Case Study: Curriculum Architecture & PTC/ Arbortext

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October 4, 2007

Agenda

- Current Situation & Need for Change
- Formal vs. Informal Learning
- Modularization
- Just-for-Me Training
- Why XML?
- Why DITA?
- Course Design Process
- Summary

PTC

- Recognized Global Leader in PLM, ECM and Dynamic Publishing
- 3,750+ employees in 30+ countries
- 40,000+ worldwide customers
- 150+ resellers worldwide
- 750+ trained systems integrator consultants
- Deep partnerships with leading system integrators, software partners and hardware providers
- Provide global help and educational programs for our product development system
- Awarded:
  - Start Magazine's 'Hottest' Companies 2005
  - Manufacturing Business Technology Global 100
  - 2005 Electronics Industry Yearbook
  - 50 Companies to Watch

Current Situation

We currently use several course delivery formats

Instructor-led training

- 4-day & 5-day classes; technical & professional development
- Bulk of our delivery (90-95%)

Web-based training

- Awareness training for products & service packages
- Business developer training

Webcasts

- Features & Functions training
- Guest speakers (PDS Implementer Q&A)

Informal Distribution of Material

- PTC PDS distribution of material to non-students in GS

Need for Change

We've gotten some consistent feedback from the field:

- Like our classes, but hard to commit to attendance
- Course material is valuable and want to use it by people who don't attend class
- Live webcasts are effective for limited uses
- More remote on-demand delivery of training
- Want to ensure learning is happening
- No easy way for students to reference topics in class material after attending the class
- Too much information at one time in a 5-day ILT class
- Need direct linkage to Realized Value Platform.

To address this feedback, we need to implement a sea change in our development and delivery model.

Informal vs. Formal Learning

There are two basic ways of learning:

Formal learning:

- GSDev defines a structured class and students attend together in-center
- An instructor facilitates learning
- It's a bus that takes everyone to the same place

Informal learning:

- The consultant decides what to learn and when
- Short, just-in-time learning bites while on the job or brief downtime
- 80-90% of all learning happens on-the-job
- It's a bicycle that the consultant takes wherever he/she wants to go

Informal vs. Formal Learning (cont'd)

ASTD studies have shown that there are sweet spots for the two different types of ways of learning.

Formal learning:

- Best for novices
- Bring learners up to a standard base-level of proficiency

Informal learning:

- Best for more experienced learners
- Best for on-the-job (OJT) training

The bulk of folks requiring training are experienced consultants with 2 – 5 years tenure.

We need to shift focus from formal to informal learning while still doing both.

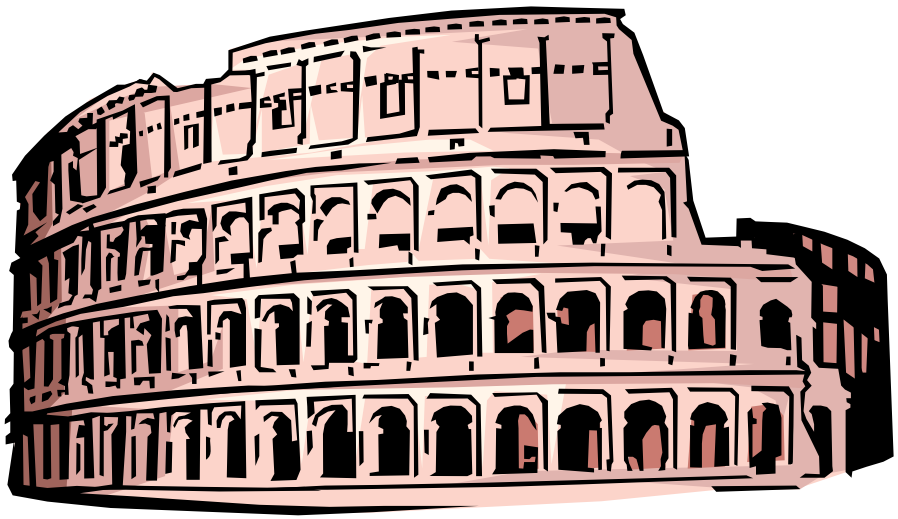
Methods of Informal Learning

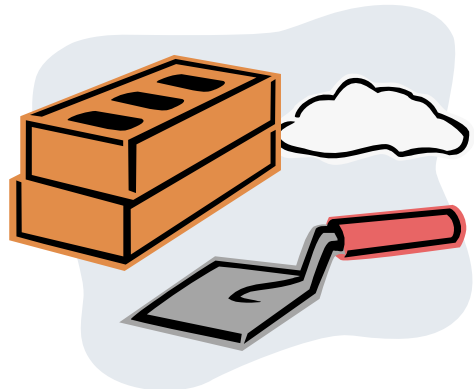
Consultants currently use the following methods for informal learning:

