
From static content to dynamic communities: the evolution of networked educational resources

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Abstract

Five years ago the problems being addressed by major educational resources were how to locate and structure a burgeoning universe of Web sites in order to serve their subject and professional communities with useful and relevant content. Today, new challenges, demands and opportunities are emerging: the linking of content with community, static information with dynamic news. Describes the evolution of three educational resources in the social sciences (SOSIG, Biz/Ed and Regard) and their use of personal profiling, distributed contributions and RSS news channels to serve and gather information. Examines the issues that arise from changing user bases and technologies, sustainability and the need for collaboration, data protection and privacy concerns. Analyses the tensions these and other services face as they move toward a model that links the static with the dynamic, content with community.

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Introduction

The emergence of the World Wide Web in the early 1990s provided a fertile field for the development of services offering content electronically to the UK's education sector. As the range and volume of material available on the Web continued to grow throughout the decade, many major educational resources successfully faced the challenge of bringing order and a critical eye to the information landscape. The professional and subject communities whose information needs they were designed to meet were well served with timely, but static, content. More recently, however, new challenges, demands and opportunities are emerging.

As the early over-enthusiasm for mailing lists waned and useful archives developed, the notion of mediated online professional networks began to be taken seriously. In recent years, developments elsewhere on the Web also confirmed that online user communities were a viable option. The early portals BioMedNet (<http://www.bmn.com/>) and EiVillage (<http://www.ei.org>) demonstrated that linking content and community added value to both. In different ways, educational resources in the social sciences were also moving toward similar goals. While there is still a need for services which facilitate the location, evaluation and provision of trusted information, users are becoming more used to the interactive and community features of commercial Web sites, digital television and online learning media, both for recreational and educational use. Their allegiance is also now being courted by a far greater number of information providers. Today's challenge for primarily content-driven educational resources is in engaging with and providing facilities for the empowerment of subject and professional communities: technologies such as RDF Site Summary (RSS) news feeds have provided new opportunities for delivering focused, timely and succinct content. Personalised services and opportunities for users to publish and contribute content are also enabling communities. Tough questions, however, remain. Publicly-funded services in particular face considerable issues of sustainability,

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while personalised services and the potential for unmediated publication raise issues of data protection and privacy.

In this paper we focus on three educational resources, each with differing aims and user communities. Each of these resources – the Social Science Information Gateway, Biz/ed and Regard – is a well-established educational resource whose core activities revolve around the provision and organisation of content. They all make use of robust technical, metadata and cataloguing standards to deliver that content. Each is gradually evolving the range and nature of services offered in order to facilitate information exchange with their users and to foster a sense of community. We monitor their evolutionary processes and note the tensions and challenges that face them in the wider context of an ever-changing information landscape peopled by ever-changing subject and professional communities. Finally, we pose questions about the nature and benefits – to educational resources and their communities – of future options for linking the static with the dynamic, content with community.

Content and community: towards a typology

Dynamic content

In many ways, networked information is too dynamic already. Web sites move or disappear frequently, and documents are often updated without appropriate version control. Web services can develop strategies to minimise the effect of this kind of change, for example by regular automated link checking and update alerts. However, much information, such as news, is inherently dynamic and requires media that reflect this structurally in a way that client-side techniques find difficult. In practice, the link between static and dynamic information has often been symbiotic in the development of particular resources. One example is BUBL (<http://www.bubl.ac.uk/>), which began life as a dynamic bulletin board for librarians. However, the board's archives soon became a resource in themselves so that now BUBL hosts an extensive listing of over 12,000 Internet resources. At the same time, dynamic information in the form of a news section covering jobs, conferences and

so on remains an important part of the BUBL service. While the BUBL approach probably takes standard HTML technology to its limits in integrating static and dynamic information, other approaches offer interactivity that begins to enable the enacting as well as the representation of online community. These are discussed further in relation to the case studies of SOSIG, Biz/ed and Regard, below.

