

JISC DEVELOPMENT PROGRAMMES

ACETS Final Report

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Special Report 8

ACETS: Assemble, Catalogue, Exemplify, Test and Share



ACETS

Assemble, Catalogue,
Exemplify, Test & Share

The ACETS Project

October 2005

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Executive Summary

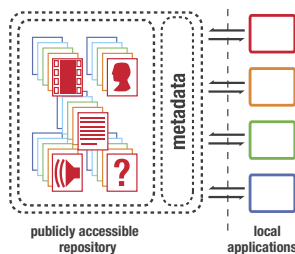
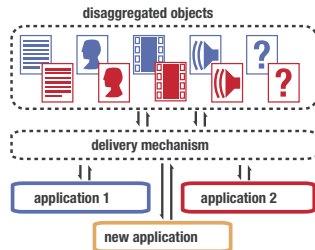
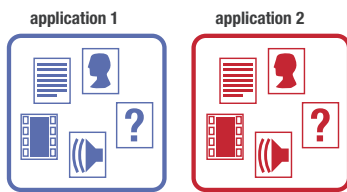
Despite much discussion of the potential benefits of Reusable Learning Objects (RLOS) there is little actual evidence available (at the time of writing) to show that they offer real practical benefits. Funded by the JISC as part of its 3 year Exchange for Learning (X4L) Programme the ACETS Project has commissioned teachers in a wide range of healthcare subjects and from a wide range of institutions to create case studies of the reuse of third party digital materials in their teaching. This report describes the background, activities and findings of the ACETS Project and is in part a record of how the Project was conducted and part an opportunity to see 'what really happens' when teachers have to work with the opportunities and problems that reuse can bring.

There are a number of recommendations arising from this Project:

- Reuse is not in itself a good or bad thing and it should not be encouraged or discouraged as a matter of dogma. Rather it should be nurtured and supported where it can provide benefits but not where it will not.
- If reuse is to become mainstream then the needs of teachers must be addressed more directly. There is currently a mismatch between learning resource provision and need. Most of the exemplifiers used materials from North American rather than UK sources and while that is not a problem *per se*, it is an issue for funding councils that there is a disconnect between the funding and provision and the needs it tries to meet. A key component of this is a regular and ongoing assessment of the needs of the teaching community, a task that is often overlooked or disregarded by service providers.
- Reuse is not particularly dependent on upfront technological support; the needs of teachers are often highly specific, contextualised and related to their personal approaches to teaching. It is therefore increasingly inappropriate for e-learning funding to go into technological developments without matched funding for pedagogical staff development. In the UK the JISC and the Higher Education Academy should be much more integrated and complementary in developments such as X4L and the national JORUM repository.
- Local support is very important but it should be as much focused on what could be done as on how it could be done. Learning technologist support should address both the pedagogy and the technology and the skills repertoire of all of those providing support extended by exposure to and engagement with the many issues associated with reusing third party materials.
- Without motivation and clearly perceivable need teachers will be unlikely to overcome the difficulties associated with using existing third-party materials. If widespread reuse is a strategic goal of the JISC or other agencies or institutions then a more sympathetic environment is going to be required. In the absence of such a change reuse will remain a minority activity, championed by some but failing to gain widespread support.

Although the ACETS Project has been able to provide a range of valuable insights on the options and issues regarding reusing third-party materials in healthcare education it cannot be considered to be an exhaustive or final study on this topic. The whole area continues to be complex, context-dependent and subject to the many and ongoing changes effecting teaching and learning at the start of this new century. It is clear however, that wider social change, in large part as a result of the information revolution, will continue to inform and structure what is considered to be desirable, doable and advantageous and that reuse in education will continue to evolve, both as an idea and as a practice.

The Learning Object Paradigm



Traditionally content has been built in to computer assisted learning applications such as teaching packages. All the resources, the pedagogy and the delivery mechanism are compiled together and become inseparable from each other. This is a model that is appropriate for non-networked situations such as stand alone CD-ROMs or videos but does not make use of the advantages offered by networked systems and in particular the web. In particular much of the rich content cannot be accessed or reused in other situations or contexts.

A learning-object-oriented approach to delivering teaching and learning packages separates the content from the delivery mechanism. This process leads to a pool of content objects that can be referenced and delivered in the same way as the original applications. This allows the content and delivery mechanism to be updated or developed independently of the other and for the resources of each to be available beyond the scope of an individual application.

Furthermore new applications for new situations may be developed using these existing resources, thus making more efficient use of all aspects of the digital content already available.

Scaling this up further, the pools of disaggregated objects can be collected together in central 'repositories' which can hold both the objects themselves and key metadata allowing the collection to be searched and accessed appropriately.

Local applications can access the repository and deliver the media as before. Moving to centralised and publicly accessible repositories allows much wider access to the objects and enhanced economies of scale regarding storage and description mechanisms and controlling IPR and other usage issues. The JISC X4L programme is engaged with issues surrounding both the technical and pedagogical use of an object/repository approach to supporting resource-based teaching in the UK

An Object Typology

There have been many definitions of a 'learning object' from a whole programme of study down to very specific entities. ACETS has adopted the following as a typology of different objects within the scope of the project



Information Object
This is a piece of information such as a picture, some text etc



+ context

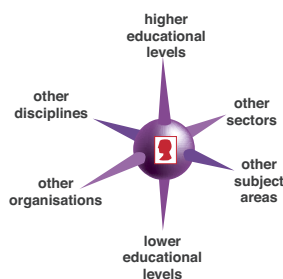
Knowledge Object
An information object plus metadata to place it in a particular educational context



**+ context
+ activity**

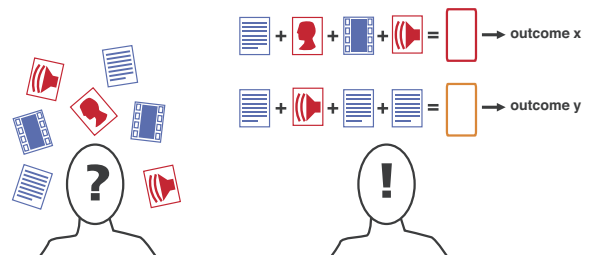
Learning Object
A knowledge object plus a learning activity or outcome

Dimensions



An information, knowledge or learning object may be reused in different dimensions. It may be used at different educational levels eg HND and BSc levels. It may be used in other subject or discipline areas eg medicine, nursing and or beauty therapy. Or it may be used in different organisations or even sectors. Each of these dimensions of re-use offer both opportunities and challenges to those providing and using these objects.

Exemplars



However, simply making lots of 'stuff' available does not provide much in the way of utility to educators or students. The ACETS project is engaged with producing 'exemplars' of learning object use from specific teaching situations.

These will act as guides or maps for teachers to practically link the benefits and opportunities of a learning object approach with the needs and processes of their real-world teaching activities.

Figure 1: the ACETS learning object primer (first published in the LTSN-01 '01' newsletter in 2003)

I: Reusable Learning Objects

Over the past 5 to 10 years there has been a move to widespread adoption and use of learning technologies in the tertiary sector. However, despite this breadth of use, it still retains a frontier ethos where there are far more problems and issues than solutions and much of the territory remains unknown and unexplored.

One of these issues is that of the reuse of existing digital content. This is fundamentally linked to the client-server architecture of the World Wide Web where files on a server are available to download to any connecting client computer. The Internet is often seen as forming a vast repository of information and resources that can be downloaded and used in different contexts and for different purposes than they were originally designed for.

The idea of learning resources being reused in different contexts has been encapsulated in the concept of the 'reusable learning object' or RLO. The term is in widespread use although there seems to be little clarity or agreement among practitioners of exactly what defining properties even just a learning object might have. Such definitions that we have, range from the very broad:

“any digital resource that can be reused to support learning” (Wiley, 2000)

... to the very specific:

“any grouping of materials that is structured in a meaningful way and is tied to an educational objective” (Johnson, 2003)

Although not applied in a hard and fast way ACETS offered its own description of some of the different terms and concepts associated with reusable learning objects in the LTSN subject centre for medicine, dentistry and veterinary medicine newsletter in 2004 (and reproduced as figure 1 opposite).

The additional dimension of reuse introduces the potential for learning objects to be used in different settings to those for which they were originally created and used. The reuse of educational resources is clearly not a new one; academic libraries for instance (and indeed the whole profession of librarianship) is built around the reuse of books, journals and other forms of publication in support of teaching and research.

However, web technologies seem to have made possible the creation, exchange and reuse of materials for teaching and learning in previously impossible ways, not least of which is that the potential for reuse is far greater and closer to individual teachers and students than ever before. Many courses now involve their students creating webpages for many different tasks, such as in support of project work, or as wikis or as personal blogs. Reuse of materials may play a significant role in any of these activities.

Reuse is not just about opportunity; it is, for instance, already a major issue for those students and staff who are publishing material on the web that everything they publish should be cleared for use (in terms of intellectual property rights, consent and so on). The importance of 'getting this right' is reflected in the increasing number of activities and organisations based around these issues, such as JISC's digital rights management (DRM) studies in the UK and the work of the Creative Commons group worldwide.

Reuse is a powerful meme, relating as it does to ideals of recycling, economy and efficiency, 'sustainability', as well as more general concepts of common purpose and interoperability. It is an attractive and compelling prospect that the digital age will bring the benefits of all human knowledge and experience to every desktop in the world for the benefit of every user. One reflection of the power of the idea of reuse as an educational theme is the ever growing number of projects based on the creation, exchange and reuse of learning materials. In the healthcare domain alone there are RLO repositories such as HEAL, and MedEdPORTAL, courses built around RLOs (for instance IVIMEDS and IVINURS) as well as more circumscribed projects like UMAP or OCTAVE (further information and explanation of all these terms and acronyms is given in the 'Further Information section at the end of this publication).

Despite the excitement and apparent activity surrounding the opportunities that the reuse of learning materials seems to bring, many teachers have not yet engaged with the concept. This is despite very significant investment in raising awareness, developing and widening access to digital resources (e.g. Computers in Teaching Initiative (CTI); Teaching & Learning Technology Programme (TLTP); Learning and Teaching Support Network (LTSN)); metadata hubs such as BIOME (OMNI) at Nottingham, and access to national collections (digital repositories) of learning resources such as Bristol Biomedical Image Archive. Each of these projects carries with it the enthusiasts and the early adopters but persuading the vast majority of teachers to engage with these resources at more than just a superficial level (i.e. informing students of their availability over the network) has always been an issue (Mayes, 1995).

At the start of the twenty-first century both teachers and learners now have access to an unprecedented range of digital resources with the potential to be used in many teaching and learning situations, and ranging in complexity from multimedia courseware packages designed to engage students for several hours of study to single images and text files. Despite this, the perception and evidence suggests that teachers make relatively little use of them and opportunities for reusing digital resources to improve the quality of the student learning experience are missed. The strategy of simply making resources available to students without contextualising their use, embedding them into practice and assessing them has not worked (Tavistock Institute, 1996). Both teachers and learners are generally fairly conservative and it seems that they will only embrace innovative teaching opportunities as long as they require minimal time commitment to explore and evaluate what is available, and involve little effort to implement. There is therefore a clear mismatch between the expectations of the proponents of reusable learning objects and the experiences of most learners and teachers at the 'chalk face'.

2: The ACETS Project

2.1: The Exchange for Learning Programme

There have been for many years substantial projects, many funded at the national or international level, which have developed large amounts of digital educational content. The UK's Joint Information Systems Committee (JISC – online at www.jisc.ac.uk) has for a number of years provided funds for creating, and more recently accessing, banks of digital content. Despite this, most of these materials remain unused outside the institution or context in which they were created. As a way of addressing this problem in 2002 the JISC launched a new large-scale programme called 'Exchange for Learning' (X4L, online at <http://www.x4l.org/>).

The main objectives of this programme were:

- To use and develop the best available tools to explore whether repurposing content could become a popular, sustainable way of producing e-learning materials for the future;
- To increase the numbers of people in institutions with the necessary skills to repurpose learning objects;
- To expose and begin to tackle the challenges associated with repurposing learning objects; and
- To begin to populate a national repository with repurposable learning materials, case studies and exemplars.

The X4L programme was organised into two strands. Strand A projects covered those that were creating learning objects or investigating how learning objects might be used and Strand B those that were investigating the tools and infrastructure issues surrounding the reuse of third-party materials. One of the larger Strand A X4L projects was the ACETS Project.

2.2: Project Focus

The ACETS acronym stands for “Assemble, Catalogue, Exemplify, Test and Share”, the five main conceptual steps the project identified at its inception that it would need to address.

