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Interprofessional E-Learning and Collaborative Work:
Practices and Technologies

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Chapter 21
Case Studies of Creating Reusable Inter Professional E-Learning Objects

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ABSTRACT

Reusable learning objects can play an important part in enhancing interprofessional learning. They provide flexible support to students of health care and provide an opportunity during the creation process, for interprofessional educators to share knowledge and understand more about each other's roles. When creating learning objects, a development and evaluation framework including technical expertise and quality control at critical stages is important, however it is the interprofessional community brought together at workshops at the start of the development cycle and the underlying pedagogical design principles that ensure the materials are fit for purpose and guarantee reuse across professional groups.

INTRODUCTION

Within the context of interprofessional e-learning, this chapter will describe three case studies illustrating the use of a development and evaluation model for creation of reusable learning objects (RLOs). A range of issues around RLO design, repositories for interprofessional learning (IPL) and collaborative approaches will be discussed and some recommendations made for future research and development. The four objectives of the chapter are:

- To provide a working definition of RLOs and explain the relevance and importance of the RLO approach for interprofessional learning.
- To show a generalised model for the creation and evaluation of interprofessional RLOs in health and social care (HSC) and discuss the variants of this in the case studies described.
- To show how educational and content creation issues have been addressed in three case studies of RLO development and use involving interprofessional teams in health care education:

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  - **Case study 1:** Pharmacology RLOs to support interprofessional learning.
  - **Case study 2:** Cross sector development of RLOs for interprofessional learning in health care (LOLA).
  - **Case study 3:** RLOs for service improvement in the UK National Health Service (NHS).
- To discuss issues arising from the case studies and make recommendations for further work and research.

BACKGROUND

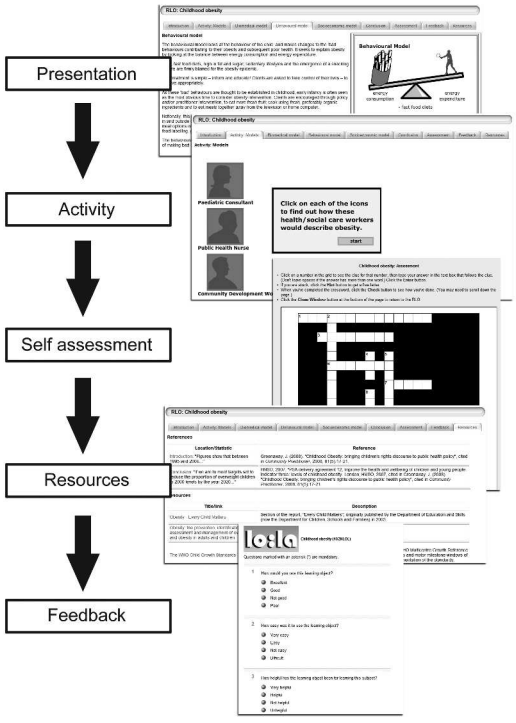
Current e-learning practice has moved away from putting whole courses online towards the creation of smaller self contained 'chunks' of learning, recently termed reusable learning objects (RLOs) (Wiley, 2000; Harden & Hart, 2002). RLOs present a number of educational advantages; they are stand-alone units of learning, which can be used in many different ways and across interprofessional disciplines (Windle et al., 2007a). This makes them extremely flexible and cost-effective. Material can be kept up to date more readily; it is much easier to update a single resource than an entire course. Students and teachers alike have access to these resources at any time or place through a standard web-browser. Teachers can combine various RLOs to form the basis for their own custom-made courses (Mason, Pegler & Weller, 2005) or they can direct students to individual RLOs to support or explain particular concepts or processes as part of a blended learning approach (Lymn, Bath-Hextall & Wharrad, 2008). Critics of RLOs would argue that reusability is a myth, and any lecturer will always deliver a subject in their own style reflecting their own slant even in the most concrete of disciplines. In his paper on 'Learning objects: weapons of mass instruction', Butson (2003) says "The overwhelming acceptance of learning objects is baffling given that they represent a decline of learning into a form of reductionism" (p. 667). If learning objects are used like Lego bricks to build courses comprising simply of content, then most educational practitioners would agree with Butson. This chapter will refute this, by demonstrating in three case studies, how pedagogically designed RLOs, created by interprofessional groups are making a real difference to learners.

