Democratize Your Data
How to Empower Faculty to Use Data for Equitable Student Success
2022 CIMA Summer Meeting
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Who We Are

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The PLC was founded in 2013 to offer participating APLU institutions with opportunities and resources to improve their understanding and implementations of personalized learning using technology. Members cooperate to share experiences and expertise, identify promising and trustworthy vendors and partners, influence data practices, and organize multi-institutional projects that benefit from scale and community.
The Problems We Have Observed

- Faculty are typically not included in their campus’ data community or conversations about how best to use data on campus and in classrooms.
  - Most commonly, data communication occurs “top-down” with college deans and department chairs distributing information and directives to teaching staff.

- Academic and advising leadership find it difficult to have conversations with faculty about student and course-level data and related student success initiatives.

- When it comes to data transparency and literacy, faculty report feeling uninformed and alienated.

- Faculty are increasingly under pressure to understand what data is available to them AND how to act on that information through student and course-level interventions and instructional design choices that improve student success and promote equitable outcomes.

- There is a significant gap in knowledge, communication, and support of faculty both within their institutions and the broader field on how to do this well.
What We’ve Learned

● A collaborative and transparent community approach is critical to success
  ○ Cross-functional executive team that includes representatives across university stakeholder communities

● Diving into data conversations with faculty can serve as a catalyst for faculty to make meaningful changes to how they teach and engage with students
  ○ Sharing successes, celebrating contributions, and highlighting impact can lead to scaled practices

● Faculty are hungry for the opportunity to use data to better understand and support their students

● Faculty (and students!) provide unique interpretations from data and have creative solutions to address gaps / barriers

● Faculty want to be engaged and empowered by university leadership to participate in this work
Project Overview

Recruitment & Surveying
We recruited 5 institutions and worked to administer an Equity and Digital Learning Student (ELDS) Survey.

Learn & Plan
Instructors and project leads attended semi-monthly PD sessions about a variety of topics and planned for the changes they would make in Spring.

Data Dives & Continuous Improvement
We will engage in another round of Data Dives to review changes over time and plan for future iterations.

Data Dives & Theories of Change
We engaged in collaborative Data Dives to review disaggregated prior student success outcomes and ELDS Survey Results. Colleges completed ToC’s to outline the changes they wanted to implement based on the data gathered.

Implement & Re-Survey
Instructors implemented changes and re-administered the ELDS survey to students.
Lessons from the Field:

University of Maryland, Baltimore County
About our LA Community

- Started in Spring 21
- ~60 faculty are members of a Learning Analytics Community of Practice (LACOP) Google Group
- ~60 staff who also provide analysis support to colleges regularly attend an institutional “Analytics @ UMBC” demo & discussion.
- All faculty have data warehouse access, mini-grant recipients get tableau license & consulting.
- Smaller group regularly attend a biweekly users group meeting.

https://doit.umbc.edu/analytics/community
Learning Analytics Defined

At its core, learning analytics (LA) is the collection and analysis of usage data associated with student learning. The purpose of LA is to observe and understand learning behaviors in order to enable appropriate interventions.

~Educause Learning Initiative (ELI), 2011

...the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs.

~Learning and Knowledge Analytics Conference, 2011

Analytics without action is just analysis
THREE REALMS OF STUDENT ANALYTICS

**Institutional**
Graduation and retention rates; time-to-degree; student success by socio-economic, geographic, ethnicity categories; academic unit assessment; support program assessment; institutional surveys

**Academic**
Advising; GPA; SAT, major performance; course selection; prior course performance; engagement; student progression; course scheduling and planning

**Learning**
Course engagement; formative and summative assessments; assignment grades; content interaction; learning system, clickers, active learning tools, etc. click stream; program of study engagement

*Thanks Jenn Stringer, Chief Academic Technology Officer, UC Berkeley for the Venn diagram!*
Types of Data & Implications for Student Success

- **Student Information System (SIS)**
  - Good for big picture patterns & trends *across terms*
  - Essential for measuring “student success” (pass/fail, retention/persistence, graduation, etc.)
  - Think “Bird’s Eye View” or Macro perspective
  - Key question: Who is able to see this data?

- **Learning Management System (LMS)**
  - Good for more real-time indicator or “proxy” of student engagement *within terms*
  - Solves the problem of final grades occurring too late to be actionable (per LA definitions)
  - Key question: If we accept students’ LMS usage as a proxy for their engagement, what might we infer about interventions (or course design) when these digital footprints vary across courses?
Why LA Has Stalled
The problem with grades is they occur too late in a term to be actionable.
Student Data Trails as Proxy for Engagement?

