



JISC Final Report - *Draft*

REHASH: Re-purposing Existing Health Assets to SHare

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2.0 Executive Summary

St George's, University of London, has led a consortium of Higher Education (HE) and Further Education (FE) partners in the Re-purposing Existing Health Assets to Share (REHASH) project, which has adapted existing large collections of high-quality health resources for different educational contexts. These re-purposed resources were specifically tailored to support student learning at several distinct educational levels including courses in FE which widen access to nursing, medicine and healthcare (HE0 level), and continue these resources through into HE undergraduate courses in medicine and nursing (HE1 and 2 levels).

The intention was to provide teachers with a fast and economic way of developing high quality educational course units, and to provide students with learning resources that would be consistent when progressing from FE to HE (a 'resource escalator' moving up the HE0, 1 and 2 levels). This 'escalator' would play its own part in promoting a feeling of familiarity, and reduce anxiety in adult learners moving to the HE sector. Discussions between FE and HE institutions over resources could promote a higher level of interaction between teachers on FE access courses and their counterparts in the HE.

The primary target of the project was to address the re-purposing of 60-70% of the learning objectives for cells, tissues, and organs from the basic and clinical sciences for medicine (HE 1 and 2), and approximately 30% of the objectives of the one-year Access to nursing course and the foundation course for medicine (HE0) In both cases, the targets have been superseded, with a greater than expected coverage of learning objectives.

In addition, there were supplementary objectives that were considered in the original proposal and these are beginning to emerge as project outcomes:

- a) resources *do* compete ergonomically and in quality with the existing rapid and efficient process used for assembly of teachers lesson plans
- b) resources *are* attractive to both teachers and students'
- c) resource sharing *has* strengthened existing collaborative relationships between the FE and HE partners
- d) institutions that have *not* created these resources are willing to use them in their own courses with little or no compromise

These resources have been embedded in both FE and HE in several ways, one of which was to create an opportunity at both the regional and the national level for sharing of these resources. As a result, and due to the multi-foci nature of this project, it required the development of a number of guidelines and methodologies for the pedagogical, technological, and societal elements underpinning re-purposing, all of which will already being made available to the wider community.

In summary, the project is already beginning to demonstrate that resources can be effectively re-purposed to different educational levels, made sufficiently 'generic', and shared by courses in different institutions. There is also genuine enthusiasm on the part of teachers in both FE and HE to utilise these resources, regardless of where they are made, so that the resources are not restricted to web-based learning but can also be use in the classroom, thereby forming a blended approach.

The natural obvious extension of this project is a formal evaluation, to include issues such as, do students and teachers value the resources, how do students use them, what is their impact on teacher/student practice, and are resources as easily adopted by institutions who were not involved in their preparation.

This project is funded by the JISC as part of the Distributed E-learning programme (theme: supporting collaborative teaching and sharing of resources across institutions).

3.0 Background

Changes in technology and pedagogy and the increased presence of the Internet have strongly influenced teaching and learning activities in higher and further education colleges. The need, and the ideal, for institutions to share learning resources are well established, and with the development of new learning technologies, new opportunities for sharing digital learning resources are possible. Over the last decade, investments in technology-based initiatives (e.g. Teaching and Learning Technology Programme - TLTP and the Exchange for Learning Programme – X4L) have had mixed results as high quality courses and resources developed in one institution were often not adopted or accepted in other institutions.

Traditionally, a lecture can be thought of as being made up of a large number of individual learning objects (e.g. images, text, audio, video), put together to form a complete lecture. Electronic learning objects take this principle a little further, in a direction that in theory promotes sharing of these objects between different teaching elements (Reusable Learning Objects or RLOs). In electronic format, the RLOs have the benefit that they can be easily retrieved and accessed. They can be used together to form a larger learning programme without the need to individually create each element or re-packaged as a complete module depending on the requirements of a specific institution or curriculum.

RLOs have the potential to make the fast and economic production of high quality educational course units a reality that can be used in a wide range of contexts; at different institutions, with different ethnic groups, at different educational levels, across different professions and with different pedagogic styles.

An increasing proportion of HE learners come from the FE sector, via Access and foundation courses. However, this group have diverse entry qualifications and they are unlikely to achieve their main qualification unless they are provided with both learning to complement their diverse learning styles, and provided with the consistency in progression from FE to HE sector to achieve confidence. High quality products will help to improve achievement and retention among a large body of non-traditional learners, who need more assistance in an environment which is not rich in traditional support e.g. libraries and high quality handbooks etc.

3.1 The needs of the teachers

Initially it is the teacher that needs encouragement to use the resources. If the RLOs are to be used, they must pass 'rule of thumb' tests embedded in normal teacher practice:

a) If teachers are to be encouraged to use these materials, then these RLOs must both compete ergonomically and in quality with the existing rapid and efficient process used for assembly of teachers lesson plans from tried and tested existing sources. Small RLOs are invariably unattractive to the teacher constructing a lesson in a context they have chosen. A teacher will not be interested in changing a schedule to incorporate a small image from a subtly different context from their original intention. Only large usable chunks or topics, 'the learning packets', will make that compromise worthwhile. In the case of SGUL, these learning packets became our 'Key Topics', now used throughout our curricula.

b) If teachers are to embrace the new technology and embed it into their practice, then it is necessary that most of them adopt it, and not just a few enthusiasts resourcing a few sections of the curriculum. Central to this is making this process easier, less time consuming, intellectually satisfying and rewarding to the teacher through positive student feedback.

3.2 The needs of the learners

These learning 'packets' must also be very attractive to students. So whilst the 'packet' may need to be teacher-centred to make it worth while for the teacher to adopt, the outcome must be clearly student-centred. It was the task of this project to re-purpose materials that fit into packages which are already suitable for the level and course.

This escalator of resources will produce a steady progression of support for student learning, through three educational levels, and an attractive framework for educational development through separate courses.

Integrated quality products which cover to adequate depth the objectives of the curriculum, and continue in a consistent pattern through different levels of courses, may help to reduce uncertainty and vulnerability among a large body of non-traditional learners. This should lead to an improvement in levels of achievement and retention.

