The 'ISI Web of Knowledge Service for UK Education', an exemplar for major service transition?

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Abstract. The 'ISI Web of Knowledge Service for UK Education' is the most high profile and heavily used academic data resource in the UK's Higher Education and Research communities. It is an intranet implementation, hosted at the UK's national academic data centre at the University of Manchester, and in terms of usage, is the largest single instance in the world. This paper will tell the tale of the last 5 years, starting with the transition activities undertaken to move the substantial user community from the previous service. The transition itself was subsequently described by the funding body's 'Monitoring and Advisory Unit' as an exemplar for a major service. This success was naturally dependent upon the establishment of a very close working relationship with Thomson ISI, the application and data provider. Activities included establishing a sound user support environment, with a variety of online and pre-printed materials. Partnering with library and teaching professionals to develop and run 'train-the-trainer' courses, repeated subsequently with new version releases. Coping with a constant increase in user base and demands on the server, any upgrade to which required formal applications to external funding committees. The innovative use of additional, low cost, application servers to meet demand peaks. The paper will also describe the formalised enhancement request process, which has helped the UK community directly affect the product's development in a structured and measured fashion and which involves all stakeholders. Topics covered will be of interest to anyone working in supplying and supporting online information services to a large, diverse community.

Keywords: ISI Web of Science, ISI Web of Knowledge, helpdesk, online information service, service transition, data centre.

Background

The University of Manchester provides a range of both local and national services through Manchester Computing. It is responsible for the provision and support of computing services to the University as well as to members of other academic institutions throughout the UK, Europe and beyond. A major national provision is via Manchester Information and Associated Services (MIMAS). MIMAS receives government funding, via the Joint Information Systems Committee (JISC) and Economic and Social Research Council (ESRC), to act as a National Data Centre providing the UK Higher Education, Further Education and Research communities with networked access to key data and information resources. MIMAS currently hosts over 40 strategic datasets, including: the UK Census; Socio-Economic data; Satellite and Digital Map data; the UK JSTOR mirror and the subject of this paper, the 'ISI Web of Knowledge Service for UK Education' (WoK).

Service History

From 1992 through to March 2000, the Thomson ISI data (ISI) was provided on subscription via a service developed and hosted by the (then) BIDS data centre at the University of Bath. The data was used extensively throughout the UK Higher Education community in both research and teaching. During 1999 JISC's negotiating agent, CHEST, negotiated the renewal of the contract, resulting in an offer for ISI's recently developed web-based product the "ISI Web of Science". As this was a completely new information service, with different hardware and support requirements, JISC followed its normal policy of going to tender for service provision. In May 1999 it was announced that the successful bid was from a collaborative partnership of MIMAS, the John Rylands University Library of Manchester (JRULM), and the Manchester Metropolitan University (MMU) Library.

Initial Transition

The new intranet service was to be hosted at MIMAS from September 1999 until September 2005. Working closely with ISI, an initial configuration was specified, ordered, installed, loaded and the service made available on schedule. The version of the application installed had been released by ISI within two weeks of it being rolled out to their internet servers in the United States. To assist institutions in the UK to transition the substantial user population in a controlled manner, the new MIMAS service was run alongside the existing service until July 2000. It was a requirement of the contract that the capacity of the new service should be double the existing (500 concurrent users) by September 2000. A formal Service Level Agreement was defined, for subsequent monitoring by the JISC's Monitoring & Advisory Unit (MAU).

During early 2000, a number of transition planning meetings were held drawing together all stakeholders, including representatives from the JISC Bibliographic Services User Group (JIBS). Colleagues from JRULM were used in the definition and development of support materials. Training materials were developed and subsequently delivered by qualified and experienced trainers from both libraries.

As a national data centre, MIMAS provide access to a variety of services, all of which have their own helpdesk and queries e-mailed to them are automatically entered into a Helpdesk system, Remedy's Action Request System (ARS). The user receives an e-mail acknowledgement together with a reference number and the query is assigned to support staff for resolution. Automatic escalation procedures are in place. The underlying database is fully searchable, so previous solutions can be found and consistency ensured. Also tailored reports and analyses can be produced on a regular or ad hoc basis.