Wiley (2000) first proposed the definition of an RLO to be 'a digital resource that can be reused to facilitate learning' and since then there have been a plethora of definitions in the literature and this is discussed in more detail in a chapter in this volume by Windle & Wharrad. One of the more pragmatic definitions (Leeder et al., 2002) is relevant to the RLOs described in this chapter: A reusable learning object is a web-based multimedia digital resource based on a single learning objective or goal, comprising a stand-alone collection of four components:

- **Presentation:** a presentation of the concept, fact, process, principle or procedure to be understood by the learner in order to support the learning goal;
- **Activity:** something the learner must do to engage with the content in order to better understand it;
- **Self-assessment:** a way in which the learner can apply their understanding and test their mastery of the content;
- **Links and resources:** external resources to reinforce the taught concept and support the learning goal (Figure 1).

Both the process of developing RLOs and the utilisation of RLOs as resources within health and social care (HSC) education can contribute to the fostering of IPL in a number of ways. The collaborative development of RLOs, comprising a face to face workshop followed by further follow up team working, is a key element of our approach (described below). Such development provides an opportunity for interprofessional

Figure 1. Components of an RLO



educators and practitioners to combine intellectual effort and expertise towards a common goal (the production of a high quality RLO) in a 'neutral' setting, meaning that the individuals involved are usually novices at RLO development and, in this context, the learners as members of the group become equals in the task. These features of this collaborative process, the common goal, neutrality and equality, provide an ideal opportunity for (inter)professional development via exchange of knowledge and skills (Miller, Ross & Freeman, 2001), out with the pressures and constraints of the usual work setting. Gaining a better understanding of, and respect for, the different professional roles in health and social care (HSC) is an important positive outcome of this collaborative, community based approach (Craddock, O'Halloran, Borthwick & McPherson, 2006).

Recognition of the value of online learning resources in interprofessional education is growing and there are many examples in the literature of projects seeking to capitalise on the affordances of technology for this purpose (Pulman, 2007; Miers et al, 2007; Cooper, Spencer-Dawe & Mclean, 2005; Juntunen & Heikkinnen, 2004). The benefits of RLOs as resources to support interprofessional learning within HSC education will be discussed within each of the case studies described.

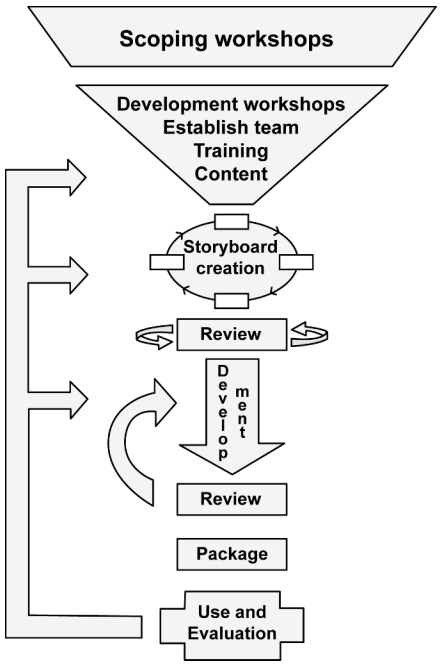
RLO CREATION AND EVALUATION

Interprofessional Collaboration in RLO Creation: A Model of the Development

The RLO development methodology used in the case studies is schematised in Figure 2. This approach and the associated tools and templates were developed and validated over a number of years, firstly by the Universities Collaboration in e-learning (UCEL www.ucel.ac.uk) (Leeder et al., 2002) and more recently by the Centre for Excellence in Teaching & Learning in Reusable Learning Objects (RLO-CETL www.rlo-cetl.ac.uk) (Boyle et al., 2006).

