Research and Practice in Technology Enhanced Learning
Vol. 1, No. 3 (2006) 269–284

CULTURAL ISSUES IN THE SHARING AND REUSE OF RESOURCES FOR LEARNING

ALLISON LITTLEJOHN* and ANOUSH MARGARYAN†

The Caledonian Academy
Glasgow Caledonian University, Scotland
**allison.littlejohn@gcal.ac.uk*
**http://www.academy.gcal.ac.uk/bulletin/*
†*anoush.margaryan@gcal.ac.uk*

It has been argued that the reuse of educational resources will contribute to the development of economies of scale in which users, both learners and teachers, can create, source, and share knowledge and information. Central to this objective are Learning Object Repositories (LORs) that can support resource reuse within and across learning communities. The uptake and use of LORs by communities will be influenced by a number of sociocultural factors that are difficult to distinguish and solve, since they involve a number of interrelated, tacit variables. In this article, we discuss three case studies outlining a range of actual and potential cultural issues affecting the implementation of LORs. We present a framework that can support systematic identification of these issues in the design and development stage and guide future implementations.

Keywords: Learning Object Repositories; learning communities; sociocultural factors.

1. Culture: A Multifaceted Variable

Culture is a significant force that is shaping the ways we share and reuse learning resources (Markus & Gould, 2001; Seufert, 2002). Culture can be described as a set of "shared motives, values, beliefs, identities, and interpretations of meanings of significant events that result from common experiences of members of collectives and are transmitted across age generations" (House, Hanges, Ruiz-Quintanilla, Dorfman, Javidan, Dickson, & Gupta, 1999). Cultural beliefs and norms are deeply rooted in each of us. They are part of each individual's mental programming, and ingrained in their social environment and life experiences (Hofstede, 1991). In the words of Hofstede, culture is "software of the mind." So, the way in which users do, or do not, share and use knowledge and information will be influenced by their cultural values and expectations.

Culture falls into a number of categories. *Organizational* culture can be reflected in the ethos of higher education or corporate training; *professional* culture includes,

for example, that of teachers or of learning technologists; *disciplinary* culture embodies both "hard" and "soft" sciences; and *national* cultures reflect ethnic diversity. Cultural impact is complex, because each facet of culture can simultaneously influence a range of processes. The ways in which learning resources might be shared and reused will be influenced by a range of organizational, professional, disciplinary, and ethnic factors, such as community size, member proximity, roles, and the types of tasks for which resources are used.

Sharing and reuse of resources for learning has been an important focus of research since the 1970s, when a number of attempts to promote reuse of educational software outside its original market took place (Bork, 1976). Over that time period, a wide range of inhibiting factors had been identified. These factors can broadly be classified as technological, pedagogical, organizational, and sociocultural (Collis, 1995). Attempts to overcome these problems have largely focused on technological solutions, such as standardization of operating systems and storage media. Similarly, investigations into the reuse of digital resources by learning communities have focused on technological factors such as interoperability standards, levels of granularity of learning resources, aggregation processes, as well as resource description and discovery. Important sociocultural factors have been largely ignored, which often resulted in "... poor matches with users' needs, misalignment with change policies and plans, confusion of roles and responsibilities in practice" (Dobson, LeBlanc, & Burgoyne, 2004, p. 2). One consequence has been poor levels of technology uptake and use.

As technological issues become less prevalent, sociocultural factors are receiving increased attention worldwide. In the UK, limited research funding is being targeted at investigations surrounding the sociocultural factors affecting sharing and reuse. One such initiative is Community Dimensions of Learning Object Repositories (CDLOR; http://www.academy.gcal.ac.uk/cd-lor/) funded by the UK Joint Information Systems Committee (JISC) to investigate enablers and barriers to successful use of Learning Object Repositories (LORs). The ideas in this paper are based upon this study.

LORs are a recent technological innovation aimed at supporting sharing and reuse of resources for teaching and learning. They are digital store boxes that host collections of digital resources in a learning object format. Heery and Anderson (2005) defined learning object repositories as "a managed storage system with content deposited on a personal, departmental, institutional, national, regional, or consortial basis, providing services to designated communities, with content drawn from the range of digital resources that support learning, teaching and research" (p. 3). One of the main differences between a LOR and some other sort of repository store is that the LOR hosts Learning Objects (LOs): resources that are designed to be integrated, aggregated, and sequenced in an efficient way to produce "units of learning" that are meaningful to learners. Current definitions for the term "Learning Object" vary (for example, IEEE, 2002; Koper, 2001; Wiley, 2001), but they mainly cluster around the idea of a highly granular digital resource developed to meet a single

learning objective. Thus LOs may be aggregated, combined with learning activities, and sequenced to form larger units of learning. Essential factors of LOs are that they should be reusable, accessible, interoperable, and durable (Rehak & Mason, 2003). Therefore, it is crucial that LOs are stored in a way that makes them easy to share, source, and adapt for a variety of purposes.

