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Internet applications, sites, trends and happenings

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This column aims to draw your attention to various interesting Web sites that I have come across and that may appeal to you. It also aims to keep you up to date with news and views on Internet trends, developments and statistics. It offers essentially a personal selection rather than comprehensive coverage.

Google

In the June 2003 issue of *PC World* an article entitled Maximum Google was published. Noting that the search engine was fast, accurate and fun to use, the article listed 25 ways to customize Google searches and to locate sites, images and news faster. In other words, train Google to work even smarter to meet your requirements. The article, which can be found on-line at find.pcworld.com/35306, mentions highlighting search terms on a Web page, using the toolbar, opening results in a new window, searching by date, finding words within a URL and drilling down with wild cards. All of this is very useful and also applicable to other search engines. In addition, the article highlighted Google's specialized sections like Froogle (for products on sale), Google answers, Google directory, Google news and Google glossary.

However, I bet you did not know that Google keeps track of every search that you perform and identifies you with a unique identification number. Part of this is to do with the latest US anti-terrorist paranoia, but part of it is to do with Google's business strategy. An article in *Time Magazine* notes that Google delivers over 200 million results daily thanks to its hyper-accurate algorithms – but there are no such thing as a free search. Eschewing pop-up advertisements and intrusive banners, Google offers paid listings. Sponsors pay for rights to keywords and when a Web surfer enters one of these keywords, a related sponsored advertisement appears alongside the search results. Actually, this is not such a bad idea (even if you do not like advertisments) – it may show you something related that you might be interested in.

However, a body called Google Watch (http://www.google-watch.org) thinks that the search engine is a privacy time bomb. Comparing the top four Web sites, Google easily comes out on top. The site provides about 75% of the external referrals to other Web sites and there appears to be a struggle about who has influence over the vast amount of user data that Google collects. The privacy struggle, which includes both the old issue of consumer protection and the new issue of government surveillance, means that the question of how Google treats its user data becomes critical. Given that Google is so central to the Web, whatever attitude it takes toward privacy has massive implications for the rest of the Web in general, and for other search engines in particular.

The other major gripe that Google Watch has with Google is the PageRank problem – the fact that Google's primary ranking algorithm has less to do with the quality of Web pages than with the 'power popularity' of Web pages. PageRank drives Google's monthly crawl. Sites with a higher PageRank get crawled earlier, faster and deeper than sites with a low PageRank. This becomes a major obstacle for sites with an average to low PageRank. If your pages do not get crawled, they will not get indexed. If they don't get indexed in Google, people will not know about them. If people do not know about them, there is no point in maintaining a Web site. Google's PageRank works on a 30-day cycle, so the missing pages stand an excellent chance of getting missed on the next cycle as well. (http://www.google-watch.org/pagerank.html).

Other anti-Google points include the fact that Google was the first search engine to use a cookie that expires in 2038. This cookie places a unique identification number on your hard disk if you do not already have one when you land on a Google page. If you have one, Google reads and records your unique identification number. For every search that you conduct, Google records everything that it can: the cookie identification, your Internet protocol (IP) address, the time and date, your search terms and your browser configuration. Increasingly, Google is customizing results based on your IP number. This is referred to in the industry as IP delivery based on geolocation. It seems that Google retains all data indefinitely. Furthermore, with the advanced features enabled, Google's free toolbar for Explorer phones home with every page you surf. It reads your cookie and passes along the last search terms that you used in the toolbar. This means that if you have the toolbar installed, Google essentially has complete access to your hard disk every time that you phone home. You can read more about Google Watch's problems with Google at http://www.google-watch.org/bigbro.html.

Google Watch offers its own anonymous proxy search – no cookies, no search term records and access log that is deleted after seven days. Try it at http://www.google-watch.org/cgi-bin/proxy.htm.

European women on the Web

The latest research from Nielsen//NetRatings reveals that 42% of European surfers, or 35 million people, are women (http://www.nielsen-netratings.com/pr/pr_030624_uk.pdf). The speed of growth is so slow – merely 1% since last year. According to current demographic rates, it will be 2010 before there is gender parity among European Internet users. In the USA, on the other hand, over 51% of surfers are female.

The proportion of female Internet users varies greatly across Europe, with Sweden (47%) and the UK (45%) having the highest percentage of women surfers. In Italy, women accounts for around 37% of the on-line population – a figure that has actually decreased since this time last year.

The sites that tend to attract female surfers include shopping, travel, education, finance, and health and beauty sites, particularly in those countries with a higher proportion of female Internet users. It seems that specialized and practical sites (e.g. shopping or local guides) do better than portals specifically designed for women.

