Integrating VLE and Library Systems: Opportunities and Challenges

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Keywords: E-learning, Integration, Authentication

This paper describes the potential benefits of VLE - Library system integration to learners, libraries and content providers and examines the role of emerging authentication technologies in facilitating the practical realisation of such integration. It reports on the activities of the 4i Project (Interoperable Institutional, Integrated Implementation) led by the University of Ulster in collaboration with WebCT, Talis and Athens. This project is funded by the Joint Information Systems Committee (JISC) under the Linking Digital Libraries and Virtual Learning Environments (DiVLE) programme which aims to explore the technical, pedagogical and organisational issues of linking digital library systems and virtual learning environments.

1 Introduction

The University of Ulster is the largest higher education establishment on the island of Ireland, with over 21,000 students. It has four physical campuses spread over a distance of 100 miles and a virtual campus, Campus One, which was launched in 2001.

Since 1999 the University of Ulster has sought to take a strategic approach to the development and implementation of e-learning [14]. To support this work, it has developed an institutional e-learning infrastructure comprising a consolidated server system, new video conferencing facilities and the procurement of an institutional VLE (WebCT). At the same time, the University established the Institute of Lifelong Learning, with responsibility for promoting e-learning across the institution. This strategic approach to the development and support of e-learning has allowed the University to rapidly roll out fully online post graduate masters courses (17 at time of writing) and to support an increasing number of traditionally taught programmes and modules. As a matter of policy, every University of Ulster module is currently provided with a student populated WebCT course area containing, as a minimum service, a calendar and a set of dynamic library links as described later in this paper.

This institutional approach to e-learning brought together a number of relevant stakeholders, in particular library, IT infrastructure and pedagogic support staff.

At an early stage of this initiative, it was noted that the information known about a user in an online course (specifically person and course data) could be used to direct contextual links to library resources and services based on the users’ expected needs for that course. This observation initiated the current VLE – Library integration initiative.

1.1 UU Library perspective

On considering the role of the library in the digital age, Pinfield [15] noted “The library is first and foremost a service. It’s primary mission is to support the learning and teaching and research activity of its parent institution by providing access to information resources. Subject Librarians [ ] can help to ensure that the service is directed at existing user needs and also be instrumental in developing and implementing new services that proactively address changing needs. This applies in the new electronic library environment just as it always has done in the traditional library”.

Pinfield’s objectives, and the need to ensure library services do not become marginalised by user preference for more convenient generic search engines [13], provided the University of Ulster with a framework for the development of its VLE – Library integration activities. In particular, the need to ensure that any such system integration went beyond the access and retrieval of documents and resources was identified as being of utmost importance and that effective integration should provide learners with access to the fullest range of library services.

The rapid development of flexible learning pathways for full- and part-time students along with introduction of programmes specifically designed for open and distance learning has produced a student body with very different needs and expectations than would have been the case
just a few years ago [6] [11]. The establishment of appropriate mechanisms to support institutional e-learning brought together a number of key stakeholders, in particular Library, IT infrastructure and pedagogic support staff. The dynamics of a multidisciplinary team have been found to promote the implementation of a holistic solution to the challenges and opportunities presented when integrating VLE - Library systems supporting the work of Johnston [10] who noted “integrated access to learning materials and the information resources which support them, cannot be achieved without new collaborations and levels of cooperation between information managers, teachers and VLE suppliers”.

The University of Ulster Library supports teaching, learning and research by providing access to the scholarly materials required by university staff and students, together with the services needed to support their best use. To ensure equity of service to students, including the growing number of part-time and distance learners, the Library has sought to leverage user and course data residing in its VLE (WebCT) to introduce a range of new services and resources to provide seamless contextual links for VLE users, direct from the course menu bar.

### 1.2 Library Resources

In the area of resource management, the Library has made significant moves towards subscribing to full text electronic journals and online reference material in support of the increasing number of students who are physically remote from the university campus. In some cases this led to the cancellation of paper-based journal subscriptions however many resources are currently available from the Library in both paper and electronic form offering users a degree of flexibility in accessing required learning material.

In addition to an extensive collection of shelf stock comprising various media, the Library offers access to an array of approximately 270 different electronic information services. These include an extensive range of online databases and retrieval services that encompass approximately 4000 full text electronic journals.

