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### Google Trends:

Mobile Learning:

frether word with the war

### Ubiquitous Learning:





### MicroLearning: Edmodo

https://www.edmodo.com/

### Interoperability Standards for MicroLearning

### **Teacher-Learner Interaction**

mediated by technology:



### Alphabet Soup

ARCC Aviation Industry Computer-Based Training

- Necessary: course content and structure descriptors.

Syntactic interoperability: through HTML and JavaScript. Semantic interoperability: through standards.

Learning Objects (LOs) are not bound to an LMS, but can

Older interoperability standards: SCORM (since 2000), using XML

Interoperability

be used in different LMSs.

### Improved Standards

- Common Cartridge larger freus en blended learning
- more inclusion of instructor.

   xAPI (TinCan): takes SCOBM further and improves
- LTE provides a standard for 3rd purity plugins.
   QTE provides standard and representation of question.
- SIN provides capability for institutional wtcharge.

### Requirements of MicroLearning

- · Learning content to be broken down in small
- · Large number of content bits to be supported.
- Many user interactions.
   Non-linear sequencing of content.
- Mobile device support.

### AICC

First interoperability standard, Originally file-based, then web-based. Allows distributed course content.

CRS file: general course information. AU file: lessons. DES tile: course elements. CST file: course structure.

### SCORM

Content packaging in XML files. Runtime specification for communication with LMS through JavaScript. Sequencing of course navigation in XML file.

imsmanifest.xml contains the tree structure of the SCOs.

### The SCORM Generalised Model



### Advantages

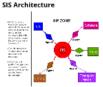
Well supported by most LMSs. Both AICC and SCORM use CMI data model.

### Shortcomings

Security problem in SCORM through JavaScript. Limited scalability and distributability of learning content,

### Common Cartridge Application

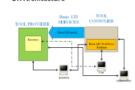




### Comparison SCORM - xAPI

SCORUM:	xAPt:
<ul> <li>Requires constant interset connection.</li> </ul>	- Session-less contratous insti-
<ul> <li>Contract most be bound in an LMS</li> </ul>	- Contest on exist anywho
<ul> <li>Tracks full (post, port-test scene, complicies</li> </ul>	<ul> <li>Tracks with variety of los experiences</li> </ul>
<ul> <li>Tracks formal d.Earning assisted</li> </ul>	<ul> <li>Con track informal, addi- guided learning</li> </ul>

### LTI Architecture



Details are only important for software developers.

But learning content developers need to use authoring tools which support these newest standards.

Relevance of Interoperability Standards

Also, LMS needs to support those standards.

### Recommendation for MicroLearning

Developers should ensure compatibility with newest Interoperability standards:

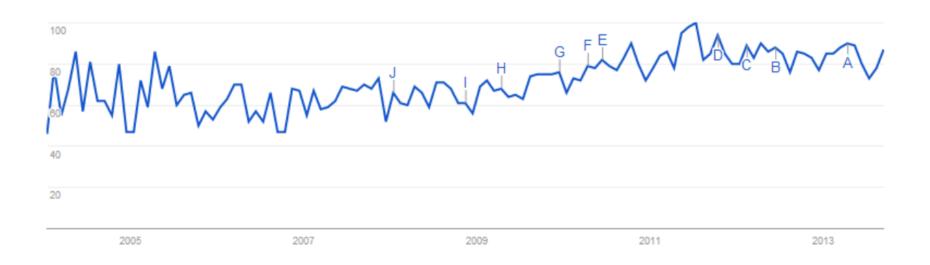
CC, xAPI, LTI, QTI.

Thank you for your attention!

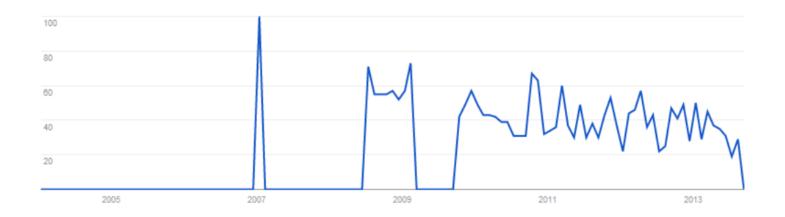
# Interoperability Standards for MicroLearning

