Building an Analytics Infrastructure
In-house

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- The Commission on Information, Measurement, and Analysis (CIMA) is a space for APLU institutions to come together to create communities of practice around effective and efficient use of data and fiscal resources to guide campus planning and decision making. Given the dispersion of activities and responsibilities within our institutions that rely on the vast array of data, CIMA provides opportunities for cross-functional discussions on how to systematically create and improve the data infrastructure, the strategic analysis capacity, and the fiscal and administrative management on campuses.
Analytics Defined

• Analytics relates to the exploration of historical data from many source systems through statistical analysis, quantitative analysis, data mining, predictive modeling, and other technologies and techniques to identify trends and understand the information that can drive business change and support sustained successful business practices.

• Advanced analytics projects are conducted and managed by separate teams of data scientists, statisticians, predictive modelers and other skilled analytics professionals, while BI teams oversee more straightforward querying and analysis of business data.
Analytics Infrastructure (High Level Example)
Why pursue an in-house analytics capacity?

• In it for the long-term – we should be moving away, not toward vendor dependence for display of operational data

• Institutions differ significantly and need to adapt definitions and display to local cultures

• Independence of how we use data internally

• Availability of APIs
VT Data Lake and Decision Support Framework
University DataCommons (UDC) - Architecture
Using a Blended Model as a Bridge

• Reduce time to implementation – a vendor focus may keep a project in scope

• Ability to build a decision oriented culture – the campus may not be ready to outline project requirements for an on-campus solution. Build the focus on actionable intelligence

• Could provide staffing relief – allowing the best data staff to focus on the biggest questions

• Provides an opportunity for institutions to identify areas of improvement (data cleanliness, permissions, etc.)

• Can “force” standardization of data elements and allows for easier comparisons with other institutions
Risks of the Bridge Approach

• Potential issue: will you continue to develop your own infrastructure? Does the implementation of a vendor solution pause your internal work (and thus ability to answer other questions)

• What is your exit strategy? What happens if the vendor changes their model?

• Does the vendor model limit your options for strategic projects?
Selected Higher Education Decision Support Questions

• Where do our students come from? (Admissions)
• What are the course taking patterns? (Enrollment/Scheduling)
• What courses tend to be taken as a group? (Enrollment/Scheduling)
• Which groups prefer what services (Academic, social or cultural)?
• What factors garner the highest alumni response? (Alumni)
• What different types of alumni are there? (Alumni)
• How does the change in tuition/fees affect total enrollment? (Revenue)
• How well are we yielding students based on the level of scholarship provided? (Yield)
• Who is likely to respond to our new marketing strategy? (Admissions)
• Who is likely to enroll? (Yield)
• Who is likely to fail, drop out or return? (Retention and student success)
• Who is likely to pledge for which amount and when? (Foundation)
What Analytics Can Do?

• Analytics in Strategic Areas
  • Competitive positioning (R1, AAU, rankings and reputation)
  • Digital learning (growth in online and hybrid programs)
  • Resource allocation (budget modeling)
  • New program development (resource optimization)
  • Student success (retention, graduation rate and financial aid)
  • Institutional effectiveness (career outcomes, career-readiness)

• New Analytics Initiatives
  • Instructional effectiveness
  • Salary equity analysis
Role of Campus Stakeholders

• Information Technology Services
  • Software and hardware support
  • Data security
  • Data access
  • Data management

• Institutional Research
  • Business process (compliance, surveys, rankings, etc.)
  • Metadata/data definitions/data management
  • Decision support analysis
  • Strategic analysis

• Other Campus Divisions (Enrollment Management, Finance, etc.)
  • Transactional and business processes (internal)
  • Operational and strategic decisions
Analytical Infrastructure Tips

• Sustained sponsorship (VPs)

• Build a broad platform to fulfill objectives not other way around

• Appoint a project management lead

• Invest in technical support

• Manage expectations
  • What is included and what is not?

• Build progressively
  • Skills, knowledge, values, timeframe
Analytical Infrastructure Tips (cont’d)

• Build the analytics team now
  • Balanced mix of analytical skills & functional knowledge

• Define business practices before implementing
  • Rules, processes, data definitions, etc.

• Secure commitments from functional users and UITS

• Establish a data governance framework
  • Data strategy

• Provide feedback loops and implementation strategies
What do we need to know?

• Does not require perfect data or perfect culture
• Analytics is about discovery and change
  • Organizational capabilities
  • Learn as you go
• Implementing the analytics platform is a moving target
  • Latest technologies and data science developments
  • Multisource (new sources are added)
  • Unstructured data (data is not just numbers)
  • Tools and techniques will change
• Requires multiple strategies and approaches
• Benefits from communication between senior leadership, IT, IR and campus community
• Need investment in talent and expertise
• Develop and share a clear vision of outcomes
• An open mind
Questions?
Higher Education Analytics Applications

Source: Educause, 2012, Provide your best estimate of how data are being used at your institution; N = 339, EDU + A&I
Data and Architecture

• Implementation Strategies
  • Full vendor
  • Software as a service (in-house)
  • In-house – open source

• Infrastructure (IT)
  • Cloud (IT and some stakeholders)
  • On-premises
  • Hybrid

• Data
  • Census files (IR)
  • Snapshots (IT and IR)
  • Live data/operational (IT and stakeholders)

• What is important
  • Institutional culture
  • Student body
  • Administrative challenges
  • Fiscal environment
  • Data governance
How Does An Analytics Framework Look Like? (minus infrastructure)