Content and community

It used to be said that content ruled the Web. This is no longer the whole truth, if it ever was. While content in the form of substantive documents remains important, it may be best to characterise this as only the first in a three-stage model of online community development. Document collections (in the broadest sense) can be understood as mediated representations of community. Content-based services reflect the output and interests of a user community via some kind of gatekeeper function. At one end of the spectrum, this results in electronic notice boards containing transient, perhaps informal, information. At the other end of the spectrum there are formal archives and journals of record. More recently, new service models have emerged across this spectrum that have involved the introduction of interactivity. Whereas content-based service models represent and serve a community, interactive models engage with a community. For example, *Behavioural and Brain Sciences* (<http://www.bbsonline.org>) is one of a number of academic journals that have pioneered alternatives to the traditional “peer review” gatekeeping function, developing a model based on “open peer commentary”. In this approach, journal articles are made the subject of an online discourse, until a point is reached where that discourse is frozen and included with the original article in a particular issue of the journal. Here we can see an innovative combination of both serving and engaging with a user community, together with document version control and a reliable archive strategy. A third development is possible though, that takes serving a community and engaging with it as its starting point. That is empowering a community by facilitating the

very enactment of that community in real time on a case-by-case basis. This is one subject of the case studies described below.

Typology for case studies

In developing an environmental model of human information behaviour, Burnett (2000) cites the work of Savolainen (1995), who distinguishes between two dimensions of “everyday information seeking”:

- (1) Practical, goal-oriented information seeking is aimed at finding specific answers to specific information needs and is often operationalised as specific questions.
- (2) Orienting information seeking is a more general activity that allows people, as part of their everyday activities, to monitor the world – or “information neighbourhood” – in which they live for any information that may be related to their ongoing interests and concerns.

Clearly, the first type of activity is related to content and the second to community, as discussed above. However, our experience in information service development and provision suggests that it is possible and useful to identify a mid-point between these two types, one characterised by focused but iterative information seeking. From this user activity typology, it is possible to infer a corresponding typology of the relationship between user and resource.

Serving communities

The foundation for the development of many early educational Web-based resources, the notion of service still underpins their core activities today. Web tools were intended to be the “servants” of their target communities. They were employed to undertake some of the hard work out of using the Web by identifying and organising quality, relevant content and delivering to the user’s desktop on the basis of search and browse commands. The “servants” encouraged the establishment of user and advisory groups, utilising a range of formative feedback loops to focus their collections and refine the user interface and organisational structure specifically to serve user needs. The nature of the service provided – whether to deliver descriptions of hand-picked resources via the subject gateways, notices of jobs, conferences or publications

via bulletin boards, learning materials or research papers via specialist sites – was generally static. Interactivity was limited to the user submitting a “find” command by searching or browsing, and the service delivering one or more results. The utility of such single-loop information discovery behaviour continues to rank highly in user surveys. It is the core of much of the learning and research activities in our educational institutions, but is expected to be surrounded by a periphery of additional features and services tailored to the user’s individual needs and desire to participate. With the emergence of new technologies and additional and more sophisticated demands, the single loop has been stretched and reformed to allow greater engagement with subject and professional user communities. Educational Web resources have evolved from a purely service model to one of trusted intermediary.

Engaging communities

As other services populate the marketplace, and usage and the user knowledge base grow, services need to engage with communities both to identify changing and complex needs and to build this change and complexity into the service. This has resulted in two distinct trends. First, search and browse facilities have been redesigned to accommodate iterative, more open-ended information-seeking behaviours. These resemble “double-loop learning”, which incorporates feedback on goals as well as on performance. Second, online resources have developed diverse programmes of user engagement, including extensive and intensive user feedback from user groups and dedicated research, and training and awareness-raising activities. In addition, some have expanded the involvement of professional user communities by recruiting them into service provision activities. For example, SOSIG has extended the role of distributed cataloguing by subject specialists and Biz/ed has engaged with a large number of domain experts in offering a variety of services, both online (such as virtual worlds) and face to face (such as conferences). Other forms of user engagement include mailing lists, facilities for contributions and suggestions, online surveys and feedback forms. The dynamic nature of these interactions, both in terms of information seeking and in terms of user

engagement in service provision, has supplemented and enhanced the provision of static content, not replaced it. Educational Web resources have improved their position of trusted intermediary by actively identifying and maximising their sources of legitimacy.

Empowering communities

Any information neighbourhood is made up of interactions in a seamless web of dynamic and static information that is personalised by individuals' socially conditioned disposition toward living and information use. That is, information is one aspect of community interactions that, for any individual, make up their "habitus" (Bourdieu, 1984). Working to foster and empower communities in this sense, online resources are beginning to work toward linking dynamic and static information into seamlessly interactive, personalised services. This approach is similar to that used by phase three of the JISC Electronic Libraries Programme, notably the Headline project (Gambles, 2000), which recognises that, at least in the social sciences, "one cannot come to a generalized model of information behaviour" (Hobohm, 1999). It is notable that the electronic resources highlighted by McKie (1999) as dramatically changing and strengthening professional collegiality are the personalised ones of "e-mail, Web phone and chat room"; it is a model that information services need to follow.

