S1000D 4.1 Support for Traceable, Technical Learning Content

Introductions to the:
Learning Data Module (LDM),
SCORM Content Packaging Module (SCPM),
Sharable Content Object Data Module (SCO DM),
Learn Codes

and

Highlights from the
OSD/TransAtlantic and ADL Bridge Project

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Agenda

• What is traceability?
• Why traceability is important.
• Overview of S1000D 4.1 support training content and structure.
• Traceability between systems.
• Highlights of OSD Bridge Project Deliverables.
What is Traceability?

• An activity that requires a transaction resulting in a record.

and

• A correlation any two objects that require a one to one, one to many or many to many relationship to determine the completeness of the relationship.
A Grim Tale

What do Hansel and Gretel have to do with breadcrumbs?
Bad Traceability Strategy

Technical training content should be traced to related product support data and to the supported system.
Traceability involves creating traces that make it possible to understand information for as long as it is needed. Öberg, 2011
Why is Traceability Important in the Training Context?

A Quantitative Reason: The Need for Integrated Technical Data and Training Content

“Of the 408 projects submitted for Computer-Based Training and PC-Simulation Maintenance, two-thirds reported the primary reason for the maintenance request was due to equipment or publication changes. Better integration of technical information with training would alleviate some of this rework.”*

* Computer-Based Training & Personal Computer-Simulation Prioritization and Cost Estimation Assessment for NETC COO Supporting FY10/11 Spend Plan (NETC 2009)

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The Learning Data Module

Highlights from the

4.1 S1 Learning Data Module Schema Structure
Learning DM Issue 4.1 Chapters

• Chap 3.9.5.2.13 Content section - Learning data module
• Chap 3.9.5.2.13.1 Learning data module - Learning plan information type
• Chap 3.9.5.2.13.2 Content section - Learning overview information
• Chap 3.9.5.2.13.3 Content section - Learning content information
• Chap 3.9.5.2.13.4 Content section - Learning summary information
• Chap 3.9.5.2.13.5 Content section - Learning assessment information
Training Content Structure in S1000D

- <dmodule>
  - <learning Plan>
  - <learning Overview>
  - <learning Content>
  - <learning Summary>
  - <learning Assessment>
The Learning Plan: Sublevel 2

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The Learning Plan: Sublevel 2

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The Overview: Sublevel 1

<learningPlan>

<overview>

<content>
<summary>
<assessment>

<lcaudience>

<lcduration>

<lcresources>

<lcsection>
Learning Content: Sublevel 1

- `<learningPlan>`
  - `<overview>`
  - `<content>`
  - `<summary>`
    - `<assessment>`
  - `<lcInstruction>`
The Assessment: Sublevel 1
The Assessment: Sublevel 2

(lcInteraction is a single question)

- <lcTrueFalse>
- <lcSingleSelect>
- <lcMultipleSelect>
- <lcSequencing>
- <lcMatching>
- <lcHotspot>
- <lcCompletion>
- <lcDragandDrop>

- <lcAnswerOptionGroup>
  - <lcAnswerOption>
    - <lcCorrectResponse/>
  - <lcAsset>
  - <lcCorrectResponse/>
  - <lcFeedbackItemGroup>

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The Assessment: Sublevel 2

<linteraction>
  (lcInteraction is a single question)
  <lsequencing>
    <lmatching>
      <lhotspot>
      <ldraganddrop>
      <lquestion>
        <lasset>
          <lsequencelenquenceoption>
            (repeatable)
            <lquestion>
              <lasset>
                <lsequence>
                <lsequencesquenceoption>
                <lfeedbackitemgroup>
  </lsequencelenquencegroup>
The Assessment: Sublevel 2

( lcInteraction is a single question )

<lcInteraction>
  <lcMatching>
    <lcHotspot>
    <lcDragandDrop>
  </lcMatching>
  <lcMatchingHeader>
    <lcItem>
    <lcMatchingPair>
    <lcFeedbackItemGroup>
      <lcMatchingHeader>
        <lcItem>
        <lcFeedbackItemGroup>
          <lcMatchingItem>
        </lcFeedbackItemGroup>
      </lcMatchingHeader>
    </lcMatchingPair>
  </lcMatchingHeader>
</lcInteraction>
Course Structure in S1000D

• 4.0 vs 4.1
• New type of reusable data module
• Creates new traceability opportunities
SCPM Issue 4.1 Chapters

• Chap 4.15 Information management - Learning information

• Chap 4.15.1 Learning information - SCORM content package module

• Chap 4.15.2 Learning information - Coding of SCORM content package modules

• Chap 4.15.3 Learning information - Building SCORM content packages

• Chap 4.15.4 Learning information - Updating SCORM content packages
SCO Content DM Issue 4.1 Chapter

- Chap 3.9.5.2.17 Content section - SCO Content Data Module
S1000D 4.0 Schema for Course Structure

**SCPM** (SCORM Content Package Module): Provides high-level course organization.

**SCO Content** (Sharable Content Object Content): Contains References to data modules.

1. References to DMs contained in high level course structure.
2. Reuse of SCO content requires duplicated SCO definition in SCPMs.
S1000D 4.1 Schemas for Course Structure

SCPM (SCORM Content Package Module): Provides high-level course organization.

