

Evolving Teaching and Learning: Beyond the LMS

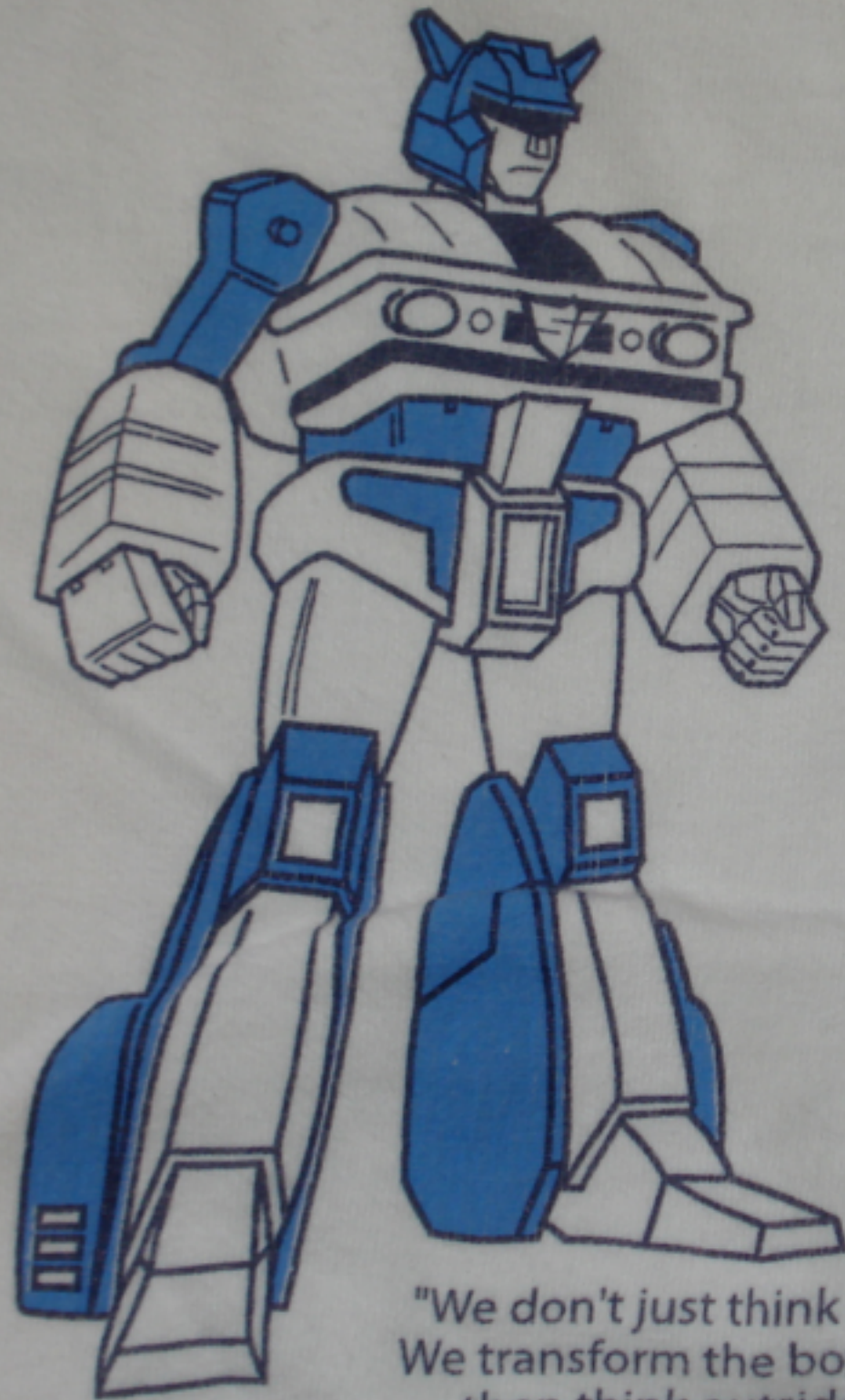
Dr. Charles Severance

University of Michigan

School of Information

IMS Global Learning Consortium

www.dr-chuck.com



"We don't just think outside the box...
We transform the box into a robot and
then think outside of the robot."

We don't just think
outside the box....

We transform the
box into a robot...

and then we think
outside of the robot.

Greg D. Crosariol - www.gregd.com



June 4,
2004





*"Collaborative eScience:
Evolving Approaches"*



**PREVIEW
SLIDES**

? HELP

⬆️ DONE

WP Web Lecture
Archive Project

← GO BACK 1

GO AHEAD 1 →

00:00:00

slide 001

Collaborative eScience: Evolving Approaches

Charles Severance
Executive Director, Sakai Foundation

Shaping Collaboration 2006
Geneva, Switzerland
December 11-13, 2006



JUMP DIRECTLY TO SLIDE ⬆️

[synchronize video with current slide](#)

www.syncomat.com

Chuck's Goals for Sakai



- ✓ Bring enterprise-level open source LMS into the Market
- ✓ Collect bright worldwide developer community and achieve sufficient adoption for sustainability
- ? Focus on ease of adding new tools
- ?? Create market to enable the free exchange of tools
- ✗ Get teachers writing tools

[Site Information Display](#) ?

[Options](#)

[Home](#)

[Assignments](#)

[Test Center](#)

[Gradebook](#)

[Email Archive](#)

[Site Info](#)

[Help](#)

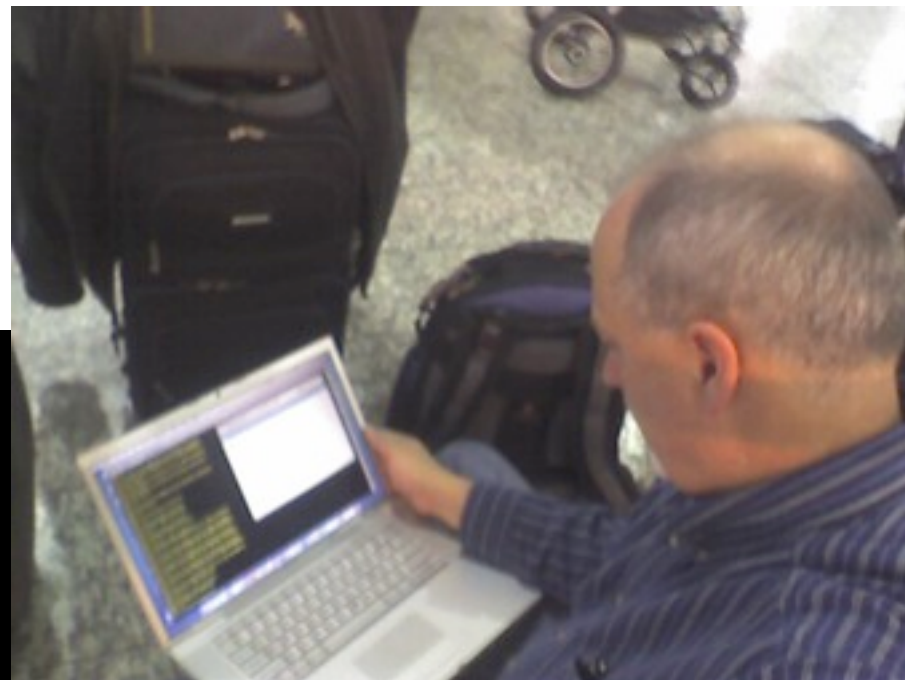
Users present:

Amanda Nichols
Charles Severance

Ctools site for Daniel Zhou's sections for W09:

502-3 29193 Group Session | Th 9-10:30 am, 412 WH | (Daniel)

502-8 29512 Group Session | Th 6-7:30 pm, 331 DENN | (Daniel)



2007



2008 Sakai Usage Data at University of Michigan



Commercial

Tools
Interoperability



Common
Cartridge



Publishers

LMS

Open Source

Standards

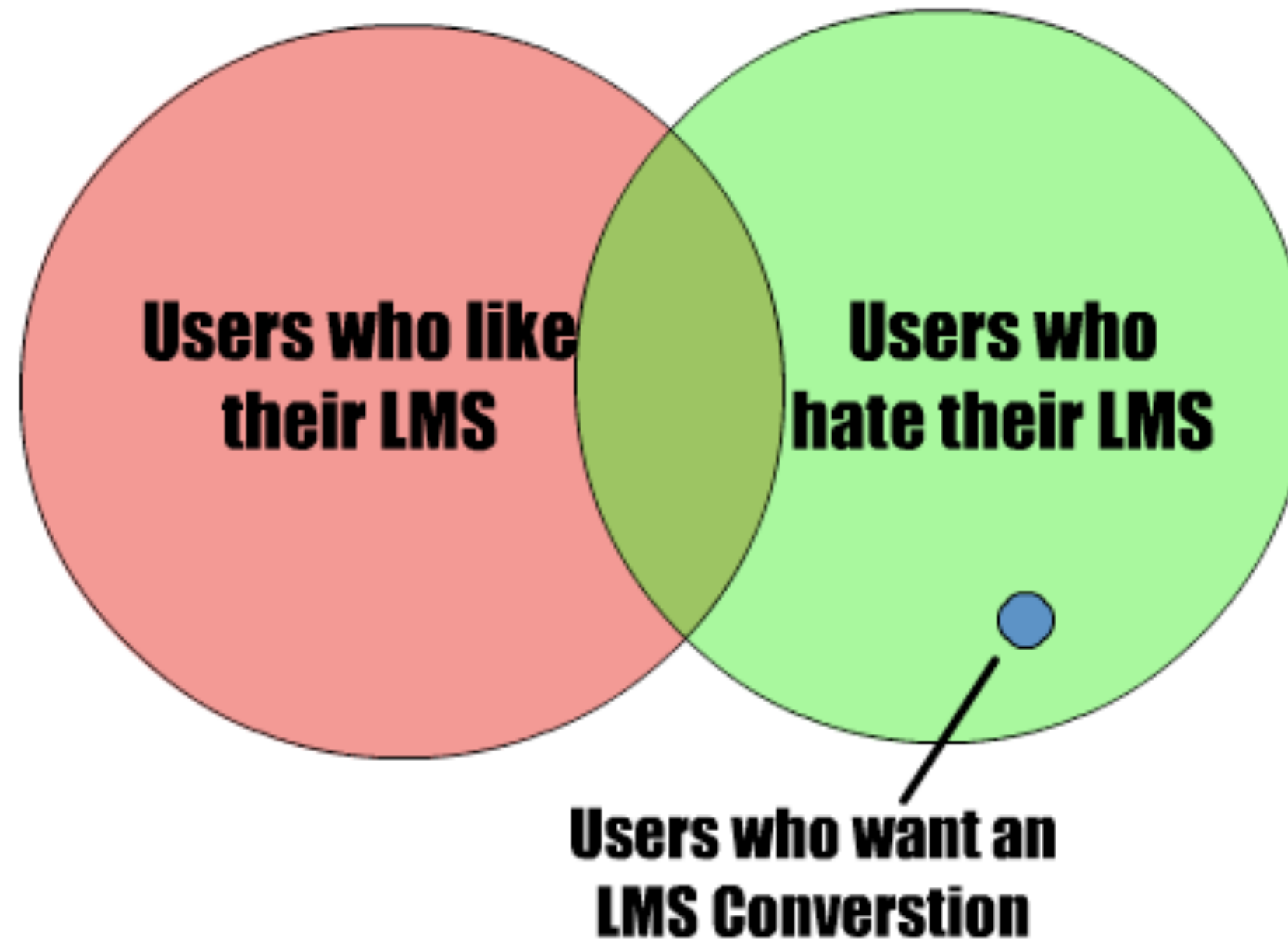
2008

www.imsglobal.org

The end of the LMS as we know it....



