Course: Analytics, Machine Learning, and the Digital Economy

Digital Economy

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The Analytics Capacity Gap

- The talent gap - Lack of analytics expertise and experience in our industry, difficulties in hiring

The Analytics Capacity Gap

- Pervasive need for professional development at all levels

The Analytics Capacity Gap

- Need for continuing enhancements in tools, applications, solutions and services – the bar is being raised

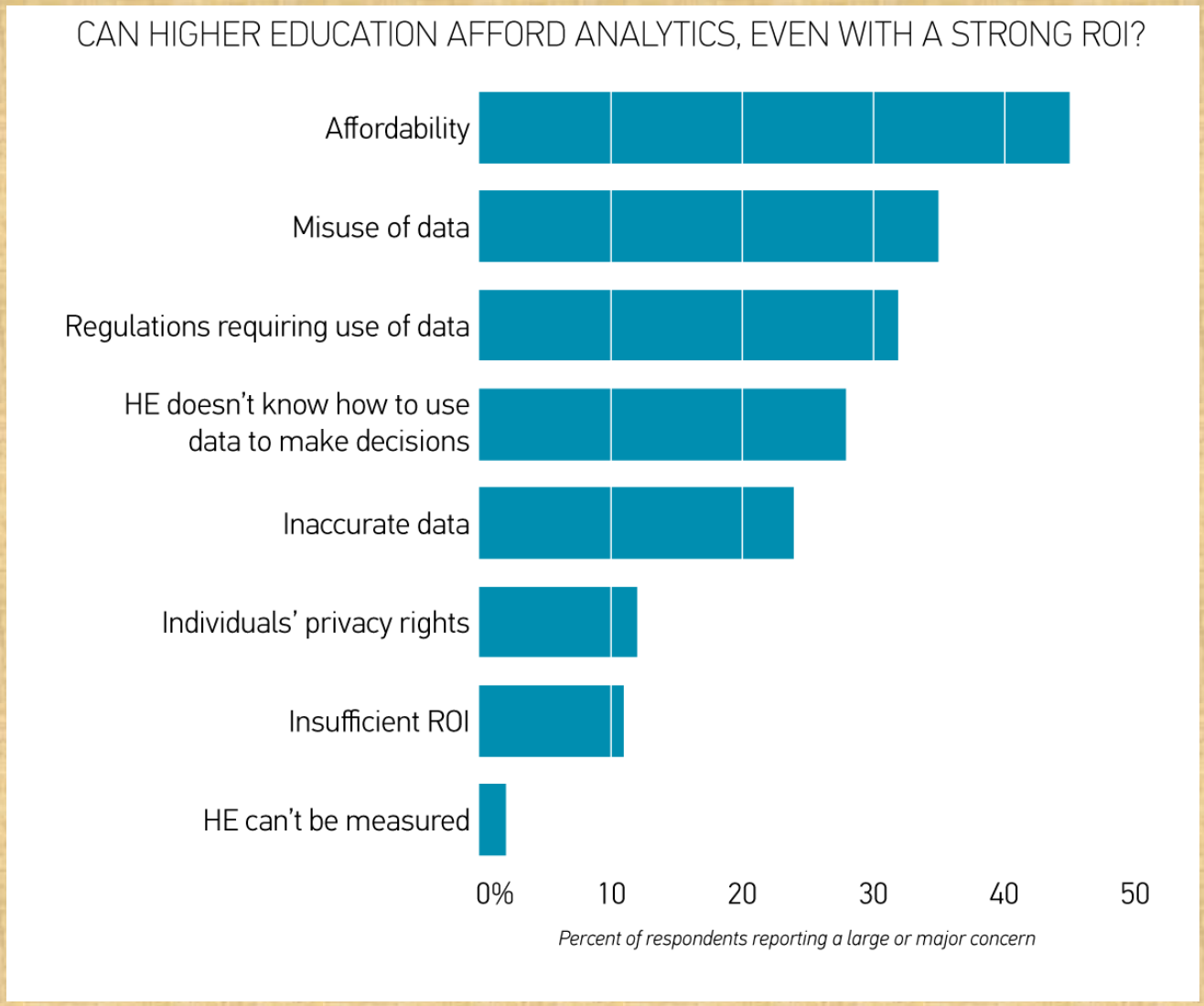
The Analytics Capacity Gap

- Need for consulting, know-how, institutional “capacity augmentation”

