

## Issues in Reusing Online Resources: Chapter 1

Allison Littlejohn

This is an era marked by rapid developments in three different educational arenas -- access, lifelong learning and e-learning. In both developed and developing countries there is a growing demand for access to education. For example, in the United States the number of undergraduate students is expected to rise by 1 million by 2005; in the UK the government has set a target that half of all school leavers will enter higher education by 2010 (DfES, 2001); while in China the expectation is 5 million extra students over the next three years (MOE, 2001). Alongside this growing demand for access, increased numbers of adults are returning to colleges and universities for additional education and training (CIHE, 2002). Lifelong learning has come of age, brought about by changes in attitudes to learning and in employment patterns, where jobs and careers are recast many times during a lifespan. Permeating and supporting these first two developments, in access and lifelong learning, are developments in information and communication technologies (ICT). New technologies are beginning to transform how higher education is organized and delivered both on campus and at a distance. E-learning affords new opportunities to increase flexibility in time and location of study, in forms of communication (for example, asynchronous discussions) and types of interaction (for example between teacher and student), in how programmes are constructed (for example modules drawn from different universities) and in access to, and availability of information and resources through the World Wide Web.

Although e-learning has the potential to provide the kinds of flexibility required by wider access and lifelong learning there are some major obstacles. On the one hand, wider access and lifelong learning require vast increases in specially designed course materials to satisfy the greater range of demands for learning. On the other hand, creating the digital resources necessary for online course delivery requires considerable investment, a factor that makes resource development only viable for courses with large student numbers or sizeable budgets. In order to address this difficulty, numerous national and international initiatives have been funded to investigate ways in which digital learning resources might be developed, shared and reused by teachers and learners around the world (so as to benefit from economies of scale). Behind these initiatives lies a vision of a future in which reusable resources (or 'learning objects' as they are called) could comprise a new currency of exchange within a learning economy. Learning objects, produced by publishers, teachers, support staff and students themselves, would be stored in digital repositories, where they could be easily accessed, recombined and reused within online courses. In an ideal world, these resources would be designed so that they could be adapted to fit different educational models, subject disciplines and levels of study.

However, despite this vision, the idea of reusing electronic resources is more complex than the object economy scenario, outlined above, may suggest. The next section identifies seven issues associated with the reuse and sharing of resources. These sections focus on educational design, the need for standards, and on the culture and organization that would be necessary in institutions (and across institutions) if reuse were to become a reality.

## **Seven issues in the reuse and sharing of resources**

### **1 How can digital resources be used to support learning?**

In the vision of a learning object economy, resources are often conceptualized as blocks of content that could be interlinked so as to produce a course. Analogous with Lego bricks, these blocks can be recombined with other blocks and reused in a different course. However, this encourages a simplistic view of learning resources and a rather narrow model of the educational process. The assumption is that teaching involves only the transmission of blocks of content to students and that learning merely involves the uncomplicated acquisition of information and resources (Wiley, 2000).

Current models of education, by contrast, place constructive activity at the heart of any teaching and learning exchange. Learners do not just acquire information but more importantly, they also construct their own knowledge through interactions with tutors, other students and with learning materials (Palinscar, 1998). From this new perspective, learning resources act as triggers for both internal (inner mental) and external dialogue (with tutors and peers). Hence a key issue is how digital learning resources or objects could be used to support the different kinds of online activities and interaction patterns that teachers use in their courses.

One way to deal with this issue is to view student learning activities and interaction patterns as resources themselves, as templates (for example a framework for discussion or a learning task) that teachers could access and use to create an online course. Teachers would also require access to electronic tools, hardware and software, that would allow these 'activity structures' to be implemented across a range of different educational environments

### **2 How can resources be reused within a range of educational models?**

Content and learning activities on their own, however, do not constitute a course.

They would have to be combined in different ways to create courses based upon different educational models (Koper, 2001). Course design might be conceived as a middle layer that integrates the course content and learning activities (for example, teacher-student exchanges) within the framework of an educational model. However, there are an infinite number of educational models, so we need a way of dealing with this complexity. Fortunately, researchers are currently developing authoring tools that will enable teachers to model and implement their own education design in an online environment. These environments could then be populated with content and process resources. Some environments may be authored to allow interaction with a teacher or peers. Others may be of an adaptive type, whereby activities and resources are presented to students 'on the fly' (ADL, 2001).