A Dutch version of this article can be found at http://www.nielsen-netratings.com/pr/pr_030624_netherlands.pdf.

Sweden comes first in e-readiness rankings

It seems that Sweden has overtaken the United States to become the leading nation in terms

of e-readiness, according to new research from the Economist Intelligence Unit (EIU) (http://www.eui.com).

E-readiness is defined as the extent to which a country's business environment is ready for Internet-based commercial opportunities. The ranking is based on a number of factors, including connectivity and technology infrastructure, business environment, consumer and business adoption, social and cultural infrastructure, legal and policy environment and support services.

The USA has come out top in the e-readiness rankings for the past three years, but the downturn in the US economy has meant that other nations have gained ground. Scandinavian countries, in particular, dominate the top 10 positions. What sets these countries apart is the extent to which the Internet has pervaded their marketplace and reshaped their business transactions, as well as the eagerness with which citizens (including women) have incorporated Internet technology into their daily routines.

Denmark took second place in the latest e-readiness rankings, while the Netherlands, US and the UK tied for third position. Finland and Norway were ranked sixth and seventh. Among Europe's stragglers are Italy (21st), Portugal (22nd), Spain (23rd) and Greece (26th). South Africa, with an e-readiness score of 5.56 (out of 10) – slightly up from last year – tied with Mexico at 31st. The research indicates that most countries have improved since last year, thanks to the continued rollout of broadband services, uptake of mobile telephony and a spate of Internet-related legislation and government programmes. The report notes that businesses and consumers do not lead the e-business revolution alone, but that smart government initiatives (including in South Africa) are boosting the Internet's potential around the world. Read more at http://store.eiu.com/index.asp?layout=pr_story&press_id=890000689 or download the free white paper at http://graphics.eiu.com/files/ad_pdfs/eReady_2003.pdf.

Internet company mergers and shutdowns

Best estimates, compiled from industry sources, show that at the beginning of the decade there were between 7000 and 10000 Internet-related companies that received formal funding. Three years after the peak of the dot com frenzy, nearly 5000 Internet companies have either been acquired or shut down in a massive sector consolidation (http://www.Webmergers.com). Webmergers surveys hundreds of published and personal sources to track mergers, acquisitions, bankruptcies and shutdowns of 'substantial' Internet companies around the world – defined as those that have received significant funding from venture capitalists, angel investors or other formal sources. Other highlights from a recent article (http://www.Webmergers.com/data/article.php?id=67) show that since 2000, buyers have spent some $200 billion to acquire almost 4000 Internet properties. During the same three-year period, nearly 1000 substantial Internet companies have shut down or declared bankruptcy.

Of all the companies that were affected, Internet destinations (Web sites that offer content or e-commerce services) accounted for most of the activity, seeing some 1500 acquisitions and over 600 failures in the three-year period. Internet infrastructure companies saw more than 1700 acquisitions and almost 200 shutdowns in the past three years. Internet-oriented consulting firms and providers of Internet access services accounted for the remaining transactions and casualties.

Reasons for the merger mania point to established information technology (IT) vendors who were highly active in acquiring enabling Internet technologies to beef up their own Web-enabled applications. The on-line collaboration niche offers an example of such activity.

Since January 2000, acquirers have spent more than $500 million to acquire 48 properties in this area. Other particularly active infrastructure categories included digital content management, security infrastructure, and e-business enablement tools and services that enable core Internet applications, such as supply chain management, customer relationship management (CRM) and procurement. In addition, investors have 'rediscovered' the potential of on-line services such as travel, employment, ticketing and financial transactions.

Electronic ink

Electronic ink is a new material that will have a far-reaching impact on how society receives its information. It is proprietary material from E Ink Corporation in Cambridge, USA that is processed into a film for integration into electronic displays. Although revolutionary in concept, electronic ink is a straightforward fusion of chemistry, physics and electronics to create the new material. The principal components of electronic ink are millions of tiny microcapsules, about the diameter of a human hair. In one incarnation, each microcapsule contains positively charged white particles and negatively charged black particles suspended in a clear fluid. When a negative electric field is applied, the white particles move to the top of the microcapsule where they become visible to the user. This makes the surface appear white at that spot. At the same time, an opposite electric field pulls the black particles to the bottom of the microcapsules where they are hidden. By reversing this process, the black particles appear at the top of the capsule, which now makes the surface appear dark at that spot. To form an E Ink electronic display, the ink is printed onto a sheet of plastic film that is laminated to a layer of circuitry. The circuitry forms a pattern of pixels that can then be controlled by a display driver. These microcapsules are suspended in a liquid 'carrier medium', allowing them to be printed using existing screen printing processes onto virtually any surface, including glass, plastic, fabric and even paper.

