

NDT Life – and how the internet is changing it

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I begin this presentation on NDT and the internet with an extract from my blog posted at the opening ceremony of this conference (Figure 1). That was posted immediately after the ceremony had taken place and was immediately accessible to my blog readers all over the world. For convenience I wrote and posted the blog using my MacBook, however I could almost as easily have done it on my iPhone. Do you have an iPhone? Regarded by some as expensive gadgets, iPhones and mobile personal digital assistants (PDAs) like them will soon be essential tools for all human beings.

Blogs (like mine!) are revolutionising the media – they are turning ordinary people into well-read journalists overnight. Anyone can start one (by now I expect *everyone* has!) and post it on the World Wide Web for the world to see and read. Gone are the days when the newspaper journalist scribbled away at his notepad, returned to the office to transcribe what he had written, passed it to the sub-editor for mark-up and editing and the story appeared for the first time in print early the next day. Blogs have brought immediacy to news. The traditional way of doing things has been eclipsed – overtaken by technology. The reason it works – and indeed why it is happening – is because for news immediacy matters. Readers are prepared to overlook the odd spelling mistake or bit of poor grammar if they get the news they want to hear about. Journalists – the traditional type, that is – are in fact consulting amateur blogs to use as a basis for their own stories. Newspapers are changing because of blogs – they have to, because what they are publishing is no longer news. Instead they have to publish stories that amplify the news, or look at it from a different angle, or explore the stories beneath.

Another feature of blogs is their ‘comments’. Comments are what set a blog apart from a traditional column because they create an immediate dialogue between the author and the audience. So I can post my blog about the opening ceremony and straight away someone half the way round the world in the UK can post a comment about what I said. Now the comments they make may lead someone else another half-way round the world in the USA to post another comment, or a response, immediately. And so it goes on. The result is a running commentary on what’s going on here and now. And there are millions of them.

What’s all this got to do with us? With NDT? Well to begin with our opening ceremony was to do with NDT and it was news-worthy, but more than that, this and other technologies like it are revolutionising our NDT Life too, and in the same way that the newspapers are changing to suit the blogs, we and our products, our media and publications, are changing to suit the new era. I’ll explain with a few more examples.

Many of you will be familiar with The British Institute of NDT's journal *Insight* – copies are available from our exhibition stand at the conference. Possibly fewer of you will be aware that there is an online version of *Insight*, available through our partner Atypon-Link. Every issue going back to January 2003 is available in PDF format for viewing online and downloading (Figure 2). This is one thing – and this itself is proving a boon to researchers, academics and libraries, who these days prefer to offer online access rather than have costly journals taking up valuable shelf-space. But that's not all, there are additional features associated with the online version of *Insight* that make it a valuable research tool.

Firstly, there's Crossref. Crossref simply stands for reference cross-linking. This means that online readers of *Insight* can immediately access a rapidly growing number of cited and linked articles. The system revolves around the use of the Digital Object Identifier, or DOI. A DOI is an alphanumeric name, for example 10.1784/insi.2008.50.7.374 for digital content – this can be not only a journal article but also a book, a chapter of a book, a patent or even an image. The DOI is associated with the object's electronic address, or URL, in a central DOI directory, and this directory can easily be updated. The DOI is published in place of the URL to prevent links from breaking if the content gets moved. In *Insight* you will see each article's DOI in the banner at the top of the first page (Figure 3). The DOI system proxy server at <http://dx.doi.org> 'translates' a name using URL syntax. Hence, for example, the above article, which commences on page 374 of *Insight* Volume 50, No 7, July 2008, would be resolved from the address: <http://dx.doi.org/10.1784/insi.2008.50.7.374>

CrossRef had nearly 33 million registered DOIs to 1 August 2008 and is taking several million new DOI records each year. Crossref supplies *Insight* with usage statistics and the growth in use of reference cross-linking is plain to see.

The significance of CrossRef for the online research experience is also easy to see – the new researchers of today not only want but *expect* to have everything they need available in electronic form. They want it interlinked, cross-searchable and accessible. Oh! and they also want it for free!

Users like accessing articles in PDF format because it faithfully reproduces the layout and quality of the print edition. However, PDF has its drawbacks as a format for online delivery. Large PDFs can be frustratingly slow to download, and unlike HTML, PDFs are typically static. *Insight* online overcomes these problems by offering not only traditional PDF versions of articles but also a PDF*plus* version. PDF*plus* is designed to address the shortcomings and extend the utility of PDF as a medium for online delivery.