### 1.3 Library Services

The Library has increased the range of self-service options available to students via online access to their borrower account in the Library Management System (Talis). In addition to checking their account status, renewing loans and reserving items online users can also request Inter Library Loans via the same online interface. Successful requests generate an email notification to the student granting access to the material requested in PDF format.

Added value services offered by the Library include an option through which users can view material recently acquired on behalf of a particular School hence creating an opportunity for further customisation of users’ view of the Library. New approaches to document delivery include subscription to the HERON (Higher Education Resources ON-demand) a national service for copyright clearance, digitisation and delivery of selected journal articles and book chapters. [7] The Library has also undertaken a digitisation exercise to provide online access to past examination papers. Such initiatives increase flexibility in terms of provision of and access to learning material.

### 1.4 Library Support

A range of training initiatives, along with the provision of web-based user guides and support material, direct students to recommended resource discovery tools and furnish them with the knowledge and skills required for independent study. It is of strategic importance that this traditional role of the Library is maintained and adapted as required as librarians find themselves working in a Library without walls supporting users in a Virtual Learning Environment (VLE).

This paper describes how the Library, in collaboration with colleagues throughout the university, addressed the challenge of integrating access to relevant learning resources, services and support for students in our virtual campus – CampusOne - whilst continuing to provide for the needs of traditional on-campus students.

### 2 Background to the University of Ulster VLE - Library integration model

#### 2.1 Overview

During the rollout of its institutional VLE and its integration with library resources and services, the University of Ulster Library has worked closely with the Institute of Lifelong Learning to ensure that students are not channelled directly from the VLE to a variety of abstract online resources, bypassing the Library.

The promotion of effective liaison between librarians and academics regarding the provision of comprehensive online resource lists for all courses pointing to appropriate tools and resources will ensure that courses are adequately supported and equity of service is maintained.

In 2001, the Library introduced a sophisticated web-based resource management facility (TalisList) to provide a controlled gateway to a range of appropriate local and remote resources tailored to students course-specific requirements. Work was later undertaken to tightly integrate TalisList with WebCT supporting distance learning by providing coherent access to resources. These resources may comprise the various elements of a hybrid library [3] with links to online bibliographic databases, full-text electronic journals,
specific journal articles or book extracts in PDF format, e-books, networked CDROMs, audio/video clips, useful internal and external websites along with direct links to the Library catalogue to display details of a specific item of shelf stock such as books or other non-book media.

2.2 TalisList resource management system

Since its introduction to University of Ulster staff in September 2001, the TalisList system was promoted to academics as a ‘resource’ rather than ‘reading’ list management system. The introduction of online module resource lists, and the institutional rollout of WebCT, presented the Library with an opportunity to entice academics away from the rather one-dimensional idea of a reading list (often a static list of library shelf stock) and encourage them to embrace the idea of a dynamic resource list, rich in both content and functionality. In doing so the Library was able to raise awareness of the range of electronic information resources available for use. Given the associated cost of acquiring such resources it is important that they are used to best advantage by all students, not just those studying at a distance.

TalisList forms an integral part of the university’s e-learning infrastructure and enables the Library to provide a contextualised gateway to the plethora of learning resources available to students. These resources are hand-picked by academics in consultation with Librarians bringing added value to the online learning experience whilst providing valuable support to traditional on-campus students. This system is centrally hosted by the Library in collaboration with academics who provide the content in a structured format. Notes of guidance on the use of particular resources from academics and recommendations from Librarians are incorporated within the resource lists thereby providing the students in an online environment the same degree of customisation they would encounter in a traditional ‘bricks and mortar’ learning environment.

2.3 VLE - Library integration model overview

At an early stage in the establishment of an institutional e-learning infrastructure, it was noted that the information known about a user in an online course (specifically person and course data) could be used to direct contextual links to library resources and services based on the users expected needs for that course. In order to achieve this, it was recognised that a means of extracting this user profile data and passing it to the library would need to be developed and that an appropriately granular view of library resources and services would be required. It was also recognised that an integrated approach to authentication would facilitate seamless user access to protected resources such as databases and online journals. In early 2002, the University of Ulster approached its Library systems and VLE providers (Talis and WebCT) and the Athens Access Management Service to initiate an institutional VLE – Library integration pilot study. This work successfully demonstrated the ability to seamlessly integrate course content in an institutional VLE (WebCT) with relevant resource lists in a resource management system (TalisList) and provide onward access to students' required learning resources using Athens Devolved Authentication.

