

Guidelines to inform the development of e-Learning in the NHS

A research study by the University of Salford



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EXECUTIVE SUMMARY

This study was commissioned by the NHS Information Authority (NHSIA) in order to achieve two aims:

- *To evaluate the procurement process for a one hour e-learning training course in Clinical Coding*
This involved a study of all the elements in the procurement process from developing the Terms of Reference for the tender document to implementation of the contract by the selected supplier. As the focus was on the process rather than the quality of the product, a separate team within the NHSIA carried out the latter evaluation. This evaluation is not described in any detail in this report, except in so far as the outcomes relate to the second aim.
- *To provide a set of guidelines to assist the development of e-learning within the NHS*
This report seeks to provide advice and guidance on aspects of the development of e-learning, not just the procurement process. The report is structured to take the reader through the process in a logical order, as illustrated in the diagram in Section 1.

The key points in this report are given below, cross-referenced to the sections in which they are mentioned.

1. An appropriate Training Needs Analysis tool should take into account the potential use of e-learning as a delivery methodology. (Section 2.1)
2. Before planning a structure for a course programme development there are a number of parameters that need to be considered: accreditation, study length, duration, learner intake, prerequisites, funding model, culture, infrastructure and resource. (Section 2.2)
3. Being clear about the aims and objectives for a new course will guide the pedagogic strategy which informs the remaining stages, including: topics to be covered, learning activities, assessment and quality assurance. (Section 2.3)
4. In order to both design and develop good quality e-learning, it is recommended that a course team is set up, consisting of: course team/project manager/leader, subject specialists/authors, readers, an educational technologist and a production team. (Section 2.3)
5. Whether written explicitly for e-learning, or adapted from existing resources, it is necessary to ensure that all materials are appropriate for the chosen mode of delivery. (Section 2.4)
6. One of the key decisions that needs to be made when an organisation decides to go down an e-learning path which involves web-based delivery is how to get started. There are at least three possible routes, including:
 - Developing a bespoke delivery and management system from scratch using internal resources;
 - Use an existing, commercially available tool; or
 - Bring in an external supplier to develop a bespoke system.(Section 2.5)

7. The types of external partnerships which might be helpful to the development and production of e-learning are dependent on the existing and developing expertise within the NHS. It is also dependent on the types of e-learning programmes which need to be developed. (Section 2.6)

8. At a practical level, it is suggested that if the Course Team approach is adopted, then the partners become members of the Course Team. (Section 2.6)

9. The key factors which should be considered when selecting an e-learning content supplier are:

- Skills;
- Track record;
- Quality standards; and
- Company stability and an understanding of how to measure this.

(Section 3.1.2)

10. Three general ways of identifying potential suppliers are:

- Existing lists of suppliers from suitable organisations;
- Associations and directories; and
- Exhibitions and conferences.

The volatility of the industry will mean that any lists created by the NHS will have a short 'shelf-life' and will require regular updating.

(Section 3.1.3)

11. An appropriate set of headings for a 'call' to identify a long list of suppliers could include:

- Description of relevant work completed during the last three years;
- Qualifications and experience of staff;
- Experience of working with the NHS;
- Development methodology and quality assurance;
- Referees;
- Trading status;
- Bank references; and
- Audited accounts.

(Section 3.1.4)

12. Framework contracts offer a way of identifying a small (8 – 10) group(s) of key potential suppliers who could be called on to tender for both small and large pieces of work. (Section 3.1.4)

13. The identification of a suitable supplier(s) for the development of e-learning materials will depend upon the balance of Authoring and/or Production skills that are required. This can be identified within the Course Team. (Section 4.1)

14. The Terms of Reference for any tender document will need to reflect the skills and experience required of the external supplier. (Section 4.1)

15. It is important that in any e-learning developments there is strong project management and that this role is taken on as part of the Course Team. (Section 4.2)

16. In looking to the future development of e-learning any organisation could usefully consider developing the role of Educational Technologist as an in-house area of expertise. Particularly when working with suppliers and developers of e-learning, it would be very useful to have an in-house person with the expertise in these areas to liaise between the subject specialist and the production team. (Section 4.2)

17. The use of more than one external supplier will create additional problems and should be limited to situations where one supplier deals with Authoring and the other with Production. (Section 4.3)

18. It is important to deliver quality e-learning, not just in terms of content or how it is delivered, but also relating to support structures and the learning principles behind the materials. Attention to detail, as well as a sound idea of the 'bigger picture' should ensure quality and, in turn, a worthwhile experience for the learner. (Section 5.1)

19. It is possible to generate checklists of items concerning the qualities in courses that should be demonstrated. The areas covered include:

- Course structure;
- Course content and materials;
- Tutorial and assessment strategies;
- Learner support; and
- Administration procedures.

(Section 5.1)

20. Reference to quality assurance and product testing and an understanding of how the testing will be carried out should be made in the Tender Documentation and the Proposal from the supplier. (Section 5.2.1)

21. In order that potential suppliers have a clear understanding of what they are bidding for, ideally the Terms of Reference for a tender should contain the following elements:

- Information concerning the context within which the proposed development will occur;
- A summary of the learning needs analysis, including likely backgrounds of participant learners and potential learning styles;
- A detailed requirements specification, including:
 - Scale and scope of the development,
 - Learning outcomes,
 - Mode of delivery, i.e. preferred medium/media to be used,
 - Degree of interactivity expected, including learner support,
 - Degree of multimedia use expected and types of media to be used,
 - Standards compliance, if required;

- A request, after shortlisting, from shortlisted suppliers for a small sample of potential product to illustrate what could be expected from the product development process (as opposed to a request for examples of previous work which can often be of little value);
- How, if at all, NHS staff will be involved in supporting product development;
- What, if any, materials are already available within the NHS (a reasonable sample of these materials should be provided with tender documentation),
- Product quality testing criteria;
- Timescales for product delivery;
- A set of assessment criteria which will be used in evaluating tenders, along with a weighting for each criterion;
- Processes and timescales for pre-deadline questions and answers.

(Section 6.1)

22. Tender assessment should not be carried out by an individual. Ideally, it would be carried out by a group consisting of at least one representative of the key stakeholder groups within the organisation. (Section 6.2)

23. It is important to ensure that unsuccessful tenderers are given timely and helpful feedback. They can then better understand why they have been rejected and work to improve their companies/bids in the future. (Section 6.3)

CONTENTS

1.0	INTRODUCTION	8
2.0	DEVELOPMENT OF E-LEARNING	9
2.1	Needs Analysis	9
2.2	Pre Considerations for Course Development.....	10
2.3	A Framework for Course Design.....	11
2.4	Production Issues	13
2.5	e-Learning Tools.....	14
2.6	Developing and Maximising Partnerships with Suppliers and other Organisations.....	15
3.0	RELATIONSHIPS WITH SUPPLIERS	16
3.1	Identification of Maximum Number of Suitable Suppliers	16
3.1.1	Background.....	16
3.1.2	What Makes a Suitable Supplier.....	17
3.1.3	Identifying Potential External Suppliers.....	18
3.1.4	Creating a Supplier List	19
4.0	SUPPLIER SELECTION	22
4.1	Use (or not) of Single Suppliers	22
4.2	Internal and External Suppliers.....	23
4.3	More than one External Supplier	23
5.0	QUALITY ASSURANCE AND PRODUCT TESTING.....	25
5.1	Product Quality Assurance	25
5.1.1	Course Structure	25
5.1.2	Course Content and Materials.....	26
5.1.3	Tutorial and Assessment Strategies	26
5.1.4	Learner Support	26
5.1.5	Administration Procedures	26
5.1.6	Checklist	27
5.2	Product Testing.....	30
5.2.1	Introduction.....	30
5.2.2	Functionality Testing.....	30
5.2.3	Usability and Accessibility	31
5.2.4	Proof Reading	33
6.0	THE CONTRACTUAL PROCESS.....	34
6.1	Terms of Reference.....	34
6.2	Assessment	35
6.3	Post Tender Feedback.....	36
6.4	Requirements for Non Standard Contracts	36
ANNEX A - AN EVALUATION PROTOCOL FOR COMMERCIAL VIRTUAL LEARNING ENVIRONMENTS		37
ANNEX B - EVALUATION PROTOCOL PROFORMA		43
AMENDMENT HISTORY		51

1.0 Introduction

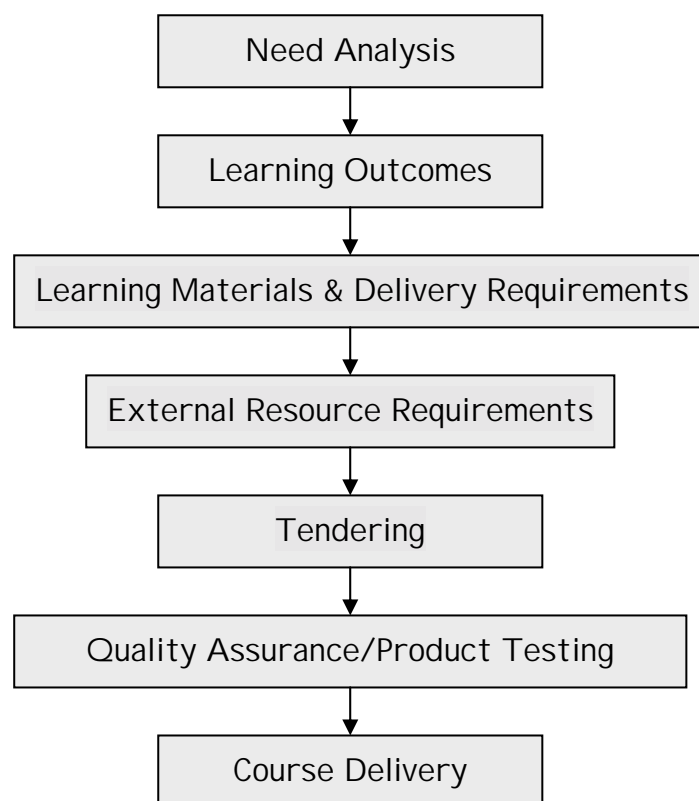
This report addresses issues relating to the procurement of e-learning products for the NHS. It covers the following range of activities:

- Building relationships with suppliers for maximum effect
- Supplier selection
- Advice on the contractual process
- Development and testing of e-learning products purchased
- Product quality assurance methods.