Overall, the support structure was to be as 'flat' as possible in order to avoid the problems sometimes associated with online information service helpdesks (Molta, 2000). Resolving queries at the first level was a primary aim, embracing the airline industry's "moment of truth" principle, where every interaction with a user is "an opportunity to satisfy and impress" (Wheatcroft, 2004). The second level support arrangements were agreed and formalised with specialists within MIMAS and the

library, but also with ISI for data corrections/amendments. Also, technical queries were to be relayed to a US-based intranet support team.

Training & Support

A series of 'train-the-trainer' courses were scheduled, specifically intended for library staff, who would then be developing their own training and support materials and training their colleagues and other members of their institution. During the Summer of 1999, 20 half-day courses were scheduled in 13 different locations throughout the UK, covering all four countries (England, Scotland, Wales and Northern Ireland) providing over 550 places. There was no charge to attend.

Each session was attended by the MIMAS Service Manager responsible for the Web of Science. This enabled questions to be answered regarding technical details and future plans, it prompted feedback from attendees and showed the face of the person who would be held directly accountable for the quality of service.

All material used was made available both online, for downloading and local customisation and as pre-printed material. This covered Presentations, Workbooks, User Guides and Promotional Materials, such as flyers and posters in various sizes.

MIMAS were also present at a number of exhibitions and conferences and took the opportunity to highlight the forthcoming changes, engage in informal discussions, but also to capture feedback.

Production Service

Transition occurred on schedule, with very little adverse reaction or comment. There were, unsurprisingly, some end users who had not seen any announcements, but these were few and far between.

Two major upgrades have occurred subsequently. In 2001, the core application, Web of Science was upgraded (from version 4.1 to version 4.3) and during 2003, ISI's newly developed portal product 'Web of Knowledge' was implemented. This represented a fundamental change in the provision of the products, which were drawn together and presented within a single online environment. This was the world's first intranet implementation of the Web of Knowledge (version 1), including an enhanced Web of Science (version 5).

The approach to each upgrade drew heavily on the approach used during the initial successful transition. The observations and recommendations made resulting from these three run-throughs are below.

Recommendations for Transition

The approach adopted is in line with recommendations for user-centred design and delivery of services, e.g. Gould and Lewis (1985), Eason (1988), and has three over-riding principles. First, engage throughout the process with the users and the wider stakeholder community, e.g. the supplier of content as well as its users. Second, support the users and their representatives through all the stages of change. Cherns (1987) in his influential 'Principles of Sociotechnical Design' states in the 9th principle that 'transitional organisation' is essential to help users through the anxiety of change. Third, use action research methods (Elden and Chisholm 1993) wherever possible. This means whenever there is an action try to get user feedback and fully consider for the next phase of action.

A proposed scientific equivalent of the Hippocratic Oath (Sulston 2001) included: "cause no harm and be wholly truthful in public pronouncements", which is an appropriate mantra for what follows.

Summarised below are 6 key components for successful service transition:

1. Involve local support staff from institutions and user group representatives from the start.

There is sometimes a view that plans should be 'firmed up' before being disclosed and discussed. Whilst this may be true for military campaigns, in an information service context, this is a mistake. The two groups mentioned are ultimately the ones who will truly experience the transition. The user groups can identify what the changes will actually mean to end-users. The local support staff will be at the front line in institutions dealing with any queries arising. Eason (1988) calls the support staff 'local experts' because they are 'local', i.e. close to the real user community, and they are 'expert' because it is their role to understand and support the service provision. They are best-placed to help the design team because they can give

early input during the formulation of transition approaches and plans. If they are involved with the development process they are also best placed to support their user community when the service changes are made. They need to be involved, supportive and share ownership.

2. Formally test-run training sessions and gather and act upon feedback.

Training materials should be developed in partnership, involving professional trainers, and both subject and system experts. Once prepared, the course should be run, in real time and conditions, though with a sympathetic audience, such as colleagues and other trainers. (This is analogous to a 'transitional system' (Amado and Ambrose 2001), a temporary set-up in a safe environment for learning.) This is effectively the alpha-test, where one is looking for failure, identifying faults for correction. Following this, it should be run again, but with an audience including potential attendees. Think of this as the beta-test, where one is looking for success, confirmation that the material is fit for purpose. Feedback should be solicited and acted upon.

3. Train the trainers 'appropriately'.

'Training the trainers', sometimes known as 'cascade training', is well known as a cost effective way of ensuring the best support reaches the end users (Nyran 1991) provided it is done appropriately. Barriers to attendance should be minimised, as non-attendance can lead to frustration and resentment.