Love / Hate

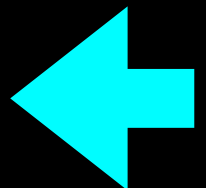
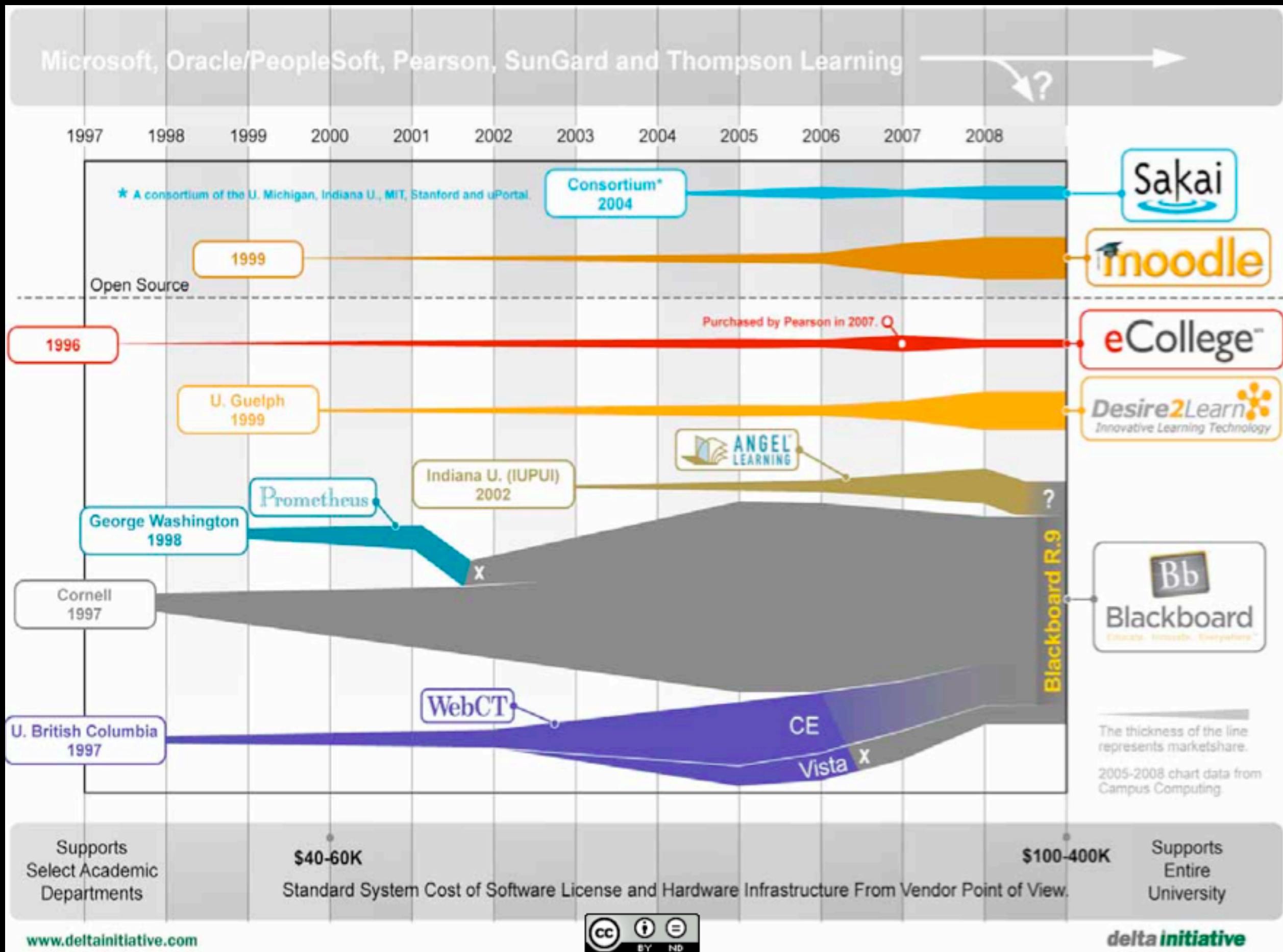


<http://graphjam.com/>

2015 LMS Market



<http://graphjam.com/>



EDU@2020

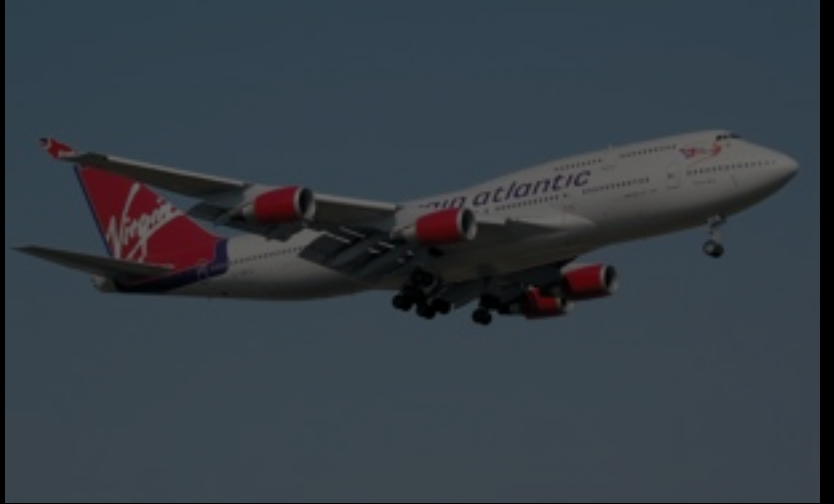
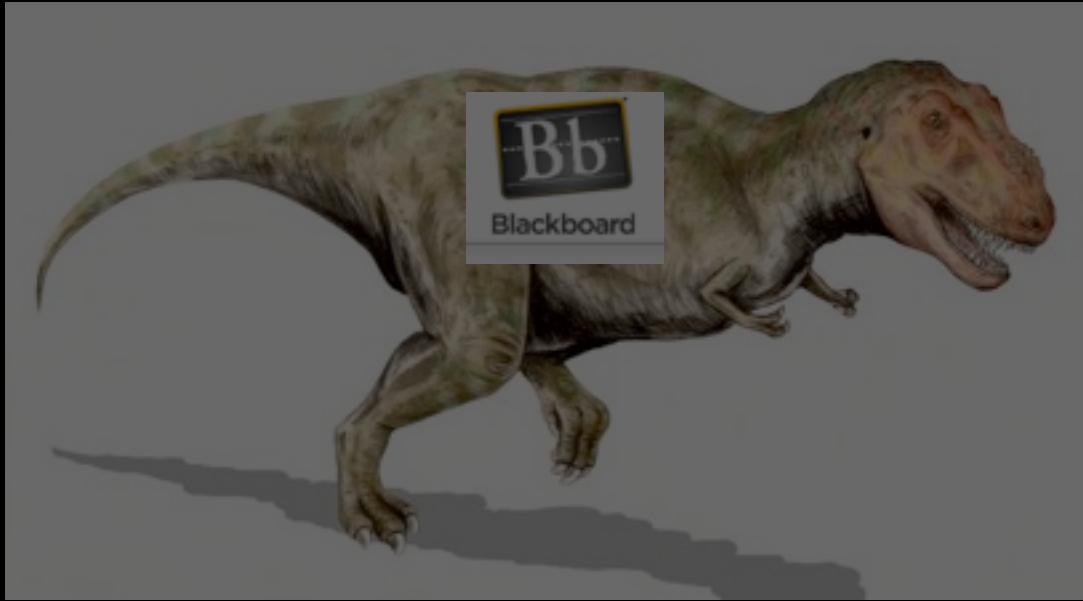


- Ricard N. Katz and Ronald Yanosky
- Google + Sakai = Google Phoenix
- Microsoft buys Blackboard
- Microsoft creates a lifelong personal portfolio
- Virtual teachers and virtual classmates

"College age young people are better socialized to virtual worlds than to real ones."



<rtsp://educause.rmod.llnwd.net/a680/ol/edu2020.rm>



MITOPENCOURSEWARE
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Mc
Graw
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open.michigan

MERLOT
Multimedia Educational Resource
for Learning and Online Teaching

PEARSON
Education



A Tale of Four Books

It is all quite complicated.....

A book is the most
essential part of a
successful learning
experience.

A book is the least
effective way to teach
complex or abstract
materials.

Teaching is about
narrative.



PREALGEBRA

Special Edition for Lansing Community College

Taken from:
Prealgebra, Third Edition
 by Jamie Blair, John Tobey, and Jeffrey Slater

Interactmath.com
 BLAIR/TOBEY/SLATER 3e

PEARSON
 Custom
 Publishing

PEARSON
 Prentice
 Hall



CHAPTER 3

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FOR STUDENTS

powered by CourseCompass™ and MathXL®

MyMathLab

Series Includes **MyStatLab**

Student

For use with an online course
Instructor Course ID required

Note: Once opened, this student access code is valid for 30 days.
The student access code inside is valid for 30 days.