The *Oxford English Dictionary* defines proxy as . . .

“the action of a substitute or deputy” or “agency of another” and from science and economics “a variable that can be used as an indirect estimate of another variable with which it is correlated; (more generally) a property used as an estimate or indicator of another with which it is associated.”

Rise of the LMS as a source of LA “actionable intelligence”

- FYI: Since 2007, UMBC students earning a final grade of D or F use the LMS ~40% less than students earning a C or higher. Every semester.
A Key Finding: Student Tool Use & Final Grade Varies by Class

UMBC Course #1

UMBC Course #2
A Pandemic Silver Lining: Practice Makes Perfect
To create distinct exams for each student in a large online course, instructors developed a pool of ~1500 questions – similar in rigor and concept but varied in prompts and “correct” answers – randomly generated and displayed in the learning management system (LMS).
Classrooms as Ad Hoc Testing Centers?

Four Biology Faculty Give 1st Exam In-class AND Online
WiFi & student laptops turn UC into a “testing center”

Before the Spring 22 semester started, four Biological Sciences professors -- David Eisenmann, Hua Lu, Jeffrey Leips, and Kevin Omland -- reached out to DoIT to see if they could (and should) try an experiment: proctor their first semester exam in the University Center (UC) Ballroom and online (via Blackboard).

All four have been teaching in the UC as part of the pandemic-driven retrofits for teaching designed by DoIT and managed by Events & Conference Services (ECS). Also, after teaching remotely for nearly two years, they’d come to like the benefits of online exams other faculty have discovered with Blackboard exam question pools, including randomization, item analysis and quicker student feedback. So, as more classes were offered on campus, the faculty wondered if they could leverage student laptops and mobile devices that made UMBC’s pandemic pivot to online learning possible.
Similar Approach @ UMich

Exam Security:

- multiple version of each question
- more answer options
- question banks/shuffled questions and answers
- increase number of exams
- weighting exams
- time-limits
- non-invasive proctoring
Pedagogical Problems

- Incoming college students are often unfamiliar with the differences between memorization and learning. They struggle with time management.

- Students are often conditioned to memorize information and reproduce it on a test. This leaves them unprepared for the rigor of college and often leads to cramming for exams.

http://events.umbc.edu/go/101268

Do students carry lessons learned to the next course?
How analytics & adaptive learning might help

Thursday, March 10, 2022 · 12 - 1 PM
Online

Resources
- Meeting recording (UMBC login req’d)
- Presentation slides
- Anonymous evaluation

In this Learning Analytics Community of Practice (LACOP) workshop, Chemistry Principal Lecturer Tara Carpenter will share early results from her learning analytics mini-grant to see if and how students continue the habit of using “spaced practice” in CHEM 351 “Organic Chemistry” during Fall ’21 – after they learned it in her Spring ’21 CHEM 102 course.

Designed to discourage students from cramming for high stakes exams, spaced practice encourages regular, smaller chunks of study & practice focused on promoting long-term proficiency and retention. To do so, Carpenter leveraged adaptive learning in her CHEM 102 course, and will share data and findings, including student survey results from her pedagogical approach. FYI: The next round of Learning Analytics “Mini-grant” proposals will be due 5/27/22.

Also, this workshop is part of a Spring 22 series about data science and learning analytics for the UMBC community. More information.
Spaced Practice

- Encourages regular, smaller study & practice focused on promoting long-term proficiency and retention.

- Spaced practice (repetition) assignments were used in CHEM 102 in the 2nd half of Spring 2021.

Goal: Promote understanding \textit{and} recall.
CHEM 102 (SP21) “Waterfall”

- Row = student
- Column = week
- Cut line = final grade
- Color = Bb mins*

* **darker color = more time**
Grades: CHEM 102 (SP21) to CHEM 351 (FA21) (the LA mini-grant)

**CHEM 102 (SP21):**

- Students who went *all in* using SP earned C or better.
- *I wonder how these students will do in the next course…*

**CHEM 351 (FA21):**

- 46% of students who opted out of SP in 102 went on to earn a DFW (n=15).
- 9% of students using SP in 102 earned DFW (n=256).
CHEM 102 (FA21)

Interactions over time by final grade earned.

- Every row is a student.
- Every column is an active day in the semester using RealizeIt.

14 days into FA21 Term: 82.6 percent accurate predicting ABC and DFW final grades for all students (83% precision).
CHEM 102 Grade Distribution

- A: FA2020 (n=205) 33%, FA2021 (n=171) 19%
- B: FA2020 (n=205) 23%, FA2021 (n=171) 24%
- C: FA2020 (n=205) 16%, FA2021 (n=171) 27%
- D: FA2020 (n=205) 9%, FA2021 (n=171) 4%
- F: FA2020 (n=205) 11%, FA2021 (n=171) 17%
- W: FA2020 (n=205) 10%, FA2021 (n=171) 6%
Why we can’t do nothing

Students don’t always know what they don’t know about their own learning.