Funded for three years and starting in September 2002, the ACETS Project was led by the University of Edinburgh with partners from the universities of Cambridge, Birmingham, Newcastle (LTSN-01 – now the Academy Subject Centre for Medicine, Dentistry and Veterinary Medicine) and two Colleges of Further Education; Suffolk and Edinburgh’s Telford College. The Project deliberately took a healthcare focus and partners were selected on the basis of their involvement in and experience of the tertiary healthcare sector.

The main focus of ACETS has been the investigation of the processes by which teachers use third party reusable learning objects in their teaching. It was not concerned with the creation of content nor was it primarily interested in technical issues. To fulfill the Project’s aims a number of multi-dimensional, detailed case studies of reuse, were commissioned from practicing teachers working in a wide range of institutions and educational settings. It was important that the case studies were generated by practicing teachers as a means of both maintaining their validity and capturing the idiosyncrasies of their experiences.

At the outset ACETS identified a number of factors that were seen as contributing to the problem:

- a lack of cognitive awareness and expectation by both individual teachers and institutions as to how these resources can be of use to them
- problems with resource discovery often related to inadequate descriptors of RLOs - lack of common language, terminology and other semantic aspects
- a lack of time and, in some instances, the creative ability, to integrate existing resources into their teaching
- a lack of documentation, exemplars and other expository material to help teachers to embed RLOs into their practice
- technological incompatibilities across the sector which inhibit teachers’ access to RLOs

The ACETS Project therefore worked from the position that, although enhancement of student learning was the ultimate aim, it could be best achieved through observing teachers discovering and acquiring suitable third-party digital materials and embedding them into their practices.

2.3: Project Management

Project management of ACETS worked at three levels.

- Rachel Ellaway (Edinburgh) and Dawn Leeder (Cambridge) were the Project Managers for ACETS, with joint responsibility for the day-to-day running of the Project. The project managers undertook most of the core work of the project such as study design, recruitment, interviewing and organizing meetings and events. The ACETS Project Director, David Dewhurst, took responsibility for strategic management, steering of the project and finances.
- The ACETS Project Board, chaired by the Project Director, met two or three times a year to monitor progress, adjust the strategy as required and set tasks and actions for the Project’s members. The board included representatives from each partner institution as well as invited guests.
- The ACETS Advisory Group, chaired by Professor Stephen Tomlinson met once a year with the Project Director to oversee the running of the project, observe and validate the Project’s progress, to particularly advise on dissemination and possible exit strategies and to pick up on issues that the Project should address.

2.4: Project Partners

Edinburgh was the lead institution: Professor David Dewhurst, Assistant Principal for e-Learning & e-Health) and Director of Learning Technology in the College of Medicine & Veterinary Medicine (CMVM), was the Project Director; Rachel Ellaway, e-Learning Manager in CMVM was one of the project managers; Erin Mills (appointed in Feb 2005) was a research assistant.

Cambridge: Dawn Leeder, the Director of Universities' Collaboration in eLearning (UCeL) was one of the project managers, particularly working on recruiting and supporting the Project's exemplifiers.

Dr Megan Quentin-Baxter, Suzanne Hardy, Dr Jean McKendree and Dr Sarah Marshall of the LTSN-01/Academy Subject Centre were advisors to the Project and responsible for the Project dissemination activities.

Suffolk College was one ACETS' two FE partners and provided four FE Exemplars (numbers 18 to 21): Suffolk's Primary Contact was Tammany Allen.

Edinburgh's Telford College, the second FE partner, withdrew from the Project in 2004 (see panel opposite).

Birmingham University provided some technical consultancy: Dr David Davies.

Hull-York Medical School (HYMS) joined ACETS in 2004 through the participation of Dr Jean McKendree who moved to HYMS from LTSN-01.

Nottingham University, the home of the BIOME service (<http://www.biome.ac.uk>), were involved as potential providers of a long-term repository for ACETS materials which was part of the original exit strategy. However this role was largely superseded by the development of the JORUM repository. The Primary BIOME Contact was Robert Parkinson.

2.5: ACETS Online

The creation of an ACETS website was one of the first activities undertaken (see figure 2). However, rather than a series of static web pages the Project decided to build a 'collaborative work environment' (CWE) to provide contact details, news, interactive tools and information to Project members across the UK. Based on tools developed for the Virtual Learning Environments built at the University of Edinburgh, they included an email tool to send messages to selected participants, a tool for voting on the required metadata the project should use (although this was overtaken by the development of the UK LOM Core), a reflective diary tool for exemplifiers, a record

Problems with Participation

Edinburgh's Telford College was one of the ACETS Project's founding members. However, with the early retirement of the individual originally identified as the core exemplifier in the College, Telford found themselves unable to respond to the requirements of ACETS participation and withdrew from the Project in March 2004. Reasons given include:

Because ACETS was looking at healthcare-related work the choice of potential exemplifiers in the College was limited. At the time that the Project needed the work to be carried out those individuals who might contribute did not have enough time outside their existing teaching commitments to participate.

There were also issues with the culture in the College, the low level of integration of technology with classroom teaching, the level of skill of lecturers and more than any of these, the lack of perceived benefit – this last factor was seen as sector-wide.

There was also a perceived lack of essential skills required to participate in the Project – most staff were young and inexperienced and not used to using computers in their teaching. There were also related issues of academic confidence. Those few experienced staff (e.g. there was one teacher involved with NLN round 3) are particularly overstretched.

for each exemplifier of their various reports and data, an Amazon-like star-rating system for project participants to score the quality of websites which might provide potential resources, and a Project content management system.

Some areas of the CWE were well used while others were less so. For instance the email function was rarely used, a similar low level of use was made of the ACETS@JISMAIL email list. About a quarter of the exemplifiers used the reflective diary facility and a similar proportion used the resources list (despite a number of requests that they did so). The contacts list and the content aspects of the CWE were the most used.



Figure 2: because ACETS Project partners and exemplifiers were distributed across the UK it was an obvious strategic decision to conduct as much of the study as possible online. Although face-to-face contact was still essential for many aspects of ACETS' work, the ACETS collaborative work environment (adapted from a VLE system developed at Edinburgh) gave a high level of coordination and support for the Projects' participants.

3: The Study

Since ACETS was a research project it depended on a robust study design. The design took almost a year to develop, partly because of the changing nature of the X4L Programme in its first year and partly because of the exploratory nature of the work itself.

The plan was to recruit between 20 (minimum) and 30 (maximum) teachers from across the UK, in both the HE and FE sectors, in a broad range of subject areas including medicine, nursing, veterinary medicine, dentistry, biomedical science, beauty therapy and sports science, to create case studies. These case studies were called 'ACETS exemplars' and the teachers were therefore 'exemplifiers'.

Each exemplar was to focus on either anatomy or (healthcare-related) communication skills as two quite different (and often problematic) areas of a healthcare curriculum.

3.1: The ACETS Exemplar

Exemplifiers were tasked with creating a learning activity using third party materials. Since ACETS was particularly interested in the process by which this was achieved they were required to complete an 'ACETS Exemplar' (see below).

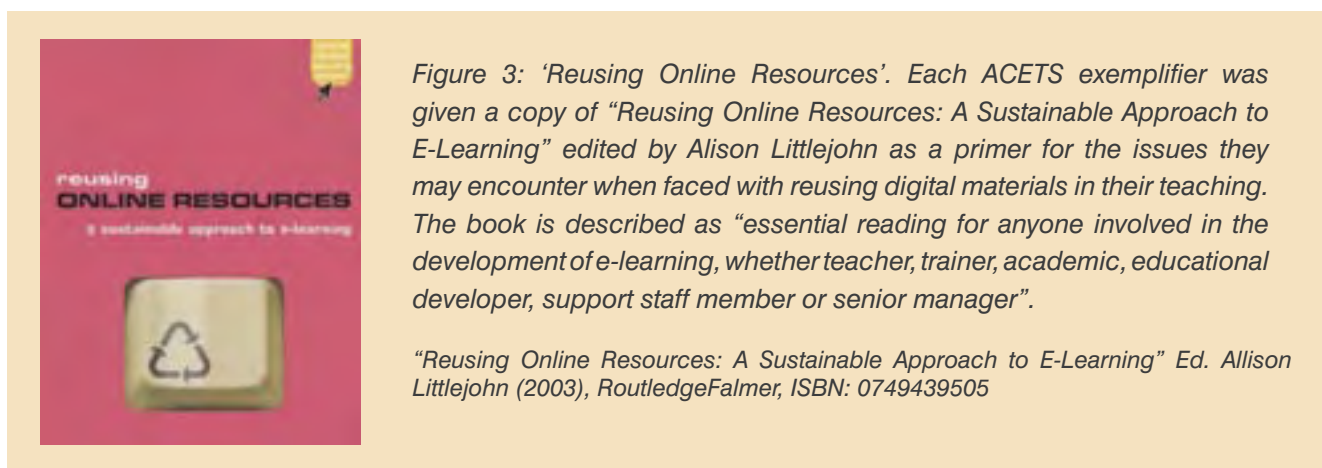
Recruitment of the Project's exemplifiers proved to be more difficult than initially anticipated. They had to be prepared to reuse third party digital materials in their teaching, document the processes they went through to achieve this and then have their work and the documentary record of the process published in the public domain.

A number of potential exemplifiers decided not to join ACETS because they were not prepared to use third-party materials or have their formative work published. The latter appeared to be more a concern that negative comments or experiences were inevitable and these were seen as counterproductive to their own work and advancement. However, most cited a lack of time as the main reason for limited participation.

Most of the successful recruitments were opportunistic and resulted from:

- Attendance at the 2003 ASME Conference in Edinburgh, and in particular the presentation of a paper "ACETS - taking a pedagogical approach to using learning objects" and a handout to all the participants
- Attendance at the 2003 Breaking Boundaries Conference in Manchester run by the LTSN-01.
- Contacts in partner institutions which proved to be one of the most successful methods
- Contacts through other external projects and research activities

As an incentive to participate in the Project each exemplifier received £1,000 on completion and delivery of their exemplar and every participant was given a copy of Allison Littlejohn's book "Reusing Online Resources: A Sustainable Approach to E-Learning" (see figure 3 below).



Funds allowed for a maximum of 30 exemplars and it was anticipated that 30-40% of these would be from FE and 60-70% from HE. In the event ACETS recruited 21 exemplars (see figure 4) and due to the withdrawal of Telford College, only four were from FE, i.e. 20%.

Figure 4: the 21 ACETS Exemplars

ID	Exemplifier	Exemplar title	Institution
01	Phil Bradley	Online Microanatomy Tutorial on Skin	University of Newcastle upon Tyne
02	Brian Lunn	Psychiatry Teaching Resource	University of Newcastle upon Tyne
03	John Sweet	Student Resources for Patient Communication regarding Periodontal Disease	University of Wales College of Medicine
04	Fraser Pryde & Sue Black	Anatomy for Forensic Anthropology: Thorax Module	University of Dundee
05	Danny McQueen	Pain and its Management	University of Edinburgh
06	Andrew Ginty	The Larynx Tutorial	University of Manchester
07	Robin Shutt	Torque and Angle	University of East Anglia
08	Heather Bull	The Anatomy and Mechanics of Respiratory Ventilation	University of Nottingham
09	Linda Malek & Liz Rogerson	Tutorial on Online Communication	University of Dundee
10	Patricia Revest	“What’s in a head: an Introduction to the Head and Neck Anatomy”	Queen Mary University of London
11	Helen Farrimond, Lesley Rhodes & Tim Dornan	Virtual Integrated Dermatology (viDerm)	The University of Manchester
12	John McLachlan	Fetal Heart Circulation	Peninsula Medical School
13	Colin Melville	Neonatal Resuscitation 101	Keele University
14	Ian G. Parkin	Introduction to Anatomy	University of Cambridge
15	Anne Davidson	Giving and receiving feedback	Coventry University
17	David Pallot, Hazel Derbyshire & Richard Yates	Anatomy of the Oesophagus	University of Leicester
18	Barbara Conway	Anatomy – Gas Exchange	Suffolk College
19	Sian Cooper	Anatomy – Sports Injury	Suffolk College
20	Steve Goodfellow	Non-verbal Communication Skills	Suffolk College
21	Tammany Allen	Communication – Effective Listening	Suffolk College
22	Patricia Warren	Respiratory Function	University of Edinburgh

Some discussion took place about the level of support the exemplifiers should receive from within the Project team. The research perspective was that the case studies should be as naturalistic as possible and any intervention i.e. support would interfere with the study. The more pragmatic, and in the end prevailing, view was that supporting exemplifiers (if they needed it) would better ensure the completion of a full quota of exemplars.