As agreed in discussions with the NHS Information Authority (NHSIA), the report broadens its initial focus beyond the evaluation of a Clinical Coding e-learning pilot project and the potential needs of the NHSIA, to look at more generic issues relating to procurement of e-learning products for the NHS.

Our aim in this report is to identify key issues that need to be considered and to make recommendations for the future. This report is structured around the above bullet points. However, in order to discuss these issues, including choice of suppliers, we felt it would be helpful to first provide background information relating to the development of e-learning as we feel this has an impact on the way e-learning is developed within the NHS, both in terms of developing in-house expertise and in procuring e-learning on a large scale for the future.

The following diagram provides a ‘route map’ through the e-learning development process, mirroring the structure of this report.



2.0 DEVELOPMENT OF E-LEARNING

In other, complementary work¹ the NHSIA highlights the need for e-learning, subject areas for development and the business case to support this. This report therefore assuming that there is an understanding of what e-learning is and how it fits in to the structure of the NHS. This section considers very briefly the issues that need to be considered when developing e-learning, starting from an assessment of the need to develop a specific course or courses. In doing this, we hope to highlight the areas that then have a real impact on the choice of supplier, potential partnerships and quality assurance.

2.1 Needs Analysis

In terms of understanding whether the development of e-learning is appropriate, there needs to be a clear understanding and linkages back to the training and education needs of the organisation. In first identifying the needs, decisions can then be made as to the appropriateness of e-learning as a way of fulfilling this need.

We have listed below a number of information sources that bring together Training Needs Analysis tools which incorporate e-learning and which may supplement the tools already being used by different parts of the NHS.

1. An appropriate Training Needs Analysis tool should take into account the potential use of e-learning as a delivery methodology.

There are many Training Needs Analysis (TNA) tools in the marketplace. However, e-learning is a specific approach to training and any TNA will need to be capable of addressing the issues relating to the use of this methodology. It is therefore worth considering a needs analysis which includes factors relating to e-learning. For more information on this area a number of articles are available on the www, e.g.:

- <http://www.learningcircuits.org/nov2000/chapnick.html> where a free e-learning readiness assessment tool can also be downloaded;
- http://www.hrdonline.co.uk/userguide/on_art.htm where an article from a commercial TNA service provider describes issues specifically related to e-learning.

It is not always going to be the case that e-learning is the best way to deliver a training need. A key element to the TNA is therefore to decide when e-learning should be the preferred delivery methodology. An article on this issue and a checklist is available at:

http://www.e-learninghub.com/articles/selecting_training.html

When looking at the subject area of Health Informatics, internal work commissioned by the NHSIA has, through research of published NHS competency assessments and from

¹ Internal report produced for the NHSIA

questionnaires answered by NHS education, training and development leads on topics needed, identified 3 areas which were felt to be most needed and also lent themselves to delivery by e-learning. These areas were:

- Information Governance: data quality (information v data, fitness for purpose, governance issues), privacy, confidentiality, security of information and Caldicott
- Knowledge management, library skills, virtual library concepts
- NHS business management, including strategy development.

Work needs to be done to clarify the areas for development in other subject areas. In Health Informatics an important factor is the identification by the NHSU of the need for Health Informatics training to enable staff working in the NHS to manage information more effectively. This development should take place in conjunction with the NHSIA.

2. NHSU 'learning for everyone' – Planned Courses

2.2 Pre Considerations for Course development

2. Before planning a structure for a course programme development there are a number of parameters that need to be considered: accreditation, study length, duration, learner intake, prerequisites, funding model, culture, infrastructure and resource.

These factors will vary according to the background of the organisation, target audience etc. but should all be considered:

- **Accreditation:** If the course is to lead to a final accreditation then at what level is this to be, and are the systems in place for such awards?
- **Length:** How long will the course take for learners to complete? Is it full time or part-time or both? Is there flexibility in completion times or are there deadlines set either by the course leader or the accreditation body?
- **Duration:** How long is it intended that the course should run for? This may depend on various factors such as size and scope of audience, whether content is to be updated on a rolling programme or will need to be revised as one block after a certain period. Is the success of the organisation's business plan dependant upon a defined course duration?
- **Learner intake:** How often will enrolment be, will there be a rolling in-take and will in-take be of the same number each time or is there scope for growth?
- **Prerequisites:** What, if any, are the prerequisites for the course to be? This could be in terms of academic qualifications, work based experience or membership of a professional body.
- **Fees and funding model:** Will the course be charged for and if so, what and how? What is the costing and pricing model?
- **Culture:** Is the course and its content appropriate for the target population in terms of professional applicability, delivery technology and social context?

- **Infrastructure:** Are mechanisms in place for supporting e-learners who are remote from the training facilities, in particular access to the technology where required?
- **Resource:** Does the course have sufficient backing in terms of organisational readiness, funding, subject expertise and technical personnel, workload time and administrative support?

2.3 A Framework for Course Design

Having considered many of the above issues, it still can seem a daunting task to identify the course itself and, in particular, how to go about developing and writing an e-learning course. There are no hard and fast rules, but generally, it probably helps to look at the course aims and objectives first, together with any pre-requisites for the learners whom you expect to do the course. A good understanding of the potential learner in terms of access, IT skills, previous use of e-learning etc, also helps.

3. Being clear about the aims and objectives for a new course will guide the pedagogic strategy which informs the remaining stages, including: topics to be covered, learning activities, assessment and quality assurance.

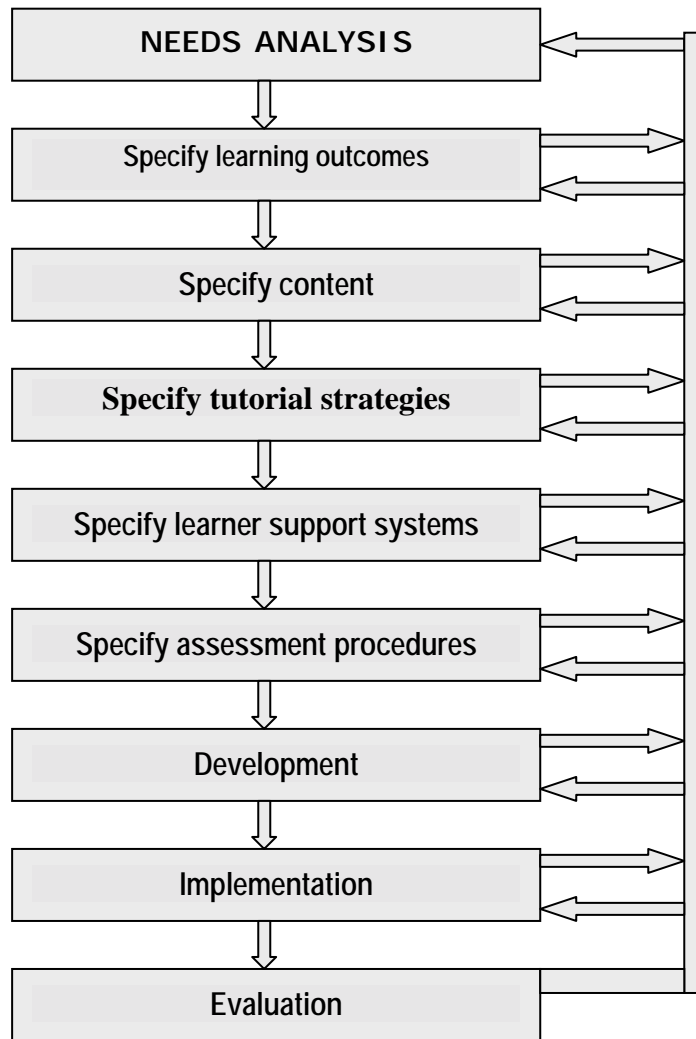
You could then look at the topics, the learning activities and assessment methods you intend to use, with regard to the sort of resources and support you are able to call upon.