- Find an expert or other project member at the customer and convince him/her to teach you
- Search for topics in PTCU
- PDSA
- Reuse course material from classes you haven't taken
- Links to learning from Realized Value Platform documents
- Read the bookcase of PTC reference documents
- Google & other search engines

What is “Modularization”?

“Modularization” of means breaking the large 4-day and 5-day instructor led courses into much smaller learning “bites.”





Doing so gives us much more flexibility for data reuse and delivery formats.

Modularization – Topics

The “bricks” in curriculum are stand-alone topics. Each topic will have:

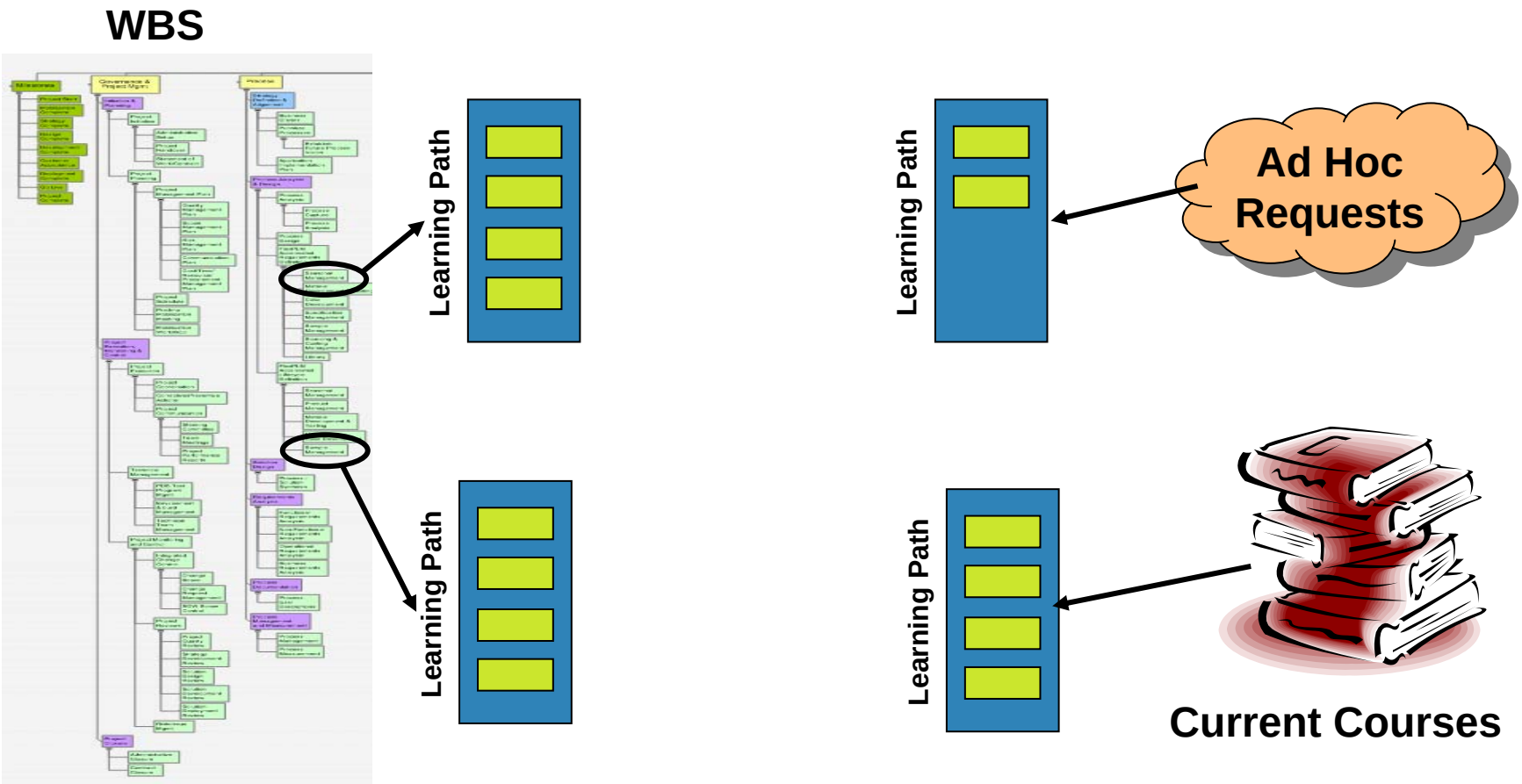
- Learning objectives
- Lecture
- Demo (optional)
- Exercise
- References (optional)
- Assessment

This is good fundamental course design in any case. Each topic must be truly standalone – no “overview now, and more detail later.”