The process begins with an 'unlocking content' workshop. Developing a community around the development process initiated via workshops is a crucial feature of the methodology. Our and others' research shows this community of practice approach provides a forum for critical debate around the content creation leading to relevant, reusable and high quality materials (Windle et al., 2007a; O'Keeffe, O'Regan & Cashman, 2008). The workshops foster a sense of ownership of the process and the outputs, leading not only to the use of the learning objects themselves but a growing community of use as networks are extended via a range of dissemination routes. This, inevitably, is a labour intensive and expensive process, yet it is recognised that rich multimedia coupled with high production values have enormous power to engage the learner and aid understanding (Edelson

Figure 2. Schematic diagram showing the developmental framework for the production and quality assurance of RLOs



& Pittman, 2001). Outputs from the workshop are in the form of A0 size (1 square meter) laminated posters (Figure 3); these are digitised and stored as an archive forming the basis of the next stage which is the written specification or storyboard.

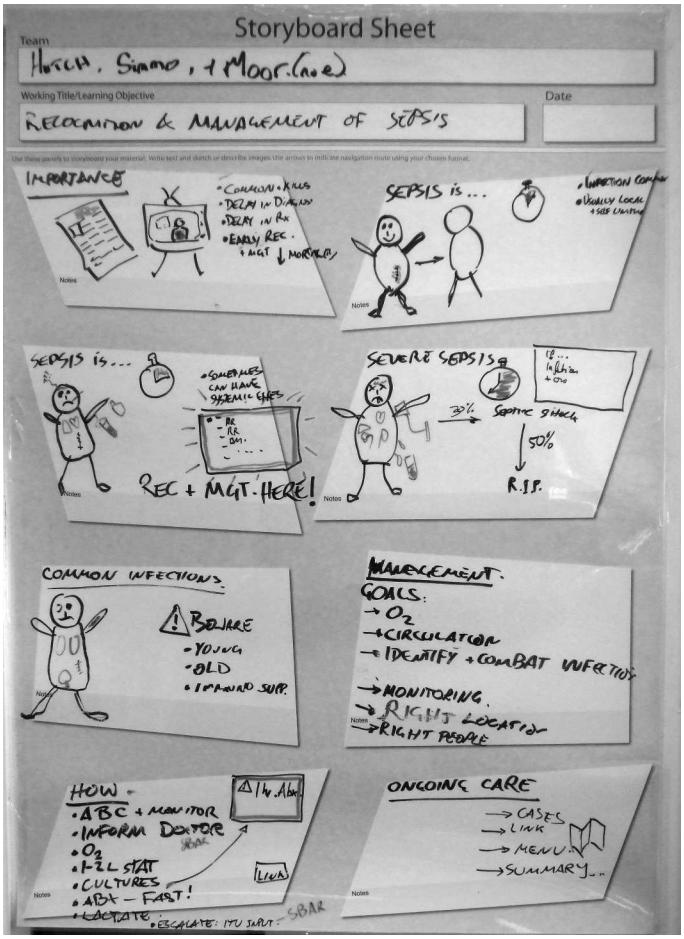
Storyboards are written through an iterative development cycle overseen by an instructional designer and learning technologist. Completed storyboards are peer reviewed; quality assurance is extremely important to the validity of any e-learning development, especially in the area of HSC. Reviewed storyboards then begin the media production process. A second peer review phase is undertaken on completed media. A set of standard forms available as Microsoft Word documents are available for each of the stages (specification template, peer reviews 1 and 2 forms and evaluation questionnaires). Following appropriate amendments the completed RLOs and their assets are packaged, metadata tagged and added to a repository.

All the RLOs produced are freely available for educational purposes under the terms and conditions outlined by the Creative Commons Licence (http://creativecommons.org/licenses/by-nc/2.0/uk/legalcode) and are available at www.nottingham.ac.uk/nursing/sonet. The recent policy announcements around open educational resources by the UK government (Lipsett, 2008) and various initiatives led by the UK Joint Information Services Committee (JISC) (www.JISC.ac.uk) suggests that open content initiatives will become an increasing focus for higher education (HE) and further education (FE) sectors in the UK.

