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Optimizing the Pedagogical Efficacy of Moodle

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Optimizing the Pedagogical Efficacy of Moodle

Michelle Li-Kuehne, Assistant Professor, Accounting and Finance Department
Evan Lowder, College of Saint Benedict
Prevalence of Course Management Systems

Learning management systems (LMSs) have dominated the teaching and learning landscape in higher education for the past decade, with a recent Delta Initiative report indicating that more than 90 percent of colleges and universities have a standardized, institutional LMS implementation (1).

(1) EDUCAUSE Quarterly (EQ), Volume 33, Number 1, 2010, Envisioning the Post-LMS Era: The Open Learning Network, J. Mott
Definitions

**Traditional:** Course where no online technology used; content is delivered in writing or orally.

**Web Facilitated:** Course that uses web-based technology to facilitate what is essentially a face-to-face course. May use a course management system (CMS) or web pages to post the syllabus and assignments.

**Blended/Hybrid:** Course that blends online and face-to-face delivery.

**Online:** A course where most or all of the content is delivered online.

> Over 6.1 million students were taking at least one online course during the fall 2010 term; Thirty-one percent of all higher education students now take at least one course online. (2)

(2) Going the Distance: Online Education in the United States, 2011, Elaine Allen, Ph.D., Jeff Seaman, Ph.D., Babson College, November 2011.
Moodle

- **News Forum**
- **Homework Discussion Forum**

- **Learning Objectives**
- **Check Figures**
- **Homework Solutions**
- **Practice Exercises**
- **Notes; Class Inking**
- **PowerPoint Slides**

- **Syllabus**
- **Announcements**
- **Links to Other Resources**

- **Camtasia Videos**
- **Links to Web-based Videos**

- **Link to WebEx Recordings**
Moodle

Course: ACFN 325, Intermediate I, Spring 2012 (L-Kuehne) - Windows Internet Explorer

1. Announcements
   1. Common Final Exam: Wednesday, May 9th, 6:00pm - 8:00pm. Simons Hall G30.
   2. Chapters 7 & 17 Quiz is moved from February 29th to March 2nd.

2. Syllabus and other Resources
   - Textbook Website: Kieso, Weygandt, Warfield: Intermediate Accounting, 14th Edition - Student Companion Site
   - Link (sifrs.iiasb.org) to IFRS: Welcome to the IFRS Foundation
   - Link to FASB Codification: American Accounting Association - FASB Accounting Standards Codification: Username: AAA51660; Password: SugipMQ
   - Syllabus
   - Link to an example IFRS Annual Report: Marks and Spencer
   - IFRS Illustrative Financial Statements (KPMG)
   - Microsoft 10K
   - Ernst and Young, Example IFRS Financial Statements

3. Homework Discussion Forum
   - Post questions, comments, and proposed solutions.

4. WebEx Session Recordings
   - Chapter 4 Discussion: WebEx, January 29, 2012
   - Chapter 4 & 5 Quiz; Adjusting Entry Practice WebEx Session; February 5, 2012
   - Snow Day WebEx Class: Chapter 17
   - Exam 2 Review WebEx Session: March 11, 2012

5. Chapter 1 (Financial Accounting and Accounting Standards) and Chapter 2 (Conceptual Framework for Financial Reporting)
   - Learning Objectives:
Chapter 6: Accounting for Capital Projects and Debt Service

Capital Projects Funds

1. Capital Projects Funds (CPFs): Definition

- A fund that accounts for and reports financial resources that are legally restricted and contractually required for the acquisition of capital assets.
- The primary purpose of this fund is to ensure and demonstrate the expenditure of the dedicated financial resource is both legally and contractually compliant.
- The total cost of a capital project is accumulated in a single expenditures account, which accumulates until the project is completed, at which time the fund ceases to exist.
- I.e. Fund has a “Project-life focus,” not year-to-year focus.