The topics must be designed so that they are reusable.

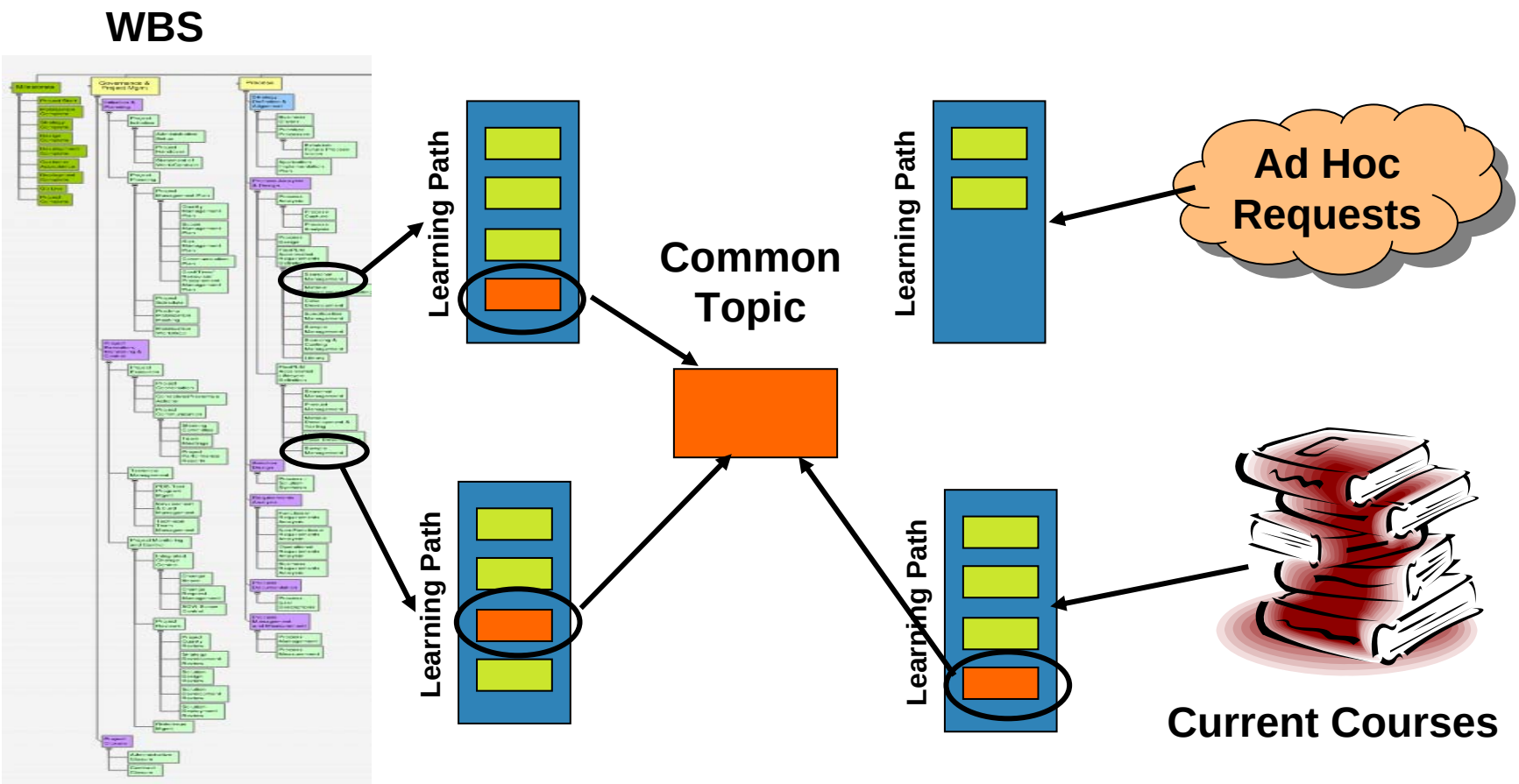
Identification of Topics

Task Analyses to meet the training needs from various sources drive learning paths which are comprised of a sequence of topics.