However, the reality is not as straightforward as this statement suggests. The idea that meaningful "units of learning" can be captured within reusable learning objects has been criticized (Friesen, 2004; Parrish, 2004; Wiley, 2003). Furthermore, studies have shown that the utility of learning objects will depend on the needs and cultural context of users and user communities (Beetham, 2004; Littlejohn, Falconer, & McGill, in press).

LORs are increasingly being used by a range of culturally diverse communities. These include work-oriented communities (business communities, communities of practice), research-oriented communities (scientific communities in academia, research and development communities in business), learning-oriented communities (classroom communities, virtual university communities), and hobby-oriented communities (communities of interest, fantasy or gaming) (Seufert, Moisseeva, & Steinbeck, 2001). Factors that are likely to influence the ways in which communities might use LORs involve:

- motivations of community members;
- their roles, status, and relationships within the community;
- existing rewards and incentives for sharing and using LOs within that community;
- who controls resource access and use;
- the size of the community and its effectiveness;
- the spatial location of community members and modes of communication employed (for instance, do they communicate predominantly online or is face-to-face communication possible?);
- community ground rules, how these develop and are supported, and how reconciliation of multiple agendas is supported;
- the rhythm of the community and its maintenance; and
- whether the community is perceived as open or closed (Margaryan, Littlejohn, & Nicol, 2006).

The issues that inhibit sharing and reuse of learning resources will differ across communities, although some will also be common across learning communities. This means that some key factors that influence LO repository utilization will differ between one community and another. Others may be generic across learning communities, and across the wider repository problem-space (for example, ePrint archives, image databases, research databanks, etc.).

One of these factors relates to the coherence of communities. Geographically dispersed teaching and learning communities are often loosely knit. In such communities, members will communicate and interact in different ways as compared

with locally based, tightly knit communities. Related to this, geographically dispersed LORs are likely to serve communities of ethnically diverse users. Different ethnic cultures will pose different expectations and norms related to hierarchical communications between students in a class or teachers in a community of practice, as well as communications between teachers and students (Jin & Cortazzi, 1998). Collaboration, sharing, and contribution will take on different forms in egalitarian cultures as compared with hierarchical cultures (Watson, Ho, & Raman, 1994). These different factors will have implications on the sharing of resources and in the use of LORs within communities.

In addition, the use of LORs within these communities is likely to be influenced by a range of dimensions of the LORs themselves (Margaryan, Currier, Littlejohn, & Nicol, 2006):

(1) *Purpose*, including LORs created to support hobby-based communities, such as gaming communities or LORs for the exchange-specific resource formats, such as sound files, learning designs, or student assignments;
(2) *Subject discipline*, including LORs created to support mono-disciplinary or multidisciplinary communities;
(3) *Scope* with LORs supporting departmental, institutional, regional, national, or international communities;
(4) *Sector*, for example school, higher education, further education, hobby-based learning, work-based, or lifelong learning, etc.;
(5) *Contributors* such as teachers, students, publishers, institutions, and hobby enthusiasts; and
(6) *Business model* concerning the business, trading, and management framework underpinning the repository.

The six dimensions of LORs described above draw out important aspects of the context within which the LORs and communities operate. However, as we noted, our starting point was that the way repositories are used depends not only on the dimensions of repositories, but also on key characteristics of communities.

A range of community dimensions and frameworks were reviewed in order to identify those that may impact the use of LORs (Margaryan, Currier, Littlejohn, & Nicol, 2006). Three existing frameworks were integrated:

- Seufert, Moisseeva & Steinbeck's five community dimensions (Seufert, Moisseeva, & Steinbeck, 2001);
- The seven-dimensional framework developed within the "Frameworks for fostering and evaluating communities of enquiry in the field of learning and teaching" strand of the Applied Educational Research Scheme (AERS; http://www.aers.ac.uk/aers/llt_1.html); and

- Koper, Rusman & Sloep's three sets of community dimensions (Koper, Rusman, & Sloep, 2005).

From these, the following community dimensions were synthesized:

(1) *Purpose*, the shared goal/interest of the community; the reason why the community was formed in the first place;
(2) *Dialogue*, modes of participation and communication (online, face-to-face, or mixed) adopted by the community;
(3) *Roles and responsibilities*;
(4) *Coherence*, whether the community is close-knit or loosely confederated/transient;
(5) *Context*, the broader ecology within which the community exists (for example, institutions, organizations, professional bodies, governments, etc.);
(6) *Rules*, implicit and explicit rules that govern the functioning of community (for example, ground rules of conduct, rewards and incentives mechanisms, control of access and use of resources, etc.); and
(7) *Pedagogy*, teaching and learning approaches used in the community (for example, problem-based learning, collaborative learning, etc.).