# Google Trends:

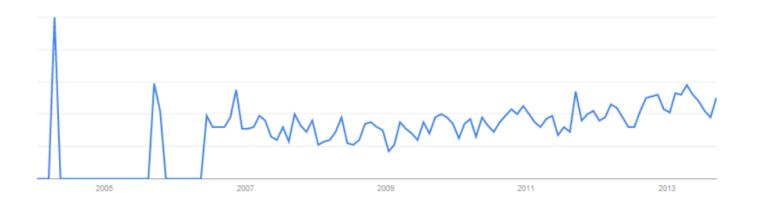
# Mobile Learning:



# **Ubiquitous Learning:**



# MicroTeaching:



# MicroLearning: Edmodo

https://www.edmodo.com/

# **Teacher-Learner Interaction**

mediated by technology:



Learning
Management
System

- · Student identification
- · Learning history
- Laune
- Suspension
- Resumption

Student results (tests, assignments)

Dismissal

LO
Learning
Object





- Student identification
- Learning history
- Launch
- Suspension
- Resumption
- Dismissal

- Student timing.
- Student results (tests, assignments)

# **Teacher-Learner Interaction**

mediated by technology:



Learning
Management
System

- · Student identification
- · Learning history
- Laune
- Suspension
- Resumption

Student results (tests, assignments)

Dismissal

LO
Learning
Object





# Interoperability

Learning Objects (LOs) are not bound to an LMS, but can be used in different LMSs.

Necessary: course content and structure descriptors.

Syntactic interoperability: through HTML and JavaScript. Semantic interoperability: through standards.

Older interoperability standards:

AICC (since 1993)

SCORM (since 2000), using XML

# **Alphabet Soup**

AICC Aviation Industry Computer-Based Training

Committee

CMI Computer Managed Instructions

CC Common Cartridge

LTI Learning Tools Interoperability

QTI Question Test Interoperability

SCORM Sharable Content Object Reference Model

SCO Sharable Content Object

SIF Schools Interoperability Framework

SIS Student Information Systems

# **AICC**

First interoperability standard.

Originally file-based, then web-based.

JavaScript runtime interface.

Allows distributed course content.

CRS file: general course information.

AU file: lessons.

DES file: course elements.

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# **SCORM**

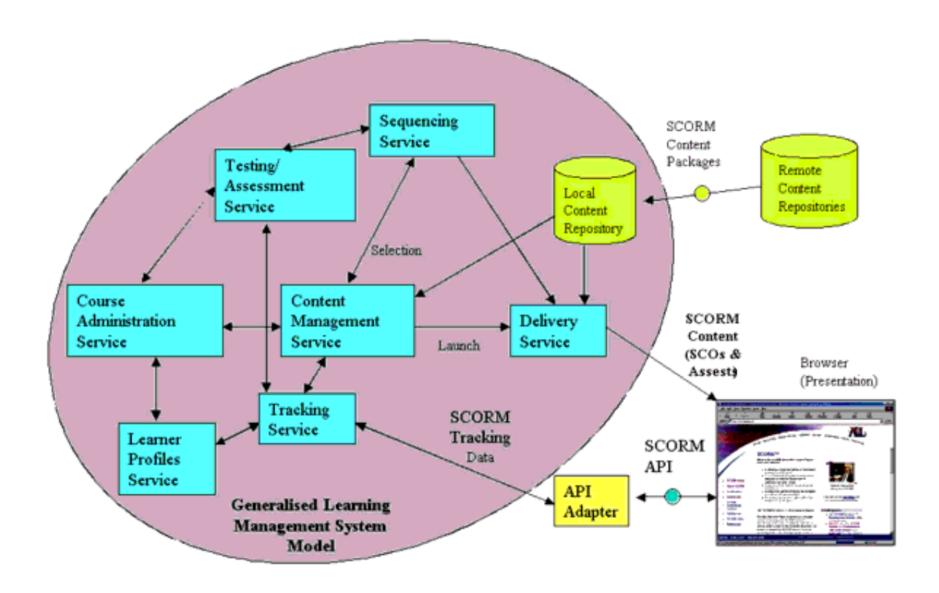
Content packaging in XML files.

Runtime specification for communication with LMS through JavaScript.

Sequencing of course navigation in XML file.

imsmanifest.xml contains the tree structure of the SCOs.

# The SCORM Generalised Model



from: IMS Abstract Framework,
IMS Global Learning Consortium (2003)

### **AICC**

First interoperability standard.

Originally file-based, then web-based.

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Allows distributed course content.

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### SCORM

Content packaging in XML files.

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Sequencing of course navigation in XML file.

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# **Advantages**

Well supported by most LMSs.

