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### Heir RAID: Re-purposing Legacy Digital Library Resources as Learning Objects

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#### **ABSTRACT**

*“RAID” is a mnemonic adopted by the eLearning community for the attributes that define Learning Objects: they should be Reusable, Accessible, Interoperable and Durable. The paper explains these attributes with examples from the SCRAN learning resource service. It suggests that they so closely match attributes generally believed to be desirable for the content of multimedia Digital Libraries, that it would seem sensible for library managers to be aware of the standards and frameworks that are emerging in the cognate discipline of eLearning, and in particular IMS, IEEE LOM, and SCORM.*

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#### **KEY WORDS**

e-learning, digital library, learning object, metadata, sustainability

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#### **INTRODUCTION**

Buenos días! Disculpe: habla poco castellano – and so I must give my presentation in English. I am delighted to have been invited to contribute to this morning’s discussion on e-learning and LIS. I do so from a background of some 30 years experience as an academic librarian and developer of electronic library services in South East Asia and the United Kingdom, and most recently as a consultant on digital libraries and virtual learning environments.

I must also apologise for my very British love of puns, which has led to the play upon words in my Title. The word “Heir” in the title is used in the sense of “receiving a legacy”, and refers to the case I attempt to make in this paper that there is little point in creating a digital library unless it can be made available to future generations of users. This I have linked with “RAID”, which in this case is a mnemonic adopted by the eLearning community for the attributes that define Learning Objects.

My paper suggests that one way of ensuring the future sustainability of Digital Libraries, is to re-purpose them so that they can serve as Learning Object Repositories, and that the attributes of Learning Objects so closely match those generally believed to be desirable for the content of multimedia Digital Libraries, that this would a technically feasible and desirable thing to do.



**Figure 1 Reusable Objects: a rights-cleared image downloaded from SCRAN**

## **RESOURCE DISCOVERY IN THE HERITAGE SECTOR**

It is only in comparatively recent years that the Cultural Sector has awoken to the need for reciprocal access and interoperability between its constituent curatorial domains. Whether for collections management, bibliographic access or inventory control, Archives, Libraries and Museums have followed similar but often mutually incompatible standards of description for the resources in their collections.

As more and more of these descriptions, and indeed in many cases actual resources, have been made available on the internet, it has become clear that the end user is not interested in the historic, technical or political reasons why the stuff they are seeking may only be disclosed via one or other resource description format: they simply want seamless access to the stuff itself. This realisation has led to the development of standards and protocols for cross-domain resource discovery, and in particular to the widespread adoption of the Dublin Core set of Metadata elements (**DCI**).

## RESOURCES FOR VIRTUAL LEARNING



During the same time period the education technology community has been working to develop models for the delivery of content for learning in the digital age. The concept of the Virtual Learning Environment (VLE) has arisen, which exists to deliver, in a seamless fashion, learning material and communication in digital form. Managed Learning Environments (MLEs) extend that concept to encompass some of the administrative aspects of a course, such as registration, progress monitoring, examinations, etc.

The content for delivery through either type of environment is increasingly defined in terms of Learning Objects, and the community has come to use a mnemonic, “RAID”, for the attributes such learning objects should possess: they should be Reusable (able to be modified and used in many different learning situations), Accessible (able to be indexed and found as needed), Interoperable (operable across a wide variety of hardware, delivery environments and tools), and Durable (continuing despite changes in versions of system software, players and plug-ins).

## RAID IN A DIGITAL LIBRARY

The above attributes of Learning Objects closely match the attributes generally believed to be desirable for digital content. It may be helpful here to give some examples, from a real-world digital library that I helped to establish, the Scottish Cultural Resources Access Network (SCRAN). The SCRAN Digital Library currently contains 1.5 million records, including 300,000 images, sound and movie clips and virtual reality objects. The resources the digital library contains, may be said to match well with the RAID criteria:

### Re-useable

SCRAN resources can be downloaded (Figure 1) by licensed institutions (currently 3,000 schools, 600 public libraries and 90 universities and colleges), and are copyright cleared for unlimited educational re-use (Royan 2000).

### Accessible

SCRAN resources are indexed for fielded and free text searching (Figure 2) and are held on a server hospitable to both Z39.50 and OAI resource discovery.

## Interoperable

SCRAN resources can be aggregated together with resources downloaded from other repositories (Figure 3) to create new learning objects (Royan 2002).

