

Information
Environment:
Development Strategy
2001-2005

2nd Draft

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1 Introduction

This strategy is concerned with articulating the goals, rationale and process for developing the Information Environment. This Information Environment must be fit to serve the needs of students, teachers and researchers in further and higher education into the future. The development of a robust and appropriate platform to provide access for educational content for learning, teaching and research purposes is a key component of the JISC 5 year strategy to: *"build an on-line information environment providing secure and convenient access to a comprehensive collection of scholarly and educational material"*.

In moving forward this strategy acknowledges that the Information Environment described here is a component of the national and global networked environment. Therefore it should be emphasised that the JISC recognises the number of significant stakeholders with whom there is a clear opportunity to actively engage and collaborate with in the next four to five years.

The Information Environment is clearly key to the goals of achieving an interoperable distributed national electronic resource. An overview of the strategic directions for the Distributed National Electronic Resource is provided at: <http://www.jisc.ac.uk/dner/background/stratandpolicy.html>. Cognate strategies, recognising the interrelation of activities, exist for Collections development and management, and Communications and are on going for Preservation.

This strategy to develop the Information Environment is underpinned by an evolving Implementation Plan demonstrating how the key vision and goals expressed here will be realised through a programme of targeted investment over the next four years.

It is intended that this strategy will be the subject of a series of consultation exercises with communities in order to move forward in a consensual manner, while providing strategic leadership and impetus where appropriate.

2 Key vision and goals

2.1 Key vision: moving forward

From fragmentation..

An Information Environment can be characterised as the set of network or online services that support publishing and use of information and learning resources. At the moment online services providing digital resources tend to operate in a stand-alone manner. The user is therefore required to navigate a complex set of different websites with different search interfaces in order to locate relevant resources. Similarly the resources offered tend to be characterised by a lack of mediation to provide vital signposts to explain context and relevance to the user. It has been recognised that this is one of the key features limiting take up of digital resources.

..To integration

Therefore the Information Environment as it is proposed here aims to offer the user a more seamless and less complex journey to relevant information and learning resources. For this reason, it is important that this activity is aligned where possible with other developments, nationally and internationally, and that it makes a leading contribution to the enhanced information use and a true democracy of learning opportunity. It is also important that it works to support and influence institutions as they benefit from and contribute to this environment.

Working in a distributed environment

It is acknowledged that the Information Environment envisaged for the JISC is ambitious. This is primarily because this has evolved to embrace two key concepts which are by nature semantically and technically complex to advance through a process of investment these are:

- the view that digital resources are inherently distributed and will never be delivered by a single service provider
- the view that users do not all want to access information in the same way but will require a diverse range of views of resources in order to satisfy their needs. A web based portal or VLE for example may operate as a specific window upon a set of distributed resources.

Working with a diversity of user requirements

This inherent complexity is a common feature of the emerging e-learning culture and the national and international infrastructures that are being required brought into place to support it. The Development Strategy for the Information Environment needs to articulate how we can progress this distributed model based upon the foundation of the progress made by the JISC in the past 5 years through research and investment.

For example, the JISC's Information Environment needs to progress in such a way that it fully acknowledges the needs of the further as well as higher education constituency. It needs to be geared up to the delivery, discovery and presentation of appropriate learning materials, and needs to support the submission and exchange of learning objects. It is worth pointing out that the needs of the higher education sector are far from resolved in terms of what the JISC currently offers and much further work is needed. However it is essential for the Information Environment to directly engage with post 16 learning requirements.

Emphasising Participation

The notion of the Information Environment also supports the goal that lifelong learning is an inherently participatory process, users of national information environments will wish to access but also to add content or context to the resources they use. The information environment must therefore allow this exchange and sharing to take place.

Harnessing and developing standards to underpin the investment

One of the fundamental methods of building national and international environments for accessing shared educational content is recognising that these activities need to be based on standards for the creation, access, use, preservation and moreover interoperability, of networked resources. In order to progress this process, the DNER office have produced a set of Standards and Guidelines intended to underpin the information environment and to support the activities of the development programmes:

(<http://www.jisc.ac.uk/dner/programmes/guidance/DNERStandards.html>). It is important to note that these standards were prepared in the context of the Government Interoperability Framework, E-gif, and that the standards framework will continue to evolve as the DNER development group actively participates in the process of sharing and building standards for educational resources in a national and international context.