Reference linking

PDF*plus* links citations to external databases like CrossRef so users can quickly retrieve abstracts for the articles referenced (see Figures 4, 5 and 6).

Forward linking

Integration with CrossRef makes it possible for PDF*plus* to include a dynamic list of forward links to other articles that have cited the article being viewed. Unlike the list of

references included in the original article, which never grows, the list of forward links may grow over time. Forward links are therefore appended in real-time when the user requests the *PDFplus* version of a document.

Sub-sampling images

Images that are produced for print tend to be high-resolution – 300 dpi or higher – and so may be quite large. A PDF file that includes several high-resolution images suitable for print may therefore be slow to download. By converting embedded images to a resolution more appropriate for display on a computer monitor, the overall size of a PDF may be reduced.

PDFplus sub-samples images to a standard screen resolution and links to the original high-resolution images as objects external to the PDF. This approach benefits the user by reducing download times, without sacrificing access to the original high-resolution figures.

The end-user experience is illustrated in Figures 7 and 8. Figure 7 shows a representative page from a *PDFplus* document. Clicking on the linked image opens the high-resolution original, shown in Figure 8, with controls added to allow the user to zoom and scroll.

There are other benefits that come with *Insight* online. Users can register with Atypon-Link for an e-mail backed Table of Contents (ToC) alerting service, an excellent way of keeping up-to-date with the articles appearing in the latest issue. Users whose computer systems incorporate firewalls or anti-virus and anti-spam software that may filter out service e-mails of this nature may opt for RSS delivery of alerts, whereby their computer retrieves the information at pre-determined intervals. RSS is one of those curious acronyms – no-one knows what the letters stand for! Some say ‘Really Simple Syndication’; some RDF or Rich Site Summary. RDF, by the way, stands for Resource Description Framework. Whatever it stands for, RSS makes it possible for people to keep up with what’s happening on *Insight* Online in an automated manner. In other words, by subscribing to RSS, readers can be sent a table of contents each time a new issue is published. All they need to receive the RSS feed is an RSS reader, which can be web browser-based or desktop-based.

So, we at BINDT are all the time creating tools that help researchers and readers of *Insight* to work and communicate more easily.

BINDT members are now able to access *Insight* Online directly through the members’ login area of the bindt.org website, without having to login a second time on Atypon-Link.

The facility has been enabled thanks to technology known as ‘Trusted Proxy Server (TPS)’, whereby a member’s status is trusted as authenticated by the *Insight*’s website back office. The process is secure – there is some ‘hand-shaking’ to ensure validity and it is not simply a matter of knowing a specific URL.

Access to *Insight* Online is thus now seamless, allowing members once they have logged-in to access the online issues of *Insight* going back to January 2003. Members are not required to register with Atypon-Link or remember an additional password.

Non-members/subscribers are offered pay-per-view access to download articles of interest and a document delivery service is also available.

So it is not simply a matter of turning the journal as we know it into a collection of online documents. Nor does it stop with enriching the online version by the aforementioned possibilities of access navigation and linking. We need to try to understand how Information and Communication Technology (ICT) is transforming the lives of our community – research scholars and technicians alike. Scholars, for example, have access to computing power on a scale unimaginable only a few years ago⁽³⁾. This enables them to carry out completely new kinds of research – collecting vast amounts of data and then processing them in complex ways with incredible speed. There are numerous examples of this described in presentations here at this conference, relating to a broad range of technologies from digital radiography to phased array ultrasonics.

What's more, scholars are working in new ways. Where they used to work in small groups in their own laboratory or university, electronic communications mean now that both the collection of data and its subsequent processing can be distributed around the world – more and more research teams are widely spread in different centres and even in different countries but they can and do collaborate and communicate perfectly easily.

Another factor is the way they are communicating – in some cases this is much more informal these days – often casual and bidirectional modes of 'chat' through blogs, 'wikis', bookmarking sites (such as <http://del.icio.us> – Figure 9) and the like are being adopted and adapted by the research community.

This brings us to The British Institute of NDT's main website at bindt.org and its sister at ndtnews.org, a complementary pair offering a wide variety of information and interactive opportunities for the NDT community.

BINDT.org is for the entire NDT and condition monitoring industries (Figure 10). It provides general information, certification news and certificate verification, education & training info, details of publications and events, BINDT membership data and the much-used buyers' guide section enabling users to source the right NDT or CM product or service from the right supplier.

www.bindt.org is attracting more than 66,000 page views per month (Figure 11). It welcomes more than 12,000 visitors each month on average and each visitor spends almost four minutes on the site each time they visit.