Figure 5: The exemplifiers were brought together mid-Project (Manchester 2004) to give them the opportunity to meet each other and ACETS team members and to share and develop their ideas

3.3: The Format of the ACETS Exemplar

The exemplar format was developed with five key elements:

3.3.1: Baseline Interview

This was completed as soon as possible after an exemplifier was recruited. The baseline survey was intended to identify contextual and individual factors that might affect the success of each exemplar before the creation of the activity took place. For instance, a teacher that has experience in, or access to, e-learning, might well be expected to be more successful in using third-party digital materials or may use technology differently from a teacher without such opportunities (a copy of the baseline questionnaire is shown in appendix D).

3.3.2: Reflective Diary and Other Formative Evidence

This was intended to capture the thinking, successes, failures, support and frustrations experienced by each exemplifier as they put their learning activity together and negotiated the issues raised by using third-party materials. Although exemplifiers were free to use any approach they wished for their diaries a tool was provided for each exemplifier to use through the ACETS CWE. The CWE structured the diary into the following sections. This was done to encourage completion and to avoid receiving data in a variety of formats. The four suggested reflective diary stages were; resource discovery, preparation of the learning activity, creation of the learning activity, and data relating to the use and evaluation of the learning activity

Despite this common suggested framework a wide variety of formats was submitted including full reflective diaries, procedural accounts, reflections from students, and evaluation results.

3.3.3: Semi-structured Interview

The interview was conducted once an Exemplar had been completed and was intended to form a rich record of the exemplifier's experiences. The approach used a questionnaire with a common overall format but also allowed the interviewer to explore or not explore the interviewees' answers as they saw fit. To help systematize the interview process, a semi-structured interview guide was followed that allowed for individual variation, adequate probing and clarification of responses. This approach also enabled the different kinds of work and the different experiences to be recorded in a fairly succinct fashion. The common core set of questions included; how the exemplar was put together, how difficult it was to do, what resource discovery strategies were used, what tools were used, what benefits and problems accrued and whether they would do it again. The resulting transcripts of the interviews were recorded in each exemplar document, all of which can be obtained from the ACETS website at www.acets.ac.uk

3.3.4: Semi-structured Learning Design Statement (SSLD)

It was anticipated that the exemplifiers would produce a wide range of different educational activities, and some means was needed to describe them in a consistent and comparable way. To do this ACETS adapted the (then just-published) IMS Global Learning Design specification (see the panel on the right hand side of this page) into a pro-forma instrument for recording learning activities by using natural language statements to create a generally understandable and usable format for recording the learning design by teachers without requiring any technical training or prior knowledge of XML. The 'ACETS Semi-structured Learning Design' pro-forma is shown in appendix B.

3.3.5: Materials developed:

The last part of the exemplar was the provision of the actual materials developed as part of the exemplar. This last component was left optional as the materials, at least for some of the exemplifiers, represented a substantial additional investment of institutional time, or contained material copyright restricted to the institution.

3.3.6: General Guidance

A guide for exemplifiers was developed to ensure that the focus, process and requirements of the Project were clearly stated and available for reference as required by all participants, including ACETS staff and exemplifiers. The development of the guide raised a number of important issues, in particular the problem of using technical, pedagogical or other domain-specific language across a range of different professional groups. In the end both FE and HE versions of the guide were to accommodate non-generic language and terminology. Development of the guide was also affected by the delay in the initial delivery of, and the subsequent absence of user guides for, the JORUM.

The basic premise of educational modelling languages (EMLs) is that all learning activities can be formally described and subsequently encoded using a common language. The result being that the activities can be shared, rerun, analysed and adapted for new contexts of use. There have been a number of EMLs developed (Rawlings et al 2002) but the most successful has been IMS Learning Design.

Learning Design models a unit of learning by describing the following: 'to achieve these learning outcomes and given certain preconditions, these individuals perform these roles (teaching/facilitating learning) by carrying out the following activities using these resources and services in this environment'

A core aspect of this is that "in IMS Learning Design the structure of the learning scenario is separated from the learning materials and services" (Jeffery & Currier, 2005). However, the IMS Learning Design specification is a technical artifact that in its purest form is expressed in extensible markup language (XML). ACETS took the basic IMS Learning Design information structure and adapted it to model the different exemplar activities using natural language with the intent that they would remain 'human-readable'.

See appendix B for an example of the ACETS semi-structured learning design statement. For more information on the IMS Global Learning Design specification see <http://www.imsglobal.org/imsl>

3.4: Cataloguing the Exemplar Materials: the 'C' in ACETS

Initially the Project team expected that each exemplifier would upload their exemplar documentation and materials to a Project repository, which the Project would build itself, where each resource would be catalogued and stored. However, from the outset the X4L Programme made it clear that X4L projects would use JORUM (an X4L Strand B Project) as a common repository. It was anticipated that this would be ready for use by the end of the first year of ACETS but for a number of reasons, outwith ACETS' control, this did not materialise. During JORUM development a number of issues arose:

- Metadata for clinical images, particularly those with associated permissions and consent issues, became a significant problem if patient-identifiable materials were to be deposited in JORUM (note that this has subsequently been addressed (in 2005) by another JISC-funded project CHERRI-PIE - www.cherri.mvm.ed.ac.uk)
- JORUM provided X4L projects with two alternative, and apparently competing, repository products, IntraLibrary and Xtensis. As JORUM was itself developing as an X4L project, these repositories remained in a state of constant flux throughout the three years of the X4L Programme. Of the two ACETS selected IntraLibrary because it was entirely web-based and therefore cross-platform (the JISC finally selected IntraLibrary in 2005 as the platform for the national JORUM repository service).
- Rules for access and login details changed several times during the course of the JORUM project which left users somewhat confused and unwilling to use the JORUM service. There were also issues about what could be deposited and about who would be able to deposit materials that added to the confusion. In the end only Project staff accessed JORUM and then only to deposit the exemplars and the Project's reports.

4: The Exemplars

4.1: Completed Exemplars

Twenty-one exemplars were completed, less than was hoped for but within our original aim of 20-30. The exemplars came from across the UK (12 were from southern England, 4 from northern England, 4 from Scotland and 1 from Wales). Regarding the provenance of the third party materials, 5 of the exemplars employed commercial resources, 10 used non-commercial resources and 3 used a mixture of commercial and non-commercial resources. From a subject perspective, 9 were from medicine, 3 from nursing and allied health professions, and 1 from dentistry and 8 from non-clinical disciplines. The rest of this section describes each exemplar in turn. A URL to a full text exemplar on the ACETS website accompanies each entry:

Exemplar 01: Phil Bradley Online Microanatomy Tutorial on Skin

An online microanatomy tutorial on dermatology using a commercial online anatomy atlas as its principle third-party resource. Developed to replace microscopes that had previously been used for microanatomy teaching; recently the labs had been refurbished and all the microscopes were taken away. Used principally by MBBS stage 1 medical students and BDS dental students in stage 1 (both first year). For third-party materials this exemplar used "Atlas of Histology" published by Lippincott, Williams and Wilkins as well as resources from a number of public websites in the USA and Canada.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/01.pdf>

Exemplar 02: Brian Lunn

Psychiatry Teaching Resource

A CD-ROM of psychiatry teaching information for undergraduate medical students. It is based around a series of videos of actors playing psychiatric patient cases. The choice of a CD-ROM format was a reaction to having to teach in NHS Hospitals and problems of firewalls and permissions set by the NHS. Reuse for this exemplar was based on recreating clinical video recordings of real psychiatric patients by using actors. More than 700 copies of the CD-ROM have been distributed to students, teachers and libraries.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/02.pdf>



Exemplar 03: John Sweet

Student Resources for Patient Communication regarding Periodontal Disease

Rather than the teacher being the creator and focus of reusing materials, in this project it was the students who reused third party materials. The result was a series of student group projects based on providing patients with information on aspects of dental health or periodontal treatments. This Exemplar looks at the way that students cope with the problems and make best use of the opportunities that reuse can bring.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/03.pdf>

Exemplar 04: Fraser Pryde and Sue Black

Anatomy for Forensic Anthropology: Thorax Module

A resource for introducing anatomy to forensic anthropology students based around a tutorial using QuickTime movies and images from the Internet compiled in PowerPoint. The exemplar covered the module on the thorax. The authors intend to build other modules to create a comprehensive series for the whole body. Materials reused are images and animations of 3D anatomy and are accessed by students using the institutional VLE.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/04.pdf>

Exemplar 05: Danny McQueen

Pain and its Management

A website for a new BSc Honours degree course on Pain and its Management for a mix of science and non-science students. The course was quite broad moving out of standard basic biomedical sciences into areas such as pain management, palliative care, ethics, the psychology of pain and how pain is represented in art and literature. The website was the focus of all the teaching on the course and it was for both staff and students. It consisted of a mixture of materials provided by individual lecturers and a selection of third party RLOs. The third party materials mostly came from the Wellcome Trust who had created and collected a body of materials around an exhibition on Pain at the Science Museum in London. This material comprised videos and essays written by a variety of academics from around the world. Other third party materials included an online copy of Leo Tolstoy's novel "The Death of Ivan Ilyich" and a selection of other relevant websites. There were also links to commercial CAL programmes. The whole site was run from the VMLE for undergraduate medicine in Edinburgh.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/05.pdf>

Exemplar 06: Andrew Ginty

The Larynx Tutorial

A tutorial for year two dental students on the BDS course at Manchester, that presented the structures of the larynx and their functions, including 3D images to help the learner explore and to aid understanding. The use of third-party resources was limited to materials supplied from the UCeL collection and links to a series of third party websites.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/06.pdf>

Exemplar 07: Robin Shutt

Torque and Angle

A PowerPoint presentation of torque and angle in the forearm and its relationship to physical properties. This exemplar failed to find suitable third-party materials.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/07.pdf>

Exemplar 08: Heather Bull

The Anatomy and Mechanics of Respiratory Ventilation

An online reusable learning resource on the anatomy and mechanics of respiratory ventilation developed to complement lectures in respiration and also to promote consolidation of concepts. Target students are first year human/health science undergraduates, and to a lesser extent GCSE, A-level and Access students. This exemplar failed to find suitable third-party materials.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/08.pdf>

Exemplar 09: Linda Malek and Liz Rogerson

Tutorial on Online Communication

A formative learning activity to help students to communicate effectively using discussion forums and on-line discussion forums in BlackBoard. Third party materials used were items of documentation from BlackBoard and other guideline documents to using online communication along with images and other resources from BlackBoard.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/09.pdf>



Exemplar 10: Patricia Revest

What's in a head: an Introduction to the Head and Neck Anatomy

A website outlining the principles of head and neck anatomy for year one medical undergraduates, although year two students may also be interested and first year dental students as well. The third party materials constitute a wide range of images drawn from non-commercial websites, most of which were from the USA.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/10.pdf>

Exemplar 11: Helen Farrimond, Lesley Rhodes and Tim Dornan

Virtual Integrated Dermatology (viDerm)

A resource to support the acquisition of dermatology clinical skills for second phase undergraduate medics. Based on resources from an old third party CD-ROM combined with public information animations from BBC Wales and clinical images and new materials. The package was largely developed by Helen Farrimond, at the time an undergraduate medical student, with support from Tim Dornan, her tutor.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/11.pdf>

Exemplar 12: John McLachlan

Fetal Heart Circulation

A series of web pages and resources within the local VLE (BlackBoard) to allow first year undergraduate medical students to gain a more thorough understanding of how the fetal heart works. The third-party materials came from a commercial medical image encyclopaedia.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/12.pdf>

Exemplar 13: Colin Melville

Neonatal Resuscitation 101

A course for teaching neo-natal resuscitation to NHS Senior House Officers (SHOs – postgraduates). Third-party materials were illustrations and clinical data which were then used as a basis for creating new materials.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/13.pdf>

Exemplar 14: Ian G. Parkin

Introduction to Anatomy

A multimedia package for undergraduate medical students about to join their degree programme for the first time. The use of third-party resources was limited to links to third party websites.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/14.pdf>

Exemplar 15: Anne Davidson

Giving and receiving feedback

A communication skills package for undergraduate first year physiotherapy students. This exemplar failed to find suitable third-party materials.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/15.pdf>

Exemplar 17: David Pallot, Hazel Derbyshire and Richard Yates

Anatomy of the Oesophagus

A resource to teach oesophageal anatomy to first year medical undergraduates. Based around an enhanced PowerPoint presentation the third-party materials used were images from a commercial provider.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/17.pdf>

Exemplar 18: Barbara Conway

Anatomy – Gas Exchange

The intention was to find up to date animation clips demonstrating a journey around parts of the body concentrating in particular on gas exchange for teaching level 3 Health and Social Care students. This exemplar failed to find suitable third-party materials.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/18.pdf>

Exemplar 19: Sian Cooper

Anatomy – Sports Injury

Development and use of practical teaching sessions using a commercial CD-ROM along with a projector to demonstrate anatomical structure beneath the skin for Level 3 Diploma in Sports Massage students. The third party materials were projected images from the commercial CD-ROM.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/19.pdf>

Exemplar 20: Steve Goodfellow

Non-verbal Communication Skills

A CD-ROM on non-verbal communication skills, including third party images and video demonstrating the skills in a doctor-patient setting for Level 3 Health and Social Care AVCE (vocational certificate) students. This resource was developed to replace paper-based resources with more interactive materials and role-play. Third-party materials came from NLN and UCeL sources.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/20.pdf>

Exemplar 21: Tammany Allen

Communication – Effective Listening

Self-contained online materials on effective communication skills to be used within a range of different courses delivered online at a distance by Suffolk College. Third party materials came from the NLN.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/21.pdf>

Exemplar 22: Patricia Warren

Respiratory Function

A standalone program designed to describe respiratory function testing for healthcare, medical and science students. This resource was a redevelopment of an existing third-party commercial CD-ROM called 'Chest Clinic'.

