Analytics Strategy, Capacity Building, and Transformation

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Agenda

• Who are you and why are you here?
• What frameworks do we use to understand analytics in higher education?
• What is the current state of analytics?
• How do institutions accelerate the development of organizational capacity for analytics?
• What transformations can result from leveraging analytics and personalized, adaptive learning?
• Outline for A Toolkit for Building Organizational Capacity for Analytics
• References
Who Are You and Why Are You Here?

• Ask attendees by show of hands:
  – Affiliation
    • Type of institution
    • Government
    • Solution Provider
  – Experience with Analytics
    • Just getting starting
    • Want to accelerate development
    • Optimize/transform
I. Frameworks for Understanding Analytics in Higher Education

• Definitions of data, reporting, analytics

• Utilize useful frameworks
  – Davenport/Harris framework – data, reporting, analytics
  – Norris/Baer framework optimizing student success

• Components of Organizational Capacity
Analytics

**Definition:** Analytics is the use of data, statistical analysis and explanatory and predictive models to gain insights and act on complex issues.

The process of using analytics to address an important question follows five steps, as reflected on the following graphic.

[Link](http://www.educause.edu/library/resources/2012-ecar-study-analytics-higher-education)
The Analytics Process

1. Start with a Strategic Question
2. Find/Collect the Appropriate Data to Answer that Question
3. Analyze that Data with an Eye toward Prediction and Insight
4. Formulate and Present in Ways that are Understandable and Actionable
5. Feedback into the Process of Addressing Strategic Questions and Identifying New Ones
Utilize Useful Frameworks

- Davenport/Harris framework
  - 8 levels - reporting, query, analysis, optimization
  - Data governance/stewardship/quality
- Norris/Baer framework
  - Student Success Applications - 7 levels
- Organizational capacity for analytics
  - Five-elements

Davenport and Harris (2007) Competing on Analytics
## Analytics and Optimizing Student Success

<table>
<thead>
<tr>
<th>Type of Reporting, Query &amp; Analytics</th>
<th>Focus</th>
<th>Decision Making &amp; Action Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimization</td>
<td>What’s the best that can happen?</td>
<td>Overall management and orchestration of analysis/query/reporting</td>
</tr>
<tr>
<td>Predictive Modeling</td>
<td>What will happen next?</td>
<td>Embed predictive analytics in processes</td>
</tr>
<tr>
<td>Forecasting/Extrapolation</td>
<td>What if these trends continue?</td>
<td>Create “what if” capacity</td>
</tr>
<tr>
<td>Statistical Analysis</td>
<td>Why is this happening?</td>
<td>Understand “why”</td>
</tr>
<tr>
<td>Alerts (Real Time)</td>
<td>What actions/interventions are needed?</td>
<td>Intervene</td>
</tr>
<tr>
<td>Query/Drill Down (Real Time)</td>
<td>Where exactly is the problem?</td>
<td>Target problem groups, individuals or processes</td>
</tr>
<tr>
<td>Ad Hoc Reports (Real Time)</td>
<td>How many, how often, where?</td>
<td>Conduct special analyses to gain fresh perspectives</td>
</tr>
<tr>
<td>Standard Reports (Real Time)</td>
<td>What happened?</td>
<td>Continuous review, standard metrics</td>
</tr>
</tbody>
</table>

Data Governance and Stewardship Perspective: Improve quality and availability of data for optimizing student success.

Source: Adapted from Davenport and Harris 2007
## Norris/Baer Framework: Optimizing Student Success through Analytics