In the UK, a number of LORs are currently under development. Their implementation has uncovered a range of problems with usage. Some of these problems will be illustrated in the next section.

2. Problems with Using LORs to Support Teaching and Learning

The types of LORs currently being implemented to support teaching and learning span a range of communities: disciplinary, classroom-based, institutional, regional, national, and/or international. An example of an international repository is the Spoken Word Services. National repositories include the Jorum, and Digital Libraries for Global Distributed Innovative Design (also known as DIDET) is an example of a local, classroom-based repository.

Issues affecting the use of these repositories by a range of communities have been analysed within the framework of the CDLOR project. The study involved a two-stage process. First, the key characteristics of these three repositories and their communities were analysed using the dimensions outlined in the previous section. Second, data from repository curators (those responsible for the development and management of the repositories) and users (teachers and students) was collected in order to identify the main cultural issues from the perspectives of these stakeholders. Data from the curators was collected using a questionnaire. Users' views were collected using semi-structured, face-to-face and telephone interviews. In the following sections, we explore these three diverse repositories: DIDET, Jorum, and Spoken Word Services.

2.1. *Digital libraries for Global Distributed Innovative Design (DIDET)*

DIDET (http://dmem1.ds.strath.ac.uk/didet/) is a repository system used to support engineering students' group design projects at the University of Strathclyde (UK) and Stanford University (USA). The repository, illustrated in Figure 1, is funded as part of the JISC "Digital Libraries in the Classroom" program. The repository is used as a support tool in a product design course in the Department of Design, Manufacture, and Engineering Management.

In this course, students are given an assignment for designing and developing a domestic product. External companies set the design briefs and assign coaches to guide students in carrying out the designs. Product design involves three phases: (a) information gathering, storing, and structuring, (b) concept generation, and (c) development and prototyping (McGill, Nicol, Littlejohn, Grierson, Juster, & Ion, 2005).

Over six weeks, the students work in small teams of four, meeting face-to-face several times per week. Tasks and assessments are designed to encourage students to store and share information online. Resource sharing is supported through the repository system where students can store, share, and manage materials. During the initial storing and structuring phase, students collect, evaluate, and store materials from a variety of sources to supplement resources created by other students. In the concept generation phase, students are required to collaboratively construct concept maps to justify their design concept. The design phase involves

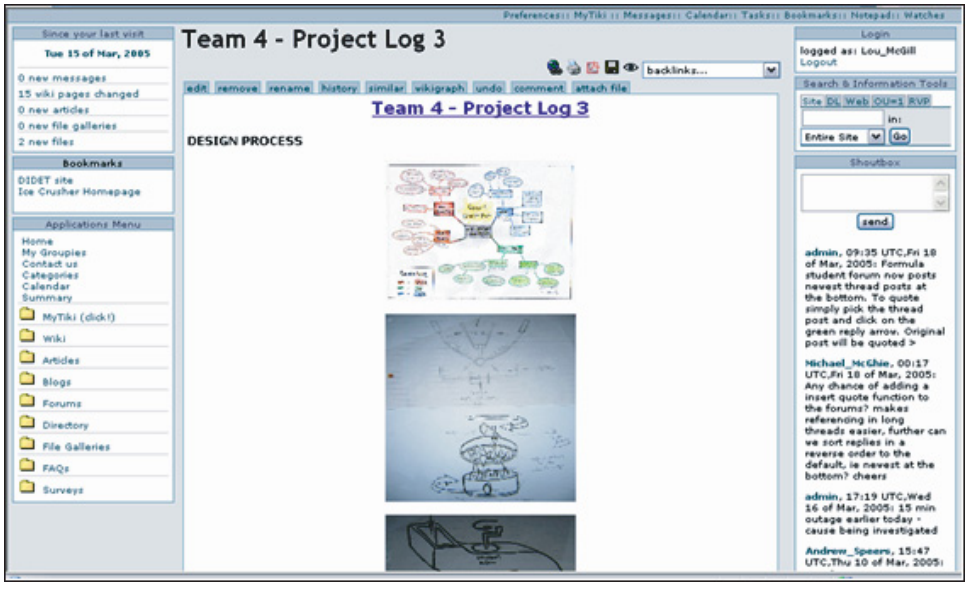

Fig. 1. The DIDET repository showing a shared group workspace.

Table 1. Key dimensions of the DIDET repository and community.

