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Creating an MLE

Implementation

- Deployment strategy
- Key roles
- Legal requirements
- Support requirements
- Communication
- System resilience

7. Implementation

Who should read this:

This Section is aimed at anyone involved in planning and/or implementing an MLE. Some of the additional resources mentioned require a certain amount of technical knowledge.

Outcomes:

On completion you should have an understanding of key issues which need to be addressed during the implementation of an MLE. This should help you to assess the scale of the work involved, and the resources and time that need to be allocated to it.

Approach:

The section draws mainly on the experiences of Managed Learning Environment projects in the JISC building MLEs in HE Programme, highlighting common themes and approaches, problems encountered and solutions. It focuses on issues that are characteristic of – or particularly relevant to – MLE implementation . (There are many existing resources providing general guidelines on implementation projects. A good starting point is the infoKit on [Project Management](#)).

Introduction

An MLE is by nature very specific to its own Institution, so there is no one right approach to implementation. However, it is possible to identify a set of critical issues relating to implementation – emerging from the JISC MLE projects and similar developments. These issues include:

- Deployment strategy
- Key Roles (Steering Group and Project Team)
- Legal requirements
- Support
- Communication
- System resilience

All of these will have to be addressed during implementation. Experience suggests that it is easy to underestimate the scale of some of them – and the impact they will have on the time and cost of the work.

The aim of this section of the MLE infoKit is to explain why these issues are important, and to point to examples of the various ways in which they have been tackled.

Deployment Strategy

There are currently no examples of what could be described as a full implementation of an MLE. Some institutions have started the implementation process and there seems to be general agreement among these that a phased approach is best – as a means of keeping the various potential problems (technical and organisational) within manageable bounds. Starting points for implementation vary between institutions, according to local circumstances and priorities. Examples from the 7/99 MLE Programme include

- Integration of the central student data system and a VLE (or VLEs)
- Integration of institutional systems via a student-oriented portal
- Integration of institutional systems via a staff-oriented portal

[Though these are only options ...and would have to go beyond these starting points.]

Key Roles: 1. Steering Group

Implementation is a highly political process, because MLE development cuts across traditional organisational boundaries. There are likely to be several different groups involved in e-learning development, of a formal or informal kind – with different cultures, different perspectives and priorities. 'Understanding your Organisation' of this infoKit provides advice on how these might be identified. Also the MLE can expose problems, incompatibilities and/or flawed academic or administrative processes. There is a danger that the MLE is seen as creating these problems and/or can solve them on its own. This range needs to be reflected in the management structure for the implementation project/phase and in the working relationships between MLE/VLE staff and other groups and departments. Many implementation projects have found it useful to set up a cross-functional steering group (See 'Why might you want an MLE?' and 'Understanding your Organisation' of this infoKit), which brings together the owners and users of the systems being integrated – pooling their knowledge and expertise, and engaging them in the process. It also needs active and committed involvement from senior management. N.B An MLE will change things so it is important that the steering group has the capacity to work through the consequences of these changes quickly.

Key Roles: 2. The Implementation Team

The teams carrying out the implementation work need to include a mix of people who can provide the necessary knowledge of:

- Project management
- Software development work
- Hardware configuration
- Interface design
- Academic and administrative processes
- User needs analysis
- Testing and evaluation

There also needs to be strength in depth so that key areas of knowledge do not reside solely with single individuals.

Legal Requirements

The implementation of an MLE must take account of the following legislation:

- Data Protection Act 1998
- Freedom of Information Act 2000
- Special Needs and Disability Act 2001
- Design and Patents Act 1988
- Case Law on ISP Liability/Copyright

These impact on

- the level of system security required
- accessibility and usability
- the guidance and information that must be available to users
- the need to establish efficient and clearly defined processes to deal with queries and possible infringements.

Support

Implementation must include determining – and planning for – appropriate levels of user support. An MLE may generate technical queries from its users (i.e. how to use the interface) and also queries relating to data or processes (e.g. if the user sees something they don't understand or which is inaccurate). Also because the MLE provides information and services outside traditional working hours (in theory 24 hours a day, 7 days a week) it can place new requirements and expectations on the levels and availability of user support.

MLE projects are addressing these issues in a number of ways, including

- The drafting of Service Level Agreements, and Protocols
- User training
- A collaborative approach to the provision of support to users, involving central and departmental IT Support staff, and Academic and Administrative staff.

A later section explores this area in more detail.

Communication

Communication is an important part of the implementation process, because of the political dimension of MLEs and because many people outside the project will not understand the scale and the complexity of the work. At the same time, communication is notoriously difficult in academic institutions, due to their complex organisational structures.

MLE implementation needs to include measures for establishing an effective dialogue with users (students and staff) – publicising the service, getting feedback, and managing demand.

System Resilience

MLEs are very visible and often provide a gateway to other services so any 'down time' will cause huge problems. Reliability has to be 'designed in' and maintained through

- Robust, scalable hardware and software
- Standardised data formats and procedures (the avoidance of 'workarounds')
- Thorough and systematic testing
- Comprehensive Documentation

The subsections on Implementation provide more detail and supporting resources for the above areas.

7.1. Deployment Strategy

7.1.1. Where to start

None of the MLEs that have (or are) being deployed so far could be described as complete. This was one of the findings of the [JISC Landscape Survey \(2003\)](#). A common thread running through all is the closer integration of systems in the host institution. However, the starting point for this integration has differed between institutions, dictated by local circumstances and requirements.

Some projects, for example CoMantle, have focussed on the passing of data between the University's student record system and a Virtual Learning Environment. Other MLE developments have taken the form of Web portals. De Montfort University's MLE is aimed primarily at students, giving personalised access to the student data system and other systems through:

'...a personalised electronic environment that supports the student experience. It brings together learning, teaching, student research, support and personal information in a tailored portal that is designed to be simple and effective to use.'