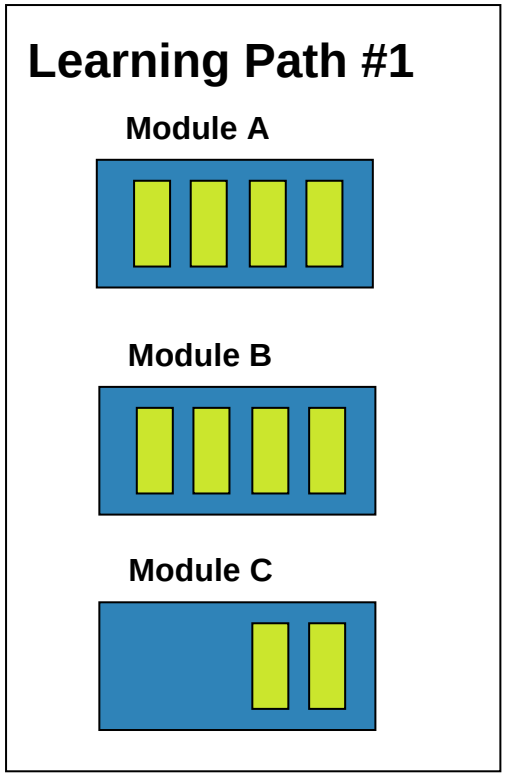
Reuse of Topics

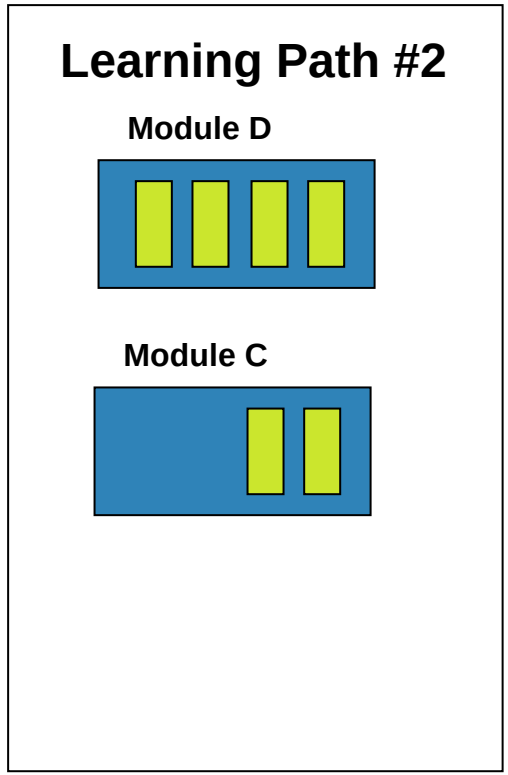
The learning paths are analyzed to identify opportunities for topic reuse.



Topic Hierarchy

It is useful to group related topics together into reusable course “modules.”





Why XML?

We need a dynamic publishing process for our course development for the same reasons that we tell our customers that they need it:

- Better for collaborative development
- Changes propagate
- Better data reuse
- Don’t need to worry about formatting
- Cross-referencing within and between courses
- Dynamic assembly of our course materials. Kind of “on the fly” publishing.
- Reuse of our materials with other departments within PTC; especially Customer Education.

Why DITA?

DITA is one of the most important innovations in XML because it incorporates several best practices to XML publishing.

- DITA requires a modular approach to building publications, which is essential for reusing information effectively and for configuring information for the varying needs of multiple audiences
- DITA allows different groups to customize their application for their specific needs while maintaining the capability to share information easily with all other groups using DITA.
- DITA increases an organization's agility to respond to new requirements by allowing adaptations of an XML application while remaining compatible with all existing downstream applications.

Course Deliverables - Current

The following course deliverables are currently maintained as separate documents:

- Task Analysis (Excel)
- Lesson-Level Outline (Word)
- Instructor's Guide (Word)
- Module – Lecture Slides (Powerpoint)
- Module – Exercises (Word)

These will be integrated into single XML environment.