However, information services must be truly hybrid (both online and offline) if they are to serve, engage and empower communities that exist in both forms. It is not merely that there needs to be both online and off-line dimensions to community services, but that neither works well in isolation. For example, Rutter (2000), in analysing the performance of self-identity in a virtual community called "RumCom.local", notes that "it appears a vital part of the local culture that trust and understanding is earned through identity performance and that the self presented is allied with that which exists offline. Personal details given off through styles of writing, allusions employed and inferences about what is not shared in the newsgroup all contribute to this construction of identity". This suggests that services that support personalised online facilities (for example, user profiles) only empower

communities when there are also other ways in which those services and communities are engaged.

This three-part typology is helpful in considering the development of online resources, and is used to structure the three case studies that are the focus of the rest of this paper.

Focus on three educational resources

The Social Science Information Gateway

In the chaos of the early Web, the Social Science Information Gateway (SOSIG) was a pioneer in offering teachers, lecturers, researchers and students a structured subject-specific gateway to trusted sources of high quality information. Launched in 1994, SOSIG's development was based on foundations of the servant model mentioned above. The service was designed to take some of the hard work out of searching the Web for relevant, authoritative and reliable social science material to support learning and research, particularly in UK higher education institutions. The social sciences are interpreted in a broad sense, covering subjects as diverse as accountancy, ethnology and anthropology, geography, law, politics and sociology (there are 16 main subject areas covered, with many sub-sections). The core team of subject experts employed to undertake the identification, evaluation and cataloguing work was initially supplemented with volunteer contributors. Gradually the model was extended to incorporate the expertise of a distributed team of subject experts from around the UK. The affiliations and credentials of these section editors are made visible on SOSIG's Web pages and demonstrate the professional and subject legitimacy that make them trusted intermediaries. In 1999, SOSIG adopted the role of the social science "hub" of the UK's Resource Discovery Network (<http://www.rdn.ac.uk/>), joining hubs in other subjects and disciplines which at a stroke extended the community of contributing experts to over 60 key institutions in UK learning and research. First and foremost, a catalogue of hand-picked Internet resources, SOSIG has in recent years begun to develop additional features to provide closer links with – and for – the social science community of

practitioners, students, academics and researchers it is intended to serve. SOSIG is freely available on the Web at <http://www.sosig.ac.uk/>

From the SOSIG home page, users are able directly to search or browse SOSIG's collection of over 16,000 Internet resource descriptions. Each of these descriptions – or resource records – offer metadata about the resource, including title, description, keywords and subject captions, and hyperlinks (through resource title and URL) to the resource itself. Resources are organised according to more than 500 subject sections. Multiple thesauri are available to aid searching, and advanced search options include access to the Social Science Search Engine, a harvested database using the 16,000+ hand-picked records as “seeds” in searching, for further resources related to them. This database holds over 50,000 resource records displaying automatically generated metadata or resource provider's embedded metadata where available.

Like many other subject gateway services that followed, SOSIG offers the facility for members of the community to suggest resources for consideration by section editors for inclusion in the catalogue. Users can also submit queries and suggestions through the SOSIG-info e-mail address (which has always received heavy traffic) and system and content development have been built on engagement with communities via user and advisory groups. SOSIG also reached out to the social science research community through the Internet Research and Information in the Social Sciences 1998 (<http://www.sosig.ac.uk/iriss/>) Conference, which in turn resulted in the creation of new primary content that was subsequently included in the SOSIG catalogue. Since 1995, a core part of SOSIG activity has been in training and awareness raising, with workshops and roadshows hosted at over 50 UK higher education institutions and all training and promotional material being made available from the Web site (http://www.sosig.ac.uk/about_us/user_support.html). These events and materials not only facilitate direct interaction with the community, but also empower infomediaries such as librarians or research methods course leaders to cascade awareness-raising activities in their local communities, further extending the

community boundaries. SOSIG researchers are in the process of contacting a range of leading figures in the subject fields covered to invite them to submit their “Expert's choice”: a Web site that they find useful in their work that they would recommend to others (with associated justification). The team intends to make these recommendations available in a similar way to the Editor's choice recommendations of each of the subject section editors already available in the subject browse sections.