System Requirements: Most courses require a computer with Internet access.
Go to <http://www.mymathlab.com/s>

CD Lecture Series
CD 1 of 5
Chapters 1 and 2

PEARSON Custom Publishing PEARSON Prentice Hall

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Register online

Src

DEVICES
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Untitled
iDisk
Prealgebra_3...

PLACES
Applications
Desktop
csev
Documents

SEARCH FOR
Today
Yesterday

btsprealg3e_sl_3_1.mov btsprealg3e_sl_3_2.mov btsprealg3e_sl_3_3.mov
btsprealg3e_sl_3_4.mov btsprealg3e_sl_4_1.mov btsprealg3e_sl_4_2.mov
btsprealg3e_sl_4_3.mov btsprealg3e_sl_4_4.mov btsprealg3e_sl_4_5.mov

btsprealg3e_sl_4_1.mov

- 122
- 420
- 11, 121

EXPRESS 50 AS A PRODUCT OF PRIME FACTORS

WHICH NUMBERS ARE PRIME, COMPOSITE, OR NEITHER?
0, 3, 9, 13, 16, 19,

PRIME :
COMPOSITE :
NEITHER :

EXPRESS 46 AS A PRODUCT OF PRIME FACTORS

00:00:00

⏮ ⏪ ⏩ ⏭ ⏸



Chapter Contents

Blair/Tobey/Sla

- + Ch 0: Orientation
- + Ch 1: Whole Numbers
- + Ch 2: Integers
- + Ch 3: Introduction to Fractions
- Ch 4: Fractions
- + Section 4.1
- + Section 4.2
- + Section 4.3
- + Section 4.4 Exponents
- + Section 4.5

interact **math**

1 2 3 4

What is the unit rate in dollars per hour?

\$ per hour is earned.
(Type a whole number or decimal)

Calculator interface with buttons for numbers, operations, and a 'More' button.

Enter any number or expression

InterActMath.com
http://interactmath.com/PlayerPractice.aspx?bookId=90621&chapterId=9§ionId=9
INTERACTMATH
Back to Exercise List

Exercise 10

Help Me Solve This

Plot $(2, -6)$ on the coordinate axes.

In plotting $(2, -6)$, first, you determine the distance and direction that the x-coordinate tells you to move.

In this case, you start at the origin and move 2 unit(s) in which direction?

- ☐ A. No where
- ☐ B. Right
- ☐ C. Left

Click to select your answer, then click Check Answer.

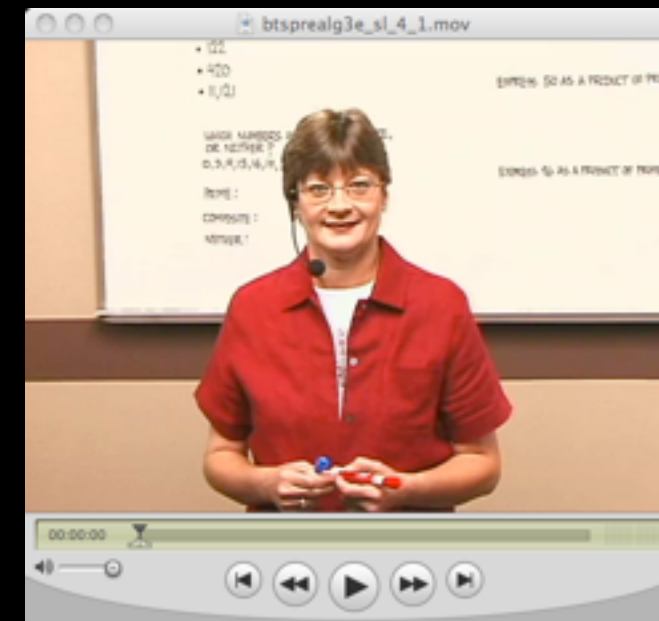
5 parts remaining

Clear All Check Answer Close

```

for sections in [1, 2, 3, 4, 5 8]:
    interactMath.doSelfAssess()
    if section.mastered() :
        continue
    interactMath.useHints()
    interactMath.doSelfAssess()
    if section.mastered() :
        continue
    sectionVideo.watch()
    interactMath.doSelfAssess()
    if section.mastered() :
        continue
    print "Dad - Help"

```





Wrote drafts of the book during my third semester of teaching SI539 in Fall 2008.

Students struggled with draft material in lab - and I fixed it.

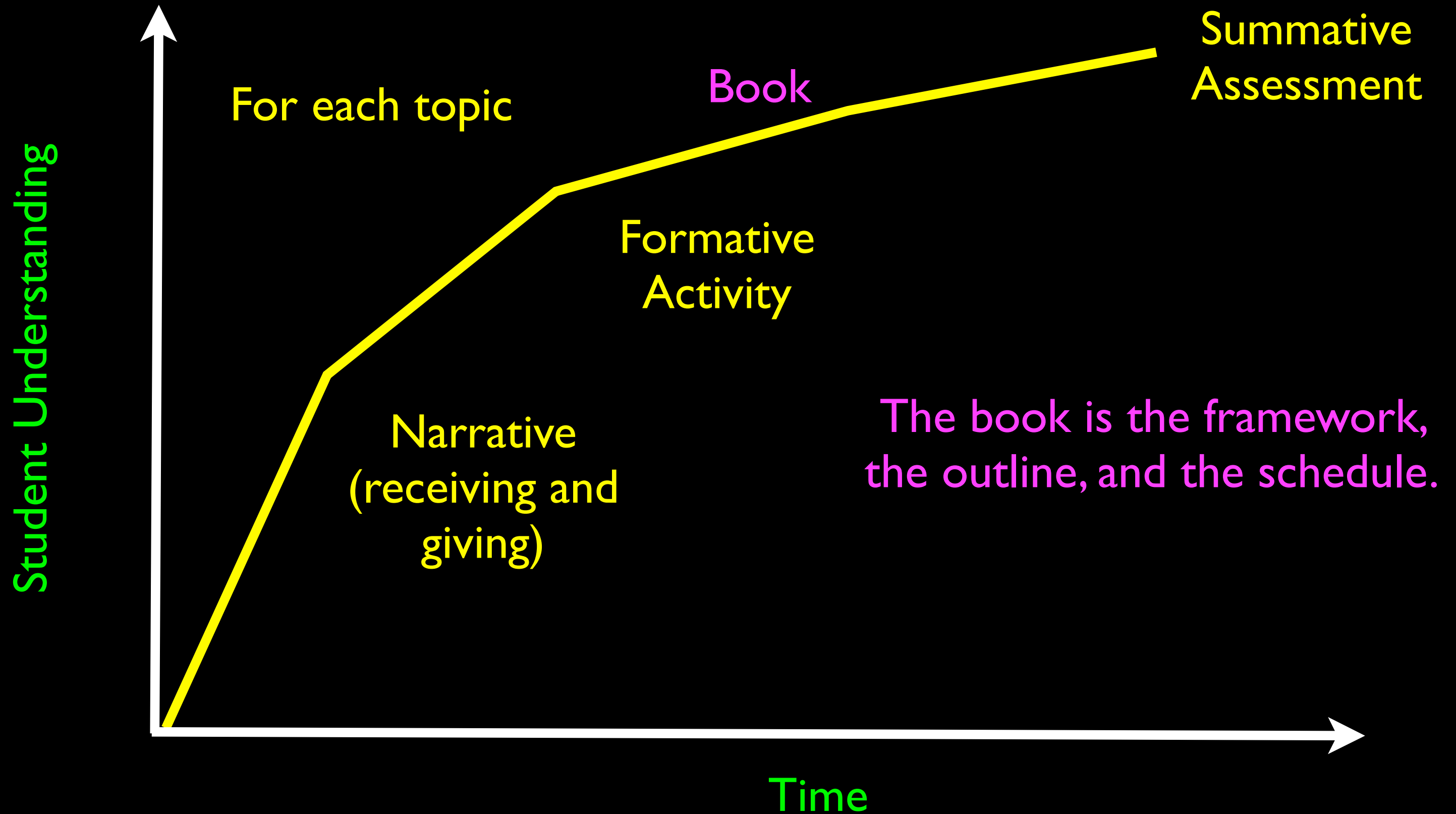
Wrote the missing parts Xmas - 2008.

Published May 2009 - in time for the second Google I/O conference.

SI539 - Design of Complex Web Sites

- Three hour lecture - slides - scribble - record audio
- Skill oriented assignment - over the weekend
- “Tech support” on class mailing list - students help each other
- Superb book - perfectly articulated with the material
- Monday - Lab for folks who “still are stuck” - QA on the course





3:57PM - To the class list

Anyone else **not seeing the submit button** in their application but rather text? I am using Google App Engine Launcher and it is opening in IE. I have the code for the form from Chapter 5 but it doesn't seem to work.

```
formstring = "" <form method="post" action="/">
<p>Enter Guess: <input type="text" name="guess"/></p>
<p>input type="submit"></p>
</form>""
```

Any ideas?

Erin

4:26PM - To the class list

You're missing the open tag for that element.