The sharing of person and module data between systems also offered potential to grant WebCT users pre-authenticated access to selected self-service options within the Library Management System (Talis).

2.4 The 4i Project

This concept has since been further developed and is now being mainstreamed across the University of Ulster with the support of funding from the Joint Information Systems Committee. The JISC-funded ‘4i Project’ (Interoperable Institutional, Integrated Implementation) continued the University’s collaboration with WebCT, Talis and Athens in this exciting field. The project was funded under the Linking Digital Libraries and Virtual Learning Environments (DiVLE) programme which aimed to explore the technical, pedagogical and organisational issues of linking digital library systems and Virtual Learning Environments.

One of the key objectives of the 4i project was to explore the hypothesis that integration of VLE and Library authentication processes can simplify user education, increase usage of electronic resources, reduce helpdesk queries and streamline library business processes. An integral part of the VLE - library system integration work of the University of Ulster was the integration its WebCT and Athens authentication processes.

The development of Athens Devolved Authentication enabled users accredited locally by the University of Ulster to acquire the necessary authentication credentials to seamlessly access a range of Athens protected resources from a WebCT course or from a subsequently visited library page (i.e. a resource list in Talislist).

The integration of these processes both simplifies the user experience and allows consolidation of helpdesk activities. It provides remote users and distance learners, as well as campus-based users, with a simple and effective means of utilising a range of online services without having to be issued with and challenged for differing sets of credentials.

3 Access Management

Providing appropriate access to resources is key to the business of a Library and authentication as always been an issue, with the humble borrower card as the basic form of ‘offline’ authentication that is still in use in academic libraries. However Library staff and users are
confronted with a growing range of resources to search and gain access to as today’s library offers access to resources beyond the confines of its shelves.

A dramatic rise in the number of university students studying at a distance and increasing demands for flexible access to resources as well as courses, combined with the proliferation of electronic resources being offered by suppliers in response to this emerging new market, presents a number of challenges and opportunities for academic libraries. New approaches to resource management and discovery have been adopted. Rather than simply displaying a Library borrower card to borrow a book, in the online learning environment we need a system to verify who an off-campus user is and what rights they have before granting access to the appropriate library resources.

The provision of a transparent, scalable access management process is a key objective for any HE Library. Such a service must be scalable and flexible if it is to meet the institutions’ current and future needs. As Lynch [12] noted “In a world of networked information resources, access management needs to be a basic part of the infrastructure, and must not become a barrier to institutional decisions to change or add resource providers.”

Students often have to acquire a new set of ‘information skills’ to enable effective use of the various electronic information services available to them, regardless of remembering which set of access credentials are required to gain access to each resource. There are inevitable language and time zone constraints with regard to providing distance learners with adequate helpdesk support. As a result innovative methods of user education and support such as the ‘Follow the Sun 24 hour helpdesk initiative’ [16] have evolved during recent years.

Early experience of providing electronic access to Library resources was a world away from the current situation. Access was often IP-based on campus with a generic institutional password available for those students who wanted to, and were able to, access networked Library resources from home. The majority of required resources were paper based and off-campus access to the relatively small collection of electronic resources was not a huge concern as most students visited the campus frequently.

Within a couple of years, the growth in electronic resources increased dramatically and libraries had to quickly adjust to meet the changing demands associated with providing appropriate access to learning materials. There was increased administration of usernames and passwords from a Library perspective and students were often subject to information overload as there was no standard authentication mechanism in place. As J. Edwards [5] noted in 1997, “One of the stumbling blocks to promoting the use of electronic journals is the potential plethora of interfaces and delivery mechanisms with which the user may be required to become familiar with.”

3.1 Athens Access Management

Athens is a large scale centralised Access Management System in common use, particularly in the UK. It is a major example of a co-operative approach to authentication in the academic Library community, requiring major planning and commitment. Resources who adopt Athens authentication are typically academic research (content) providers. For a full list see http://www.athensams.net.

Athens has the current JISC contract for an Access Management Service for use in UK Higher and Further Education. Athens has a similar contract with the NHS (National Health Service) Information Authority for centralised registration, account management and authorisation facilities, for access to the same set of online academic research material.