Government must maintain capital projects funds for resources that are legally restricted, committed, or assigned to expenditure for capital outlays.

- This provides the acquisition or construction of capital facilities
- Funds does not account for capital assets

Two types of capital projects

- General (public benefit)
  - Examples: public buildings, roads, highways and bridges, park improvements, sewer systems, plant and equipment, etc.
- Special assessment (private benefit)

We’ve noticed that you have a webcam. Select here to send video to other participants.
### Table: Losses of Value

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$(600,000)</td>
</tr>
<tr>
<td>2008</td>
<td>250,000</td>
</tr>
<tr>
<td>2009</td>
<td>1,000,000</td>
</tr>
<tr>
<td>2010</td>
<td>400,000</td>
</tr>
</tbody>
</table>

### Other Information:

<table>
<thead>
<tr>
<th>Year</th>
<th>Projected Benefit Obligation</th>
<th>(Market Related Value)</th>
<th>Corridor</th>
<th>Accumulated OCI (G/L)</th>
<th>Minimum Amortization of (Gain) Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$4,000,000</td>
<td>$3,400,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>4,500,000</td>
<td>3,640,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>4,900,000</td>
<td>3,900,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>5,250,000</td>
<td>4,360,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regina Company has a stable labor force of 120 employees who are expected to receive benefits under the plan. The total service-years for all participating employees are 3,500. The beginning balance of unrecognized net gain or loss is zero on January 1, 2007. The market-related value and the fair value of plan assets are the same for the 4-year period. Use the average remaining service life per employee as the basis for amortization.

Use the schedule above to calculate the minimum amortized gain/loss for each of the years. Apply the “corridor” approach in determining the amount to be amortized each year.
Are these “great” resources making a difference?
Initial Study

- Three introductory financial accounting courses, fall 2009 (n = 27) and fall 2010 (n = 52).

- Analyses were performed to determine whether student Moodle use correlated with student performance.

- A student survey was conducted to gather quantitative and qualitative evidence to determine what resources were considered most useful by students, and to compare student perceptions of usefulness with actual use.

- Pre- and post-course exam were administered during the fall 2010 study to assess how Moodle use impacted student learning.
Fall 2009 Results

Fall 2009

- Results indicated a slightly negative relationship (not statistically significant, p=.32) between Moodle use and course grade.

![Course Grade by Actual Moodle Hits for All Resources](image-url)

- The equation of the line of best fit is $y = -0.0051x + 2.8637$.
- The coefficient of determination, $R^2 = 0.0398$.
- The sample size is $n=27$, $t=-1.02$, and $p=.319$. 
Multiple Linear Regression: Pre/Post Test Ratio, Fall 2010

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>T stat</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.4126</td>
<td>3.3875</td>
<td>0.0016</td>
</tr>
<tr>
<td>Moodle Hits for Written Solutions (homework and worksheets)</td>
<td>-0.0141</td>
<td>-1.8843</td>
<td>0.0668</td>
</tr>
<tr>
<td>Moodle Hits for Video Solutions and Check Figures</td>
<td>0.0469</td>
<td>4.1884</td>
<td>0.0002</td>
</tr>
<tr>
<td>Moodle Hits for Written Chapter Objectives</td>
<td>0.1163</td>
<td>1.9732</td>
<td>0.0554</td>
</tr>
<tr>
<td>Moodle Hits for PowerPoints</td>
<td>-0.0207</td>
<td>-1.2763</td>
<td>0.2092</td>
</tr>
<tr>
<td>Moodle Hits for Written Check Figures and Templates</td>
<td>-0.0318</td>
<td>-1.1877</td>
<td>0.2419</td>
</tr>
<tr>
<td>Moodle Hits for Written Chapter Outlines and Other Handouts</td>
<td>-0.0265</td>
<td>-0.7242</td>
<td>0.4731</td>
</tr>
</tbody>
</table>
Correlation and Regression Analysis: Fall 2010 Results

Fall 2010

• The multiple linear regression model for various Moodle resources and course grade was not statistically significant, $p = .087$. Similar to results from the 2009 study, several Moodle resources appear to have a slightly negative relationship with Course Grade.