The Analytics Capacity Gap

- Need for “free-range” personal capacity build

DATA AND AFFORDABILITY ARE THE BIGGEST CONCERNS



http://www.educause.edu/library/resources/2012-ecar-study-analytics-higher-education

What are your concerns about the growing use of analytics in higher education?; N = 339, EDU + AIR

IT and IR Differences Concerning Analytics

IT Professionals

- The use of analytics to mange central IT is more advanced
- Funding for analytics at their institutions is viewed as an investment in future outcomes
- Their administration accepts the use of analytics
- Their institutions' IT professionals know how to support analytics
- Individuals' privacy rights are a concern
- Affordability is a concern
- Return on investment is a concern

IR Professionals

- The use of analytics in faculty promotion and tenure is more advanced
- The use of analytics in procurement is more advanced
- Their institutions have dedicated professionals with specialized training in analytics
- Their institutions' IR professionals know how to support analytics

Bridging the Analytics Gap: Preliminary Findings

Current Gap	Description	Bridging and Closing the Gap
Gap Between Articulated Institutional Needs and Solution Provider Offerings (Tools, Applications, Solutions, Services)	• More Advanced Predictive Modeling Tools • Need for Improved Visualization, Better Dashboard Options • More Affordable Analytics • Cloud-based applications/services • Consulting services • Next Generation Core Systems (ERP, LMS, assessment, academic systems, and analytics)and Learning Analytics	• Solution Provider Tools/Applications are under development – IBM/Adobe/Other Solution Providers • More Advanced Visualization and Dashboard Tools are being developed and deployed • Price points are under downward pressure in all analytics, including those for student success • Cloud-based alternatives are being offered by most major providers, aggressively by some • Solution Providerss/consulting firms are increasing scope of services and consulting offerings • Next Gen Core Systems are emerging – more capable, open, and cheaper – and Learning Analytics are positioned to achieve breakthroughs over the next 2-3 years
Analytics Capacity Gap Compared to Emerging Expectations	• Low Level of Analytics IQ among typical institutions • Deficiencies in all elements of analytics capacity: technology, processes, practices, skills, culture, and leadership	• Need comprehensive development and certification of individual competences and institutional capacity in analytics • Need to extend institutional capacity through collaborations and Solution Provider services
Collaboration Gap	• Institutions need help in every aspect of student success analytics – getting started, assessing readiness for student success analytics, leveraging best practices and learning from leading practitioners	• Substantial collaboration is needed to bridge the Analytics Capacity Gap • Pervasive development efforts are needed at the individual, team, and institutional levels
Talent Gap	• Substantial Analytics Talent Gaps exist in all industries, including higher education	• The Talent Gap can be narrowed through increasing the pipeline of analytics professionals – this is a longer term solution • Pervasive collaboration is necessary to share and leverage analytics talent • Cloud computing can be used to cluster scarce resources

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

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Culture and Process

- Senior leaders who are interested in and committed to suing data to make decisions
- Our administration largely accepts the use of analytics

Culture and Process

- 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

Culture and Process

- We have a process for moving from what the data say to making changes and decisions
- Our faculty largely accept the use of analytics

