

Universities' Collaboration in eLearning (UCeL): a community of practice

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Abstract:

Universities' Collaboration in eLearning (UCeL) is a partnership between a number of UK higher education faculties and is pioneering new methods of interactive eLearning content creation. Founded in March 2002 by 6 UK Higher Education institutions, UCeL is actively exploring ways in which high quality content can be unlocked and made reusable across the many disciplines comprising the wide field of health professional education.

A number of subject areas have been identified as broadly generalisable, and therefore potentially the most promising for generating reusable content across all health professional disciplines. These are: statistics, epidemiology, research methods, anatomy and physiology.

This paper presents an overview of eLearning practice in health professional education across the UK higher education landscape in the form of a series of short reports presented by either an educator or a developer from each partner institution. It offers a model of how large and diverse organisations can collaborate to assimilate eLearning into their current working practice and shows how eLearning can be deployed in a unifying manner. The individual reports flag up a number of possibilities, opportunities and challenges. Taken as a whole, the collection of six stories shows the multi-faceted nature of this pragmatic and innovative project as it attempts to transform promises into practice by empowering and enabling people and focussing on the learning aspect of learning technology.

Background

Universities' Collaboration in eLearning (UCeL) is a partnership between a number of UK higher education faculties and is pioneering new methods of collaborative and interactive eLearning content creation. Founded in March 2002 by the Universities of Cambridge, Manchester, Nottingham, East Anglia, Wolverhampton and Peninsula

Medical School, UCeL is actively exploring ways in which high quality content can be unlocked and made reusable across the many disciplines comprising the wide field of health professional education.

Interactive multimedia is notoriously expensive and time-consuming to produce yet there is evidence that if made and deployed effectively it can enhance the learning experience and student evaluations show that, provided the materials are high quality, they are well received and valued; consequently if material can be collectively made and shared across courses and institutions then the deliverables will be significantly more cost-effective. The business model is not-for-profit and self-funding, with each partner institution contributing an annual membership fee of up to £20,000 depending on the numbers of students. In the interests of sustainability, partners are invited to commit funds for 3 years and according to the amount committed a proportion (~35%) is pre-allocated back to them in commissioned production. The remainder is available for administrative costs (e.g. collaboration web site, methodology development). Outputs are made available to other institutions in the consortium free of charge.

A number of subject areas have been identified as broadly generalisable, and therefore potentially the most promising for generating reusable content across all health professional disciplines. These are: statistics, epidemiology, research methods, anatomy and physiology. The eLearning resources are generated in the form of reusable learning objects (RLOs). RLOs are small, self-contained 'chunks' of eLearning each supporting a single learning objective. They utilise a variety of multimedia components including assessments and activities to maximise learner engagement.

Although UCeL is a state-of-the-art eLearning project it is not technology led, focusing on the needs of educators and the demands of their teaching and learning practice. Recognising that (understandably) people dislike having technical solutions imposed upon them, UCeL endeavours to engage educators in the creative processes of content creation in order to harness their invaluable knowledge, skills and ideas and deploy them to effective purpose. By placing people at the centre of eLearning practice, reuse of the resulting resources is further encouraged by the collective sense of ownership that arises from active participation in the project.

What follows is an overview of eLearning practice in health professional education across the UK higher education landscape in the form of a series of short reports presented by either an educator or a developer from each partner institution. It offers a model of how large and diverse organisations can collaborate to assimilate eLearning into their current working practice and shows how eLearning can be deployed in a unifying manner. The individual reports flag up a number of possibilities, opportunities and challenges. Taken as a whole, the collection of six stories shows the multi-faceted nature of this pragmatic and innovative project as it attempts to transform promises into practice by empowering and enabling people and focussing on the learning aspect of learning technology.

Peninsula Medical School

Peninsula Medical School is a new organization, managed by the Universities of Exeter and Plymouth in association with NHS Partners, which accepted its first intake of 130 students in September 2002 and its second steady state intake of 176 students in September 2003. It is a full five-year undergraduate programme, with problem based learning as its key method of delivery. The Peninsula Medical School, as its name indicates, is intended to operate throughout the south-west of England, where facilities are variable in nature, and transport infrastructure is poorly developed. Electronic communication is therefore more important than in many institutions.