Pedagogical Design

The pedagogical design underpinning the RLOs in each of the case studies to be described was based on IMS learning design principles (IMS Global Consortium, 2003) with the emphasis on the environment in which the learning occurs, the roles played by the learner and "RLO-author" and the activities undertaken. Designs ensure that the most appropriate multi-media environment is created, so that learners take active roles within the learning process and are supported by help and feedback (Windle et al., 2007b). Activities and self assessments in the RLOs are aligned with the learning goal (Biggs, 2003) and are important because users must be actively engaged in the process of learning (Laurillard, 2002) and need feedback from self assessments to determine whether they have successfully achieved the learning goal. A variety of activities including crosswords, drag and drop, open text, annotating diagrams, multiple choice quizzes were incorporated. High granularity, partly to facilitate reuse and "just-in-time learning", but also as our research (Wharrad, Kent, Allcock & Wood, 2001) shows, small online learning units of between five and 20 minutes are the most valued and effective for the learner.

Figure 3. Examples of A0 laminated storyboards – the outputs from the RLO creation workshops



Evaluation Framework and Toolkit

The framework and tools used to evaluate the process and outputs of RLO creation have been devised by the RLO-CETL. The theoretical framework for the RLO-CETL evaluation strategy informed by Cultural-Historical Activity Theory has been reported elsewhere (Morales, Carmichael, Wharrad, Bradley & Windle, 2007). The primary purpose of the evaluation is to ensure the pedagogical effectiveness of the RLOs, but we also determine the tutors' views on the usefulness of the RLOs and an understanding of the various teaching and learning contexts in which the RLOs are situated, so for example whether the context is interprofessional or multiprofessional. The evaluation tool kit includes: technical evaluations of the new content; assessments of changes in teaching and learning environments and practices; formative evaluation by teachers and students; and summative measures of use.

The key elements of the toolkit used in the case studies are listed below (the toolkit can be downloaded from www.rlo-cetl.ac.uk):

- A short online survey added to each RLO comprising 10 questions about usability and quality (collated using Zoomerang software www.zoomerang.com).

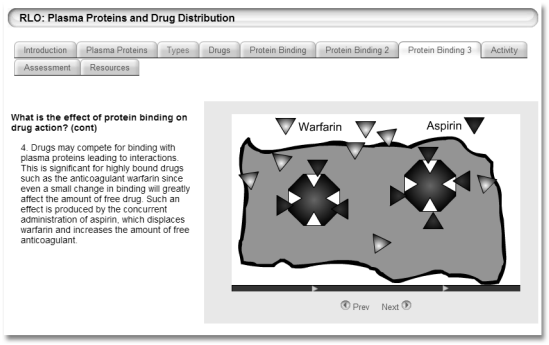
- A more detailed questionnaire completed by students who have used one or more RLOs in their module.
- Tutors' forms that collect information about the module and the context for the RLOs' use. The tutor's evaluation of learning effectiveness form is based on the JISC case study template (http://www.e-learning.ac.uk/effprac/html/cs_template.htm); this is a tool designed to encourage tutors to reflect on the RLOs' use.
- Peer review forms comprised of fixed and open response questions to determine from independent experts in the field whether the RLO content accurately represents the subject area..
- Learning Object Attribute Metric (LOAM) tool. This allows RLOs to be classified according to various attributes such as media richness, interactivity etc and is described in more detail in another chapter in this volume by Windle & Wharrad.