Four components are considered: course cost, content, location and timing.

- There should be no charge to attend (n.b. to reduce costs and administration, try and avoid catering beyond providing (soft) drinks.).
- The trainers are unlikely to be novices and may well be experts in various aspects of the service. So specific emphasis should be put on the differences from any existing service.
- Try to run courses in the most convenient/least inconvenient locations. Consider local geography and associated travel links and be sensitive to people's regionalism/nationalism.

- Schedule courses away from times of peak activity, such as the start of an academic year. Local trainers need time to prepare their own materials. This should not be underestimated – they will be dealing with many changed services. Try to keep the training course itself specific and concise, though with scope for optional sessions at the end of the course, which may be just more time to complete a practical session or a follow-on discussion.

4. Offer specific transition arrangements.

Aim to provide as much information as possible and on an ongoing basis, to all groups affected by the forthcoming change. This will include: documentation describing all aspects of the new service; early 'mock-ups' of the eventual live environment; demonstrations (you show) and trials (they show) of the service and, ultimately, parallel access to the service alongside the existing one. As well as reporting on progress, it can be useful to create some form of measure of each institution's transition activities, though it should avoid outright competition, which can be demoralising.

5. Inform all involved in the service's extended 'supply chain'.

Establish a core communication channel (or channels). Inform and reassure frequently and regularly, but "be truthful in public pronouncements", do not hide non-trivial mishaps. Via this core channel announce things 6 times over:

- 'What&When' – an outline schedule, six to twelve months before;
- 'Coming Soon' – one or two months before a key event;
- 'Reminder' – two to four weeks before;
- 'Imminent Change – one or two days before;
- 'Implemented!' – immediately after, this is a joint success;
- 'Reminder' – within a week of transition.

6. Work with supplier for mutual benefit.

A very significant stakeholder to engage in the process of service development is the content supplier. A positive and mutually cooperative relationship

is essential. The service provider will sometimes be entirely dependent upon the supplier - but will remain the public face of the perceived problem. From the supplier's point of view, the quality of service contributes to their highly prized and hard won prestige.

Helpdesk

The WoK Helpdesk experiences peak and troughs. It peaks when something changes, including an increase in active users, a new version of the interface or a fault with the service or supply chain. Just as the server running the service should be able to cope with peaks of demand, so must the Helpdesk. The Service Level for Web of Knowledge includes the following performance indicators:

- 100% of inquiries received by Helpdesk acknowledged within 1 working day.
- 92% or inquiries logged in Helpdesk system resolved within 5 working days.
- 98% of inquiries logged in Helpdesk system resolved within 20 working days.

The above are all exceeded currently; in fact over 98% of inquiries are resolved within one day.

Usage Profile

When the service first started, capacity was notionally provided for 1,000 concurrent users. However this limit was not immediately enforced in an effort to establish the peak demand. A peak of 1,390 was reached in November 2000 and the server response was degraded significantly. The 1,000 limit was then enforced and some additional memory was installed to sustain response times during peak times.

The demand for additional access to the service during the first term of the academic year, principally down to training requirements, was discussed with the funding body and Thomson ISI. It was decided that additional capacity, for up to 200 concurrent users, would be offered from a US-based server, in effect acting as a 'training server'. However, the demand in October 2001 resulted in a record sessions count, even though the 1,000 concurrency limit was in place and up to 1,200 people were turned away in one day. Also the server's processors were at 100% utilisation from 10am through to 6pm every working day.

MIMAS and ISI were directed to identify a cost-effective method of adding additional capacity for peak times in time for the 2002 academic year.

New Server Architecture from 2002

Many options were considered, but the use of low cost application servers supplementing the existing, highly resilient (and expensive) server was taken forward. At this time, this approach had not been implemented anywhere. Eight additional application servers were installed and configured to each run a copy of the application code, though still accessing the data held within the main server. A basic load balancing program was implemented which spread the user sessions between the main server, up to 950 concurrent users and across the application servers, up to 50 concurrent users each. This increased the capacity to 1,350 concurrent users and gave scope to further expand via additional application server at low cost (less than £1,500 each).

This architecture is still in place and has seen a peak, under close scrutiny, of over 2,000 concurrent users active. In October 2003 a new high of 435,500 sessions was recorded, compared to a previous high of 380,000 in October 2001.