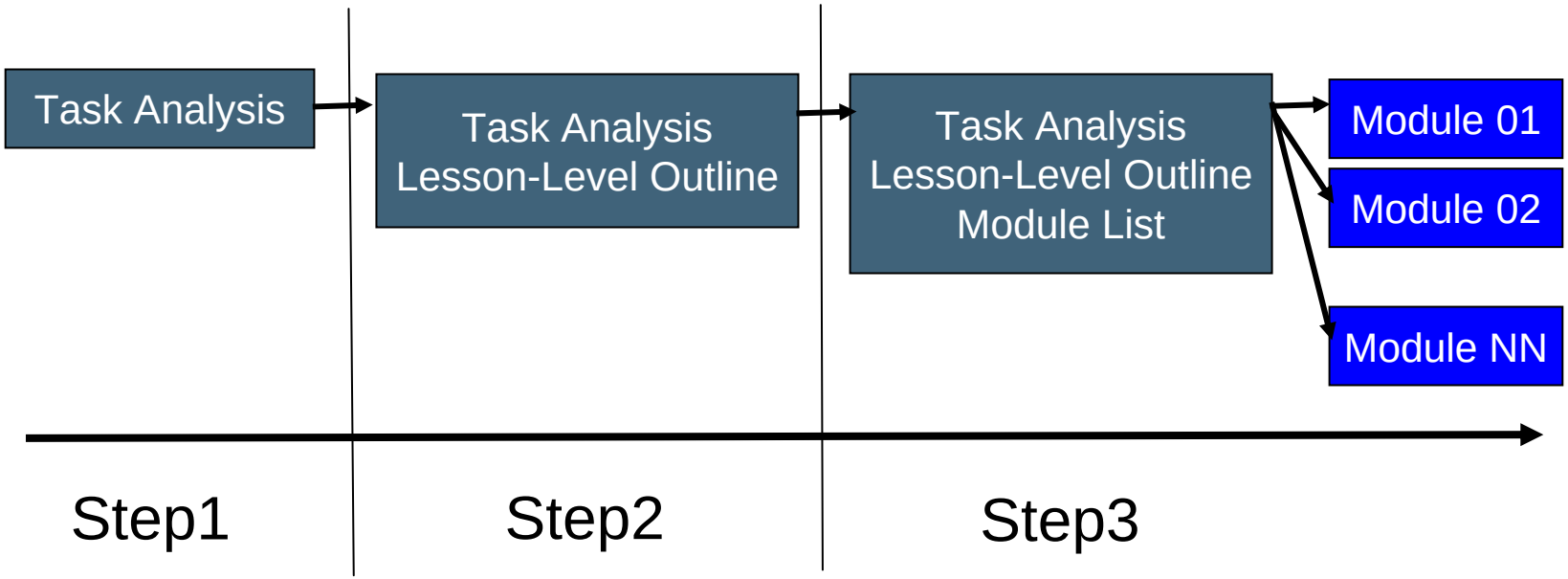
Course Deliverables

The following course deliverables:

- Task Analysis
- Lesson Level Outline
- Instructor's Guide
- Student's Guide
- VAR Instructor Guide
- Module – Lecture Slides
- Module – Exercises

Course Design Deliverables

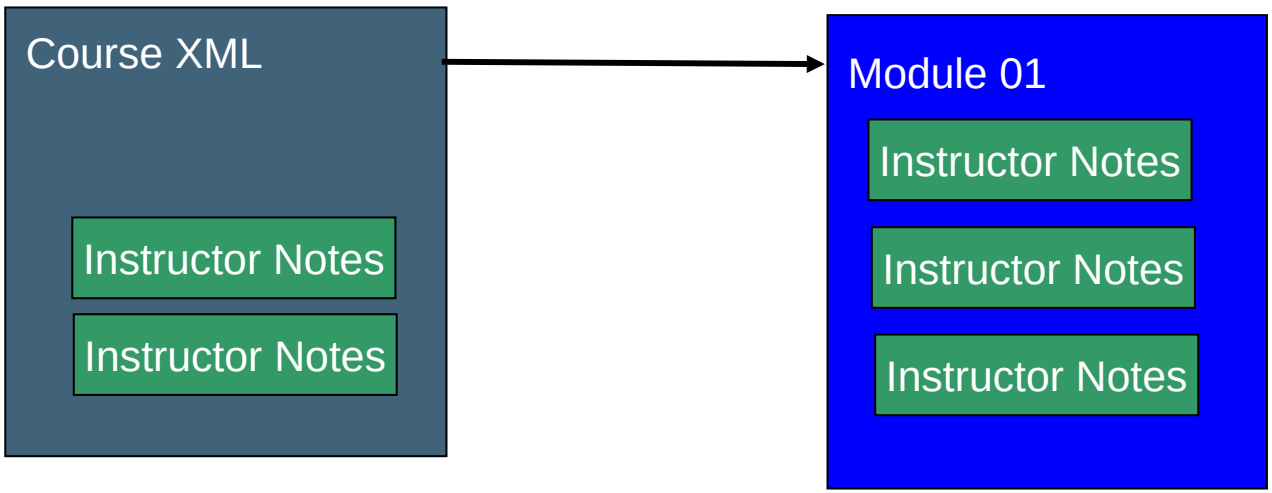
The design deliverables will be imbedded into an evolving XML course object:



The Task Analysis and Lesson Level Outline can be published for review with different stylesheets.

Instructor & Student Guides

The instructor's guide will also be embedded into the course main XML and course module XMLs.



The instructor's guide and student's guide are published using conditional logic (Arbortext's profiling capability).

Customer Education uses a similar technique today with hidden text in MS Word.

WBT Courses

WBT courses created directly from the ILT XML – using the same text & modules.

Additions for WBT:

- Narration audio
- Video demos
- Picks & clicks exercises
- Simulation

Output as HTML or Flash format for PTCU.

XML & DITA Development Process

DITA development process supports modularization in the following ways:

- Structured documents can be easily modularized
- DITA ensures that modules have all required components; important for “guest” course designers
- Attributes embed skills/competencies/knowledge taxonomy annotation directly into the course material
- Information required to create PTCU self-study modules can be automatically extracted from the module dynamic document
- Automatic assembly of authored fragments, or the small reusable pieces we create
- A topic will be reusable at any level, based on the context of the course.
- Much more flexibility on where something is used. The relationship between the topics will be unique to each course.

Summary of Benefits

A course development process with DITA offers the following benefits:

- All design and course documents integrated which reduces errors and facilitates updates
- Greatly improved data reuse for courses
- Modularization facilitates creation of WBTs from ILT courses
- Automatic publication of PDFs for internal use, VARs, and partners
- Better for collaborative development
- Changes propagate
- Don’t need to worry about formatting
- Cross-referencing within and between courses

DITA can help us achieve higher quality, more efficient course development process.

OASIS DITA Learning Content Subcommittee

Top-level Goals:

- Develop a top-level DITA specialization design and processing model for learning content, promoting DITA standard approaches and best practices.
- Design and develop general processing support for print and web
- Design and develop targeted processing support for standards-compliant SCORM and IEEE LOM
- Build on existing DITA infrastructure (editors, CMS, transforms) as much as possible
- Member companies include: Avaya, Blue Mango, Comtech, Flatirons, IBM, Information Mapping, IXIASOFT, Justsystem, KONE, PTC, Sun, ADL, US Navy other individual members

OASIS DITA Learning Content Subcommittee

Target Timeframes

Phased design plan approved	**Feb 2007**
Topic type, map domain, interactions domain, and metadata domain	**Oct 2007**
Processing design and sample implementations	**Oct – Dec 2007**
Full specification complete and submitted to DITA TC	**April 2008** **(for inclusion in the next update to the DITA specification)**

S1000D-DITA Learning Content Subcommittee Summit

- In April, a group of about 60 instructional designers, content developers, and others convened at the Advanced Distributed Learning (ADL) co-lab in Alexandria, VA
- Goal was to develop an interoperable data model for learning content that is compatible with SCORM
- Much of the audience came from the US Department of Defense training and instructional design communities
- Companies included: Lockheed Martin, Boeing, Raytheon, Northrop Grumman, IBM, U.S. Navy Submarine Learning Center, UNITECH, IDSI, OutStart, SAIC, D.P. Associates, Avaya, AMSEC, ADL, Progeny Systems Corporation, Imedia.it, Eduworks, Blue Mango Learning Systems, Delex, and Learnitech

DITA Specializations for Learning and Training Content

Learning topic types

- Learning Plan
- Learning Overview
- Learning Content
- Learning Summary
- Learning Assessment

Learning map domain

- Structures topic references into learning objects and groups
- Makes learning content available for use in any DITA map

Learning interactions domain

- Defines six basic assessment interactions, for use in learning assessments as pre-tests, post-tests, or both