NDTNEWS.org is aimed at the NDT Quality and Condition Monitoring practitioner but will be of interest to the entire communities (Figure 12). It delivers up-to-the-minute news of and from the industry and the latest jobs available in the industry.

Frequently updated, this lively site features training and certification news and information, Bernard McGrath's insightful 'On the Job' blog from his column in the

NDT News newspaper publication, and quizzes, cartoons and a bit of fun in ‘Coffee Break’.

Launched in May 2007, NDTNEWS.org also includes a Forum for visitors to air their views, discuss their industry and share their problems.

There is an e-mail alert subscription service which allow visitors to subscribe to e-mail alerts for job vacancies. The service is free and available to all – simply add your e-mail address to the list and you can unsubscribe at any time. It is planned to extend the service to SMS text messaging too.

At present the resource available to Members only includes access (via Atypon-Link) to the full-text of the feature articles appearing in *Insight*, available in PDF format for downloading and viewing/printing; details from our Countdown services, including details of the discounts available to you for places of interest and attractions, restaurants and travel information and tokens; and a forum for messages and discussion on relevant topics. The information available to members will be expanded and developed in these and other areas, including membership, training and events, networks and a virtual community.

The ICNDT website (see Figure 13) is the subject of continuous review and I should like to thank Stefan Cullmann, his colleague Tobias Klette and the German Society for NDT for their continued support and assistance.

The site is currently being reorganised to make it more user-friendly and in particular to ease navigation.

This process has begun and users who have logged-in may have noticed for example that most documents are now accessible through the ‘Document Store’ in easily identifiable folders.

All minutes and documents associated with a particular committee are stored in a folder named after that committee.

We can control access to the appropriate folders and files according to the individual registered user and the role he or she has in the ICNDT.

Everyone who participates in any ICNDT committee, working group or forum is registered on the website and has been given access to the areas applicable to them.

As I said before, the website is the subject of ongoing development. Action Plan 2 of the Strategic Plan presents details of specific areas for development. Specifically, item no. 4 in the Strategic Plan: ‘Build on progress to date and establish an upgraded website, linked to members websites, to provide an intelligent NDT information portal’ is the focus of our current attention.

With reference to the ICNDT Strategic Plan, Action Plan 1: Support for Societies, a website shell scheme for new NDT societies is under consideration with a view to presenting further details soon.

The EFNDT website (see Figure 14) has similar objectives within its own community in Europe.

Overall, I should like to state that it is the intention to make both ICNDT and EFNDT websites valuable and attractive resources not only for ICNDT and EFNDT officers but also for the NDT community as a whole.

Conclusions

It is hoped that this paper goes some way to describing the impact of the internet on our NDT lives. A couple of years ago⁽⁴⁾ I read Jia Xian advocating that China should make more use of computers and the internet, particularly with respect to contribution, review, editing and management of journal papers. ‘This will enhance efficiency, shorten the time to publication, decrease the cost of journals and generally increase their value’, he said.

English has become the most important language in this process of internationalisation – especially in international academic exchange. At present, a quarter of publications worldwide and 80% of the networked scientific literature are published in English. A majority of journals included in some international important index systems are published in English. For example, over 80% of the journals included in SCI and CA are English-language ones. The remainder are chiefly in Chinese with just a few in other languages such as Japanese, French, and German. This bias of the international indexing systems towards the English language obviously encourages a move towards the use of English in scientific and technical journals. So some non-English speaking countries, such as Germany, Japan, and France, publish some of their important journals in English, and China should do more in that respect.

Thank you all very much for your attention.