2.2 Goals

The following features are key aspects of the evolved Information Environment:

- **Fit to serve all kinds of digital content.**
The kinds of electronic content that the Information Environment must deal with are increasingly diverse, and in many cases are based on rapidly evolving and non standard

technologies. For example it must be able to accommodate all types of content from streaming video, to electronic books to new types of learning resources. It must be able deliver these efficiently, and must allow them to be accessed and mediated in a series of useful and satisfying ways which progress learning, teaching and research.

- **Fully supporting the submission and sharing of research and learning objects.** Activity will focus on methods to allow members of the community to build the content that they will access, and to share this in meaningful ways with other colleagues and peers. This activity will build a framework for leveraging our mutual community resource, the significance of which is emphasised in the JISC 5 Year strategy and elsewhere.
- **Providing a range of meaningful, rich and innovative methods of accessing electronic materials, to enrich and develop the learning and research process.** This will be achieved through developing new portals services which can fuse relevant content, by subject or learning aim for example, to offer enhanced access and greater relevancy to users. Portals and other services will also be developed so that they can be harnessed and embedded at an institutional level. This will be a component of providing an enhanced presentation layer for the rich content available through JISC funded activity in collections development, the holdings of our national data services, and resources held within our community.
- **A collaborative landscape of service providers who work together to seamlessly cater for the needs of the community on a national basis.** This will be achieved through the developing sophistication of shared services and developments in service infrastructure to enable the providers who work within the Information Environment to operate in a truly joined-up fashion.
- **Underpinned by real world interoperability, based upon a common standards framework and common semantic for digital resource description and access.** It has become clear that enhanced interoperability for users will not be achieved without the agreement of some common semantics to support cross searching. As part of developing the Information Environment the JISC will strive for the cross-sectoral adoptions of standard terminologies, for example for subject, audience level, resource type and certification.

3 Activity Areas and Definitions

This strategy presents a vision of an integrated Information Environment with a wide range of methods of accessing information and learning resources suitable for a community with diverse needs, character, and learning, teaching and research demographic. This needs to be fortified by a significant process of targeted investment, that needs to be prioritised in logical ways. This strategy is intended to articulate a useful and practical way of moving the JISC's Information Environment forward allowing us through an incremental process to implement what is currently a fairly abstract model, if one conceptually advanced, for access to distributed resources.

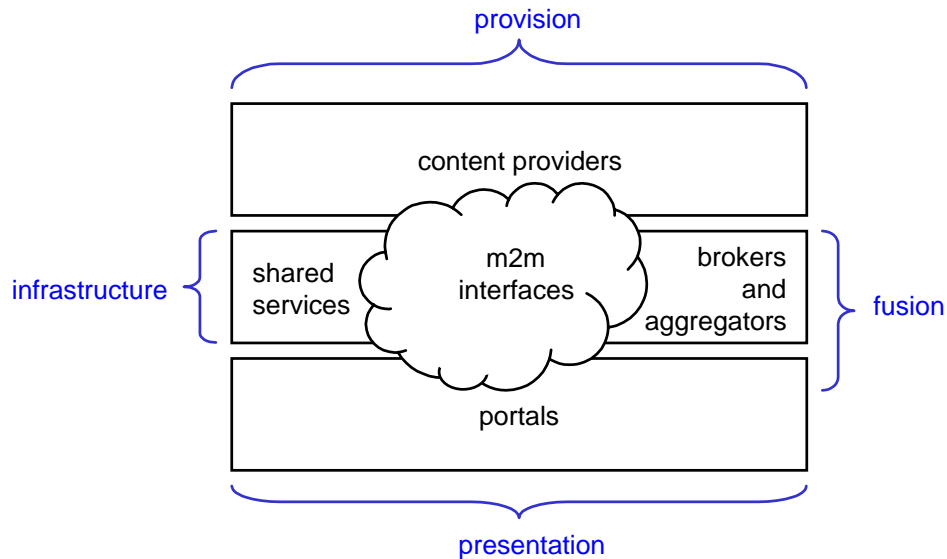
This involves the development of:

A robust service provider architecture, content submission and sharing mechanisms fusion and portal services, shared infrastructure services, and an enhanced presentation layer, supported by the network infrastructure, Super Janet 4 (managed elsewhere in the JISC.)