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

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

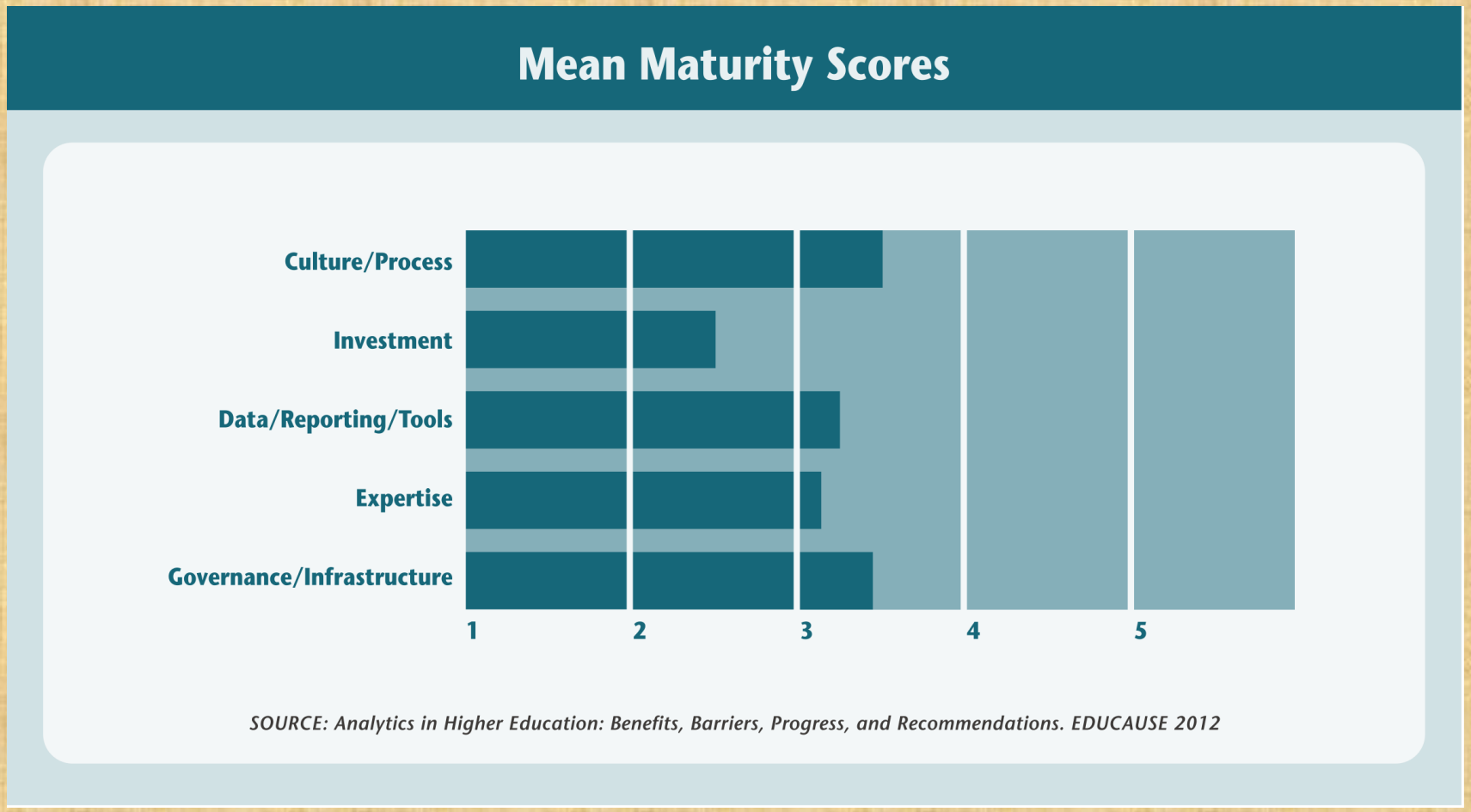
Expertise

- 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

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

ECAR Overall Maturity Index – All Institutions Participating



Next Steps: Building Your Template (As Part of Your Case Study or Plan)