**NEW!** – A single reference to SCO DM Identifier vs. a list of DM Refs
Learn Codes in the DMC

<table>
<thead>
<tr>
<th>Hardware Identification</th>
<th>Information Type</th>
<th>Learn Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klassek130AAA</td>
<td>253B</td>
<td>T25C</td>
</tr>
<tr>
<td>AAAB</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>HM3-30-0130</td>
<td>3+1</td>
<td>3+1</td>
</tr>
<tr>
<td>01ABC</td>
<td>IC/ICV</td>
<td>LC/LEC</td>
</tr>
<tr>
<td>2-14 MI</td>
<td>1 Opt + 6-8 SNS</td>
<td></td>
</tr>
<tr>
<td>1-4 SDC</td>
<td>2 + 1-3 DC/DCV</td>
<td></td>
</tr>
<tr>
<td>1 Opt + 6-8 SNS</td>
<td>3+1</td>
<td></td>
</tr>
<tr>
<td>1-4 SDC</td>
<td>1 ILC</td>
<td></td>
</tr>
<tr>
<td>2 + 1-3 DC/DCV</td>
<td>3+1</td>
<td></td>
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<tr>
<td>1 Opt + 6-8 SNS</td>
<td>1 ILC</td>
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<td>2 + 1-3 DC/DCV</td>
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<td></td>
</tr>
<tr>
<td>3+1</td>
<td>1 ILC</td>
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</tr>
</tbody>
</table>

= 17-41 DMC

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Learn Code Description: H and T Codes

• **H Codes (Human Performance)**

  The “H” coding framework for human performance technology data modules is derived from an industry-recognized human performance technology model developed by Darlene M. VanTiem, James L. Moseley, and Joan Conway Dessinger. Human performance technologists need to be familiar with this model and its core requirements.

  **Example Learn Types**
  - H10 Performance analysis
  - H11 Organizational analysis - Vision statement
  - H12 Organizational analysis - Mission statement
  - H13 Organizational analysis - Values
  - H14 Organizational analysis - Goal statement
  - H15 Organizational analysis - Objective statement
  - H16 Organizational analysis - Gap statement
  - H17 Environmental analysis - Organizational environment
  - H30 Intervention definition
  - H31 Performance support
  - H32 Job/Work design
  - H33 Personal development
  - H34 Human resource development
  - H35 Organizational communication

  **Note:** Each code corresponds to a `<tag>` in the `<learnPlan>` schema structure.
Learn Code Description: H and T Codes

- **T Codes (Training)**
  
  The coding framework for training data modules is derived from a theory of instruction by Robert Gagne, known as the Nine Events of Instruction. Trained or certified Instructional Systems Design (ISD) professionals need to be familiar with these events of instruction as a framework for designing training systems. Other well-established theories of instruction, learning, and/or motivation are also reflected in the training learn codes to facilitate their use and understanding across ISD practitioners.

Example Learn Types

- T20 Learning objectives
- T21 Terminal objective - Intellectual skill - Discriminations
- T22 Terminal objective - Intellectual skill - Concepts
- T23 Terminal objective - Intellectual skill - Rules/Principles
- T24 Terminal objective - Intellectual skill - Processes
- T25 Terminal objective - Intellectual skill - Procedures
- T26 Terminal objective - Intellectual skill - Higher order rules
- T27 Terminal objective - Verbal information - Facts
- T48 Animated content – Discrimination
- T49 Animated content – Fact
- T4A Animated content – Concept
- T4B Animated content - Rule/Principle
- T4C Animated content – Procedure
- T4D Animated content - Higher order rule

**Note:** Each code corresponds to a `<tag>` in the `<learnPlan>` and other parts of the LDMschema structure.

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*S1000D 4.1 Support for Traceable, Technical Learning Content*
OSD/TransAtlantic
Bridge Project Highlights

• Concept of Operations
• Bridge API
• AIM/SCO Workbench Content Development Tool
• Bridge Toolkit (Transformation)
• Data Identification Service (Life Cycle Tracing)
• Cost Benefit Analysis

• Publically available Bridge Project deliverables at http://www.adl.net.gov/bridge-conops-project-tackles-life-cycle-management-for-distributed-learning-content
Providing Traceability

Bridge API

Learning Content Development Tools

Data Identification Web Service

S1000D Specification

Common Source Databases

Technical Data

Technical Training Content

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Traceability Demonstrations

• S1000D Transformation Toolkit: [http://s1000d-scorm.adl.net.gov/JQueryMobileTest3/](http://s1000d-scorm.adl.net.gov/JQueryMobileTest3/)

• Product Data Identification Service [http://www1.idsi.com/ecpwebclient/Account/Login.aspx](http://www1.idsi.com/ecpwebclient/Account/Login.aspx)
Summary

• Good data traceability practices are fundamental to integrated data environments.
• 2/3 of changes to U.S. Navy training content driven by technical system changes.
• S1000D structures and manages a variety of information types that support the integrated data concept.
• Traceability occurs between systems and data.
• OSD Bridge Project offers tools and techniques for integrated technical data and training content.
Thank you / Tack!

• Questions and Discussion

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