Others were initially aimed at staff, e.g. GIMIS:

'The overall aim of the project is to establish practical methodologies for the dissemination of MIS information throughout the College, expanding and reinforcing its Information Strategy by providing the ability to create intrinsic streams of information flow.'

and INSIDE:

'INSIDE started with three general goals: the development of a sustainable model of the University's information flows and processes based on analyses and formal modelling techniques; the piloting of value-added services based on the analyses of existing processes; and the generation of user-centric portals for staff based on their institutional roles and responsibilities.'

For more information on approaches taken, see 'More Resources' in this section, and the section ['Technology Options – What Projects Have Done'](#).

7.1.2. The incremental approach – a pragmatic solution

The portal concept supports an incremental approach to MLE development – it may initially only link together a small number of systems, but more systems can be added over time. In many cases, a definite decision has been taken to avoid a 'big bang' approach. For example, the INSIDE project used a 'Model, Analyse, Improve' approach – identifying problem areas, modelling them and then piloting solutions:

'The success of the Model, Analyse, Improve approach has suggested that incremental progress is more effective than big bang approaches, both in terms of cost, and functional fit. Some proper comparisons, and even identifying the parameters for such comparisons, would be interesting. The use of manageable scale pilots for value-added services and new systems works well. Several issues always come to light in a pilot that cannot be anticipated. It is therefore important that the pilot is on a manageable scale and that users are aware of its nature.' (See 'More Resources': INSIDE. Management Report 5, section ['Gathering requirements'](#))

The TISR project also recommends an incremental approach:

'MLE projects should be realistic, if they are to stand a chance of success, and based on simple components. Rather than attempt to build a whole system, we believe it is better to follow the TISR model and build functional components whilst building up understanding of the institution and its requirements. As the MLE itself is developed, it can be founded on these components, rather than being just another application to integrate. In short, integration is at the heart of MLEs, and the soul of all applications should be integrative.' (See More Resources: TISR. Management Report 4)

There is a realisation that the integration of systems at an institutional level is likely to have far-reaching consequences, and that no single person or group can be expected to have the complete and detailed knowledge required to foresee all the potential difficulties. An incremental approach allows the implementation team and the institution to acquire this knowledge and to keep any problems within manageable bounds. (See section 7.2 and also the sections ['Why might you want an MLE?'](#) and ['Understanding your organisation'](#) for related discussions)

Another advantage of the incremental approach is that some of the benefits of an MLE can be demonstrated as they become ready – at an earlier stage in the project. This can be useful as a means of maintaining support for the project in the institution. This is echoed in a recent review of institutional portals:

'...senior institutional stakeholders will want to see working systems rather than the conceptual design required for thorough portal development planning' (Liz Pearce. Institutional Portals – A Review of Outputs. The PORTAL Project, 2003)

A 'big bang' approach would require a very considerable amount of analysis of the institution and its processes before any development could begin.

7.1.3. Importance of the Institutional perspective

The danger of an incremental approach is that it makes it easier to begin developing an MLE without taking account of the requirements of the institution as a whole. If the institutional perspective is lost the MLE becomes simply a collection of piecemeal solutions. It needs to be more than this for it to function effectively at an institutional level and for it to be sustainable in the long term.

Jos Boys, in a JISC Report on MLEs, highlights the drawbacks of a portal-based approach:

'Some form of web-based portal for students (and staff) is increasingly becoming the 'standard' mode of joining up the previously separate components of student data system, VLE and learning support services via an additional connecting layer. Such an approach is extremely pragmatic – organisationally, technically and financially. It is, however, a very limited model for educational or organisational change, since key issues of content and structure can easily become marginalised in decision-making processes, or be treated as additional rather than central to MLE development. It might even be suggested that the portal approach is taking hold precisely because it enables institutions to avoid difficult questions about how they organise themselves.' (Jos Boys. Managed Learning Environments, joined up systems and the problems of organisational change. See Key Resources.)

Boys goes on to argue that

'If the development of MLEs is to be seen as more than a technical adaptation of existing sub-systems, then its strategy and implementation should include:

- a 'problem seeking' rather than just a solution driven approach
- an explicit model for the management of change, relevant to tertiary education
- explicit organisational and educational goals, preferably including some kind of institution-wide business process review
- development methodologies which centre on structure and quality of content and processes rather than on technical compatibilities
- involvement of students from the outset and a student centred approach to analysing and improving processes
- alternative 'visualisations' of what a MLE is, including the learning of lessons from the existing integration across administrative and academic areas of learning support and information services'

The lesson seems to be that deployment has to be carried out as a series of incremental steps, but these need to be planned carefully so that implementation relates closely to institutional goals, and to ensure that processes are integrated, not just the technical systems.

[Follow this link](#) for key resources for this section (these open in a new window)

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7.2. Key Roles

7.2.1. Steering group and project team

MLE development is a highly political process because it cuts across the traditional organisational boundaries in institutions. This can be a particular problem in universities, which are traditionally seen as having

- a dual managerial structure, in which there is an administrative line of management but also the involvement of academics in university management right through to the most senior level;
- a high degree of autonomy for individual faculties or academic departments, which can make it difficult to implement institution-wide initiatives;
- complex committee structures, which can slow down and obscure the decision-making process.

The situation may be less complex in FE but many of the same issues arise.

A project steering group can provide the necessary authority for implementation of an MLE and perform a useful coordinating role. Membership of the group needs to

- be sufficiently high-level to implement institution-wide decisions;
- span the separate academic and administrative departments and
- include representatives of various owners and users of the systems to be integrated – pooling their knowledge, and involving them in the implementation process.

See the sections '[Why might you want an MLE?](#)' and '[Understanding your organisation](#)' for more discussion of project steering groups.