- Indiana Univ. (2019) study of student “grade surprise” across five, very large (300+ students), general ed courses over 6k students.
**Right Message, Right Person, Right Time**

<table>
<thead>
<tr>
<th>Student Agency</th>
<th>Intrusive Advising</th>
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<tbody>
<tr>
<td><strong>Week 1 (thru add/drop)</strong></td>
<td><strong>Week 4</strong></td>
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- **Week 4**
  - Digital Tool Usage: LMS & eTextbooks: 70-98% predicting >=C final grades (p<.005, n=986 in 5 FA17 courses)
  - Check My Activity: Students can compare LMS activity with anonymous summary of course peers earning the same, higher or lower grade on any assignment -- if instructors post grades

- **Week 6-8**
  - Midterm Alerts & Nudges: First Year Intervention (FYI) alert asks faculty to ID students in jeopardy of D/F “if semester ended tomorrow.” (~60% go on to get >=C)
  - Bb Predict: 87% accurate predicting >=C by week 4, AYs 16-18.
  - Two Empathetic Nudges: 1) to predicted DFW and 2) to predicted DFW & FYI (slightly different but key is “talk to your instructor” & seek tutoring).
  - 2nd Nudge of Course Repeaters: Go to the Math Lab! It works.

- **Week 12 & beyond**
  - Last Day to Withdraw (Week 11)
  - Course Repeat Policy

- **Week 1**
  - Syllabus Quiz
  - PSCY100: Since SP17, students who didn’t take SQ were 4x more likely to earn DFW (p<.001, n=1,455)
  - ECON122: Students req’d to take SQ before submitting 1st assignment for credit. Class earns 20% higher grade on dept. common final exam.

- **Student Agency**
  - High Credit, Low GPA Nudge: “Here’s where other students have gone to get help, if you need it.”
  - Nudging Course Repeaters: Go to the Math Lab! It works.
  - High Credit, Low GPA Nudge: “Are you sure?”
Questions?
Thank You!

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Moving the Heart & Head?

Greater attention is needed to the accessibility and presentation of analytics processes and findings so that learning analytics discoveries also have the capacity to surprise and compel, and thus motivate behavioural change.

Research must also delve into the sociotechnical sphere to ensure that learning analytics data are presented to those involved in strategic institutional planning in ways that have the power to motivate organizational adoption and cultural change” (p. 161).


**Numbers Are Not Enough. Why e-Learning Analytics Failed to Inform an Institutional Strategic Plan**

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**ABSTRACT**

Learning analytics offers higher education valuable insights that can inform strategic decision-making regarding resource allocation for educational excellence. Research demonstrates that learning management systems (LMSs) can increase student sense of community, support learning communities and enhance student engagement and success, and LMSs have therefore become core enterprise component in many universities. We were invited to undertake a current state analysis of enterprise LMS use in a large research-intensive university, to provide data to inform and guide an LMS review and strategic planning process. Using a new e-learning analytics platform, combined with data visualization and participant observation, we prepared a detailed snapshot of current LMS use patterns and trends and their relationship to student learning outcomes. This paper presents selected data from this “current state analysis” and comments on what it reveals about the comparative effectiveness of this institution’s LMS integration in the service of learning and teaching. More critically, it discusses the reality that the institutional planning process was nonetheless dominated by technical concerns, and made little use of the intelligence revealed by the analytics process. To explain this phenomenon we consider theories of change management and resistance to innovation, and argue that to have meaningful impact, learning analytics proponents must also delve into the socio-technical sphere to ensure that learning analytics data are presented to those involved in strategic institutional planning in ways that have the power to motivate organizational adoption and cultural change.

**Keywords**

Learning management system (LMS), Virtual learning environment (VLE), Learning analytics, Strategic planning, Student engagement, Change management, Institutional culture
Is LA Ethical?

Research Article

Ethical Learning Analytics: “Do No Harm” Versus “Do Nothing”

John Fritz, John Whitmer

First published: 26 May 2020 | https://doi.org/10.1002/ir.20310

Read the full text

Abstract

In this chapter, we explore the obligations for individuals and institutions that emerge from the newfound insights that are enabled through learning analytics. While ethical concerns are raised through learning analytics, a misplaced trend is a “do nothing” approach as a way to assure we “do no harm.” We suggest that this is a misplaced notion that reduces our impact on student success.