3.3 The resources

St George's, University of London (SGUL) and Guy's, King's and St.Thomas' School of Medicine (GKTSM), have specialised in the development of web accessible teaching resources and have become teaching content specialists in the medicine and healthcare area.

Both partners specialise, particularly, in the development of image-based and interactive resources, which have been extremely well-received by students. Their very large collections of teaching resources already support their existing medicine and healthcare courses, and in the case of SGUL, these resources covers most of the basic and health science objectives for the first two years of undergraduate medicine.

The consortium partners, and in particular Kingston University and Croydon College, have considerable experience in supporting adults returning to learning, and learners making the transition from FE to HE study.

The REHASH project has built on the experience of past projects and utilised emergent technologies and new tools to work at supporting the needs of both student and teachers by re-purposing existing resources to different educational levels in different health related courses.

4.0 Aims and Objectives

The key objective of this project was to re-purpose existing collections of teaching resources (Reusable Learning Objects), to provide teachers with attractive learning materials which support:

- Courses which widen access to nursing, medicine and healthcare at levels NVQ 3 and *HE0*
- Diploma and undergraduate programmes which follow these Access and Foundation courses at NQF4/5, *HE 1 and 2*

In re-purposing these resources, the project has produced a seamless progression through rising educational levels; providing a consistency of learning resources in the transition from FE to HE. It is generally accepted that HE is well adapted to its traditional market but less well adapted to the needs and entry points of non-traditional learners from the FE sector. It is hoped that this 'resource escalator', from FE to HE, will play its own part in promoting a feeling of familiarity, and reduce anxiety, particularly in adult learners. At the same time the discussions over resources has already promoted a higher level of interaction between teachers on FE Access courses, and their counterparts in HE.

None of these original objectives have changed over the project life cycle.

5.0 Methodology

5.1 Overall approach

The overall approach was to develop materials which support Access to Healthcare courses, Foundation entry to Medicine and the first two years of the medical undergraduate programmes, in the body system areas.

Partners concentrated broadly on different areas both in terms of educational level and in terms of the areas of the curriculum addressed, though there was a continual sharing of resources. The focus of each sector (HE 0/1/2) depended upon both the need for and availability of resources. Each institution played to its strengths, using the knowledge of GKTSM and SGUL in the sectors of medical and healthcare training, and that of the FE colleges in the transitional sectors of NQF3 (HE 0).

For the purposes of this study, REHASH has re-purposed Key Topics in the following basic and clinical science classifications, relating to body systems:

- Reproduction and growth
- Respiratory
- Alimentary
- Nervous
- Endocrine
- Musculoskeletal
- Renal

- Circulatory
- Sensory
- Defence and Infection
- Cellular
- Skin

The percentage of learning objectives covered by the Croydon College re-purposed topics are in excess of 75% for their Access to nursing course. This is significantly greater than what was set out at the start of the project (initially 30% coverage projected). The objectives covered by the foundation course to medicine, at Kingston, are awaiting calculation and analysis by their academic staff.

There have been no changes to the overall approach outlined in the project plan apart from:

1. Testing with and upload into the JORUM repository was due start on the 26th of August 2005 but due to the delay in their repository development, work on this phase could not commence till January 2006
2. Adding a thorough quality assurance guide for all REHASH resource development

5.2 QA Methodology

The quality assurance scheme for the project incorporates a rationale, a QA process, and a checklist. This scheme has been developed to ensure the maintenance of standards in four key areas:

1. The educational validity of each re-purposed Key Topic
2. The attractiveness and overall quality of the content
3. The usability and overall quality of the interface
4. Consistency of presentation within and between Key Topics
5. Technical conformance to standards for the sharing of resources

These key areas, which also incorporate technical and accessibility standards, are elucidated more fully in the QA rationale document. This document, along with the procedures and checklist, will become part of a larger development guide which will also be made available via the REHASH website for the benefit of existing partners and the wider community.

Quality was assessed both internally and in collaboration with external subject-matter experts at set stages during and subsequent to the development process. The QA procedures outline the stages at which, checking should occur, the nature of the checks to be completed, the team member/s responsible for the checks, and the method of recording completed checks. A checklist had also been drawn up to guide the checker through the relevant checks for each stage (to be made available via website). The procedures are continually undergoing refinement and will be mapped to a progress tracking system to improve both the efficiency and the effectiveness of standards and QA monitoring.

The REHASH team has implemented a consistent planning, design and development process. However, there are six stages at which specific QA checks are implemented:

1. Media design check
2. Pre-proofing check
3. Proofreading
4. Content sign-off
5. Technical check
6. Final check

These checks act as an internal monitoring system, as a method of progress tracking, and as record of evidence for stakeholders. Verification of the success of the re-purposed Key Topics as RLOs will be provided by the evaluation conducted in the case study (detailed in section 7.9). The outcomes of this evaluation will feed back into the QA scheme, initiating a review the QA procedures and the implementation of modifications as appropriate.

5.3 Research and Evaluation Methodology

With the original objectives due to be met in the lifetime of the project, there will be little change in the nature of the data gathering. This will continue relatively unchanged to achieve those original objectives. Consequently attention will switch to evaluating the outcomes which were not originally stated in the project plan, but have emerged from successful and unexpected outcomes in the use of these resources in FE.

A separately funded case study is underway, to explore the possibility of taking web-based resources, primarily intended as *supplementary support* for HE students, directly into the post-16 classroom and structuring the lesson plan around the resources. Evaluation will answer the following questions:

Do the students value the resources?

- Do students like the resources?
- What needs are being met by them?
- Who (i.e. what types of users) find it most useful?
- What features of the support materials are most useful to students?

How students use the resources?

- How usable is the e-learning tool or material?
- How do students actually use the learning system/materials?
- What are the best ways of using these e-learning resources? Pre-familiarisation/revision?
- How could this approach be modified to better suit those purposes?

Effectiveness of the resources

- Is there sufficient need for the resources to make it worth developing them?
- Will this approach be an effective way to improve the problem of

- A lack of suitable study resources?
- Continuity with HE through using similar resources?
- Under what conditions are the resources most effective?

Impact on teacher/student practice

- How does this change teaching practices, learning/study practices? (e.g. the performance of the lecturer, attitudes of the class, attention levels; effects does it have on lecturer delivery and Does it affect performance in assessment activities?)
- What are the changes in time spent on learning?