Abby

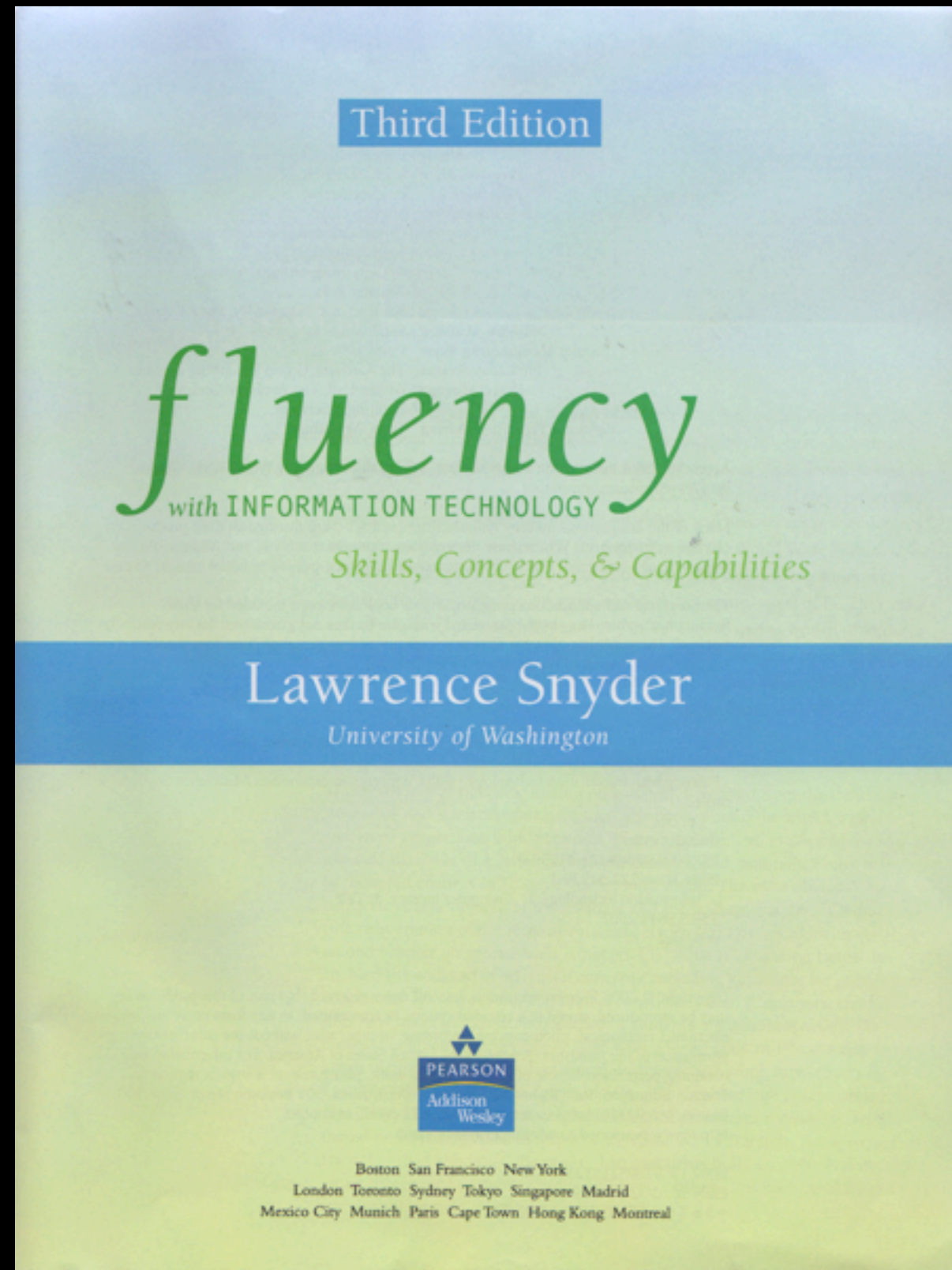
4:59PM - To Abby

Thanks.

/Chuck

Technology Literacy (si502)

- Three hour lecture - provide slides - record audio - scribble
- Hand out assignment - pushes students to review material and stretch themselves (over the weekend)
- Discussion section (12-16 students) with G.S.I.
 - More customied narrative due to the lack of a book and rapid pace
 - “After” narrative

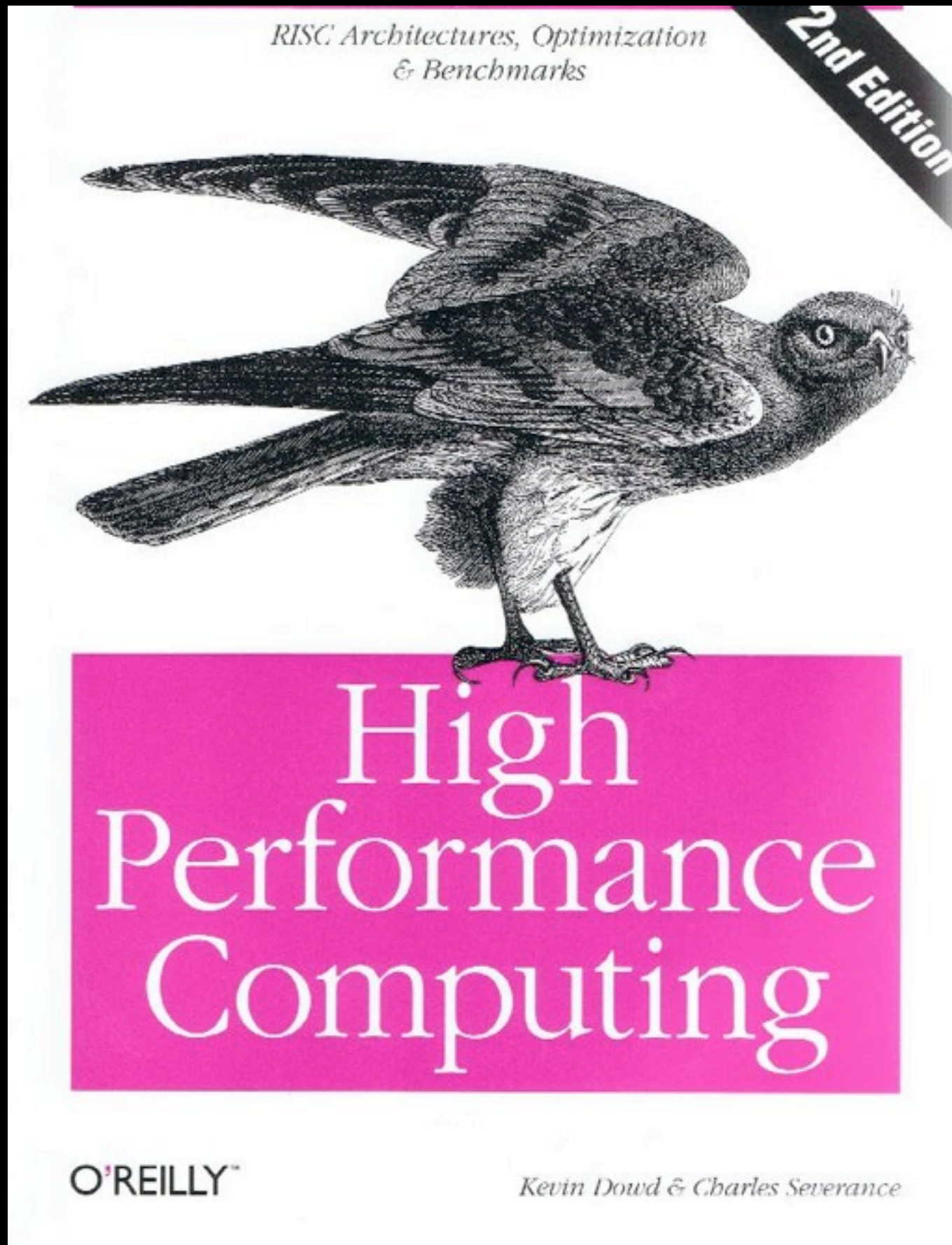


\$120 is too expensive!

Grrr. I am writing my own
version of this book right
now!

I will give it away and
printed copies cost \$10.00

Conexions (www.cnx.org)



Wrote drafts of the book during my third semester of teaching a HPC course in Fall 1997.

Awesome narrative - students could teach themselves from the book.

Out of print in 2000. I got copyright back in 2006.

Republishing as free remixable book on Conexions 2009.

A Tale of Four Semesters

Inverting Instructional Design...

First Semester

- No more than a few hours ahead of the students - always in panic
- Must create slides, assignments, pick reading materials and draw it together with a narrative
- Advantage: Narrative is raw and fresh - you can share how you learned the material - you remember the narrative that worked for you
- Your primary tool is LMS with the ability to send files to the whole class at the last minute

Second Semester

- You see the big picture - far fewer “syllabus surprises”
- Material is chunked properly - fewer “patch slides” a week later when you realize what you meant to say
- The slides begin to capture your learning path and include necessary learning objectives
- The slide narrative does a far better job preparing students for homework - fewer gaps in coverage

Third Semester

- If you don't have the perfect book, you have time to write non-slide narratives for the critical junctures of the course - patches to the book to fix gaps in the book
- You wish you had a tool that would have quietly captured all your homework and exam questions into pools to save cutting, pasting, and altering homework and exams
- Some materials are done so early that you need an LMS which understands "release dates" so you can automate the release of information - right at the moment you feel is right

Fourth Semester

- You study the incoming and outgoing learning objectives for your materials and check to see that the flow is really right
- You become even clearer about the learning objectives you have for each assignment - it would be nice to have software to help you with learning objective management
- It would be nice to make questions with learning objectives as well
- Your materials are becoming a book or web site that is reusable outside the context of your course.

A Tale of Four Semesters

- Notice that the flow and generation of knowledge is exactly the **opposite** of the “big up-front design” approach that is put forward as the ideal way to capture teaching technique
- Notice that it is really hard to tell the curriculum committee what the real learning objectives of the course are before you even teach it once...

