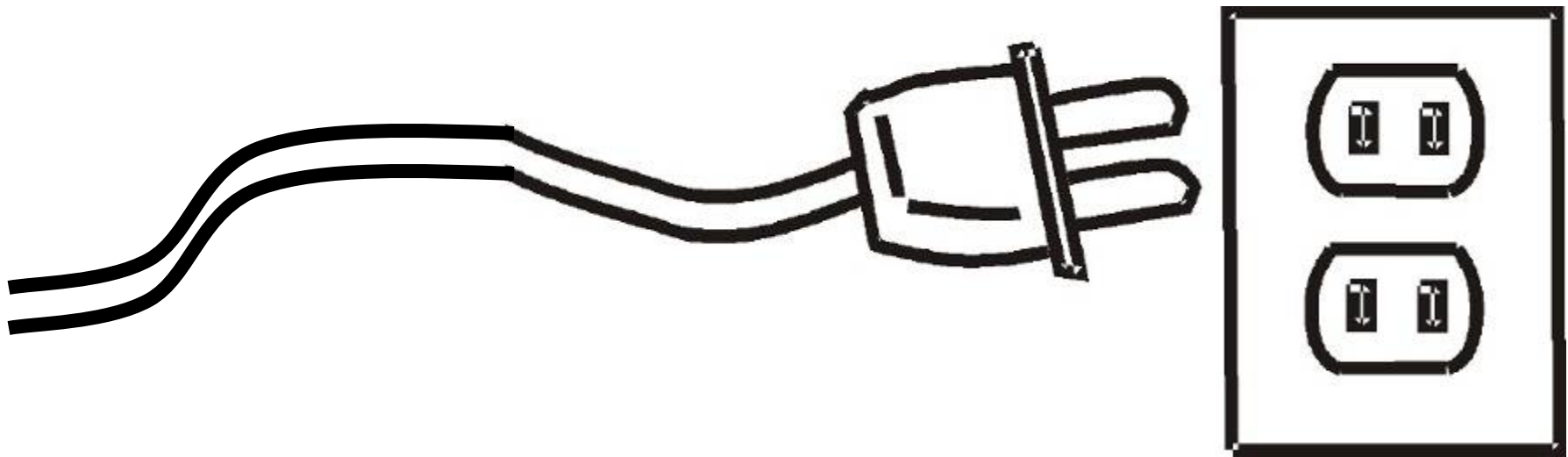


National Science Digital Library *Reusability and Interoperability Workshop*

GUIDELINES - INTEROPERABILITY

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Interoperability



Definition of Interoperability

- Extent to which a digital learning resource will “plug and play” on different platforms.
- Extent to which a digital learning can be modified using different tools.
- Ease with which two software components (or systems) can exchange and correctly interpret each others’ data.

Two Approaches to Interoperability

- **“Standards”**

- HTML
- XML
- Learning Object Metadata
- SCORM
- IMS Questions & Test Interoperability
- MathML
- And many others . . .

- **Standardized formats**

- PDFTM
- FlashTM
- JavaTM
- MS PowerPointTM / WordTM
- T_EX
- And many others . . .