This phase involves promoting the project via a variety of activities, such as workshops to raise the profile of the project and provide events that will enable like minded practitioners to gain hands on skills and contribute to the project (please visit www.gre.ac.uk/delconf for more details on conference). Discussion has already started relating to the dissemination of the resources for FE, to the local network of FE colleges linked to Kingston University.

In addition to the above, REHASH has explored the standards and technical issues in great detail. The main issues can be summarised into web standard compliancy and standards for sharing re-purposed resources:

5.4 Compliance to web standards methodology

One of the main aims of the REHASH project was to ensure that all deliverable resources utilised current technical standards – effectively future proofing the resources and maximising their interoperability with other systems.

The existing resources produced by the REHASH project at St George’s, University of London, were created to conform to The World Wide Web Consortium (W3C) specification for HMTL v.4.0. Standards in web page creation have advanced, and the W3C specification for XHTML 1.0 has fast become the defacto standard for web publishing.

In addition to aiding the creation of consistent web page design, the introduction of the new template was needed to address accessibility issues and several W3C (The World Wide Web Consortium) web standards. All re-purposed resources have uniformity in design and structure, one that is also web compliant to meet accessibility needs. The new template was designed with consideration to re-purposing and the sharing of these resources within learning resource “content packages”.

The REHASH project created and successfully implemented a new HTML template (for use with the web authoring tool Macromedia Dreamweaver) for the creation of web pages within a resource. This new template was fully conformed to the XHTML 1.0 specification. The decision to adopt the XHTML specification was particularly beneficial when considering the future interoperability of resources.

The XHTML specification is designed with general user agent interoperability in mind. As the XHTML specification evolves, documents conforming to XHTML 1.0 will be more likely to interoperate within and among various XHTML environments. Alternate ways of accessing the internet are constantly being introduced. By complying with the XHTML 1.0 specification, newly created web page resources can be read by all XML enabled devices. Resources will be compatible with existing web browser technology and be able to offer support for future browsers on multiple platforms, including mobile devices.

The introduction of a new web page template also enabled the opportunity to implement support for cascading style sheets into the creation process of new HTML documents. The new template includes relevant cascading style sheet language and the subsequent HTML documents created from the template conform to the W3C Cascading Style Sheets, level 2 (CSS 2.0) specification.

The Cascading Style Sheets, level 2 (CSS 2.0) specifications is a style sheet language that allows web page authors to attach style (e.g., fonts, spacing, and aural cues) to structured documents (e.g., HTML documents and XML applications). By separating the presentation style of documents from the content of documents, CSS2 simplifies Web authoring and site maintenance, and will therefore reduce the development time of resources.

The use of the XHTML and CSS 2.0 specifications for all web page resources allowed for the creation of structurally cleaner HTML documents, with clearer separation of style and content. As predicted, this has simplified creation and editing of content and reduced the development time of resources.

The REHASH project was very keen to increase the accessibility of the resources it creates. REHASH investigated guidelines set out by the Web Accessibility Initiative of the W3C. The project team endeavoured to create web resources that conform to the accessibility standards set out by the W3C Web Content Accessibility Guideline [Priority 2], to ensure all current and future material that produced is viewable to all who wish to make use of the teaching resources.

5.41 Training and technical standards guidelines

Documentation and guidelines on how developers can practically implement these technical specifications were created to ensure that these standards were implemented correctly and consistently. In addition to covering technical specifications, the technical guide will be a comprehensive manual for the more technical aspects of resource re-purposing and creation.

These technical standards guidelines have become a useful reference for REHASH developers during the creation of resources. The project recommends the use of detailed developer guides. The REHASH project found clear documentation helped to clarify team members, particularly in light of the differing levels of technical ability throughout a development team.

In addition to producing technical documentation, the REHASH project found it necessary to train staff members in new development techniques, such as the use of content-packaging tools such as RELOAD.

5.42 Technical standards quality assurance

To ensure these web standards are adhered to during the development of resources, the existing quality assurance procedure was modified to incorporate additional checks for conformance to these technical specifications. The additional checklist formed one component of the quality assurance procedure of resource development.

Several key components of the quality assurance procedure for web technical standards compliance have been carried out. These were the validation of newly created HTML documents through the use of application based standards checks (Macromedia Dreamweaver), and the submission of HTML documents to online validation tools for XHTML, CSS, and accessibility standards.

Additionally, increased web browser checks, particularly with newer browsers such as Mozilla Firefox, Opera, and Safari, ensured cross-browser compatibility of the resources developed. The quality assurance procedure for technical standards is constantly under review.

The implementation of technical checks for the more stringent XHTML, CSS and WAI specifications resulted in an increase in the time not only to create resources, but also the time required to carry out quality assurance checks. Along with the additional training required of staff, the increased development time should be taken into consideration when developing resources.

5.5 Standards for sharing re-purposed resources methodology

In the re-purposing of a Key Topic resource to a different educational level, a new version of this topic is created that can be regarded as a completely separate learning resource from the original resource. Similarly, re-purposing to different healthcare disciplines creates another new resource.

The existing format of the Key Topics comprises of HTML pages linked together with in-page hyperlinks. The resources are hosted within the institution network. One aim of re-purposing was to share newly created resources with the wider educational community. The degree to which educational content can be reused and re-purposed depends on how it is stored, made available, and delivered to the academic user community. Existing learning technology interoperability standards are designed to ensure the reusability of educational content within different authoring environments, content repositories and delivery platforms such as virtual learning environments (VLEs). Creating resources in the highly reusable format of a content package will also facilitate easier editing and further re-purposing of the resources created.

5.51 Content packaging of learning resources created

The REHASH project addressed the issue of interoperability of newly re-purposed resources by adopting learning resource content packaging standards, incorporating the process of content packaging into the procedure of re-purposing.