Since its launch as RDN social science hub in February 2000, SOSIG has implemented a complete interface redesign and introduced a range of more interactive and community services based on professional and subject profiles (Huxley, 2000). By registering for MyAccount, users are able to specify what is of particular interest to them. SOSIG responds by delivering content in static format or dynamically based on user choices. These include the type of information delivered (conference announcements, Internet resources, colleagues in the same field), subject areas covered (over 1,000 to choose from to deliver a fine level of granularity) and form of delivery (RSS channels, e-mail message or alert on their MyAccount page). RSS channels bring news and announcements from many other services directly and seamlessly into the SOSIG MyAccount pages. Users can see at a glance what is new on SOSIG, Biz/ed or Regard; the latest headlines from *The Guardian*; the most recent additions to the British Official Publications Collaborative Reader Information Service (<http://www.bopcris.ac.uk/index.html>) and many others. RSS channels also bring electronic mailing lists and their archives into a new, more user-friendly realm: RSS channels can show the latest postings to relevant mailing lists, with dynamic links to the message archives. The outputs from several related communities can be drawn together, with the static (html) content supplemented by dynamic RSS newsfeeds which themselves contain links to often static pages.

Registration with MyAccount also allows users to publish information in the Grapevine section of SOSIG. They can publish details of their research/subject profiles and expertise, their CVs and details of forthcoming conferences and courses of relevance to others

in their field. To encourage face-to-face interactions within the community, the SOSIG section editors also contribute conference and course details to Grapevine. RSS channels, “what’s new” features and e-mail updates are all designed to engage target communities and draw them often into repeat visits through the community “gateway”. The facility for users to publish their own information, either through Grapevine or by recommending an Internet resource for evaluation and addition to the collection, enables community members to participate actively rather than indulging in the passive “lurking” behaviours identified by Burnett (2000). SOSIG has been successful in serving and engaging with its communities for several years and has an established presence and legitimacy that it is now bringing to bear in developing empowering and enabling tools. The first experimental period of MyAccount and Grapevine services is coming to an end and their usage, promotion and visibility are currently under review. With close links with considerable research and development activity in personal profiling, recommender systems and the semantic web through its host at the Institute for Learning and Research Technology and colleagues through the RDN, SOSIG can be expected to push further the boundaries of combining content and community.

Biz/ed

Focusing more on secondary and further education, Biz/Ed also brings order to an ever-growing maze of business and economics Web sites and has developed in collaboration with a wide range of commercial and not-for-profit partners. As well as providing the subject expertise for the business section of SOSIG, the Biz/ed team has developed a portfolio of services for students and teachers which encourage participation. Biz/ed is freely available on the Web (<http://www.bized.ac.uk/>).

Biz/ed offers a wide range of resources to support group and individual teaching and learning in economics, econometrics, business and management. The target audiences include students and staff in higher and post-16 education in schools and colleges. The informal but structured look and feel of the service reflect the wider range of users and their needs, based on detailed

knowledge of the curricula in the UK (and for international baccalaureate students) in a small number of specific subject areas. A glossary not only offers key terms, but also a “diagram bank” of diagrams (with explanations and links to related concepts) that can be used to illustrate key ideas in business and economics. A weekly online newsletter available from the home page keeps users on return visits up to date with new features.

Teaching materials, an Internet catalogue and “company facts” were available as static, primary content from an early stage. In recent years, the focus has been on inviting users to interact with material available on the site: online graphing facilities are available for illustrating changing variables in the Penn World Data datasets (<http://www.bized.ac.uk/dataserv/pennndata/graphs/>), while users are able to manipulate tax and other economic variables to predict and assess changes to the budget in the Virtual Economy (<http://www.bized.ac.uk/virtual/economy/>), a well-publicised and respected “be your own chancellor”. Other virtual worlds include the Virtual Factory and the Virtual Developing Company. Information and picture-rich resources to support economics, business and development studies courses in schools and post-16 colleges, all the virtual worlds can be downloaded for local use on a single machine or organisation’s intranet. The Virtual Worlds provide virtual community building capacity both on a global and local scale.