This Exemplar is online at: <http://www.acets.ac.uk/exemplars/22.pdf>



4.2: Exemplar Issues

Despite the success in obtaining 21 exemplar case studies there were a number of issues and problems encountered in creating and completing the exemplars:

4.2.1: Exemplifier Issues

During the Project six of the recruited exemplifiers withdrew from the project. Five of these cited insufficient time as the major reason why they were unable to take part in the study and one did not even attempt to use third party materials. Of the 21 submitted exemplars:

- 4 exemplifiers were unable to find appropriate third-party materials. It was decided that these cases would prove useful as indicators of how and when using third-party materials was not possible.
- 4 had not delivered the resource to their students at the time of submission
- 10 had not evaluated it
- 1 did not have a baseline taken and 1 did not submit a reflective diary

The importance of naturalism in the study was also hotly debated within the project, the two main positions being:

- **Naturalism:** ACETS is a study into what happens when practicing teachers try and integrate third party materials into their teaching. In order to ensure that the exemplars are as valid as possible, any support that would not normally be available (such as from the Project) should not be offered, as it would lessen the validity of the case study.
- **Supported:** it would be unethical for ACETS to allow exemplifiers to fail. Any additional support and involvement from the Project that would ensure the delivery of a successful exemplar should therefore be made available.

ACETS generally followed the naturalistic path although a relatively small number of exemplars received additional financial (above the £1000 exemplar fee) and practical support from ACETS Project members as an incentive, as without the additional financial support, completion would have been impossible. This has been recorded in the exemplar document whenever it occurred.

4.2.2: Interview Issues

The exemplar interviews, conducted at the close of each exemplar were intended to explore the experiences and feelings of the exemplifiers once they had gone through the many stages of putting a learning activity together that included the use of third party materials. To ensure that a basic range of information was covered in each interview, a pro-forma set of questions was provided to guide the conversation. While this guide contained a list of questions and general topics to help to keep the discussion focused, interviewers employed a more semi-structured approach to gathering data which encouraged participants to describe in their own words issues of particular importance. In all, ACETS had five different interviewers. The combination of different interviewers with the different exemplifier's interests and agendas led to a variation in the depth and detail of the interviews conducted. This was compounded by the different media used to conduct the interviews; although a face-to-face interview was the ideal scenario, a number of the later interviews had to be conducted over the phone.

In addition to this variation in the execution of the interviews, a number of exemplifiers committed to further information which, once the exemplar had been signed off, was not forthcoming. Despite

these issues, the interviews represent a solid evidence base for the Project and have elicited valuable information and insight into how academics react to the kinds of challenges raised by ACETS.

4.2.3: Reflective Diary Issues

The reflective diaries were expected to take numerous forms as it was anticipated that each exemplifier would have their own way of describing their experiences. A reflective diary tool was added to the CWE as a means of providing those exemplifiers who wished to use it with a method of recording these experiences. While, 9 exemplifiers used this tool, the others used their own more idiosyncratic approaches to complete this task. In the end the reflective diaries ranged from a sketched few hundred words to 10 pages or more of detailed procedures and activities undertaken as part of constructing the exemplar.

4.2.4: Some Semi-structured Learning Design Issues

The creation of the semi-structured learning design (SSLD) statement was part of the closing interview for each exemplar. Derived from the principles of the IMS Learning Design specification, it became clear as the instrument was being developed that teachers had great problems completing an SSLD themselves as the terminology it uses and the way it takes an abstracted way of modelling educational activities was unfamiliar to them. As a result an ACETS Project Officer, drawing on interview questions and observations, completed the SSLD. Once completed, the SSLD was something that the teachers could work with and they were given the opportunity to validate the way their exemplar was captured in the instrument. Almost every SSLD went through several rounds of validation and clarification before it was published.

Although the SSLD proved to be very valuable at describing the exemplar activities in a detailed and algorithmic fashion, this method of data collection raised a number of issues:

- The scope of description proved problematic as some contextual information, such as the information on when the learning activity was to be used was required. A variety of responses were generated, and the contexts ranged from designing the exemplar for use during an entire course to simply using a single artifact. Assessment was also an issue if what was to be learnt in the activity was separated from when it was assessed. This was also linked to the importance of start and stop triggers and whether they fell within or outside the activity. Over all it became very clear that activities were rarely self-contained but instead intersected with many other activities and processes.
- The amount and granularity of detail required was also an issue. Some exemplifiers provided a more stepwise approach to describing the activity, while others just a broad overview. The focus of the SSLD, whether it was the activity's pedagogical focus, the steps taken to carry it out or the resources used also varied greatly. Many exemplars used a combination of online and offline activities – the differences between these are important from a technological point of view but less so from a purely pedagogical perspective.
- Many exemplifiers used domain-specific terms that required further explanation for audiences outside the academic's immediate community of practice. This factor was a clear indicator of the extent to which teaching and learning is very culturally and politically rooted.
- It is also semantically important to note that what was actually being accomplished in the learning activity created a representation of a 'teaching design' but not a 'learning design' as it encoded what the teacher thought either should or did happen, thus raising a variety of issues related for instance to issues of 'hidden curricula' (Snyder, 1971).

5: The Findings

Once gathered and completed (as far as possible) the next step was to analyse the exemplars to identify the common themes and issues that the exemplifiers experienced. The Project used three methods:

- Pattern analysis techniques to identify common experiences or responses that could be represented numerically and graphically.
- Thematic analysis techniques to identify common themes and issues expressed by the exemplifiers regarding their experiences. This was achieved by using the qualitative research application 'N6' to develop a coding model using principles adopted from 'grounded theory'. This was the core analysis technique and the one that produced the main thematic Project findings and the basis for its recommendations.
- The semi-structured learning design statements were analysed to identify common issues and practices and to situate the third-party materials within the activity context which used them.

The combination of these analysis techniques was intended to provide a view at both the general (pattern) and specific (thematic) level and to enable the Project to draw some conclusions and recommendations from what is admittedly a relatively small experimental sample.

5.1: Pattern Analysis

The pattern analysis of the exemplars involved looking at specific issues that could be tracked numerically, such as differences between baseline survey and interview statements, and the more objective and simple interview questions. The results are shown in figures 6 to 9.

5.2: Thematic Analysis

The thematic analysis involved identifying and resolving common themes expressed by the exemplifiers. This mainly drew upon the interviews but also used the reflective diaries where possible and compared these against the baseline surveys where appropriate. The thematic analysis identified seven major themes that persist through many of the exemplars and form the main research findings of the Project.

5.2.1: Resource discovery for teaching is not easy

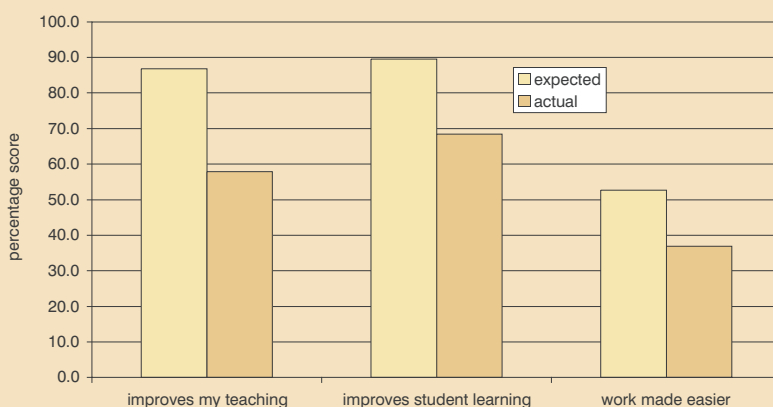


Figure 6: difference in expected and actual improvements as a result of using learning objects for all ACETS exemplars. Overall there was a consistently lower improvement than anticipated with both the anticipated and actual efficiency of their work was made easier scoring lower than the other two factors.

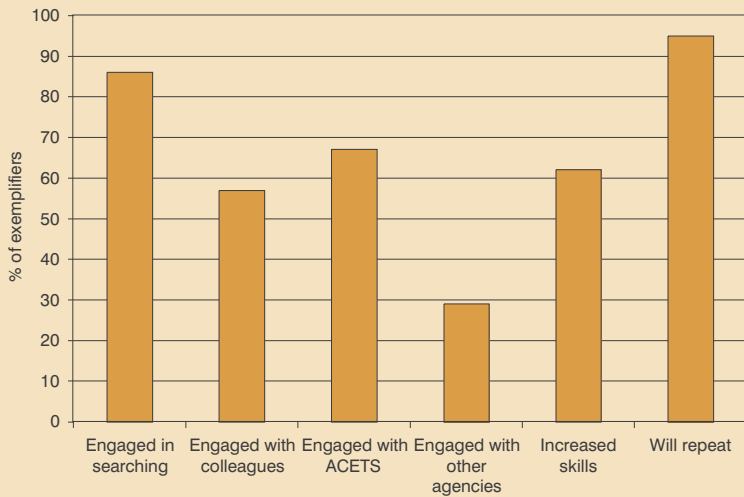


Figure 7: 86% of the exemplifiers engaged in some form of searching for third party materials, 62% considered that building the exemplar increased their skills (across a range of areas), 95% indicated that they will continue to use third party materials and build and use learning objects. 67% of exemplifiers actively worked with the ACETS Project staff, 57% with their colleagues and only 29% engaged with any other agency or organisation (such as JISC).

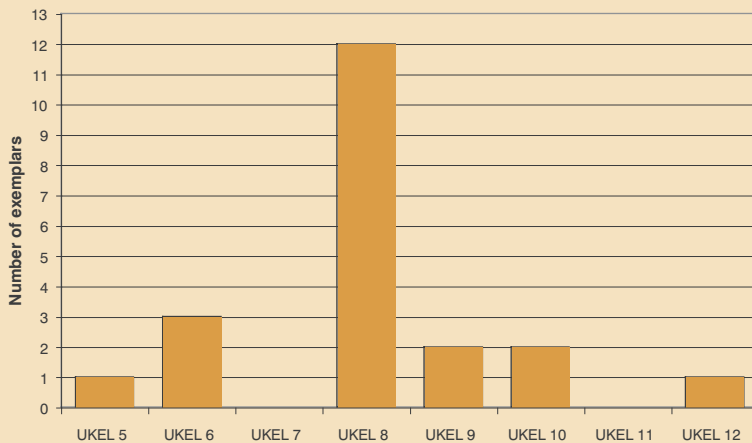


Figure 8: The number of ACETS exemplars per UKEL/SCQF educational level. The UKEL and SCQF scales use common gradations of educational levels for tertiary education*. Although the majority of the ACETS Exemplars were created for first or second year undergraduate teaching (level 8) there was a spread of learning activities aimed at students studying at NVQ2 (level 5) to those studying at postgraduate doctoral level (level 12).

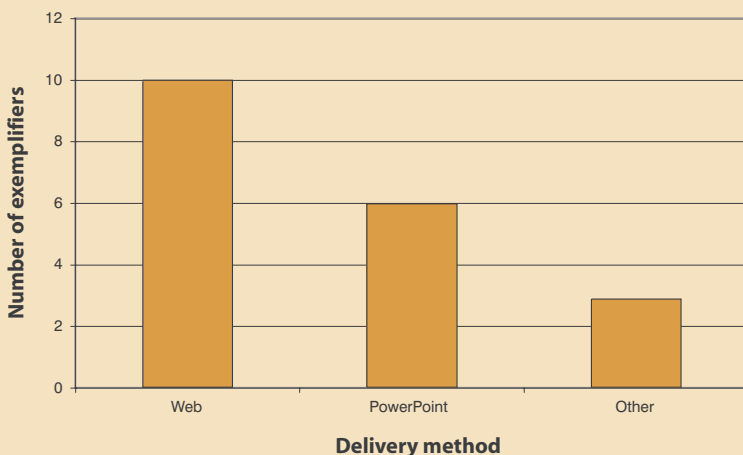


Figure 9: delivery method for exemplars. More than half chose web pages (incorporating a range of different media), with PowerPoint the second most popular medium of delivery. Other choices included using Macromedia's Authorware or Flash tools or using face-to-face classroom digital projection.