5.52 Customisation and use of the RELOAD tool for learning resources created

REHASH has deployed the JISC funded; open source, content repackaging, and metadata editor tool RELOAD throughout the course of the project. After initial investigation into the various standards in content-packaging (IMS and SCORM), the REHASH project adopted the SCORM specification for content packaging learning resources. The adoption of learning resource content packaging standards addressed the issue of interoperability of newly re-purposed resources, with a new content package created for every re-purposed Key Topic resource. REHASH successfully tested IMS and SCORM content packages of a re-purposed topic within the Virtual Learning Environment's (VLE's) Blackboard, and the institutional VLE, Moodle.

RELOAD has now become an integral component of not only re-purposing specific development, but all resource development. RELOAD also offered the additional benefit of allowing the creation of a HTML based "preview" of a content packaged re-purposed resource. This allowed academic reviewers, subject matter experts, and content providers to view topics throughout the various resource development stages. REHASH customised the open source RELOAD tool, applying institutional branding to the web based preview package. RELOAD's metadata editor functionality was also customised for REHASH as reported below.

5.53 Documentation of the content packaging procedure for REHASH methodology

The incorporation of content packaging into the re-purposing process has led to the need and creation of a RELOAD guide specifically for re-purposing. This guide is currently of benefit to ETU members using RELOAD. It has come to our attention that the entry of metadata will also require quality assurance procedures to ensure the integrity of the metadata. A separate document detailing guidelines for the entry of metadata has been created and is currently under review. The rationale and procedure of customising RELOAD and metadata profiles will also be documented (a possible content packaging guideline).

5.54 Adoption of metadata scheme methodology

The content packaging of learning resources also allows the incorporation of metadata into each learning resource. Metadata offers many benefits to both the sharing and development of learning resources. It allows the storing of descriptive words that are relevant for people using free text search. If learning resources are uploaded into a learning object repository, this will allow the easy discovery of these resources by educators and course developers. Metadata can also store information on the publisher and the resources intellectual property right (IPR) status, and any restrictions on use. Metadata can also be used to track the progress of a resource during the development process, and ascertain the current status of the resource.

The REHASH project investigated current standards in metadata that apply to learning resources. The most well known is the IEEE LOM. This standard specifies

the syntax and semantics of Learning Object Metadata, defined as the attributes required to adequately describing a learning object.

REHASH made a preliminary decision to use a version of the IEEE Learning Object Metadata standard, which has been adapted for use in the UK educational context, known as the UK LOM Core (formerly known as the UK Common Metadata Framework). This adaptation of the IEEE LOM is known as an application profile. With it, people can search for e-learning resources with terms and categories that make sense in the UK educational system, while maintaining interoperability with the rest of the world.

Jorum, the JISC national learning object repository, to which REHASH is a contributor, announced its own metadata application profile based on the UK LOM Core in February 2005. This metadata profile has been specifically tailored for use with resources uploaded into Jorum. The REHASH project worked closely with the Jorum metadata team to ensure minimal repetition of metadata fields.

The REHASH project agreed on the content of key metadata fields that are considered mandatory in the UK LOM Core, as well as additional metadata fields. REHASH agreed on the inclusion of metadata keywords for each learning resource that will be taken from the National Library of Medicine's Medical Subheadings (MeSH) vocabulary. MeSH is widely recognised, as the standard for cataloguing medical resources.

RELOAD's metadata editor interface was customised; the metadata entry form was edited to display only the metadata elements that were required to be completed in the final metadata profile. This increased the speed of entering metadata. A metadata template was also created that includes the values of metadata elements identical for all re-purposed resources. This template was imported into each content package and reduced the time spent entering metadata during the content packaging of resources.

5.55 Metadata guidelines and quality assurance

The REHASH project produced a metadata guideline for classifying all resources created from the project. This guideline was followed by developers to catalogue resources by key fields, including: title, description, keywords, and educational level. In addition to this metadata guideline, the checking of metadata became part of the technical check of resources during quality assurance.

6.0 Implementation

The project start-up phase involved the creation of a management structure. Initially, this started with the appointment of project director and manager. Key existing personnel were identified and the core of the project team was assembled. In addition to this, a team of educational technologists were employed, all with a range of skills, including web development, image manipulation, editorial, and animation skills. The majority of the developers in the team also held a dual qualification, both technical and bioscience. The developers went through an induction process and were given training where needed.

Once the team was assembled, and the project was initiated, a project website was created (www.etu.sgul.ac.uk/rehash). The site was created with the intention of not just being an information source. It was also the staff and student facing. The project team, although immersed in technical interoperability work, took a belt and braces approach to the release of resources for students and thus created a password protected area, for both student and staff access. The staff access via the site was primarily for re-purposing work, a development area.

A pilot was then conducted with students from Croydon College studying on the Access to nursing course. A topic was re-purposed by the FE tutor, in collaboration with the courseware development team at SGUL. The tutor then taught the students in a face-to-face environment by using the actual re-purposed resource as a lesson plan. The anecdotal student feedback from this pilot was very much in favour of these resources.

An Away Day was organised and hosted by the team for the REHASH project partners and participants. The REHASH website was officially launched and the project was officially started.

The technical stage of the project encompassed tools and template development. The project team conducted some research and as a result of this, RELOAD was chosen as the most appropriate tool to content package the Key Topics. Together with the X4L support staff, the REHASH team began to develop a set of technical standards which encompassed metadata and HTML templates for the resources, and furthermore investigated appropriate IMS and SCORM standards to ensure interoperability with most virtual learning environments (VLEs) and repositories. Interoperability testing also occurred with all partner VLEs (Moodle and Blackboard), the Intrallect test area (sandbox) for Jorum and using the RELOAD browser view via the REHASH website. In addition, a quality assurance process was developed to ensure all Key Topics met a defined set of criteria before they were content packaged (this included MESH classification for all Key Topics).

The main focus of the project was on the actual re-purposing. Key Topics were re-purposed to different educational levels, escalating from HE0 to HE2. Existing resources were re-purposed by FE and HE tutors to their set defined learning outcomes for their appropriate educational level. The changes were implemented by the development team at SGUL, whilst conforming to agreed QA and technical standards. The Key Topics were then content packaged (both IMS and SCORM) and the outputs were signed off by all the relevant experts for content correctness. The resources were then made available to students via their institutional VLEs and also the REHASH website as a backup.