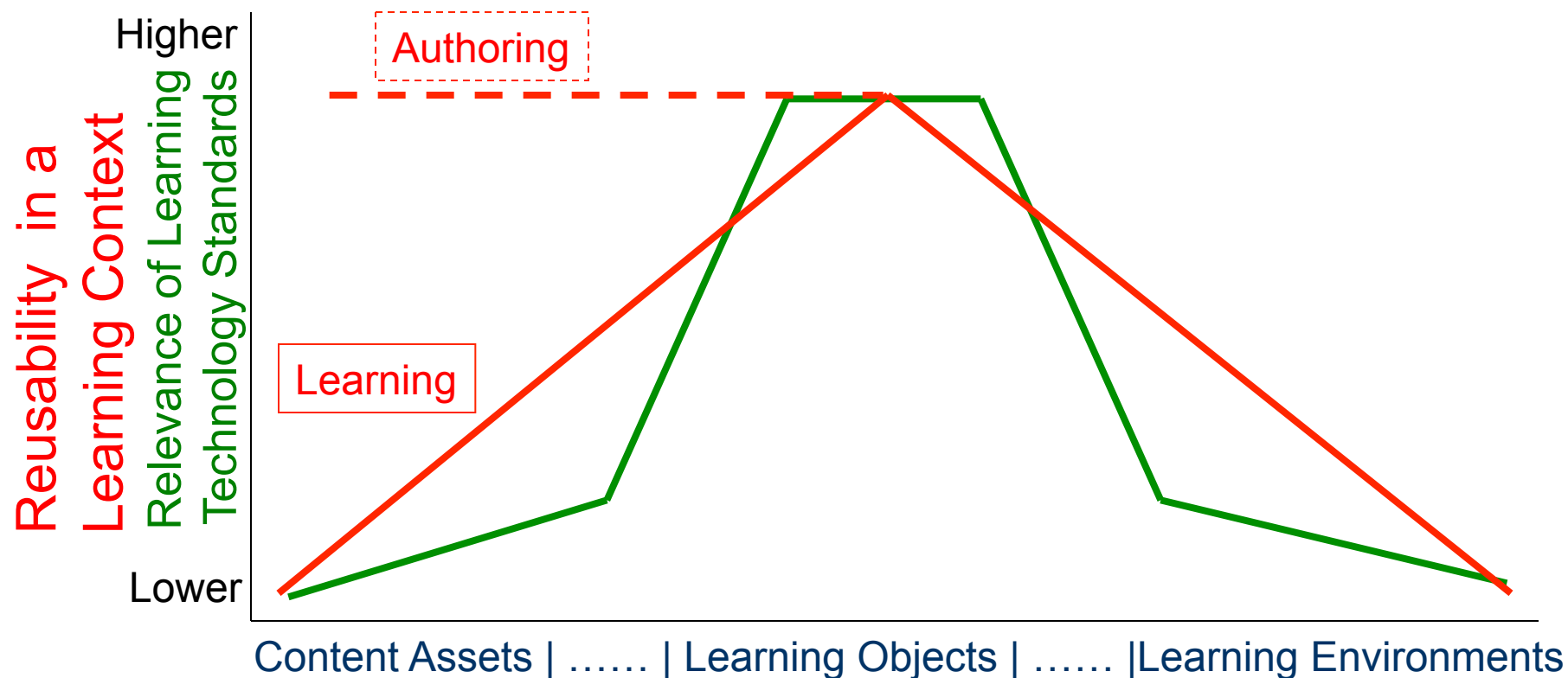
NOTE:

1. Standards may exist within a small community – e.g. the British systems of weights and measures or T_EX
2. The meaning of interoperability and the appropriate standards depend on granularity