At De Montfort University, the steering group function is performed by the MLE Corporate Implementation Group. Its composition and terms of reference are set out below:

'The implementation of a MLE will be the responsibility of the MLE Corporate Implementation Group. This group will be responsible for the development of an implementation strategy, for evaluation and dissemination on all aspects of the development.' The group will report to the ISSC [Information Services and Systems Committee].

Membership:

- Pro Vice Chancellor Learning and Teaching
- Pro Vice Chancellor Student Experience
- Librarian
- A Dean of Faculty
- Representative from Educational Partnerships Division
- Representative from Academic Registry
- Teacher Fellow
- Director ISAS (Information Services and Systems)
- Director SPMIS (Strategic Planning and Management Information Systems)
- Computer Based Learning Coordinator, CLT
- Student Union, VP education
- Team leader MLE

The group will meet quarterly. It will agree development plans, validate and agree reports on progress. Make proposals on major changes to plans and outcomes, comment on resources. The Group will be active creating and implementing disseminating strategies for application across the

organisation. (De Montfort University). MLE Management Structure
http://ribble.dmu.ac.uk/files/mgt_str.doc)

MLE implementation inevitably leads to changes. By bringing together the relevant decision-makers, a steering group can help your institution work through the consequences of these changes quickly, and prevent the implementation process from stalling.

A steering group can also provide the necessary coordination between related ICT developments. For example, DMU's MLE has been implemented at the same time as the purchase and installation of a new VLE (Virtual Learning Environment) system. The Corporate Implementation Group includes key people from both projects, making it easier to adopt a joint approach to technical development, dissemination and user support.

It is important to note that while most JISC funded MLE projects have found it relatively easy to establish a steering group, it is harder to ensure that the group plays an active part in the implementation process. For this, a high level of commitment from senior management is essential.

7.2.2. The Development Team

MLEs involve the integration of technical systems and of organisational processes. Therefore the development team needs specialist technical skills, but also the ability to collaborate effectively with other colleagues both within the team and in other departments. The composition of the team will vary according its place in the organisational structure and the various skills and input it can call on from other groups and departments.

For example, the DMU's MLE Development Team is a sub-group within the university's Information Services and Systems department (ISAS), and consists of

- a project manager
- a specialist in HCI and user needs analysis
- 2.5 full time equivalent software developers. Dissemination has been carried out mainly by the project manager and the HCI/user needs specialist.

At various times there has also been significant involvement from other groups in ISAS:

- Networking and Communications
- Server Support
- User Support
- Senior management

The software developers included

- one senior developer with over 5 years experience in the main development language (Java)
- one developer with significant experience of the university's student data system and other backend databases.

Both of these have been vital for the success of the project.

At the same time, care has been taken to ensure that key areas of knowledge do not reside solely with any single individual. This has necessitated a significant amount of training for project team members. Considerable amounts of time and resources need to be set aside for this.

7.3. Legal Requirements

MLE implementation is likely to make a wider range of institutional data available to more people. Consequently, your institution will need to review its existing policies to ensure that your ICT systems operate within the law.

The following section does not aim to describe this process in detail, but rather to provide information on the most relevant legislation, and to highlight

1. useful sources of information, and
2. the key issues, so that sufficient time and resources can be allocated to the task.

7.3.1. Data Protection Act

The Act will apply to any MLE system in which personal data is collected, used or distributed. Your institution must ensure that

- there are clear lines of responsibility for the data
- they have a detailed knowledge of what data is processed, and why
- they inform users if any of their personal data is being processed, and why
- take reasonable steps to protect the data
- the systems for processing and protecting the data are monitored and evaluated
- training on data protection is provided for all staff involved.

Your institutions will need to carry out an audit of the requirements of the Act in relation to its systems. The JISC's Code of Practice on the [Data Protection Act](#) is a useful starting point for gathering information on these requirements – the following sections are particularly relevant to MLE implementation:

'HE and FE institutions are obliged under the 1998 Act to have in place an institutional framework designed to ensure the security of all personal data during the collection to destruction cycle. A key current international benchmark for Information Security Management Systems (ISMS) is BS7799. A framework that meets this standard will provide a high level of compliance with the 1998 Act. Where complete compliance with BS7799 is infeasible or unreasonable for all, or certain types of, institutional personal data processing operations, certain minimum standards should still be met. Such standards should ensure:

- a level of security appropriate to the risks represented by the processing and the nature of the data to be protected.
- that data security is assured no matter where or by whom data is stored or processed and throughout the whole procedure, including the transmission of data.
- that there are clear lines of responsibility and the controller's ultimate responsibility for data security is clearly understood.

Your institution should, as a minimum, ensure that:

- existing and proposed personal data processing operations are evaluated for potential risks in order to determine the cost, effectiveness and practicability of proposed levels of security.
- appropriate levels of security are applied, commensurate with the anticipated risks, and appropriate to the type of personal data held.
- agreed levels of security are applied, monitored and regularly reported upon as regards their effectiveness
- all staff are trained to take effective action to protect personal safety, data and equipment (in that order) in the event of disaster.

- competent people are assigned to be responsible for the accuracy and integrity of personal data held in each part of an institution's personal data processing operations.

Your institution should not:

- display results outside their local area (e.g. via the Internet) without obtaining the consent of the data subjects; ...'

This has implications for management responsibility, requirements for training and documentation, and also technical development. As a recent JISC Report points out, the introduction of an MLE may require institutions to raise the level of security they provide in their systems:

'Authentication is currently used to identify the user and thus protect his/her file store and Email activities. With the introduction of an MLE, authentication may result in processes (e.g.: testing and other assessments) that contribute to the user's final degree status. Thus it is important that the strength of the authentication process, and institutional information security in general, be consistent with risks the institution would encounter if security measures were to fail. It would be useful to review current institutional security policies in light of these new requirements.' JISC Report on Security

It is important that the question of security is addressed at an early stage in the development of the MLE. This is one of the recommendations of the JISC Technical Review of Building MLEs in HE Projects:

'Many projects intend to secure their systems with SSL [Secure Sockets Layer] but towards the end of the project cycle. Aside from exposing users of prototype systems to the risk of plain text password interception, retrofitting SSL is not always straightforward. SSL should be used from the outset.'