Commercial

Tools
Interoperability



Common
Cartridge



Publishers

LMS

Open Source

Standards

2008

www.imsglobal.org



Standards that Touch Teachers

- **IMS Common Cartridge** - An export for a course - content hierarchy and metadata - soon to have IMS LTI and Objectives
- **IMS Learning Tools Interoperability** - A tool can be exchanged by a URL and a Key/Secret - a “Smart YouTube”

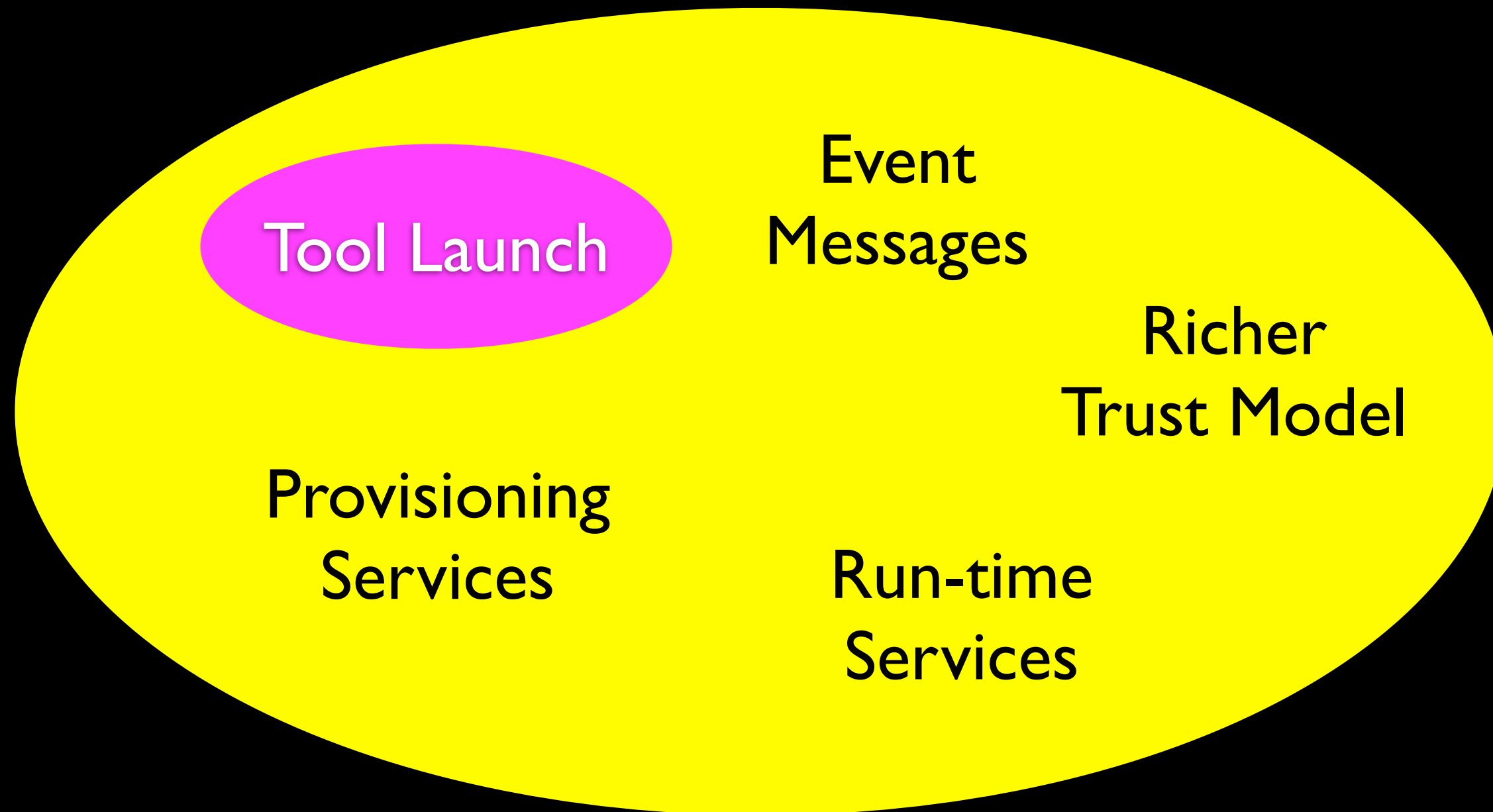


Thanks: LTI Working Group

- Basic LTI would not be possible without months of focused and dedicated effort by the LTI Working Group
- Lance Neumann, Blackboard (Chair)
- Greg McFall, Pearson (Chair)
- Bruno Van Haetsdaele, Wimba (Chair)



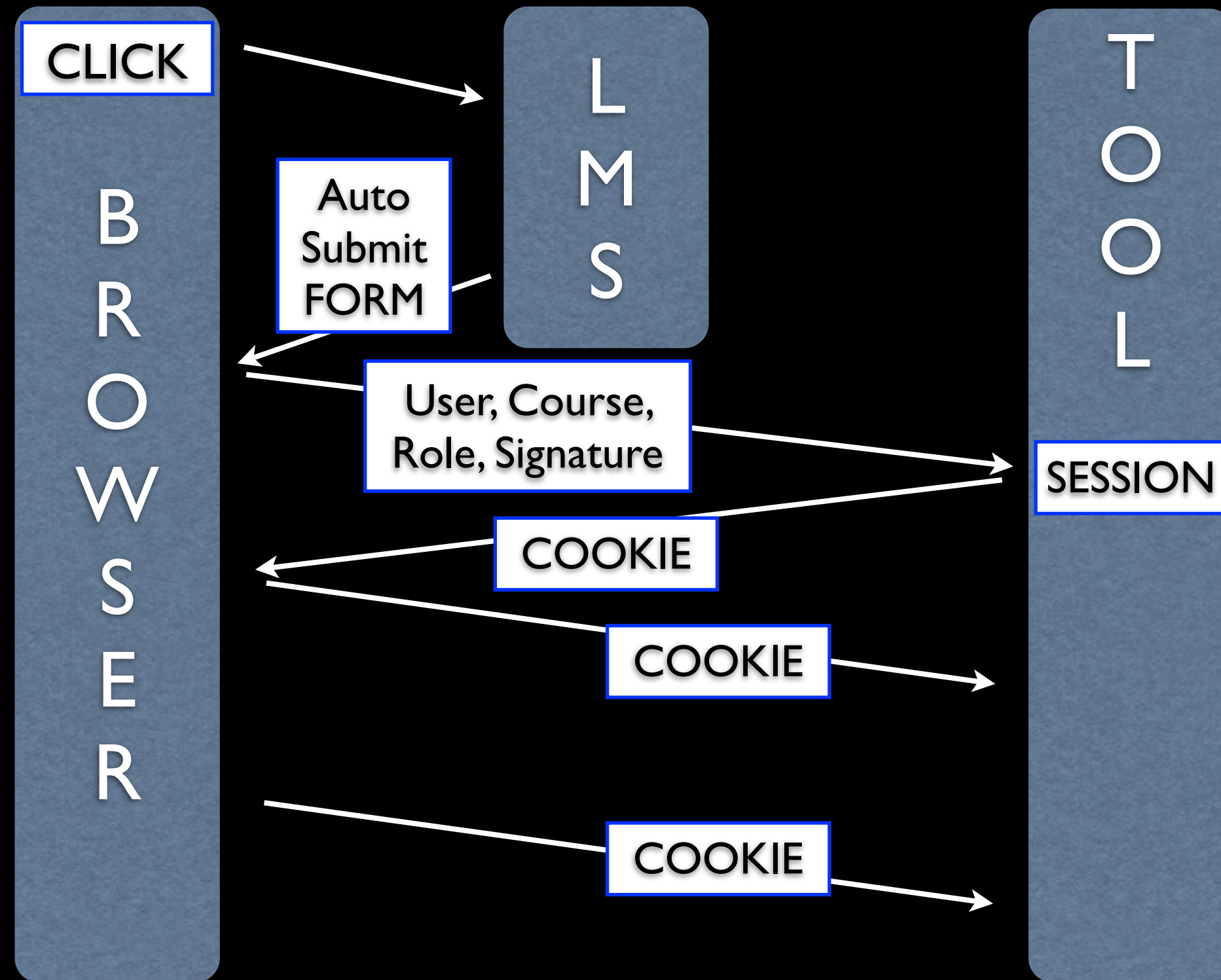
Basic LTI is Included in Full LTI



Basic LTI: Executive Summary

- Allows an LMS to launch an External Tool and securely provide user identity, course information, and role information to the external tool
- Uses a HTTP POST through the browser – secured by the OAuth security (www.oauth.net)
- LTI Design Influences: Blackboard Proxy, Facebook API, Pearson TPI, and WebCT PowerLinks

LTI Launch Sequence



Pushing Basic LTI Adoption

- Sample Java + PHP Basic LTI implementations at
 - <http://code.google.com/p/ims-dev/>
- Use/include/have fixed sample code from oauth.net
- Both structured to provide reusable code
- Copyright IMS, Apache 2 – Usable anywhere

Blackboard Learn

http://www-dev.explore.vle.ed.ac.uk:8008/webapps/portal/frameset.jsp?tab_tab Google

My Places Home ? Help Logout

Bb WebCT The University of Testing

My Institution Courses Content Collection System Admin Scholar

Home View Edit Info History Watch Search: RSS Print

Home [Recently visited](#)

Home last modified by Charles Severance (Admin) on Tue, 3 Nov 2009 16:01:46 -0500

Welcome to the Sakai Wiki Tool Running in BlackBoard

What is a wiki?

A wiki is a tool which allows people to create web pages individually or as a group, without needing any web skills.

Using the wiki tool, you can create and edit web pages within your worksite. If you wish, you can make all or some pages publicly viewable.

Using wikis for teaching

There are a wide number of ways to use wikis for teaching - a web search will find any number of suggestions and case studies. For example, students can develop a collection of resources about the topic they are studying, and make them available to the outside world. Other lecturers like to produce a wiki page as a way of publishing lecture notes and course guidance for students to read but not edit.

Using wikis for research groups

A wiki allows people to work on producing a document together, such as to draft research proposals as a team, or to keep an up to date list of project contacts.

My Home Email Locker Schedule LOR

Welcome, Matt Oct 21, 2009

Course

Course Home Content Discussions Dropbox Quizzes Classlist Grades

Surveys Edit Course Logout

Content Map

[Collapse All](#) [Expand All](#)

Unit1. [LTI Testing](#)

1. [Link to SpACE](#)

Link to SpACE


[Back to Table of Contents](#)

PlacemarksFile managerOptionsHelp

Untitled

MapOrder

Change map type: MapFind location



Initial map (centre/zoom/type): SaveRestore

Click on the map to add a placemark.