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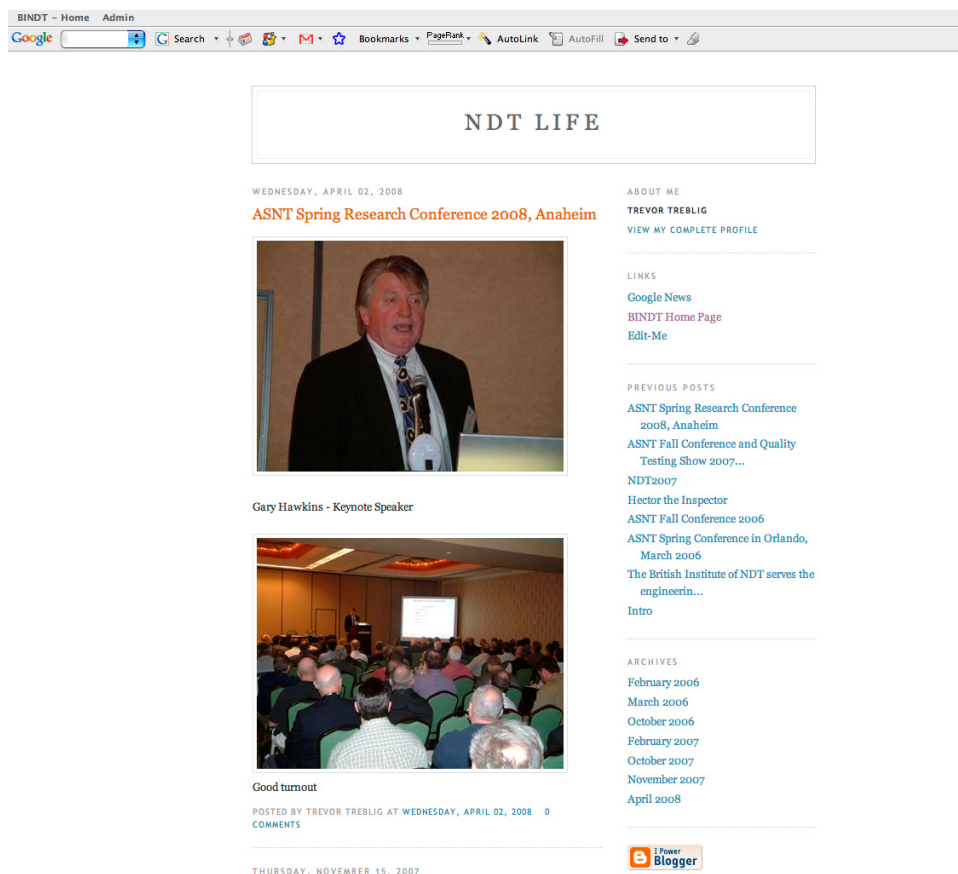


Figure 1. NDT Life blog



Figure 2. Insight Online

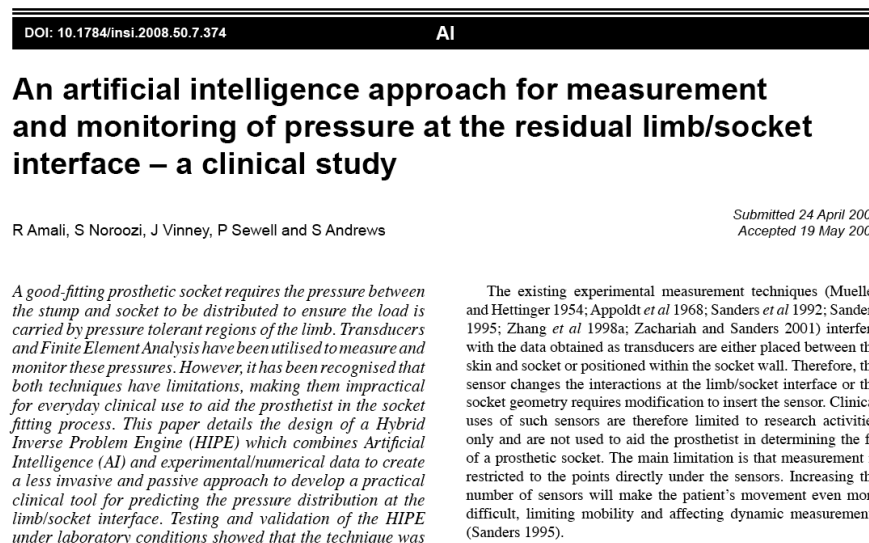


Figure 3. The Digital Object Identifier (DOI)

region within them. For example, patch ten has the high pressure on the Medial Tibial Shaft and a low-pressure region next to it, which will result in an average pressure on the patch much lower than the peak value. It is expected with the reduction of patch size it will be possible to improve the accuracy of the ANN pressure prediction.

Further studies are also needed to validate the accuracy, train the network for shear loads, which also contribute to the level of prostheses fit, and to generalise the system so that the training data for each patient can be gathered easily.

Future research will concentrate on investigating other forms of ANN input data (*ie* photoelasticity), enhancements in the use of strain sensor technology (including investigating alternative methods for attaching the sensors) and methods of manufacturing non-specific loading pads for every socket. The results of this research will be published at a later date.