The choice of educational (or pedagogical) strategy that you will use will also depend on your general aims: there may be a mix of acquiring skills, developing knowledge and understanding, and forming values. In order to deal with all the variables the pedagogical strategy can be dealt with in a very systematic way, in a course design framework:

- A description of the desired learning outcomes – commonly expressed as course aims and objectives
- A specification of course content - describing the knowledge and skills and desired learning experiences
- A specification of the strategies to be employed, including the sequencing of learning experiences, choice of media for delivering learning experiences and any interactive activities
- The assessment strategy which will be used, including both formative and summative assessment.

An understanding of all these components and the linkages between them should provide a clear framework for design, and this should form part of the quality assurance framework. See Section 5.1 for more detailed information about the Quality Assurance framework.

It is only once these components have been identified, discussed and developed that the course material can be developed.



4. In order to both design and develop good quality e-learning, it is recommended that a course team is set up, consisting of: course team/project manager/leader, subject specialists/authors, readers, an educational technologist and a production team.

This has particular relevance to developments within the NHS, where a number of the functions of the team might be given to outside bodies, such as suppliers and developers of e-content. The members of the course team and whether they are internal or external to the NHS will depend on the internal expertise available and this is discussed in more detail in Section 4.2.

As stated above, the course team ideally should consist of:

- **A Course Team/Project Manager/Leader:** This person will have overall responsibility for the development and delivery of the course. This might well be the

subject/course tutor or may be a dedicated project manager who is responsible for the developments of e-learning in the organisation.

- **Contributing subject specialists/authors:** These people will be the subject specialists who write and contribute to the course. It may be that the subject specialists have experience of developing face-to-face programmes but have no experience of authoring for e-learning courses. The author must adopt an altogether more journalistic style of presentation for electronic delivery of materials especially when this is the primary or only mode of learning. This could be an area where either the subject specialists become adept at writing e-learning content through staff development, or where this function can be supplied externally. One of the key identifiers of e-learning is the separation of learning and delivery, meaning here that the individual who creates the learning materials may not be responsible for its delivery, i.e., not tutoring on the course.
- **Readers and commentators:** These people will be subject specialists and training/educationalists who by reading and commenting on the materials, will help to refine and further develop the materials. It will also include proofreaders who may not be subject specialists.
- **Educational Technologist/Learning Technology Advisor:** This person acts as a kind of “hybrid” person by understanding both the pedagogy and course design framework and what and how the technology can do. They will advise on the planning, development and structuring the materials, choice of media, assessment and evaluation.
- **The Production Team:** These include people with responsibility for web design, video, graphics, administration and technical support. In the case of the NHS, it is likely that this is the area where third-party suppliers will be engaged, instead of investing and supporting an in-house production team.

2.4 Production issues

- | |
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| <p>5. Whether written explicitly for e-learning, or adapted from existing resources, it is necessary to ensure that all materials are appropriate for the chosen mode of delivery.</p> |
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However, it is important to note that the mode of delivery:

- May not necessarily have been selected at the time of writing the content,
- May change during the planning or delivery of any given course, or
- May be used for an entirely different purpose at a later date.

All materials must of course comply with copyright law and organisational copyright policy.

Listed here are a number of information sources related to both copyright and intellectual property rights.

1. Chartered Institute of Patent Agents
<http://www.cipa.org.uk/>
2. Copyright and patents act 1988
http://www.hmso.gov.uk/acts/acts1988/Ukpga_19880048_en_1.htm
3. Intellectual property
<http://www.intellectual-property.gov.uk/>

Images and graphics which are suitable for paper-based learning may not translate well in to the digital format, for instance a detailed diagram is unlikely to be clearly visible on-screen so it may be necessary to cut unnecessary parts, ensure that it is possible to print a copy from the digital format (fitting on to standard A4 sized paper), or enable the end-user to enlarge or zoom in on certain parts of the image. These are all technical tasks, which the subject authors must work closely with the Production Team on.

Similarly the materials must be appropriate for the delivery technology. Where material is being distributed via a high capacity media, such as on a CD, it may be acceptable to use high resolution images which makes for large computer files. This would not however be appropriate for delivery over the Internet where such files would take a long time for the end-user to download. There is nothing to prevent use of a combination of delivery methods, sending learners CDs of high resolution images for use in conjunction with online materials. You simply need to be clear from the outset about what technologies you are going to use and how you are going to use them. Again, all of this needs to be considered when deciding on the appropriate supplier for production.

2.5 e-Learning tools

6. One of the key decisions that needs to be made when an organisation decides to go down an e-learning path which involves web-based delivery is how to get started. There are at least three possible routes, including:
 - Developing a bespoke delivery and management system from scratch using internal resources;
 - Use an existing, commercially available tool; or
 - Bring in an external supplier to develop a bespoke system.

An outline discussion on these issues can be found at: <http://www.fliinc.com/publications.htm> in Volume 14, Number 3 and Volume 15 Number 1.

One of the advantages of the second option is that commercial suppliers with a good product tend to regularly update and improve the product and work to ensure that it meets both existing and emerging standards. In 2000 the NHSIA commissioned an analysis of the main e-learning environments then in existence as part of its 'Virtual Classroom' initiative. While the results of the analysis itself are out of date, the methodology used, with minor

amendments, is still relevant and has been included here as Annexes A and B. Some other, more recent, sources of information are:

- An up to date review of most of the main commercial products can be found at: <http://www.edutools.info/course/productinfo/index.jsp>
- Summary information on development, delivery and management products, along with links to a range of resources, (last updated in September 2002) can be found at: <http://www.knowledgeability.biz/weblearning/softwaretools.htm>

2.6 Developing and Maximising Partnerships with Suppliers and Other Organisations

7. The types of external partnerships which might be helpful to the development and production of e-learning is dependent on the existing and developing expertise within the NHS. It is also dependent on the types of e-learning programmes which need to be developed.

The relationships with both suppliers and other external partners can be seen both strategically, in terms of long term relationships and added value, but at the same time need to be firmly grounded at a practical level. There needs to be a very good rationale and clear understanding as to the value of the partnership and how it will support the development of e-learning in the NHS. The partnerships might well change dependant on the particular e-learning developments.

8. At a practical level, it is suggested that if the Course Team approach is adopted, then the partners become members of the Course Team.

For example, the supplier would be a part of the production team and possibly one of the contributing authors, whilst partnerships with HE and FE can provide readers and commentators.

Other partners, including Higher and Further Education Institutions, might provide subject expertise, understanding of the pedagogy and assessment strategies, accreditation, evaluation and possibly novel ideas for the production. As the NHSU matures, more clarity is required as to the services and support they will offer, but potential areas for partnership might be in terms of commissioning programmes, accreditation, delivery and learner management systems.

Other potential partnerships could be envisaged with professional bodies and internal networks.

3.0 RELATIONSHIPS WITH SUPPLIERS

3.1 Identification of Maximum Number of Suitable Suppliers

3.1.1 Background

The e-learning industry is relatively new and volatile due to a number of factors, including:

- **Bandwidth:** Until recently bandwidth limitations meant that most of the companies in the sector were only developing multimedia content in CD-ROM format, with on-line delivery being mainly text based. Broadband access is now increasing rapidly with the Office of the e-Envoy reporting that at the end of May 2003 there were over 2 million broadband subscribers in the UK, with the number of new connections rising at 30,000 per week. The potential audience for high quality, multimedia-based on-line learning is therefore growing rapidly.
- **Skills:** The last decade saw the fusion of the skills of computer based training and video production industries to create the multimedia based training industry. This decade is seeing the industry absorb a whole new range of skills, including web-based design. While this is happening the quality of the e-learning product can often be an issue.
- **Technology:** Technology continues to develop rapidly, so hardware and software purchasing decisions carry the fear of obsolescence within a relatively short period of time. This is particularly the case in the context of the emerging e-learning standards for transferability of content from one software platform to another.
- **Stability:** The e-learning industry is fragmented and immature, with many young companies, some of whose lifetime is short. In addition, mergers and acquisitions are taking place adding an extra dimension to an already confused situation.

In this environment choosing suppliers who can produce a quality² product is no easy task.

² In this context, quality relates to the quality of the learning taking place when the product is used, rather than materials production quality.

3.1.2 What Makes A Suitable Supplier?

9. The key factors which should be considered when selecting an e-learning content supplier are:
- Skills;
 - Track record;
 - Quality standards; and
 - Company stability including an understanding of how to **measure this**

There are a number of factors that should be considered when selecting an e-learning content supplier:

- **Skills:** The balance of academic, pedagogic, editing, design and web-based skills and experience is rarely found in one individual. The development of e-learning therefore tends to be a team-based activity, with the lowest common denominator determining overall quality, e.g. a sound pedagogic approach which is badly executed will result in a poor product. It is therefore important to understand what range of skills is available within a given supplier and, in particular, which individuals would be used on a specific commissioned project. This is particularly the case when both authoring and conversion are required of the supplier. Terms of Reference should identify the required skill sets, with suppliers being asked to provide CVs of both the staff who would be involved in delivery and those who would provide back-up.
- **Track Record:** A good CV does not necessarily equate to good skills. This is particularly true in a situation where the industry itself is immature and individuals working in it can come from a range of backgrounds such as: education; software design; web-based design; graphic design; multimedia production and consultancy. A suitable supplier should therefore be able to provide both references and samples of relevant work already carried out by members of the team that would be assigned to the project. In this context a track record of working with the NHS would be of value. Two or three references should be requested and followed up.
- **Supplier Standards:** In the UK there are two organisations that offer membership to e-learning suppliers who meet certain quality standards:
 - The Institute of IT Training (IITT) offers an accreditation service for IT training companies, although this covers both traditional and e-learning providers (<http://www.iitt.org.uk/public/accreditation/train-prov.asp>).
 - The British Association for Open Learning (BAOL) who have designed a 'quality mark' for materials development. This is based on the European Foundation for Quality Management (EFQM) approach ([http://www.baol.co.uk/qmcats.htm - materialsdevelopment](http://www.baol.co.uk/qmcats.htm-materialsdevelopment)).