Desire2Learn

Blackboard Learning System - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Your Institution UNIVERSITY

My Blackboard | Accessibility | Help | Log out

Build Teach Student View

PowerLinks demonstrations - Basic LTI

Course Tools

Course Content

(H) = Hidden

Instructor Tools

- Manage Course
- Grade Book
- Grading Forms
- Group Manager
- Tracking
- Selective Release

Your location: Home Page > Make a guess

Hello: PowerLinks Demonstrator (Instructor) from PowerLinks demonstrations - Basic LTI via basiclti

Please enter a valid, numeric guess

Enter Guess:

Enter Name (opt):

Guess Reset Game Data

Demo - LTI

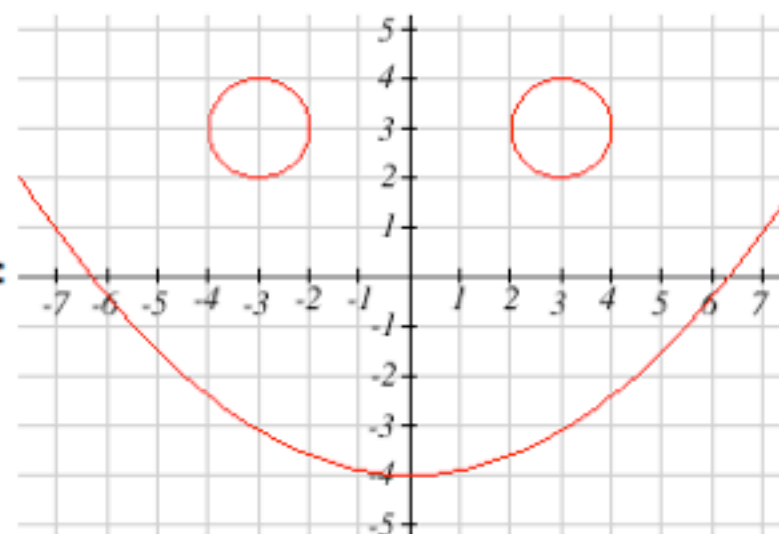
Welcome!

Welcome to this iMathAS / WAMAP demo course. If you are seeing this, then you've probably done an LTI course placement.

Let's make sure all the features work:

An equation: $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

A few graphs:



Basic LTI Coverage (approximate)

- Desire2Learn
- Sakai 2.7
- Moodle 2.0, 1.9, 1.8
- Blackboard 8
- Blackboard 9
- WebCT Vista
- ANGEL Learning
- Liferay
- uPortal

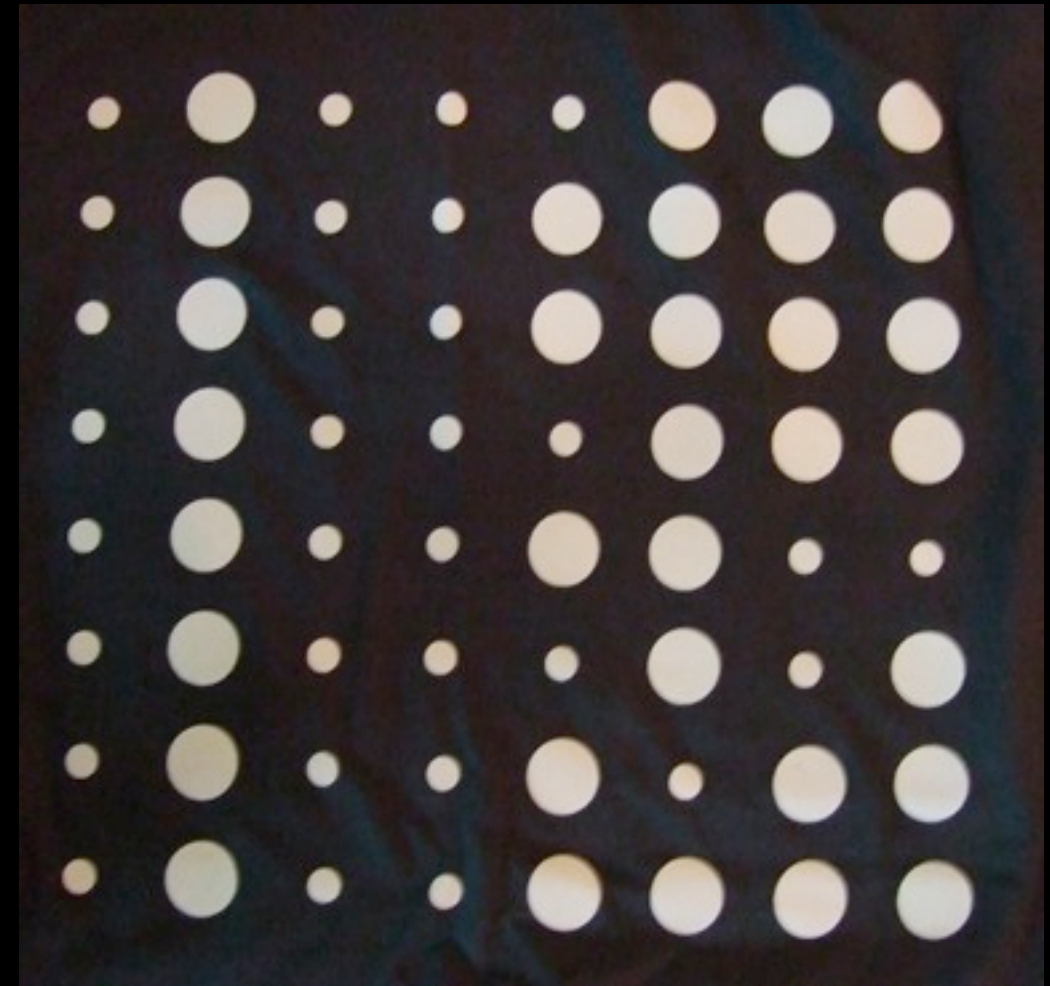
These are just what I *hope* will be available within 3-6 months.

Where Do Tools Come From?

- Tool Vendors / Publishers – Write once run anywhere
 - As LMS's ship with Basic LTI out of the box, this becomes the low-effort solution for the Wimba's of the world
- Faculty / Students / Tech Support
 - PHP Tool Kit
 - Python / Google App Engine Tool Kit

Getting The Next 1000 Learning Tools Written

Google I/O 2008





High School
College
Freshman
Level

Building Web Applications



Using

Google
App Engine

O'REILLY®

Charles Severance



Programming
HTML
CSS
Database
JavaScript

AppEngineLearn

[EZ-Launch](#) [Book](#) [Author](#) [Python](#) [App Engine](#)

These are supporting materials for the O'Reilly book titled [Using Google App Engine](#). This book is aimed at people who want to gain skill in web programming in general and the Google App Engine. The book has been used to support many beginning courses ranging from High School to College. As such there are chapters on Python, HTML, CSS, and HTTP. More advanced programmers will likely want to skip over the first few chapters.

I see Google App Engine as a way for virtually everyone to have their own interactive software-based web site regardless of their level of programming skills. Increasingly, web programming will simply need to be a competency like mathematics and this book is dedicated to teaching everyone about Google App Engine.

- You can download the [Sample Applications](#) from the book.
- [Installing Python and Your Programmer Text Editor](#)
- Installing the App Engine and writing your first Application.
 - Macintosh: ([Handout](#), [Screencast](#), [YouTube](#))
 - Windows Vista: ([Handout](#), [High Quality Screencast](#))



[Ruby on Rails Development](#)

Development and Training Start ups, SaaS, Business Apps

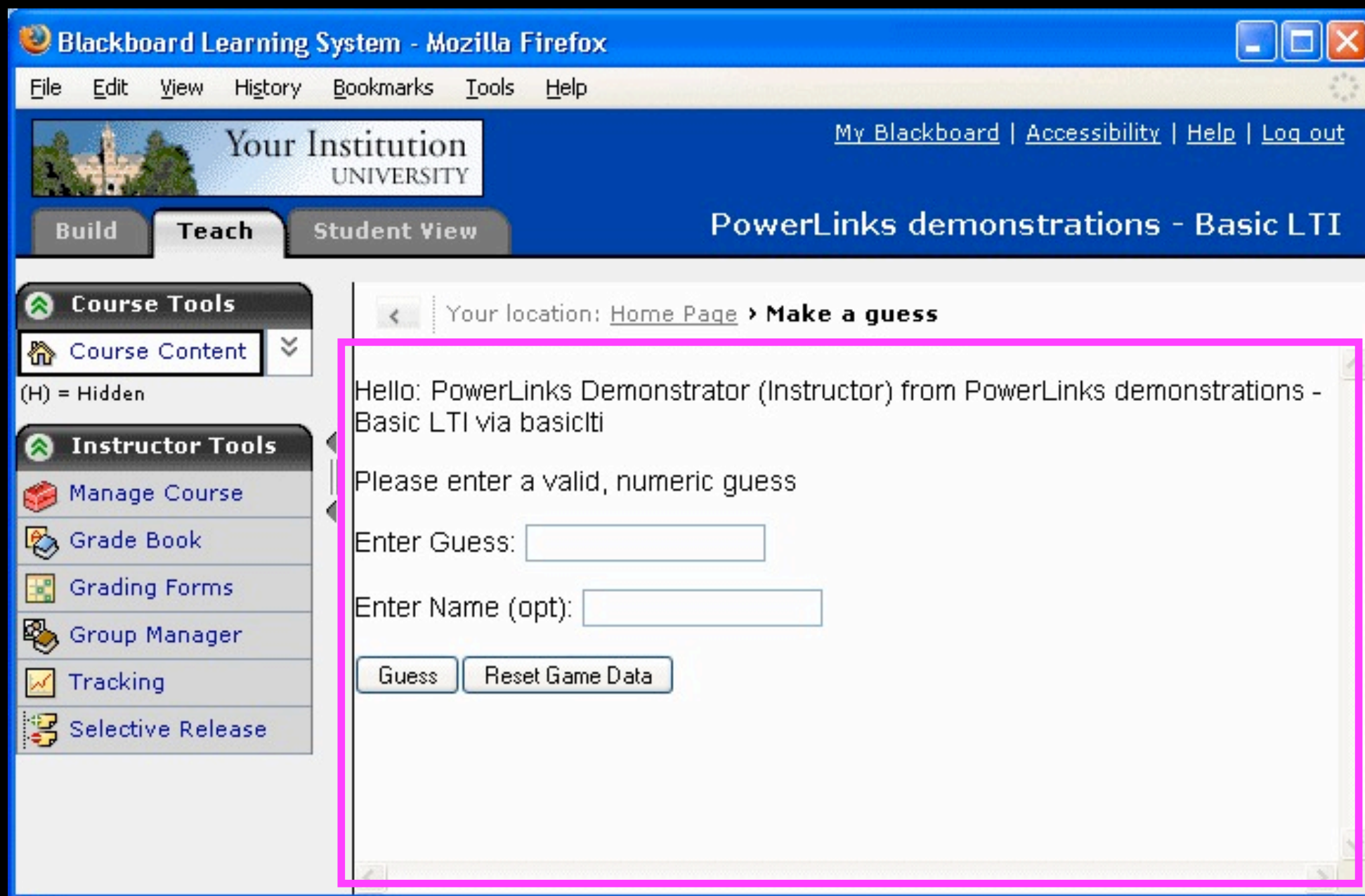


TsugiProject Goals

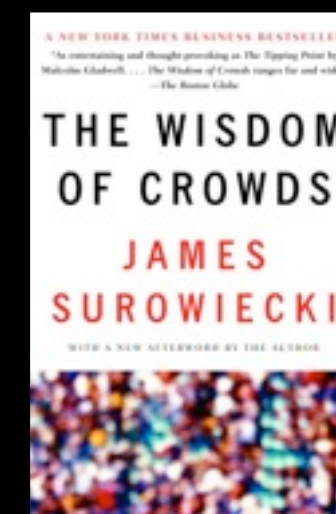


- Easy to use tool building and hosting environment
- Supports **IMS Learning Tools Interoperability**
- Written in Python, Free, Open Source
- Hostable on Google for **Free**
- Teachers writing tools - students writing tools