Biz/ed also undertakes a range of outreach activities including workshops and, like SOSIG and Regard, engages with communities via its user groups and contact with partners in the overlapping commercial and educational business and economics worlds. Many of the features of Biz/ed directly facilitate community participation. Burnett (2000) suggests that participants in online communities use them as they would “more traditional information resources to make explicit queries with the expectation of receiving relevant answers. In addition, they can come to their communities knowing that, because other participants share their interests, they are likely to be congenial information environments, places where information in which they are interested is likely to be found, even if they do not have explicit queries. And they can do so in a

situation which, while it lacks the face-to-face interactions of more traditional communities, provides considerable opportunity for socializing and other types of interaction along with the exchange of information” (Burnett, 2000).

While SOSIG and Regard also support interrogation (through search/browse facilities) and deliver appropriate content, Biz/ed’s younger target audience is also supported with some very innovative services offering the kinds of opportunities Burnett mentions for socialisation and information exchange. These include the Online Revision Help (<http://www.bized.ac.uk/stafsup/exams/online.htm>) offered through an Internet chat room by a senior examiner, who commits to being available at a specified time to respond to queries made in real-time by students of economics A and AS levels. An experimental service for 2001, Online Revision Help has so far proved very popular. The On the Case (<http://www.bized.ac.uk/case/>) feature engages with both students and teachers: it uses case studies – with interactive questions – based on topical articles from the *Financial Times*. Evaluative feedback is encouraged from those using the cases, whilst teachers are empowered through the facility to contribute their own worksheets or case studies. The QuestionBank features also focus on interaction, this time with students, by providing question sets under curriculum headings to help with revision.

One of the keys to engaging user communities is in providing both reliable, static content supplemented by dynamic, topical news. Unlike SOSIG and Regard, Biz/ed focuses less on the use of RSS channels for news feeds and more on the integration of topical information in much of the primary content provided. This can be seen in the chats with examiners and *FT* case studies, and also in the In the Know (<http://www.bized.ac.uk/stafsup/exams/>) feature, a gateway to revision notes, topical issues to illustrate learning and letter from an economist, provoking thoughts on items in the news relating to elements of the curriculum. Like SOSIG and Regard, Biz/ed is also actively engaged in meeting with its communities face to face. The DEBE conference (<http://www.economics.ltsn.ac.uk/debe/>) in September 2001, jointly hosted with the Economics Centre of the Learning and

Teaching Subject Network (<http://www.economics.ltsn.ac.uk/>), focused specifically on professional networking and the sharing of good practice. Biz/ed is at the centre of serving, engaging with and empowering its student and teacher communities in a unique collaborative network.

Regard

Launched in 1997, Regard – the research database service of the Economic and Social Research Council (<http://www.esrc.ac.uk/>) – was faced with bringing structure to a somewhat different disordered information universe: that relating to academic research projects. The ESRC is the largest independent funder of economic and social research in the UK. Although largely supported by a central government grant, the ESRC funds independent work by researchers, mainly in UK universities. Information on this research is held primarily by two bodies. The ESRC holds details of the research awards granted, which includes the duration and anticipated direction of the work. Details of research outputs, such as publications, data or broadcasts, are held by the researchers themselves. One of Regard’s roles is to bring together these two sources of information into a service that is of value to the ESRC, to academic researchers and, just as importantly, to those working in the government, voluntary, commercial and media sectors who need to be aware of the latest research findings. Thus, Regard is working with diverse communities in its service development. Regard is freely available (<http://www.regard.ac.uk/>).

From the Web site, it is possible to conduct searches of the 7,000 research awards and over 60,000 research outputs that are held on Regard. As well as a basic keyword search, options are available to search by researcher name, date, reference number or to browse lists of the ESRC research centres and programmes. These centres and programmes represent the long- and medium-term research priorities of the ESRC and, as such, are key elements in the (offline) research community. Regard’s initial brief was to produce a high quality database service from existing resources and to put in place systems that ensured that this service was technically and administratively sustainable. Feedback was collected to tailor the service to user

needs, and a user group was set up partly to advise on more strategic matters. The service that developed at this time (1997) remains an important core of today's Regard, that is a searchable database of UK social science research. However, between 1997 and 2000 the Regard team developed an enhanced model of the service. This model was based on understanding users as engaged in double loop, iterative information-seeking behaviour more like active learning than answering simple, well-defined queries. Regard was re-launched in 2000 with a redesigned interface and additional features to support ongoing engagement with its user communities. Like SOSIG, an important aspect of this engagement has been the development of an account facility, called "my Regard". Although perhaps not yet as sophisticated as the SOSIG "My Account" facility, it does enable users to save and re-run searches and e-mail results to themselves.