<table>
<thead>
<tr>
<th><strong>Elements</strong></th>
<th><strong>Description</strong></th>
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</thead>
<tbody>
<tr>
<td>1. Manage the student pipeline</td>
<td>Scientifically refine strategic enrolment management of the student pipeline.</td>
</tr>
<tr>
<td>2. Eliminate impediments to retention and student success</td>
<td>Eliminate structural, policy, and programmatic impediments to retention and success.</td>
</tr>
<tr>
<td>3. Utilize dynamic, predictive analytics to respond to at-risk behavior</td>
<td>Embed analytics in academic and administrative support processes to enable real-time interventions dealing with at-risk behaviors, both academic and co-curricular.</td>
</tr>
<tr>
<td>4. Evolve learner relationship management systems/integrated personalized advising systems</td>
<td>Build tracking systems that can track and manage the many facets of learner progress and identify and respond to at-risk behavior.</td>
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<tr>
<td>5. Create personalized learning environments/learning analytics</td>
<td>Embed personalized learning analytics into learning management systems and learner relationship management systems</td>
</tr>
<tr>
<td>6. Engage in large-scale data mining</td>
<td>Use data mining to illuminate pathways to student success and discover unforeseen insights.</td>
</tr>
<tr>
<td>7. Extend student success to include learning, workforce, and life success</td>
<td>Expand the definition of student success to include the entire student lifecycle – cradle to career, including learning, work, learning-to-work transitions, and workforce success.</td>
</tr>
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</table>
Organizational Capacity for Analytics

Technology Infrastructure
Process & Practices
Leadership
Culture & Behaviors
Skills & Values

Strategic Initiatives Inc. ©2012
II. The Current State of Analytics

• ECAR: Current Analytics Activities
• Three-Stage Model for Capacity Building for Analytics
• Maturity Model
  – ECAR Analytics Maturity in Higher Education
  – ECAR Model: All Institutions in Participating in Survey
  – ECAR Model for State University (Sample)
• Evolution of Vendor Offerings
• Stages of Student Success Analytics
• Case Studies: What Have Leading Institutions Done
ECAR Survey: Current Analytics Activities

AREAS OF ACTIVE ANALYTICS

- Enrollment management
- Student progress
- Finance and budgeting
- Instructional management
- Student learning
- Progress of strategic plan
- Central IT
- Alumni/advancement
- Cost to complete degree
- Human resources
- Facilities
- Library
- Faculty teaching performance
- Faculty promotion and tenure
- Faculty research and promotion
- Procurement

Legend:
- Use proactively
- Make predictions
- Monitor
- Dormant data
- No data
Three-Stage Model

• Institutions need to take different approaches depending on their state of development
• Analytics tools and possibilities are advancing rapidly. The performance bar is being raised.
• Without concerted action, institutions will fall behind.

<table>
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<th>Stages in Capacity Building for Analytics</th>
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<td>Transforming/Optimizing through Leveraging Analytics</td>
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Maturity/Readiness Indices/Models

- ECAR Maturity Index
- Strategic Initiatives Analytics Readiness Matrix
- Others Under Development
ECAR Model: Analytics Maturity in Higher Education

1. CULTURE -- Committed leadership; culture accepts use of data to make decisions
2. DATA & TOOLS ---- Clean, standardized data and reports; right tools and software
3. INVESTMENT-- Funding and staffing for analytics
4. EXPERTISE--IR and/or business professionals with analytics training
5. INFRASTRUCTURE--Storage capacity; IT professionals supporting analytics; policies regarding security and rights to data

http://www.educause.edu/library/resources/2012-ecar-study-analytics-higher-education
ECAR Overall Maturity Index – All Institutions Participating

Mean Maturity Scores

Culture/Process
Investment
Data/Reporting/Tools
Expertise
Governance/Infrastructure

### ECAR Institutional Readiness/Maturity Index for State University

#### Maturity Categories

##### Culture/Process
- Senior leaders who are interested in and committed to using data to make decisions
- Our administration largely accepts the use of analytics
- We have a culture that accepts the use of data to make decisions; we are not reliant on anecdote, precedent, or intuition
- We have identified the key outcomes we are trying to improve and better use of data
- We have a process for moving from what the data say to making changes and decisions
- Our faculty largely accept the use of analytics

**Overall Score**

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##### Data/Reporting/Tools
- Our data are of the right quality and are clean
- We have the right kind of data
- Our data are standardized to support comparisons across areas
- Reports are in the right format and show the right data to inform decisions
- We have the right tools and software for analytics

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##### Investment
- We have an appropriate amount of funding for analytics
- Funding for analytics is viewed as an investment in future outcomes rather than an incremental expense
- We have an appropriate number of analysts for analytics