7.3.2. Freedom of Information Act

The JISC has produced briefing papers on the Freedom of Information Act, and the separate Freedom of Information Act for Scotland. Public authorities (including universities and colleges) must deal with requests for information from individuals. A wide range of information is covered by the Acts, but it is important to note that personal information is one of the exemptions:

'There is an absolute exemption from the provisions of the FOIA if an applicant making a request for information under the FOIA is the subject of the information requested and they already have the right of 'subject access' under the Data Protection Act 1998. There is also an exemption from the provisions of the FOIA if the information requested under the FOIA concerns a third party and disclosure by the institution would breach one of the Data Protection Principles.' (See Key Resources: JISC Briefing Paper on the Freedom of Information Act.)

7.3.3. Current Law on Internet Service Provider Liability

If an MLE enables users to post their own material on the Internet, it provides new opportunities for copyright infringement and also defamation. The law in this area is developing, and providers of Internet services are increasingly seen as having some degree of responsibility for material that is posted or published in their systems. This involves taking practical steps to prevent infringements, and dealing efficiently with any that occur. The JISC guidelines on Internet Service Providers Liability includes this useful checklist:

- Has your Institution, in its capacity as an ISP, taken all reasonable steps and adequate measures to ensure that your network users are not making illegal use of their access?
- Has your institution a system in place to fast-track the removal of obscene, illegal, infringing

- or defamatory content from your servers?
- Has your institution configured the network to bar access to known sites that may be classified as defamatory, illegal, obscene, or infringing? Do the system administrators review this on a regular basis?
- Is your institution operating its network in accordance with the JANET Acceptable Use Policy?
- Following a hacking incident with one of your web pages, for example the defacement of your homepage, have you an emergency procedure in place to restore the site and to remove the un-vetted content? This may be especially relevant to institutions with a younger student population. Have you an appropriate legal disclaimer on your website? Have you specified the applicable jurisdiction in the event of a dispute?

Another JISC paper, '[FE/HE Institutions and Liability for Third Party Provided Content](#)' suggests a number of strategies which FE/HE Institutions can use to reduce the risk of liability. These include

- Formulating an Acceptable Use Policy, which
 - ◆ staff and students are required to agree to
 - ◆ incorporates a clear 'notice and take down' procedure for dealing with reports of infringements
- is supported by a clear internal disciplinary system.
- Restricting membership of bulletin boards and discussion groups to limited numbers of registered users.

It also recommends that institutions do not attempt to monitor all activity on their systems:

'What institutions must not do is to adopt a policy of general monitoring of their servers and/or user accounts. By adopting such editorial control an institution can open itself to liability as a publisher under the Defamation Act, or, in relation to content more broadly, may put itself in a position where it could be considered that due to a policy of active monitoring it should have been aware of certain illegal content which has 'slipped the net'.'

7.3.4. Special Needs and Disability Act 2001

The JISC's briefing paper on Disability Legislation and its Effect on Information Services in Further and Higher Education draws attention to the requirements of the Special Needs and Disability Act (SENDA):

'FE and HE institutions have two broad sweeping duties under the SENDA with effect from 01 September 2002. These are as follows:

- A duty not to discriminate by treating disabled students less favourably, without justification, for a reason which relates to their disability
- A duty to make reasonable adjustments to ensure that disabled people are not put at a substantial disadvantage in comparison with those people who are not disabled when accessing or trying to access Further and Higher education.'

The paper goes on to argue that these general requirements extend to an institution's Web-based systems:

'Is it a reasonable adjustment to modify or design a web site to make it accessible? Although not definitive, all the indications are that the answer to this question is yes.

When updating or redeveloping a website accessibility is a major issue and should form part of the specification.'

As with security, it is important that accessibility is 'designed in' to a web site at an early stage in its development. Also, many commentators on Web design make the point that there is a strong link between the requirements of accessible, disability-friendly Web sites and general principles of good design and usability.

[Follow this link](#) for key resources for this section (these open in a new window)

7.4. Support Requirements

An MLE is likely to place new demands on the user support and systems support provided by your institution. An MLE is a gateway to essential systems and information, so there will be pressure to solve any problems quickly. As an institution-wide service, it will have a relatively large and diverse user population. A significant proportion of usage – and therefore some of the problems and enquiries – will occur outside standard working hours and off-campus. Also, because it links together a variety of systems and increasing the range of institutional data that is available, an MLE will generate various types of enquiry – some relating to the system and its interface, and some relating to the information that it is displaying. The following list of support-related issues was compiled following discussions in De Montfort University's Information Services and Systems division (ISAS).

7.4.1. Exercise Supporting the MLE/VLE

The following were identified under 'What type of problems might our customers come up against':-

Key:

- D** relates to data issues
- H** relates to Help
- T** relates to technical/ISAS issues

Logging in problems	<ul style="list-style-type: none"> • Typing it in wrongly (H) • Different Web browsers (T) • PC set up issues (T) • Information from QLS might be missing/incorrect (D) • Accounts not existing (D) • Password/P number not known (H) • Locked account (T) • 'Where/how do I find' queries (H)
Once logged in	<ul style="list-style-type: none"> • Navigation problems (H) • Data errors/missing data (D) • Language/Terminology problems (H)
System availability	<ul style="list-style-type: none"> • Hardware problems (T) • Network problems (T) • System monitoring systems (T) • Fault isolation systems (T) • Error message reporting (T)
System maintenance	

	<ul style="list-style-type: none"> • Window for system backups (T) • System outages/maintenance (T)
What language the User might speak (H)	
Service level	<ul style="list-style-type: none"> • User knowledge of the service level (H) • Help Desk hours (human contact as opposed to other forms) (H) • Out of SL hours, news services not updated (T) • Contact detail/escalation (T)

