

Something Old, Something New, Something Borrowed, Something SCORM®: The Odyssey Continues

ASTD TechKnowledge® 2004 Conference & Exposition

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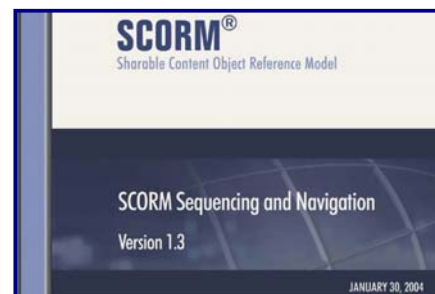


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Objectives

- Identify the key components of the SCORM specification and their value in developing and managing e-learning content.
- Determine your current degree of SCORM conformance based on your use of AICC, IMS, and other standards and specifications.
- See demo of part of latest ADL test suite
- Develop realistic, hype-free responses to 10 common misconceptions about SCORM.

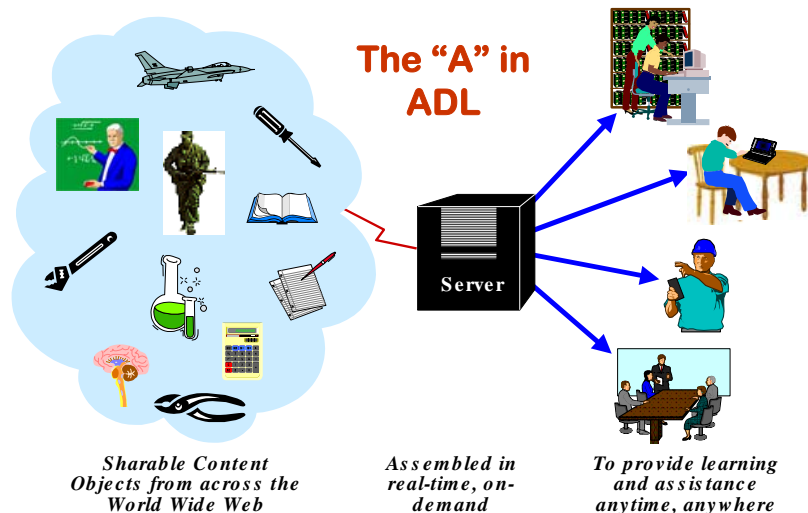




Sharable
Content
Object
Reference
Model

Sharable	Content	Object	Reference Model
Available	Any size	Data	“Road-Map”
Many LMS’s	Any scope	Properties	Best practices
“Findability”	Many granularities	Behaviors	Bookshelf metaphor

ADL and SCORM™ Revisiting the Vision Intelligent Tutoring Systems (ITS) and More



Source: SCORM 2004 Overview
 January 30, 2004



Components

SCORM®
Sharable Content Object Reference Model

SCORM Content Aggregation Model
Version 1.3
JANUARY 30, 2004

SCORM®
Sharable Content Object Reference Model

SCORM Run-Time Environment
Version 1.3
JANUARY 30, 2004

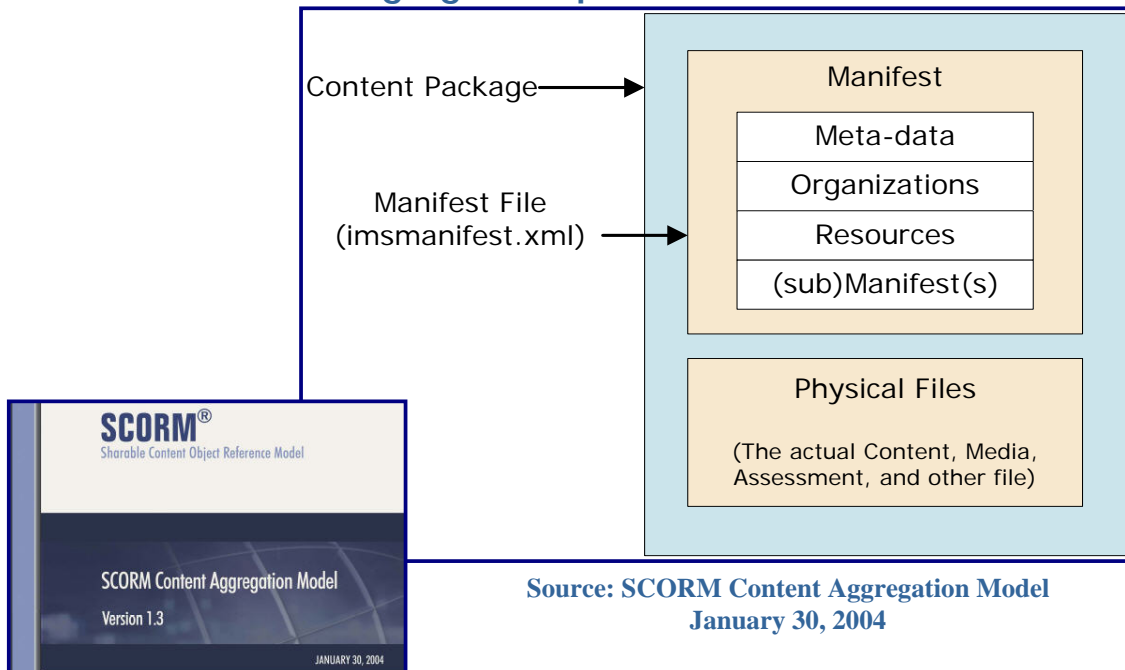
SCORM®
Sharable Content Object Reference Model