- **Technical Standards:** Companies should be aware of, and supply materials that adhere to, any technical standards (e.g. SCORM) that the NHS views as important.
- **Company Stability:** Companies that deliver quality products get new business and survive. Although this should not debar a newly formed company, how long a company has been established needs to be considered. Many companies in the sector have migrated into e-learning from the computer based training sector and can demonstrate a significant track record over a long period of time.

3.1.3 Identifying Potential External Suppliers

There is no easily accessible and comprehensive list of potential suppliers for e-learning development contracts. This is not surprising in such an immature and rapidly changing business sector. There are, however, a number of routes that could be followed which could produce a suitable list. Such a list would only give a snapshot of a particular time and would quickly become out of date, requiring regular renewal.

10. Three general ways of identifying potential suppliers are:

- Existing lists of suppliers from suitable organisations;
- Associations and directories; and
- Exhibitions and conferences.

The volatility of the industry will mean that any lists created by the NHS will have a short 'shelf-life' and will require regular updating.

- **Existing lists of suppliers:**

At the beginning of 2003 the NHS launched an initiative, NHS-sid (the NHS Suppliers Information Database) (<http://www.pasa.doh.gov.uk/sid/>). This prequalification and tender support system from the NHS Purchasing and Supply Agency (PASA) makes supplier generated tender support information available electronically to all NHS supplies teams in England. Its stated aim is "rationalising the management of pre-qualification data during the procurement process, thereby reducing the administrative burden on potential suppliers to the NHS". There is some awareness of this database in the e-learning supplier 'community' and this should grow. However, by encouraging its potential suppliers to register for this free service, the NHS could simplify the process of identifying companies for future tenders.

The NHSU is in its early stages of development. It is presumed that the NHSU will wish to create its own list(s) of suppliers, perhaps in a similar way to the Ufl.

- **Associations and Directories:**

There are a number of associations where suppliers can pay a fee, undergo some form of accreditation and be listed in the association's promotional materials. The key ones include:

- British Association of Open Learning (BAOL) (<http://www.baol.co.uk/home.htm>) has a section on its web site called BLA Direct (<http://www.baol.co.uk/bdirect.htm>) which offers the ability to search among its membership for providers of a range of services. There are links to the web sites of the majority of these service providers.
- The eLearning Alliance (<http://www.elearningalliance.org/elearning-alliance-homepage.cfm>) is a membership-based organisation that seeks to promote e-learning in Scotland and beyond. Its membership database contains a range of, primarily Scottish based, e-learning content developers and providers.
- The Institute of IT Training (<http://www.iitt.org.uk/index.asp>) offers a free service which allows an Invitation to Tender to be posted on their web site (<http://www.iitt.org.uk/public/tender/index.asp>). It will reach those companies accredited by the Institute itself.
- A directory of 150 suppliers of e-learning products and services, operating in 25 different European countries and indexed by region, vendor category and industry classification is available for 99 Euros (<http://www.elearning-directory.com/>). Free updates are available on-line.

- **Exhibitions and conferences**

There are many conferences with e-learning as a theme, but not many attract a good range of potential suppliers, particularly in the UK. A useful search tool for conferences on the general subject of distance education can be found at <http://www.theconferencecalendar.com/>. There are occasional exhibitions with associated conferences outside of the USA which give a large number of suppliers the opportunity to showcase their skills. A forthcoming example (<http://www.e-learningevent.com/>) is the World of Learning Conference and Exhibition (WOLCE) at Birmingham on 17-18 November 2004. A list of exhibitors is available from the above web site. Within Europe, 'Online Educa Berlin' (<http://www.online-educa.com/en/>) takes place between December 1st and 3rd 2004, but will have fewer suppliers than WOLCE. The advantages of attending such events are that it provides the opportunity for face-to-face discussions with the suppliers and an in-depth assessment of their capabilities.

3.1.4 Creating a Supplier List

A combination of the means outlined above should enable the NHS to identify potential suppliers. If the NHS wishes to create a 'long list' of e-learning suppliers it could adopt the approach of the UfI, which shortly after its creation, circulated potential suppliers with a Call for companies wishing to become qualified suppliers.

11. An appropriate set of headings for a 'call' to identify a long list of suppliers could include:
 - Description of relevant work completed during the last three years;
 - Qualifications and experience of staff;
 - Experience of working with the NHS;
 - Development methodology and quality assurance;
 - Referees;
 - Trading status;
 - Bank references; and
 - Audited accounts.

Such a list could then be updated on a regular (possibly bi-annual) basis. This would create a long list of suppliers, all of whom could be contacted as and when required. The main problem with this approach relates to the probable large size of the list. From the NHS perspective, many companies would need to be contacted and many responses assessed. From the companies perspective the size of the competition would mean that many tenders would need to be responded to with little chance of success.

Another approach could be to use Framework Contracts.

12. Framework contracts offer a way of identifying a small (8 – 10) group(s) of key potential suppliers who could be called on to tender for both small and large pieces of work.

This approach would have advantages from two perspectives:

- The administrative burden on the NHS would be reduced as there would be a limited number of responses to each tender;
- Potential suppliers would be more enthusiastic about responding as their chances of success would be higher than in a normal open tendering situation.

Alternatively, the Framework approach has been accepted by the EU as part of the terms under which a government department can select a supplier for work 'advertised' in OJEC, allows a department to select a supplier on the basis of 'value for money'. An S-CAT (IT Consultancy Services) Category 10 (IT and Management Training) supplier, by definition, is deemed to already offer value for money, by virtue of the vetting and qualification process which got them into the S-CAT catalogue. Therefore the Framework approach allows a government department to use an S-CAT supplier without requiring more bids. However, a broad approach using S-CAT Category 10 may not be appropriate for the highly defined area of e-learning.

The advantage of the NHS creating its own Framework Contracts would be that more than one category could be created according to the range of needs for e-learning. For example, there could be categories for:

- IT training materials development and conversion into e-learning;
- Conversion of existing materials into an e-learning format.

4.0 SUPPLIER SELECTION

4.1 Use (or not) of Single Suppliers

While there are many elements to the production of good quality e-learning materials as outlined in section 2, they can be categorised under two broad, but overlapping, headings:

- **Authoring:** which involves the pedagogic aspects of materials development, from needs analysis to learning objectives to learning content (delivery methodology, materials and assessment);
- **Production:** which involves taking the scripted materials etc. and converting them into the required e-learning environment, be it CD-ROM or web-based.

13. The identification of a suitable supplier(s) for the development of e-learning materials will depend upon the balance of Authoring and/or Production skills that are required. This can be identified within the Course Team.

Authoring requires skill sets based around an understanding of how learning takes place, whereas Production involves the placement of learning content into a user-friendly and interesting environment. As stated previously (Section 2 and 3.1.2), good quality e-learning requires high standards in both of these areas. In most cases the decision to contract externally would indicate that, at a minimum, Production skills are required in the supplier.

14. The Terms of Reference for any tender document will need to reflect the skills and experience required of the external supplier.

The tender development team will need to consider the following issues in order to determine the skills required:

- **Needs Analysis:** Has a needs analysis been carried out? If not, it may be appropriate to either wait until it has been completed using internal resources or let a separate contract to carry out the analysis.
- **Pedagogic and Academic Skills:** Which of the required skills are both in existence and available internally? The issue of availability is important since, while trainers with the appropriate skills and knowledge background may well exist internally, they may not necessarily be willing or capable of being made available, e.g. due to existing commitments, to work with an external supplier. This needs to be considered when putting together the Course Team (Section 2) and the players within it.

4.2 Internal and External Suppliers

An earlier report³ on the development of a one-hour Clinical Coding e-learning course can be considered as a case study which illustrates this issue. Firstly, it is important to ensure that any internal trainers who are asked to work with an external supplier should have the willingness, ability and the capacity to become involved. In this case, the external supplier agreed that the internal trainers could be best used as readers and commentators. This was only possible because the supplier was:

- Able and prepared to spend time to understand the course content;
- Capable of converting and modifying existing PowerPoint-based content into a pedagogically sound web-based environment, and even adding value to the existing materials; and
- Prepared to communicate fully with internal staff and act on feedback relating to draft content.

If these factors had been missing, the outcomes of the course development process could have been very different.

