The Future of e-Learning

Inclusive learning objects using RDF

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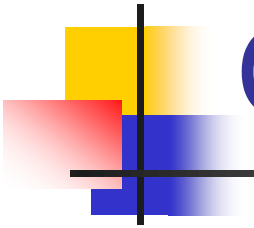
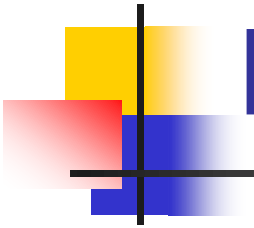


Overview

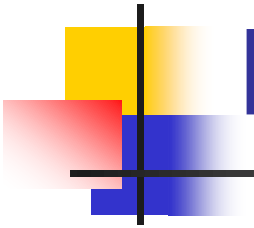
- **Explains why current approaches to e-Learning systems are increasingly problematic**
- **Indicates why RDF-based *inclusive* learning object systems are intrinsically better**
- **Sketches new e-learning environment**
- **Shows importance of *inclusive*, RDF-based e-Portfolios**
- **Indicate likely changes in undergraduate and postgraduate teaching and learning.**



History of Learning Resources

- Books, journal papers, photos, films etc
- Multimedia (ROM, CDROM, DVD)
- Early web: Simple web pages, Word, Excel, pdf files managed by simple databases of learning content (mark-up)
- e-Learning systems managing meta-data (WebCT, Blackboard, Domino etc) (markup and XML)
- Learning object systems (SCORM, ADL, IMI, OCPI, etc) (XML)

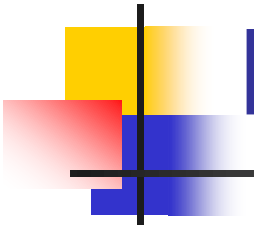
- The future….. RDF, OWL, e-portfolios



Learning Content

Benefits of electronic learning content

- Re-useable
- Shareable
- Modular
- Access to massive resources
- Can be easily assembled into courses
- Basis for other learning modalities



Role of Meta-data

Meta-data makes it possible to computer search and manage learning content

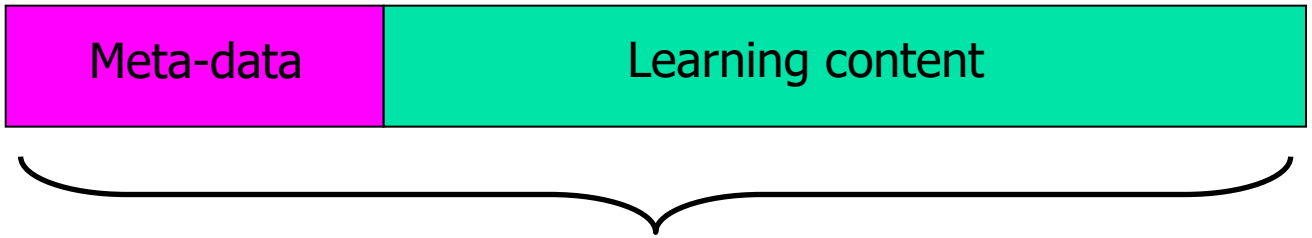
Typical meta-data :

- Title
- Author
- Type of content - keywords
- What learning designs it is suitable for
- What kind of media (html, pdf, Word etc)

Markup-based Learning Objects

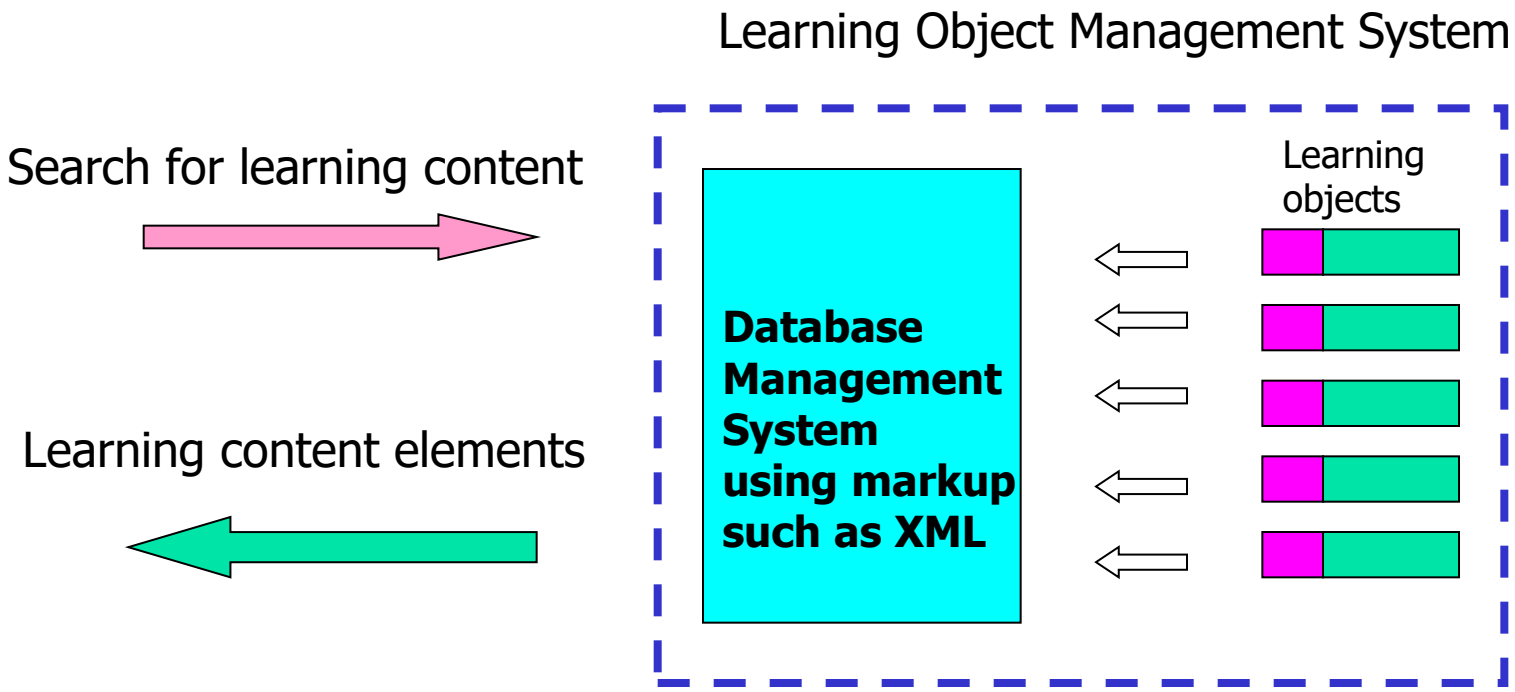
Markup-based systems add meta-data to learning content elements and combine them into digital 'learning objects'
E.g. html web pages have keywords and meta tags