7.4.2. Planning for support

De Montfort University took a number of steps to try to ensure that adequate support was in place before their MLE was launched to users. These are listed below:

Examples

1. Simple design, with standard, easy-to-use, interface. The uPortal interface to De Montfort University's MLE contains many elements which can be made user-configurable, but DMU currently only allows users access to a very limited subset of these – to avoid possible confusion amongst users and support staff.
2. User testing – the results can inform both the design of the system and the help and guidance provided. User testing showed that the logging in process caused the most problems for users, and so special attention has been given to this in the online help pages and in printed leaflets about the MLE.
3. Determining on the level of service which can be provided with the resources available, and clearly specifying this to the Institution and to the users. The on-line Help pages include a service level statement for users (see below).
4. Provision of comprehensive on-line help. The on-line help pages for the MLE include information on all the functions available, plus a special section on logging on, an FAQ section, and a statement on the level of support provided.
5. Ensuring that appropriate levels of support staff are in place. DMU has implemented a collaborative approach to the provision of user support, involving central and departmental IT Support staff, and Academic and Administrative staff. This has taken a considerable amount of preparation and time.
6. Providing opportunities for user training. Drop-in sessions are organised for students in the first few weeks of the academic year.
7. Allocating the responsibility for supporting each hardware and software component. Agreement between the MLE Project Manager and the Systems Support Manager over who supports what.

The GIMIS Project approached the question of user support in the following ways:

'As new routines come online (e.g. Student Identification Card System), the support needs of the end users become all too apparent. As GIMIS is a highly complex series of independent logical constructs that constantly evaluate variables and then perform conditional processing based on the values, there are not enough experienced staff with the software skills necessary to support users. In order to address this foreseen situation, the GIMIS team has been expanded to accommodate training and support services.

The need to provide very simple instructions, as users are often perplexed when confronted with a new system for the first time. At no point have the GIMIS Development Team assumed a high level of knowledge and understanding, all too often users do not follow the instructions and have assumed what 'it' is, rather than literally following the onscreen instructions. The approach has been to pitch user information at the lowest common denominator, without any prior assumptions

being made.' (GIMIS Management Report 5.)

7.4.3. Innovative approaches to user support

Some Institutions have found innovative methods of extending their IT support cost-effectively. The London School of Economics has a joint arrangement with three other Universities at different time zones to provide full 24 hour Help Desk coverage. The scheme was awarded the UCISA Teaching, Learning and Information Group's Good Practice Award 2003 (see Key Resources.):

London School of Economics:

Follow the Sun– the three continents helpdesk

Three years ago a revolutionary idea was launched: why not provide an out-of-hours email-based helpdesk support service by exploiting the differences between various time zones around the world? In a joint initiative the London School of Economics and Political Science and Macquarie University (Sydney, Australia) set up a Remote Email HelpDesk Service (now known as 'Follow the Sun: the Three Continents HelpDesk'), with Colorado (USA) and Newcastle (New South Wales, Australia) as two further partners ensuring full 24 hour coverage divided into four equal six-hour shifts.

In essence, the concept is that queries emailed to one institution during unsocial hours when no local helpdesk staff are on duty are picked up by staff at the other institution during their normal helpdesk duties. This allows partner institutions to provide a near real-time email support desk stretching the limits of conventional 9–5 local IT Support. The service initially focused on general software, email and internet queries where intimate knowledge of the partner institution was not required and emails were forwarded automatically. The service currently utilises IMAP technology, thus further reducing the need for active administration and increasing effectiveness of tracking particular queries and responses.

The service is designed to be able to address time-sensitive problems: perhaps the best illustration of this is an LSE student who was working overnight on her own PC and realised that her computer was infected with a virus but was unable to clean it herself. She emailed LSE IT helpdesk and her query was picked up by Macquarie staff who got back to her with instructions on how to disinfect that particular virus. The student was very happy and continued to work through the night.

Another scheme shortlisted for the UCISA award was University of Wales Aberystwyth's arrangements for online support.:

University of Wales Aberystwyth:

Towards an integrated, effective 24-hour support service

The Advisory team is currently undertaking a project to update the content and simplify the structure of the computing FAQs, to weed out obsolete and repeated material and to build in automated procedures to ensure regular future updates. New pages will be filed and linked by a named staff member, to ensure consistency in style and storage. A comprehensive keyword list, and procedures for the use of metatags, will provide more accuracy in keyword searches. A new and more versatile database, written by and Advisor in PHP with an SQL-compliant language, is also in development.

Library enquiry specialists in the Advisory Team, in conjunction with Academic Liaison, have also begun a review of the Library FAQs. Further development of a Virtual Information Desk (VID) using a decision tree structure is being investigated.

In 2001 the department re-launched Help Desk Live (HDL), a virtual help facility consisting of a text chat tool which allows users to chat on-line to the Advisor on duty, and incorporates the facility for the Advisor to take over the desktop of the caller and demonstrate a solution to their problem. This service is accessed by another shortcut on the public service desktop. HDL is currently staffed 9–5, but may be extended to cover evenings and weekends as demand for support grows at times when minimal staffing cover is available.

[Follow this link](#) for key resources for this section (these open in a new window)

7.5. Communication

7.5.1. The need for a communications strategy

McCredie and Updegrave have highlighted the complexities of implementing 'enterprise-wide' systems in educational organisations, and the need for good communication. Their remarks might also be applied to MLEs:

Implementing a new enterprise-wide administrative application will be one of the most complex software projects in which you are likely to be involved. The technical components of the project are complicated, but most of the really hard issues will arise from the functional process changes and organizational adjustments that are inherent in these implementations.

Most individuals on the periphery of the project will not understand the intricacies of such a large effort. Faculty members who may be involved in various review committees are likely to be very critical of the amount of time, effort, and money required to rebuild a major part of the organization's administrative infrastructure. Even if they are part of the communication process they are likely to be unhappy about any large investment in administrative support. A coordinated communication plan is a good way to explain the goals, timelines, benefits, and problems of the project.