Both AICC and SCORM use CMI data model.

# **Shortcomings**

Security problem in SCORM through JavaScript.

Limited scalability and distributability of learning content,

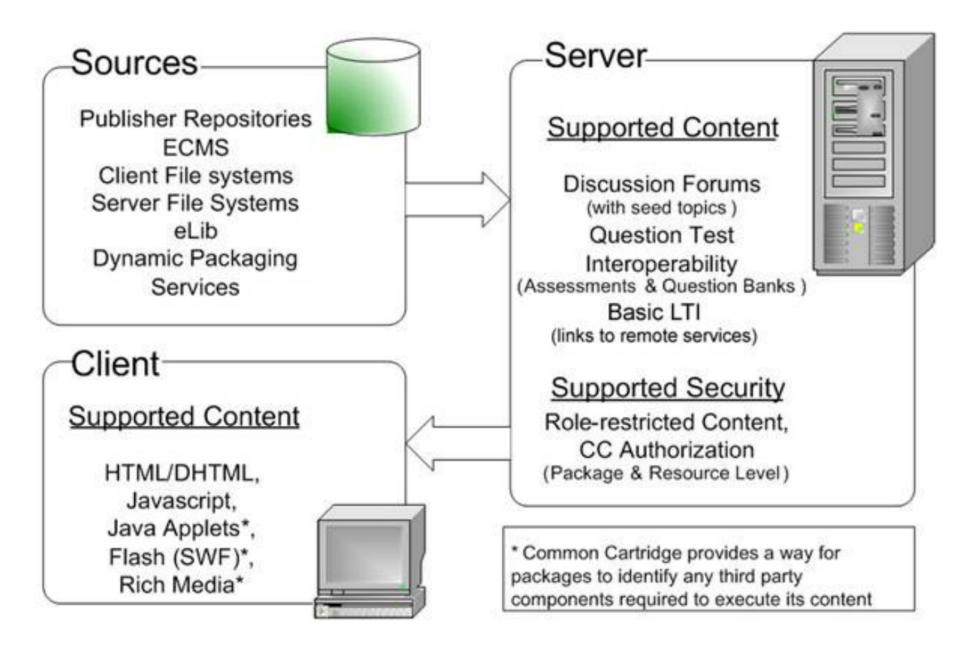
# **Improved Standards**

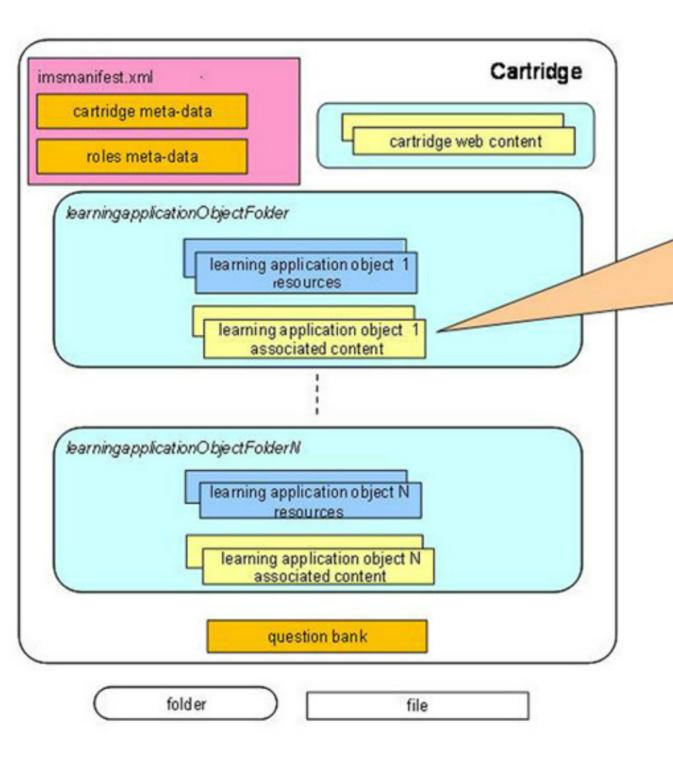
- Common Cartridge: larger focus on blended learning, more inclusion of instructor.
- xAPI (TinCan): takes SCORM further and improves scalability and interaction from the student.
- LTI: provides a standard for 3rd party plugins.
- QTI: provides standardised representation of questions and tests.
- SIS: provides capability for institutional exchange.

# Requirements of MicroLearning

- Learning content to be broken down in small segments.
- Large number of content bits to be supported.
- Many user interactions.
- Non-linear sequencing of content.
- Mobile device support.