As a consequence, a virtual learning environment (VLE) was placed at the heart of the learning landscape from the beginning of the project. All staff must use it for all parts of the course, and students must access it for all teaching materials and course information. Library provision is largely digital in many sites.

However, this requires that high quality materials be provided to populate the VLE. The medical course is designed around the principle of self-directed learning, requiring materials well adapted for this purpose. For instance, it is essential that they be consistent in presentation style and include self-assessment materials. This means that if the concept of RLOs did not exist, we would have had to invent it, and since we cannot produce all the necessary RLOs, joining a consortium is essential.

However, UCeL provides more than just the possibility of shared RLOs. It provides a forum in which to circulate ideas, and resolve both technical and pedagogic problems. While the former tend to engross IT staff working in this area, the latter are more significant, and there are relatively few opportunities to discuss these across disciplines. The collaboration also provides the 'activation energy' needed to start a project. Often, day-to-day operational issues mean that it is tempting to delay the commencement of a particular RLO. Participating in a collaborative project, where a moral commitment has been given to a particular set of activities, gives the RLO an appropriate place in the timetable. Once an RLO has been commenced, then the nature of the team work process at Peninsula ensures that it continues and is completed against a realistic time table.

To the collaboration we bring a dedicated IT staff working within a large well-equipped multimedia space, designed specifically to undertake such activities. Staffing levels have responded largely to the developing needs of the course as a whole, and provide an interesting insight into the number of personnel required. Currently, these include an IT manager, a multimedia developer, a database developer, and a VLE developer with a full time assistant. Valuable use has been made of IT students on one-year placements. These individuals (normally three at any one time, but with an overlap so that the outgoing students can induct the new ones) have proved adept at solving technical problems under the close supervision of the lead multimedia developer. Close co-operation between the lead academic staff member and the project developer is essential, but pressures on academic staff time are even greater than those on IT staff, and the principle is that the academic staff member will not do anything that can be done by the IT partner.

The use of the VLE within a problem based learning curriculum provides a natural way for RLOs to be presented to the students. Evaluation of the use and effectiveness of the RLOs will take time and effort, but initial student and staff feedback is very positive. The peer review process means that the RLOs have face validity, and the design structure promoted by UCeL means that the RLOs are of appropriate size and are truly 'reusable'.

Of course, challenges also arise. These have included interoperability issues between operating systems, and the problem of devising an internal strategy for RLO project selection. Since we are developing RLOs for the first time (inevitable in a new organisation!) we are currently taking a rather experimental approach to their selection. Currently, this is essentially 'interest led' by individual academic staff members, who propose topics which they feel are suitable for RLOs, generally where they already have materials capable of being adapted for this purpose. These tend to focus on single topics suitable for isolated treatment, and the field is so vast that this approach is adequate for the foreseeable future. However, in time the more difficult problems of subject integration will have to be encountered.

There is also perhaps a need for a single UK wide RLO project. Much outstanding work is done by the LTSN network, and through FDTL projects, for instance. It would be invaluable if common standards for the pedagogic content of the kind promoted by UCeL were adopted throughout the community. The JISC programme has devoted much thought and effort to technical issues such as interoperability, and there is a widespread feeling that it would be valuable for JISC to continue its recent moves towards assessing pedagogic issues, such as the extent to which students use VLE and other digital resources, the demographics of students engaged most in such use, and crucially, the impact of electronic resources on student learning, as opposed to student perceptions. The IVIMEDS project offers an invaluable strategic overview of materials needed in medical education, which could very profitably be integrated with practical 'bottom-up' delivery by projects such as UCeL. The scale of the task is considerable. EU rules suggest that a medical undergraduate course should represent some 6000 hours of actual study, and all of this could be supported by RLOs (since different institutions will deliver variable parts of the course by other means). International co-operation may well prove to be essential, bringing particular difficulties of its own

However, at the moment it is impossible to understate the value of developing an extending cadre of technical and academic staff familiar with the problems of developing RLOs, in addition to the production of RLOs themselves.