SCORM Sequencing and Navigation
Version 1.3
JANUARY 30, 2004

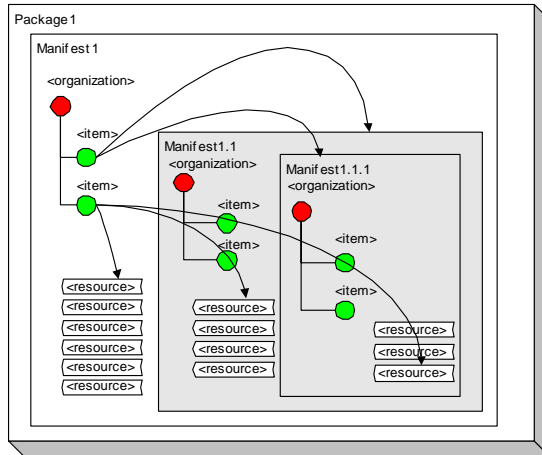
New!!!!



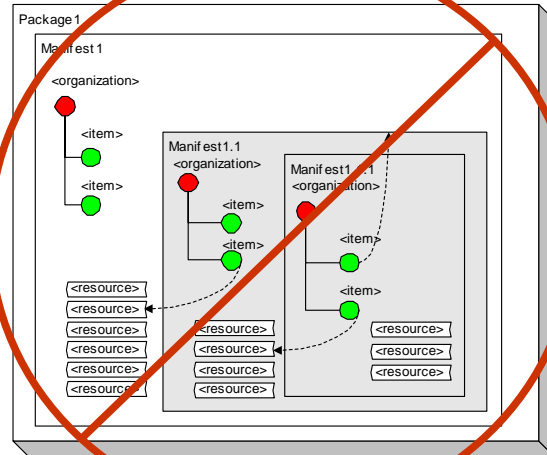
Content Packaging Example



Legal and Illegal References in IMS Manifests



Source: SCORM Content Aggregation Model
January 30, 2004



Source: SCORM Content Aggregation Model
January 30, 2004

You may be closer to conformance than you think!

Content Model: definition of common terminology used throughout the CAM book (IEEE LOM 1484.12)

Content Packaging: descriptions and requirements for aggregating and bundling learning content (derived from AICC)

Meta-data: descriptions and requirements for describing SCORM components, especially LOM's (from IMS)

Sequencing and Navigation: descriptions and requirements for defining sequencing and navigation information (from IMS)

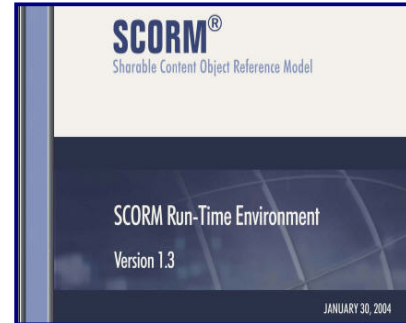


“The IEEE recommends the use of the vocabulary token set defined in the LOM. SCORM acknowledges this recommendation but further permits, if necessary, the creation and use of an organizations own vocabulary token set for those elements marked as Best Practice Vocabulary.” Source: *SCORM Content Aggregation Model*