The REHASH project team is an active member of the London, South East and South West DEL programme dissemination working group (DELDISSE) responsible for hosting a national conference on the 5th of June 2006. The target audience for the event would be those who would directly benefit from the outputs of the projects, not just from partner institutions but the wider community. This will include people from FE and HE and possibly Adult and Community Learning. The tone of the event is to be practical so that delegates will be able to assess the usefulness of the projects

they are interested in and whether they will be of use to their own institution. The REHASH team is responsible for the planning of the conference programme. Main duties include timetable planning, session planning, presentation structure, arranging speakers, organising poster session etc. There are further DELDISSE meetings planned to finalise all of the above as the conference date nears (5th June 2006). Further information is available via the conference website: <http://www.gre.ac.uk/delconf>

In general, the project team followed the best elements of Projects in Controlled Environments methodology (PRINCE2), especially the sub-processes relating to the planning process, in order to implement the agreed workpackages. The stages and contents of the workpackages have never changed over the course of the project life cycle.

6.1 Project challenges

The major challenge, over the course of the project, had been to interest and involve those members of the various consortia who needed to not only use their expert knowledge to create and approve editing to the various educational levels, but also to commit to using these materials in their own institutions and courses. We had been conservative in our expectations, and so this element of the project always remained on course.

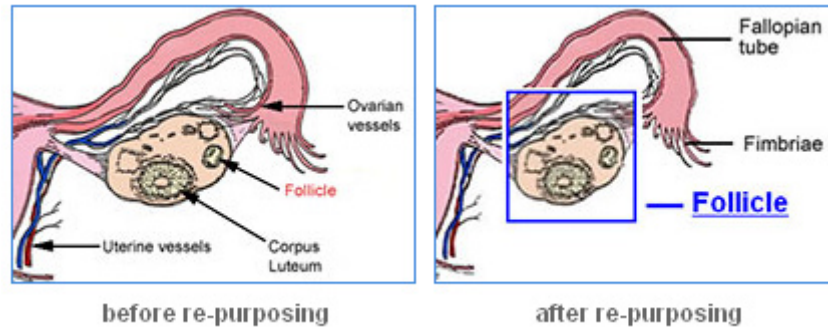
7.0 Outputs and Results

The main outputs and results of the project are detailed below.

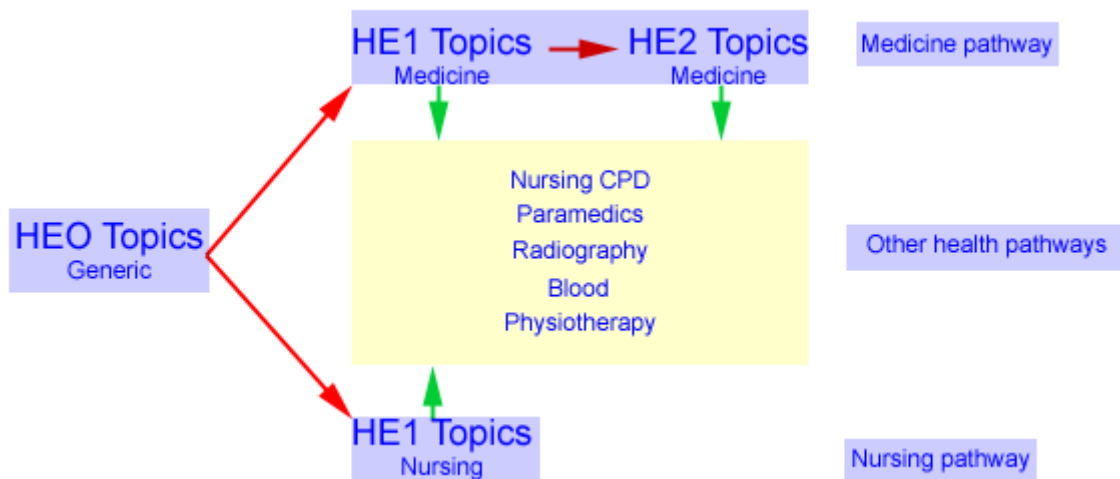
7.1 The re-purposed resources

Resources covering cells, tissues, and organs, re-purposed to HE0, for Access to medicine and health. This led to the development of the resource escalator: re-purposing from existing resources to HE0, 1 and 2, and a consideration of the extent to which different versions are necessary for different health-based resources.

These main content deliverables are in the form of 'Key Topics'. These are learning resources, covering the core curriculum, which are designed to support personalised, self-directed learning. Key Topics are developed in a web-based, and where possible, image-to-text format. This format increases student interactivity by providing them with a choice of direction. They are unique in that they integrate all the disciplines involved in teaching these courses (e.g. anatomy, physiology, radiology and biochemistry). This produces well rounded contextual resources which match specific learning objectives. Each Key Topic consists of a number of Reusable Learning Objects (RLOs). The resources are in the form of individual images, photographs, diagrams, animations or videos. All re-purposed Key Topics have been thoroughly checked and signed off by specialists for content accuracy and each one conforms to our own quality assurance and technical standards. Below is a diagram illustrating key changes before and after re-purposing:



In addition, it has been agreed by the project team and partners that, by minor compromise, identical resources for both foundation to medicine and Access to nursing and health can be shared by both disciplines: an academic, rather than a multiple versioning solution to RLOs. So for example, A Key Topic re-purposed to HEO (for both medicine and nursing) can be re-purposed to two further levels for medicine (HE1 and 2). However, that same HEO topic can be re-purposed to HE1 for nursing and other discipline specific health related courses. This produces a number of pathways which all start at a generic HEO level. Please see diagram below for more details.