(Jack McCredie and Dan Updegrave. Enterprise System Implementations: Lessons from the Trenches. CAUSE/EFFECT journal, Volume 22 Number 4 1999.)

The authors' solution is to 'communicate broadly about the complexity of the implementation process' – 'An up-to-date Web site and extensive electronic mailing lists are helpful and many projects find that a periodic newsletter is very popular. Regular reports to the executive levels of your college or university are absolutely essential.'

MLE Implementation is a highly political process, because (as discussed elsewhere in this infoKit):

- MLE development cuts across traditional organisational boundaries
- There are several different groups involved in e-learning development with different cultures, different perspectives and priorities
- By integrating previously separate systems, the MLE can expose problems, incompatibilities, and/or flawed academic or administrative processes. There is a danger that the MLE is seen as creating these problems and/or that technology alone can solve them.

Because of this MLE implementation needs to include a carefully considered dissemination strategy. Absolute clarity and consistency is needed – there is a great capacity for messages to be misunderstood. Dissemination needs to promote the system, to encourage interest and uptake among staff and students. At the same time great care needs to be taken to manage expectations. For more discussion on this area see '[Why might you want an MLE?](#)'.

7.5.2. Promoting the system

At DMU, a range of methods has been used to publicise the MLE to data owners and end users:

- the MLE Web site
- presentations to various groups
- various powerpoint presentations, including a stand-alone presentation, with voice-over, which could be circulated
- a global email to all staff
- a section in the DMU Student Handbook
- handouts

One thing that has become clear is that while each of these methods has succeeded up to a point, no single one has reached all its intended audience (a recent staff survey found that, in spite of the publicity, over 20% of respondents had not heard of the MLE!) Communication needs to take place at multiple levels, multiple times and in multiple formats. The form of publicity that many staff seemed to find the most useful was a basic one-page flyer aimed at introducing the MLE to students (see Key Resources). Methods of promoting the MLE are also discussed in this infoKit in the section '[Understanding your organisation – Planning dissemination and evaluation](#)'.

7.5.3. Managing expectations

The GIMIS project recognised the danger of creating unrealistic expectations:

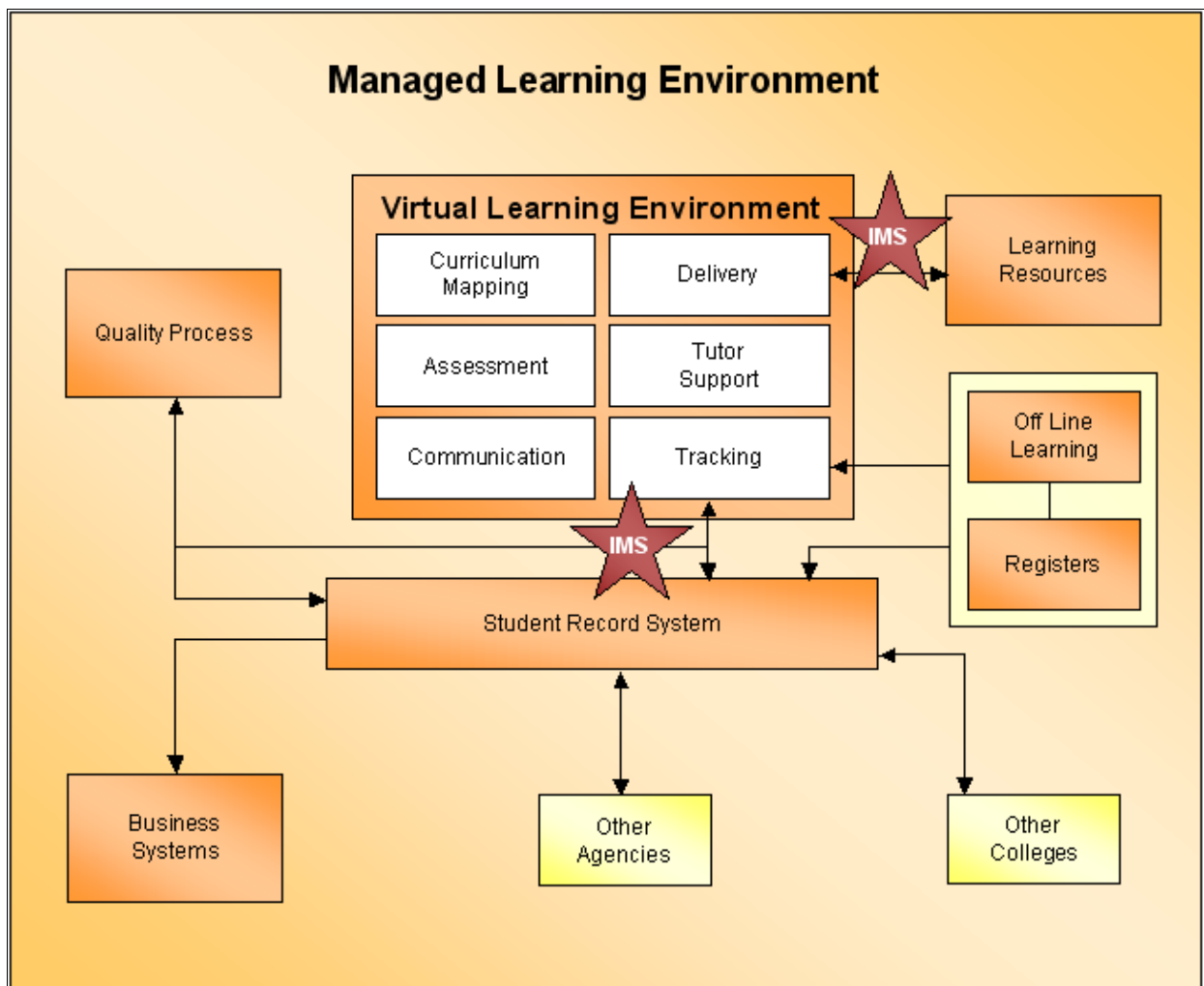
... As more functionality is made available to staff, their expectations have increased exponentially. A number of discussions have ensued with colleagues asking if GIMIS can help them either to eliminate the repetitiveness of the task in hand or in some cases to be able to do quite complex data analysis e.g. Activity Based Module Costing. Whilst this represents a watershed i.e. colleagues using the system, unless it is carefully managed it may cause the project to creep. It is therefore important to acknowledge the enthusiasm, whilst at the same time carefully managing expectations i.e. don't over promise and be guilty of under-delivery.