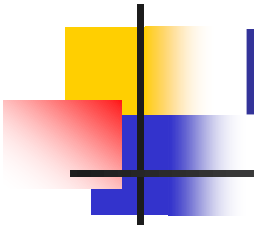
Meta-data is made integral to the learning object



Learning Object Systems

Typical LOMS defined by ADL, SCORM, IEEE and are based on XML



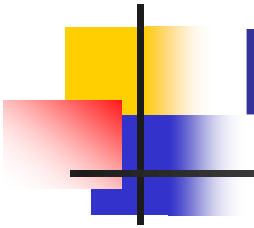


Problems

Key issues are:

- Interoperability
- Portability
- Scalability

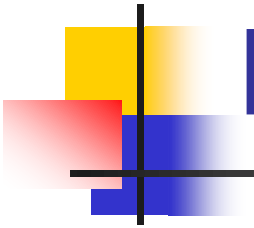
These present significant problems for markup-based e-learning and learning object systems



Layers and Levels

Learning object systems involve several levels:

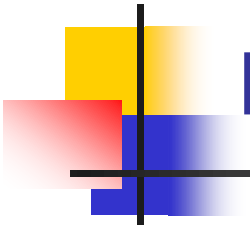
- Page description (computer screen)
- Application
- Operating system
- Networking services
- Web-serving applications
- Underlying database structure
- Hardware
- Data elements
- Information structures (multiple levels)
- Cultural issues