15. It is important that in any e-learning developments there is strong project management and that this role is taken on as part of the Course Team. (Section 2).

16. In looking to the future development of e-learning any organisation could usefully consider developing the role of Educational Technologist as an in-house area of expertise. Particularly when working with suppliers and developers of e-learning, it would be very useful to have an in-house person with the expertise in these areas to liaise between the subject specialist and the production team.

4.3 More than one External Supplier

17. The use of more than one external supplier will create additional problems and should be limited to situations where one supplier deals with Authoring and the other with Production.

As the number of suppliers (both internal and external) involved in the project rises, so does the complexity of the project management process and the resources that need to be devoted to it. Factors to consider are:

- Lines of communication need to be clear and unambiguous

³ Internal report for the NHSIA – discussed in Section 1 of this report.

- The roles of each supplier need to be carefully specified
- Each external supplier will require a separate contract
- Timescales for final product delivery can increase
- Very strong project management.

Such problems can be minimised, but not eliminated, if one external supplier is contracted to work with the internal team to carry out the Authoring process. Strong project management will still be required. The second external supplier then takes over to perform the Production process, with the internal team providing feedback on the product as it develops.

5.0 QUALITY ASSURANCE AND PRODUCT TESTING

5.1 Product Quality Assurance

18. It is important to deliver quality e-learning, not just in terms of content or how it is delivered, but also relating to support structures and the learning principles behind the materials. Attention to detail, as well as a sound idea of the 'bigger picture' should ensure quality and, in turn, a worthwhile experience for the learner.

Quality Assurance Systems are used throughout industry and the public sector and they can provide a means for producing good quality e-learning courses, but they do not guarantee them. They help establish a common, acceptable standard for the e-learning provision being developed, and are an integral part of the design framework.

19. It is possible to generate checklists of items concerning the qualities in courses that should be demonstrated. The areas covered include:
- Course structure;
 - Course content and materials;
 - Tutorial and assessment strategies;
 - Learner support; and
 - Administration procedures.

Such a checklist approach has its merits, but is possibly of limited value if items are ticked off in a mechanistic manner. Experienced course developers can probably identify a good quality course when they see one, which may not equate to a course having all the ticks in a checklist. Judgements of quality are inevitably subjective in part.

Typical items in a checklist would mention aspects such as the following (not necessarily in order of importance):

5.1.1 Course Structure

E-learning, and particularly on-line courses, need to be clearly structured into coherent sections, and sub-sections. This greatly improves the chances of learning from the experience of using the course material. As outlined in section 2, courses need explicitly-stated learning outcomes to guide the learner, that focus on the essential aspects of the learning. This clarity will act as a motivator, since learners will be relatively clear about what it is they are expected to learn.

Providing alternative learning routes helps learners with differing learning needs, or different learning styles.

5.1.2 Course Content & Materials

The material needs to be at the 'right' level for the learners. The writing style needs to be interesting, and any graphics used should be attractive, and appropriate. The aim is to engage existing (and prospective) learners, so the use of interactive multimedia content is recommended.

The actual text should be accurate and up-to-date, with only the relevant material included in the course (avoid padding). The key terms and concepts should be clearly explained and, if appropriate, relevant backup material needs to be referred to, perhaps as further reading.

Other aspects include the general usability of the materials, such as how clear the internal navigation is to users.

An important factor in a quality online course is the degree of accessibility of the entire course, considered broadly. Accessibility usually refers to the ease with which learners with various types of disabilities can make use of the course materials. There are established guidelines to assist course designers in this matter. The choice of supplier and content production methodologies need to identify whether accessibility is taken into consideration.

5.1.3 Tutorial and Assessment Strategies

Whatever activities are included in the course, they must be relevant to the course aims, and also to any assessment activities that learners are expected to do.

Since the criteria for successful completion of a course often involve marks gained on various types of assessment, then the instructions for the assessments, and the performance criteria used by tutors, need to be clearly stated. Assessments need to be appropriate.

5.1.4 Learner Support

These are crucial aspects of e-learning courses, especially where most of the contact is with the course material, and not by face-to-face interactions with tutors or peers. All courses need to include certain provision for learner support; possibly this is the most important aspect of all learning.

For e-learning courses, it is usually a good idea to provide a Learner Guide of some sort, which outlines important course information, such as the assessment schedules, the course calendar, contact names of tutors, how to obtain help and so on.

5.1.5 Administration Procedures

A number of questions need to be asked, including:

- Are there adequate administration procedures in place to support this, and other, courses, and who will manage this?
- Are learner records easily maintained, and kept up-to-date?

Modern learning systems tend to rely on computerised systems, which needs a well maintained IT infrastructure. Not all data will necessarily be in the same system and therefore the information required needs to be identified and managed appropriately.

5.1.6 Checklist

Below is listed a comprehensive checklist with regard to quality assuring course development and production. Obviously not all points will be relevant for every course, but it gives a clear indication of the types of elements which need to be looked at. Having a comprehensive quality assurance framework, which is identified at the beginning of the development work can help in the design and development of the course. It can also be helpful in terms of the information given in the tender documentation.

COURSE STRUCTURE:
1. Does it have clearly stated aims and objectives?
2. Does it have clearly stated learning outcomes?
3. Does it have a clear structure, with clearly marked subsections, introductions & summaries?
4. Does it have overall coherence and comprehensibility?
5. Is it structured into manageable 'chunks'?
6. Does it have flexible learning routes adapting to a learner's progress and preferences?
7. Does it have an appropriate overall workload?
8. Does it have facilities for bookmarking the learners' progress through the material?
9. Does it have clearly signalled exit procedures?
Course Content & Materials:
10. Is it relevant for the course aims and objectives?
11. Are the aims and objectives sufficiently explicit?
12. Is it aimed at the right level?
13. Is it relevant & worthwhile for learners' contexts, interests and personal goals?
14. Does it address personal & professional capabilities where relevant?
15. Is it written in a reader-friendly tone?
16. Is the text at an appropriate level of readability, without oversimplification?
17. Is it factually correct?
18. Is it up-to-date?
19. Are all relevant and useful materials included?
20. Are any irrelevant or unnecessary materials included?
21. Is it presented in a suitable manner, e.g. does it include lists, diagrams, and use of other media where appropriate?
22. Does it include a useful and relevant use of resources?
23. Does it include a bibliography of readings and/or list of references?
24. Are key statements backed up with evidence?
25. Are new terms or concepts clearly explained?
26. Is there appropriate use of terminology?

27. Is a glossary of key terms included?
Copyright and Intellectual Property Rights (IPR):
28. Are all materials copyright-cleared?
29. Are Copyright permissions clearly stated?
30. Have issues of IPR been addressed and cleared?
Navigation:
31. Is there clear and consistent signposting of where users are, where they may go?
32. Is there clear and consistent signposting of expected action or behaviour?
33. Is there clear and consistent use of page layout and typography?
34. Is there clear and consistent use of menus and dialogue boxes?
35. Is there clear and consistent use of navigation aids (buttons, maps)?
36. Have all 'dead links' been removed?
37. Are there useful error messages that offer explanations and solutions?
Tutorial Strategies:
38. Are clear instructions included at all relevant points?
39. Are appropriate support mechanisms detailed?
40. Are activities relevant to course aims and objectives?
41. Are activities timely?
42. Are activities interesting and useful to learners?
43. Are activities accompanied by formative feedback?
44. Are activities supportive of self-assessment?
45. Are different media used when relevant and appropriate?
46. Is online collaborative learning a feature?
Assessment Strategies:
47. Are assessments appropriate to course aims and objectives?
48. Do the types of assessment enable students to adequately demonstrate that they have achieved all the designated learning outcomes?
49. Is the assessment type and criteria clearly explained?
50. Do the assessments follow institutional assessment regulations?
51. Are assessments credited according the units credit framework?
52. Does the assessment task merit the amount of time that staff and students spend on it?
Student Support:
53. Are there effective induction procedures?
54. Can online tutor support be provided for each learner?
55. Is there a study/information guide?
Does the Information Guide have:
56. Tutor contact details?
57. Course support materials?
58. Course prerequisites?
59. Course structure?
60. Course calendar?
61. Assessment requirements & deadlines?
62. Award(s) to be gained?
63. Example lesson with activities?
64. Clearly specified and appropriate study times?

65. Guidance, e.g. time management, how to study online etc?
66. IT requirements?
67. IT skills prerequisites?
68. IT skills support materials?
Does the course use a Virtual Learning Environment (VLE)?
69. VLE guide included?
70. How to use assessment tools?
71. How to use communication tools?
72. How to access to own records?
73. How to use online calendars?
74. How to use bulletin boards and discussion boards?
75. Where to find IT support and access to helpdesk?
Tutor Support:
76. Are there effective induction procedures?
77. Are times set aside for tutors to train/learn/work online?
78. Does the tutor(s) responsible have the skills and time to put the course materials and supplementary resources online and maintain them?
79. Are existing tutors suitable for an online support role?
80. Is there a tutor guide?
81. Are there systems for mentoring?
82. Are there systems for monitoring?
83. Are there systems to receive feedback from students?
ICT Issues:
84. Do the tutors responsible have adequate and reliable access to a PC?
85. Is the network available suitable in terms of bandwidth?
86. Are appropriate hardware and software available for delivering the course?
87. Has the material been developed to be standards compliant, and which standards?
Accessibility:
88. Have all accessibility issues been adequately addressed?
89. Are all the course areas & materials accessible, or alternatives provided if not?
Administration/Support structures:
90. Have administration issues for the course been resolved?
91. Are IT support and help systems available?
92. Are IT support and help systems available to off campus students?
93. Are IT support and help systems available to off campus students living in a different time zone?
94. Is there a library support system available to all off campus students?