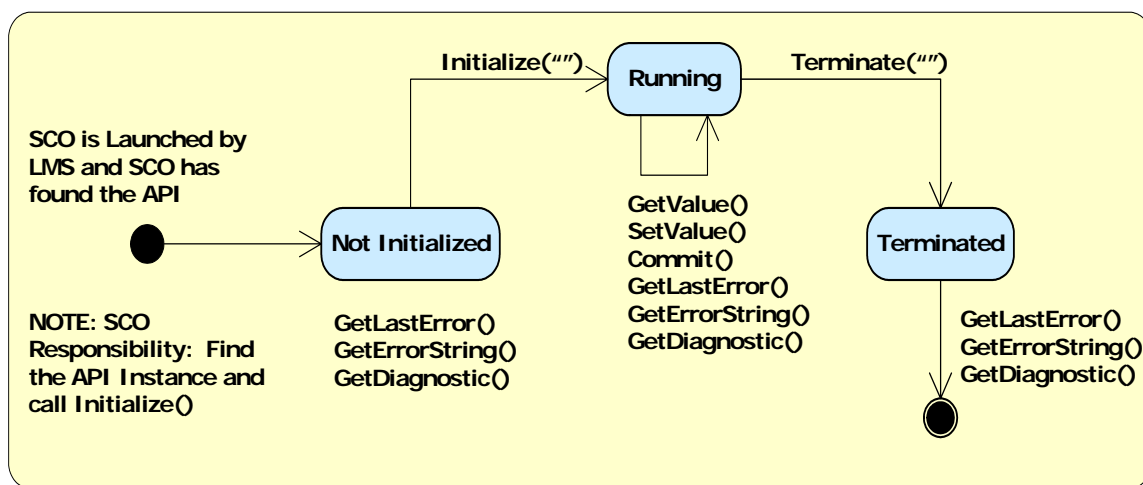
January 30, 2004

Runtime Environment: Application Program Interface (API)

- Defines a common means for content to communicate with LMSs
- **NOTE:** The initialize and finish functions are the only required parts of the API!!!



A Day in the Life of a SCO



Source: SCORM Run-Time Environment
 January 30, 2004

SCO/LMS Communication (initiated by SCO) The 8 Commands

LMSInitialize	initialize (SCO required)
LMSFinish	finish (SCO required)
LMSGetValue	read a data model value from the LMS
LMSSetValue	update a data model value to the LMS
LMSCommit	important, since items sent may only be
LMSGetLastError	obtain return code (not necessarily an
LMSGetErrorString	description associated with the return
LMSGetDiagnostic	read information provided by LMS

SCORM Runtime Environment: Data Model

- Based on P1484.11.1 Draft Standard for Learning Technology - Data Model for Content Object Communication
 - Standard produced by the IEEE LTSC Computer Managed Instruction (CMI → the “cmi” in the notation).
- Information about SCOs, the student, and the session that can be tracked by LMS's.

Core	basic information about the student and lesson
Launch Data	information used by the SCO during launch
Objectives	information on SCO objectives
Student Data	SCO information about student performance
Student Preference	SCO options selected by the student

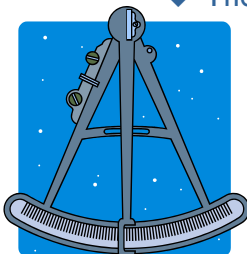
SCORM Run-Time Minimum Requirements

- Every SCO must call `LMSInitialize()` at the start of every SCO so that it can communicate with the LMS.
- `LMSFinish()` must be called when the SCO has finished communicating with the LMS.
- The other 6 commands are optional!!
- Only one SCO may be loaded at a time. Therefore, failure to issue an `LMSFinish()` prior to unload a previous SCO will cause an error condition when the new SCO is loaded and it issues an `LMSInitialize()` command.

Navigation, SCO's and LMS's: Who Does What? (Prior to SCORM 1.3)



- The SCO handles all navigation within the SCO. It handles all sequencing of web pages as long as it has control.
- The LMS controls the sequencing of SCO's.
- So how have course authors controlled the sequencing of SCO's up to now?
 - ◆ The `imsmanifest.xml` file