A particular feature of Regard is its relationships with user communities as both information seekers and as information providers. In particular, Regard has sought to become thoroughly engaged with the UK social science research and policy development community. The re-launch of Regard in 2000 took place at a major national conference, organised by Regard, called Future Social Science Research: Support, Strategy and Direction. This was a significant contribution to ongoing debates on the importance of evidence-based policy and practice, enabling senior staff in both the research and policy communities to map out priorities. By engaging offline in this way with user communities, Regard has been able to forge links that anticipate its next move, which is toward enabling users to enact their relationships to both content and community.

The long-term goal of Regard is to create an online social science research neighbourhood. Many of the building blocks, both technical and conceptual, are already in place. For example, Regard has developed robust architecture, cataloguing and work process standards that both support an effective database service and offer opportunities for expanding the neighbourhood content beyond that currently held. Various proposals for such expansion are currently under discussion.

As well as expansion, Regard is following SOSIG in looking to integrate static and dynamic content by the use of RSS channels. At present these channels bring together Regard news and features but, if combined with subject classification and personal profiling, they would offer a means whereby instances of Regard could be generated on the fly to suit the preference structure of any user community. Because of an extensive investment in classification, SOSIG can offer detailed user profiling as described above. Subject access to Regard is currently based on broad disciplines (such as economics), which could perhaps be used as a basis for user profiles. A more detailed classification scheme would, however, offer greater flexibility. Again, various proposals are under discussion, and expectations are high that Regard will be able to develop into an online research and policy environment wherein seamless, flexible interactivity fosters and empowers user communities.

Challenges and opportunities

Data protection and privacy

Inevitably, the provision of online services involves storing personal information. SOSIG MyAccount users, for example, must provide at least an e-mail address in order to take advantage of e-mail updates. Publication of a Likeminds (research profile) or CV entry inevitably involves exposure of some personal information, although users can select which contact information they make public. To submit case studies or queries to Biz/ed, users must provide some basic personal information. In the case of Regard, some information is held about researchers who contribute information about their research outputs and about other members of Regard's user communities that have been involved in some way in Regard, such as requesting a training session. In addition, the provision of personalised services such as "my Regard" involves storing certain profile information. At present, in Regard's case, this is merely an e-mail address. There are plans to develop a more integrated approach to profiling, to encompass users as both information providers and information seekers. Hence, users logging in would have

Regard profiles that are carried with them and invoked as necessary while in the Regard environment.

Part of the establishment of legitimacy and community presence is the personal authority of community members, particularly where “big names” in the research field can provide a magnetic focus for other participants. Privacy and data protection are, in such cases, problematic. In the UK the Data Protection Act 1998 regulates the electronic storage of personal information, and SOSIG, Biz/ed and Regard will continue to comply fully with the Act. For example, a written data protection and privacy statement is available on the Regard Web site, and both SOSIG and Biz/ed have similar policies in place. Provisions are in place on Regard to restrict access to details of researchers who see their work as making them vulnerable to attack (for example, from animal rights activists). In fact, the development of integrated personal profiling may enable even tighter control of personal information by automating some procedures, so reducing the scope for human error.

Sustainability and attraction of new users

In the Web, a medium where transience is the norm, sustainability is a key success factor for online resources. Sustainability includes technical considerations (such as standards), social considerations (such as user acceptance), and funding considerations. Success in the first two of these is largely a matter of professional information science practice. Success in the third is perhaps less predictable. In the case of SOSIG and Regard, funding is currently mainly via medium-term grants from central sources. While not ideal, this does at least enable these services to plan effectively. Biz/ed’s massive success has been achieved despite no such advantage, and thus Biz/ed has perhaps faced the challenge of sustainability most squarely in collaborative partnership and with specific funding support from a range of commercial and not-for-profit organisations. While the multiplicity of funding sources serves to enhance participation and legitimacy of the service, it can also resemble something of an administrative nightmare and offers even less security to the service team.

