

4 Course delivery

Course delivery encompasses the Virtual Learning Environment, personal learning environments and/or other channels, such as social media, through which students receive their course materials or communicate with fellow learners and staff.³ These systems represent a very significant investment of financial and human resource in their acquisition and on-going support.

The selection of a particular system, which may influence teaching developments for many years, should be driven by both educational and technical requirements. Educational requirements include delivery of learning resources, facilities for online communication and tools for assessment. Technical requirements include reliability and security standards. The delivery system should be reviewed and monitored to ensure it continues to meet these requirements.



³ The system through which the e-learning student interacts with the University may have several components: a system through which the student accesses learning materials and teaching services, an administrative system that handles registration, etc. These components may be commercially acquired or developed by the institution itself. We are using the term VLE as a coverall term to describe this system. In a well-developed system a student should be able to access all services via a single log-on.

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Effective course delivery requires collaboration between academic and operational divisions of the institution. Technical infrastructure should serve the educational requirements of the academic community, both students and staff.

Benchmarks

- 19 The technical infrastructure maintaining the e-learning system is fit for purpose and supports academic, social and administrative functions. Technical specification is based on stakeholder requirements and involves realistic estimates of system usage and development.
- 20 The systems for communication and storage of data are secure, reliable and assure appropriate levels of privacy. Measures are in place for system recovery in the event of failure or breakdown.
- 21 Appropriate provision is made for system maintenance, monitoring and review of performance against the standards set. These standards are updated when necessary.
- 22 E-learning systems provide a choice of online tools which are appropriate for the educational models adopted and for the requirements of students and educators.
- 23 Information about how to use the institution's e-learning systems and services is provided to all users in a logical, consistent and reliable way.
- 24 Institutional materials and information accessible through the VLE are regularly monitored, reviewed and updated. The responsibility for this is clearly

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defined and those responsible are provided with appropriate and secure access to the system to enable revision and updating.

4.1 Technical infrastructure

Effective delivery of e-learning courses requires the institution to acquire, operate and maintain a computer-based system capable of: registering students to courses and programmes; distributing e-learning materials to students; maintaining and updating records of student performance; conducting aspects of e-business with respect to student fees etc.; and facilitating communication between the institution, its students, staff and affiliate staff (if any).

The system must be capable of operation to standards commonly encountered in the commercial world in terms of availability and capacity to cope with anticipated business flows. This section does not purport to offer detailed definitions of the services or the technical specifications required.

The technical infrastructure for e-learning, together with its management and development, should be guided by a strategic plan at institutional level.

4.1.1 System design and architecture

The design and architecture of the institution's technical infrastructure is a key factor in successful delivery of e-learning programmes. This may demand significantly greater capacity and capability than is required to support campus based students or research programmes.

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Institutional systems are one aspect of the delivery system, the other major factor being the facilities owned or accessed by its target student audience. Increasingly students can be expected to own their own devices (laptops, tablets or smartphones). Institutional decisions should therefore be influenced by information about the equipment and online services used by students. Hence socio-technical foresight activities play a role in informing institutional decision making. The institution should adopt a strategy that allows for increases in demand and the emergence of new technologies and patterns of use. For example, there has been a shift from personal computers to tablets and smartphones; this creates a pressure for platform-neutral delivery to which content and web applications delivered through a browser offer one solution. But perhaps paradoxically, the rise of tablets and phones has also created a demand for apps which are high platform-specific.

The institution may choose to work in consortium arrangements with other institutions or to outsource provision of its technical infrastructure. In either case it should ensure that the arrangements will provide effective service for students and staff.

Indicators

- The technical infrastructure is well defined and supports institutional e-learning objectives.
- The system meets the equipment and connectivity requirements of student users.
- Any necessary contractual relationships with partners or service providers are in place and well defined.
- There are secure systems for storing and analysing data

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on students' learning activity and interactions with university online systems (learning analytics data).

At excellence level

- The strategic plan defines the current and future technical needs of the institution.
- The institution undertakes regular technical foresight activity to inform decision making.

4.1.2 Technical infrastructure management

The technical infrastructure should be professionally designed, managed and maintained to ensure that it meets capacity and availability targets.

