiments but there is a feeling that many of

these are aimed towards revenue preservation, especially as there seems to be little if any financial incentive to use the newer formats and distribution channels on offer.

On the user side there are two groupings to consider.

3.5 Professional Users

Here we have had the greatest progress. In the business community in particular we have seen a virtual revolution, the move from main frame dominated computing to local networking and with that the availability of localised information distribution via socalled Intranets. However, we have to ask, were these developments driven by existing information service suppliers or have new players arrived? The answer is that some of the «old» suppliers have benefited, Reuters for example, but much of the new supply is provided by new information entities, set up to provide integrated services via a common interface, typically the Web. In the technical industry sector we have had a move towards decentralisation of information supply, driven partly by downsizing of libraries and their replacement by direct access by end users. Intranets in these organisations have given the existing service suppliers new opportunities.

3.6 The General Public

If one is to believe the hype one reads in the newspapers then the general public is about to be inundated with new information supply tools, from tv on demand to interactive multimedia. There is little real evidence of this but there are a lot of experiments. This potential opens up new opportunities for the information sector, but it will be driven by the developments by Microsoft and Netscape first and then the information suppliers can move in.

4 Is information easier to use?

In the last 12 years we have certainly improved the methods of delivery but have we really made it easier to use? The answer is probably yes, in the sense that it is generally easier to identify information sources that may be of value in the conventional information stores and the means available for ordering original materials are more efficient. The computer and telecommunications have been the major drivers here but not all the suppliers nor the libraries have been as quick to react to their potential as they might have been.

5 Is information easier to find?

If we restrict the answer here to search engines, the last few years have seen a real explosion in the number of tools at our disposal. However, there seem to be more complaints than ever that, especially in the Internet, information is harder to find. In the world of specialist on-line services a number of new techniques have improved the quality of searching but these have tended to be of value only to highly experienced and

regular users. The new tools in the Internet have been developed outside the information sector, a fact which has led to a «not invented here» type reaction from information professionals. They are not perfect, but one can ask «what is»? and they are quick to adapt, which is more than can be said for the information professionals who criticise them. In the Internet area the number of requests placed with these new search engines daily far exceeds the number of searches of on-line services, so they are getting more market feedback, can attract advertising to support their costs and make investments in new techniques. It is an area where the information professionals could have made more contribution but they have been slow to do so.

6 Is information better value for money?

The answer here is «probably yes» for many years the information sector has tried to prove a cost benefit relationship for investment in information seeking and purchase. Most of the work has been fruitless, especially in influencing the policy makers and those in charge of budgets. The last few years has brought, without much help from the information professionals, a lot of interest in the so-called Information Society by politicians and their assessment has helped improve the image of information and information related activities. It is also clear that the improvements in technology and telecommunications has brought about a reduction in the direct cost of using modern information retrieval tools. The beneficiaries of this are the users mostly, but revenue increases have enabled more investment in new products and services.

7 Better quality information?

There is still a serious lack of valid quality measures for the sector. Larger volumes of information and more access does not necessarily mean better quality. Despite all the developments there is still too much information of mediocre quality on offer and too many errors in the data sets. It is to be expected and hoped that the next few years will bring, through competition and through greater customer pressure, an information industry led movement towards valid quality measures which can be compared on an equal basis to show improvements and disimprovements.

8 The balance sheet of 12 years of progress

On the positive side we can say that we have:

On the negative side we might note:

Much more information available	More expectations than we can deliver
Better presentation of that information	Belief that a simple «point and click» interface is available information
Better access to it, on balance	Overselling of information
A better understanding of information value	New Players threatening some of the older ones

On the negative side we have created and are probably still creating, through the hype associated with the Internet and the Web an expectation that information is available at the click of a mouse, through a set of blue underlinings on the screen. We, the professionals, know this is not true, but what are we doing to overcome the misinformation? The Web clearly shows us the way the audience wants its information, what are we doing to deliver that requirement?

9 The next 12 years

9.1 What sort of information are we talking about?

It used to be that information meant professional information, used for professional activities. General news, features, entertainment, were not considered in the same area. However, due to digitalisation, all information will be treated in the same way in the future. This means that «our» information, the professional and business use, will be mixed in with the other information, at least as far as its creation and distribution are concerned. In addition, multimedia, the addition of sound and motion video, will mean that information products and services will be created by new types of organisations, more aligned with the entertainment industries.

The other major development will be that information of all kinds will be delivered through the same channels. Obviously, the use to which the information is put will vary and so will the tools for its use, but, increasingly, the digital signal will come through a common «pipe» to our home or our place of work, or while we are travelling.