# **Common Cartridge Application**





Resource - web content
Resource - web link
Resource - discussion topic
Resource - assessment
Resource - question bank

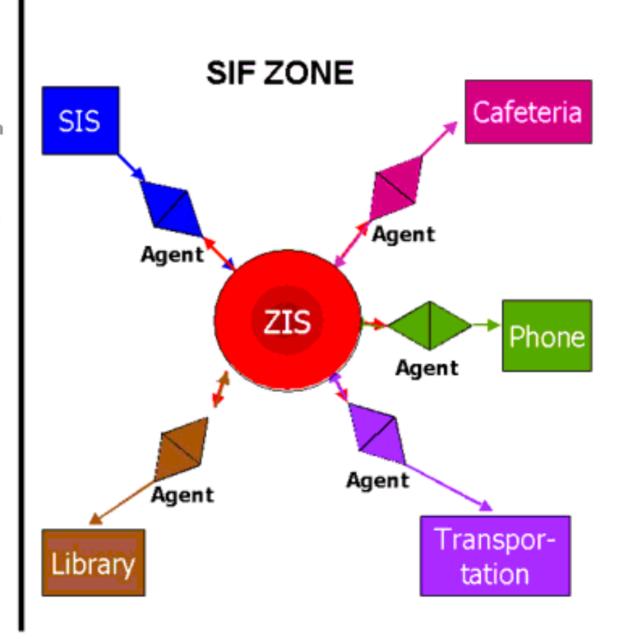
Intra-package reference

# **SIS Architecture**

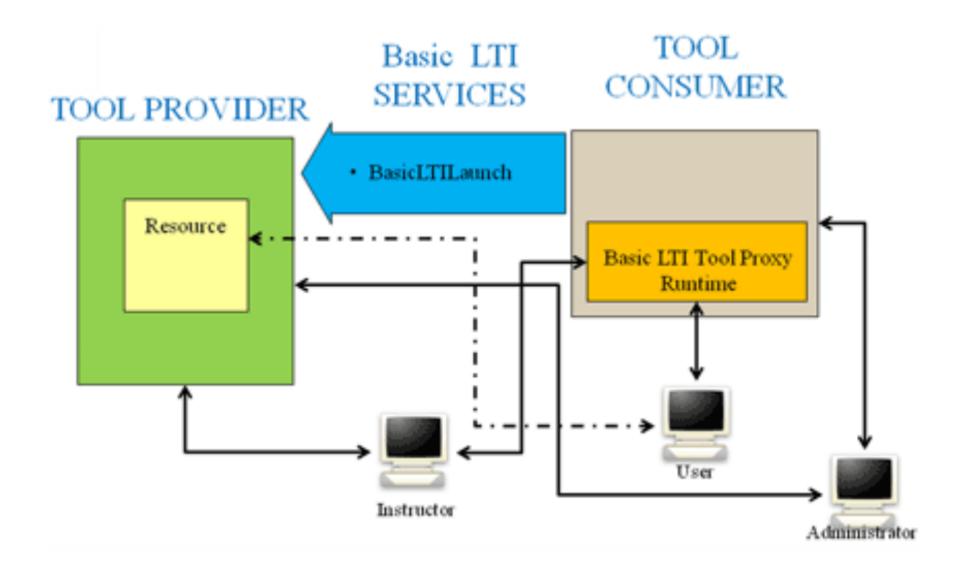
¥A SIF Zone is a logical grouping of applications, in which each application has an Agent that communicates with other Agents through the Zone Integration Server (ZIS).

¥The ZIS handles all security information and routes all messages.

¥ A SIF Zone Is platform independent and vendor neutral meaning that all data can be shared dynamically.



# LTI Architecture



# **Comparison SCORM - xAPI**

## SCORM:

- Requires constant internet connection
- Content must be housed in an LMS
- Tracks fail/pass, post-test score, completion
- Tracks formal eLEarning courses

## xAPI:

- Session-less communication
- Content can exist anywhere
- Tracks wide variety of learner experiences
- Can track informal, selfguided learning

# Relevance of Interoperability Standards

Details are only important for software developers.

But learning content developers need to use authoring tools which support these newest standards.

Also, LMS needs to support those standards.

# Recommendation for MicroLearning

Developers should ensure compatibility with newest Interoperability standards:

CC, xAPI, LTI, QTI.

# Thank you for your attention!

Questions?