Evaluation:
95. Does the course have an evaluation strategy?
96. Have evaluation criteria been decided (what you are trying to measure)?
97. Have sampling methods been decided (who will be asked to provide data)?
98. Have data collection techniques been decided (how you will collect data)?
99. Will the evaluation results be fed back into the development process?
Maintenance, Updating of content, Support mechanisms:
100. Are the course materials and the development process properly documented and archived?
101. Are procedures to update course materials and ensure sustainability in place?
102. Are procedures to review support mechanisms in place?
103. Are funding mechanisms in place?
104. Once initial support ends, are continuation strategies detailed?

5.2 Product Testing

5.2.1 Introduction

The need for proper testing and all-round quality assurance is often underestimated when planning the development of internet-based applications. When delivering e-learning, the importance of thorough and comprehensive testing is vital; you are not only developing an online application, you are imparting knowledge and training. If your copy is wrong, or your interface flawed, the value of your material is obviously diminished.

This section deals with some testing and quality assurance issues such as functionality testing, usability testing and proof reading. Some testing needs to be carried out by the supplier before the course is made live for testing by the course team. How much of the testing is carried out before handover by the supplier needs to be made explicit.

- | |
|--|
| <p>20. Reference to quality assurance and product testing and an understanding of how the testing will be carried out should be made in the Tender Documentation and the Proposal from the supplier.</p> |
|--|

5.2.2 Functionality Testing

Functionality testing is the term given to ensuring your e-learning product is working consistently and reliably. It validates and measures the quality of your product. Functionality testing evaluates whether your product satisfies the project requirements, based on pre-set criteria.

The first step of any functionality testing involves constructing a plan, and a set of “test steps”.

There are four levels of testing before a project goes “live”:

- **Unit Testing:** This is performed by the developers. This is often undocumented, but should at least have a “sign off” to say that the developer certifies the basic functionality of their work.
- **Prototype Testing:** When the units are combined to form a prototype on a server, a “black box” testing strategy should be employed. This means that the testers literally try to break the system. This is the stage which employs the aforementioned “test steps”, of which will be discussed shortly.
- **Integration Testing:** Once the product passes the previous stage, it can be moved to a mirror live environment at the final deployment location. Here developers and testers ensure that the product runs as specified, making any changes needed for running in this location.
- **Regression Testing:** Obviously changes will be made to a product throughout its life cycle. When these changes are made, affected parts (units) should be identified and tested to ensure that these changes have not affected other related parts of the product.

Test Steps

This is literally a list of things to test, along with the expected result. These steps are most commonly performed in a linear fashion, following a plan such as this:

Test No.	Description	Results	Pass/Fail
1.1	Click “Home” Button on top menu	User returns to Index page	
1.2	Click “Info” Button on top menu	User taken to Info Index	
1.3	Click “Mail” Button on top menu	Attempt to spawn email client with specified address	

There should also be facilities for the tester to provide note-form feedback. A very common way to do this on large projects is to employ a “Bug Tracking” system. Such systems allow comments and “bugs” to be reported and assigned to relevant developers. For example, if one of the above test steps failed, the tester would write in the id number of their comment/bug. A popular bug-tracking tool is found at <http://www.bugzilla.org/>.

Test steps will include everything from ensuring a link works, to testing on varied machines and configurations (this is tied in with accessibility tests).

5.2.3 Usability and Accessibility

Testing for usability and accessibility ensures that your product is easy to use and can be used by as many people as possible. You need to pay particular attention to making the product suitable for delivery to a variety of devices. Of particular note is the aspect of accessibility, especially for people with disabilities such as the visually impaired.

- **Usability.** Usability is something which until recently was considered to be an “afterwards” aspect of website design & development. Thankfully it is becoming common to build usability into the design process of a project.

Usability testing is a largely qualitative process. Testing is done by methods such as questionnaires, observation of tasks, focus groups and interviews.

What we gain from the above activities is information about how users are using our system. Of particular interest is the level of intuitiveness of our product: How long does it take a user to perform a given task? How quickly can the user locate core information? etc. Through observation and other methods, we can identify trends in the use of our product and spot potential areas for improvement.

- **Accessibility**

Good design practise ensures that the web-based course is accessible to the maximum possible level for a very wide range of users. If you are starting a web-based development a set of accessibility guidelines can be found at www.w3.org/TR/WCAG10/. There are also Internet resources which offer a good basic way to test if an existing website displays properly in a text based browser. The most popular (and standards-compliant) can be found at <http://lynx.browser.org/>.

If your website can be viewed and navigated easily in Lynx, then it’s likely that it will be interpreted properly using a screen reader such as JAWS. Simple things to remember include providing alternate text for images, and properly naming links with descriptive text, rather than the increasingly standard “Click Here”. Other areas of note include the proper rendering of formatting, such as tables and frames.

Regarding other disabilities, people with hearing difficulties should be provided with transcripts of video/audio where possible. Also (where technologically possible) you should endeavour to provide keyboard shortcuts, as the visually impaired (for example) don’t use a mouse – you can’t guarantee that the user has a mouse either. So where possible, provide as much keyboard interaction as possible.

The NHS has specific guidelines relating to identity, usability and accessibility. The visual identity guidelines (essential requirements) are to use:

- The NHS logo (or organisation's logo) in the right place;
- An nhs.uk URL
- Corporate fonts and colours from the approved palette and no patterns, textures or strong colours for the background;
- Appropriate images and graphics; and
- Plain language.

Full details can be found at www.doh.gov.uk/nhsidentity/

From a national perspective, the Government has published guidelines for the development of websites in the form of a checklist, which also addresses accessibility issues:

<http://www.e-envoy.gov.uk/assetRoot/04/00/06/96/04000696.pdf>

In addition, the e-Government Interoperability Framework (e-GIF) sets out policy and standards for interoperability across the public sector.

5.2.4 Proof Reading

Proof reading for any publication is of course a vital, if longwinded, task. Proof reading for the web often entails a large amount of editorial skill.

A lot of formal, educational content will need to be “repurposed” for interactive media. The aim is to make the text more concise, as it is harder on the eyes to read a screen as opposed to paper, plus less text equals lower download times. Of course, the trick is to make the material as concise as possible, without sacrificing the quality of information provided. This ties neatly in with the accessibility issues described above.

With regards to the actual proof reading, it is essential that people other than the author of the content do this. It is often suggested that at least three un-connected people completely read it through, but this may not be practical.

Proof reading of electronic content benefits from being checkable for spelling. Most web-authoring tools have an inbuilt spell checker. Failing that, portions of text can be easily copied into other applications with this facility.

Obviously spell checking is only a part of the entire process. Proof reading involves ensuring good grammar and general “flow” of a text. A large part of proof reading for electronic delivery (notably web-based delivery) involves ensuring that the language used is not overly colourful. Simple tricks like cutting out unnecessary adjectives can hugely improve the readability – and thus accessibility – of a website. Consider the target audience, and consider that in a medium that is globally accessible, you cannot make precise assumptions about your audience’s education and vocabulary.

6.0 THE CONTRACTUAL PROCESS

If an external supplier is going to be used in the development of e-learning materials, an effective contractual process will be key to identifying the right supplier to work with.

6.1 Terms of Reference

On the basis of a learning needs analysis, clear Terms of Reference (ToR) need to be developed. It will be important to include the internal course development and delivery team in the ToR development process, especially if it is led by a central project manager.

The benefit of clear and comprehensive ToRs is that they provide a 'level playing field' against which suppliers can bid. This should not stifle innovation and creativity, but will give clear limits within which capabilities and experience can be expressed, particularly through the provision of sample materials. It should also ensure that suppliers do not minimise the multimedia aspects of the product to bring down their price. This is a very important consideration as the costs of developing e-learning materials are heavily dependent on the amount and type of multimedia content and the level of interactivity required. In this context it will need to be emphasised to suppliers that the financial criterion for assessment is value for money and not price.

The issue of whether or not to include information about budgets is a difficult one. It has the advantage of helping suppliers decide what they can offer for the price, and the disadvantage of ensuring that most of the tenders will come in close to the budget. However, having clear value for money criteria in the assessment should lead to a more effective process.