It should also be noted that, there are a series of pre-existing and forthcoming DNER development programmes and related studies underway in this area. Effort will be directed to

ensuring that they are strategically aligned with over all DNER and JISC objectives and that programme results directly support the development of the Information Environment.

3.1 Technical Model of the Information Environment



- **Definition of Terms**

For the purposes of this strategy and the related Implementation Plan it is important to be consistent about the terminology that is employed and its meaning. It is also recognised that these terms may differ in meanings in other contexts. This usage aims to be as close as possible to that used by UKOLN in their work on defining the abstract DNER architecture.

Technical Model of the Information Environment = this contains all of the elements as indicated above and will termed to have become operational well all elements interact smoothly to provide a seamless service to end users. The Information Environment needs to support both the addition of content to the national resource and its access by end users.

Provision = the storage and delivery of **Content**

Fusion = the bringing together of **Content** from multiple providers either by machine to machine **Brokers and Aggregators** or **Portals** which are visible to end users

Infrastructure = **Shared Middleware Services** which support other activities

Presentation = interaction with the end users in a direct and visible manner to give them access to **Content**

3.2 Development Process

Essentially building the Information Environment is about how we manage the following stages:

Stage 1: Generic Technical Architecture

We have, as shown in the above diagram, an abstract technical model for the Information Environment which has been defined in conjunction with UKOLN. For further information see: <http://www.ukoln.ac.uk/distributed-systems/dner/arch/dner-arch/>

Stage 2: Developing an Information Environment Implementation Plan for 2001-5

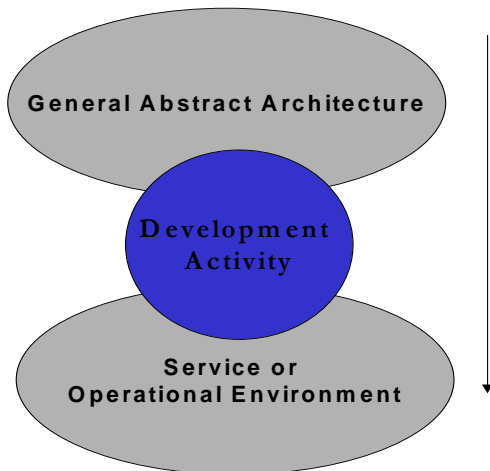
This will define the direction for a series of complementary approaches to funded activity. Investment will comprise, some targeted development funding to experiment with new approaches, to directly involve the community in some programme based activity, and to develop project to service approaches where appropriate.

This process will also involve benchmarking the current service providers operating in the Information Environment. We currently have a set of JISC funded service providers who are responsible for providing a range of roles intended primarily to serve educational on-line resources to our community and to support this process in various ways. In order to achieve an operational Information Environment it is essential to benchmark our current services against the model proposed. In this way some investment can be made at a service level to allow providers to operate within the new technical architecture.

Stage 3: Building the operational Information Environment

In order to arrive at an operational Information Environment we need to fund and manage the development activity as detailed in the related Implementation Plan.

This process is represented diagrammatically as follows:



- **Implementation Plans and Studies**

Building the Information Environment is a complex and wide ranging activity, therefore it is important to emphasise that this Development Strategy is supported by a series of documents presenting detailed approaches. Some of these are already in place others are under development. (* = already in place.)

1. **DNER Technical Architecture:**

UKOLN's work on the technical architecture of the DNER is available at:
<http://www.ukoln.ac.uk/distributed-systems/dner/arch/dner-arch/>*

Ongoing work:

UKOLN are working to develop this area and to provide a range of studies and supporting specifications which will provide us with a firm technical underpinning for the approaches we take in moving forward.

2. **Implementation Plan for the Information Environment***

The evolving plan encompasses the following areas, it is currently in its second draft stage.

Building the Information Environment

- Content Submission Mechanisms Programme
- Service Provider Development Programme
- Portals and Fusion Programme
- Shared Service Programme
- Presentation Programme
- Evaluation Activity

3. **Programme Management procedures and guidance for DNER Development programmes:**

- Reporting framework*
- Standards and Guidelines*
- Copyright and licensing guidelines*
- Business and exit strategy

3.3 Development Time scales and Targets

The overall timeframe for this phase of the development of the Information Environment is between 2001 and 2005. It is important to recognise however, that this is only the first phase of a longer term process of transformation within environments enabling access to electronic resources. This ongoing transformation will be the result of both the evolution of technology and resulting cultural change within learning, teaching and research.