## Durable

SCRAN resources are digitised at the highest economic resolution, usually much higher than can be handled by current bandwidths or screen resolutions (Figure 4), and archival copies are maintained in simple, open formats (eg uncompressed TIFF files) on media which can be readily migrated to future-proof the content as much as possible.

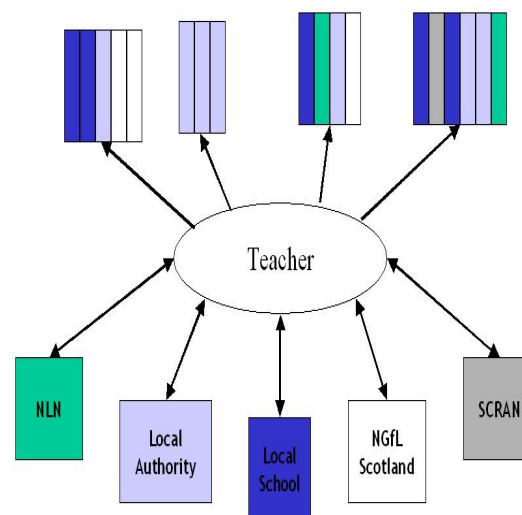
## SPECIFICATIONS, STANDARDS, AND A REFERENCE MODEL

The newcomer to the educational technology field will be confronted by a veritable “alphabet soup” of acronyms and initialisms. For the purpose of this position paper, we need only consider three: IMS, IEEE LOM, and SCORM.

IMS takes its acronym from the phrase “instructional management system”, but this is no longer spelt out, since IMS has come to be involved in a range of learning contexts from Computer Based Training to integrated Learning Environments. With an initial base in Higher Education, it also now has active stakeholders in corporate and government training, schooling, and continuing education. The IMS Global Learning Consortium includes all the major technology suppliers and educational publishers. Its purpose is to define a range of specifications, which will allow suppliers to develop learning products and services that are interoperable. Although widely influential in the educational technology community, IMS is not in itself a standards-making body. **(IMS).**

The Institute of Electrical and Electronic Engineers have the status to develop and establish international standards, and they have taken the role of publishing standards in this field. The first standard to be published is the Learning Object Metadata standard, IEEE LOM, which is in effect a standard for the location of materials. **(IEE).**

Another key body in this field is the Advanced Distributed Learning (ADL) Initiative, sponsored by the US military, which has a vested interest in establishing ways to “use advanced communications and learning technologies to transform how we will educate, train and provide performance support to the U.S. Military Services”. The underpinning of the ADL Initiative is “a collaborative effort between the public and private sectors to develop the common standards, tools and learning content that are central to the future learning environment”



**Figure 3 Interoperable Objects: mixing objects from several repositories**

(ADL).

The chief vehicle for this is the definition of a reference model, known as the Shareable Content Object Reference Model (SCORM). SCORM indicates which of the emerging standards and which of the specifications could work together to enable this idea of delivering learning in a managed environment, by enabling learning objects to be identified and retrieved and packaged in various ways.

## **LEVELS OF GRANULARITY**

The IMS specifications were the outputs of an industry-wide project to enable courses developed by rival publishers to work on each other's delivery platforms. But as the specifications developed it became clear that the course was the wrong level of granularity for such interoperability. Instead it would be very useful to structure lower level objects (e.g. a small virtual experiment) in such a way that they could be used in more than one course.

The SCORM model defines three levels of granularity for them: fundamental learning Assets (such as images), Shareable Content Objects (collections of assets accessible by, for example, topic) and Content Aggregations (put together to deliver a defined learning outcome). LOM sets out standard access points for the discovery of such learning objects while IMS defines best practice in sequencing them and packaging them for delivery within the VLE.

It is not difficult to think of examples from the cultural library domain, for each of the three levels defined above, and there is a strong case to be made for viewing digital library objects as a special category of Learning Object.

## **LEARNING OBJECTS AND THE LIBRARY DOMAIN**

The case for the library domain adopting Learning Objects is threefold: a progressive, a technological and a business case.