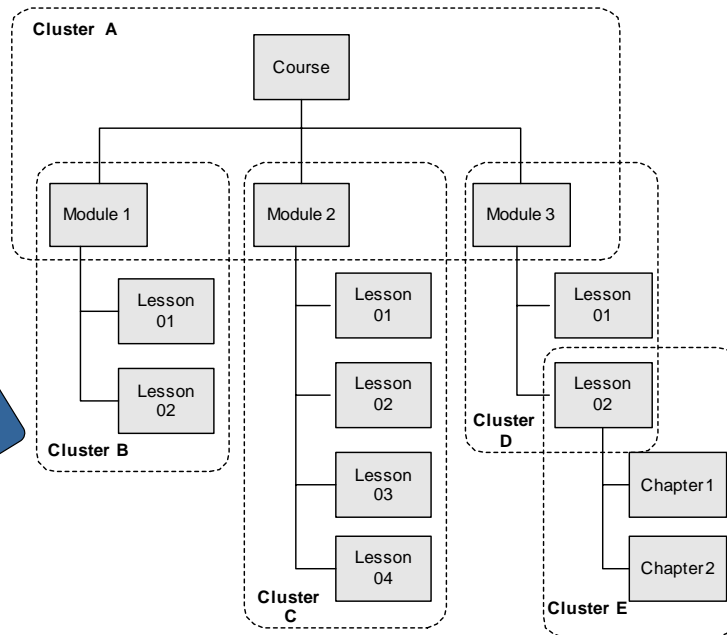


- essential packaging information for a course
- course description
- sequencing information
- names of course files

Activity Trees, Clusters, and Leaves




Plus a couple hundred pages of documentation derived from IMSSS!!



Source: SCORM Sequencing and Navigation
January 30, 2004

Our Test SCO: E-Learning's "Hello World!"

Hello World



The camel is a mammal.

<input type="button" value="Reporting for class!"/>	<input type="button" value="Finish this Lesson"/>
<input type="button" value="The Camel is a Reptile"/>	<input type="button" value="The Camel is a Mammal"/>

SCO Run-Time Environment Test

Excerpt from SCO-Test Launch Screen

This is what the LMS would be telling your SCO at run-time!!!


2. Please provide the following information that might be used for the individual SCO being tested:

Student ID (default - User01)	<input type="text" value="Student1234"/>
Student Name (default - Student, Joe)	<input type="text" value="Camel, Joe"/>
Is SCO being taken for (default - credit):	<input type="text" value="credit"/>
Lesson Mode (default - normal)	<input type="text" value="normal"/>
Launch Data (default - blank)	<input type="text" value="Welcome to Anaheim!!!"/>
Comments From LMS (default - blank)	<input type="text" value="excellent student"/>
Mastery Score (default - blank)	<input type="text" value="100"/>

Demo of SCO Test using Version 1.2.6 (Self Test)

- Make mandatory calls
- Use LMS launch data
- Greet student by name
- Obtain student's required mastery score for SCO from LMS
- Allow student to interact with SCO, including answer challenging question
- Report student's back the raw score to LMS
- Report student's results to student within the SCO
- Make use of LMS comment information
- Run on ADL Test Suite

Hello World



The camel is a mammal.

Reporting for class!!

Finish this Lesson

The Camel is a Reptile

The Camel is a Mammal

SCO Run-Time Environment Test

Make mandatory calls

```
// call LMSInitialize()
```

```
function mm_adlOnload()  
{  
  if (mm_adl_API != null)  
  {  
    mm_adl_API.LMSInitialize("");  
  }  
  return null;  
}
```

Tests for connection to LMS

Delegation of mandatory LMSInitialize()

```
// call LMSFinish()
```

```
function mm_adlOnunload()  
{  
  
  // THIS IS WHERE WE'LL TELL  
  //STUDENT HIS/HER RESULTS  
  
  mm_adl_API.LMSFinish("");  
}
```

Delegation of mandatory LMSFinish()

Use LMS launch data

```
var launchData = mm_adl_API.LMSGetValue("cmi.launch_data")  
alert(launchData)
```

We'll set this message before we launch

Greet student by name

```
var studentName = mm_adl_API.LMSGetValue("cmi.core.student_name");  
var studentNameS = studentName.split(',');  
var lastName = studentNameS[0];  
var firstName = studentNameS[1];
```

Stored LastName, FirstName

JavaScript to parse name into two usable parts

```
alert("Hello " + firstName + " " + lastName);
```

Say Hello!