21. In order that potential suppliers have a clear understanding of what they are bidding for, ideally the Terms of Reference for a tender should contain the following elements:
- Information concerning the context within which the proposed development will occur;
 - A summary of the learning needs analysis, including likely backgrounds of participant learners and potential learning styles;
 - A detailed requirements specification, including:
 - Scale and scope of the development,
 - Learning outcomes,
 - Mode of delivery, i.e. preferred medium/media to be used,
 - Degree of interactivity expected, including learner support,
 - Degree of multimedia use expected and types of media to be used,
 - Standards compliance, if required;
 - A request, after shortlisting, from selected suppliers for a small sample of potential product to illustrate what could be expected from the product development process (as opposed to a request for examples of previous work which can often be of little value);
 - How, if at all, NHS staff will be involved in supporting product development;
 - What, if any, materials are already available within the NHS (a reasonable sample of these materials should be provided with tender documentation);
 - Product quality testing criteria;
 - Timescales for product delivery;
 - A set of assessment criteria which will be used in evaluating tenders, along with a weighting for each criterion;

6.2 Assessment

It is important that the tender assessment criteria are carefully tailored to the needs of the project. Their inclusion in the tender documents should ensure this happens. It is possible that a Contracts Department will have its own generic set of assessment criteria for contract evaluation. However, if these are not appropriate for the product to be developed, it is important to ensure that they are suitably modified to meet the specific needs of the ToRs, bearing in mind any contractual obligations that need to be included.

All suppliers should be given the opportunity to ask questions during the bid development process up to a certain point before the bid deadline. However, to ensure fairness, all questions/answers should be circulated to each company, which has indicated an interest in bidding at least a week before the bid submission deadline.

22. Tender assessment should not be carried out by an individual. Ideally, it would be carried out by a group consisting of at least one representative of the key stakeholder groups within the organisation.

The assessment panel should include representatives from:

- Internal course development/delivery team(s);
- Management; and
- IT support.

An important fact that the tender assessment panel needs to remember is that a company can be very good at writing bids, but bad at delivering the product (and vice versa). A well constructed set of ToRs can help the panel to see through this and more objectively assess how well the potential supplier can fulfil the need for the product.

6.3 Post Tender Feedback

Companies that put considerable time and effort into preparing their tenders are often extremely upset when little or no feedback as to why they have failed is provided. It is in everyone's interest to help failed suppliers understand why they have been unsuccessful.

23. It is important to ensure that unsuccessful tenderers are given timely and helpful feedback. They can then better understand why they have been rejected and work to improve their companies/bids in the future.

6.4 Requirements for Non-Standard Contracts

It is clear from our prior knowledge of activity in the NHS that following a central, standard contracting procedure can lead to a number of issues and difficulties. The key factors that need to be considered are:

- The potential benefits of using Framework Contracts (Section 3.1.5);
- Bespoke assessment criteria (Section 4).

As they have been discussed in detail earlier in this report, they will not be repeated here.

ANNEX A

AN EVALUATION PROTOCOL FOR COMMERCIAL VIRTUAL LEARNING ENVIRONMENTS

Virtual Learning Environment (VLE) Evaluation Protocol

This document is adapted from part of an earlier report⁴ containing an evaluation of a range of Virtual Learning Environments (VLE) potentially suitable for delivering e-learning in the NHS.

1. Approach

The majority of evaluations which have been carried out have focussed on a checklist of features with a yes/no approach. There are some important issues that such an approach raises:

- There is a tendency to focus on completeness, i.e. quantity rather than quality, with individual features not being weighted. The question of knowing where to stop creating the checklist then arises. A possible comparison is with a video recorder, where the majority of people only use a small proportion of the available features.
- The software and delivery technology is changing so rapidly that new features are being added with bewildering regularity so checklist type evaluations rapidly become out of date.
- Value judgements may well have to be made when filling in a checklist, particularly when the experience of the assessor becomes a factor, e.g. evaluating ease of use.
- The Virtual Learning Environments (VLEs) on the market vary considerably in their design and structure, so that, while two packages may get a tick in a given features box, there may be a considerable difference in the functionality and value of that feature.

Variations on the above approach have been proposed by Britain and Liber⁵ and by Collis⁶. They both, from slightly different starting points, attempt to shift the emphasis from the product to the requirements of the customer. In this context the customer refers to the decision maker, the manager, the teacher and the learner. Britain and Liber propose a model which combines the “Conversational Framework”⁷ (focusing on teacher to individual learner interactions) and the “Cybernetic Model”⁸ (focusing on organisational factors). Also coming from a user-led perspective, Collis proposes that the evaluation framework be constructed as a decision support tool which adopts a “usability” approach.

⁴ Internal Report for the NHSIA “Towards A Virtual Classroom”, 2000

⁵ A Framework for Pedagogical Evaluation of Virtual Learning Environments, Sandy Britain and Oleg Liber, University of Wales - Bangor,
<http://www.leeds.ac.uk/educol/documents/00001237.htm>

⁶ Collis, B.A. (1999). A perspective on the usability of evaluation frameworks for WWW-based course-support systems, W3LS deliverable, University of Twente, the Netherlands.
<http://www.oc.utwente.nl/w3ls/english/bruikb.htm>

⁷ Laurillard, D. (1993) *Rethinking University Teaching - a framework for the effective use of educational technology*, London: Routledge

⁸ Beer, S. (1981) *The Brain of the Firm*, 2nd Edn, Chichester: John Wiley

Assuming an organisation decides to allow its stakeholders to participate in the decision making process, it would seem sensible to construct a VLE evaluation framework which adopts a user focussed approach. This means that a key first step is to identify the stakeholders. In the context of the NHS the perspective stakeholders could include:

- NHS employees who will be provided with learning opportunities;
- NHS (and other) staff who manage, develop and deliver learning/ information packages;
- IT specialists who will be expected to provide a transparent ICT based infrastructure (This will be particularly important if there is a need to integrate a VLE with legacy systems);
- Managers who will be responsible for finance allocation and/or decision-making.

Such a protocol would need to combine a limited checklist type approach (using key functionality criteria) with a descriptive element which allows a stakeholder comparison of relative value of key features.

2. Evaluation Framework

A clear vision needs to be articulated as to what the VLE should do. In the NHS there could be more than one element, e.g.:

- Delivery - the “virtual learning space”; and
- The identification of individual learning needs - “continuous personal needs analysis” and “development of personalised educational pathways”.

The former identifies the requirement for a web based delivery, learner support and management platform. The latter implies the need for a knowledge management system which can match identified needs with appropriate learning opportunities.

In the above case there is a real probability that no single VLE can currently provide a total solution, although the technology is changing rapidly. In addition, if there is such a VLE, it may well present such a barrier to usability that it would be destined to fail when used for a range of learner backgrounds – there is an association between openness/flexibility and complexity/barriers to use. Any evaluation framework must balance out a range of relevant factors and support the NHS’s decision making process so that what is chosen, if not ideal, is at least the best usable solution available. Hence standards compliance will be a key factor to ensure that any change from one VLE to another in the future will not create compatibility problems.

Despite the above concerns, the draft framework given below attempts to encompass the complete functionality requirements outlined above.

The framework will contain a number of elements which attempt to look at the key aspects which would be of interest to the various stakeholders identified earlier. These elements also address key aspects of the “virtual learning space” part of the vision for the Virtual Classroom. It is proposed that the protocol be divided into two elements. The first will be an "Overview" which describes the capabilities of the VLE under a range of headings which align to the various stakeholder groups in the NHS. It will end with a "Strengths and

Weaknesses" summary from the perspective of the NHS. The second will be "tick-in-the-box" "Functionality" and will give depth to the overview for those who are interested in a particular area. Where more detail or clarification is required, more data could sit behind any given function box.

A. Overview

Summary of each product and example(s) of where/how it has been used, to include:

A1 General

- Delivery model (e.g. rent-v-buy, synchronous-asynchronous),
- Target market (corporate or education)
- Demonstration availability (URL where a stakeholder can go to investigate VLE and/or demonstration CD ROM)

A2 Ease of use

- Intuitive interface, ease of navigation, length of learning curve for:
 - Learners
 - Teachers – including ease of developing and uploading content and managing courses
 - Administrators
 - Technical staff – including ease of installation, maintenance, user administration and security
 - Availability of user guide/VLE user training course as part of VLE package

A3 Educational

- Synchronous v asynchronous delivery
- Educational model used e.g. teaching v learning v training or passive v active v interactive
- Flexibility – to adapt to use by staff at different points on the technology learning curve

A4 Technical

- Interoperability:
 - Ease of use of third party content and authoring tools, database-driven software and other delivery tools (e.g. synchronous if product is asynchronous) *(This will be a key issue if the NHS migrates to a successor system when there will be a requirement to salvage data generated and captured by the system)*
- Standards compliance e.g. to IMS, AICC and SCORM
- Platform
- Hardware requirements
- Technical support from vendor

A5 Futures

- Strength of vendor
- Expandability/scalability – number of validated users the system can support
- Upgrade path

- Flexibility to cope with advances in WWW functionalities
- Predicted feature changes

A6 Costs (*different vendors have complex/vague pricing structures, with combinations of elements such as per-seat, per-use and per-employee pricing*)

- Licenses – server and client (if not web based)
- Additional software (if required)
- Hardware
- **Technical support – general maintenance/administration and specialist – e.g. customisation**

A7 Strengths and Weaknesses

Summary of overview and key features under two headings.