Electronic ink is claimed to move information display to a new dynamic level. It has dramatic benefits over traditional media. It has a superior look because it is made from the same basic materials as regular ink and paper. Electronic ink retains the superior viewing characteristics of paper, including high contrast, a wide viewing angle and bright paper-white background. It is versatile and can be printed on almost any surface, from plastic to metal to paper, and it can be coated over large areas cheaply. Electronic ink is a real low-power user. It displays an image even when the power is turned off and it is even legible in low light, reducing the need for a backlight. This can significantly extend battery life for portable devices. Also, the electronic ink process is highly scaleable, which makes it competitive against today's older technologies.

To learn more about the technology behind electronic ink, its key benefits and the company that makes it visit http://www.eink.com/.

Planet Jemma

Planet Jemma is one young girl's view of life at university as she studies physics and astrophysics. The basic idea is that you learn a little physics and science along the way in return for sharing in her fun. In one 'lesson' her friend has disappeared and brief texts explain the theory of instantaneous quantum teleportation and provide links to more serious science Web sites. A video diary enables the viewer to see what daily life on campus is like as Jemma shows you round and talks about her courses. Additional planets enable Jemma to introduce her friends. Visitors can sign in and send e-mails and take part in discussion groups and quizzes. The Web site is a different approach to getting young people interested in science – view it for yourself at http://www.planetjemma.com/.

Gates Foundation

The Bill and Melinda Gates Foundation was created in January 2000 through the merger of the Gates Learning Foundation, which worked to expand access to technology through public libraries, and the William H. Gates Foundation, which focused on improving global health. Led by Bill Gates' father, William H. Gates, and Patty Stonesifer, the Seattle-based foundation has an endowment of approximately $24 billion through the personal generosity of Bill and Melinda Gates.

The foundation is building upon the unprecedented opportunities of the 21st century to improve equity in global health and learning. This year marks the midway point of the foundation's commitment to bring computers with Internet access to every public library serving a low-income community in the United States and Canada. The Library Programme was the foundation's first large-scale, private philanthropic effort and nearly 30000 computers have been installed in communities stretching from the Yukon Territory to Texas and from New York to California, providing free information access to over 145 million people – almost half the population of North America. These efforts are making a dent in the digital divide in so far as North America is concerned. In the last two years alone, Internet connectivity in US public libraries has increased from 83% to more than 95%. In the same time period, libraries have also nearly doubled the number of public access workstations.

In recognition of the unique training and information needs of native American communities in the US, the Bill and Melinda Gates Foundation is working with tribal leaders, librarians and educators in the southwest to help bridge the digital divide among native Americans. The goal of the Native American Access to Technology Programme (NAATP) is to empower native communities through increased access to digital information resources. The programme provides access to tools and technology to preserve local culture and heritage, as well as opportunities for communities to teach digital skills to their members.

Further information about the Gates Foundation's programmes in libraries, education and health can be found at http://www.gatesfoundation.org/default.htm.

Book review and interview

The knowledge medium: designing effective computer-based learning environments
Gary A. Berg, Information Science Publishing. 2003. 300p. $79.95. ISBN 1-59140-103-8

This new publication examines the notion of computers as knowledge media and what such an idea might mean for education. *The knowledge medium: designing effective computer-based educational learning environments* suggests that the understanding of computers as a medium may be a key to re-envisioning educational technology. Because the subject is interdisciplinary, combining science with the humanities, the theoretical discussion draws from a broad range of disciplines: psychology, educational theory, film criticism and computer science.

Dr Gary A. Berg is the author of *Why Distance Learning?* and has published over 20 articles on higher education and the use of technology in education. He has worked in higher education for many years as an administrator and was Director of Extended Education at Chapman University. Dr Berg has developed many distance learning format courses and programmes and has been a consultant for educational and government organizations on the use of distance learning. He is currently Director of Extended Education and Distance Learning for California State University, Channel Islands. What follows is an interview with him regarding his new book.

Q. How are computers now being used for educational purposes?

A. In higher education, computers are generally used to automate traditional teaching methods. Since the lecture is still the dominant form of teaching, the computer is primarily used to present lecture material by way of text, PowerPoint, video talking heads or audio. Given this unimaginative approach, distance learning can never be more than a pale imitation of face-to-face education.

We must move beyond thinking about computers to automate and consider the strengths of the medium (which are many) and construct learning environments that take advantage of those abilities. One clear strategy that is being discovered is the advantage of increasing communication among students and faculty members through Internet-based learning. When Internet-based courses were first developed, many approached their design emphasizing a great deal of media-rich content with images, video and sound. Now, many educators have come to realize that this posting of content is not as important as structuring courses to create opportunities to communicate. So teaching in these courses is often more about facilitating communication than posting content.