CASE STUDIES

Case Study 1: Interprofessional Development of Pharmacology RLOs

Students across all health professions find it difficult to relate pharmacology concepts to clinical experience. As more nurses, pharmacists and allied health care professionals seek training in prescribing, the levels of academic knowledge of trainee prescribers are likely to become more diverse. Lymn, Bath-Hextall & Wharrad (2008) stated that almost half of students attending their prescribing course had no more than a GCSE in a biological science subject. There is also a lack of classroom time available for teaching pharmacology (Wharrad, Allcock & Chapple, 1994; Latter, Rycroft-Malone, Yerrell & Shaw, 2001; Latter, Maben, Myall & Young, 2007; Avery & Pringle, 2005), and students state that they would benefit from preparatory material covering basic principles to develop familiarity with pharmacological terminology (Bradley, Bradshaw & Nolan, 2006). Perhaps part of the problem lies with the nature of pharmacology education which appears to utilise traditional teaching methodologies almost exclusively (Banning, 2004). While lectures result in delivery of information they do not necessarily engender learning and understanding, which may be better supported by blended or more applied teaching methodologies such as RLOs.

Figure 4. Screenshot from RLOs for Case Study 1



The first workshop to explore the possibility of developing pharmacology RLOs (Figure 4) for healthcare courses was held in 2003 and was attended by seven lecturers responsible for teaching pharmacology to nurses, midwives and medical students (on both traditional and graduate entry courses) and two learning technologists. The different academic and professional requirements were debated and draft specifications were agreed and drawn up for seven RLOs covering bioavailability, half life, first pass metabolism, plasma proteins, drug-receptor interaction, understanding the synapse and the lock and key hypothesis. Each lecturer produced a more detailed specification for one of the RLOs including sketching ideas for images, animations, activities, self assessment and glossary. Animations were produced in Macromedia Flash and embedded in HTML web pages. Although funding was available to buy out lecturers from their teaching, in fact they did not or could not arrange this. No existing templates

were available so these had to be developed from scratch and copyright free images were difficult to find and most had to be drawn. Peer review at the written specification and prototype RLO stages, lengthened the process (this was similar to journal article reviewing) so it took over a year to complete all the RLOs.

Since their release in 2004, thousands of students from medicine, nursing, midwifery, physiotherapy, dentistry, podiatry and veterinary science have now been used interprofessionally and there is wide global reuse of the RLOs by a range of healthcare learners. This success has led to further workshops involving other lecturers from nursing, medicine and allied health professions. The number of pharmacology RLOs released to date is eighteen and evaluations are almost exclusively positive. Access to RLOs statistically significantly increased an interprofessional group of post registration students' perceived understanding of pharmacology in successive cohorts and had an impact on their clinical practice (Lymn et al., 2008). The ability to visualise processes as computerised animations or videos compared to trying to understand from static text appears to enhance learning and increase test scores (Thatcher, 2007; Chew, Stiles, Joseph & Whitley, 1994). Qualitatively, student comments from our online evaluation feedback reinforces this claim,

For me it was the visual aspect, actually seeing the concept visually was a huge bonus for me because it just made things click. We'd had key lectures and I'd read about things, but I think for me just to see how things worked visually was what I needed to put the whole picture together (Non medical prescribing student, University of Nottingham).

The simplicity and the fact that it had text and diagrams to support the explanation. I also thought that the activity at the end was a good idea as it reinforced learning (Podiatry student, University of Northampton).

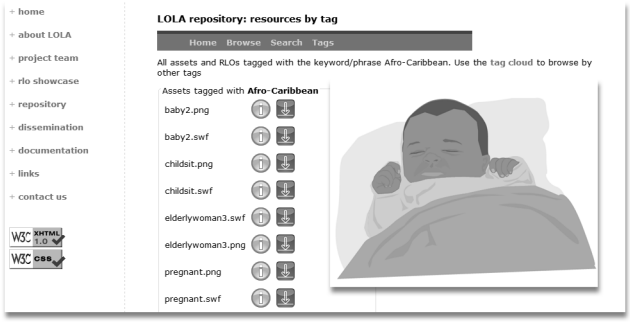
The value of these pharmacology RLOs may be partly because they are, by their very nature, different to traditional e-learning tools – they require no more than around 15 minutes to complete thus they do not require a time-intensive input making them more flexible for students to use at work or home. Many students commented on being able to repeatedly use particular RLOs until they understood a concept. Similarly the visual, audio and interactive nature of these RLOs means that they have an appeal for visual, auditory and kinaesthetic learners an important issue bearing in mind data which suggests that learning style is important in web-based e-learning (Manochehr, 2006).