7.2 Re-purposing model

To ensure that the process of re-purposing conforms to certain standards a re-purposing model is currently being finalised for dissemination via the REHASH website. This model will be a guideline for all re-purposing and will encompass:

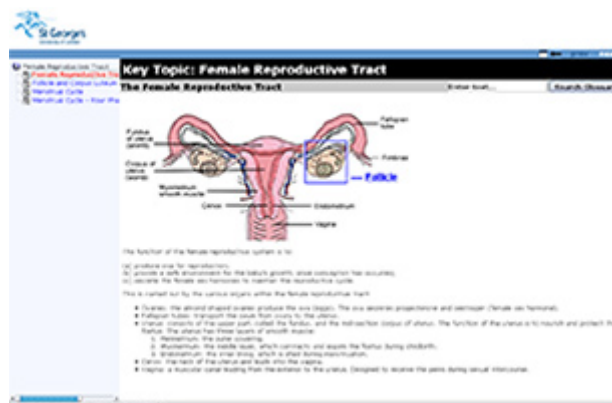
- identifying and involving appropriate experts
- highlighting learning objectives
- identifying educational level descriptors
- mapping to existing RLOs
- developing specific techniques for re-purposing
- maintaining design templates and frameworks
- maintaining quality assurance procedures
- the resource escalator

An early version of this model is shown below:



7.3 Re-purposing pilot study

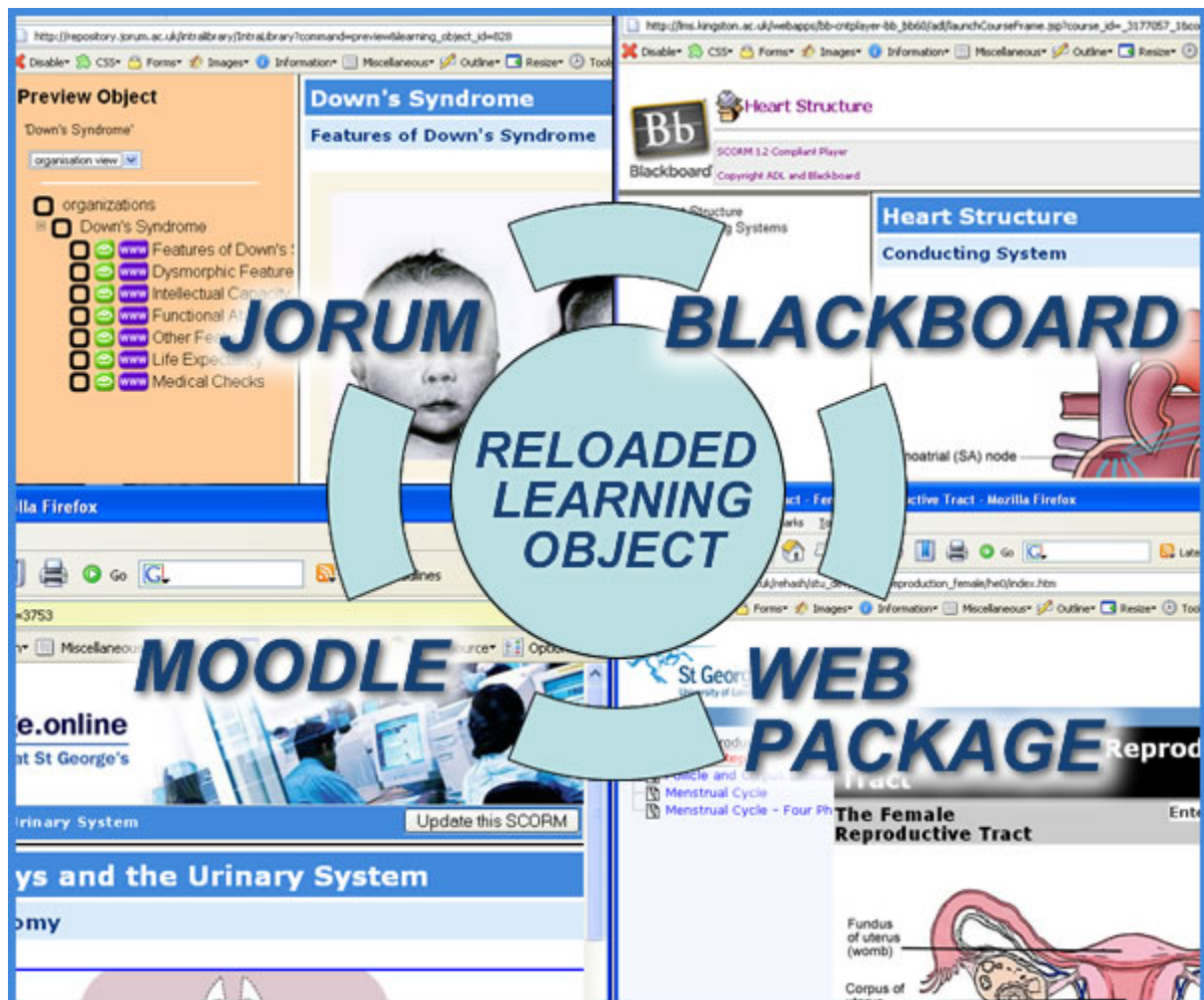
Initially, collaboration with our FE partner (Croydon College) provided us with the opportunity to develop an exemplar of a re-purposed Key Topic. This pilot was the re-purposed product of an existing Key Topic, and demonstrated re-purposing from HE1/2 to HE0. This prototype was evaluated and used as the basis for development of the process. It was the tutor who tailored the existing resources and decided what to keep or what to omit, in terms of text and annotations. The output of this pilot is not just available to students to access in their own time; it will also be available to the wider community via the REHASH website. Below is a diagram showing a screenshot of the re-purposed topic that was used in the pilot case study (the female reproductive system):



7.4 Sharing

The re-purposed Key Topics are already being shared with all project partners through not only their institutional VLEs but also through the password protected areas of the REHASH site, as a backup. This element of sharing within the project has involved a considerable amount of overlap with the technical interoperability standards. The project team is currently working closely with Jorum towards