![Figure 1: Schematic of Athens Access Management](image)

In its simplest terms, Athens is a central database that contains

- Details of institutions that use Athens, with links to their preferred database of credentials for access to Athens-protected services. These can be held centrally in Athens, or delegated to the institution itself, using a local authentication service. The latter is referred to as Athens Devolved Authentication or AthensDA.
- Usernames and passwords for institutions that wish to use its central database for its usernames and passwords. Athens offers extensive web-based account management facilities for these usernames and passwords. This is delegated account management.
- Authorisation rights for access to the online services. Athens does not sell services, it simply holds the rights information. When an Athens-protected service is sold by the content owner or their agent to an institution using Athens, Athens is simply informed by the accredited agent and the institution is given access to the service.
At the time of writing, there are over 250 Athens protected web services and there has also been a shift from the use of generic institutional passwords to individual user credentials i.e. Athens personal user accounts.

Increased availability of Athens-protected electronic resources in recent years has benefited both users and HE libraries as one set of credentials granted access to an ever-increasing range of resources. For example, major services such as SwetsWise and ScienceDirect use Athens authentication providing a standard method of off-campus access to approximately 4000 full text journals for University of Ulster students. However the administration and secure distribution of Athens usernames and passwords is still a time-consuming and costly task for libraries. The plethora of available online resources requires extensive user education programmes and is often bewildering for learners, resulting in high numbers of helpdesk queries [4].

Secure distribution of Athens credentials can be problematic, especially when dealing with distance learning students. Perhaps due to their isolation from general Library procedures this group of students can also experience particular difficulty in understanding when and how to use their Athens username and password.

A survey conducted amongst University of Ulster Library support staff indicated that the majority of helpdesk queries from distance learners were associated with obtaining and appropriate use of their Athens credentials. This supports the finding that the complexities of authentication and authorisation can inhibit user awareness and utilisation of an academic Library’s collection of electronic resources [2], even when a standard mechanism such as Athens personal accounts is in use.

3.2 Athens Devolved Authentication (AthensDA)

One of the key aspects of Athens is that it maintains a central repository of all its users and hence a separate namespace with different Athens usernames. This poses a series of problems to administrators at participating institutions, relating to unnecessary duplication of user record data such as data freshness, correctness and data sharing.

AthensDA [1] solves some of these problems by integrating with an institution’s existing user data and authentication frameworks. This extension will allow members of participating institutions to gain remote single sign-on access to Athens authenticated resources using their own institutional credentials transparently with a level of security acceptable to Data Service Providers (DSPs), users and institutions.

AthensDA works by referring a user to some software running in their institutional domain which will authenticate the user and then alias that user an Athens entity which has the correct authorisation permissions for that user. The user is still authenticated by DSPs, using the existing Athens infrastructure.

4 UU VLE - Library integration model

The use of a common data schema across legacy systems is one of the fundamental requirements for successful VLE-Library integration on an institutional scale. The University of Ulster uses the same categorisation schemas (module code and student number) in its Student Records, VLE and Library systems, with the population of each system being generated from a common data source. Initial integration work utilised these two key data elements to provide contextual linkages from WebCT to resource lists (in TalisList) and self-service options (in Talis). This shaping of Library services to the context in which the student is presently operating is achieved generating a cookie containing the student’s registration number and module code from WebCT. Each link read and acted on the cookie independently, extracting the module and person data as required.

Successful implementation of this mechanism to pass person and module data between VLE and Library systems led to the application and enhancement of this technology to ease and integrate student access to other Library services and resources that reside outside the two core Library systems (Talis and TalisList), for example past examination papers and HERON documents.

This process was enhanced by the integration of the WebCT and AthensDA login processes to facilitate pre-authentication of VLE users to Athens protected resources. Such use of the authentication functionality of an institutional system (i.e. the VLE) augmented with local verification of Library privileges from an institutional directory service provided an access management model that could enable such Athens pre-authentication to be realised.

The development of such a hybrid AthensDA implementation utilising VLE authentication and Directory Service authorisation was subsequently supported by Athens, who developed it as Local Authentication Assertion (LAA) mode. In the simplest terms, this means that the user only needs one username, for WebCT.