Case Study 2: Cross Sector Development of RLOs for Lifelong Learning in Health Care Education

Despite many UK government policy recommendations (DFES, 2003; 2005) cross sector education collaboration involving UK HE and FE are difficult to initiate and sustain for a whole variety of reasons (Weiss, 1987); however, more support is needed for learners moving from one educational sector to another. This case study (LOLA - Learning Objects, Lifelong Application), a three year project funded by the UK Eduserv Foundation in 2005, describes a cross sector collaboration involving a UK HEI (post 18 years university), FE College (post 16 years education) and an NHS Trust. The aim was to collaboratively develop a set of interprofessional RLOs in health spanning the lifelong learning continuum. The RLOs would be catalogued and housed in an 'open' repository along with all their constituent media components.

Along with a project director, learning technologist and researcher, the project team consisted of two lecturers from the HE sector (pharmacologist and infection control specialist),

Figure 5. Screenshot from the LOLA website, Case Study 2



two NHS employees (a senior pharmacist and a senior infection control nurse both delivered professional development sessions to NHS staff and medical students) and two lecturers from a local FE College (a health visitor and a biologist). These members were content experts in the areas of infection control and medicines management and taught interprofessional groups of students. RLOs were produced following the process outlined in Figure 2.

Fifteen RLOs were produced on: aseptic technique, glove use, personal protective equipment, childhood obesity, body mass index, general adaptation syndrome, aminoglycoside dosing, volume of distribution, inflammatory response, bacteria and viruses, sizes and scales, prokaryotes and eukaryotes, introduction to clearance and clinical consequences of changes in clearance and home hazards. All the RLOs with one exception (Home Hazards) used a custom built 'media player' which housed the text, audio commentary and Flash and video components of the RLO and provided the navigational control buttons. The design template and functionality was informed by feedback from users of previous RLO designs (Windle, McCormick, Dandrea & Wharrad, 2009). RLOs were packaged using RELOAD and catalogued with the UK LOM Core Metadata Schema (this schema has fields relating to instructional design and pedagogy). A hundred and eighty media assets were catalogued using the simpler Dublin Core schema (Figure 5).

Online feedback data shows that the LOLA project and its outputs have benefited the wider community well beyond the immediate project team (Wharrad et al., 2008). The RLOs have been embedded into many modules particularly for the HEI courses; the partner sector use is not as great, for the NHS sector this is because they do not deliver as many sessions; for the FE college the lack of IT facilities, lack of IT skills of tutors and students, and a concern that despite input and peer review from FE lecturers, the RLOs were too difficult for FE students not necessarily in terms of the subject content but the level of the language used in the text and narration. Whilst the individual RLOs produced in this project are benefiting many healthcare students, the repository represents an example of a bank of health resources available for different professional groups.

Chapter 14 in this volume by Timmons et al. describes further research findings from this project and the project website and repository contains the outputs and documentation from the LOLA project (www.nottingham.ac.uk/nursing/lola).

Case Study 3. RLOs for Health Professionals and Staff on Service Improvement in the NHS

The final case study describes a commissioned project funded in 2008 by the UK NHS Institute for Improvement and Innovation (NHSI), which took five months to complete. The project remit