University of East Anglia – School of Medicine, Health Policy and Practice

The University of East Anglia, Norwich has been a member of the UCeL project from the outset. Originally subscribed to by the School of Medicine, Health Policy and Practice, UCeL is now gaining more widespread recognition and participation across the University.

RLOs offer a potentially valuable learning resource; however, expertise in their development needs to be created. Dr Bruce Lindsay (School of Nursing and Midwifery) and Dr Veena Rodrigues (School of Medicine, Health Policy and Practice) were awarded a University teaching fellowship in 2002-2003, to enable the start up of such expertise within the UEA. This fellowship will seek to enhance the ability of the applicants to design and implement RLOs in the provision of teaching and learning for health care students at under- and post-graduate levels. It will also enable the 'roll-out' of this expertise across other academic staff in the Health Schools.

The project is directly relevant to UEA's three key learning and teaching strategies, which are:

- To develop research-led teaching and learning as one of the hallmarks of education at UEA
- To enhance the quality of the learning and teaching environment and experience
- To enhance access, participation and progression by a diverse range of students who are able to benefit from higher education and continue to develop learning support appropriate to the needs of a diverse student population.

RLOs use up-to-date research data from local, national and international sources, in developing students' research and related knowledge and expertise. The provision of this new type of interactive resource will enhance the quality of teaching and learning and encourage interdisciplinary learning. UCeL will make RLOs available to students as an on-line resource, accessible directly or via course packages housed on the VLE. This will enhance access, participation and progression by all students, but will particularly benefit those who are part-time, mature, undertaking research-based programmes, and/or based at a distance from UEA campus.

The project will be evaluated locally through personal reflection, and feedback from colleagues and workshop participants. This evaluation will be included in an end of project report paper, to be submitted for publication.

Two workshops held at the UEA drew a response from 17 very interested and enthusiastic staff members (from across the University) and about eight RLOs were attempted. Of these, it was felt that no less than five themes could be developed further and would be of potential interest and use to more than one UEA health school. The added value of the workshops was the involvement not only of content 'experts' but also potential 'developers' from the UEA Learning Technology Group, which offers advice and support on the effective use of technology in learning and teaching. A major part of this group's current work is running and supporting Blackboard, UEA's chosen virtual learning environment. This new development offers the potential for creating and developing RLOs in-house at the UEA, after suitable training.

In the short-term, it is planned that RLOs which are relevant to more than one health school will be priorities for development. The simplest method of topic selection for an RLO is for a content expert to identify a common problem areas for students. This

method ensures that teachers have materials to support the teaching process in these areas, and students have access to an extra resource for a potential area of difficulty.

University of Nottingham - Schools of Nursing and Medicine

The School of Nursing at the University of Nottingham is one of the biggest providers of nurse education in the UK with 4000 students, over 200 staff and geographically covering 3000 square miles through five main centres. Development and evaluation of interactive CAL materials with students (Wharrad et al, 2001) began in 1995, in the belief that e-delivery of learning, if used appropriately could be used, not to replace nurse educators, but to help them to 'work smarter'. This is still the philosophy as is the desire for students to actively construct knowledge rather than to be instructed. Technology can facilitate this process if e-resources are engaging and interactive and by encouraging vicarious learning through on-line communities.

UCeL has provided an opportunity to develop and share multimedia resources as part of a multiprofessional collaboration. The boundaries that traditionally defined the roles and responsibilities of health professionals are blurring for example, the 'extended roles' of nurses exemplified by nurse consultant posts and nurse prescribing roles, so it makes a lot of sense for health professional educators to develop sharable materials together. Fostering understanding between lecturers from different professional groups and recognition of what each profession brings to health care is enhanced by collaborations such as UCeL. The development of electronic, re-usable learning resources representing smaller elements of learning that can be selected (by searching a database for particular tags) to address the specific learning needs of different multiprofessional groups rationalises the use of lecturers' time in preparing common material. The context in which they are used within modules and courses then provides the flexibility and relevance for individual professional groups.