www.tsugiproject.org



80 lines of Python
25 lines of HTML
Scalable
Multi-Tenancy
IMS Basic LTI



```
import logging
import pickle
from google.appengine.ext import db
from core.tool import ToolRegistration
from core import learningportlet

class Wisdom(db.Model) :
    blob = db.BlobProperty()

def register():
    return ToolRegistration(WisHandler, "Wisdom of Crowds")

class WisHandler(learningportlet.LearningPortlet):

    def doaction(self):
        wisdom = Wisdom.get_or_insert("a", parent=self.context.course)
        if wisdom.blob == None :
            wisdom.blob = pickle.dumps( dict() )
            wisdom.put()
        data = pickle.loads(wisdom.blob)

        name = self.request.get("name")
        if len(name) < 1 : name = self.context.user.email
        guess = self.request.get("guess")
        try: guess = int(guess)
        except: guess = -1
```

80 lines
of
Python



```
import logging
import pickle
from google.appengine.api import memcache

from core.tool import ToolRegistration
from core import learningportlet

def register():
    return ToolRegistration(WisHandler,
                           "Wisdom of Crowds", """Game""")

class WisHandler(learningportlet.LearningPortlet):

    def doaction(self):
        whiskey = "WisCrowd-"+str(self.context.course.key())
        data = self.getmodel(whiskey)

        name = self.request.get("name")
        if len(name) < 1 : name = self.context.user.email

        guess = self.request.get("guess")

        try: guess = int(guess)
        except: guess = -1
```

80 lines
of
Python




```
msg = ""
if self.context.isInstructor() and name.lower() == "reset":
    data = dict()
    logging.info("Storing Wis Key="+wiskey)
    memcache.set(wiskey, data, 3600)
    msg = "Data reset"
elif guess < 1 :
    msg = "Please enter a valid, numeric guess"
elif len(name) < 1 :
    msg = "No Name Found"
elif name in data :
    msg = "You already have answered this"
elif len(data) > 1000 :
    msg = "Game only supports 1000 players."
else:
    data[name] = guess
    memcache.set(wiskey, data, 3600)
    logging.info("Storing Wis Key="+wiskey)
    data = self.getmodel(wiskey)
    if data.get(name, None) == guess :
        msg = "Thank you for your guess"
    else:
        msg = "Unable to store your guess please re-submit"
return msg
```

80 lines
of
Python



```
def getview(self, info):
    wiskey = "WisCrowd-"+str(self.context.course.key())
    data = self.getmodel(wiskey)
    rendervars = {'context': self.context,
                  'msg' : info}
    if self.context.isInstructor() and len(data) > 0 :
        text = ""
        total = 0
        for (key, val) in data.items():
            text = text + key + "," + str(val) + "\n"
            total = total + val
        count = len(data)
        ave = 0
        if count > 0 : ave = total / count
        rendervars["ave"] = ave
        rendervars["count"] = count
        rendervars["data"] = text
    return self.doRender('index.htm', rendervars)
```

```
def getmodel(self, wiskey):
    data = memcache.get(wiskey)
    if data == None or not isinstance(data, dict):
        data = dict()
    return data
```

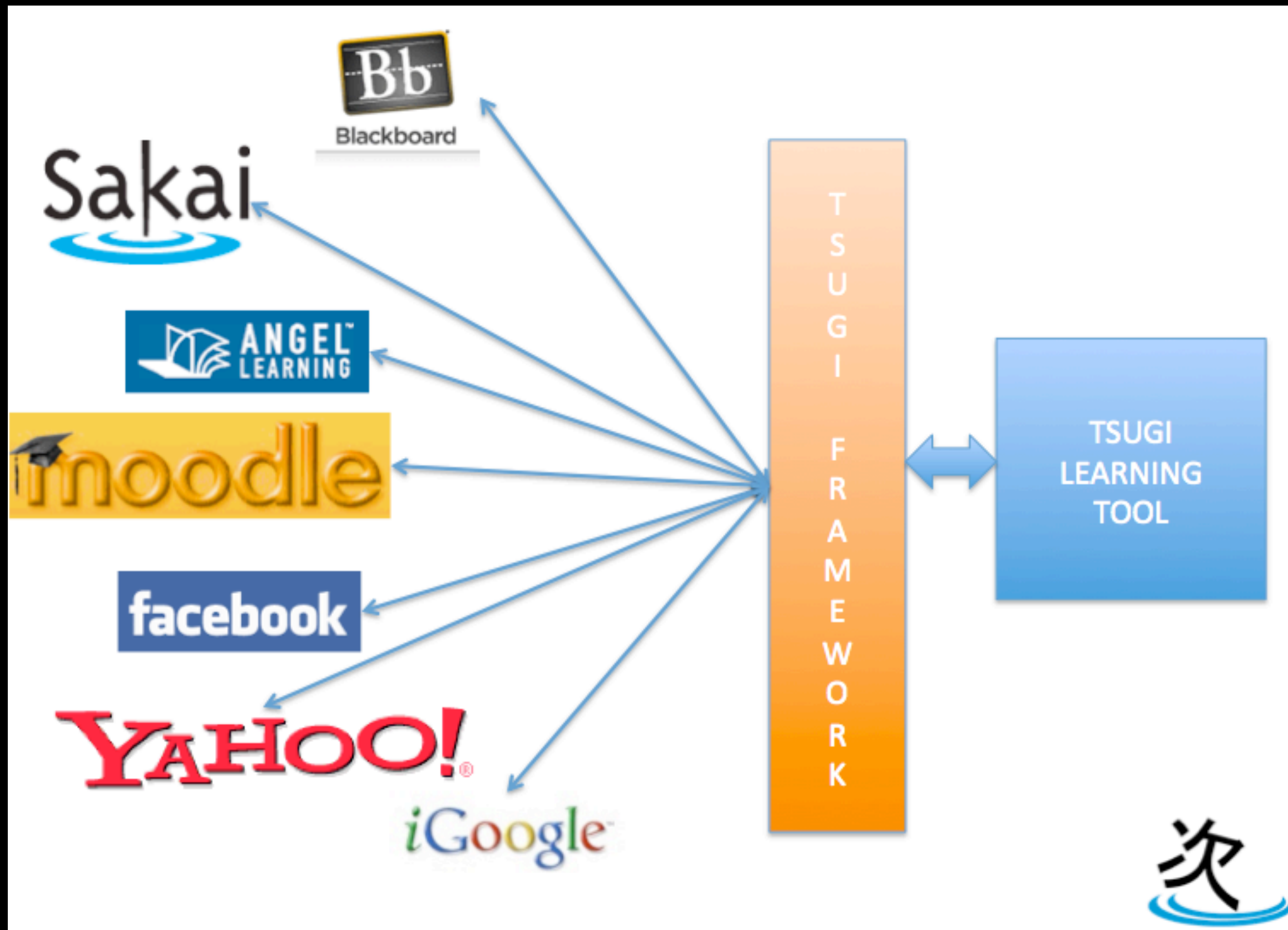
80 lines
of
Python



```
<p>Hello: {{ context.getUserName }}  
{% if context.isInstructor %}  
(Instructor)  
{% endif %}  
from {{ context.getCourseName }}</p>  
{% if msg %}  
<p>{{ msg }}</p>  
{% endif %}  
<form method="post" action="{{ context.getPostPath }}">  
  {{ context.getFormFields }}  
<p>Enter Guess: <input type="text" name="guess" /></p>  
<p>Enter Name (opt): <input type="text" name="name" /></p>  
<p><input type="submit"></p>  
</form>  
{% if ave %}  
<p>Average: {{ ave }} Count: {{count}} </p>  
{% endif %}  
{% if data %}  
<pre>  
  {{ data }}  
</pre>  
{% endif %}
```

25 lines
of HTML





Available Applications



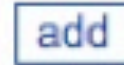
Address Book

Create a dynamic, online address book so your group can stay in touch. You control what fields are part of the address book.



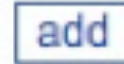
Pearson MyMathLab

Provides practice problems sets and supporting instructional materials



Favorites

Enable your group to build a list of their favorite things. You can choose one of our default list types (favorite posts, movies, music, books, or TV) or create your own custom favorites type.



For Sale

Create an easy way for people to buy and sell from each other. You can choose to customize the application to make it about a specific type of item (e.g. bicycles or tickets or) or leave it open to anything.



Give Away

Whether you're a Freecycling or Freesharing group that is dedicated to giving stuff away or you're a group that is about something else entirely but just wants to make exchanges possible among group members, this application makes it easier for folks to give stuff away.



YAHOO! GROUPS

My Talks for 2010

- Workshop on how to write **Desire2Learn** tools using Google App Engine
- Workshop on how to write **Blackboard** tools using Google App Engine
- Workshop on how to write **Sakai** tools using Google App Engine
- Workshop on how to write **Moodle** tools using Google App Engine

Learning -1.0

Inverted Learning - (i.e. matrix inverse)



Installing Your Next LMS

- Insert this code in your web page and press “Refresh”

```
<script type="text/javascript"  
  src="http://api.cloudsocial.org/js/ile-main.js">  
</script>  
<script type="text/javascript">  
  ile_init("49c480149a008");  
</script>
```



PythonLearn – Self-paced learning Python

http://www.pythonlearn.com/ RSS Google

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New: Learning Google Application Engine www.appendinelearn.com

For the best effect to go through the material, you should install the appropriate software. See the "Software" tab.