Purpose of the repository and types of resources: Support engineering students' group design projects; contains student- and teacher-created resources, links to external resources, including external discipline-specific repositories
Disciplines: Design and manufacturing engineering
Scope: Classroom-based
Sector: Higher education
Contributors: Students, tutors, industry-based coaches and information specialists
Business model: Trading model is not applicable, but commitment from academic staff is necessary; incentives might be required at departmental level to motivate all staff to participate
Purpose of the community: Learning about product design principles through applied projects
Dialogue: Communication face-to-face, as well as via blogs, wikis, chat, and discussion tools available within the electronic environment
Roles: Coaches define project brief and give students feedback; students in groups progress their product designs by sourcing, evaluating, sharing, and integrating resources; tutors guide students and assess the project outcomes; information specialists provide guidance and skills training in resource management, and maintain the digital learning environment
Coherence: Tightly knit community; classroom facilitation important; small group learning
Context: Institutional and subject-specific (engineering), with links to industry
Rules: Curricular aims and learning objectives of the course; learning assessment
Pedagogical approaches: Wide range of resources; learning task design critical; different pedagogies possible although focus on social constructivist pedagogies (collaborative and project-based learning)

the students populating these maps with information resources. During these two phases, an information specialist guides students in selecting, evaluating, organizing, and storing information. By organizing and structuring information in this way, the students justify and capture their design decisions. Key dimensions of DIDET are summarized in Table 1.

Analysis of DIDET highlighted a number of problems with sharing and reuse related to culture. Some of these problems arose from differences in professional cultures. There were differences in perspectives between the contributors and the curators of the LOR. While primarily focusing on technological issues, the repository developers did not fully consider end-user (student and tutor) current practices and needs. For example, to promote maximum reusability of resources, the developers required users to decontextualize materials so they could be reused across a range of contexts. However, decontextualization is counter-intuitive to tutors and learners. Preparation of resources for reuse is not part of current practice; therefore, tutors and students do not have the skills in developing reusable materials.

In addition to supporting resource discovery within the repository, developers instructed learners to tag resources with small amounts of metadata. This task proved difficult for the students since they had poor skills in organizing and categorizing information. DIDET tried to overcome these problems by providing information literacy support; however, it was difficult to affect immediate culture change.

Some potential problems were identified too. Firstly, there could be cultural misfit between various contributors. Professional conflicts are likely to happen as people assume different roles, such as content experts, teachers/tutors, learners, support staff, and managers. Also, the disciplinary, institutional, and cultural contexts within which these contributors operate will differ, for example, in terms of tolerance for learners selecting or creating their own resources.

Geographical scope is a further dimension which can have potential cultural implications. Repositories like DIDET serving communities at local (classroom- or department-based) levels will be used differently from those with regional, national, or international scope. Some studies of current practice indicate that, when developing educational materials, teachers prefer to share resources with locally based colleagues (Margaryan, 2006; Strijker, 2004). Therefore, national repositories may experience problems in encouraging users to contribute resources.

2.2. *Jorum*

Jorum (http://www.jorum.ac.uk; Jorum means a collection bowl) is a national, interdisciplinary repository available to all tutors (but not learners) within UK higher and further (vocational) education institutions. Funded by JISC, Jorum aims to collect and make available learning and teaching materials created by individual tutors and by JISC-funded projects. The repository is based around two interrelated services. The "Jorum Contributor" service requires each institution or JISC-funded project to nominate a person who serves as a "contributor." The role of the contributor is to gather and upload resources from colleagues across their institution. The "Jorum User" service provides tutors from all UK institutions access to all gathered resources. Users can source, preview, download, repurpose, and reuse materials within their teaching context. The Jorum interface is shown in Figure 2. Key dimensions of Jorum are outlined in Table 2.

Problems arise from the broad purpose of the repository to share resources across all institutions and disciplines. The literature provides evidence that different discipline communities have preferences in sharing and reusing different types and formats of resources (Masterman & Lee, 2005). For example, science and engineering disciplines are more likely to use simulations, while social sciences tend to use text-based resources (Littlejohn, 2004). In addition, the different subject disciplines display diverse patterns of technology use that underpin a range of pedagogic approaches, which influences the selection and deployment of LOs (Collis, 1995; Russell, 2005; HEA, 2006, Cook, 2006).

Therefore, because of their cultural diversity, different disciplines use LORs in different ways and for different purposes. Consequently, to serve a range of communities requires Jorum to gather and make available a wide range of high-quality resources in a variety of formats. However, curators have reported difficulties in reaching this critical mass, and users pinpointed a lack of high quality materials directly relevant to their curricular needs.

Fig. 2. Interface of Jorum.

Table 2. Key dimensions of Jorum.