A range of subjects has been identified as being suitable for multiprofessional learning including health promotion, communication skills, study skills and research methods and at Nottingham there has been shared learning between medical and nursing students in the biology based subjects in the past. As part of the UCeL collaboration, medicine, nursing and midwifery schools at Nottingham are working together to produce RLOs in a range of subjects including, research methods, statistics, pharmacology, pathology and clinical skills. Reaching a decision about what RLOs should be produced to justify the time and costs involved are complex and include some or all of the factors listed below.

- Student demand
- Lecturer has to regularly go over the material
- Scope for reusability in other modules or courses
- Has not been done (in this way) before
- Lack of subject specialists
- Content and materials available in other forms
- Addresses single learning objective

The examples that follow illustrate how and why RLOs are being used in various courses. (a) RLOs on ‘Levels of Measurement’, ‘Levels of Measurement: what you can and can’t do arithmetically’ and ‘Why a questionnaire’ have been developed to support students in their research modules. The scope for reusability of these RLOs is illustrated in Table 1 that shows the number of research courses delivered in the School of Nursing alone. These RLOs are used to support face-to-face sessions freeing up contact time for discussion and problem solving. (b) The rationale for using RLOs to support Pathology teaching in medicine is in part due to a national shortage of pathology lecturers in medicine. Pathology images are stored in a Learning Discovery Catalogue and these media assets (RLOs in themselves?) are being used to develop UCeL style RLOs. (c) The School of Nursing is running a post-registration programme to prepare nurses to prescribe drugs. Students come from various clinical settings and most are mature students who find pharmacology difficult. High quality graphics and audio are being used to develop pharmacology RLOs to facilitate learning. 12 RLOs have been written, using the UCeL model and templates, and will be ready to incorporate into the course in April 2004. Reusability options will be explored with Medicine and Midwifery.

Table 1

Re-usability: Research Methods/Statistics

	Modules	n	Centre	Intakes
Master of Nursing Science	Intro to research	60	Nottingham	1
	Statistics	60		
	Dissertation	60		
Master of Advanced Nursing Practice	Research & Statistics	20	Nottingham	1
Continuing Professional Development (post-registration diploma) Top up degree	Evidence-based Practice	>120	Nottingham,	4
			Lincoln, Boston,	4
			Derby, Mansfield	2
	Dissertation		4	
Diploma in Nursing	Evidence-based Practice	>300	Nottingham,	2
			Lincoln, Boston,	2
			Derby, Mansfield	2
				2
				2

The success and sustainability of the RLO approach depends on producing a critical mass of high quality RLOs before measurable benefits will be gained. This can be tackled in a number of ways. Firstly, more lecturers need to be engaged in the process of RLO development. Nottingham has run workshops and a one-day conference to introduce the idea of RLOs and to allow staff to gain hands on experience of developing them. The feedback suggests that lecturers who are constantly juggling the competing demands of research, teaching, administration and (in vocational courses) practice supervision, can allocate some of their time to developing small chunks of e-learning. Putting whole modules or courses on-line is a far more daunting consideration. Secondly, there is also the often misconceived idea that the lecturer has to be able to do all the programming and media development when developing e-learning. Within the School’s of Nursing and Medicine we have appointed learning technologists to support lecturers in planning and producing e-learning materials. The distributed media development approach built into

the UCeL framework means that the lecturers (content developers) and learning technologists (media developers) act as a pooled resource for the development of RLOs. The third point relates to the potential role of the students themselves in producing RLOs. Following a workshop on e-learning attended by a group of health professionals who were doing a masters in education studies, one of the students (an A&E nurse) wanted to develop her group's idea for an RLO as part of her master's dissertation. She has produced an RLO on handwashing that will be used for updating and training health professionals in clinical practice. The RLO will be evaluated by expert reviewers for accuracy and relevance, and by nurses and other users in hospitals. Similarly a nursing student is producing and evaluating an RLO on mouthcare for her master's dissertation. Along with the theoretical components, interactivity and formative assessment both RLOs contain video clips demonstrating good and bad practice. These are just three of the strategies Nottingham is using to increase the productivity of RLOs.