The final aspect of the integration model is the routing of all such linkages through a single ‘Library gateway’ rather than having embedded “hard coded” links to specific Library targets. This gateway is locally known as the Library Service Point (LSP).
During the VLE – Library integration process, person and module information passed from WebCT is manipulated by the LSP to generate person-, module-, school- and faculty-specific links to various Library resources and services. These contextual linkages between the institutional VLE and Library are automatically embedded into the global navigation bar of WebCT. This approach, where the point of integration (LSP) sits outside the actual systems concerned, maintains system independence in the integration between VLE and Library systems.

- Module resources (link to My Module Reading List in TalisList)
- Subject guide (link to Library Information & Services for My Faculty in Library website).

The implementation of the LSP as ‘middleware’ picking up requests from the VLE and routing them onward to the appropriate Library service or resource, depending on the users current requirements, offers a number of benefits to the student as well as those working on maintaining the respective VLE and Library systems.

**4.1 Benefits of the VLE – Library Gateway (LSP)**

The provision of contextual links to specific module resource lists and subject related discovery gateways support both student learning and research needs.

**Learner benefits**

Students benefit from seamless access to a variety of customised Library services and resources they would previously have had to use their own search and navigation skills to locate, and individual authentication credentials to access.

The VLE benefits

Requests to a fixed reference point rather than direct addressing to the back-end Library services from the VLE avoids hard coding of links. Any changes to the URL of the Library service/resource requested need only be implemented at the LSP and not in WebCT. The LSP offers flexibility in terms of either providing a direct link or indirect links via a menu of service and support offerings, which can be amended without maintenance issues on the VLE side. This reduces the workload of the instructional designer as they no longer have to worry about incorporating appropriate Library links within their online courses.

References to learning resources are not stored within the VLE, rather they are centrally managed by the Library in collaboration with academics using the TalisList resource management system. This further reduces associated...
maintenance tasks such as ensuring currency of links and relevance of material that is managed by the Library.

Users can simply locate and access relevant Library resources and services directly from online course pages. This will promote student utilisation of Library resources and research tools.

**Library benefits**
The LSP is advantageous to the Library as it enables Library services to have a single authoritative and stable source of information. This can then be used to authorise trusted access to other Library services such as past examination papers or HERON documents on the basis that the user has been authenticated by another UU service (in this case WebCT). The need for a separate system of authentication is effectively eliminated.

The provision of a consistent ergonomic user interface within ALL online module/course areas simplifies user access, reducing user education and helpdesk workloads.

**4.2 Evaluation**
The University formally enabled its VLE – Library integration in February 2003. Formal evaluation of the integration is ongoing at the time of writing of this paper. Initial investigations indicate:

1. Institutional pre-authentication of UU WebCT users to AthensDA protected resources using the LAA mode was achieved. All WebCT sessions from February 2003 onwards have acquired, where appropriate, AthensDA credentials. In addition, every WebCT user received, upon successful login, a message notifying them of their Athens status and the range of services available to them. During the months of Feb – April, the average number of daily page requests to the WebCT server averaged in excess of 140,000.

2. Automated, contextual integration with a range of Library systems and services leveraging VLE provided user and course information can be implemented on an institutional basis. All UU modules are provided with a WebCT module area which includes the LSP facilitated Library links described earlier. These WebCT module areas are populated from the student record system, providing students with a contextual gateway to the Library for all their modules of study.

3. The VLE – Library gateway was successfully used by learners accessing the Library from off campus. In percentage terms, 55% of LSP activity emanated from outside the .ulster.ac.uk domain. Utilisation of the service by distance and off campus learners can be evidenced by 53% of LSP activity emanating from outside the .uk domain. Detailed analysis of system and server logs is in progress at the time of writing of this paper.

4. Managed access to protected resources can be provided to distance learners without the need for Library specific credentials. Indeed a potentially complex user education programme to describe how distance learners can gain access to such resources has been replaced with a personalised awareness and information service, supported with contextual links on the UU WebCT homepage, WebCT course pages, Library hosted module resource lists and other Library pages. The success of this approach was immediately apparent as Athens related queries from distance learners largely ceased on the introduction of the Athens LAA process using UU’s WebCT system. Residual Athens related queries from distance learning students related to access to resources not yet supported by AthensDA. The opportunity for these queries to re-occur will reduce as more DSPs support AthensDA. It is expected that all DSPs who use Athens will be AthensDA compliant by September 2003.

5. The availability of module resource information to Library systems can be used to inform Library stock management and user education activities.