Purpose of the repository and types of resources: To collect and make available learning and teaching materials to all UK higher and further education institutions. A wide range of resources from single files, images, and documents to IMS content or SCORM packages
Disciplines: All disciplines
Scope: National
Sector: Higher and further education
Contributors: Designated contributors in each institution collect resources from tutors; JISC-funded projects contribute resources arising from these projects
Business model: Trading model critical; incentives possibly financial within and across disciplines; requires separate organization (for example, JISC) or consortium to manage LOR, workflow, and digital rights
Purpose of the community: To share resources across institutions and disciplines
Dialogue: None at present
Roles: Designated contributors collect and submit resources; curators provide training and technical support, as well as curatorial services
Coherence: Loosely knit
Context: National, multi-institutional
Rules: IPR and curricular differences across different sectors and disciplines
Pedagogical approaches: Focus on content; possibly distant from learning culture of individual institutions

Further issues with Jorum are related to its operation across two educational sectors. This leads to potential cultural differences in attitudes to sharing and collaboration across these sectors. Jorum curators report cultural differences in attitudes to sharing and collaboration across participating institutions. This is congruent with previous studies reporting that different educational sectors reflect diverse organizational and social cultures (Littlejohn, Jung, & Broumley, 2003). The standardization of curricula in further education has, in some ways, encouraged reuse of resources designed to support teaching across these programs. Conversely, continued implementation of non-standardized curricula across higher education institutions may inhibit reuse, since resources for these courses are generally bespoke.

The national scope of Jorum presents further problems in terms of providing national user training and support. Users do not currently have the skills required to use the repository in an effective way. Moreover, user skills will vary across the different types of communities served by Jorum. This will result in problems with scalability of user support and guidance when the repository is rolled out more widely. These scalability problems are also experienced when using international repositories such as Spoken Word Services which is discussed next.

2.3. *Spoken word services*

Spoken Word Services (http://www.spokenword.ac.uk/) is an international repository based at the Glasgow Caledonian University in the UK. The purpose of this repository is to share authentic audio resources across UK and US higher education institutions. These resources are BBC radio archives, including interviews, talks, features, documentaries, and news coverage of key events. Audio resources are supplemented by text-based materials such as journal articles, reports, legislation documents, and relevant websites.

Resources have been prepared from BBC archives by repository curators and evaluated by subject-matter experts. Teachers wishing to use these materials search for appropriate resources which they download and make available to students. The students listen to the audio files to help them carry out learning tasks. Students have opportunity to share ideas, comments, queries, and reflections on the audio material via online discussions or other interactive features. The interface of this repository is shown in Figure 3. The key dimensions of Spoken Word Services are summarized in Table 3.

The cultural issues related to this repository echo some of those pertaining to Jorum. First, it was identified that users from particular disciplines preferred text-based rather than audio resources. This variation in preference for specific formats of resources has been reported in the literature (Littlejohn, Falconer, & McGill, in press). Second, variation in user IT skills was identified as a potential issue related to diversity of disciplines and scope. This difference in IT skills could result in problems

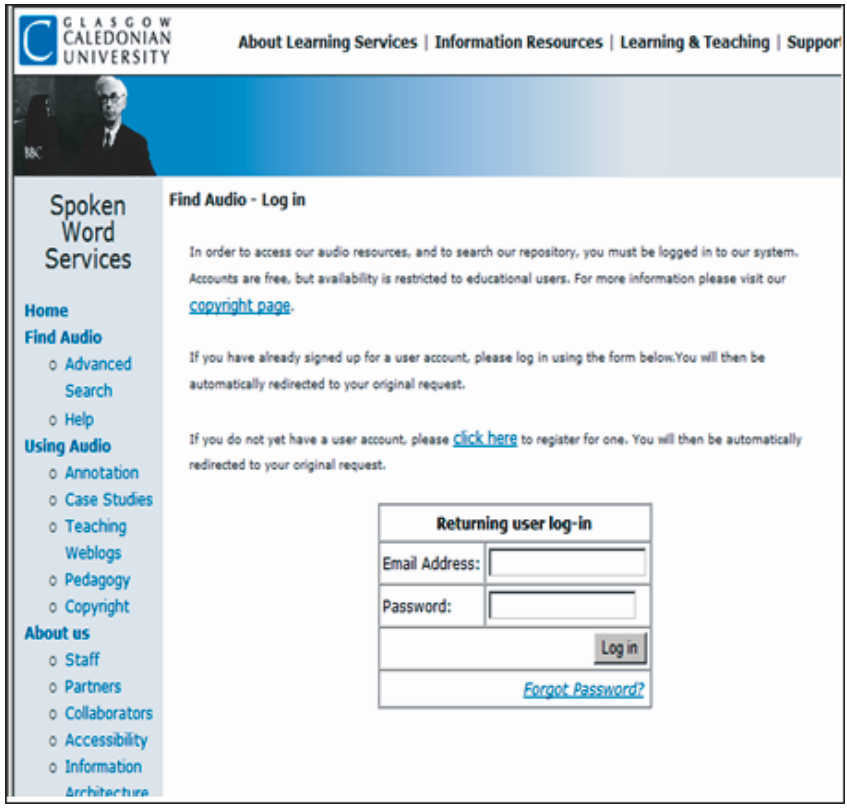

Fig. 3. Interface of the Spoken Word Services repository.