Q. What advantage is there to understanding the computer as a medium?

Seeing the computer as a medium makes educators aware of both the power of its use in education, as well as the danger of misuse. Rather than being just a tool, as it is commonly described, the computer is in fact a very powerful new medium. Computers borrow from many other media, such as film, television, still photography and books. When computer users view moving images on a screen, they bring with them their interpretative experience of viewing movies and television programmes. Those that design computer software must be aware of this and take advantage of these conventions. On the other hand, users and learners should be aware of how they are manipulated. Nevertheless, computers are not just a combination of these media, but have unique features, such as interactivity and associative linking, in addition to the power of the computer processor in repetition and searching, and tracking user behaviour.

Q. How are techniques from other media borrowed by designers of educational programs for computers?

One example is the use of point-of-view. In simulation or role-playing types of applications, you will notice the equivalent of first-person camera angles used in film and television. Transitions from one 'scene' or location to another (with dissolves and fades) are directly taken from film. PowerPoint, which is now commonly used for educational presentations, has a selection of transitions as a feature, all of which are borrowed from film and television. Editing techniques, character animation, staging within the frame and overall dramatic structure are things that are taken from film and television in particular for use in educational computer applications.

Q. What are the dangers of the media properties of computers?

The danger is two-part for both software designers and users or learners who are not aware of the power the computer medium. Firstly, designers must understand that when they use borrowed media, they are tapping into the user's expectations and familiarity with this media. Additionally, media, particularly photographs (moving and still), have great power to convince the user of the truthfulness of what they represent. Designers must use the collection of media employed in educational software responsibly. On the other hand, students must be taught media literacy so that they can effectively understand and interpret what they encounter on a computer screen.

Q. Is it best to learn using computers in groups or through tutorials?

Students can effectively learn both in groups and individually. Each has its own advantage in computer environments. Going back to Skinner's teaching machines, one of the touted advantages of the computer has been that the computer as a tutor reduces the workload of teachers. In more recent constructivist terms, the computer for individual learning has been seen as an advantage in customizing the learning experience, and possibly even adapting to individual learning styles.

On the other hand, one of the biggest criticisms of on-line education has been its lack of student community formation. Forming students into groups to complete interdependent tasks is one way of encouraging on-line community formation. The interdependent nature of the tasks or projects is important because students learn from each other and form a community through their joint work.

Overall, it is interesting because many of those drawn to on-line education are very independent and do not want to work in teams. Nevertheless, this group approach is clearly an effective way to learn.

Q. How does the role of the faculty member change when teaching on-line?

Many have spoken about how teachers in on-line courses become facilitators rather than the traditionally dominant figures they are in face-to-face courses. I would add that the role varies depending on the delivery format, course content and teaching style. Generally, teachers should recognize the importance of structuring communication rather than pouring content into the on-line course. Of course, one might say the same about a face-to-face course, depending on your teaching perspective.

When one looks at the economic model for distance learning, one sees that the traditional faculty roles are in fact unbundled to reduce expenses. If this is done, then the faculty member is either the content developer, the discussion facilitator or assessor.

Q. How best can computers be used for educational purposes?

I think there are three important things to consider in using the computer. Firstly, emphasize the structuring of communication among students and with faculty members. Secondly, form teams to complete interdependent tasks. Finally, when it is possible, use simulations and case studies. It is clear to me from my own research and experience and from the research literature that these basic approaches lead to better educational experiences for students in computer-based learning situations.

Q. How will we learn in the future using computers?

I suspect that computers will be better integrated with the rest of our lives. Look at the example of education and training at work. Many people sit at a desk with a computer all day long and yet we do not really take advantage of this in delivering training at the workplace that incorporates specific work experience. More generally, I see computers used over a lifetime, tracking the learning of the user, adapting to preferences, facilitating on-going communication with other learners and finding new resources on a continual basis. Eventually, the outdated separation of formal learning from the rest of life experience will be lessened with the use of the computer.

Q. Looking ahead, what are the major obstacles to the effective use of computers in education?

In the K-12 environment, it is training of teachers, too little time and a lack of good educational software. In higher education, it is resistance to change in both pedagogy and administrative structures. In both cases, the obstacles will be overcome when, over time, we demonstrate more effective use of technology in education.

About the author

Dr David Raitt is senior technology transfer officer with the European Space Agency in the Netherlands. His work involves finding applications for space technologies in non-space sectors, particularly those useful for improving everyday life. An information scientist by education and training, David is also editor of *The Electronic Library* and chairman of the Internet Librarian International conferences.

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