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##### Expertise
- We have IR professionals who know how to support analytics
- We have dedicated professionals who have specialized analytics training
- We have business professionals who know how to apply analytics to their areas

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##### Governance/Infrastructure
- Our information security policies and practices are sufficiently robust to safeguard the use of data for analytics
- We have sufficient capacity to store, manage, and analyze increasingly large volumes of data
- We have policies that specify rights and privileges regarding access to institutional and individual data
- We have IT professionals who know how to support analytics

**Overall Score**

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Other Readiness Indices

• Several other options in **Toolkit**
  – More extensive version of readiness index, expanded to deal with analytics options
  – Expansion to include ICT, IR, Academic Division, Strategic Enrollment Management and Student Affairs
  – Templates on desired performance leaps/performance gaps, using Davenport/Harris and Norris/Baer
Evolution of the Analytics Application Marketplace

- Stand alone BI tools
- ERP/BI Consolidation
- Point/departmental solutions in visualization, analytics applications
- ERP/LMS/Analytics/Services Combinations
- Integrated, Personalized Advising Systems
- Personalized, Adaptive Learning, Embedded Analytics
- Data Mining/Big Data
- Student Success Systems
The market is immature, but multiple solutions are emerging in each application category.
## Stages of Student Success Analytics

(See Handout)

<table>
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<tr>
<td><strong>Stage 1</strong></td>
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<tr>
<td>Static Reporting</td>
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| Values and Skills | | |
| Culture and Behaviors | | |
| Leadership | | |
| Number of Institutions | | |
| Time to Achieve Level | | |
| Potential Impact of Intervention | | |
Case Studies: What Have Leading Institutions Done?

- For-profit Institutions – American Public University, University of Phoenix, Capella University
- Primarily Online, Public University – University of Maryland University College
- Research Universities – Arizona State University, Purdue University, University of Maryland Baltimore County
- Comprehensive Universities – St. Cloud State University, University of Minnesota, Rochester
- Community Colleges – Sinclair Community College, Rio Salado Community College
- Private Institutions – Northeastern University, Southern New Hampshire university
- Systems of Institutions/Federations – Minnesota State Colleges and Universities, PAR (Predictive Analytics Reporting)
III. Accelerating the Development of Organizational Capacity for Analytics

• Three-Stage Model
  – Stage I – Getting Started
  – Stage II – Accelerating Development
  – Stage III – Creating Transformative Strategies for Leveraging Analytics

• Strategy as Focused Behavior Over Time

• Summary of Initiatives for Accelerating Development

• Sample: Creating an Action Plan for Analytics at State University

• Implementing Plans, Executing Strategy, and Building Organization Capacity
# Three-Stage Model

## Stages in Capacity Building for Analytics

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Getting Started with Analytics

1. Focus on the biggest opportunities first.
2. Start with questions, not data.
3. Embed insights to drive action.
4. Keep existing capabilities while adding new ones.
5. Build the analytics foundation according to an information agenda.

Raise Analytics IQ

STRATEGIC INITIATIVES ©2013
Creating an Action Plan for Analytics

1. Start with the Strategic Problem to be Solved
2. Engage a Team (Cross-Unit Collaboration)
3. Conduct Internal/External Scan • Learn from What Others are Doing
4. Express Institutional Readiness/Maturity • Express Desired Outcomes and the Performance Gap to be Closed
5. Create an Action Plan: • Solutions to Problems • Investment in Tools, Processes & People • Needed Changes in Culture/Behavior
6. Implement Action Plan
7. Assess/Evaluate Success • Provide Feedback

Raise Analytics IQ

Change Culture/Behavior
Helpful Hints for Action Plans

- Be aware in wide variations in analytics capabilities across functional areas
- Identify Quick Wins, Harvest “Low Hanging Fruit”
- Get the President/Chancellor and Cabinet using dashboards and analytics
- Pursue “analytics for the masses” and create “single points of truth”
- Reach out to engage teams
- Engage Deans, Department Chairs and Admin Assistants in analytics applications
“The more people that touch the data, the better the understanding.”