It is important to note that not all the areas in which we will invest between 2001-2005 will lead to the development of fully operational services by the end of the 2004/5 academic year. For some areas it seems likely that the development trajectory will take place over a longer time scale. We will need to accept that some activity will result in learning outcomes or enhanced understanding of a particular area and will not in itself lead to an operational service. It is also important to recognise that the Information Environment is an evolving concept and related development plans and programmes will need to be reviewed on an annual basis in order to retain flexibility and to be responsive to change.

The Implementation Plan for the Information Environment referred to above presents detailed recommendations for moving forward in each area of activity referred to above.

The following are the targets that we intend to achieve in each area dedicated to building the Information Environment by 2005:

Content Submission Mechanisms Programme

1. To progress access to and sharing of community content through developing and enhancing mechanisms for the disclosure, discovery, deposit and exchange of resources
2. To have significantly enhanced access to community collections through the use of these mechanisms
3. To have funded and managed a number of community based programmes in order to ascertain the organisational, technical, and business challenges involved in sustaining this area as a core strand of JISC activity.

Service Provider Development Programme

1. To have developed a service provider architecture suitable for the realisation of the Information Environment
2. To have funded a range of development activity needed to transform "service vision" into "service provision"
3. To have in place by a sustainable network of service providers whose services are developed to provide the operational Information Environment

Portals and Fusion Programme

1. To have a fully developed view of the nature and role of portals within the Information Environment
2. To have developed and tested a series of demonstrator portals in a range of subject, format based, and community based areas
3. To have been able to commit to a strategy for full portal roll out to satisfy the core needs of learner, teachers and researchers in further and higher education
4. To have explored the potential of portals as an extendable network of "gate keepers" to content being generated within a variety of cross sectoral initiatives, and their ability to address a variety of audiences beyond the formal education sector.

Shared Services Programme

1. To have fully ascertained the parameters for the operation of shared services within the Information Environment and to have reached an integrated technical solution that also inter-works effectively with developments in authentication and authorisation managed elsewhere in the JISC.
2. To have undertaken a series of studies, prototypes, and pilots leading to operational services in order to have tested the full range of shared services to lead to a full roll out from 2005.

Presentation Programme

1. To have significantly improved the usability of JISC Services and resources offered through the Information Environment
2. To have established the most effective means of embedding the presentation of resources within institutional, departmental, local and personal environments

3. To have established and disseminated best practice where ever possible in design of interfaces to support the requirements of access to diverse types of digital resources

4 Moving forward in collaboration

The Information Environment development is part of a national and global agenda for developing cognate environments for lifelong learning. Other initiatives for example, the People's Network, National Grid for Learning and Research Grid are, like the JISC's Information Environment, intending to provide information and resources for new generations of adult learners who will increasingly rely on accessing information and training through virtual, networked environments. This is also true of key public bodies such as the British Library and National Health Service who are also embracing the potential of digital access. This strategy recognises that the key to pursuing the development of the Information Environment is in partnership with other agencies who are also looking to find solutions to the challenges of distributed information resources and ways of presenting them to new audiences.

The strategy as it is presented here does not suggest that the JISC has found all the answers to the issues of distributing searching and access to relevant resources for life long learning. Technology and paradigms for access are fast moving, and managing this change is an intrinsic part of the process. This strategy is intended to explicate the directions in which it is proposed forward funding will be focussed, which will be refined in consultation with others who have a stake in the concepts and processes that underpin this development.

5 Character of development activity: from innovation to operation

Development activity is essential for the JISC across all of its various initiatives and programmes, it defines the process of moving forward and allows targeted investment to take place. In this way development activity is clearly pivotal for a leading edge initiative such as the Information Environment. This strategy and the concepts it puts forward, aim to add coherence to the process of positioning the JISC as the provider of an information environment suitable for the next generation of adult learners and teachers in the UK.