This site should not be used for anything other than learning. Taking is using the self-paced approach and pace.

Basic Python

- Writing Simple Programs: [Data](#)
- Computing with Lists: [Data](#)
- Decision Structures: [Data](#)
- Computers and the Internet: [Data](#)
- Loop Structures and Booleans (Chapter 8): [Handout](#), [Sample Code](#), [Audio](#), [Assignment 5 - Statistics with Spam](#)
- Data Collections (Chapter 11): [Handout](#), [Sample Code](#), and [Screencast](#)

Course Email

[Options](#) [Permissions](#)


You are authorized to send email from: csev@umich.edu

Email sent to the following addresses will be archived and sent to participants:

- si301w09@ctools.umich.edu
- e7084975-1258-4092-bdd8-4d5b533f15b2@ctools.umich.edu

Viewing 1 - 20 of 55 items

| From | Subject | Date Received |
|--------------------------|--|-------------------------------|
| csev <csev@umich.edu> | All Assignments and Exams Are now Graded | Apr 30, 2009 11:51 AM EDT |
| csev | SI301 Exam Is Up and ready | Apr 27, 2009 |



[Getting Started](#), and [Assignment](#)

[1 - Reading through a file](#)

[Assignment 3 - Reading Through a File](#)

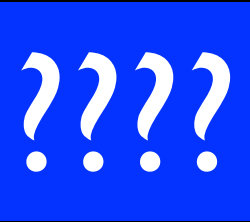
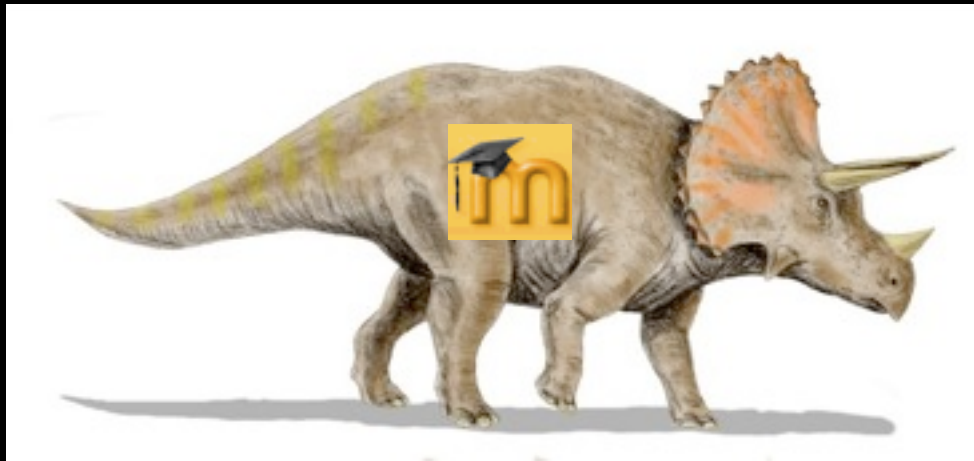
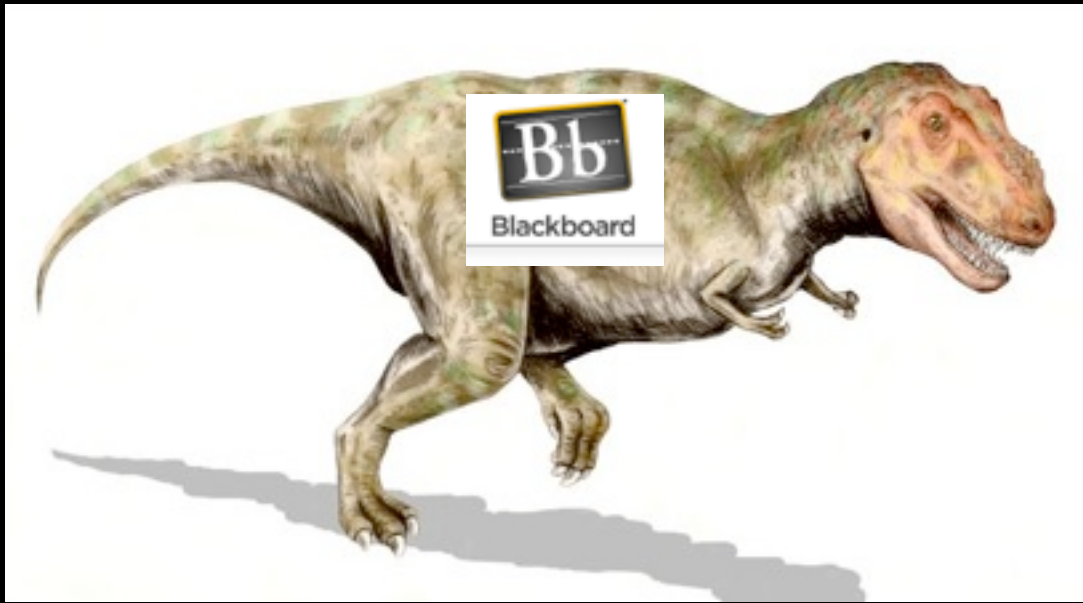
[4 - Figuring out who has the most](#)

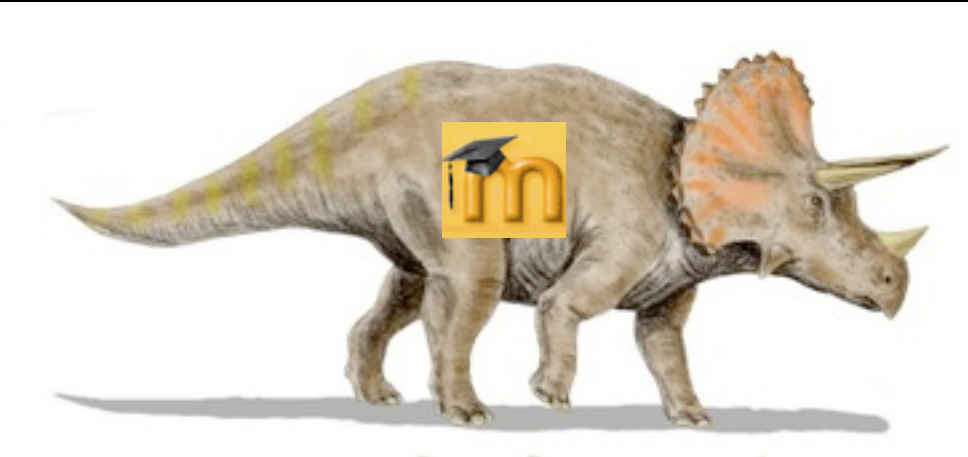
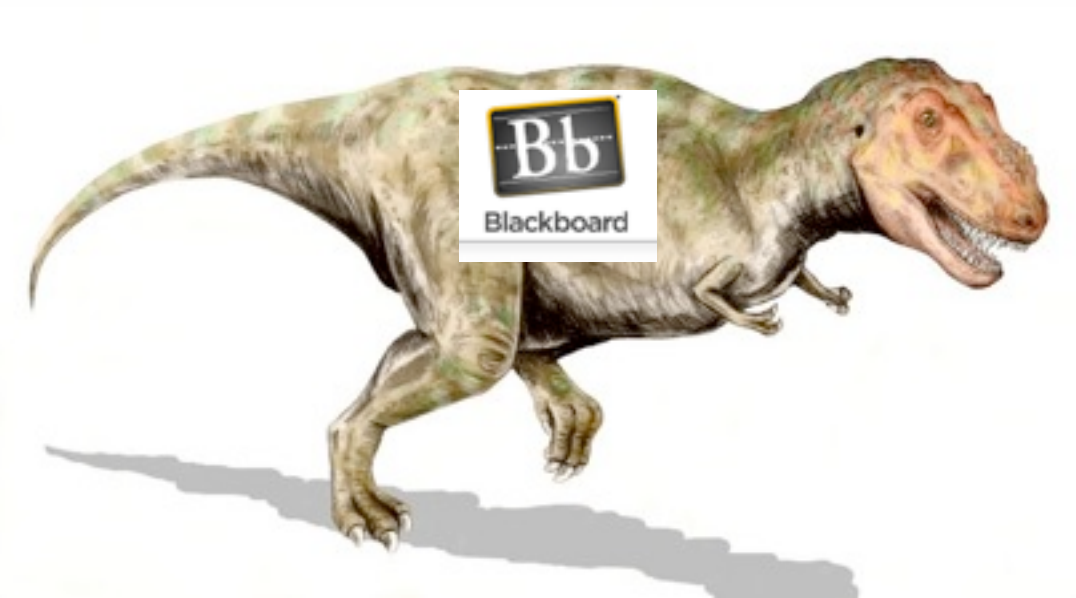
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<http://www.cloudsocial.org/>

The end of the LMS as we know it....







PythonLearn - Self-paced learning Python

http://www.pythonlearn.com/ RSS Google

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New: Learning Google Application Engine www.appenginelearn.com

For the best effect to learn Python on your own, you should purchase the [textbook](#) and go through the materials in order. If you want to attempt the programming assignments make sure to install the appropriate [software](#) on your system. Installation instructions are provided under the "Software" tab.

This site should not be a substitute for a course you are taking - even if the course you are taking is using the same textbook. Each course and each instructor will take their own approach.

Basic Python

- Writing Simple Programs (and [Assignment Data](#))
- Computing with Strings (C [through a file](#))
- Decision Structures (Chap [Through a File Again](#))
- Computers and Programs [who has the most commits](#)

Wiscrowd grab I close

Hello: Joe User from IN101

Enter Guess:

Enter Name (opt):

assignment 1 - Getting Started, Assignment 2 - Reading, and Assignment 3 - Reading, Assignment 4 - Figuring out

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Thanks and a Final Thought

Who will build the “App Store” for teaching and learning content and tools and sell directly to the end customer???