**4.3 Challenges of implementation**
In developing and deploying a VLE – Library integration service on an institutional basis a number of challenges were identified at an early stage.

**Proliferation of course related roles within e-learning**
The proliferation of para-teaching roles within e-learning courses, each requiring access to the VLE, provides a significant access management challenge, as the exact nature of their relationship with the University can, from a Library perspective, be unclear. Some of these users will be eligible under the licence conditions for access to Library resources, others will not. The use of explicit staff categories (such as associate and visitor) to populate both VLE and Library systems can provide some inference to the users Library permissions. However, the users exact status of Library access will be determined by the personal terms that he or she has agreed with the institution. This mapping of personal and group membership credentials with specific institutional (including Library) permissions is at the heart of emerging role based authorisation projects such as Shibboleth. To date, the University of Ulster is only providing Athens access to WebCT users with an existing Library account.

**Library business processes**
The heart of this VLE – Library integration is the provision of module resource lists. With over 5000 live modules, the creation and maintenance of such large numbers of lists poses a significant challenge. Initial investigations have focussed on the defining consistent list vocabularies and schema and examining the issues surrounding the harvesting and input of large numbers of resource items into Talislist.
The provision of devolved resource input to academics, coupled with librarian approval options provide an opportunity for Talislist to be used as a means of promoting greater academic – librarian collaboration. An output of the 4i project will be an investigation into the issues surrounding the large scale input and management of module resource lists.

Library service that does not ‘spoon feed’ the learner

The Module Resource Lists hosted in Talislist provide learners with an organised list of resources (paper-based and electronic) selected by academic staff. The level of detail within each list is appropriate to the requirements of the teaching staff for the module.

The Subject Guide pages are managed by subject librarians and provide a more generic overview of the range of available databases, subject gateways and resources available on a subject by subject basis. These pages provide learners with a useful starting point when embarking on research activities.

The Library Service Point provides learners with a means of obtaining deep links to a range of services; some personal, some subject related and some informative of Library activities.

This combination of complimentary services, supported by academics and librarians respectively, provides a simple interface to a range of Library services and resources appropriate to the needs of the subject, academic and learner.

Interoperability

The current method of WebCT - Library integration developed to date by the University of Ulster lacks a number of key interoperable attributes:

1. If exported to another institution, the course will continue to point to the UU LSP.
2. The integration is realised because both the VLE and the Library use the module code within their systems. Many institutions may wish to utilise other course data (subject, campus etc.) to realise this integration.

An output of the 4i project is the development of explicit use case scenarios to describe how institutions may wish to integrate their VLE and Library systems.

The described integration can readily be adapted to work using a Web Services model. It is the intention of the University of Ulster to develop this approach when the relevant Web Services and interoperability standards have become more fully defined and have broad sector acceptance.

5 Emerging metadata standards and access management technologies

5.1 IMS

IMS Global Learning Consortium, Inc. (IMS) develops and promotes open specifications to facilitate online distributed learning activities such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems. IMS came into existence in 1997 as a project within the National Learning Infrastructure Initiative of EDUCAUSE.

A number of IMS schemas are of relevance to the integration of Library services with online courses hosted within a VLE. In addition to the Content Packaging schema, which provides a means of specifically identifying resources that are utilised in support of a given course, IMS released in March 2003 a Digital Repositories Interoperability (DRI) specification [8]. This specification seeks to “define a specific set of functions and protocols that enable diverse e-learning components to communicate with each other. These functions and protocols draw on XML technologies such as SOAP (Simple Object Access Protocol) and XQuery, and established technologies such as Z39.50, developed by the Library community. The specification acknowledges a wide range of content formats and is applicable internationally to both learning object repositories, as well as to other traditional content sources such as libraries and museum collections."

The development of these schemas is ongoing, with the need for effective interoperability between VLE’s and institutional Libraries a key objective. The availability of appropriate metadata standards will facilitate system integration across multiple vendor combinations and allow institutions to readily implement effective VLE – Library integration services that are sustainable beyond their own context.