9.2 The segmentation of the market and disintermediation

With all information being delivered in a common channel, there will be a lot of segmentation of the markets for the different kinds of information for different audiences. Information professionals, both at the production and the distribution level will have to create information products and services which meet the needs of increasingly sophisticated groups of users, in increasing competition with other products and services, such as interactive television and segmented and mixed media entertainment/education/information products. Another phenomenon will be disintermediation, or the removal of the (human) interface between a user and the information he or she seeks. We already see this in services on the Internet such as Infoseek, Pointcast and with search engines such as Alta Vista. This trend will continue, so that information professionals will be competing with system designers as well as working alongside them to create better and more efficient interfaces as well as ensuring that the information actually needed is indeed delivered through the interface.

9.3 More demanding audiences

The result of these changes will be the creation of a professional audience for information which is very different from what we have today. They will be much more at-

tuned to the technological capabilities as a result of exposure to high tech tools during their education and in their work. They will be expecting to choose their information from amongst a wider range of competitively priced and presented offers, they will have the opportunity to compare and contrast the options available and they will know that they can publish their results and their experiences widely, including their opinions of the information products and services they have received.

In summary, the professional audience of to-morrow will be:

- MUCH more demanding.
- MUCH more aware.
- MUCH less accommodating.
- MUCH less willing to fund or pay for information that does not meet the need.

9.4 The new audience, what will they need?

There are many opportunities for information professionals in serving this new audience. They will need well designed and managed information product and services. These will be based around the concepts introduced by the World Wide Web - which means that there will have to be a lot of design work on the creation of the links, their maintenance and ensuring that they are relevant. Up to now information professionals, despite the fact that they have been accustomed to creating classification and cataloguing systems, the webs of old, have not been active in the design of the new web. The skills need to be brought up to date to extend the work into this new area. In addition, technology will offer the opportunity to use intelligent agents, software packages which will be launched into the Net to seek out information. While this sounds rather science fiction to-day, there is significant work under way in this area and again, the information professional has a role to play. Using the software tools the professionals should be able to design their use to optimise their efficiency. An agent which is not «information aware» will not produce efficient results, the initial information awareness will have to be «learned» and then tuned to retain its effectiveness.

As I stated earlier, multi-media will extend the effectiveness of information by adding new dimensions. Whilst the technical and artistic skills will come from media professionals again the information skilled will have to be introduced.

Finally, these new audiences will need their information «just in time» when they ask, in the form most appropriate and in the right quantity. This will present the greatest challenge to the information profession.

9.5 Who will deliver the information?

This is the really interesting question. Traditionally, publishers and libraries in their various forms have been the vehicles for the creation and delivery but that is changing. Microsoft, a company founded in the late seventies, is now one of the world's leading publishers. CompuServe, a computer offshoot of a specialist publisher of taxation information is a major distributor of information. Telecommunications companies, the successors to the old monopolies, are actively seeking partnerships for information delivery.

To deliver information in this new world will require new skills. Information artists will be needed who can create new forms of information delivery which will stand out from the mass of information around. The information professionals will have to become like choreographers, co-ordinating streams of information in many forms from many sources. These information artist/choreographers will become the «new publishers».

10 Conclusion

The real question is, will the traditional libraries and their professional occupants survive all these changes? Many will say that my view is exaggerated, and perhaps it is. However, if we do not believe that there is significant change going on around us then we are living in an unreal world. It may well be that many information professionals have, as yet, been untouched by the newer activities, typically in the «soft sciences» history, philosophy, etc. That is true, but it will not remain like that for long. Again, many information professionals will, rightly, say that the Internet, using that as a generic term for all the new information channels, does not contain much that is new and contains much that is not very good. This is also true, but it does not mean that it will die off. If we examine the way, for example, the search engines have been developing, it reflects exactly the sorts of developments in library science, the improvement of cataloguing and classifications which we made as the amount of data to be processed increased. The difference is that we, the information professionals, have tended to look down on the search engine developments as mere mechanics, whilst we have not attempted to use our knowledge and experience to create better tools.

In this paper I have tried to point out that change is now a way of life. What was once a settled profession dealing with books and other information materials following well established rules is undergoing dramatic change.

If we look forward twelve years, we will see even more dramatic change. Just to itemise a few of the issues:

- Information ownership and users, authors and distributors rights.
- New methods for managing information.
- Dealing with information overload, filtering information for users.
- Managing information in multiple modes.
- How to organise the payment for information delivered in multiple modes and through multiple channels.

If you do not think that these and perhaps other changes will affect you then perhaps you should start looking for a new job. If you do stay in the information profession, then you are in for an interesting time.