Requisite Variety

There is a necessary amount of variety needed to manage variety

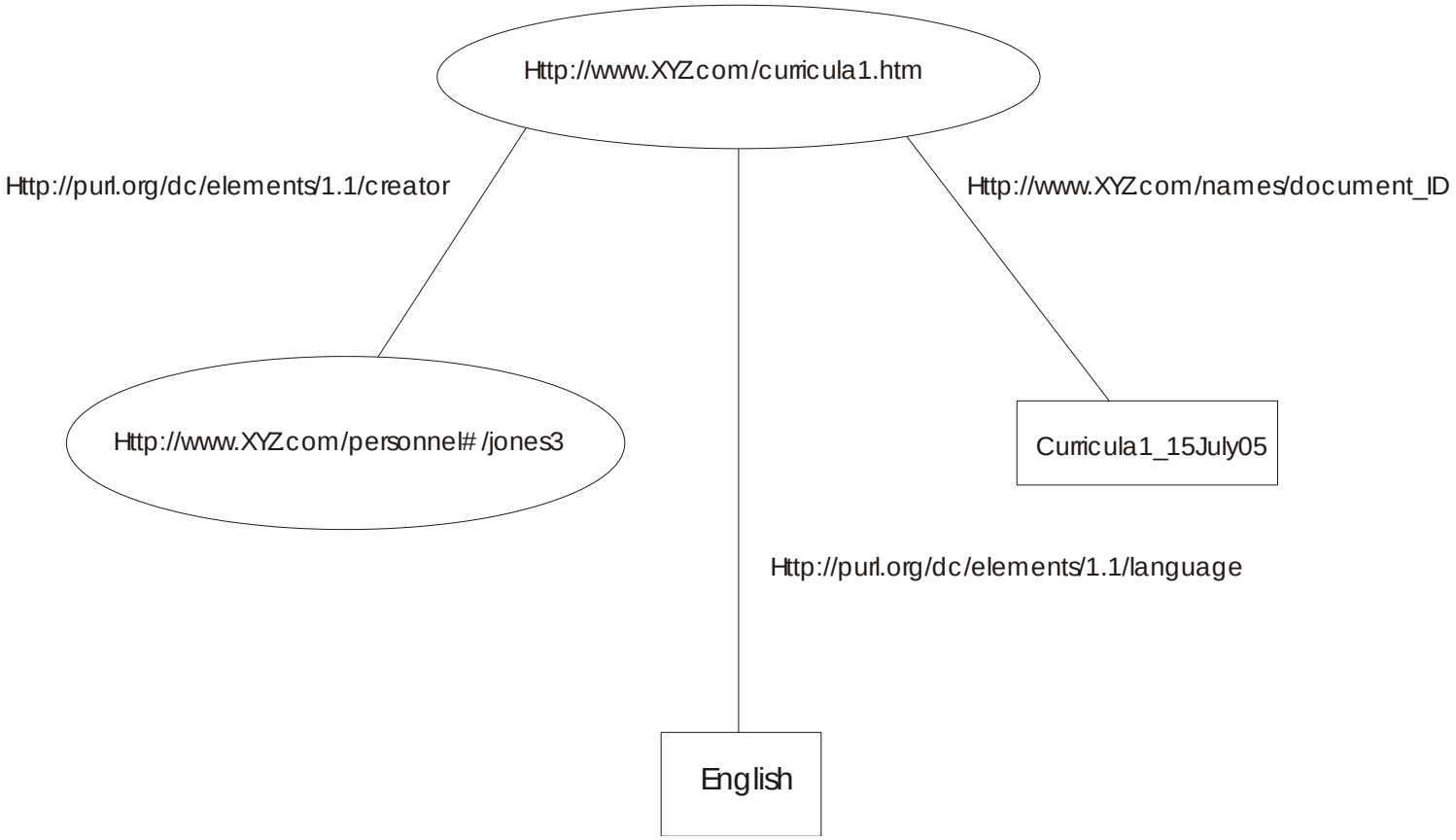
- Interoperability, portability and scalability all require the management of system variety
- Markup-based LOMS attempt to control variety using a page description format in html or XML.
- Does not control variety at higher levels in the systems – resulting in the current massive efforts to create proprietary standards at upper system levels, which *increases* variety.
- Managing variety requires controlling variety in the overall information management framework

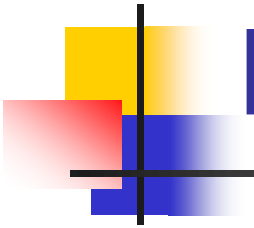


RDF (Resource Description Framework)

- RDF keeps meta-data external to objects
- Graph-based - two nodes and arc between them.
  - **subject** is the focus of the statement
  - **predicate** describes a **property** of the subject
  - property value is the **object**.
- ‘http://www.XYZ123.com/index.html has an author whose value is Mary Jones has:
  - **Subject**: URL http://www.XYZ123.com/index.html
  - **Predicate**: the word "author"
  - **Object**: the phrase "John Smith"

RDF graphs are URI web references



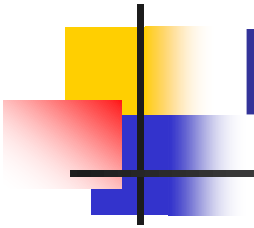


Benefits of RDF

- RDF URI's can refer to *anything* and their relationships not just digital, e.g. lecturer, book, student
- RDF controls variety because it is an information *framework*
- It is extendable and doesn't require rigid meta-data structures or proprietary standards or fixed vocabularies
- Efficiently enables interoperability, portability and scalability

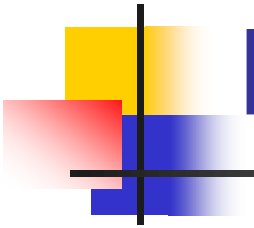
Inclusive RDF-based Learning Object Systems

- Traditional learning object systems are *digital only* and hence usually refer only to elements of learning content
- *Inclusive* RDF-based learning object systems can include *all* aspects of learning and teaching including
  - *People – lecturers, students, administrators and other constituents*
  - *Real items such as books, films , … historical sites, geological strata etc*
  - *Educational processes such as discussions, lectures, meetings*
  - *Practical administration of lecture theatres*
  - *Integration of other real world and digital systems relating to education and its management*
  - *……*



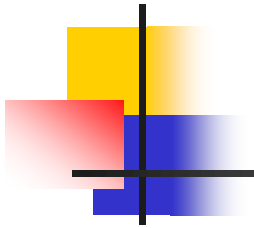
RDF-based e-Portfolios

- Portfolios are emerging as a key educational modality.
- Using RDF enables e-Portfolios to be used to gain lifelong benefits in the efficiency and effectiveness of education provision.



Futures of e-learning

- Precedence of distance education over on-campus
- RDF/OWL and RDF/XML as the basis of e-learning systems within the Semantic Web
- E-Portfolios as the central and primary learning, teaching and assessment modality



Questions?