* More information can be found on UK Educational Levels (UKEL) at <http://www.ukoln.ac.uk/metadata/education/ukel/> and more information on the Scottish Curriculum Qualifications Framework (SCQF) at <http://www.scqf.org.uk/>.

Despite the fact that many had solid academic research skills and were accustomed to searching for research literature, the teachers who participated in this study were rarely skilled in resource-discovery for teaching. Finding good quality and reliable materials, indeed even knowing where to start was often a daunting task. To assist with that difficult first step, the ACETS project provided a 'jump page' (consisting of a list of websites, with a link and a brief description, considered likely to be of use to the exemplifiers) on the CWE but this proved only moderately successful. Although some of the exemplifiers did indeed use it as a starting point for resource discovery, only one or two used its Amazon-style star rating to provide feedback on the usefulness of any of the resources and none actively recommended new resources (although neither activity was a condition of partaking in the study).

Many participants, regardless of what previous searching/technical experience they had of using the Internet, began their search with 'Google' while many others who employed a different search strategy eventually turned to Google. The position of Google as the application of choice for general Internet resource discovery seems unassailable, particularly given its speed, comprehensiveness and the addition of useful tools such as Google image searching.

It is important to note that some of the most successful approaches to using third-party materials in ACETS occurred when the teacher sidestepped the resource discovery stage altogether, either by choosing known commercial sources or by taking a lateral perspective on what reuse can actually mean.

5.2.2: The Internet is not the cornucopia it may often seem

Despite the enormous amount of information and material housed on the Internet, it is rarely a source of appropriate, good quality, reliable and readily available materials for teachers in the tertiary sector. Indeed these four factors were the key determining aspects of whether materials, once located, were acceptable for use by the teacher:

- **Appropriateness:** often teachers found resources that were either too simplistic (black and white hand drawn figures) or too complex for their needs (excessive labelling or detail). For instance there are a great number of simple anatomy images online but few that tackle the detailed aspects of anatomy required by teachers in the tertiary sector. Quite often communication resources were found to be linked too specifically to their original national or professional contexts to be of practical use in new settings.
- **Quality:** often the resources available online were of insufficient quality for use in teaching. This may have been due to the resource being created using lower than acceptable production standards, or that its resolution or size was too small, or that it had a particular visual or audio style that made it incompatible with the context of reuse.
- **Reliability:** the ACETS exemplifiers also raised concerns about the reliability of the materials they found. Some were factually inaccurate or inappropriately vague, others had content problems such as different spellings or other problems of reliability. There was also concern expressed about the provenance and continued availability of materials.
- **Availability:** some sites had no copyright or conditions of use statements and either had no contact information for pursuing them or simply did not respond to emails. Others had overly complex conditions of use and many more required a fee or subscription to be paid for third-party reuse.

5.2.3: Context and cost matter

Even when the ACETS exemplifiers were able to find materials that fit their needs they were faced with additional barriers including context and cost. Despite the top-down hopes and policies of the tertiary sector, teaching and learning is not generic. Each situation has its own semantics, politics and dynamics that can either afford or block the reuse of third-party materials. Cost is also a major issue. Both money and time is in short supply in the tertiary sector but it was particularly the time factor that exemplifiers raised as an issue, with resource discovery identified as the most onerous and frustrating task associated with reuse.

5.2.4: Experience and support are less important than creativity and imagination

In this study there seemed to be little correlation between prior experience and positive outcomes. Similarly the absence of prior experience did not necessarily lead to poor outcomes. Rather it seemed that creativity and imagination were the most important qualities for an academic to possess or develop when trying to reuse materials in teaching. Similarly the presence of local support did not necessarily lead to positive outcomes although some of the more adventurous exemplars were achieved only with the support of local learning technologists.

If this proves to be the case across the sector then this has a number of significant consequences:

- Staff development, and perhaps more importantly staff empowerment, is required to enable teachers to engage with reuse in their teaching. The focus of staff development and support should concentrate on empowering and creativity rather than purely technical or procedural use of learning technologies.
- The role of a learning technologist should focus more on nurturing the creativity of the staff they support rather than the purely technical aspects of the systems they run. The concern over the developing professional role of learning technologists is reflected in debates within professional organisations such as the Association for Learning Technology (ALT – <http://www.alt.ac.uk/>)
- If creativity and imagination are key then there are issues as to where investment should be made to better enable reuse and the use of learning technology to be embedded in mainstream teaching practice. For instance the substantial investment from the JISC in learning technology support should be matched by funding council or HE Academy support for how it can be developed and used more creatively and imaginatively. This last factor is perhaps reflected in the popularity of Gilly Salmon's creative and pragmatic books 'e-Moderating' (Salmon, 2000) and 'e-Tivities' (Salmon, 2002).

Repositories

Although most of the online materials suitable for educational reuse are scattered across a myriad of websites, increasingly resources are being provided in organised collections, most often called repositories. These provide searchable catalogues of resources with sufficient structure to enable users to find relevant resources with ease. The following are some of the repositories or repository-like projects relevant to the immediate ACETS community.

The JORUM was originally an X4L strand B project but has since been nominated as the provider to the JISC of its national learning object repository. JORUM is online at www.jorum.ac.uk. The National Learning Network (NLN at www.nln.ac.uk) provides a wide range of reusable learning materials for the post-16 sector in the UK.

Some repositories focus on particular kinds of resources, for instance the Universities Medical Assessment Partnership (UMAP at <http://www.umap.org.uk>) and the vet equivalent OCTAVE (at <http://www.vetschools.ac.uk/Octave>) have developed banks of online assessment items.

Healthcare specific repositories include the Health Education Assets Library (HEAL at www.healcentral.org), BIOME (at [biome.ac.uk](http://www.biome.ac.uk)), the BioMed Image Archive (at www.brisbio.ac.uk) and in the US the AAMC's MedEdPortal (at www.aamc.org/meded/mededportal).

The International Virtual Medical School (IVIMEDS at www.ivimeds.org) and the International Virtual Nursing School (IVINURS at <http://www.ivinurs.org>) are developing members-only banks of learning objects linked to core curriculum maps.

Commercial providers are increasingly developing repository or portal like access to their online resources. For instance the publisher Elsevier provides online access to large banks of educational resources if you purchase their key textbooks. Their site, called 'Fleshandbones.com' is at www.fleshandbones.com

5.2.5: Reuse introduces risks

Teachers engaged in reuse are often exposed to risks and uncertainties. Exemplifiers raised issues of permissions and digital rights, the accuracy of the third-party materials and occasionally hostility or lack of support in their local working environments. A number of the issues already discussed in this report are also associated with risk, in particular the time taken to search for and incorporate materials into existing or new activities. In an already time-pressed academic working environment teachers are unlikely to spend valuable time searching for elusive resources when they could more reliably and safely design their own or just do without. In some cases, the introduction of a new or changed form of practice, is not easily supported or embraced by the educational institution leading to the innovator or early adopter becoming exposed to greater and perhaps less than friendly scrutiny.

5.2.6: Reuse can stimulate significant positive outcomes for all concerned

The challenges and opportunities afforded by reuse may stimulate innovation. In this study reusing existing materials appeared to help teachers reflect and refocus their approach to teaching and how it might be approached. For instance Exemplar 05 describes how a teacher changed the focus of their teaching by placing a Tolstoy novel at the centre of a course on pain, while Exemplar 03 describes how a teacher turned the process of resource discovery and reuse into the basis of a semester of studies for a class of dental students. And as a stimulus to rethinking and redeveloping approaches to teaching reuse can also lead to improved learning outcomes.

5.2.7: Reuse will not become part of mainstream practice without good cause, substantial staff motivation and sector-wide support

In this study reuse has been shown to take a significant amount of effort for the uninitiated. It is clear that, without support and a more receptive environment, reuse will fail to become a part of mainstream teaching practice – but then why should it? Similarly, without motivation and opportunity academics may have little impetus or reason to reuse materials as part of their teaching practice.

This issue can be represented in terms of the difference between an adoption potential and the benefits accruing from reuse. For most academics the former is much larger than the latter which means that reuse is neither attractive nor practical (see figure 10).

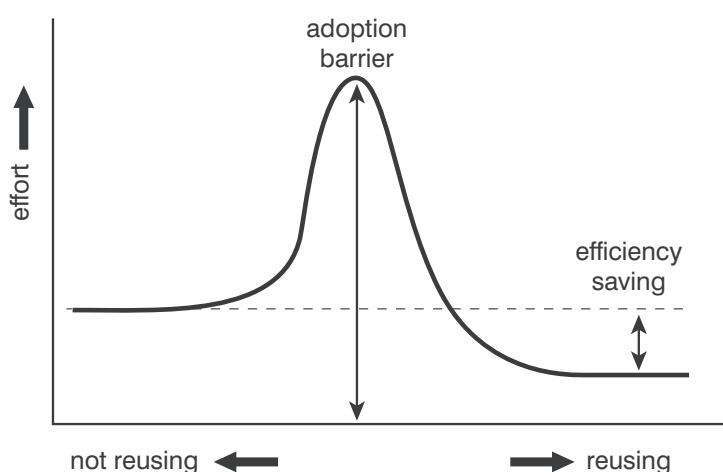


Figure 10: the adoption barrier versus the efficiency saving measured in terms of the effort required to make the change from not reusing to reusing third party materials in teaching. Without the means to reduce the effort required to overcome the adoption potential to a level below the efficiency savings that can be achieved from reuse there is no incentive or reason why teachers should make the change to a reuse culture.

5.3: Comments from the ACETS Exemplifiers

As an illustration of some of these issues the following is provided as a representation of the experiences of the ACETS exemplifiers in their own words. Many of the exemplifiers spoke of the importance and value of using third party materials:

The broad idea of what would be included only took me a day or so to come up with, particularly once I realised that the Wellcome Trust had already done much of the work for me [05]

Although we could have done it entirely ourselves, that would have taken a lot longer. I have to say that some of the images we've used are very high quality, much nicer and obviously by professional artists. I'd have been stuck for a lot of it [10]

We could have created everything ourselves but it would have required substantial money and time. It's hardly worth doing unless you have something that is very individual you want to do or demonstrate [01]

We're all using third party materials all the time for everything. All of our evidence for our practice is third party materials isn't it? [03]

It was essential that we obtained third party materials, as other materials were not specific enough. The video content was particularly important and this would have been very difficult (and probably expensive) to create 'in-house' [17]

Some remarked that over all time was saved or their work was made easier as a result of using third party materials:

It was important because it saved quite a lot of time [09]

Yes I think so. I knocked together another 2 or 3 after that and I did so fairly easily and I think a few others are also using this approach now [01]

If you know what you're trying to do then it's relatively easy to put together. That's not to say that things didn't go through iterations. Obviously you start doing things and then think, if only I'd done this instead or in a different way [13]

However many also noted that finding appropriate third party materials can take a long time:

We don't have the staff and for the amount of time it takes to do this. It is easier to buy something of poorer quality because you can't invest the staff time to get what you really want and is tailor-made to what you need. I would have to employ somebody for a year doing this and nothing else to produce a fully usable course for one of our semesters. That is unrealistic for most universities.