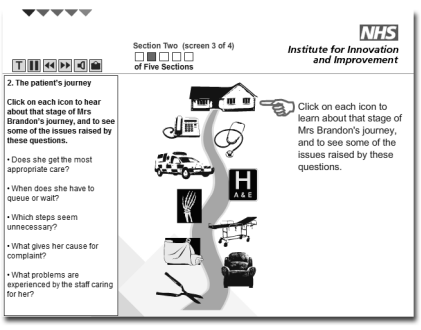
was to produce one hour of e-learning on service improvement in the NHS in the form of learning objects to be used by any health professional or other NHS employee either as part of an induction or training programme. The overarching aim of the improvement project is 'to develop a future workforce that has the mindset to challenge and be challenged in the way that healthcare is delivered, together with the skills to make the necessary improvements' (NHS Institute for Innovation and Improvement, 2008). This is to be achieved by threading the message into professional education and training that everyone, whatever discipline or grade, has a contribution to make to provide better, safer healthcare. Fifteen text based Leader Guides on improvement theory and practices (Laher & Penny, 2005) had already been produced and included for example, the plan, do, study act (PDSA) cycle, process mapping and producing run charts. For us there were two key challenges: firstly how to select the most desirable content for the RLOs from the extensive text based resources already available; and secondly how to design them in a way that would be appropriate for this diverse user group.

At the initial workshop twenty NHS interprofessional improvement trainers and educators who worked in NHS Trusts across the UK scoped ideas and content outlines for an RLO, each taking one of the broad Leader Guide themes. Using their expertise the key messages to convey in the RLOs were established along with some analogies that could be developed into animations to illustrate the ideas.

The first of three RLOs is on 'Improving Care'. The key message is that improvement is everyone's responsibility and that little improvements can have a big impact. The user is asked to think about an activity they have organised recently, maybe a family event such as a party, they then work through a model for improvement that introduces an animated version of the Plan, Do, Study, Act cycle (Langley, Nolan, Nolan, Norman & Provost, 2009). 'Planning for Improvement' is the second RLO which takes the form of an interactive patient journey. The user identifies areas for improvement along this journey, and then uses the PDSA cycle to show how improvements could be planned. The third RLO challenges the user to think about their practice and how this relates to the six core dimensions of the Knowledge and Skills Framework (Department of Health, 2009). A portfolio tool allows learners to record and print information as they work through the package (Figure 6).

In this case study, there were variations to the standard development framework (Figure 2). The project team (two e-learning health science academics, two NHSI academics and two media developers) developed the RLO content using the workshop storyboards as a guide and a 'distributed' peer review process, implemented by putting links and online forms onto a closed project website, was used to allow the workshop attendees to feedback on the prototype RLOs. The RLOs are in the NHS e-learning object repository (http://www.e-learningrepository.nhs.uk/) and are also available at www.nottingham.ac.uk/nursing/sonet. The RLOs are being incorporated into NHS induction programmes and HEI pre-registration interprofessional health courses, with positive evaluations.

Figure 6. Screenshot from RLOs for Case study 3. (© 2008, NHS Institute for Improvement and Innovation. Used with permission).



DISCUSSION AND FUTURE RESEARCH DIRECTIONS

This collaborative process for interprofessional RLO creation based on learning design principles has addressed some of the criticisms identified in previous investigations of the effectiveness of e-learning technologies for health professionals, among them cost, poorly designed packages, lack of skills, need for a component of face-to-face teaching, time intensive nature of e-learning (Wharrad et al, 2001) and computer anxiety (Wilkinson, Forbes, Bloomfield & Gee, 2004; Childs, Blenkinsopp, Hall & Walton, 2005). Whilst the RLOs have been exclusively rated by users as high quality and having an impact on learning (Lymn et al., 2008; Windle et al., 2007; Wharrad et al., 2008; Windle et al., 2009), each case study project brought with it a different challenge in terms of the creation of RLOs: devising appropriate visual representations of complex scientific processes and reaching agreement on the core concepts in the first case study; in the second, the challenge of cross sector working and building a repository and the third – condensing a large amount of material into learning objects that would be suitable (not too difficult on the one hand or patronising on the other) for a very diverse range of users. A further synopsis of some key issues will follow with a focus on future directions and research.