Institutional leader, Minnesota State University, Mankato
Crafting a Strategy for Analytics

1. Engage Team and Articulate Leveraging Analytics as a Major Change Initiative (Kotter’s Eight Steps)
   - Frame Analytics Strategy and Align with Other University Strategies
   - Consider Next Gen Issues and Identify/Map Possible Inflection Points
   - Develop Road Map for Building all Aspects of Analytics Organizational Capacity and Executing the Strategy

2. Raise Analytics IQ
   - Execute Strategy
     - Build Organizational Capacity
     - Achieve Kotter’s Eight Steps
   - Express Strategy and Action Plans for Executing:
     - Strategy
     - Goals/Objectives
     - Actions

3. Change Culture/Behavior

4. Assess/Evaluate Success
   - Provide Feedback
   - Refine Strategy and Action Plans

5. Strategic Initiatives ©2012
The Eight Accelerators
The Processes that Enable the Strategy Network to Function

- Institutionalize Strategic Changes in the Culture.
- Build and Maintain a Guiding Coalition.
- Formulate a Strategic Vision and Develop Change Initiatives Designed to Capitalize on the Big Opportunity.
- Communication the Vision and Strategy to Create Buy-In and Attract a Growing "Volunteer Army."
- Accelerate Movement Towards the Vision and the Opportunity by Ensuring that the Network Removes Barriers.
- Celebrate Visible, Significant Short-Term Wins.

Create a Sense of Urgency Around a Single Big Opportunity
“Strategy is consistent, focused behavior over time, adapting in response to emerging conditions.”

Strategies to Deal with Emerging Technologies and Issues

Emerging Issues, Technologies, and Inflection Points

- Next Gen Solutions for Core Systems/ERP
- Cloud-Based Solutions
- New Mobile Technologies, Apps and Practices
- Next Gen Learning – Personalized/Open
- Free-Range Learners
- New Organizations/Structure/Competitors
- New Solution Providers/Opportunities for Collaboration/Sharing
- ICT/Analytics Talent Gap

Realized Strategy

Emergent Strategy

Deliberate Strategy

Unrealized Strategy

Definition: Strategy is Consistent, Focused Behavior Over Time, Adapting in Response to Emerging Conditions

Source: Mintzberg, Ahlstrand and Hampel
Strategy Safari: A Guided Tour Through the Wilds of Strategic Management
Why You Might Need an Institutional Strategy for Analytics

- Your analytics efforts have been successful but fragmented.
- A new leadership team has called for a major focus on student success, a greater investment in analytics, and a strategic commitment (See Toolkit for examples).
- The playing field has changed - the new opportunities provided by Big Data and new solutions are bigger than your earlier vision.
- Leadership is understanding the potentials of analytics-enabled personalized learning.
- Leadership is considering a Next Gen solution for ERP/LMS/analytics
“Most institutional analytics strategies are emergent and expeditionary. They are best understood by looking backward to explain analytics behavior that has emerged over the past five to seven years.”

Donald Norris and Linda Baer, *A Toolkit for Building Organizational Capacity for Analytics*
Initiatives to Accelerate Capacity Building for Student Success (Handout)

- Build a cross-institutional team
- Focus on all Five Elements of Capacity (See next slides for examples – also handout)
- Student Success is the Killer App for Analytics – Take advantage of this Importance
- Link to Case Studies, Learn from Leaders, Avoid Missteps
- Incorporate Insights on Analytics Needs in Your Action Plans
- Align Analytics Strategies with Institutional Strategies and Raise Performance Expectations to New Levels
Sample: Creating an Action Plan for Analytics – State University (Handout)

- Schematic of Action Planning Process
- Maturity Index – State University
- Performance Leaps at State University, Focusing on Student Success
- Expeditionary Initiatives Involving Student success Analytics
- Eight Steps to Creating Major Change – Student Success Analytics at State University
Implementing Plans, Executing Strategy, and Building Organizational Capacity

• Implement project plans
• Elevate from project → initiative
• Achieve expeditionary execution of strategy, responding to emerging conditions
• Use analytics to support strategy, innovation, and organizational development
IV. Transformative Results of Leveraging Analytics and Personalized, Adaptive Learning

• What Is Transformative Change?
• What Opportunities Catalyze Transformation?
• How Do We Plan to Transform?
• Reinventing Strategies, Business Models and Best Practices
• What Analytics Practices Will Support Transformation?
What Is Transformative Change?