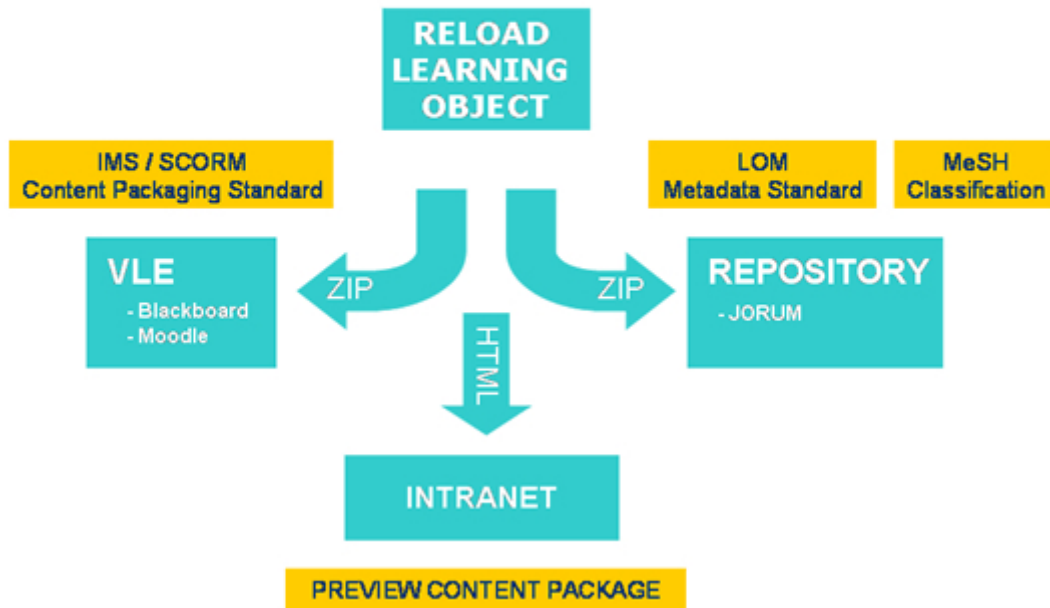
uploading content packaged re-purposed Key Topics into their repository in order to share with the wider HE/FE community. The diagram below shows the various sharing possibilities that REHASH has investigated and catered for:



7.5 Resource standards

The RELOAD tool has been incorporated into the re-purposing model to ensure that all resources are truly interoperable with repositories and VLEs. An easy-to-update html template has also been finalised after a series of meetings exploring RLO standards and house/design styles. This template and all the guidelines relating to technical standards will be made available via the REHASH website. In addition to the technical standards, a comprehensive quality assurance guide will also be made available. The diagram below shows the various resource exit routes that the project team considered and catered for:

EXIT STRATEGY



7.6 Dissemination

A national dissemination event is currently being organised by a southern cluster of 7 DEL projects, including REHASH. The event will focus on not only the transition from FE to HE but also to incorporate themes of e-learning (content, access, sharing etc.) into the day. More information relating to this event is available by clicking on the screenshot below:



Conference website: <http://www.gre.ac.uk/delconf>

The project team have already presented the REHASH project at the AMEE 2005 (The Association for Medical Education in Europe) conference in Amsterdam and

have already submitted abstracts for presentation on REHASH project findings and experience at AMEE 2006 in Genoa. In addition to this, the team will also be presenting at Ottawa Medical Education Conference 2006 in New York about the REHASH project. The involvement of the REHASH project in the DEL conference will also lead to a submission of an article about the project in the BJET (British Journal of Educational Technology), autumn 2006.

7.7 Website

The project website (<http://www.etu.sgu.ac.uk/rehash>) is 'live' and fully operable. The 'development' section within the website is maintained and updated on a regular basis. It serves as the main port of call for all re-purposing work which has been and is being undertaken. It also contains a listing and a map of all the topics which are to be re-purposed. A 'student' section is also available within this website and contains time-released resources currently being used by courses at our partner institutions. In addition, the website will also contain all project related documents, including the many standards and guidelines mentioned on this report. This website is due to be archived as part of the UK web archiving consortium (UKWAC), JISC. See below:

What is REHASH?

The REHASH (Re-purposing Existing Healthcare Assets to SHare) project is intended to support student progress from further to higher education in medicine and healthcare by creating an 'escalator' of common reusable learning resources. This will provide a continuity of learning from one year to the next, particularly benefiting the new generation of adult learners moving up from FE to HE, who often express both a high level of motivation and a high level of anxiety over their learning requirements.

The project entails re-purposing (adapting) existing collections of high-quality online learning resources to different educational levels. In a six-step process the resource is re-purposed, through collaboration between the developer and topic specialist, signed off and then packaged for use in any course or web-delivery system.

The existing resources

The St George's, University of London (SGUL) Key Topic collection is a set of online learning materials developed in-house, in collaboration with subject specialists. Each Key Topic consists of a combination of text and visual media, which may include images, photographs, diagrams, animations or videos. The collection of over 300 topics covers all the disciplines that underpin medicine and healthcare courses at levels HE1 and HE2 (anatomy, physiology, radiology, biochemistry and others).

Click the images for examples of Key Topics before and after re-purposing.

before re-purposing after re-purposing

7.8 Away Day

The REHASH away day was hosted at Dorich House, Kingston, for all the partners involved. This included an overview of the project and afternoon workshops on re-purposing existing assets to lower/higher educational levels. A brief account of the proceeding and snapshots from the day are available from the 'documents' section of the REHASH website. Below is a photograph illustrating a presentation at the REHASH away day:



7.9 Resource evaluation

An evaluation of the impact of HE0 resources on students in the FE sector, specifically with students on the Access to nursing course at Croydon College is currently being performed. Although separately funded, the results of this will be made available for the wider community via the REHASH website. Below is a picture illustrating the focus group that was carried out as part of the case study:



8.0 Outcomes

- a) The key objective of this project was to re-purpose existing large collections of teaching resources (Reusable Learning Objects), to provide teachers with attractive learning materials to support a variety of healthcare and courses. Specifically these were the access and foundation courses, which widened access to medicine and healthcare and the Diploma, and undergraduate programmes, which follow these courses.

Part-way through this project these objectives are already being achieved. So far teaching materials have been re-purposed which provide learning resources for 20 sessions at FE level /HE level 0. Moreover they have been adapted to their own needs by the FE/HE0 teachers of the same access and foundation courses, with some element of sharing the same re-purposed resource between different courses.

- b) The intention was create a 'resource escalator' - resources which continued, in consistency and nature, from one educational level to the next. The project has already produced 10 examples of resources which progress from FE to HE in either medicine or healthcare (nursing). These topics covered basic body systems.

There were other objectives that were considered in the original proposal:

- c) If teachers are to be encouraged to use these materials, then these RLOs must both compete ergonomically and in quality with the existing rapid and efficient

process used for assembly of teacher's lesson plans from tried and tested existing sources.