If not selective, the size of the ANN (*ie* number of required inputs and outputs) can easily become too large which gives an ANN that is slow to converge (*ie* slow to find the function relating the inputs and outputs). To minimise the size of the ANN, only strain data from the key and sensitive locations on the socket surface should be obtained. It has been shown that the number of strain sensors used in this study have been reduced by carrying out a sensitivity study to find the insensitive regions of the socket (*ie* regions of the socket that are insensitive to load). This improved the

of fitting iterations required, reduce man hours and materials needed, thus reducing the cost of fitting a socket, and reducing the length of time for patient rehabilitation. The monitoring of pressure data also has the potential to be used as the basis for a prosthesis fitting database, which will aid in the training of newly qualified prosthetists and aid experienced prosthetists in diagnosing complex fitting problems.

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3. D S Childress and J W Steege, 'Computer-Aided analysis of Below-Knee socket pressure', Journal of Rehabilitation Research & Development 25: 22-24, 1987.
4. P K Commean, K E Smith, M W Vannier, B A Szabo and R L Actis, 'Finite element modelling and experimental verification of lower extremity shape change under load', Journal of

Figure 4. Reference cross-linking

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Figure 5 PDFplus links citations to external databases like CrossRef



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Figure 6. The cited paper

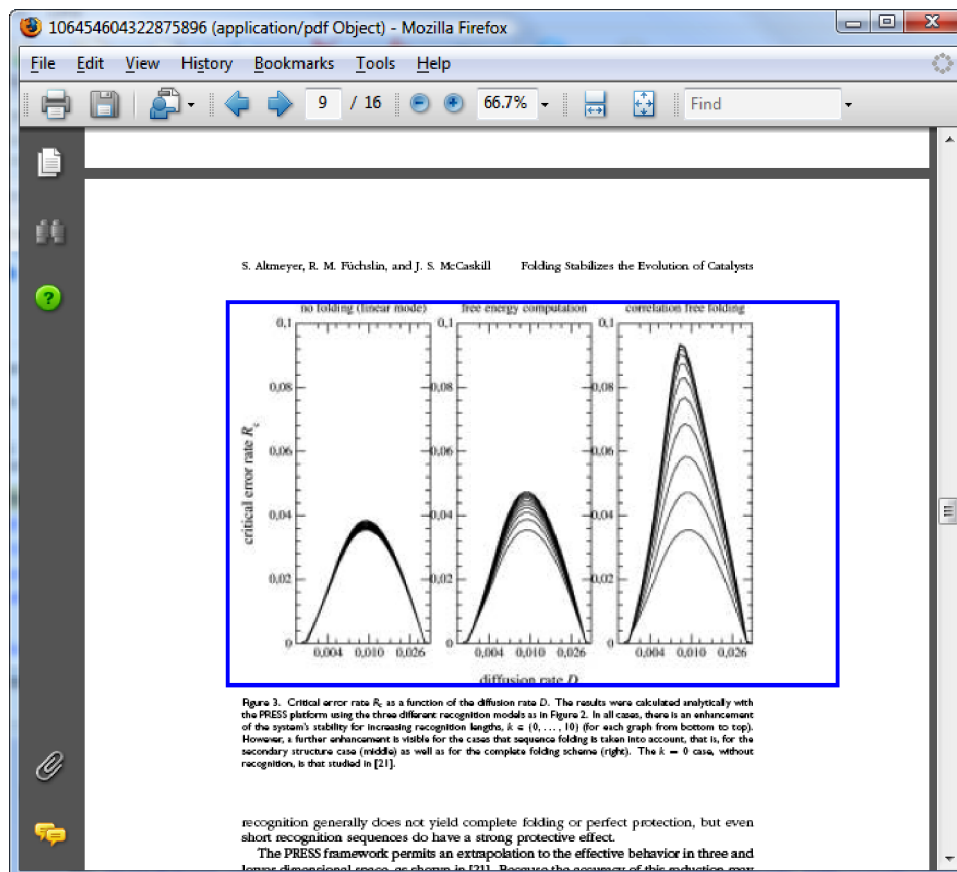


Figure 7. Sub-sampled images are linked to the original

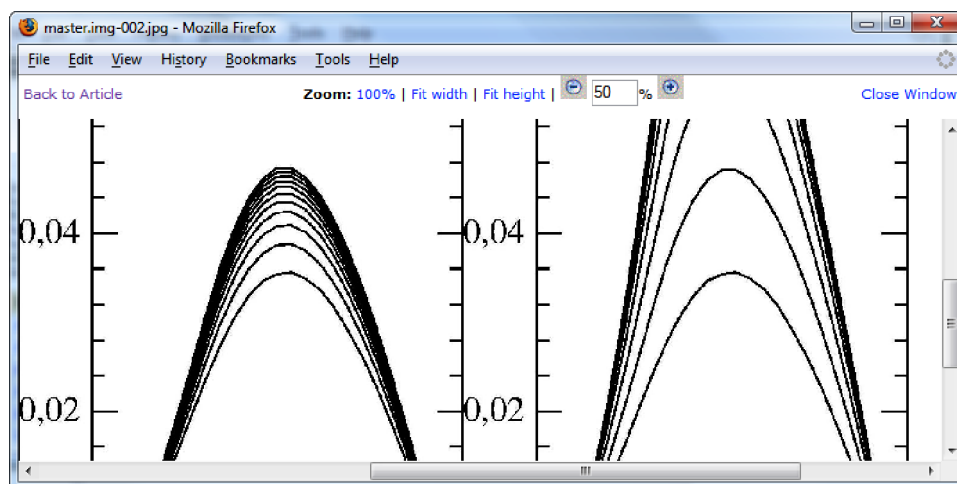


Figure 8. Users can zoom and scroll the high-resolution original

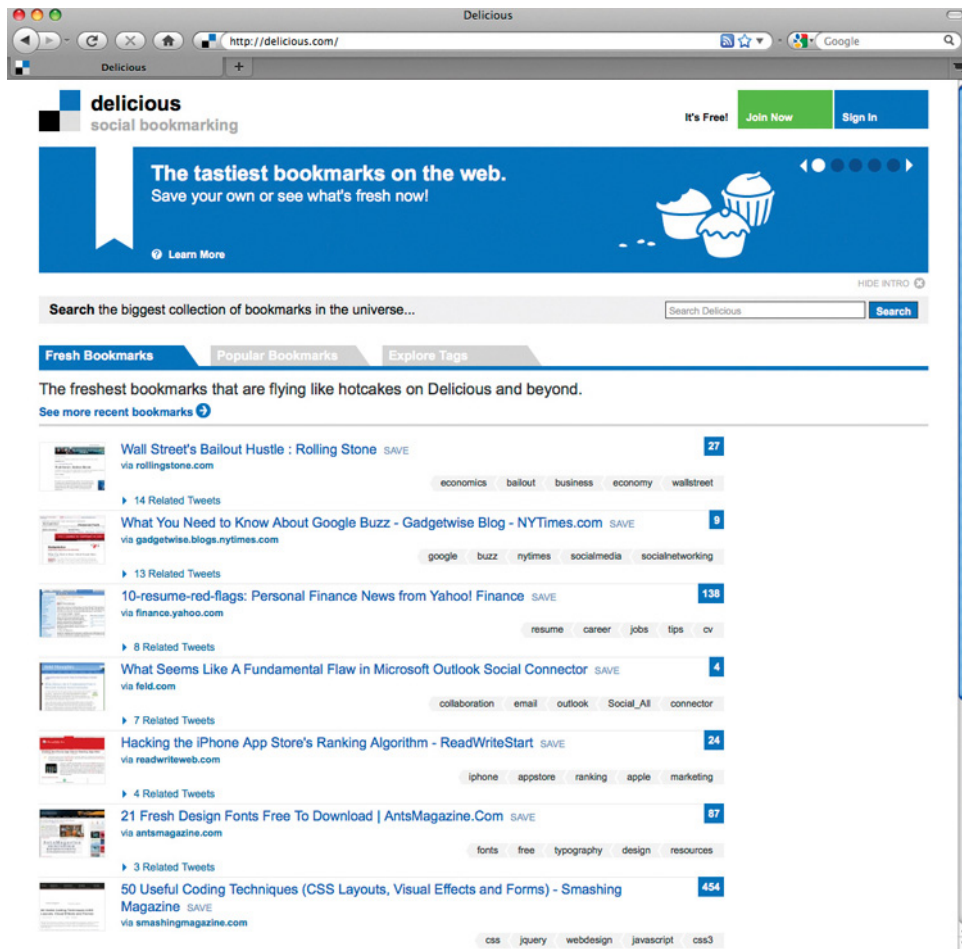


Figure 9. <http://del.icio.us>



Figure 10. www.bindt.org

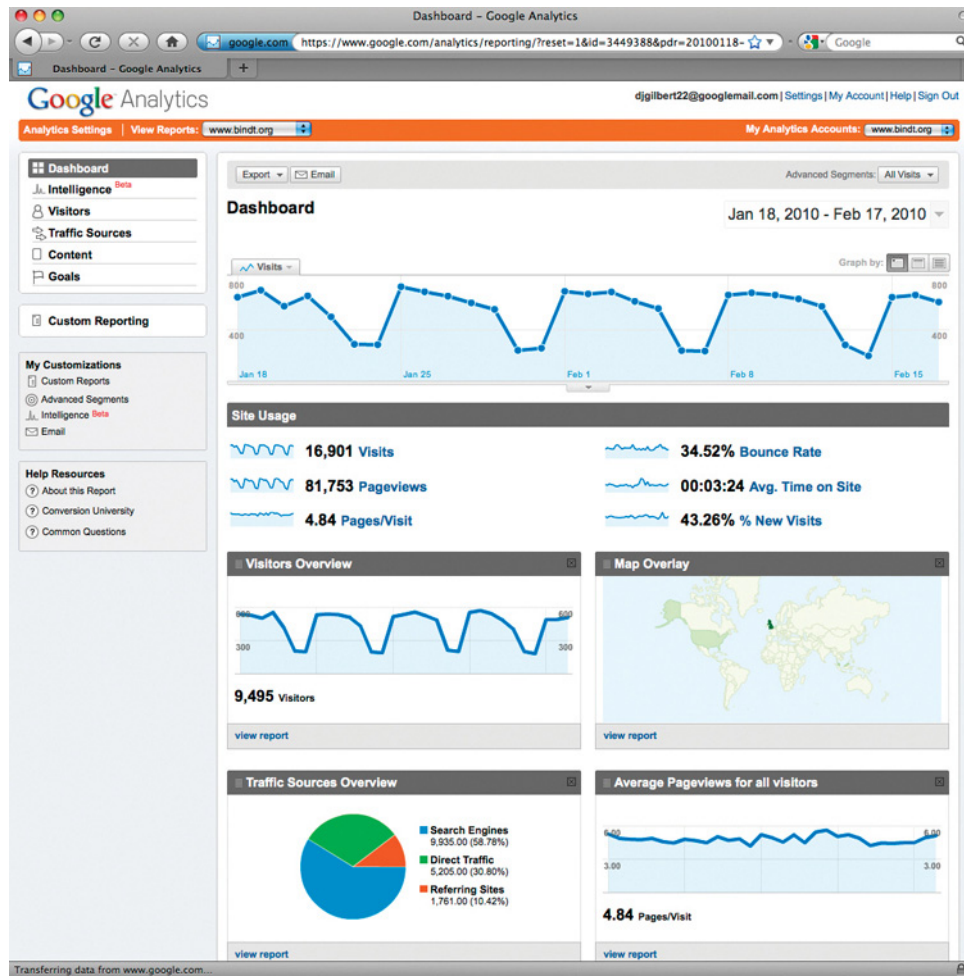


Figure 11. Google Analytics statistics for www.bindt.org



Figure 12. www.ndtnews.org

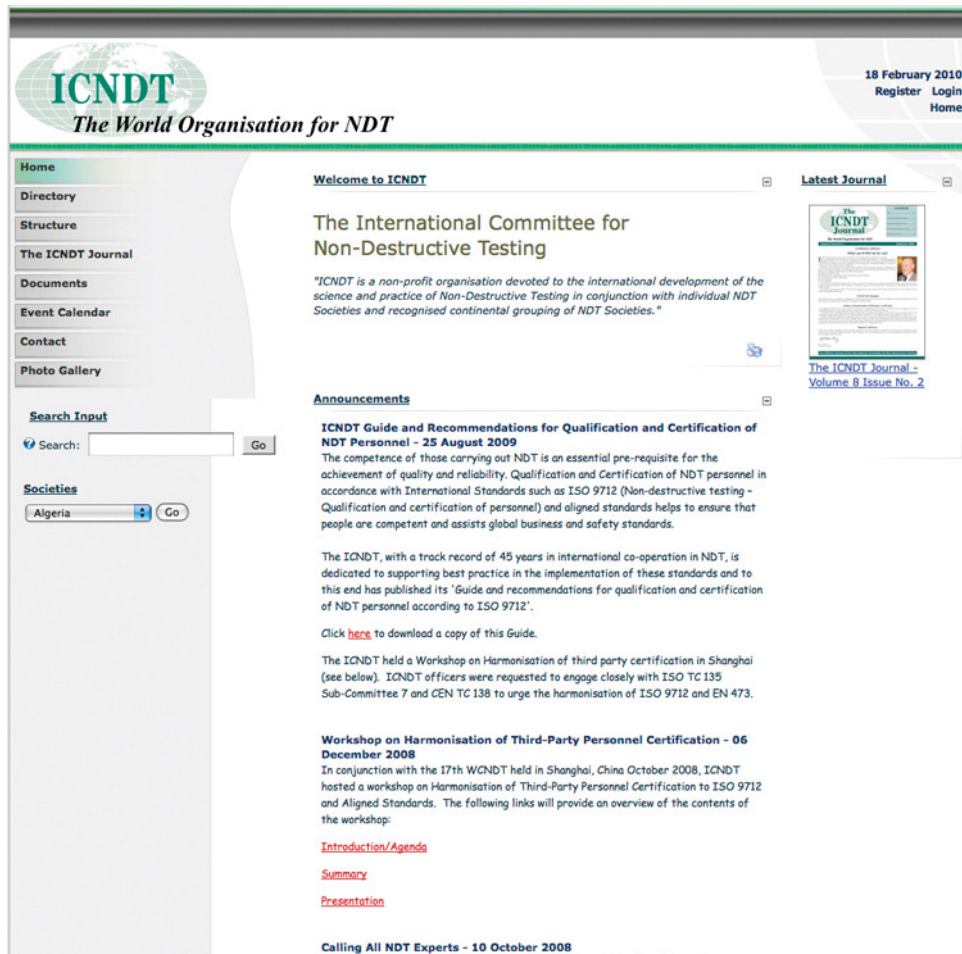


Figure 13. www.icndt.org

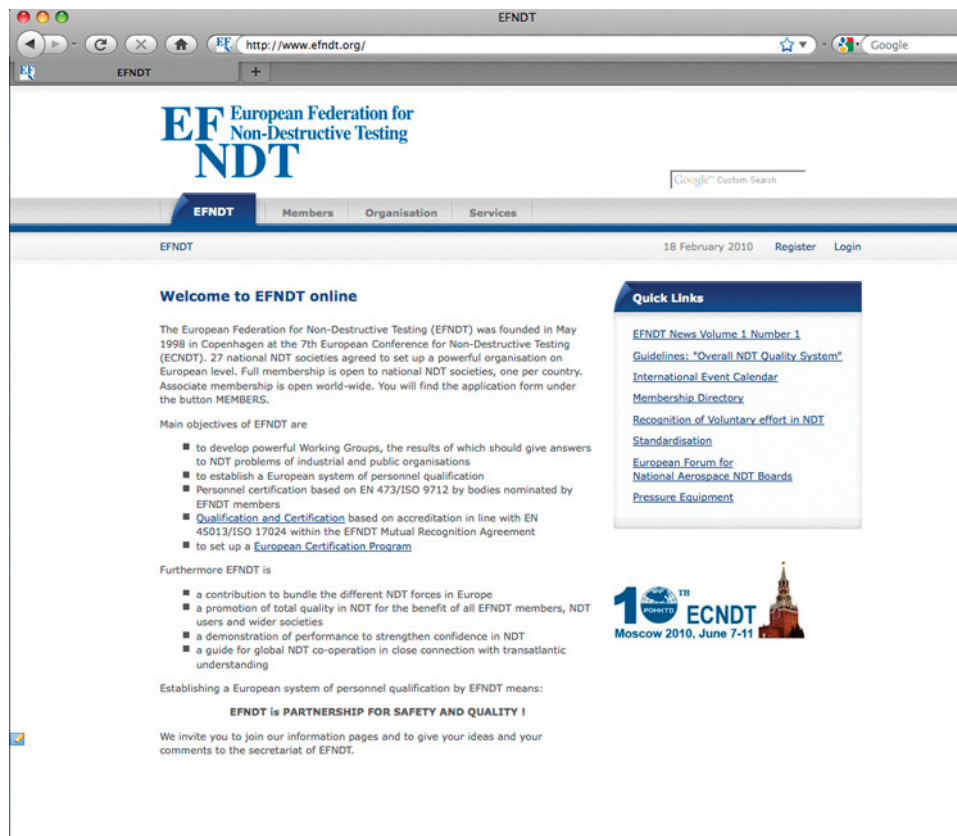


Figure 14. www.efndt.org