### **The March of Convergence**

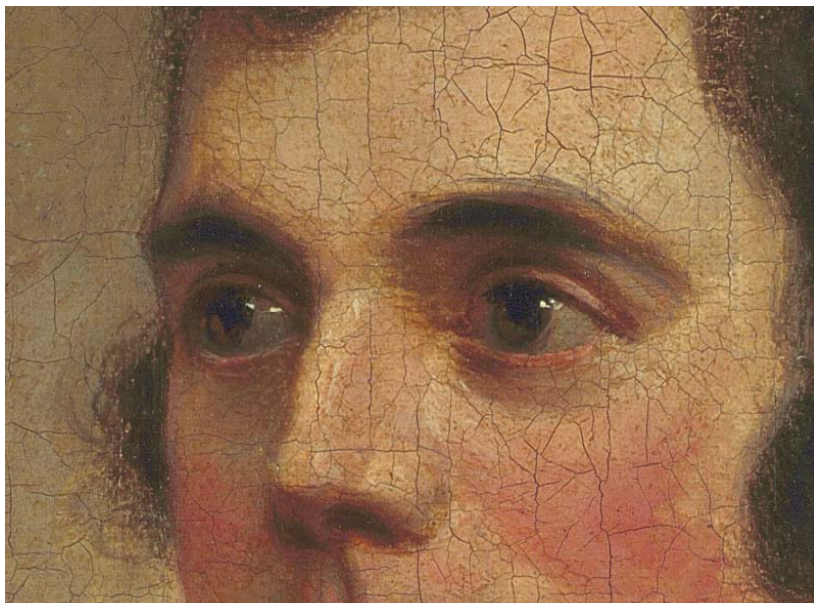
Although the library domain has not so far been directly involved in the development of the standards for Learning Objects, it is not accidental that those involved in LOM have chosen to base their work on an extended version of the Dublin Core. Just as the original Dublin Core initiative had its origins in a desire for seamless interoperability between Archive, Library and Museum domains in the service of the end user, so the Dublin Core set of metadata elements turned out to provide a sound basis for interoperability work within the educational technology sector. It is likely that this trend towards convergence of historically disparate sectors, at least at the level of resource description, will continue into the future, particularly in the context of national and international eGovernment interoperability frameworks. The library domain, once the initiators of such convergence, needs to remain in the forefront of interoperability standards-making and adoption. It is now a truism to say that for the majority of users, if a resource cannot be discovered on the internet, it might as well not exist.



## A Technological Imperative

The concept of developing digital resources, not in a monolithic way, but as an aggregation of reusable interoperable components, is a compelling one for the library domain. We are all aware of CD-ROM publications that deliver a pre-defined experience in a completely closed environment, which have been developed at a cost of enormous amounts of money, and which are now sitting on someone's shelf, no longer used, because some of the content is out of date or the treatment is no longer fashionable or because of their reliance on obsolescent technology. If only the Learning Object approach had been available when these products were built, their individual components would still be available for updating and re-use.

## Learning is our Business



**Figure 4 Durable Learning Objects: Archival image is so big it would not fit on the size of screen currently in use**

In considering setting up a digital library, the watchword is “sustainability”. It may not currently be too difficult to get capital grant aid for a well-planned digitisation project, but securing an income stream to support the maintenance of the resulting resource delivery service into the future is an altogether different kind of proposition. Advertising and

sponsorship are, with some high-profile exceptions, unlikely to be available to fund the majority of services, and the revenue from commercial sales has been proved historically to be much less than might have one time been expected. (Royan 1999). The one market sector that continues to be both fairly well funded and actively interested in resources from the library domain, is education. If digital libraries define education as the main source of their revenue, it does make sense that they should work to ensure that their products and services are compliant with the standard expectations of their user community.

For example in England the Department for Education and Skills (DfES) has developed a reasonably well-defined set of specifications for learning objects, with which any electronic learning publications or services hoping to sell into the English schools sector are expected to comply. Compliant products are awarded a “kite-mark”. To ensure take-up, DfES are actually providing electronic credits to each school totalling millions of pounds sterling, which can only be spent on learning objects kite-marked according to this set of standards. Libraries and other cultural institutions and organizations are being actively encouraged to participate in this initiative.

Even if a digital library does not rely on subscription or other income from the educational sector for its future survival, it is likely that education and learning will be part of its host institution's core mission. Such an institution would surely benefit from a framework within which both to discover and procure useful digital resources for its own purposes, and to disclose its resources for re-use in external learning environments.

It is a self-evident fact, that most libraries see themselves as learning institutions. During the course of this short paper, I have attempted to show that some of the products that they are currently building in that role, could well benefit from the standards and frameworks of the educational technology community.

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