ANALYTICS: A 21ST CENTURY TEAM SPORT

From Distance to Digital Learning:
Shaping the Future

Dr. Linda L. Baer
9:15-10:00
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IF YOU WANT TO GO FAST GO ALONE

IF YOU WANT TO GO FAR GO TOGETHER
What’s your driving question?
U.S. Education Pipeline

100 students start 9th grade

75 graduate high school

51% on "college prep"

33 graduate college

56 enter college

38% need remediation

U.S. Department of Education, various studies and reports

http://www.changemag.org/Archives/Ba7c%20I%ssues/2011/May-June
2011/first-in-the-world-full.html
Louisiana's progress

To reach state goals, the state will not only have to maintain current rates of attainment but also significantly increase the number of people who enroll in programs and earn all types of credentials beyond high school. With the inclusion of workforce certificates (beginning in 2014), Louisiana's overall rate of educational attainment has increased by 18.7 percentage points since 2008.

AGENDA FOR THE SESSION

• Right Data
• Recruiting and Training Skilled Staff
• Building the Team
• Equipment/Tools/Playbook
• Data -> Insight -> Action
21st Century
Targeting the Right Data
Targeting the Right Data

- What are the targets?
- What are the data definitions?
- What milestones and destination?
- Where are the data?
- Who can access?
Figure 1. Conceptual Framework of Analytics in Business and Higher Education

ANALYTICS

- Business Analytics
- Academic Analytics
- Learning Analytics
- Predictive Analytics
- Actionable Intelligence (Action Analytics)
- Decision-making

Analytics in Higher Education: Establishing a Common Language
Angela van Barneveld, Kimberly E. Arnold, and John P. Campbell ELI White Paper 2012
Analytics: Evolving From Hindsight to Foresight

Gartner Analytics Model retrieved August 15, 2016.
INTERVENTIONS TIMING: Completion by Design
Measuring Loss and Momentum Points

**CONNECTION**
- Interest to Application

**ENTRY**
- Enrollment to Completion of Gatekeeper Courses

**PROGRESS**
- Entry into Course of Study to 75% Requirements Completed

**COMPLETION**
- Complete Course of Study to Credential with Labor Market Value
# Types of Student Success Data

<table>
<thead>
<tr>
<th>Pre-enrollment</th>
<th>Academic</th>
<th>Motivation and Self-efficacy</th>
<th>Use of Support Services</th>
<th>Student Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>Class attendance</td>
<td>Comfort with academic ability</td>
<td>Advising</td>
<td>Athletic team affiliation</td>
</tr>
<tr>
<td>High school grade point average</td>
<td>First semester grades</td>
<td>Depression</td>
<td>Career services</td>
<td>Campus membership</td>
</tr>
<tr>
<td>Parents' experience with college</td>
<td>Grades in select core courses</td>
<td>Financial issues</td>
<td>Counseling</td>
<td>Campus membership</td>
</tr>
<tr>
<td>Test scores</td>
<td>Login to student web portal</td>
<td>Homesickness</td>
<td>Disability support</td>
<td>Campus membership</td>
</tr>
<tr>
<td></td>
<td>Midterm grades</td>
<td>Lack of friends or connections</td>
<td>Financial aid</td>
<td>Campus residency</td>
</tr>
<tr>
<td></td>
<td>Registration for next semester</td>
<td></td>
<td>Health center</td>
<td>Campus Wi-Fi usage</td>
</tr>
<tr>
<td></td>
<td>Use of learning management system</td>
<td></td>
<td>Library</td>
<td>Dining center</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Tutoring</td>
<td>Leadership roles</td>
</tr>
</tbody>
</table>

[https://www.naspa.org/images/uploads/main/PREDICTIVE_FULL_4-7-17_DOWNLOAD.pdf](https://www.naspa.org/images/uploads/main/PREDICTIVE_FULL_4-7-17_DOWNLOAD.pdf)
Metrics for Online Success

- Readiness
- Engagement
- Persistence
- Satisfaction

http://www.unc.edu/tlim/ser/
Factors Contributing to Graduate Completion

- Financial Support
- Access to and feedback from mentor/advisor
- Family Support
- Social Environment
- Program Quality
- Professional/Career Guidance

PH.D. Completion and Attrition by the Council of Graduate Schools 2009
http://www.phdcompletion.org/
Recruiting and Training Skilled Staff
EXAMPLE: PEOPLE AND SKILLS

• Mapping goals, assessing skills needed
• Created and repurposed positions:
  • **AVP for Student Success & Analytics**
  • Repurposed counseling positions to **retention and intervention specialists**
  • Hired a **director of institutional analytics**
  • Business operation **managers with data background**
• Results:
  • **Data people** that were also **content experts**
  • Cultivated more faculty buy-in
MODERN DATA SCIENTIST

Data Scientist, the sexiest job of the 21st century, requires a mixture of multidisciplinary skills ranging from an intersection of mathematics, statistics, computer science, communication, and business. Finding a data scientist is hard. Finding people who understand what a data scientist is, is equally hard. So here is a little cheat sheet as to who the modern data scientist really is.