University of Wolverhampton – School of Health

When RLOs were first explored with staff from the School of Health at the University of Wolverhampton, their potential value was immediately apparent from a number of perspectives.

The University of Wolverhampton's Strategy for Learning and Teaching (2002-2005) has threefold priorities:

- staff: to develop our intellectually responsive learning community
- students: to develop the independent learner
- technology supported learning: to develop the interactive learning environment

The notion of RLOs fits comfortably with these priorities. The Learning and Teaching Strategy for the School of Health, reflects the annual targets of the University strategy and the development of RLOs has become one of the key targets.

The School of Health is commissioned to recruit and educate pre-registration students to meet staffing requirements of local health care providers. There are currently 1762 students undertaking a 3 year programme of study culminating in Registered Nurse status, with a Diploma of Higher Education (RNDipHE). There are also approaching 100 students studying for RNBSsc and 100 for RMBSc – Registered Nurse and Registered Midwife linked to an undergraduate award.

Whilst this pre-registration study accounts for the majority of the student numbers there are also undergraduate students undertaking a range of pathways, such as a Foundation Degree in Community Health and Social Care and BSc(Hons) Complementary Therapies. Once nursing and midwifery students have achieved professional registration, the School provides for their continuing professional development needs through a range of pathways and at a range of academic levels. They may access undergraduate or

postgraduate study. Some healthcare professionals opt to undertake a Professional Studies (Work Based Learning) Award, where they negotiate outcomes to best fit their areas of practice. This all swells the population within the School by a further 1200 students per annum.

Although there is great diversity in the subject areas addressed within the School, there is equally commonality. All clinical practice needs to be based on best available evidence. To do this, practitioners need to understand the nature of evidence. Again as practitioners they work within social and political frameworks. Whatever their area of practice, politics will have an impact on how care is to be provided. These are but a couple examples of areas of commonality that would benefit from the development of reusable learning objects.

Areas of commonality are not unique to just one School or indeed just one institution, and this is where the UCeL project is so crucially important. Why all reinvent the wheel if there is already valuable, quality material available elsewhere?

Availability of study materials in a range of formats is also becoming an increasingly important issue. Whilst the taught mode is still utilised for many pathways, some students find it difficult to access taught modules on a regular basis. Flexible approaches to learning are seen to be increasingly valuable, to afford students opportunity of access to study and professional development. This is particularly the case with qualified health care professionals.

Students studying at the University of Wolverhampton have access to WOLF (Wolverhampton Online Learning Framework), a purpose built, computer-based learning environment developed by the University. Its aim is to enable students to access materials and activities associated with topic areas quickly and easily. As the staff within the School of Health have engaged increasingly with WOLF, developing topics based on the modules that they are delivering, the materials being put into the WOLF topics has become increasingly interactive. This, coupled with recognition by the staff involved that there are areas of commonality across pathways, has led to acknowledgment of the value of the development of objects that are both interactive and reusable. It is believed that reusable learning objects will enhance both learning and teaching activities.

These are but a few of the reasons why the opportunity to develop RLOs has been welcomed by the School of Health. It is an opportunity to maximise on areas of learning and teaching; to encourage interactivity and to contribute positively to the learning and teaching targets of both the School and the University. It is also too good an opportunity to miss, to share good practices within a School, but also across a number of institutions.

University of Manchester – Evidence for Population Health Unit

The Evidence for Population Health Unit (EPHU) at the University of Manchester is currently delivering a web-based masters programme entitled Masters of Population Health Evidence (MPHe) to around 100 students. This contains an Introduction to

Biostatistics and Epidemiology module with web-based content comprising textual materials and graphs, some required reading from a specified text book, some additional reading from on-line text books, plus a few links to interactive Java applets, which are used to demonstrate simple statistical principles.

Whilst these types of material are of sufficient quality and variety to be appropriate for teaching purposes, they fail to take full advantage of the electronic medium through which they are being delivered. The UCeL approach has the ability to bring this material to life through the use of colour, movement and sound, and in time it will be possible to combine materials from different levels and contexts to suit individual learner need.