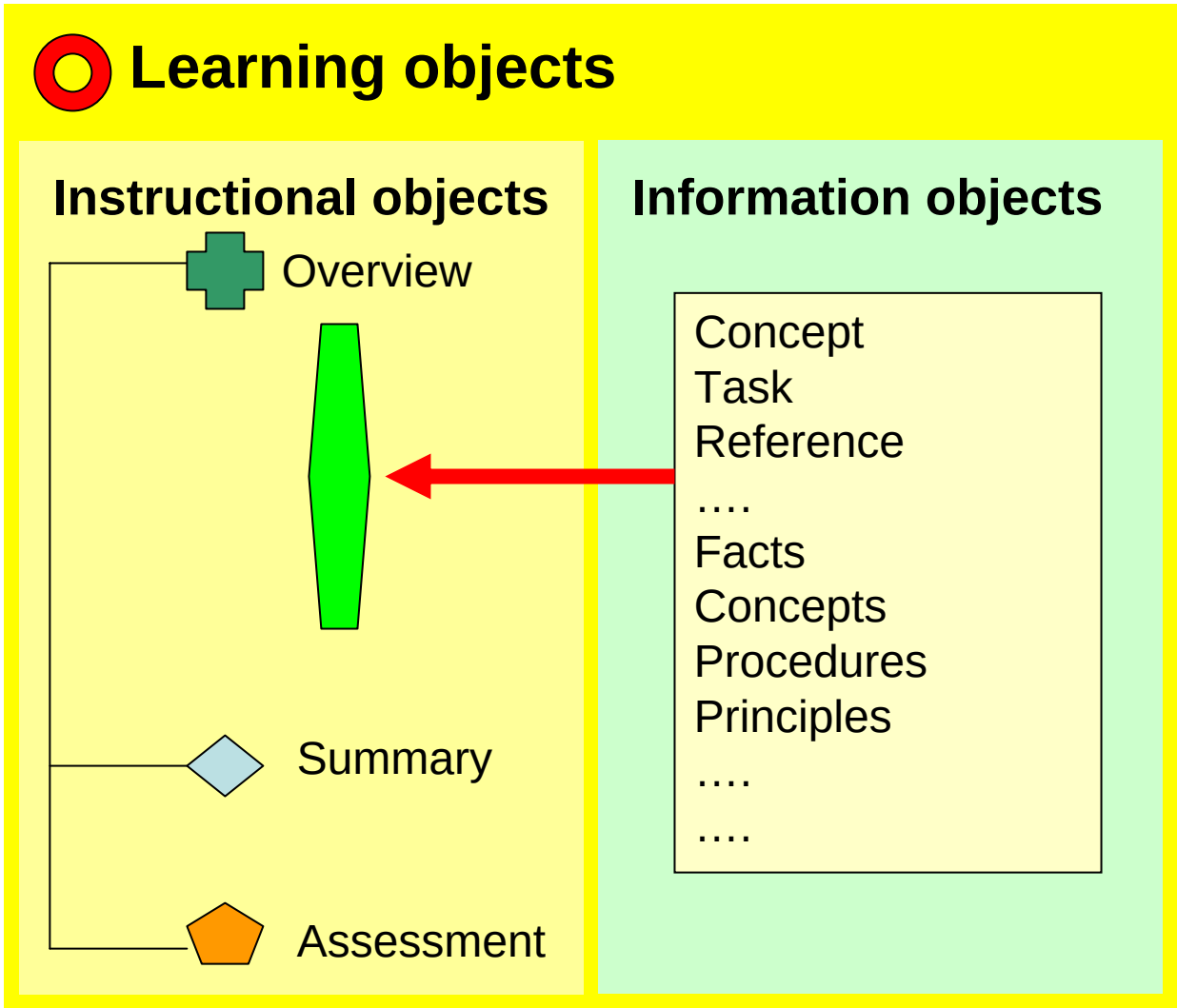
Learning metadata domain

- IEEE LOM metadata for use in learning topic prologs and map domain topicmeta

Details about the five learning topic types

- Learning Plan
  - Describes learning needs and goals, instructional design models, task analyses, learning taxonomies, and other information necessary to the lesson **planning** process.
- Learning Overview
  - Identifies the **learning objectives**, includes other information helpful to the learner, such prerequisites, duration, intended audience, and can include information and strategies that seeks to gain attention and stimulate recall of prior learning.
- Learning Content
  - Provides the **learning content** itself, and enables direct use of content from DITA task, concept, and reference topics, as well as additional content of any topic type that supports specific objectives declared in the Learning Overview topic type. A Learning Content topic comprises a set of self-contained content about a single terminal learning objective supported by zero or more enabling learning objectives.
  - Also includes content that **supplements** the primary learning content, such as practices, exercises, or simulations, and could also include scenarios that invoke role playing, games, in-class homework, and group discussions.
- Learning Summary
  - **Recaps** and provides context for the learning objectives, provides guidance to reinforce learning and long-term memory, and may pose questions to enhance encoding and verification of the learning content.
- Learning Assessment