Obtain student's required mastery score for SCO from LMS

```
var masteryScore =
    mm_adl_API.LMSGetValue("cmi.student_data.mastery_score");
```

Report student's raw score to LMS

```
function mm_SetScoreToZero()
```

```
{
    alert("I'm sorry, that isn't quite the right answer.");
    mm_adl_API.LMSSetValue("cmi.core.score.raw",0);
    mm_adl_API.LMSCommit()
}
```

Grossly oversimplified, of course (we're forcing a 100, usually perfect score, but....)

```
function mm_SetScoreTo100()
```

```
{
    alert("Terrific! You're really making progress!");
    mm_adl_API.LMSSetValue("cmi.core.score.raw",100);
    mm_adl_API.LMSCommit()
}
```

Also oversimplified (we're forcing a 100 score for demo)

Could vary by student

Report student's results to student

```
alert("Leaving Lesson.");
mm_adl_API.LMSCommit("");
```

Always a good idea, "just in case"

```
var finalScore = mm_adl_API.LMSGetValue("cmi.core.score.raw");
```

SCO saved this to LMS

```
if (finalScore >= masteryScore)
```

We read this earlier from LMS earlier(see previous slide)

```
    alert("Congratulations! Your final score was " + finalScore +
        "! Your required score for mastery was " + masteryScore + ".");
```

```
else
```

```
    alert("You must take this lesson again. Your required score for mastery was "
        + masteryScore + " and your score was only " + finalScore;
```

Use LMS comment information

```
var comments = mm_adl_API.LMSGetValue("cmi.comments_from_lms");
alert("Your previous instructor thought you were " + comments);
```

Run-time value

ADL Test Suite (Latest Version—Just Out, January 16, 2004!!!)*



Welcome to the Advanced Distributed Learning (ADL) Sharable Content Object Reference Model (SCORM™) Conformance Test Suite

Version 1.2.6 (Self Test)

[About the ADL SCORM Conformance Test Suite](#) [View the ADL SCORM Conformance Matrix](#)



Certification Note: Successful outcome of this test does not constitute ADL Certification unless an ADL Certified Auditor conducted the test.

Select the test you wish to perform from the following options:

- ~~Learning Management System (LMS) Run-Time Environment Conformance Test~~
- ~~Sharable Content Object (SCO) Run-Time Environment Conformance Test~~
- ~~Meta-data Conformance Test~~
- ~~Content Package Conformance Test~~



*(requires Java™ Plug-in 1.3)

ADL Test Suite: SCO Test Example

Please provide the following information:

SCO Product Name:	<input type="text" value="Version1-2-6Test"/>
SCO Version/Release Number:	<input type="text" value="5.9.4.3"/>
SCO Vendor/Developer:	<input type="text" value="Shackelford & Associat"/>

For your use. Has no effect on run.

1. Please provide the following information that is required to start the test:

LMSInitialize Timeout Value	<input type="text" value="20"/>	Seconds
<input type="radio"/> Single SCO Test	<input checked="" type="radio"/> Multiple SCO Test	
SCO Address or Filename	<input type="text" value="C:\Documents and Setti"/>	<input type="button" value="Browse.."/>
Add To List	<input type="text" value="c:\SCOTestArea\MyFirstSCO.htm"/> <input type="text" value="c:\SCOTestArea\MyNextSCO.htm"/> <input type="text" value="c:\SCOTestArea\MyLastSCO.htm"/>	

List box only appears when Multiple SCO Test is selected

ADL Test Suite: SCO Test Example (continued)

2. Please provide the following information that might be used for the individual SCO being tested:



















Student ID (default - User01)	<input type="text" value="Student1234"/>
Student Name (default - Student, Joe)	<input type="text" value="Camel, Joe"/>
Is SCO being taken for (default - credit):	<input type="text" value="credit"/>
Lesson Mode (default - normal)	<input type="text" value="normal"/>
Launch Data (default - blank)	<input type="text" value="Welcome to Anaheim!!!"/>
Comments From LMS (default - blank)	<input type="text" value="excellent student"/>
Mastery Score (default - blank)	<input type="text" value="100"/>

We will use **FOUR** of these

Analyzing Results (the run-time log)