Innovation

The information environment as proposed here, is by nature innovative and rests upon a conceptual framework that is in advance of what is currently offered to students and teachers who access digital resources, and the technologies that are in place. It should be recognised at the outset, that while every effort will be made to take on board the research outcomes of development activity, not all current projects will lead us to operational services. Some activity is by nature experimental, allowing us to test our assumptions and proposed directions, and to evaluate them with users. All development activity will exist within a "business" and organisational environment whose constraints necessitate strategic decisions about ongoing funding.

Cultural Change

It should be noted that, these new developments are not only technically innovative they have the power to transform the process of learning and research. By transforming and informing the currency of how information and learning resources are accessed they will bring fundamental change to the process of learning and research. For example, the Information Environment will provide new opportunities for interrogating aggregated resources supporting the discovery, and

the presentation of items in new contexts so pushing back the boundaries of knowledge.

Demonstration

Equally however, as it stays ahead of the game, the JISC needs to provide active evidence of what the landscape of the future will look like. The Information Environment is about providing resources to students now, and in ways which appeal to them and those who teach them. The JISC needs to be able to demonstrate the range of significant services and resources that it supports, while providing evidence, particularly to teachers and information mediators, of the validity of new approaches.

Harnessing distributed resources

Development activity is therefore about two different kinds of processes which will need to run in parallel for both the JISC and DNER:

- It is firstly about allowing the services and resources that are visible to our end users to be presented to them in such a way that they are actively used and understood, allowing them to become a normal aspect of the teaching, learning and research process.
- Secondly development activity is that which allows us to push forward the boundaries of information provision, allowing us to test out new approaches.

6 Management, Consultation and Dissemination

6.1 Management Mechanisms

The Implementation Plan will provide more detail about the range of management processes underway to support the process of going forward.

The development of the Information Environment is being lead by the DNER development team reporting to the JISC Committee for Electronic Information (JCEI). In future it is anticipated that the activity will be overseen by a dedicated Information Environment committee, and will operate within the JISC Executive Development Directorate. Co-ordination mechanisms will embrace input from JISC Committees, staff and stakeholder communities (An informal technical working group is also proposed to orientate this activity more closely with commercial developers of relevant systems and services).

It is expected that the flow of development activity funding will be managed through the following three processes:

- ***Community calls*** to directly engage with institutional, domain and user issues in working on projects which directly test, examine and model the role of sharing and exchanging community content within the DNER, for example.
- ***Funding closely orientated to augment existing service provision*** and work with JISC funded service providers in achieving an operable environment.
- ***Project funding*** to involve a range of players in further and higher education community in order to embrace expertise in developing new approaches.

6.2 Consultation Process

In moving forward it is important to recognise the role the following groups:

Representatives of cognate initiatives, those developing parallel approaches within a UK and International Context. An appropriate channel for this input will be put in place to ensure ongoing input.

Members of the FE and HE community will be invited to comment on the Development Strategy and related plans, and in particular to consider the impacts and benefits upon institutions and the users that they serve.

6.3 Dissemination Activities

The communications and dissemination activities which will need to take place in order to develop the Information Environment collaboratively with the user community and stakeholders are given a broader strategic point of reference by the DNER Communications Strategy and the overarching JISC communication strategy planned by JISC Assist.

However within this framework, specific activities, groups and events will need to be planned and prioritised in order to allow team managing this area to target its efforts toward communication and dissemination activities which directly enhance the process of moving forward.

7 Evaluation Strategy

It is essential to consider the role of ongoing evaluation activity, whether formative or summative, its scale, role and funding as a part of the wider suite of activities with which this strategy is concerned. The Implementation Plan makes some preliminary recommendations for the nature and scale of dedicated evaluation activity appropriate to this development.

It should be noted that the formative evaluation of the DNER development programmes (funded in advance of this strategy) has commenced, and is being carried out by the eDNER team. eDNER is led by the Centre for Research in Library & Information Management (CERLIM) at the Manchester Metropolitan University. The existing development programmes will remain the focus of this work though it is hoped that for the remaining period of this activity, some effort can be aligned to feeding into the process of developing the Information Environment and considering its on-going and future impacts upon the community that we serve.

It is also important to note that evaluation activity here is also part of broader JISC activity as led by JCALT, JISC Committee for Awareness Liaison and Training. It is recognised that there are important synergies with the work being carried out under the aegis of the JISC User Behaviour Monitoring and Evaluation Framework, and in particular JUSTEIS, (JISC Usage Surveys: Trends in Electronic Information Service) Project.