Services and standards of performance should be equivalent to those encountered in customer service organisations such as banks and other companies that offer their customers online services. Staff responsible for these functions should have performance targets and reward systems equivalent to those encountered in the service sector.

Indicators

- There are clear operating standards and management processes.
- Operating standards are implemented effectively.
- There is sufficient server capacity and bandwidth to

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handle the planned usage.

- The technical requirements of the system are monitored on a regular basis.
- E-learning requirements are integrated with the longer-term IT infrastructure plans of the organisation.

At excellence level

- The institution sets standards for the operation of its technical infrastructure that are benchmarked against other major online customer service providers.
- The future planning of technical infrastructure for e-learning is a major aspect of organisational ICT planning.

4.2 Virtual Learning Environment

The term Virtual Learning Environment (VLE) is used to describe the collection of software systems that provide materials and facilities for online learning. These systems allow for management of all processes from course authoring to delivery of the course materials to students and recording their performance. (The term Learning Management System (LMS) is often used synonymously with VLE but may indicate a greater focus on administration than on course authoring and production.)

The system requires integration with many pre-existing systems within an institution e.g. its student registration system. Some institutions may choose to implement a VLE by an internal systems integration project. Increasingly institutions are

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purchasing commercial systems, or using open source systems that may be modified to suit institutional requirements.

This section describes aspects of the functions carried out by the VLE. It is not a checklist for VLE functionality.



4.2.1 Learning platforms and management systems

The core of the Virtual Learning Environment is the system for delivery of e-learning materials to students. This component of a VLE may also be known as a learning platform. Its facilities influence the nature of teaching and student interactions that can be offered and affect the work of course designers and students.

Previously many institutions operated home-grown learning platforms, often with their origins in a single department. For most institutions the operation of such systems is no longer a feasible option. Instead, institutions may choose to:

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- buy a system from a commercial provider and manage it in-house;
- buy a managed service from a commercial provider;
- operate and manage an open source system (and contribute to the development community);
- join a consortium that has itself selected one of the above options.

The advent of cloud computing may result in institutions and their students using services that are hosted in the cloud rather than on servers controlled by the institution's staff. Cloud computing is 'software as a service': the cloud provides the infrastructure and platforms on which the applications run and end-users access cloud-based applications through a web browser or a light-weight desktop or mobile app.

Students are accustomed to using public services for social media (e.g. Facebook) and storage and sharing of media (e.g. Flickr). The issues facing institutional use of these services include how to integrate them with a VLE and defining the boundary between institutional and personal space.

Whatever the service model chosen, the institution retains the responsibility for ensuring it fulfils institutional objectives.

Learning analytics approaches to improving student learning depend on accurate tracking of an individual student's activity in the VLE. To support this the VLE should capture appropriate data and provide reporting tools that can be tailored to the intended user (student, tutor or support staff).

A further aspect provided by a VLE is a learning management system that focuses on administrative aspects such as the allocation of students and staff to courses, the submission of assessment, etc. Many institutions have existing administrative systems and the VLE should be integrated effectively with these.

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Indicators

- The VLE is appropriate for the type of learning and the requirements of learners.
- The system provides robust privacy, and this applies to personal data and interactions, in addition to academic and financial transactions.
- The VLE captures data that can be used for learning analytics approaches and there are appropriate reporting tools such as dashboards for users of this data.
- The VLE and resources demonstrate ease of use for the full range of target users, including people with disabilities.
- Provision of the VLE is protected by robust contractual arrangements and contingency planning.
- The system allows for personalisation.

At excellence level

- The VLE is under constant review in the light of technical and educational developments.
- The institution contributes to the development of e-learning systems.

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4.2.2 E-learning material provision

E-learning resources should be developed or selected to meet the requirements of target users (learners and teachers). The e-learning system should address the needs of users for easy access and high quality interaction with the learning materials. The e-learning system should enable students to interact with all features of the learning materials as intended by the course developers without any reduction in intended functionality or interactivity.

In circumstances where students do not have routine access to good connectivity, the institution may use hybrid systems to deliver materials. For example, materials that have large amounts of dynamic graphics or video content may be distributed via DVD rather than online.

Course materials and delivery technologies should be evaluated under realistic conditions of anticipated use that replicate both the equipment and connectivity used by students and the traffic volumes anticipated at central portals and course servers.