Resource discovery took a while, partly because I think I was looking in the wrong places, making it too complicated. But actually the learning object didn't take a huge amount of time, and it was good fun as well [09]

Initial searches were extremely time-consuming. It was easy to find resources on effective communication skills however in a way this made searching for very specific types of content harder [21]

Very easy to use but very difficult to find! [13]

The search for third party materials raised a number of issues. Some spent a great deal of time searching but with little result:

Searching the net was a very time consuming exercise, and on many occasions was fruitless. Having said that Google's image search was extremely useful. It just takes a bit of time to find which search engines and search words work best [04]



Figure 11: getting the creative juices flowing at the ACETS midway workshop in Manchester, June 2004

I was looking for anatomical illustrations of procedures like intubation and also things like transition circulation. In the end having failed, I looked at various others ones I knew were out there and all of those drew a blank, so then I did a Google search and there was some useful information from that. There was an American lecture that had a few illustrations which I used [13]

Some failed to find anything they could use at all:

We had little success searching the web so then I decided I had to produce my own materials. Both Dawn [Leeder] and I searched and searched the web. We tried every combination of key words for any kind of text or image. Nothing similar, just nothing [07]

I tried more complicated searches, I looked at all the resources on the ACETS website and I looked at Medline, but it was all too academic for what I was trying to do, I needed something much simpler [09]

It was a case of finding a collection of images that were suitable for the message that we wanted to get across, and they weren't there whether they were commercial or university or whatever [14]

We set about many hours of internet searching via all the commonly available search engines, other anatomy department web sites, and book web sites. From the multitude of sites that were found, many were produced by American institutions, which made the terminology and spelling impossible for us to use. Others were too technically complex, using 3-D images, and displaying anatomy at a more detailed level than required by our introductory site [14]

Jane and I searched for what was available on things like MERLOT one afternoon but at the end of it we felt there wasn't anything particularly useful, although we did find material that would be useful to other aspects of the module [15]

Other problems associated with searching included:

Actually when it comes down to it there's so little that's freely available it's frustrating [15]

It was difficult to find any materials, specifically relevant to gas exchange, any better than our own current materials. There were interactive resources that could have been used but these are simply not practical with the College's ICT facilities since we will most likely not have a room full of computers to use and the network is not reliable enough [18]

We started with searches of various Internet sites and looking through videos available in the library or online but the resources were either the wrong topic or at the wrong level or very out dated and it was very time consuming [18]

It was difficult to find resources that were more informative than those already used. Animations were very two-dimensional showing little more than a coloured diagram. Copies of BBC Horizon videos would have been ideal however it has not been at all easy to find such resources or something similar online [18]

Even when ACETS exemplifiers were able to find resources there were still problems with the quality of what was available:

A lot of the images were really of not good quality and we thought that if you use a poor quality image or too simplistic then it is a reflection on the quality of the work you are trying to produce yourself. It was almost easier to weed out the ones that we definitely wouldn't use to narrow it down to those that we could use [04]

Sourcing our images can drive you nuts. For instance the Visible Human Project had all these links – and I thought this will be gold, we'll just use these. But when you look at them, the images were bad, a lot of the links were missing, and in the end I didn't use any of them. I used to spend at least two afternoons a week just looking. You could do a whole afternoon and not find any sources that were good enough. Once you've got one good resource then you want them all to be of that quality and I don't think the Internet has that many [04]

Much of what is out there is not very good [12]

Our own prosector said when looking at some of the sites we showed him 'they look like the dog's been chewing them'. You know but this bit of chewed sample might be sitting there available three-dimensionally and all sorts of other clever technical things but the actual specimen is of little use [14]

Quality issues with Internet resources led some to alternative approaches:

We had a look at basic searches but quickly realised there was little available without too many constraints and that a commercial product was likely to be the only viable solution. Diagrams were available but good ones were difficult and time consuming to find and videos were even more limited [19]

In terms of 3rd party materials, we do look at lots, but we don't always use it, for example a drawing from a textbook, we might look at it, and decide not to use it, because we can improve on it, so we critically analyse it really [12]

Acquiring permission to use third party materials raised a number of different issues. Some exemplifiers either chose or did not need to get permissions:

I think that the feeling is that in fact if there is no restriction given in the information on the website then they felt they were free to take it and use it as they wanted to. This is probably not true, or at least not necessarily true. I knew that I wasn't going to use the materials beyond the teaching exercise until I had got clearance [03]

We didn't need to get permission to use any of the materials, as they are part of the database that we already pay for. We can draw in images when we want to [12]

Since I haven't gone live with this course I haven't as yet got clearance but that's the next stage [13]

I wasn't using anything particularly sensitive or difficult to get access to and I didn't need to get permission for it [09]

Others were more cautious:

I looked at a few but certainly there were restrictions and we wanted to make something that we wouldn't be tied down with [06]

I wanted to find a resource where it was very obvious who owned it so you knew who to contact [10]

For some, getting permission was an obstacle to reuse:

Another external source was identified and there appeared to be no copyright issues. However this source was not used as a courtesy email was not replied to [17]

In the light of local regulations relating to use of copyright material on "our" web sites, I wasn't happy proceeding unless I had the Trust's permission in writing, and getting that took a good six months [05]

I spent a long time trawling the Internet for images. I found quite a few which said in the disclaimer that images could be used for educational purposes. After returning to websites, many had changed their disclaimers. We contacted authors to see if we could use their pictures, but they did not get back to us [11]

For others using third party materials just didn't fit in with their needs at all:

We did aim to use third party materials, and spent a long time to find it but this proved to be impossible in the end. It would have been a lot cheaper to use things that were already there, but we found we couldn't.

I was disappointed not to be able to find the resources I was looking for. I appreciated the help provided in looking for these and the links and resources from ACETS and JISC were useful for starting off new ideas ... I did feel the time spent searching could have been better spent elsewhere [18]

One of the most common advantages of exemplifiers building their own resources was the ability to adapt them over time:

What I've seen from the commercial products there doesn't seem to be the attention to the quantity and quality of detail we need. There isn't the flexibility in it either. No two courses are the same and when you're constructing something for yourself you can make it fit in absolutely where you want. The commercial packages don't fit what you do and you end up adapting your teaching to what's available rather than adapting what's available to your teaching much once we'd got a design we liked the look and feel of we stuck to it, but in fact how the content is displayed can be evolved; you can go back and edit it again [06]

The product could be used in different ways and should be developed differently for different student groups [06]

The ACETS Project was identified as providing support for some but not for others:

The ACETS workshop in Manchester was helpful it was interesting to see there were so many people in the University who were doing the same sort of thing or had the same interest in developing this sort of material. It gave us an idea that we wanted to develop these things [06]

A key question regarding the reuse of any material is what its owner is prepared to let you do with it. Although intellectual property rights (IPR) pertain to all materials and represent the basic rights of all those associated with the creation of an object, it is the materials' copyright holder that decides on who and how the materials can be used. In the UK copyright pertains to any reified idea, thus while the idea for an image is not copyrightable, any image generated from that idea is. Copyright of commercial materials is usually very clearly expressed in the licence agreement between the supplier and the client and for this reason the commercial option is attractive despite the associated costs.

The development of digital rights expression languages (DREL) is one way that the complex permissions pertaining to objects can be managed. The JISC commissioned a digital rights management study in 2004 to investigate these issues (see <http://www.intrallact.com/drm-study>). The Creative Commons project (see <http://creativecommons.org/>) provides a number of free licenses that copyright holders can use when releasing their works on the web. JORUM has adopted a variant of Creative Commons licences for licensing its materials.

[my work] was helped a lot by going to the ACETS meeting in Manchester, where we did your workshop on designing a learning resource because that narrowed down our focus. We'd had grandiose ideas before that which weren't realistic [10]

It would have been useful to have more contact with the ACETS project team or other exemplifiers. We felt that we met at the start and then were simply left to get on with it without any help. The workshop was very useful – perhaps shorter (1-day) workshops/meetings would have been beneficial. As is often the case, the informal conversations between like-minded people are often as useful as the formal sessions and so simply getting exemplifiers together would have been useful [17]

Others had concerns about the concepts and the background to the project:

I'm still a little concerned about what an RLO actually is, I was worried by the conflict even between members of the ACETS group [10]

I get quite confused with JISC and the X4L I found it a confusing term I was never quite sure what it was [15]

Overall there were mostly positive reactions to participating in the ACETS Project:

Advice to others: Be prepared to be disappointed in finding the right RLO for your project, however if you surf long enough there are many pleasant surprises to be found [04]

Until we undertook this project little was known about the quantity and quality of anatomical images on the web and how RLOs can be used in teaching. Now it is known that there are substantially more anatomical images of good quality on the Internet than was previously thought. Having said that, there are many that are not of good quality or some sites require subscription. Also, it was felt that images of some areas such as the interior of the heart and the root of the lungs were deficient. This in a way limited the detail of the text, since it is in the interest of the students to be provided with suitable images alongside text [04]

Overall it's been slightly disappointing seeing what's available both commercially and for free. As I say there were some surprises. Our expectations were not met [04]

I feel that obtaining permission to use copyright material is an area that needs to be more tuned and sorted so that academics can get fast track permission to use learning material that's already out there, or alternatively there should be global declarations in websites that you can contact for a designated person for permission [05]

There are benefits all round from this experience aren't there, for students, from our own personal view of moving on for the future. Not only are the students up and running, we're up and running [14]

We use textbooks to re-package information to students, and most academics will have their favourite 3 or 4 books that they like to draw on, and students walk away with the same message, but when an academic starts to question how does it get done, or happen, these are new questions. The result is that the academic learns more about their own subject –normally the process rather than the result [12]

At the end of the day I liked it better than I thought I was going to. Like any project you have moments where you think it'll be great and moments where you thought it'd be horrible and you wish you'd never signed up, but at the end of the day I'm happy with it [10]

There's also quite a challenge there to think about what you want in an online learning activity, and it's a useful way to go about it. Universities are promoting the use of online materials and I think going through how to build one gives you a better insight when approaching it or asking someone else to build one for you [06]

Lecturers' time is already stretched and finding these resources needs to be easier. Following link after link can be extremely frustrating. Resources also need to be relevant and reliable, which at the moment there are large amounts of information out there that do not meet these criteria [18]

It is always useful to investigate new possibilities although it has highlighted the need for reliable sources of information to use in education in a less time consuming manner than completing wide searches of the Internet. More sites like NLN would be very useful [21]

If someone has already produced good material then I see no reason to recreate it. However, I find it difficult to locate suitable material [22]

Access and copyright issues main problem with third party stuff, and finding most relevant material in shortest time, time searching too long and relevant care settings difficult to find because of patient confidentiality [20]

It's a good driving force to do a project sometimes you need a project to actually learn new skills and see it through go through the difficulties and challenges [06]

5.4: Learning Design Analysis

Of the 20 learning design statements submitted:

- 9 of the activities were mandatory, 11 were not.
- 16 of the designs required students to work through the resource with no more granularity or structure than that. 3 designs were based around displaying material to students in a classroom setting and 1 was based on students doing the reuse themselves.
- 12 used the Internet as the main medium of delivery, 6 used CD-ROMs and 3 used both.
- 6 designs were based on limited duration activities, 7 designs were longer but limited duration and 7 were if no particular duration.
- None of the designs incorporated summative assessment, 5 incorporated some form of formative and assessment and 15 incorporated no form of assessment at all.
- 13 of the designs used the local VLE as the framework for delivery and 1 used the departmental website, 3 were for face-to-face delivery and the remaining 3 were of an unspecified context.



Figure 12: among the more esoteric materials reused was a short novel by Leo Tolstoy "The Death of Ivan Illyich" reused in exemplar 05. The novel was used to illustrate patients' experiences of pain to undergraduate medics and biomedical scientists. Image source: <http://members.screenz.com/bennypostcards/Tolstoy-3.JPG>

6: Project Reflections

In order that future Projects can gain from this report, and the work of the Project can be better evaluated by the reader, the following is an account of how the Project ran in terms of its timeline, identifying positive and negative events and issues as they arose:

The general Project timeline and the key events and milestones are shown in figure 13:

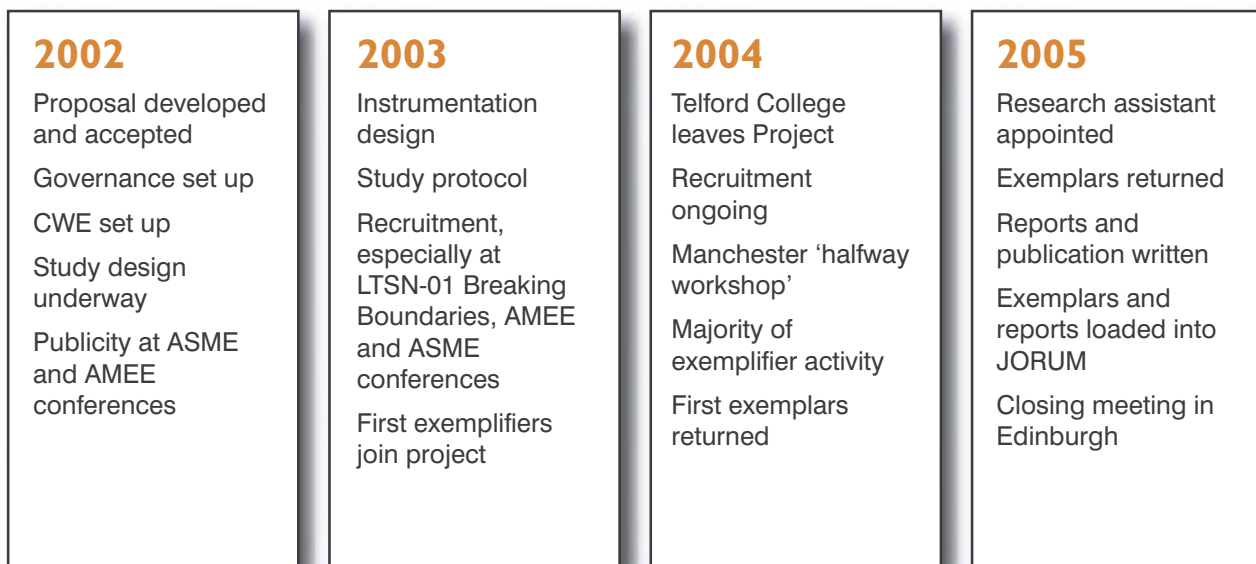


Figure 13: graphical representation of ACETS' timeline and its major milestones.