The majority of students at Manchester find it difficult to read large amounts of text from the computer screen so they usually choose to print out all reading material. The RLOs being developed as part of the UCeL collective are far easier to view directly from the computer screen. The inclusion of movement in the RLOs brings the pages to life and animations are usually designed to highlight some of the points being made in the text that makes the text easier to follow and increases its comprehensibility.

The University of Manchester has recognised that web-based teaching is an important part of the learning mix and a growing number of departments are delivering on-line materials. Within the university a special project has been established to develop interactive web-based material for basic quantitative methods. There are regular meetings of the various groups who develop and teach using web-based material and it is the experience of these groups Manchester offers the UCeL project. In addition, because staff have many years experience of delivering teaching material via distance learning they have an in-depth understanding of the problems faced by remote and isolated learners.

Despite the University's positive attitude to web-based teaching and distance learning there are still some political and cultural barriers to overcome. The administration system is designed for full-time undergraduate students and it is not appropriate for students who enrol on a web-based masters. Furthermore there is a reluctance to embrace the electronic delivery of teaching material and the danger that RLOs may be seen as a gimmick. Some of the reluctance comes from the view that the electronic delivery of material is an impersonal teaching medium and that the personal satisfaction of the teacher is lost. UCeL goes some way to overcoming this potential problem with its focus on the educational aspects (rather than the technology) and its ethos of "you can't replace face-to-face" with a mission to integrate eLearning alongside with all other teaching and learning activities.

This semester, two RLOs have been presented as part of the Introduction to Biostatistics and Epidemiology Module; these are "Levels of Measurement", a gentle introduction to the four levels of measurement (nominal, ordinal, interval and ratio) and "Power and Sample Size" which explains about Type I and II errors and shows how variables affect the power of a test. In both topics the learner is presented with some introductory material and some required reading and the RLO is included to bring a new interactive dimension to the learning experience and to aid greater understanding.

Informal evaluations and anecdotal evidence indicates that students are responding very positively to the RLOs and see them as a valued component of the course. Frequent comments were that they found them much easier to understand than the static material, very easy to use, and they also aided retention of the learned material. Next year, the RLOs will be even more closely integrated into the online course and will replace some of the existing textual material.

Conclusion

With such a great variety of institutional “takes” on the UCeL collaboration it seems that the model can readily be generalised to support a wide range of educational needs. 100 students taking the online masters at Manchester and 4000 student nurses at Nottingham have found the same two RLOs an effective aid to study despite their different backgrounds. By focussing on “difficult” topics, reusability can be further encouraged, and by applying high production values an engaging educational experience can be created. There is undoubtedly a real need for these resources and preliminary evaluations have found that students find them useful and valuable. The next task will be to provide a detailed table of topics in statistics for each of UCeL’s many health professional disciplines to discover which can be identified as most reusable. The School of Nursing at Nottingham has already begun this process and the expertise they amass in so-doing will benefit the entire collaboration as their results feed back into the wider community. It is a true “propitious” circle.

From enthusiastic participation in the workshops; ‘spin-off’ funding attracted to provide teaching fellowships and parallel RLO collections; eLearning seen not as a replacement but more as a powerful ally; a wide range of subjects targeted at potentially difficult areas of teaching at the chalk-face; supporting diversity within areas of broad commonality; enhancing staff and students’ IT skills; a robust peer-review process to ensure quality; providing practical support with the tools and templates required to produce the RLOs and evaluate them effectively; here is ample evidence for the real needs this collective addresses as a growing community gathers strength and takes shape.

The debate over whether RLOs will benefit the education community is currently hindered by the lack of research on RLO use in practice. The learning economy using RLOs will only be achieved if it is embraced not only by the enthusiasts but also by the wider learning community. Published work in this field is not generally based on empirical research so it is difficult for lecturers to make informed decisions about any benefits, for them, of embracing the opportunities offered by RLOs. The UCeL collaboration has the infrastructure to be able to strengthen the evidence base for e-learning by carrying out research projects alongside RLO production. Some of the research questions relating to sharing and reusability of RLOs within and between professional groups and institutions might be answered.

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