Table 3. Key dimensions of Spoken Word.

Purpose of the repository and types of resources: Integration of digitized audio into learning and teaching
Disciplines: All disciplines
Scope: International
Sector: Higher education
Contributors: BBC archives; teachers and students within UK and US higher education institutions
Business model: Sources provided and made freely available by the BBC; this model requires staff commitment and incentives for use within the institutions
Purpose of the community: To share audio resources across institutions and disciplines
Dialogue: Local face-to-face dialogue amongst teachers; rudimentary community of practice currently coalescing
Roles: BBC provides sound clips. Curators expand these sound files with other resources (transcripts, URLs, etc); teachers source, annotate and make resources available to students
Coherence: Loosely knit
Context: International, multi-institutional
Rules: IPR; learning objectives
Pedagogical approaches: Content can be incorporated into a variety of pedagogic approaches; possibly distant from learning culture of institutions

with scalability of user support and guidance when the repository is rolled out more widely.

Further potential cultural issues were related to the business model of the repository, in particular incentives and rewards. It was suggested that some institutions may lack policies with recognition and reward for tutors experimenting with new technologies. This factor may discourage wider adoption of repositories.

This study also identified problems related to community stakeholders' perceptions of what activities constitute legitimate practice, efficient use of time, and how this impacts on community, belonging, and identity. Some users commented that their experimentation with different learning designs and resource formats was considered by peers to be outside the bounds of normal practice. They further reported a "sense of personal validation," through their involvement with the repository and other users across the University, which they do not gain from peers in their departments. As a result, a tightly knit community of practice has started to coalesce around the Spoken Word repository.

2.4. *Key issues from these three case studies*

S*ubject discipline* was viewed as a significant dimension that influences user decisions. Our findings show that it affects resources and processes: the types of resources being stored for reuse, as well as the ways in which these resources will be used. Some disciplines may favor complex, interactive resources, while others prefer text-based materials. Clearly, repositories aimed at single disciplines can be more focused in terms of the resource types within their collections. Consequently, these repositories will rapidly reach the critical mass of resources required to sustain user interest within the collection. User prerequisite skills and literacy can vary across different disciplines.

Similar to discipline, the *scope* of the repository will strongly influence user skills, choices, and needs. LORs with a narrow scope (for example, classroom-based DIDET) have more opportunity to meet the needs of their user community than those with a wide scope (such as Jorum).

Contributor perspectives was another significant cultural dimension, affecting users' approach to reuse and the types of rewards that are meaningful to them. Rewards and incentives is a key factor within the *business model*. Finally, the choice of resource will limit options in terms of *pedagogical approach*, although seemingly noninteractive resources could be rendered active by combining them with meaningful learning activities.

3. Next Steps: Overcoming Cultural Issues and Supporting Implementation

In this analysis, we have identified a range of actual and potential cultural issues affecting the implementation of repositories. Cultural impact is complex, because each facet of culture can simultaneously influence a range of processes. The analysis

highlighted a number of dimensions that may help identify potential solutions to problems with implementing and running repositories. However, these dimensions are strongly interrelated, and so potential solutions will have to be considered across several dimensions simultaneously. In this section, we present a framework that can be used to systematically examine issues that span across dimensions (Margaryan *et al.*, 2006). The framework combines the community and repository dimensions discussed earlier in this paper and can guide future implementation of repositories.

These dimensions are expressed as a series of questions:

(1) What is the purpose of the repository? For example, what kinds of learning resources will be stored in the repository and what cultural factors could underpin their potential utilization within diverse communities?
(2) Who are the key stakeholders of the community? Of these, who will contribute to or use resources within the repository? What cultural tensions could potentially arise between these diverse stakeholder groups?
(3) What business model will be used in the operation of this repository? How does the business model link with the cultural values and expectations of user communities?
(4) What is the purpose of the communities that the repository will support? What dimensions of these communities could be influenced by culture?
(5) What are the modes of participation and communication within that community? How might cultural diversity influence participation and communication? And how does the repository culturally fit with these patterns of interaction?
(6) What are the roles and responsibilities of those involved in the community? Which cultural factors might influence the distribution of these roles when repositories are introduced?
(7) How coherent is the community?
(8) What is the broader context within which the community operates?
    (a) What subject(s) or discipline(s) will the repository serve? What cultural values inherent in these disciplines are likely to impact their use of repositories?
    (b) What is the scope of the stakeholder community the repository will serve and which sectors will it cover? What are the cultural norms and expectations inherent in these sectors that could impact their utilization of repositories?
(9) What are the implicit and explicit rules that govern the functioning of that community? (For example, rules of conduct, rewards and incentives, control of access, workflows, etc.) What cultural factors could influence these rules?
(10) What pedagogical approaches are in use within the community? What cultural issues will impact upon their effectiveness, especially when repositories are used to support these approaches?

These questions could help repository curators, managers, and anyone involved in repository implementation to place conceptual issues on a practical plane.

Further studies are required to validate the ways in which the repository and community dimensions interconnect. Some existing gaps between repositories and communities could be bridged by ensuring that LORs are developed by multidisciplinary teams of learning designers, tutors and subject-matter experts, information specialists, and learning technologists, using rapid prototyping models of design and development. End-users should be involved at each stage of design, development, and testing to ensure their cultural needs are met.

Acknowledgements

The authors would like to thank colleagues in the CDLOR project team for their continued collaboration: Sarah Currier, David Nicol, and Peter Douglas. Thanks go to the reviewers and the Special Issue co-editors for critical comments. We would also like to thank JISC for funding this study.

References

Beetham, H. (2004). Review: Developing e-learning models for the JISC practitioner communities. Report for the JISC e-Pedagogy programme. JISC, UK.

Bork, A. (1976). *Transferability of computer-based learning materials*. Internal report. Physics Computer Development Project, University of California, Irvine, CA.

Collis, B. (1995). The evolution of educational software productivity. In D. Ely & B. Minor (Eds.), *Educational media and technology yearbook*, Volume 21 (pp. 76–97). Englewood, CO: Libraries Unlimited.

Cook, J. (2006). Disciplinary patterns in e-learning: What technologies and approaches are used in the different communities? Presentation at the e-learning in the Disciplines Symposium, HEA and JISC, Birmingham, UK. Retrieved September 3, 2006, from http://www.heacademy.ac.uk/learningandteaching/eLDJohnCook.ppt

Dobson, M., LeBlanc, D., & Burgoyne, D. (2004). Transforming tensions in learning technology design: Operationalising activity theory. *Canadian Journal of Learning and Technology*, *30*(1), Retrieved September 3, 2006, from http://www.cjlt.ca/content/vol30.1/cjlt30-1_art2.html

Friesen, N. (2004). Three objections to learning objects. In R. McGreal (Ed.), *Online education using learning objects* (pp. 59–70). London: Routledge. Retrieved September 3, 2006, from http://www.learningspaces.org/n/papers/objections.html

HEA (2006). *Reflections on key curriculum outcomes, challenges and e-learning issues from cognate discipline groups*. Report on the outcomes of the e-learning in the Disciplines Symposium, HEA and JISC, Birmingham, UK. Retrieved September 3, 2006, from http://www.heacademy.ac.uk/learningandteaching/ELDisciplinesCombinedReflections.doc

Heery, R., & Anderson, Sh. (2005). *Digital repositories review*. Report. JISC, UK. Retrieved September 3, 2006, from http://ahds.ac.uk/preservation/digital-repositories-review-2005.pdf

Hofstede, G. (1991). *Cultures and organisations: Software of the mind*. New York: McGraw-Hill.

House, R., Hanges, P., Ruiz-Quintanilla, A., Dorfman, P., Javidan, M., Dickson, M., & Gupta, V. (1999). Cultural influences on leadership and organisations: Project GLOBE. In W. Mobley, M. Gessner, & V. Arnold (Eds.), *Advances in global leadership*, *1*, 171–233. Stamford, Connecticut: JAI Press. Retrieved September 3, 2006, from http://leadership.wharton.upenn.edu/l_change/publications/House/Cultural%20Influences%20on%20Leadership%20-%20House%20.doc

IEEE (2002). Draft standard for learning object metadata. Retrieved September 3, 2006, from http://ltsc.ieee.org/wg12/files/LOM_1484_12_1_v1_Final_Draft.pdf

Jin, L., & Cortazzi, M. (1998). Dimensions of dialogue: Large classes in China. *International Journal of Educational Research*, *29*, 739–761.

Koper, R. (2001). *Modelling units of study from a pedagogical perspective: The pedagogical meta-model behind EML*. Document for the IMS Learning Design Working Group. Retrieved September 3, 2006, from http://eml.ou.nl/introduction/docs/ped-metamodel.pdf

Koper, R., Rusman, E. & Sloep, P. (2005). Effective learning network. *Lifelong Learning in Europe*, *IX*, 18–28.