• Goals of Transformation
  – Intentional
  – Deep
  – Pervasive
  – Consistent over time
  – Institution-shaping

• Characteristics
  – Applies adaptive expertise to challenges
  – Responds to new conditions, requires leading indicators
  – Focuses on innovation – new to improve performance
  – Disrupts the status quo
  – Leadership is shared
  – Anyone can be a change agent

Adapted from On Change III.
The ACE Project on Leadership and Institutional Transformation
What Opportunities Catalyze Transformation?

• ICT has been a sustaining innovation, not a transformative or disruptive one. Big Data will help change that.
• Cost has grown at unsustainable rates.
• Economical learning & developmental solutions/experiences are available and ready to scale.
• Personalized, adaptive learning with embedded analytics will transform institutional-centric and DIY learning.
• Current models and institutions lack the capacity and resilience, alone, to transform for the needs of tomorrow.
• A perception gap exists between institutional leaders and the campus community, on the urgency for change and transformation.
What happens to the learning when we move from the stable infrastructure of the twentieth century to the fluid infrastructure of the twenty-first century where technology is constantly creating and responding to change?

*Thomas and Brown (2011) A New Culture of Learning*
How Do We Plan to Transform?

- Assess challenges and opportunities
- Distinguish between routine change, strategic change and transformation
- Distinguish between sustaining and disruptive change
- Understand the nature of change process in the institution – and how to change it
- Understand the roles in enabling change of outside partners, solution providers, collaborators and competitors
- Reinvent strategies, business models and emerging practices
Reinventing Strategies, Business Models and Emerging Practices

• Data quality, embedded analytics and Big Data are essential to reinvention. So is a culture of performance excellence.

• In order to build resilience:
  – Track A: Reinvent legacy programs to compete more effectively is disruptive times.
  – Track B: Discover new programs, experiences and revenue streams that meet value expectations of disruptive times.

• Plan from the future backward – examine what the world of learning and work will look like in 2020 and pull those insights back to the present.
“Remember, just because we are changing a lot does not mean we are transforming.”

*Sustaining Innovations ➔ Disruptive Innovations*

Dolence and Norris, *Transforming Higher Education: A Vision for Learning in the 21st Century*
What Analytics Practices Will Support Transformation?

• Embedded predictive analytics, autonomic intervention, aggressive Big Data sense-making
• Personalized, adaptive learning with embedded analytics, provided through shared services and MOOCs
• In-the-cloud solutions, shared services, federations, constellations of user communities
• Shared talent, campus-based “farm systems” for analytics talent
• Competence-based learning/certification, streamlined articulation, transfer and credit for prior learning/personal portfolios
• New generations of success-making systems
V. Outline for A Toolkit for Building Organizational Capacity for Analytics

Overview: How to Use This Toolkit
Chapter 1: Why Analytics?
Chapter 2: What is the Current State of Analytics in Higher Education?
Chapter 3: Analytics Planning at Different Stages of Organizational Development
Chapter 4: Implementing Plans, Executing Strategy and Building Organizational Capacity
Chapter 5: Transformative Analytics in an Age of Disruption
Chapter 6: The Policy Implication of Transformative Analytics
Chapter 7: Frequently Asked Questions and Match-Up Services (Under Development)
VI. References

Bichsel, Jacqueline (2012). ECAR Study of Analytics in Higher Education EDUCAUSE
http://www.educause.edu/library/resources/2012-ecar-study-analytics-higher-education

Davenport, Thomas and Jeanne Harris (2007) Competing on Analytics


The ACE Project on Leadership and Institutional Transformation


Thomas, Douglas and John Seely Brown (2011) A New Culture of Learning
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