• A multiple linear regression was performed using the post/pre-exam ratio as the dependent variable, and various Moodle resources as the independent variables; $p = .0025$, $R^2 = .38$

• The model showed a positive relationship between the use of videos and the Pre/Post Exam Ratio ($p = .0002$).
## Actual Moodle Hits, Introductory Course, Fall 2010

<table>
<thead>
<tr>
<th># of Resources Evaluated</th>
<th>Total</th>
<th>Written Solutions (homework and worksheets)</th>
<th>Video Solutions and Check Figures</th>
<th>PowerPoints</th>
<th>Written Check Figures and Templates</th>
<th>Written Chapter Objectives</th>
<th>Written Chapter Outlines and Other Handouts</th>
<th>Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>110</td>
<td>46</td>
<td>26</td>
<td>10</td>
<td>5</td>
<td>10</td>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>

### # of Resources Evaluated

<table>
<thead>
<tr>
<th>Total Moodle Hits for all Resources</th>
<th>Total Hits for Written Solutions (homework and worksheets)</th>
<th>Total Hits for Video Solutions and Check Figures</th>
<th>Total Hits for PowerPoints</th>
<th>Total Hits for Written Check Figures and Templates</th>
<th>Total Hits for Written Chapter Objectives</th>
<th>Total Hits for Written Chapter Outlines and Other Handouts</th>
<th>Other Moodle Hits, e.g. Syllabus</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Total Hits</td>
<td>100%</td>
<td>35%</td>
<td>19%</td>
<td>13%</td>
<td>10%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Mean # of Hits</td>
<td>34.2</td>
<td>12.1</td>
<td>6.5</td>
<td>4.5</td>
<td>3.4</td>
<td>2.4</td>
<td>2.4</td>
</tr>
</tbody>
</table>

### Mean # of Hits

### % of Total Hits
Student Perception, Introductory Course, Fall 2010

<table>
<thead>
<tr>
<th>%Agree/Strongly Agree</th>
<th>67%</th>
<th>60%</th>
<th>54%</th>
<th>54%</th>
<th>52%</th>
<th>44%</th>
<th>42%</th>
<th>40%</th>
<th>38%</th>
</tr>
</thead>
<tbody>
<tr>
<td>written homework solutions increased my understanding</td>
<td>videos improved understanding of concepts</td>
<td>video homework solutions increased my understanding</td>
<td>Moodle site has helped me achieve higher grades</td>
<td>video extra practice increased my understanding</td>
<td>PowerPoint Slides increased my understanding</td>
<td>videos helped achieve higher grades</td>
<td>used videos to study for exams and quizzes</td>
<td>used videos to help with homework</td>
<td></td>
</tr>
</tbody>
</table>
Fall 2011: Classes

- **ACFN 113**
  - Introductory course ($N = 26$)
  - WebEx attendance **required** (or substituted forum post)
  - WebEx content: basic concepts
  - Pre/Post Test
  - Survey

- **ACFN 326**
  - Upper-level course ($N = 58$)
  - WebEx attendance **not required**
  - WebEx content: advanced concepts
  - Survey
Purpose of Fall 2011 Study

- Explore student attitudes toward Moodle and WebEx resources
- Explore relationship between WebEx and student performance
- Explore relationship between Moodle use and student performance
Fall 2011: Qualitative Survey Results

What is most beneficial about the WebEx sessions?

“Being able to talk directly with you about specific questions that we might have. Also, it was nice to have the rest of the class there so we could work together.”
Fall 2011: Qualitative Survey Results

Indicate what you liked about any aspect of the course Moodle site.