### **3 Why is standardization necessary?**

The idea that different kinds of resources are reusable in many contexts implies some degree of standardization both of the descriptions of the resources and of the tools and environments these resources inhabit. Without standardization it would be exceedingly difficult for teachers to find electronic resources to fit their needs, to share these resources with others or to implement them in different electronic learning environments. Standardization exists at, at least two levels. First, anyone producing resources for a digital repository has to provide a description of that resource in terms of standard metadata (for example resource author, ability level). Standards here ensure interoperability of resources across different electronic environments and platforms. For example, the same set of resources could be migrated from one electronic learning environment to another. A number of organizations are currently developing international standards for metadata (IEEE, 2002). Secondly, in order for users to be able to locate resources in, and retrieve them from, a digital repository there must be a classification system or taxonomy. Without an agreed classification system and terminology it will be difficult to find what you are looking for in a repository.

The process of defining metadata is problematic: it is time-consuming for resource authors to carry out and there are problems in describing large resources with metadata. While teachers and students, as users, need not be aware of these metadata issues they do need to understand how resources are classified and the taxonomic terms that are used. Given that each discipline has its own language and discourse structure, and that resources will be shared transnationally (ie across cultures) this is a major challenge for developers of digital repositories.

#### **4 Is there an optimum size for reusable resources?**

Another issue in reusability is resource size. In general, the smaller or more granular a resource, the greater the possibility of it being reused in another educational context: for example, an individual image is likely to be more readily reused than an entire course (Downes, 2000). However, larger resources usually have greater educational value: it may be less time-consuming for a teacher to reuse a larger resource, such as a learning activity, rather than to construct a course from many small, basic components. Therefore, in terms of resource size, there is often a tension between increasing educational value and maximizing reusability.

#### **5 Should resources retain contextual information?**

There are other difficulties in ensuring educational resources are reusable in multiple situations. For example, for maximum reuse, resources should be context free: they should not contain information specific to a particular subject discipline, course or class (Naeve, 1999). However, this contradicts the way that teachers normally modify and adapt resources to fit specific teaching situations, disciplines, abilities of students and so on. One way of tackling this problem is for resource creators and users to detach context information from resources, rather than having contextual information as an integral part of a resource. In this way, the context information itself can become a reusable resource that could be made available to new users. However, separating context from resources is an unusual task for a teacher to perform.

#### **6 How are educational institutions likely to change?**

A learning object economy implies quite significant changes in what teachers will do in future and in how they spend their time. They are likely to spend less time creating learning resources, but more time developing activities for students, re-contextualizing resources and describing new resources with metadata (LTS, 2002). However, the need to find, create and share resources will require changes in the roles of other staff in the educational institution, not just teachers. For example, educational developers and learning technologists may have stronger roles in course design; technical support staff will be required to manage electronic learning environments and content management systems; audio visual staff will be needed to develop templates and complex technical resources; librarians will be required to manage digital resources; copyright officers will be needed to advise on copyright and intellectual property right issues. This implies that there will have to be much greater

collaboration across staff concerned with learning than exists at present. Ensuring this collaboration will be a major challenge to the ways in which educational institutions operate. In addition, all staff in institutions will require support to enable them to play their role in the reuse of resources within a learning object economy. Students will also need support in developing skills to benefit from reusable learning resources.

### **7 Is global sharing of resources a possibility?**

The vision of a learning object economy implies the existence of distributed, digital repositories serving communities of users across multiple institutions, educational sectors and nations. Harnessing this potential would require major strategic reorganization not just within and across institutions but also across different educational sectors, for a number of reasons. First, at a cross-institutional level, obvious conflicts exist between institutional competition for students and the collaboration implied by a learning object economy. Secondly, to get maximum value out of the development of reusable resources they should be shared across disciplinary communities, but this kind of cross-disciplinary sharing is not a strong feature in education. Disciplines differ in their languages, in their methods of enquiry and in their social and cultural organization (Becher, 1989). Thirdly, at a transnational level, cultural and language differences add a further complexity to the idea of resource sharing. However, on a more positive note, globalization coupled with new technology is resulting in the emergence of real and virtual communities in which previous barriers to collaboration are being broken down. Hence, a learning object economy might not seem so far-fetched 10 years from now.