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

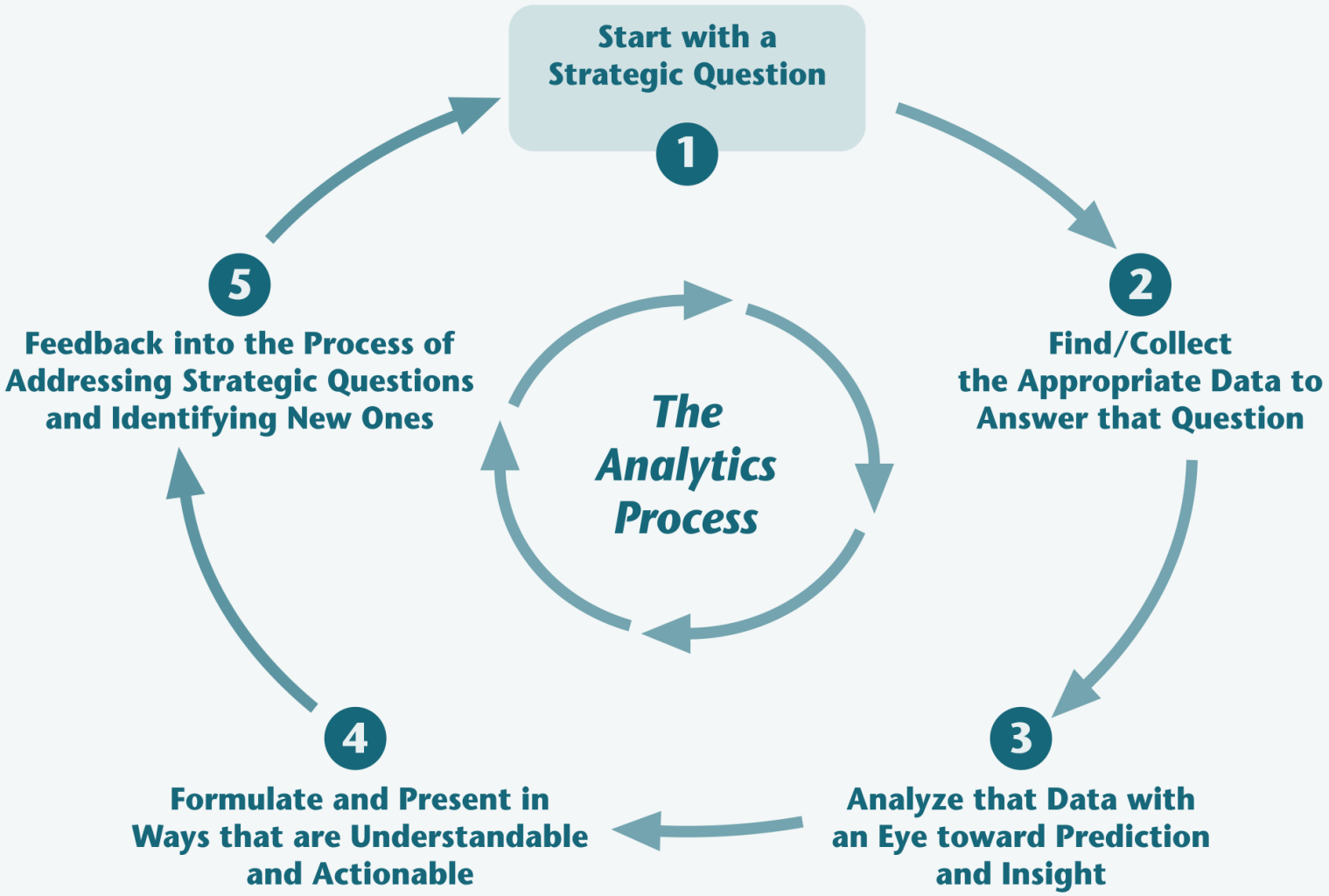
The Purposes of this Section

- Understanding the ongoing processes of analytics and how to accelerate them.
- Combining purposeful planning, strategy making, and capacity building with analytics.
- Embedding analytics into on-going planning and strategy processes and initiatives.
- Elevating the leveraging of analytics into a major change initiative at your institution.
- Considering future inflection points, today.

1. The Analytics Process

- The five-step analytics process is the basis for the continuous churn of analytics activities.
- At any time, there are constellations of ongoing analytics activities.
- Davenport describe a five-step process for “getting starting with analytics” – which is a means of focusing organizational attention on analytics.

The Analytics Process



2. Creating an Action Plan for Analytics

- An Action Plan is a handy way to increase the impact and accelerate the uptake of analytics.
- It can be used to organize multiple analytics projects into a more coherent initiative.
- Action Plans can be excellent communication vehicles for applying “What Works” in analytics at other institutions to your institution.
- Understandable Action Plans set the stage for institutional strategies for leveraging analytics.

When Might You Need an Action Plan for Analytics?

- A particular problem has arisen that requires a greater investment in analytics (cite examples from the Toolkit)

When Might You Need an Action Plan for Analytics?

- You are just getting started and want to learn from what others have done and accelerate your development.