The ISI Web of Science Enhancement Committee - WoSEC

Action research methods involve establishing not only the data to be collected during any change process but also the agency that will receive and act on the data and the form in which the data will be provided. As an integral part of the (now) ISI Web of Knowledge Service for UK Education, MIMAS have developed and run a structured and inclusive feedback mechanism for enhancement requests since service start-up in 1999, called WoSEC, the Web of Science Enhancement Committee.

The group was set up to achieve two major things, both of which have direct relevance to any service provision. Firstly, to oversee and agree transition arrangements for the service. Secondly, to provide a forum in which user comments about the service could be discussed by the Publisher (ISI), the Director of Product Development (ISI-US), the Service Provider (MIMAS), the Funding Body (JISC), the Negotiator (CHEST), and User Group Representatives (JIBS).

MIMAS classify every feedback request received and twice yearly consolidate the, typically 300 to 400, requests into an anonymised list. Then a prioritised enhancement report is produced jointly with JIBS for discussion at the meeting. So the Service Provider is providing a factual or objective measure of requests and the User Group is able to set the context, allowing for better groupings of the requests.

Independently, JIBS also maintain their own 'Wish List' of specific changes they would like to see implemented. This will suggest specific wording and detailed functional information. This has latterly been immediately useful as a 'tick list' when communicating the scope of new releases and value to the user community.

This forum has significantly influenced the development path for the product on a number of occasions, affecting both functionality and timing of releases. The community in the UK is large enough for its opinion to be significant to the product developers, yet small enough for such a co-ordinated and "user-led requirements construction" (Flynn & Jazi, 1998) approach to be feasible.

As a point of interest, giving the users community every encouragement to provide feedback has led to a separate classification of 'positive feedback'. This ranges from a simple "Thanks!" through to detailed information on how the service has helped the user perform some task. This has progressively increased as a proportion of feedback received, reaching a high of one in four.

Conclusion

The current agreement for service provision ends in September 2005. Contract negotiations are well advanced and propose that the application itself be served from Thomson's new European Data Centre in Ireland. However, all other aspects of the service will remain as currently, with MIMAS providing service and transition support and the Enhancement Committee still meeting. The fact that all stakeholders see value in this additional service layer and approach to managing transition suggest that it is indeed a possible exemplar for major service transition.

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References

Amado, G. and Ambrose, A. (2001). *The Transitional Approach to Change.* London: Karnac.

ARS from Remedy. http://www.remedy.com/

Cherns, A. B. (1987). Principles of Sociotechnical Design Revisited. *Human Relations*, *40*(3), 153-162.

Eason, K.D. (1995). New systems implementation. In Wilson J. R. and Corlett E. N. (Ed.), *Evaluation of Human Work* (2nd ed). London: Taylor and Francis.

Eason, K. D. (1988). *Information Technology and Organisational Change.* London: Taylor and Francis.

Elden, M., & Chisholm, R. (1993). Emerging varieties of action research: Introduction to the special issue. *Human Relations*, *46*, 121- 142.

ESRC. http://www.esrc.ac.uk/

Flynn, D.J., & Jazi, M.D. (1998). Constructing user requirements: a social process for a social context. *Information Systems Journal 8*(1), 53-84.

Gould, J.D., & Lewis, C. (1985). Design for Usability; Key Principles and What Designers Think. *Comm. ACM 38*(3), 300-311.

ISI. http://www.isinet.com/

JIBS. http://www.jibs.ac.uk/

JISC. http://www.jisc.ac.uk/

MIMAS. http://www.mimas.ac.uk/

Molta, D. (2000). A little service please. *Network Computing 11*(16), 39-40.

Nyran, P. I. (1991). Cost effectiveness of core-group training In *Advances in Industrial Ergonomics and Safety III.* Karwowski,W., & Yates, J.W. (Eds) London: Taylor and Francis.

Sulston, J.E. (2001). An oath for scientists?. *BBC News Report*. Retrieved October 1, 2004, from http://news.bbc.co.uk/1/hi/sci/tech/1250331.stm

Wheatcroft, P. (2004). Does your service organisation pass the ‘moment of truth’ test? *Computer Weekly*, March 3, 2004, 40-41.

WoK. http://wok.mimas.ac.uk/