In our pilot study with Croydon College this has proved to be the case. Given that the Croydon and Kingston teachers were reviewing and editing these materials themselves, it was still worth their time and effort to adapt them. Admittedly an educational technologist would physically change the resources in this first instance, but it is clear that in future, the sharing of 'generic' resources will significantly reduce the task of the teacher (or educational technologist if still needed).

- d) These learning packets must also be very attractive to both teachers and students'. Initial feedback and preliminary evidence from the first focus group at Croydon College, has indicated that students believed these materials to be both useful and attractive, that they improved their learning and improved the performance of the teacher, who took the materials into the classroom and used them as direct teaching aids.
- e) This new partnership will strengthen existing collaborative relationships and will augment initiatives currently in existence between the FE & HE partners. It will assist the local progression of students into the HE sector, prompting redesign of both HE and FE curricula to widen participation and improve the student experience.'

There is already evidence already that institutions that have NOT created these resources are willing to use them in their own courses. I.e. the new RLOs are genuinely 'reusable'. The School of Nursing & Midwifery, King's College London, also wishes to use the resources for Pre-Registration Nursing (HE1) and believes they will not need to change most of them.

St George's has already begun to consider new access routes to medicine from the FE sector and will soon begin discussions with Croydon College.

- f) These resources will be suitable for a central national repository for use and reuse throughout the health sector. They will range in size from individual image or text files to complete multimedia learning topics. Our experience with Croydon College FE teachers in Access to Nursing, Kingston University teachers of undergraduate Nursing, and foundation to medicine, GKT teachers of diploma and undergraduate Nursing, and our own experience in undergraduate medicine has demonstrated, the teacher requires learning materials which are substantial enough to provide a significant chunk of teaching. This may not represent optimum reusability, but it is what the teacher wants and needs.

The project is already demonstrating that learning resources can be effectively re-purposed to different educational levels with positive impacts on students, teachers and course development. It will also have demonstrated that the FE sector is not only willing and able to adapt and reuse the resources, which have been generated by the HE sector, but it is able to use this resource directly within the classroom.

The important next step, beyond the lifetime of this project is to establish that these reusable resources are truly reusable across the entire sector, and that they can be made sufficiently generic that the number of variants needed can be reduced to a minimum without making the granularity of the resources so small, that the teacher will no longer take the time and effort to find and use it.

This is very important point because this the key process in whether these material are truly and widely reusable or not, and so far there are no studies which have attempted to test this concept of a successful 'generic' learning object, made by a representative section of the community, for the entire community.

In comparison with other projects of this nature there is a significant difference in approach. The debate over reusable learning materials has often concentrated on issues such as granularity, metadata, content packaging, repositories etc, but this has frequently left to one side the most basic questions which are, why would the average teacher want to change their methods to use/ access these materials? Or (if used as open learning objects) why would institutions want to assemble the materials, into formats which can be accessed by their students in support of their existing curricula?

As stated in the project plan, the knowledge base which covers the anatomy, biochemistry, and physiology of tissues and organ systems is relatively unchanged over the years at these basic educational levels; it is a body of knowledge which has largely become accepted fact. Therefore, the effort to maintain these resources (within the project website) has been relatively small. The versions of the re-purposed resources which St George's sets into a repository (hopefully JORUM) are already being maintained as part of our own continuing teaching and learning programme.

9.0 Conclusions

Having successfully addressed the project objectives, one of the crucial questions that had been generated by the outcomes is both a practical and pedagogic one. Can well-designed RLOs be both large enough to be useful, and yet sufficiently unrestrained by context, as to be re-used in other institutions in similar courses?

The indications from the project are that, at least in the healthcare sector, teachers from a number of institutions require resources which are large enough to be worth the effort of collecting and using, both in lesson plans and as supplementary web-based resources. Typically this means that each teaching session might contain the equivalent of 1-3 separate resources.

Teachers involved in creating resources were asked to take the viewpoint that these resources should ideally contain the core elements for teachers in other institutions on similar courses and with similar curricula. This approach appeared to be successful. The existing project has already collected anecdotal evidence that teachers from institutions that have not been involved in creation of these resources are willing to use them in their own courses, notably amongst the FE colleges in the South West Thames region, i.e. the new RLOs are genuinely 'reusable'.

In addition GKTSM nursing school has suggested that the REHASHed resources (RLOs), which are generated by one institution for healthcare, can be reused with little or no change in another. Typically curricula of each area of healthcare are relatively similar, in terms of their core objectives and learning outcomes.

10.0 Implications

REHASH will produce a steady progression of support for student learning, through three educational levels, and an attractive framework for educational development through separate courses. Integrated quality products which cover to adequate depth the objectives of the curriculum, and continue in a consistent pattern through different levels of courses, may help to reduce uncertainty and vulnerability among a large body of non traditional learners. This should lead to an improvement in levels of achievement and retention.

The advantage of this will be both local and national; local courses will add tailored resources to fill the gaps in their web delivered support, and the national repository will gain a large amount of material covering substantial tracts of the core healthcare curricula at different levels (i) Access to nursing (HE0/NQF 3) (ii) Foundation entry to medicine (HE 0). These resources will also support medical and healthcare diplomas and courses, and the undergraduate medical courses (HE 1&2).

The knowledge base which covers the anatomy, biochemistry, and physiology of tissues and organ systems is relatively unchanged over the years at these basic educational levels; it is a body of knowledge which has largely become accepted fact. The effort to maintain this is relatively small. The versions of the re-purposed resources which St George's sets into a repository will be maintained as part of our own continuing teaching and learning programme, an institutional need which well provides a level of stability to the continuing resource update. The continuing availability of the resources should ensure that the interest and knowledge of their existence is relatively easy to maintain.

This project will inform good practice on RLO development, reuse and transferability throughout the HE sector. It will provide a much clearer view of the practical needs of the teacher in RLO construction, and at the same time provide additional insight into the reasons why the reuse of RLOs have been comparatively slow in many areas.

11.0 Reference

All documents mentioned as outputs from the project are already, or will be, available via the project website:

<http://www.etu.sgu.ac.uk/rehash>