<ul style="list-style-type: none"> i Test Identification Information: SCO Product: Version1-2-6Test SCO Version: 5.9.4.3 SCO Vendor/Developer: Shackelford & Associates i Starting Self Test i Loading the Sharable Content Object i Attempting to Launch SCO C:\Documents and Settings\Administrator\Desktop\ASTD TechKnowledge 2004\Hands On SCORM\HelloWorld.htm i SCO is searching for the API Adapter ✓ SCO was able to find the API Adapter i LMSInitialize() has been invoked ✓ LMSInitialize() finished successfully i LMSGetValue(emi.core.student_name) has been invoked i Value returned from LMS: [Camel, Joe] ✓ LMSGetValue() finished successfully i LMSGetValue(emi.launch_data) has been invoked i Value returned from LMS: [Welcome to Anaheim!!!] ✓ LMSGetValue() finished successfully 	<ul style="list-style-type: none"> i LMSSetValue(emi.core.score.raw,100) has been invoked ✓ LMSSetValue() finished successfully i LMSCommit() has been invoked ✓ LMSCommit() finished successfully i LMSCommit() has been invoked ✓ LMSCommit() finished successfully i LMSGetValue(emi.core.score.raw) has been invoked i Value returned from LMS: [100] ✓ LMSGetValue() finished successfully i LMSGetValue(emi.student_data.mastery_score) has been invoked i Value returned from LMS: [100] ✓ LMSGetValue() finished successfully i LMSGetValue(emi.comments_from_lms) has been invoked i Value returned from LMS: [excellent student] ✓ LMSGetValue() finished successfully i LMSFinish() has been invoked ✓ LMSFinish() finished successfully i SCO is no longer initialized
---	---

Analyzing Results (Final Diagnostic from Run-Time Test)

-  SCORM 1.2 Run-Time Environment Conformant
-  SCO-RTE1+Mandatory and Optional
-  Features Supported:
-  API Support
 -  Find an LMS provided API Adapter
-  Execution State:
 -  LMSInitialize()
 -  LMSFinish()
-  Data Transfer:
 -  LMSGetValue()
 -  LMSSetValue()
 -  LMSCommit()
-  State Management:
 - None Supported
-  Data Model Support
 -  SCORM Run-Time Environment Data Model
 -  cmc.core.student_name
 -  cmc.launch_data
 -  cmc.core.score.raw
 -  cmc.student_data.mastery_score
 -  cmc.comments_from_lms

Open Forum on SCORM Misconceptions (??) (Yea or Nay)

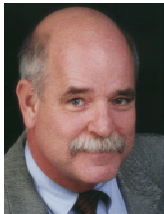
1. SCORM is an entirely new standard.
2. There is no SCORM "vision"
3. Everything in my organization needs to be SCORM conformant.
4. Whew! Now we've made it. All we need to do is conform to SCORM 2004, and our troubles are over.
5. If I've used the ADL Test Suites and have passed all of the self-tests, then I'm SCORM-certified.
6. SCORM is all-or-nothing I have to implement all of it, or there's no point.
7. Metadata standards will assure that all data is consistent
8. Starting with SCORM 2004, sequencing occurs entirely within a SCO
9. SCORM-conformant content that runs on my SCORM-conformant LMS will run on all SCORM-conformant LMS's
10. We'd all be better off just letting the vendors and ADL fight it out and not bother ourselves worrying about SCORM.

Questions?

Hey, Bill!!!!!!



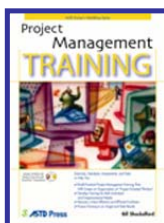
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Bill Shackelford founded Shackelford & Associates in 1982 after 12 years as a college administrator—first at Indiana University, then at IIT, and finally as IT manager at University of Illinois, Chicago. He is Senior Facilitator for Russell Martin & Associates and member of the DCI faculty. His *Project Managing E-Learning* (2002), is part of ASTD's E-Learning series; and he is a frequent speaker on the topic, presenting at On-Line Learning's conferences in the U.S. and Europe. He appeared as Keynote Speaker at CCASTD E-Learning Conference and the Illinois Association of Educational Technology and Communication. As an active software developer, trainer and facilitator, Bill has served such diverse clients as the U.S. Department of Defense, BP-Amoco, Bank One, Allegheny Power, Pullman Educational Foundation, American Association of Law Libraries, Choice Point, DiamondCluster, CIT Financial Services, Kemper Financial Services, Piedmont Natural Gas, Sentara Health Care, American National Educational Corporation, Books & Periodicals Online, Hertz, University of Texas, and the University of Illinois.



Bill is the Chicago correspondent for *Opera Magazine* (UK), Editor of *Best Practices in IT Leadership*, and Editor of the *Wagner News* of the Wagner Society of America. His article, "The Art of Smart: Cultivating Customer Loyalty through E-Learning" appeared in the November 2001 issue of *Cutter IT Journal*. He teaches both on-line and at the Chicago campus in Keller Graduate School of Management's Project Management MBA program. His article "A SCORM Odyssey" appeared in the August 2002 issue of ASTD's *T&D Magazine*. His latest book, *Project Management Training*, was released last week by ASTD Press. He is currently authoring online courses in classroom management for Pearson Education and teaches online in Keller Graduate School of Management's Project Management MBA program.



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