  - Presents instruments that **measure progress**, encourage retrieval, and stimulate reinforcement of the learning content, and can be presented before the content as a pre-assessment or as a post-assessment test. The interactions use a sub-set of the **Question-Test Interoperability (QTI)** specification, implemented as a DITA domain specialization.

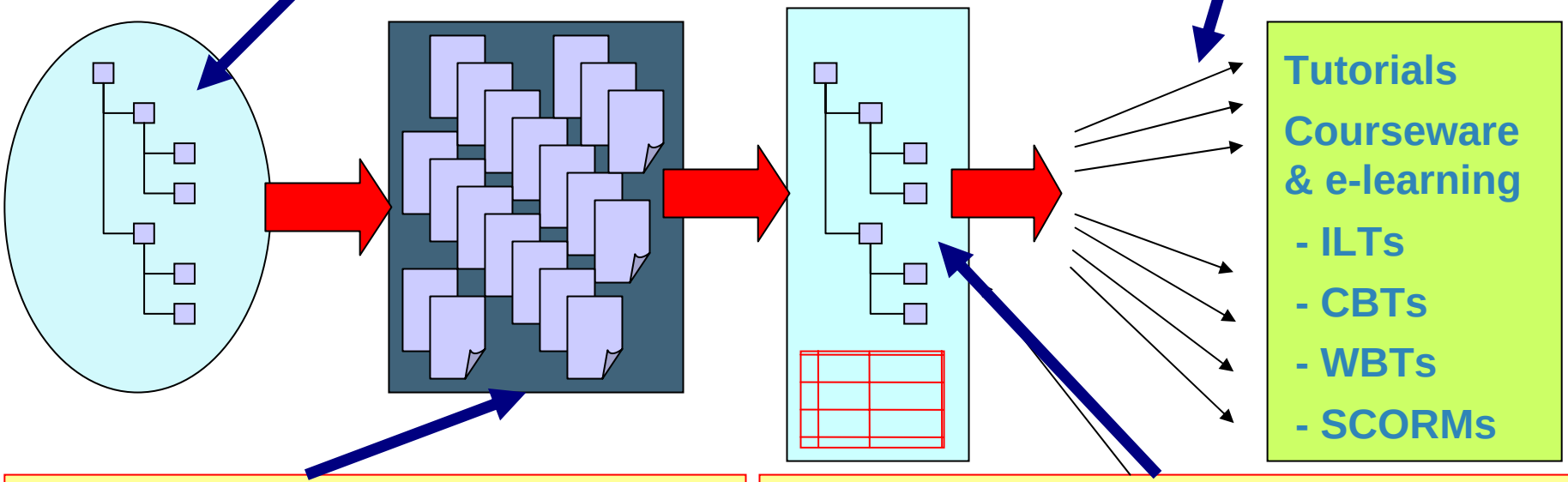
Learning objects and specialized DITA learning types



Learning content design, creation, and delivery through DITA specialization

1. **Specialized learning maps**
   Structure sets of DITA topics as learning objects

4. **Specialized processing**
   Generate learning deliverables



2. **Specialized learning topics**
   Lesson objectives, lesson content, summaries, exercises, assessments, including interactions and metadata domains

3. **Build maps and relationship tables**
   Organize learning objects into lessons and courses and manage relationships and interactions among them

What does DITA bring to learning content?

Consistency of content, processing, and delivery

- Can change the look and feel, change the formality, support different audiences and objectives with the same underlying content

Can capture instructional design information in a consistent way, such as objectives, audience, and other metadata

- Enable other course developers to find, retrieve, reuse, and repurpose existing content in new ways and for new deliverables
- Can use design info to scale up in formality, manage and process against prerequisites, subject matter, instructional approach, competencies, and so on

Can enable reuse between learning-specific content and other existing content

Can grow as DITA grows

- Embed Flash objects today; generate interactive elements directly from DITA content tomorrow

Thank you!