“Organized, all useful/helpful information in one place.”
Fall 2011: Method

- Included Moodle and WebEx data for ACFN 326 (Intermediate Accounting)
- Compiled end-of-semester grades, “Final Grades”
- Scored and compiled “Pre/Post Test” results for ACFN 113 (Financial Accounting)
- Collected “Total WebEx Attendance” from website, grading records
- Collected both “WebEx Link Hits” and “Total Moodle Hits” from Moodle
  - Excluded from “Total Moodle Hits”: User View, Course View, Course Recent, Quiz, Forum Search, etc.
WebEx Session Attendance Averages (Per Session):
Pre-October 33rd: 5.7
Post-October 3rd: 10.7
Post-October 3rd (both WebEx and Forum): 17.3
Entire Semester (WebEx Only): 9.2
### Fall 2011: Results for ACFN 113

#### N = 26  
**Correlation Between “Pre/Post Test” and:**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pearson’s ‘r’</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Total WebEx Attendance”</td>
<td>.356</td>
<td>.075</td>
</tr>
<tr>
<td>“Total WebEx Link Hits”</td>
<td>.190</td>
<td>.351</td>
</tr>
<tr>
<td>“Total Moodle Hits”</td>
<td>.474</td>
<td>.014*</td>
</tr>
</tbody>
</table>

#### N = 26  
**Correlation Between “Final Grade” and:**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pearson’s ‘r’</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Total WebEx Attendance”</td>
<td>.209</td>
<td>.305</td>
</tr>
<tr>
<td>“Total WebEx Link Hits”</td>
<td>.095</td>
<td>.645</td>
</tr>
<tr>
<td>“Total Moodle Hits”</td>
<td>.241</td>
<td>.236</td>
</tr>
</tbody>
</table>
Fall 2011: Results for ACFN 326

- Average WebEx Session Attendance: 10.91 students/session

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pearson’s ‘r’</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Total WebEx Attendance”</td>
<td>.376</td>
<td>.020*</td>
</tr>
<tr>
<td>“Total WebEx Link Hits”</td>
<td>.044</td>
<td>.792</td>
</tr>
<tr>
<td>“Total Moodle Hits”</td>
<td>.085</td>
<td>.611</td>
</tr>
</tbody>
</table>
Conclusions

Financial Accounting (1st year students)

- Neither student use of Moodle resources, nor WebEx attendance, appear to impact the course grade.
- Moodle use appears to impact students increased knowledge of the course material as shown by the comparison of post-exam to pre-exam scores.
- Of all the resources available, student use of Camtasia videos and attendance at live WebEx sessions show the most significant relationship to improvement in the pre- to post-exam scores.

The implication is that student entry-level skills are more influential in predicting course grade than other factors, such as Moodle use.

Intermediate Accounting (upper level accounting course)

- Overall use of Moodle did not impact students’ course grades.
- WebEx live attendance was significantly correlated with higher course grades.
Limitations

- Frequencies of Moodle hits were analyzed. Differentiation due to the length of Moodle visits was not recorded.
- The assumption that students were unaware their Moodle hits were being monitored appears reasonable for the introductory accounting classes (1st year students).
- Students in the Intermediate Accounting classes were generally aware that hits to Moodle can be monitored.
- ACFN113 students were required to attend WebEx (or post to the homework discussion forum) for participation points, which may have skewed the pre/post exam correlation results.
- WebEx sessions were optional for ACFN 326 students which may have skewed the correlations results upward.

Future Study

- Add a pre/post test to the ACFN 326 analysis.
- Focus on the quality of WebEx use; monitor chat and “attentiveness” ratios.
“Although the LMS needs to continue serving as an enterprise CMS, it also needs to be a student-centered application that gives students greater control over content and learning. Hence, there is continual pressure for the LMS to utilize and integrate with many of the Web 2.0 tools that students already use freely on the Internet and that they expect to find in this kind of system. Some educators even argue that the next requirement is a Personal Learning Environment (PLE) that interoperates with an LMS.”