MATH & STATISTICS
- Machine learning
- Statistical modeling
- Experiment design
- Bayesian inference
- Supervised learning: decision trees, random forests, logistic regression
- Unsupervised learning: clustering, dimensionality reduction
- Optimization: gradient descent and variants

PROGRAMMING & DATABASE
- Computer science fundamentals
- Scripting languages e.g. Python
- Statistical computing packages, e.g., R
- Databases: SQL and NoSQL
- Relational algebra
- Parallel databases and parallel query processing
- MapReduce concepts
- Hadoop and Hive/Fig
- Custom reducers
- Experience with noSQL like AWS

DOMAIN KNOWLEDGE & SOFT SKILLS
- Passionate about the business
- Curious about data
- Influence without authority
- Hacker mindset
- Problem solver
- Strategic, proactive, creative, innovative and collaborative

COMMUNICATION & VISUALIZATION
- Able to engage with senior management
- Story telling skills
- Translate data-driven insights into decisions and actions
- Visual art design
- R packages like ggplot or lattice
- Knowledge of any of visualization tools e.g. Flare, GGplot, Tableau
Moving to Insight and Action
How many interventions do you have?
SOLVING THE INTERVENTION RIDDLE

INTERVENTION TYPES

INTERVENTION OPPORTUNITIES

INTERVENTION TRIGGERS
INTERVENTION OPPORTUNITIES
FOCUSING ON RISKY TARGET GROUPS

1. Academically under-prepared students
2. Undeclared/undecided students
3. New students (FTIC)
4. Adult learners
5. Students of color
6. Students in transition
7. Students on academic probation
8. Marginally involved students
9. Others
INTERVENTION TRIGGERS: WHY DO STUDENTS LEAVE?

• Goal change or attainment
• Uncertainty of educational/career plan
• Extra-institutional factors, family emergency
• Adjustment/transition difficulties
• Academic difficulty
• Congruence/fit (boredom, dissonance, irrelevance, isolation)
• Finances
INTERVENTION TYPES

1. Early identification
2. Continuous monitoring/tracking
3. Proactive/intrusive academic advising/counseling
4. Improve classroom instruction
5. Special interventions, programs, and services
6. Encouragement of affiliation/engagement activities
7. Removal of obstacles/barriers to success
8. Build personal, caring, and supporting relationships
9. Direct contact with individual students based on predictive analytics-based identification of “risky behavior” and/or risky/choices
Building the Team

- Enrollment Management Pipeline
- Admissions
- Student Services
- Faculty & Advisors
- Academic Success
Federated Knowledge:
Strategy, Insights, Interests
Metrics Are Easy; Insight is Hard

“In contrast to abundant data, insights are relatively rare. Insights are defined as actionable, data-driven findings that create business value. They are entirely different beast from raw data. Delivering them requires different people, technology, and skills – specifically including deep domain knowledge. And they’re hard to build.” Irfan Kamal
The Analytics Translator

1. Identifying and prioritizing problems that analytics can assist in solving issues
2. Collecting and preparing data to produce most useful insights
3. Building the analytics engine to solve in an efficient and interpretable form
4. Validating and deriving business implications—synthesizing complex analytics insights into easy-to-understand, actionable recommendations
5. Implementing the solution and executing on insights – drives adoption among the users
Using the Right Equipment/Tools/Playbook
Building A Playbook

- Set Goals
- Determine Impact
- Get the Right People in the Right Positions
- Ensure Repeatability
- Determine Focus
  - Institutional Goals & Policies
  - Student-Focused Goals
EXAMPLE: CHANGING THE PLAYBOOK

- Admissions consolidated twelve steps for new student entry to four
- Required information sessions for all students to get the overview of programs and their field of study
- Redesigned 300 degree programs to help more students finish on time and be better prepared for employment
- Grouped similar degrees into broad paths or areas of study
- Repurposed & built talent
Where Are You in the Use of Student Success Solution Tools?
### Legacy ERP / SIS / LMS
- ellucian
- ORACLE PeopleSoft
- JENZABAR
- Canvas
- Bb
- D2L
- moodle

### Vendor Solutions
- connectedu
- MICROSOFT Dynamics CRM
- hobsons Starfish
- parchment
- campuscruiser
- campuslabs
- Educational Advisory Board
- CIVITAS Learning
- Nuventive

### Homegrown Solutions
- eAdvisor
- Sinclair’s MAP
- Valencia’s LifeMap
- Austin Peay’s Degree Compass
- SSP
- Central Pledmont’s Online Students Profile
- Course Signals
- Predictive Analytics Reporting (PAR)

### Direct to Students
- connectedu
- PERSISTENCE + PLUS
- CollegeTransfer.Net
Student Success Technologies

INSTITUTIONAL PLANNING

PERFORMANCE MEASUREMENT & MANAGEMENT

INTEGRATION SOLUTIONS

STUDENT PLANNING TOOLS

ACADEMIC PLANNING & AUDIT

CAREER PLANNING

CO-CURRICULAR RECOGNITION

ADVISOR TOOLS

DIAGNOSTICS

ALERTS & SIGNALS

CASELOAD MANAGEMENT

TRANSFER EVALUATION

STUDENT SERVICES

TUTORING

AID, BENEFITS & WELLNESS

LIFE SKILLS

CHANGE MANAGEMENT

ANALYTICS

TYTON PARTNERS
LESSONS LEARNED

• Sense of urgency!

• Can’t continue with business as usual.

• Analytics isn’t a silver bullet but it gives us a fighting chance.

• Data -> “myth busting”

• Need real-time data for real-time interventions.

• Continue to build the infrastructure to support and sustain the data strategy.
LESSONS LEARNED

• Connect with people who can benefit from data.
• Changing job descriptions to match needs.
• This is a game changer. Need to continue to improve.
• This is very disruptive.
• Intentional metrics for change.
RESOURCES
Q & A
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