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 we think outside of the robot.

Greg D. Crosariol - www.gregd.com
Collaborative eScience: Evolving Approaches

Charles Severance
Executive Director, Sakai Foundation

Shaping Collaboration 2006
Geneva, Switzerland
December 11-13, 2006
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
There are more than 15 applications...

2008 Sakai Usage Data at University of Michigan
Standards
Commercial
Open Source
Common Cartridge
Tools Interoperability
Publishers
LMS
Standards
2008
www.imsglobal.org

Thursday, November 12, 2009
The end of the LMS as we know it....
Love / Hate

Users who like their LMS

Users who hate their LMS

Users who want an LMS Conversion

http://graphjam.com/
• Ricard N. Katz and Ronald Yanosky

• Google + Sakai = Google Phoenix

• Microsoft buys Blackboard

• Microsoft creates a lifelong personal portfolio

• Virtual teachers and virtual classmates

rtsp://educause.rmod.llnwd.net/a680/o1/edu2020.rm

"College age young people are better socialized to virtual worlds than to real ones."
A Tale of Four Books

It is all quite complicated.....
A book is the most essential part of a successful learning experience.

Teaching is about narrative.

A book is the least effective way to teach complex or abstract materials.
**CHAPTER 3**

Introduction to Equations and Algebraic Expressions 167

3.1 Solving Equations of the Form \( x + a = c \) and \( x - a = c \) 168

3.2 Solving Equations of the Form \( ax = c \) 177

How Am I Doing? Sections 3.1–3.2 185

3.3 Equations and Geometric Formulas 186

Chapter 3 Organizer 201

Chapter 3 Review Problems 203

How Am I Doing? Chapter 3 Test 204

Cumulative Test for Chapters 1–3 208

**CHAPTER 4**

Fractions, Ratio, and Proportion 211

4.1 Factoring Whole Numbers 212

4.2 Understanding Fractions 219

4.3 Simplifying Fractional Expressions 227

How Am I Doing? Sections 4.1–4.3 236

4.4 Ratios and Rates 237

4.5 Proportions and Applications 246

Chapter 4 Organizer 259

Chapter 4 Review Problems 261

How Am I Doing? Chapter 4 Test 265

Cumulative Test for Chapters 1–4 266

**CHAPTER 5**

Operations on Fractional Expressions 269

5.1 Multiplying and Dividing Fractional Expressions 270

5.2 Multiples and Least Common Multiples of Algebraic Expressions 281

5.3 Adding and Subtracting Fractional Expressions 288

5.4 Operations with Mixed Numbers 299

How Am I Doing? Sections 5.1–5.4 310

5.5 Order of Operations and Complex Fractions 311

5.6 Solving Applied Problems Involving Fractions 317
What is the unit rate in dollars per hour earned?

(Type a whole number or integer)

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
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
Narrative (receiving and giving)

For each topic

Formative Activity

Book

Summative Assessment

The book is the framework, the outline, and the schedule.

Student Understanding

Time
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.

```html
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 customized 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.


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 - your 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...
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

- Tool Launch
- Provisioning Services
- Event Messages
- Richer Trust Model
- Run-time Services
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

1. Click
2. Browser
3. Auto Submit Form
4. LMS
5. User, Course, Role, Signature
6. Cookie
7. Tool
8. Session
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
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.
Desire2Learn
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
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
High School
College
Freshman
Level

Programming
HTML
CSS
Database
JavaScript

Thursday, November 12, 2009
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)
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
Hello PowerLinks Demonstrator (Instructor) from PowerLinks demonstrations - Basic LTI via basiclti

Please enter a valid, numeric guess

Enter Guess: 

Enter Name (cpt): 

Guess  Reset Game Data
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
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):
        wiskey = "WisCrowd-"+str(self.context.course.key())
        data = self.getmodel(wiskey)

        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
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
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
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 %}
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.

[add]

**Pearson MyMathLab**
Provides practice problems sets and supporting instructional materials

[add]

**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.

[add]

**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.

[add]

**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.

[add]
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”

```html
<script type="text/javascript" src="http://api.cloudsocial.org/js/ile-main.js"></script>
<script type="text/javascript">
  ile_init("49c480149a008");
</script>
```
The end of the LMS as we know it....
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???