(GIMIS Management Report 5)

Their solution was to use formal written agreements – to manage expectations and prevent 'project creep':

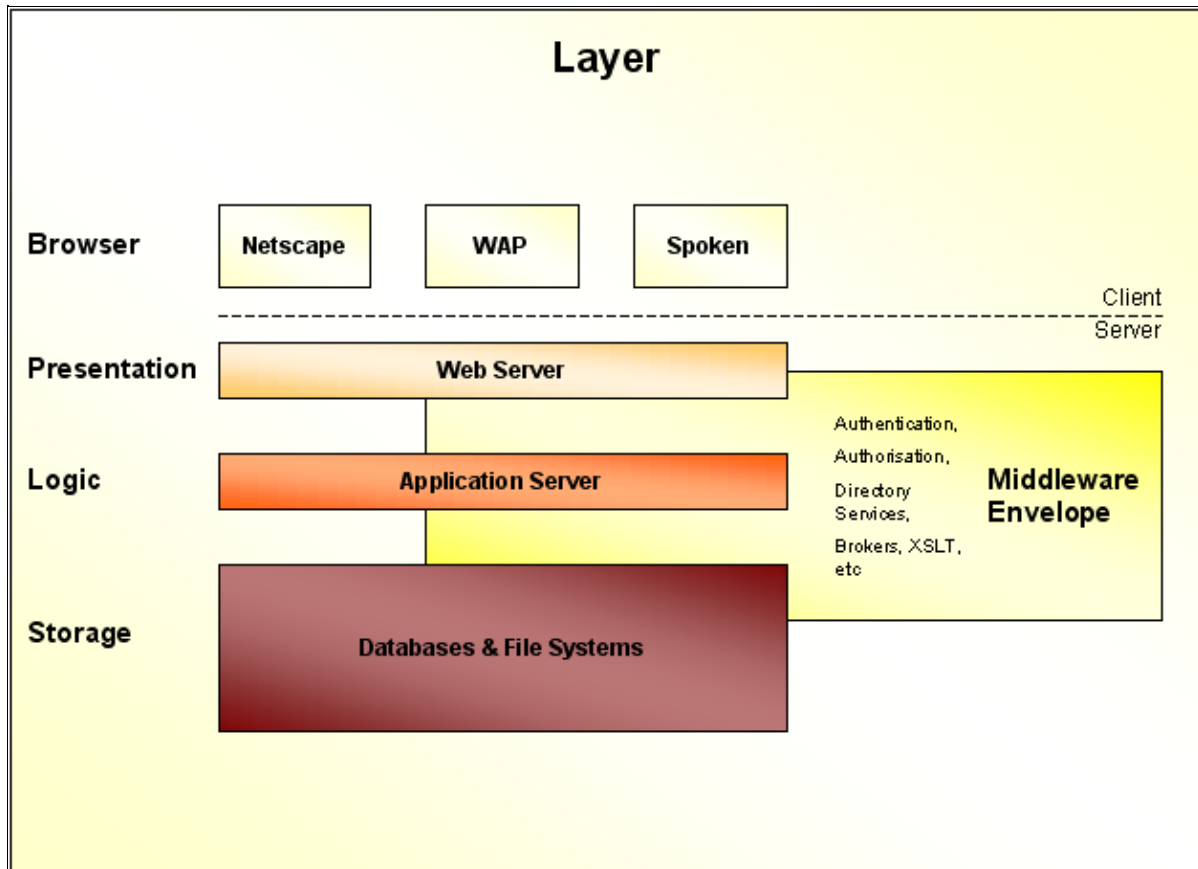
As GIMIS continues to develop, a milestone has now been reached where it has become necessary to codify a set of logic construct rules, applied within the source code. A set of bespoke Departmental Rules are being drawn up and will be amended as changes are made to the underlying logic, set out in clear unambiguous terminology stating what GIMIS will be doing with their source data and their responsibilities towards their data ... Each set of rules will be signed off by the GIMIS Project Director and the Department Manager, any adverse feedback from users will be directed to named individuals to cite their case for a rule amendment. The documentation will adhere to all version control standards already in place ... The project team has been proactive in authoring the Project Initiation and Definition Document. This document will act as a control mechanism to avoid scope creep as the project gains momentum and conflicts arise from Departmental Process as distinct from the College's Management Information Systems (MIS) systems Finance, Library, Student Records and Timetabling.

Perhaps because of the difficulties in defining an MLE, diagrams have played an important part in their dissemination. The earliest is probably the one produced by the British Educational and Communications Technology Agency ([BECTa](#)) in 1999. This is reproduced in the JISC briefing paper '[MLEs and VLEs explained](#)'.



It shows the MLE as a number of linked systems, and is useful for showing the relationship between an MLE and a VLE (Virtual Learning Environment). The disadvantage, at least for a Higher Education audience, is that some of the concepts and terminology are specific to Further Education.

Another type of diagram visualises the MLE in terms of its underlying software. The JISC's Technical review of the systems developed by the 'Building MLEs in HE' programme, includes diagrams of each of the six systems reviewed, and one that synthesises these into a suggested 'generic MLE architecture' (see below).