### **Discussion of these issues within this book**

Trying to grapple with these seven issues is what led me to plan this book. Each of the issues is explored in more detail in relevant chapters in the book. The book is divided into four parts dealing with theory, design, resource and strategy. Each part draws on current research and the practical experience of scholars within school, continuing and higher education as well as the commercial sector. In the first part, underpinning theoretical concepts are introduced within a context of case studies and futuristic visions of sharing and reuse of resources. The second part explores educational design perspectives, including issues of accessibility and scalability. The third part examines resource perspectives, which are presented against the backdrop of emerging software tools and standards. The final part examines strategic issues within the wider educational context of schools, further and higher education and

online communities, and further explores some of the barriers outlined in the first part.

Ideas drawn from a variety of disciplines, including education, information science, computing and librarianship, are brought together in this collection on the reuse of online resources. While preparing their chapters each author had online access to the texts of other authors, so that ideas could be cross-fertilized and cross-referenced. This book offers the reader valuable insights into a rapidly developing and intriguing field of research and practice in reusing educational resources. It is hoped the book will make a useful contribution to the ongoing debate in the sharing and reuse of resources for e-learning.

## References

ADL (2001) Advanced Distributed Learning Initiative, Sharable Content Object Reference Model (SCORM) version 1.2: The SCORM Overview, <http://adlnet.org/Scorm/downloads.cfm#spec>

Becher, T (1989) *Academic Tribes and Territories*, The Society for Research into Higher Education and The Open University Press, Milton Keynes

CIHE (2002) The Council for Industry and Higher Education, Response to the joint consultation document from HEFCE and the Learning and Skills Council, <http://www.cihe-uk.com/partnershipsfor.htm>

DfES (2001) (Department for Education and Skills) *Education and Skills: Delivering results a strategy to 2006*, TSO, Norwich

Downes, S (2000) Learning Objects, Academic Technologies for Learning, Alberta, [http://www.atl.ualberta.ca/downes/naweb/Learning\\_Objects.doc](http://www.atl.ualberta.ca/downes/naweb/Learning_Objects.doc)

IEEE (2002) IEEE Learning Technology Standardization Committee, Draft Standard for Learning Object Metadata, version 6.4 [http://ltsc.ieee.org/doc/wg12/LOM\\_WD6\\_4.pdf](http://ltsc.ieee.org/doc/wg12/LOM_WD6_4.pdf)

Koper, E J R (2001) Modelling units of study from a pedagogical perspective: the pedagogical meta-model behind EML, document prepared for the IMS Learning Design Working Group, <http://eml.ou.nl/introduction/docs/ped-metamodel.pdf>

LTS (2002) Learning Objects -- The Compelling Proposition: A symposium, Learning and Teaching Scotland, Gordon J, Graham, G and Thomas, M

MOE (2001) Chinese Ministry of Education, <http://www.mow.gov.cn>

Naeve, A (1999) Conceptual Navigation and Multiple Scale Narration in a Knowledge Manifold, Royal Institute of Technology, Numerical Analysis and Computing Science, Kungl Tekniska Hogskolan, Stockholm, Sweden, [http://cid.nada.kth.se/sv/pdf/cid\\_52.pdf](http://cid.nada.kth.se/sv/pdf/cid_52.pdf)

Palincsar, A S (1998) Social constructivist perspectives on teaching and learning, *Annual Review of Psychology*, 49, pp 345--75

Wiley, D A (2000) Connecting learning objects to instructional design theory: a definition, a metaphor, and a taxonomy, in ed D A Wiley, *The Instructional Use of Learning Objects*, <http://reusability.org/read/chapters/wiley.doc>