Repositories of Interprofessional RLOs

A Gartner report (Yanosky, Harris & Zastrocky, 2004) claimed that e-learning repositories have the potential to be transformational in the way HE delivers education yet many repositories are initially successful but have been difficult to sustain. Expensive knowledge repositories have been set up in a 'top down' manner and not used by lecturers for a range of technical, cultural and attitudinal reasons (Tate & Hoshek, 2009). Even community driven 'bottom up' repositories are difficult to sustain (Brosnan, 2005). In order for interprofessional users to share knowledge residing in a repository some key factors that we have identified, driving success are: ensuring that there is a critical mass of RLOs to make the repository worth visiting and searching; ensuring that the metadata describing the RLOs is effective so that lecturers and learners can access content in focused ways (Kwan & Balasubramanian, 2004; Nash, 2005); the need for enough context to allow evaluation of the content (Weiss, Capozzi & Prusak, 2004); providing guidance and support for contributors about copyright issues and continually adding to the RLO bank by seeking funding for new projects and partners. There is a difficult tradeoff between ensuring quality and control over the depositing of materials into a repository and the necessary flexibility and agility demanded by contributors who do not have a lot of time. Further research is needed to understand more about how lecturers and students are using repositories especially when federated searches and harvesting of RLOs from multiple interprofessional repositories becomes possible.

Granularity and Context

Despite the success of collaborative workshops in producing fit for purpose interprofessional RLOs, granularity remains a key factor in ensuring reuse. The focus on a distinct learning goal is relevant to the use of RLOs within an interprofessional learning setting. Whilst a defined focus ensures that the RLO has a limited size or granularity, this can be a problem in interdisciplinary development teams when each discipline seeks to retain its own specific context. As shown in the case studies, by means of negotiation and cooperation, a satisfactory compromise can be reached and this process in itself is valuable for understanding more about the culture and practices of different professional groups.

Quality and Workflow

There is a tension between ensuring RLO quality, by adhering to the quality assurance steps, limited funding (Pulman, 2007) and deadlines for release of the materials or delivery to student groups. A major consideration is managing the process illustrated in Figure 2. In our experience the lecturer-centric approach is crucial to ensure materials are fit for purpose and reuse. This impacts on the complexity of project management since RLO creation has to be fitted into an already busy lecturer's and clinician's schedule and project managers have to ensure work flow to media developers is not interrupted. As RLO communities of practice diversify to include more interprofessional groups, the logistics of project management become more complex. In the case studies described the time spent on this aspect of the project is hidden but it does add up to many person hours; however, the bite-sized RLO approach does have advantages over many technology development projects where loss of funding and momentum leads to unfinished products.

Collaborative Approaches

Creating RLOs collaboratively using the standardised framework and tools has allowed lecturers and clinicians new to, and sometimes sceptical of, e-learning to become involved. Creators of RLOs are required to analyse their perspectives and teaching materials on the topics they deliver and often be more critical and creative; the workshops always draw debate on what the focus of the RLOs should be; this is a new type of role for lecturers, lesson preparation is more often done in isolation and therefore much less transparent and open to scrutiny. Web 2.0 philosophies, that of students, users, carers and client groups contributing their own content in the form of stories and reflections using various technological platforms, (Pulman, 2007) is becoming commonplace and we too are now involving these groups in RLO development (Windle et al., 2008; Hallawell, Windle, Wharrad, Laverty & Williams, 2009). Further research might address how an interprofessional sharing culture is influenced by the process of RLO creation and how reuse is influenced by different content creators.

CONCLUSION

This chapter has illustrated via three case studies how an interprofessional collaborative method for creating RLOs has resulted in a widely, flexibly used and growing bank of high quality materials. The collaborative process of creation itself forces us to think in different ways. It demands that we take the wider view, broaden our horizons. Interprofessional collaboration enriches our perspectives, makes us more aware of others; this can only benefit healthcare outcomes in the long term. Interprofessional lecturers and educators, engaged in creating RLOs discover the need to reflect on the very processes of teaching and of learning at a fundamental level; this informs their teaching practice in many other situations beyond the world of e-learning whilst also creating valuable high quality resources available for present and future generations of students. RLOs can thus be seen as a vanguard for interprofessional educational change.

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