Another useful source of diagrams is The JISC report 'Developing a Shared Understanding of the Managed Learning Environment' (See Key resources.) The report also discusses diagramming in general and alternative methods of representing MLEs.

[Follow this link](#) for key resources for this section (these open in a new window)

7.6. System Resilience

Reliability has to be one of the core attributes of an MLE. The nature of MLEs – enterprise-level systems joining together key academic and administrative processes – means that any hardware or software failure is likely to have a considerable impact.

An MLE needs to be resilient against

- hardware or software faults
- changes in requirements
- changes in back-end data sources
- changes in personnel

Resilience needs to be designed into the system at each stage of its development:

- hardware specification and configuration
- software design
- testing
- documentation

7.6.1. Hardware specification and configuration

It is not possible to produce a detailed set of recommended hardware specifications for an MLE.

Existing systems vary greatly – not only in terms of the numbers of users, but also in the type of content delivered (i.e. how much of it is static or and how much obtained dynamically from back–end systems, whether it includes interactive or multi–media elements, etc.)

MLE developers have had to make educated guesses about hardware requirements, but have generally applied the following principles to try to ensure system resilience:

- Include redundancy in the system – i.e. multiple interchangeable components to perform a single function in order to cope with failures and errors;
- Over–specify – so the system is not working to full capacity all the time, and can cope with spikes in demand;
- Ensure that the system is scalable – so extra capacity or processing power can be added easily if the load on the system increases, or has been under–estimated.

Developers have to choose one of two basic architectures:

1. The 'Big Box'
2. Load balanced/clustered

Bristol University's Portal Project has assembled a useful collection of extracts from mailing lists and other sources where the two approaches are discussed – often with details of the hardware used. These may be found in the Key resources for this section.

7.6.2. Software Design

The scale and complexity of an MLE will mean that software is written, debugged, maintained and further developed collaboratively. Therefore it is essential that good design principles are applied i.e. it should be modular and use standardised components where possible.

MLE software needs to be simple and robust. There can be pressure to use 'work–arounds' to speed up the implementation process, but these are counter–productive because they greatly increase the effort required to support and maintain the system. For example, De Montfort University has had to postpone the introduction of several of the functions developed for its MLE – even though they were piloted successfully – because currently

- They rely on processes that were difficult to scale – e.g. manually uploading data to the MLE from a back–end system; or
- The function worked well for one faculty or department, but could not be applied across the whole institution.

Several projects have chosen to use toolkits or development environments which offer the required flexibility but also simplify some of the basic tasks, encouraging modularity and standardisation, e.g.

Tool: uPortal

A set of Java classes and XML/XSL documents for producing a campus portal (More details:

<http://mis105.mis.udel.edu/ja-sig/uportal/>)

Used by:

DMU MLE; MARTINI

Tool: Zope

Application server, written in Python, for building content management systems, intranets, and portals. (More details:

<http://www.zope.org/>)

Used by:

SMILE

Tool: ColdFusion

A tag-based scripting tool for developing data-driven Web sites. (More details: <http://www.macromedia.com/software/coldfusion/>)

Used by:

GIMIS

The GIMIS Project uses a standard approach to developing in ColdFusion, which is set out in their Tag Based Web Development Programming Guide (See Key Resources.)

De Montford University changed to using uPortal after first developing a completely in-house MLE. The perceived benefits of using uPortal were:

- It provides standard format/process for building and adding channels – enables division of labour
- It enables the separation of presentation and business logic
- It provides some standard Portal functions 'out of the box', e.g. setting personal preferences, bookmarks, announcements
- Increased credibility – examples of successful implementations; VLE vendors interested in developing links.

Another advantage of Coldfusion, uPortal and similar tools is that they each have a body of knowledge which projects can draw on, in the form of

- Experienced developers
- Technical manuals, guides, and support forums
- Training

7.6.3. Testing

At De Montfort University, testing of the MLE has identified a range of issues, including potential technical problems. The Report on Evaluation of the MLE User Interface includes a section on Summative Evaluation – carried out once the main development phase has been completed. The following methods are used:

- cognitive walk through
- heuristic assessment
- observational study.

(See Key Resources for more information.)

The GIMIS project has provided a Testing Guidelines document. This defines the following types of testing:

- Functional (black-box) Testing – i.e. testing that the program does what it is supposed to do, and does not do what it is not supposed to do.
- Structural (white-box) Testing – concerned with the degree to which test cases exercise or 'cover' the logic of the program.
- Integration testing – checking for errors related to the interfaces at unit, sub-system and system level, or related to data transfers in the system.
- Acceptance tests – involving the client, and testing the functionality of the system as stated in the requirements specification. (See Key Resources for more information.)

7.6.4. Documentation

MLE development needs to be underpinned by comprehensive documentation. This has been explicitly addressed in the GIMIS Project, which has produced a set of standards for Document Control (See Key Resources.) The rationale is explained in the Introduction to this document:

There is a need for documentation control on all projects or service agreement provision. The need varies depending on the size of the project or service provision, however it is essential that all documentation is:

- Easy to use
- Of high quality
- Controllable
- Uniquely identifiable
- Of a common style
- Transferable between users

It recommends documents should include the following information on every page:

- Document title
- Document reference
- Document version and, where applicable, document revision
- Issue date (not print date)
- Page number

and the following information on the front page, or control page:

- Status (draft for comment or definitive)
- Total number of pages
- Contents list
- Amendment history (or issue record)
- Author of the amendment
- Approval, authorisation and client signatures, if required.
- A synopsis may also be added to the document front page if required
- Logos and copyright information can appear as required

Section Editor

Ian Bloor is Project Manager for De Montfort University's Managed Learning Environment, which began as a JISC-funded research project and is now an operational service available to all first-year students at the University. Before this, Ian worked on a number of national and European projects researching into digital libraries and library management.

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