6.1: Some you win ...

The ACETS Project changed and developed as it rolled out, partly as a result of the development of the study design and partly as a result of changing circumstances. Although beneficial in many ways, the multi-institutional focus led to a number of problems. Some partners ended up playing a smaller role than had originally been intended. For instance the setting up of the JORUM repository meant that the need for BIOME as a long-term repository was obviated and the need for core Project technical development was limited so that the technical consultation from Birmingham played a lesser role than originally planned. The partner focus also changed over time as Edinburgh's Telford College withdrew and Hull York Medical School joined. Coordination across the Project also proved difficult as different partners tended to emphasise different aspects or priorities and, as has already been discussed, they supported and debriefed their exemplars in different ways.

Synergies were gained with a number of partners' other interests and activities. For instance Dawn Leeder in Cambridge had set up the Universities Collaboration in e-Learning (UCeL) consortium around the same time that ACETS started. UCeL was developing very particular kinds of learning objects for healthcare education. The UCeL authoring methodology was demonstrated with great success at the Manchester meeting and a number of the exemplifiers were also UCeL partners. Other synergies included those with the Scottish Deans' Medical Curriculum Group (www.scottishdoctor.org) and those with standards bodies such as Medbiquitous in the United States (www.medbiquitous.org).

6.2: ACETS Publications

Papers presented as part of ACETS (up to September 2005) are as follows:

- Ellaway, R., Dewhurst, D. and Leeder, D. (2003). "Assemble, Catalogue, Exemplify, Test and Share: the ACETS Project". Conference proceedings: AMEE, Bern, Switzerland
- Ellaway, R., Dewhurst, D. and Leeder, D. (2003). "X4L in action: ACETS and the reusable learning object". LTSN-01 Newsletter
- Leeder, D. and Ellaway, R. (2003). "ACETS - taking a pedagogical approach to using learning objects". Conference proceedings: ASME, Edinburgh
- Ellaway, R., Dewhurst, D., Leeder, D., Allen, T., Hardy, S. and Baxter, M. Q. (2005). "RLO Reality Check: the ACETS Project". Conference proceedings: ED-MEDIA, Montreal, Canada
- Ellaway, R., Dewhurst, D., Leeder, D., Hardy, S. and Mills, E. (2005). "Recycled learning objects: the ACETS project". Conference proceedings: AMEE, Amsterdam, Netherlands
- Ellaway, R., Hardy, S. and Mills, E. (2005). "Using the ACETS Semi-structured Learning Design Statement". CETIS Pedagogy Forum, Newcastle-upon-Tyne
- Ellaway, R., Dewhurst, D., Leeder, D., Allen, T., Hardy, S. and Baxter, M. Q. (2005). "Learning Objects and Reuse: What Really Happens?" Conference proceedings: ASME, Newcastle upon Tyne, UK
- Ellaway, R., Dewhurst, D., Leeder, D., Allen, T., Hardy, S. and Baxter, M. Q. (2005). "What Just Happened; Stories from the Reusability Frontline". Conference proceedings: Slice of Life, Portland, Oregon, USA

Other dissemination: leaflets disseminated through conference packs at AMEE 2003 and ASME 2003, also sent with LTSN-01 mailshots and at a number of events.



Figure 14: ACETS on the road (clockwise from top left): Rachel Ellaway presenting the ACETS message at the 2005 Slice of Life meeting in Portland, Oregon, Andy Ginty (being photographed by Dawn Leeder) designing a learning object in Manchester in 2004, Rachel Ellaway and Suzanne Hardy presenting at a CETIS Pedagogy meeting in Newcastle in 2005.

7: Discussion

Although there has been much activity and discussion around the general topic of learning objects among learning technologists, this has yet to make any significant impact on the majority of teachers and learners. The ACETS Project has attempted to focus attention on how existing third party materials can be reused by teachers to create teaching and learning activities for their students and the issues surrounding this process, and to do this the Project commissioned teachers, from a range of FE and HE institutions, to create exemplar case studies of this process. Analysis of these case studies has enabled the Project team to identify a number of key issues, which are discussed in this section.

Using third party materials requires teachers to rethink the way that they teach, spend time in discovering suitable resources and integrating these into their own teaching. Unless the use of third party materials is already established in a teacher's existing practice, there is little incentive to overcome the perceived or actual barriers to rethinking and redeveloping their teaching. As a result, the potential of the numerous e-learning projects and services now being developed (in the expectation that the practice of reusing materials in education will become widespread) will only be realised if there is substantial positive incentive and capacity injected into teachers' overtaxed professional lives to accommodate this change. Although the tangible (rather than potential) benefits of reuse were clearly identified by many of the teachers who contributed to the ACETS Project it was also clear that those teachers who were involved would not have undertaken the work without the Project giving them the purpose and context to do so.

Once the inertia to reuse existing materials (the adoption potential) had been overcome, teachers became engaged in the process and proved to be highly imaginative and creative in the way they did reuse these resources. They also reported that their efforts had been generally very successful. More importantly they reported added benefits such as saving time, stimulating new approaches to teaching and learning and providing a vehicle for reflection and innovation in their own approaches to teaching and learning.

In addition to generating views into the ways teachers engage with reusing materials in their teaching, ACETS was also successful in developing a methodology and supporting tools for capturing both ethnographic accounts and formalised abstractions of situated learning activities from their inception through their design to their use and evaluation.

ACETS was not a neutral observer of the events it has reported. By designing the study, commissioning exemplar case studies and holding events, describing the work in academic journals and to conferences, and generally acting proactively in the area ACETS was able to act as a change agent in a number of different ways:

- Many exemplifiers reported being inspired and motivated to develop additional RLOs as a result of their work with the ACETS project
- Some exemplifiers noted that the high-visibility of the project also assisted in changing a few co-workers/colleagues 'not-so-positive' attitudes towards reusing materials and e-learning in general. However, some exemplifiers described encountering significant 'resistance' in the workplace when putting together their exemplar.
- Some ACETS exemplifiers noted that participating in the project prompted them to seek out staff development opportunities around the development of learning materials and/or more technical training

7.3: Stakeholders

Before moving on it is perhaps important to reflect on the beneficiaries of reuse, and the support, interest and investment required from these different parties, after all who is reuse for and whom does it benefit?

- **Students:** most of the learning activities were designed for student consumption with little direct student input (03 and 11 being notable exceptions to this rule). Improved student learning was reported by a number of exemplifiers although this seemed to be as a result of the stimulus to redevelop teaching approaches rather than as a direct result of the use of third-party materials.
- **Teachers:** as the exemplifiers were exclusively drawn from this group it is perhaps not surprising that they were most affected by the Project. There were many benefits reported for teachers including saving time in recreating materials, stimulating them to rethink the way they teach and encouraging them to seek out and take advantage of professional development opportunities. There were also some disadvantages including the time it took (particularly resource discovery) and the problems of copyright and accuracy. Overall it would seem that there are real potential benefits for teachers in reusing materials but the time investment in skills acquisition and creating the learning activities may be a serious problem.
- **Learning Technologists:** this group had a very heterogeneous profile across the range of exemplar projects. Some exemplifiers reported the role of learning technologists to be absolutely essential while others fared perfectly well without them. The kinds of roles that learning technologists were involved in were also very different and even if they were not directly involved in creating the activities, they were implicated in running the VLEs that were used to deliver many of the teaching and learning activities.
- **Institutions:** because the nature of the exemplars was very 'bottom-up' the institutional impact of the reuse of third-party materials was unclear. However, some of the risks associated with reuse have a substantial potential impact on institutions. If an action for breach of copyright was brought as a result of inappropriate reuse of materials then it is the institution that is most likely to suffer and the time that teachers might spend on resource discovery must come at a cost to other activities and needs. It is also apparent that many institutions do not have a clear view of who owns the IPR of the teaching materials created by their staff. This may also be a disincentive for teachers who are considering creating new teaching and learning resources.
- **Funding organizations:** at least in the subject areas covered in ACETS there was very little use or even interest in the publicly funded educational resource collections currently available to practitioners in the UK (including those funded by the JISC), the only exception being the NLN materials used in further education. It can only be concluded that in the healthcare professions any investment in the creation of resources for teachers, particularly in HE, has not resulted in tangible benefits for the sector.

Box S: You say 'to-may-to' and I say 'to-mar-to'

There is, as has often been remarked, an ongoing issue of incompatibility between North American and British English versions of textual materials – what we may call the 'to-may-to' or 'to-mar-to' debate. This is of particular concern in healthcare where British clinical terms generally follow the Greek way of spelling while North American versions simplify the spelling; for instance paediatrics in Canada and the USA is pediatrics. It is interesting to note that the difference is not absolutely defined by the Atlantic; exemplar 12 is called "Fetal Heart Circulation" (the British spelling might be expected to be foetal) while exemplar 17 is called "Anatomy of the Oesophagus" (N.American: esophagus). Another significant issue even within the English-speaking world is that of units of measure. The USA is still predominantly imperial while the rest of the world uses decimal units. The net affect is that otherwise relevant and available materials may not be appropriate outside their original linguistic or cultural contexts. The translation between these contexts – internationalisation – is a particular issue for Internet technologies, so much so that there is a range of techniques associated with managing these issues which are called i18n– see <http://www.debian.org/doc/manuals/intro-i18n/>. Other local differences can include different trade names for drugs and indeed different drugs being licensed for use in different nations.

8: Conclusions

There are a number of recommendations arising from the ACETS Project:

- Reuse is not in itself a good or bad thing and it should not be encouraged or discouraged as a matter of dogma. Rather it should be nurtured and supported where it can help and provide benefits and it should be available but not over-promoted where it will not. Further work needs to be done to identify where these different scenarios apply.
- Reuse is not particularly dependent on upfront technological support; the needs of teachers are often highly specific, contextualised and related to their personal approaches to teaching.
- If educational institutions and supporting bodies such as the JISC (and the ever-growing number of advocates of the reuse of learning objects) wish reuse to become mainstream then they must deal more directly with the issues and needs of teachers. There is currently, at least in healthcare subjects (a relatively high-stakes subject area) in the UK, a large mismatch between the learning resource provision and need. Most of the exemplifiers used materials from North American rather than UK sources and while that is not a problem *per se*, it is an issue for funding councils that there is a disconnect between the funding and provision and the needs it supposedly meets.
- Appropriate resources for teachers' needs need to be made available, with conditions of use and the facility to obtain them for local applications made clear and simple. A key component of this is a regular and ongoing assessment of the needs of the teaching community, a task that is often overlooked or disregarded by service providers.
- Web and multimedia skills, although interesting and useful, are far less important than good pedagogical and instructional skills. As such it is inappropriate for e-learning funding to go into technological developments without matched funding for pedagogical staff development. In the UK the JISC and the Higher Education Academy should be much more integrated and complementary in developments such as X4L and the national JORUM repository.
- The technology that the exemplars used was mostly Google for searching and local VLEs for delivery. As such, the infrastructure is mostly in place and frequently used. It was a matter of concern that the JORUM service proved so problematic for the ACETS project; some provision for a simpler and more flexible service is recommended if there is to be large-scale adoption and use of this service.
- Local support is very important but it should be focused on what could be done as well as how it could be done. Learning technologist support should address both the pedagogy and the technology and the skills repertoire of all of those providing support extended by exposure to and engagement with the many issues associated with reusing third party materials. More attention should also be paid to the specificity of educational context as the pervading assumption that generic services are sufficient for all needs is clearly misguided.
- Without motivation and clearly perceivable need teachers will be unlikely to overcome the difficulties associated with using existing third-party materials. If widespread reuse is a strategic goal of the JISC or other agencies or institutions then a more sympathetic environment is going to be required. In the absence of such a change reuse will remain a minority activity, championed by some but failing to gain widespread support.

The ACETS Project has shown that:

- Resource discovery for teaching is not as straightforward as it first appears and the Internet is rarely the cornucopia of learning resources it may often appear to be.