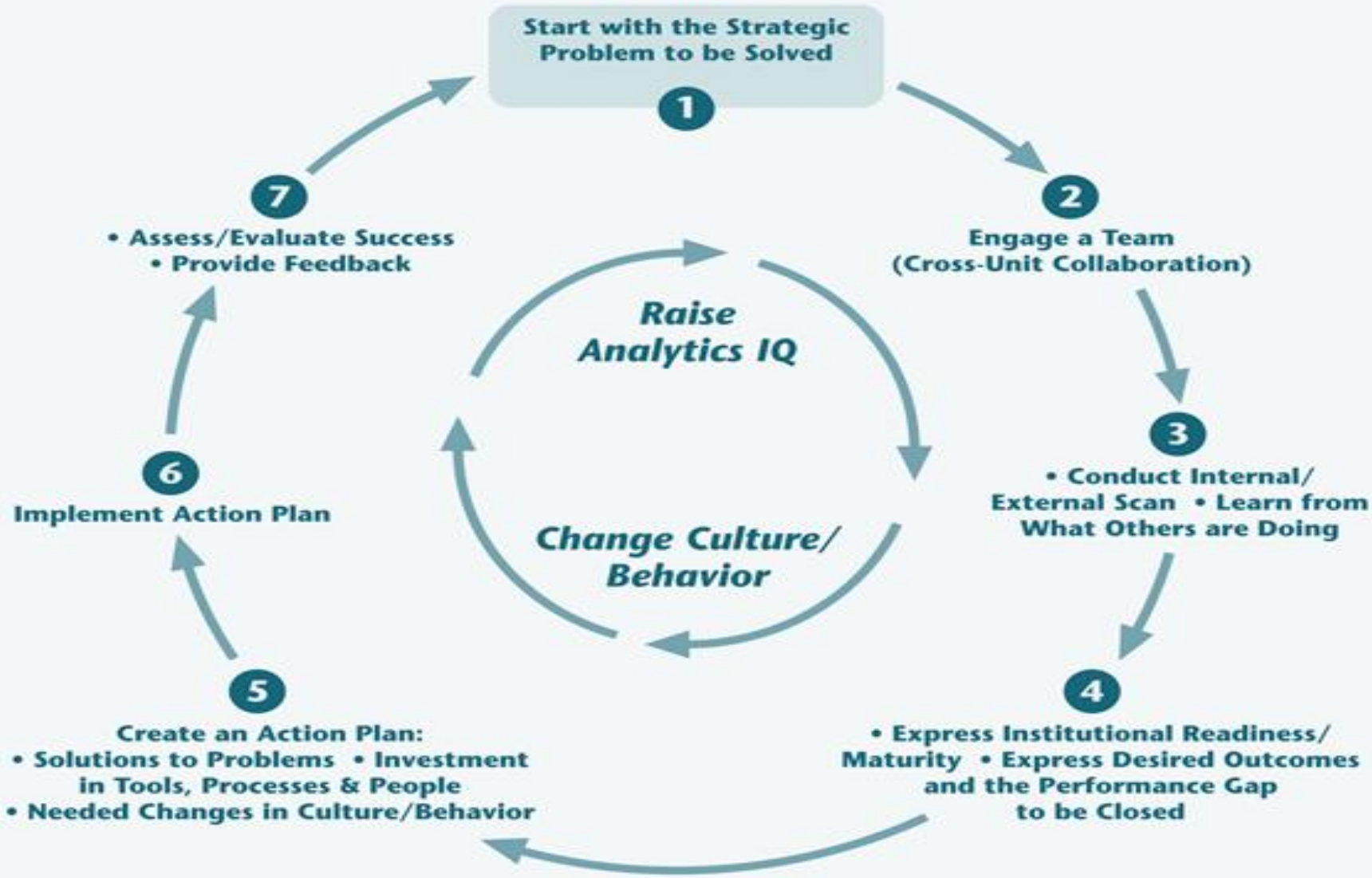
When Might You Need an Action Plan for Analytics?

- Your leadership wants to engage a broader cross-section of the institution in expanding analytics. Elevate from departmental to enterprise perspective.

Examples of Institutional Action Planning

- American Public University System
- Arizona State University
- University of Maryland Baltimore County
- University of Minnesota
- Sinclair Community College
- Rio Salado Community College
- Northeastern University

Creating an Action Plan for Analytics



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

Reference

- 1. Shalev-Shwartz and Ben-David. Understanding Machine Learning: From Theory to Algorithms (Cambridge University Press, 2014)
- 2. Daum´e. A Course in Machine Learning.
- 3. The Art of Statistics: How to Learn from Data by David Shpigelter
- 4. Learning From Data – January 1, 2012 by Yaser S. Abu-Mostafa (Author), Malik Magdon-Ismail (Author), Hsuan-Tien Lin (Author)
- 5. Statistics: The Art and Science of Learning from Data by Alan Agresti
- 6. Learning From Data: An Introduction To Statistical Reasoning by M.Glenber.
- 7. Statistics: Learning from Data (with JMP Printed Access Card) by Rocky Pek
- 8. The Elements of Statistical Learning by Gerim Garold
- 9. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems 2nd Edition
- by Aurélien Géron (Author)