Copyrights and licence arrangements should be protected and managed effectively and any limitations on the use of third party materials effectively implemented.

The organisation's approach and policy on interoperability of resources and adherence to technical standards should contribute to the effectiveness of the system.



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- The content is presented in a learner-oriented fashion.
- Policies for delivery of materials are consistent with the technical infrastructure available to students.
- The e-learning materials exploit opportunities for interactivity.
- The VLE supports rich interactivity.
- Course materials and delivery systems are technically tested under realistic conditions.
- There is a system for securing and recording the rights necessary for use of third party resources in teaching materials.

At excellence level

- The institution has in place policies for internal reuse of materials and is active in the OER movement facilitating the sharing of materials between institutions and individual learners.

4.2.3 Information requirements

There should be clear information available to students and other interested parties on the main aspects of each course: its size and level, subject content, relationship with other courses, mechanisms for dissemination of course materials, and types of assessment.

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Information may be extracted to suit the needs of differing audiences and modes of presentation, for example prospective students, enrolled students, system managers and student support agents.

Indicators

- Students contemplating study by e-learning are adequately informed of the courses available to them and the requirements for study.
- Learners are provided with full information on sequence, timing and options within their intended programme of study.
- Details of course delivery are provided to learners and staff in a clear and accessible way.
- Responsibilities of the different staff groups (teachers, tutors, etc.) involved are specified and clear to learners.
- The provision of information is managed consistently at programme level.

At excellence level

- The institution has a comprehensive policy for the provision of online information to prospective, current and former students.
- There are institutional templates for the presentation of information and these are adhered to by all programmes and courses.

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- There is clear responsibility for overall management of information provision across all programmes.

4.2.4 Monitoring and updating the e-learning system

The e-learning provision should be monitored and managed on a continuous basis to ensure its effectiveness. It should be evaluated and updated on a planned and appropriate basis. Monitoring should cover both the detailed operational aspects of the system (performance, availability, capacity utilisation, user error reports etc.) and also the performance of the human support systems.

Routine student surveys administered online should be augmented by consultation with the student body regarding the effectiveness of the system. This information should be used to inform future development.

Indicators

- The performance of the e-learning systems is monitored and opportunities for performance improvement identified.
- Performance of mentors, tutors and moderators is monitored regularly.
- Problems and issues are acted upon promptly.
- Longer term improvements are identified.

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At excellence level

- Provision is evaluated and updated on a planned and appropriate basis.
- There is an institutional policy of performance analysis and survey that informs future developments.

4.2.5 Online assessment

Online assessment is an important function of a Virtual Learning Environment, and may be formative or summative. Online systems are capable of delivering assessments in a range of styles and providing remedial teaching in response to student error. The system should be designed to do this effectively and provide feedback speedily, linking with other support mechanisms wherever possible.

For assessments that are essentially conventional in format, e.g. essays, but are submitted online, security in transit between student and marker, quality of the marking tools and detection of plagiarism are technical aspects that should be implemented and monitored.

Students should have access to their up-to-date assessment record at all times.

Indicators

- Assessment methods are appropriate to the programme and topic.
- Learners are informed about the conditions and outcomes

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of the assessment before and after completion.

- Appropriate arrangements are made for security of assessments.
- Data protection and privacy procedures are in place.
- Feedback is relevant, contains appropriate depth and is timely.
- Progress details are available to the individual involved.
- Plagiarism detection systems are available and staff conform to policies on the use of these systems.
- Learning analytics approaches use data from online assessments.

At excellence level

- The institution invests in the development of online assessment tools and techniques.
- There is evidence of research and development of online assessment and the dissemination of these across the institution.

4.2.6 Alternative formats

Though it is envisaged that the majority of learning needs will be met by online materials, a course may be designed to include physical materials (e.g. printed books or CDs/DVDs). Additionally, online material may need to be provided in multiple formats to

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meet the accessibility needs of individual students. The learning system should make it clear to students which materials are delivered online and which in a physical format.

Indicators

- Distribution systems for physical materials operate effectively and meet student needs in terms of time and cost.
- Online material are provided in alternative formats to meet the accessibility needs of individual students.