- There are many issues concerning the reuse of third-party materials such as their appropriateness, quality, reliability and availability, which need to be addressed if reuse is to become a mainstream activity.
- Context and cost matter: designing and conceptualizing a RLO-based learning activity can require significant investment in time and money.
- Experience and support are less important than creativity and imagination. What teachers do reuse however is often quite surprising!
- Although reuse can introduce a number of risks it can simultaneously stimulate significant positive outcomes for all involved in the learning process
- Reuse will not become part of mainstream practice without good cause, substantial staff motivation and sector-wide support

These are key findings for a range of different stakeholders. Teachers can reuse materials successfully but will tend not to unless it is easy, safe and there is a good reason to do so. Students can benefit from reuse being part of their learning environment although the main focus is on the teacher rather than the learner. However, the main message from ACETS is to those who manage and support teachers across the many healthcare disciplines in the UK tertiary sector. Learning technologists need to support pedagogy and innovation every bit as much as they support technology use. More importantly, educational managers need to consider very carefully whether reuse should be a part of mainstream teaching practice at all. If it is going to become part of the academic mainstream then it will need to be better supported, both by improving teachers' abilities to find suitable materials and by reducing the complexity and risk associated with using third-party materials.

While the ACETS Project identified and describe many of the advantages and disadvantages associated with everyday teachers reusing third-party educational materials, there are still many issues that need to be considered. For instance, although the ACETS exemplifiers were willing participants in the study, it has yet to be seen how those teachers who are less favourably disposed to reusing third-party materials might react if there were moves to move it in to the mainstream. Time will tell ...

"The product could be used in different ways and should be developed differently for different student groups"

"We had a look at basic searches but quickly realised there was little available without too many constraints and that a commercial product was likely to be the only viable solution. Diagrams were available but good ones were difficult and time consuming to find and videos were even more limited"

"We could have created everything ourselves but it would have required substantial money and time. It's hardly worth doing unless you have something that is very individual you want to do or demonstrate"

"It was helped a lot by going to the ACETS meeting in Manchester, where we did your workshop on designing a learning resource because that narrowed down our focus. We'd had grandiose ideas before that which weren't realistic"

"Doing this has made me develop, increased my awareness/ access to new/other resources, improved links within my college, increased my confidence in lesson structure and the presentation of material. More rewarding teaching experience for me helps to increase students' learning"

"It has meant that I don't need to give so much detail in a lecture – I can focus more on discussing concepts and ideas; I tell them to go and read up on the details. I can also help students more by explaining the general overview"

Interoperability

Another core aspect of the X4L Programme was the use of learning technology standards and specifications. Interestingly none of the ACETS exemplars employed or depended on standards or specifications even though the Project team were engaged with their application, for instance through JORUM. The following are available as CETIS briefings from <http://www.cetis.ac.uk/static/briefings.html>

Enterprise: IMS Enterprise is a specification for transferring data about people and groups.

LIP: The IMS Learner Information Package (LIP) is a specification for a standard means of recording information about learners.

Content package: IMS Content Packaging is a specification for sending learning resources (or learning objects) from one program to another, facilitating easier delivery, reuse and sharing of materials.

QTI: IMS Question and Test Interoperability is designed to make it easier to transfer information such as questions, tests and results between different software applications.

Simple Sequencing: IMS Simple Sequencing is a specification used to describe navigation paths through a collection of learning activities.

SCORM: Sharable Content Object Reference Model provides a technical architecture for learning objects to be easily shared across multiple learning delivery environments

Learning Design: IMS Learning Design is a specification used to describe learning scenarios. It allows these scenarios to be presented to learners online, and enables them to be shared between systems.

Accessibility for Learner Information Profile: The IMS AccLIP Specification provides a means of describing preferences so that learners can interact with an e-learning system regardless of disability, hardware or environment.

LOM: This standard specifies the syntax and semantics of Learning Object Metadata, defined as the attributes required to fully/adequately describe a Learning Object.

Appendix A: Baseline Survey and Results

Note that these figures cover all baseline surveys undertaken including five exemplifiers who subsequently dropped out of the project or did not complete an exemplar.

No.	Stem	Responses
1	Teacher/academic's name	Metadata
2	Teacher/academic's position	Metadata
3	Teacher/academic's institution	Metadata
4	Range of subjects taught	Metadata
5	Contact information	Metadata
6	Principal interest	Metadata
7	Interviewer	Metadata
8	Date of survey	Metadata
9	Do you know how to make web pages?	Not at all=11, a little=7, a lot=8
10	Have you used the web in your teaching?	Not at all=4, a little=9, a lot=13
11	Do you use anything that you would consider a 'learning object' in your teaching?	Not at all=4, a little=7, a lot=15
12	How would you rate your own computing skills against those of your colleagues?	Non-existent=0, poor=1, average=6, good=13, expert=6
13	How would you rate your own teaching skills against those of your colleagues?	Non-existent=0, poor=0, average=1, good=12, expert=12
14	How would you rate your own use of CAL against those of your colleagues?	Non-existent=2, poor=4, average=4, good=9, expert=7
15	How much relevant staff development and training is available?	Not at all=3, a little=14, a lot=9
16	How much relevant staff development have you actually made use of?	Not at all=4, a little=15, a lot=7
17	Do you have access to support in making electronic learning materials?	Not at all=4, a little=7, a lot=15
18	Is this available as a free service?	N/a=4, not free=1, with restrictions=8, completely=13
19	Have you made use of this support service before?	N/a=4, none=2, a little=10, a lot=10
20	Would you expect that you would need to use this service to use learning objects in your teaching?	N/a=3, none=3, a little=9, a lot=11
21	Do you have a VLE (or equivalent) available to support your work?	N/a=5, Local system=10, WebCT=2, BlackBoard=9, other commercial = 2

22	What is the system called (eg WebCT, or equivalent local system name)?	Free text responses
23	Does it allow you to put teaching/learning materials online for your students	N/a=3, none=2, a little=3, a lot=18
24	If so, do you do this or is it done centrally for you?	N/a=4, done for me=6, I do this=16
25	How easy is it for you to get teaching materials online?	N/a=4. Very hard=0, quite hard=2, quite easy=9, very easy=11
26	Do you have your own computer at work	No=3, yes=23
27	Do you use a computer at home for work	No=5, yes=21
28	What level of computer access do you think your students have in the institution and at home	Not very good=5, average=9, very good=12
29	How much of this is internet-enabled ?	N/a=0. none=0, a little=4, a lot=22
30	How much teaching and learning materials are provided online for the students	N/a=1, none=2, a little=9, a lot=14
31	To what degree do you expect the use of learning objects to enhance your teaching	N/a=0, none=1, a little=6, a lot=19
32	To what degree do you expect the use of learning objects to enhance your students learning	N/a=0, none=0, a little=5, a lot=21
33	To what degree do you expect the use of learning objects to make your work easier	N/a=1, none=5, a little=11, a lot=9

Appendix B: ACETS Semi-structured Learning Design

The following is a completed ACETS SSLD as an illustration of the format and the way it can represent a learning activity:

<i>Learning Design Name:</i>	Pain and its Management Honours Course
<i>Learning Designer(s):</i>	Daniel McQueen
<i>Institution(s):</i>	University of Edinburgh
<i>Course Context(s):</i>	BSc (Hons)
<i>ACETS exemplar ID:</i>	05
<i>LD period:</i>	Semester 1 2004
<i>LD duration:</i>	12 weeks

In order to attain the following learning objective(s):	To get an overview and understanding of pain management in its broadest sense: what is pain, is there a problem in managing it (both pharmacological and resource management), who is involved, palliative care, removing and reducing pain and its causes, ethical dimensions and so on		
With prerequisite(s):	To be an undergraduate student at the University of Edinburgh. No other academic prerequisites were required. Medical students would have had a grounding in pain, pharmacology and related topics the others mostly would have no particular relevant experience.		
Trigger(s):	Start: having selected the course at the start of semester 1 from a range of options attendance at the first seminar starts the course. End: end of course marked by end of 10th seminar.		
The following persons/roles:	Name	Type (staff, student)	Description
	Course organiser	Staff	Organises, designs and runs the course, sets the exam, recruits lecturers, communicates and supports students.
	Student	Student	Participates in the course.
	Lecturer	Staff	Delivers timetabled seminar on specific topics.
Perform:	Which roles?	Do what?	
Learning activity(s):	CO and students	First meeting of the class to discuss course structure and protocols.	
	Students	Students were strongly urged/required to read the Tolstoy novel LO. One of the end of semester exam questions was based on the relevance of pain management, as described in the novel, to the contemporary situation	
	CO and students	Participate in 10 weekly seminars during which digested material would be presented to them in a condensed form. 45 minute talk followed by 30 minute discussion then directed to materials on the web to follow up each seminar. Seminar contains core material.	
	Students	Self-study based on video LOs, essay LOs and other website material LOs as directed during weekly seminars. Self-study contained additional material.	

Learning activity(s):	CO and students	Weekend reading party at the University's Firth Centre in the Scottish highlands. This was to enable students and the course organiser to get to know each other and discuss and explore issues regarding pain in more personal depth, in non-assessed (important – promotes communication skills without fear and competition associated with formal appraisal) presentations in the classroom. Different topics were given to students (in groups of three) beforehand for them to research and prepare to discuss during the weekend.	
	Lecturer and students	Lectures on specific topics	
	CO and students plus volunteer members of the public and NHS staff.	Visit to hospice to meet patients and staff and see pain management at first hand.	
		Visit to post-operative patients in pain at the Royal Infirmary (students were guided to what might be appropriate and inappropriate types of questions).	
	Visit to working clinical laboratory to get students to perform somatosensory testing on themselves		
CO and students	Exam – during the last seminar slot. 90 minutes long and in two parts: general short-form essay questions reflecting the nature of the course and an in-depth essay to follow.		
Support activity(s):	None		
Using environment(s) or scenario(s):	CO, lecturers and students	Seminars and lectures	
	CO & students plus volunteer members of the public and NHS staff	Various fieldwork venues	
	CO and students	Reading party venue	
	Students	Libraries, own computer, University computing labs, libraries etc	
Using:	Which roles?	Use what?	To do what?
Tool object(s):	All	Course website, computers	Access materials
Knowledge object(s):	All	Tolstoy novel, Wellcome videos, essays and other resources, other websites and other readings.	Self-study
		Lecture notes and slides	Reviewing and checking course content
Test object(s):	CO and students	Exam (paper-based)	
Search service(s):	Students	Any web search as purely optional follow up	
Communicate service(s):	All	Email	
Announce service(s):	Course Organiser	Email	Some students failed to check email on a regular basis.
Other elements or notes:	None.		

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Sources

The following is a brief selection of the online resources employed by our exemplifiers. See the ACETS website for a full list (note that 'link attrition' is common and no guarantee is given that these links are still 'live'):

British National Formulary	www.bnf.org
The Dental anatomy teaching website	www.med.umich.edu/anatomy/plastinate/examples.html
e-skeletons Project	www.eskeletons.org
Newcastle anatomy	www.anatome.ncl.ac.uk
Digital Anatomist	www.sig.biostr.washington.edu/projects/da/
AMA atlas of the Body	www.ama-assn.org/ama/pub/category/7140.html
UK visible Human Project Mirror website	wwwihm.nlm.nih.gov/
Anatomy TV	www.anatomy.tv
Human anatomy online	www.innerbody.com
Web anatomy	www.gen.umn.edu/faculty_staff/jensen/1135/webanatomy/
Instant anatomy	www.instantanatomy.net/abdomen.html
Dermatopathology Images	www.pathology.iupui.edu/drhood.html
BBC Health First Aid Action	www.bbc.co.uk/apps/ifl/health/gigaquiz?path=firstaid_scaffold&infile=firstaid_scaffold
Dermatology Slide Atlas	www.med.unc.edu/wrkunits/2depts/derm/atlas/welcome.htm
Dermis	dermis.multimedica.de/doia/include.asp?zugr=d&lang=e&file=copyright
HEAL Multimedia collection	www.healcentral.org/heal/search/simplesearch.jsp
Knowledge Weaver Tools – Dermatology	weavernt.med.utah.edu/kw/derm.html
Skills Base	www.skillsbase.man.ac.uk/portfolio/skill/training/visualimages/ophthalmoscopy/ophthalintro.htm
Virtual Dermatology Cases	erl.pathology.iupui.edu/cases/dermcases/dermcases.cfm
Virtual Hospital – Basic Dermatology	www.vh.org/adult/provider/dermatology/PietteDermatology/
Chest Clinic - human respiratory function testing	www.sheffbp.co.uk