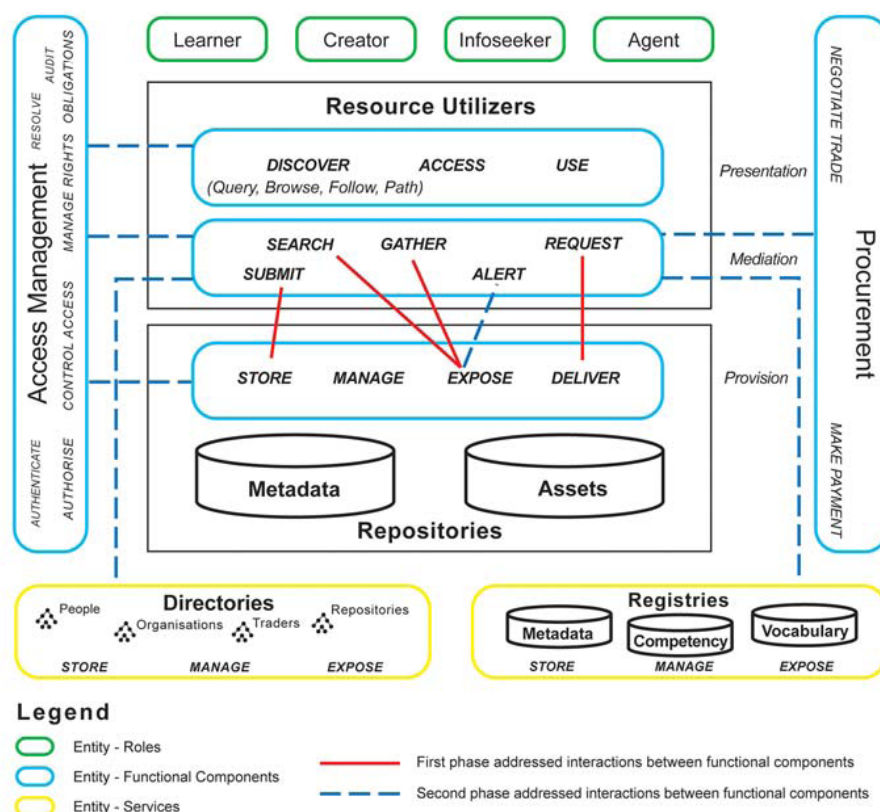
Granularity and Interoperability

Learning Environment	Learning Component	Learning Object	Information Object	Content Asset
<ul style="list-style-type: none"> • All about the system • General IT infrastructure standards • IMS Enterprise, OKI, ... 	<ul style="list-style-type: none"> • Like Learning Objects • Avoid tying to specific learning environment 	<ul style="list-style-type: none"> • All about the content • SCORM, AICC, IEEE, IMS ... • Exchange via XML-based formats • Authoring tools can be specialized 	<ul style="list-style-type: none"> • Like Content Assets • Special issues for software • Standards for Questions & Tests • Tools are not specific to learning 	<ul style="list-style-type: none"> • All about the format • Use common formats • Use standards • Avoid dependence on proprietary software or plug-ins

A Comment on Learning Objects



Interoperability for Collections



- All about the policy
- Metadata is key
- OAI, DOI, Fedora, ...
- Multiple issues: see IMS Digital Repository Interoperability Spec
- Focus here on supporting *content* reuse

Interoperability - Guidelines

Description: Ensure that content can run properly in as many computing and learning environments as possible. Support authors and developers by providing versions of content that can be edited and modified.

Explanation: Ensuring interoperability - primarily through the use of standards - will make it possible for the widest possible audience to adopt or adapt a resource.

Three specific Guidelines:

- 2.1 - Standardized and Portable Formats
- 2.2 - Standards for Communication, Sequencing and Navigation
- 2.3 - Provide Editable Versions

2.1 Standardized and Portable Formats- P1

Description: Use standardized and portable formats for content.

Explanation: Learning resources should be made available in formats that can be easily used by all members of the community for which they are intended, and that have the best chance of being used by an even wider audience.

Techniques and Examples:

Collection:

- Develop collection search tools and other services to use applications with default (common) installations.
 - Be prepared to store/link to multiple formats for each resource.
- Example: <http://chickscope.beckman.uiuc.edu/explore/eggmath/>

Developer:

- Learning content that is packaged using standards
- Express content in XML
- Develop content to use applications with default (common) installations.
- Use formats that are cross-platform or platform independent.

2.2 Standards for Communication, Sequencing and Navigation – P3

Description: Use industry interoperability standards for communication, sequencing and navigation.

Explanation: Using appropriate interoperability standards and specifications will allow digital learning resources to run on any conformant learning platform.

Techniques and Examples:

Developer:

- Use standards and specifications to sequence (order) content in ways that are independent of the delivery platform.

- Example: <http://www.reload.ac.uk/>

2.3 Provide Editable Versions – P2

Description: Provide an editable version, a link to an editable version or the source code, or a link to the content's assets to make modifications.

Explanation: The ease and ability of a resource to be adapted is increased if an editable version of the resource is provided.

Techniques and Examples:

Developer:

- Provide resource content in editable formats and make source code available
- Example: Hearing Conservation, environmental safety and health.
http://www.skillsoft.com/demo/esh_gotrain.asp
- Example: Larry Green's Applets - links to the source code -
<http://www.ltconline.net/green/java/index.html#Intermediate%20and%20College%20Algebra>

Activity – 15 minutes

10 minutes:

1. Review the guidelines and techniques and ask for clarifications.
2. Evaluate a resource (or two) for interoperability using the guidelines. In cases where guidelines are not met, comment on what techniques could be made to improve interoperability.
 - ChickScope – <http://chickscope.beckman.uiuc.edu/explore/eggmath/>
 - Kurtis Scaletta's site - <http://www.tc.umn.edu/~kurtis/flash/>

5 minutes:

3. Discuss evaluations with your table and the larger group.



Next: Lab – Examining a Full Resource

Questions? Comments?