Each of the services has operationalised, over time, a wide range of strategies

designed to attract new users. The majority relate to outreach and dissemination activities through face-to-face workshops, conference attendances, publicity material and partnerships with other organisations, as well as publications in academic and professional journals. SOSIG, for example, has collaborative agreements with two major publishers whose own publications (Web and paper-based), including catalogues and journals, help reach users who may not previously have heard of the service. In return, users are offered small discounts on publishers’ products by registering free on SOSIG’s MyAccount feature. Biz/ed has also undertaken collaborative and mutually beneficial activities with not-for-profit organisations, and the DEBE conference was hosted in collaboration with the Learning and Teaching Support Network Centre for Economics. Regard has also hosted a major conference, in this case on the future of social science research, which was important in bringing together the academic research and public policy communities. Regard is also engaged in an outreach programme and, as discussed below, in collaborating with other relevant organisations and services.

Collaboration

User communities are often temporary, shifting, overlapping and ill-defined. Empowering such communities involves resources collaborating to provide relevant services that do not break at boundaries that are seen to be arbitrary by those communities. Several approaches to this challenge are possible, the two most common being cross-searching and data-sharing. In the former, boundaries are masked by the implementation of standards that enable virtual services to be built merely by specifying the resources to be included. In the latter, these services are physically built by passing standardised data between hosts. In both cases, then, standards are the key.

Through participation in two major European projects – DESIRE (<http://www.desire.org/>) and Renardus (<http://www.renardus.org/>) – and being a hub of the Resource Discovery Network, SOSIG has been instrumental in developing cross-searching standards for networked resource

discovery across a wide variety of subject areas. SOSIG is also closely involved in the development of a social science portal service which will in future allow users to cross-search a heterogeneous set of social science resources and access an even wider variety of individual resources and collections. This work is only just underway in the field of research project information, and Regard is hoping to play a major role in developing analogous standards to those operational in the RDN. As we have seen, Biz/ed undertakes extensive collaborative work in terms of content provision, feedback and funding, and is monitoring developments in standards for the discovery – across services – of learning objects. Regard has begun to work closely with other information services important to the personal information landscape of particular user communities. For example, Regard information is now accessible via the Info4local (<http://www.info4local.gov.uk/>) service, which has strong links to UK local government research and policy communities.

Summary

Regard, Biz/ed and SOSIG all aim to enable the communities they serve by linking them to each other and to relevant content, and also to enhance their capabilities by offering value-added facilities such as personal profiling and, more recently, RSS channels. They each engage user communities by offering content that meets the fine grain level of professional interests. They also provide a means of deploying existing sources of trust and legitimacy to the democratic medium of the Internet through the content contribution and evaluation by distributed subject and professional teams. In their most recent iterations they also synthesise static and dynamic information, allowing user communities to benefit from seamless and transparent navigation between the two.

SOSIG, Biz/ed and Regard have a number of similar aspects. However, as can be seen from the brief descriptions of the services above, the specific features offered by each are quite distinct. All three resources serve, engage with, and are working to empower a

variety of relevant user communities. All are moving to develop a distributed model wherein users' expertise can be an informing feature, whether this be via RSS channels, distributed cataloguing or synchronous interaction technologies such as chat rooms. Furthermore, all are putting in place building blocks of sustainable community-based resources, such as private profiles, sustainable resource models and collaborative working practices. However, SOSIG, Biz/ed and Regard are different resources precisely because these common aspects are being implemented within different user communities. SOSIG is a broad-based gateway service focusing on the higher education community, Biz/ed offers a suite of tools useful to those working particularly in secondary and further education, and Regard is a research resource for academic and policy communities. These differences are reflected in the strategies each has adopted to attract and keep users. SOSIG has, first, become embedded in a larger network (the RDN), wherein it can occupy a unique position and, second, offered facilities for users to communicate with each other in ways appropriate to their involvement in the (offline) higher education community. Biz/ed's strategy is far more focused on building new interactive tools to support teaching and learning in economics, and to facilitate the discussion that arises from their use. Regard currently attracts users by ensuring the quality of the information held, and by developing strategic collaborations appropriate to the information landscapes of its user communities. While there are no guarantees, it is hoped that these strategies will ensure that SOSIG, Biz/ed and Regard prove to be lasting resources embedded within active user communities.

Burnett (2000) has noted that “from the point of view of the provision and availability of information, the primary significance of virtual communities is the fact that they function for their members not only as social settings, but as ‘information neighborhoods’, contexts within which they can engage in ongoing information sharing activities”. The challenge for those who would empower communities is in enabling them to engage in the kinds of interactions that constitute such neighbourhoods. The three-part

typology offered in this paper is perhaps one way to understand these interactions. The three cases reviewed demonstrate the value of understanding communities in this multi-dimensional way.

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