B Functionality (under a range of overlapping headings):

B1 Learner Features and Tools

- General:
 - Learner course manual
 - Learner can see list of all courses being taken at log-in
 - Learner "home page"
 - File upload area for students (e.g. personal reflection logs)
- Collaborative working:
 - Threaded discussions
 - Chat rooms for small groups
 - Learners can create their own collaborative groups
 - Bulletin board/conferencing
 - Whiteboard
 - Private e-mail
- Content delivery:
 - Access possible from PC with internet/intranet connection
 - Catalogue of resources
 - Access WWW from within VLE
 - Search tools
 - Bookmarking
 - File download for students to work off-line
- Assessment:
 - File/assessment submission
 - Self assessment
 - Access to own grades
 - Access to group grade distribution

B2 Instructional/Mentoring Features and Tools

- General:
 - Instructor course manual
- Collaborative working:
 - Asynchronous communication between instructor and learner/group of learners

- Synchronous communication between instructor and learner/group of learners
- Instructor can create learner groups
- Assessment:
 - Instructor can, from within VLE, create/mark:
 - "Fill in blank" questions
 - Multiple choice questions
 - True/false questions
 - Short answer questions
 - Essay type questions
 - Automatic marking and feedback on fill in blank, true/false and multiple choice questions
 - Construction of test database possible within VLE

B3 Content Development Features and Tools

- Ability to transfer content to/from other VLEs
- Authoring on PC (Windows NT/2000/XP)
- Content authors do not need HTML expertise
- Multimedia content can be authored using standard web based packages
- Test stage for courses before going live
- Instructor can change course content

B4 Course Management Features and Tools

- Scheduling, course outline
- Class lists and profiles of staff and students
- Announcements/notice board
- Data analysis tools and ability to export data for further analysis
- Tracking students – recording learning which has been undertaken and creation of individual profiles for learners
- Ability to integrate with other systems (e.g. training management systems, personnel)

B5 Professional Development Features and Tools

- Needs assessment
- Matching of needs with available learning opportunities
- Learning outcomes assessment

B6 Technical Features and Tools

- VLE complies with:
 - IMS standard
 - AICC standards
 - SCORM
- Transfer to/from existing database applications
- Platform server software runs on
 - Windows NT/XP
 - Unix

ANNEX B

EVALUATION PROTOCOL PROFORMA

A. Overview

A.1 General

	ASPECT	COMMENTS
A.1.1	Delivery model (e.g. buy v hosted service)	
A.1.2	Target market (e.g. corporate or education)	
A.1.3	URL of vendor or developer	
A.1.4	Vendor contact details	
A.1.5	URLs of sites where product has been used	
A.1.6	Availability of demonstration CD ROM	

A.2 Ease of use

	ASPECT	COMMENTS
Learners		
A.2.1	Interface	
A.2.2	Navigation	
Communication tools		
A.2.3	Threaded discussions	
A.2.4	Chat rooms for small groups	
A.2.5	Bulletin/notice board	
A.2.6	Whiteboard	
A.2.7	Private e-mail	
A.2.8	User guide	
A.2.9	Availability of training	
A.2.10	Length of learning curve	
Teachers/Mentors		
A.2.11	Interface	
A.2.12	Navigation	
Communication tools		
A.2.13	Setting up and managing discussion groups, chat	

	rooms etc.	
A.2.14	Addition/modification of learning materials	
A.2.15	User guide	
A.2.16	Availability of training	
A.2.17	Length of learning curve	
Administrators		
A.2.18	Interface	
A.2.19	Navigation	
A.2.20	User administration	
A.2.21	Security	
A.2.22	User guide	
A.2.23	Availability of training	
A.2.24	Length of learning curve	
Technical Staff		
A.2.25	Installation (including time to get VLE up and running)	
A.2.26	Maintenance	
A.2.27	User guide	
A.2.28	Availability of training	
A.2.29	Length of learning curve	

A.3 Educational

	ASPECT	COMMENTS
Pedagogic approaches supported:		
A.3.1	Teachers teaching students	
A.3.2	Teachers mentoring students, e.g. didactic/traditional roles	
A.3.3	Students creating materials	
A.3.4	Students mentoring students	
A.3.5	Case studies	
A.3.6	Problem based learning	
A.3.7	Shared studies	
A.3.8	Personal Learning Plans/Portfolios	
A.3.9	Collaborative working options	

A.4 Technical

	ASPECT	COMMENTS
A.4.1	Ability to use third party content and authoring tools, database-driven software and other delivery tools	
A.4.2	Type of transfer to/from existing database applications (e.g. direct API v data warehousing)	
A.4.3	Client software minimum specification (e.g. web browser minimum version number)	
A.4.4	Hardware requirements	
A.4.5	Platform used	
A.4.6	Technical support from vendor	
A.4.7	Specialist support available – e.g. for customisation, such as student personalised desktop	

A.5 Futures

	ASPECT	COMMENTS
A.5.1	Strength of vendor	
A.5.2	Expandability/scalability – number of validated users the system can support	
A.5.3	Upgrade path	
A.5.4	Flexibility to cope with advances in WWW functionalities	
A.5.5	Predicted feature changes	

A.6 Costs

	ASPECT	COMMENTS
A.6.1	Costing model used	
A.6.2	License costs– server and client (if not web based)	
A.6.3	Additional software required and associated costs	
A.6.4	Hardware required and associated costs	
A.6.5	Technical support available and costs – general maintenance/ administration	

A.7 Strengths and Weaknesses + Risks and Benefits

Summary of overview and key features under four headings

STRENGTHS	WEAKNESSES
BENEFITS	RISKS

B. Functionality (under a range of overlapping headings):

B.1 Learner Features and Tools

	FEATURE	Yes/No	Comments
B.1.1	Learner manual (how to use VLE)		
B.1.2	Portal view of own courses		
B.1.3	Learner "home page"		
Collaborative working:			
B.1.4	Videoconferencing within VLE		
B.1.5	Threaded discussions		
B.1.6	Chat rooms for small groups		
B.1.7	Bulletin/notice board		
B.1.8	Whiteboard		
B.1.9	Private e-mail		
Content delivery:			
B.1.10	Access possible from PC with internet/intranet connection		
B.1.11	Catalogue of resources		
B.1.12	Access WWW from within VLE		
B.1.13	Access Intranet from within VLE		
B.1.14	Search tools		
B.1.15	Bookmarking		
B.1.16	File download for students to work off-line		
Assessment:			
B.1.17	File/assessment submission		
B.1.18	Self assessment		
B.1.19	Access to own grades		
B.1.20	Access to group grade distribution		

B.2 Instructional/Mentoring Features and Tools

	FEATURE	Yes/No	Comments
General:			
B.2.1	Instructor course manual		
Collaborative working:			
B.2.2	Asynchronous communication between instructor and learner/group of learners		
B.2.3	Synchronous communication between instructor and learner/group of learners		

B.2.4	Instructor can create learner groups		
B.2.5	Learner can create learner groups		
Assessment:			
<i>Instructor can, from within VLE, create/mark:</i>			
B.2.6	"Fill in blank" questions		
B.2.7	Multiple choice questions		
B.2.8	True/false questions		
B.2.9	Short answer questions		
B.2.10	Essay type questions		
B.2.11	Automatic marking and feedback on fill in blank, true/false and multiple choice questions		
B.2.12	Construction of test database possible within VLE		
B.2.13	Import questions from other systems		
B.2.14	Creation of portfolios possible		

B.3 Content Development Features and Tools

	FEATURE	Yes/No	Comments
B.3.1	Ability to transfer content to/from other VLEs		
B.3.2	Authoring on PC (Windows 95/98/NT/2000)		
B.3.3	Authoring on Apple Macintosh		
B.3.4	Authoring on Unix		
B.3.5	Content authors do not need HTML expertise		
B.3.6	Multimedia content can be authored using standard web based packages		
B.3.7	Test stage for courses before going live		
B.3.8	Instructor can change course content		
B.3.9	Version control feature for revised content		
B.3.10	Local user can change content to suit local preferences		

B.4 Course Management Features and Tools

	FEATURE	Yes/No	Comments
B.4.1	Learners required to log-in to VLE		
B.4.2	Scheduling		
B.4.3	Course outline		
B.4.4	Class lists and profiles of staff and students		
B.4.5	Announcements/notice board		
B.4.6	Data analysis tools and ability to export data for further analysis (with data protection)		
B.4.7	Tracking students – recording learning which has been undertaken, recording of associated accreditation and creation of individual profiles for learners		
B.4.8	Ability to integrate with other systems (e.g. training management systems, personnel)		
B.4.9	Supports basic finance functions		

B.5 Professional Development Features and Tools

	Feature	Yes/No	Comments
B.5.1	Continuous needs assessment		
B.5.2	Matching of needs with available learning opportunities		
B.5.3	Learning outcomes assessment		
B.5.4	Identifies follow-up learning options		

B.6 Technical Features and Tools

	Feature	Yes/No	Comments
Complies with:			
B.6.1	IMS standard		
B.6.2	AICC standards		
B.6.3	HTML standard		
B.6.4	Other standards		
Platform server software runs on:			
B.6.5	Windows NT/XP		
B.6.6	Unix		

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