Littlejohn, A. (2004). *The effectiveness of resources, tools and support services used by practitioners in designing and delivering e-learning activities*. JISC final report. Retrieved September 3, 2006, from http://www.jisc.ac.uk/uploaded_documents/Final%20report%20(final).doc

Littlejohn, A., Falconer, I., & McGill, L. (in press). Characterising effective e-learning resources. *Computers and Education*.

Littlejohn, A., Jung, I., & Broumley, L. (2003). A comparison of issues in reuse of resources in schools and colleges. In A. Littlejohn (Ed.), *Reusing online resources: A sustainable approach to e-learning* (pp. 212–220). London: Kogan Page.

Marcus, A., & Gould, E. (2001). *Cultural dimensions and global web user-interface design: What? So what? Now what?*. Retrieved September 3, 2006, from http://www.amanda.com/resources/hfweb2000/AMA_CultDim.pdf

Margaryan, A. (2006). Report on personal resource management strategies. CDLOR Deliverable 7. Retrieved September 3, 2006, from http://www.academy.gcal.ac.uk/cd-lor/CDLORdeliverable7_PRMSreport.doc

Margaryan, A., Currier, S., Littlejohn, A., & Nicol, D. (2006). Learning communities and repositories. CD-LOR Desk Research report (Deliverable 1). Retrieved September 3, 2006, from http://www.academy.gcal.ac.uk/cd-lor/learningcommunitiesreport.pdf

Margaryan, A., Littlejohn, A., & Nicol, D. (2006). Community dimensions of learning object repositories. Paper presented at symposium: Repositories for teaching materials and learning objects: Enablers and barriers to use, Networked Learning 2006 Conference, April 10–12, 2006, Lancaster, UK. Retrieved September 3, 2006, from http://www.networkedlearningconference.org.uk/abstracts/pdfs/04Margaryan.pdf

Masterman, L., & Lee, S. (2005). *Reusing learning materials in English literature and language: Perspectives from three universities*. Report on HEA English Subject Centre Mini Projects. The English Subject Centre, University of London, UK. Retrieved September 3, 2006, from http://www.english.heacademy.ac.uk/archive/projects/reports/reuse_lams_oxford.doc

McGill, L., Nicol, D., Littlejohn, A., Grierson, H., Juster, N., & Ion, W. (2005). Creating an information-rich learning environment to enhance design student learning: Challenges and approaches. *British Journal of Educational Technology*, *36*(4), 629–642.

Parrish, P. E. (2004). The trouble with learning objects. *Educational Technology Research and Development*, *52*(1), 49–67.

Rehak, D. & Mason, R. (2003). Keeping the learning in learning objects. In A. Littlejohn (Ed.), *Reusing online resources: A sustainable approach to e-learning* (pp. 20–34). London: Routledge.

Russell, C. (2005). Disciplinary patterns in adoption of educational technologies. In J. Cook, & D. Whitelock (Eds.), *Exploring the frontiers of e-learning: Borders, outposts, and migration* (pp. 64–76). Proceedings of the ALT-C 2005 Conference, September 6–8, 2006, Manchester, England, UK.

Seufert, S. (2002). Cultural perspectives. In H. Adelsberger, B. Collis, & J. Powlowski (Eds.), *Handbook of information technologies for education and training* (pp. 411–421). Berlin: Springer Verlag.

Seufert, S., Moisseeva, M., & Steinbeck, R. (2001). Virtuelle communities gestalten [Virtual communities outlined]. In A. Hohenstein, & K. Wilbers (Eds.), *Handbuch E-Learning* [Handbook of E-Learning]. Köln: Fachverlag Deutscher Wirtschaftsdienst.

Strijker, A. (2004). *Reuse of learning objects in context: Human and technical aspects.* Doctoral dissertation. Enschede, The Netherlands: Faculty of Behavioural Sciences, University of Twente. Retrieved September 3, 2006, from http://130.89.154.170/proefschrift/

Watson, R., Ho, T., & Raman, K. (1994). Culture: A fourth dimension of group support systems. *Communications of the ACM*, *37*(10), 45–55.

Wiley, D. (2003). The coming collision between automated instruction and social constructivism. Retrieved September 3, 2006, from http://telr.osu.edu/research/pdf_word_docs/Wiley_OLN.doc

Wiley, D. (2001). Connecting learning objects to instructional design theory: A definition, a metaphor, a taxonomy. In D. Wiley (Ed.), *The instructional use of learning objects.* Retrieved September 3, 2006, from http://www.reusability.org/read/chapters/wiley.doc