5.2 Shibboleth

Shibboleth [9] is an emerging Web authorization architecture and software, and is one of the key developments in the field of authentication. It is an Internet2 / MACE (Middleware Architecture Committee for Education) project, whose objectives are “to define the architecture and message protocols for the secure management of authorisation information that can be used in access control decision making” along with practical technologies, and open source implementations. The architecture emphasises federated administration, access control based on attributes rather than identity, and active management of privacy to provide a scalable and extensible framework for inter-institutional authorization.
The architecture of Shibboleth defines roles for the institution and for the resource provider. The institution is responsible for:

- A local authentication service providing federated or devolved authentication
- An Attribute Authority providing approved attributes of individuals to external services
- A Handle Server to communicate with Resource Providers. (Provided by Shibboleth)

The Resource Provider is responsible for:

- Directing the user to his institutional authentication system and receiving in turn a 'handle' or key to the user’s attributes
- Making authorisation decisions based on the user’s attributes

Shibboleth deliverables include an architecture definition, a set of message passing specifications, a set of sample code and a reference implementation.

Athens are committed to integration with Shibboleth, so that institutions registered with Athens can access Shibboleth protected resources, and conversely that institutions who adopt Shibboleth can access Athens protected resources.

The availability of this Athens service to the UK HE sector will provide institutions a robust approach to implementing access management for their users and will facilitate the development of consortia and inter-institutional learning and research initiatives with a user authentication process that is both simple for the user and auditable for DSPs.

6 Conclusions

The benefits of an integrated, interoperable, institutional approach to VLE and Library system implementation, typified by the 4i project, are multi-faceted.

6.1 Streamlining of Library business processes

The implementation of AthensDA addresses the root cause of a large proportion of Athens-related helpdesk queries by firstly removing the need for students to remember an Athens username and password and secondly relieving Library staff of administrative tasks associated with maintaining the external central Athens repository in line with institutional student records and human resource systems.

With full implementation of AthensDA there is no longer a requirement to synchronise internal legacy systems with the central repository of accounts hosted by Athens. Rather the institution maintains its own directory service (e.g. LDAP) which is used by the Athens as a trusted data source for the verification of legitimate members of the university. This reduces the administrative burden on the Library of generating, maintaining and distributing large volumes of Athens personal user accounts.

The use of a resource management system results in a single authoritative source of information on the Library resources required by various courses. Such information can be used to inform an academic Library’s resource management strategy. For instance, it is possible to determine how many courses make use of a particular resource. For paper-based resources this enables additional copies to be ordered as required and for electronic resources usage can be traced back to Schools and Faculties to enable costs to be attributed accordingly.

6.2 Simplified user education

Integration of authentication mechanisms, using the LAA mode of AthensDA, eliminates the need for students in an institutional VLE to enter an additional username and password in order to access a large proportion of the Library’s electronic resources. This development redefines the role of Library support staff to some degree. The focus shifts from one of user education (“You need to use this set of credentials to access this set of resources”) to raising user awareness of what they can access (i.e. timely notification of what resources they can access). This has led to reduced helpdesk enquiries and increased usage of a Library’s electronic information services.

6.3 Reduction in helpdesk queries

Prior to the implementation of the VLE-Library gateway (LSP) and AthensDA at the University of Ulster, Library support staff reported a large number of helpdesk enquiries relating to Athens personal accounts. The majority of such queries were from off-campus distance learning students and survey results indicate that these were the most problematic and time-consuming for support staff to resolve.

The end users’ relative isolation from Library procedures and practices coupled with the inherent complexities managing Athens credentials for a large user population compounded these problems. Queries relating to verification of usernames and passwords and the appropriate use of these credentials were relatively straightforward to resolve, providing the time-zone and language differences could be overcome. However, helpdesk staff could not always offer an immediate solution to certain queries, such as those relating to currency of data held in the central repository of Athens accounts. These had to be forwarded to systems administration staff for further investigation and where therefore more time-consuming which has a negative impact on the user experience.

6.4 Increased usage of electronic resources

The introduction of a resource list management system (TalisList) to provide coherent access to support material
was a catalyst for improved liaison between Library and academic staff. This led to increased awareness amongst academic staff of the full range of electronic information services available to support teaching and learning, which in turn promoted student use of these resources.

Statistics show a general upward trend in the usage of electronic resources, especially those that have recently become Athens-protected, for example, ScienceDirect which offers access to a range of full text electronic journals. There has been a three fold increase in the usage of this particular resource by University of Ulster students during the past year. Statistics show a 93% increase in usage since the institutional launch of the LSP and AthensDA.

References


