

ANALYTICS: A 21ST CENTURY TEAM SPORT



From Distance to Digital Learning:
Shaping the Future

Dr. Linda L. Baer

9:15-10:00

Tuesday, April 10, 2018

IF YOU WANT TO GO FAST GO ALONE

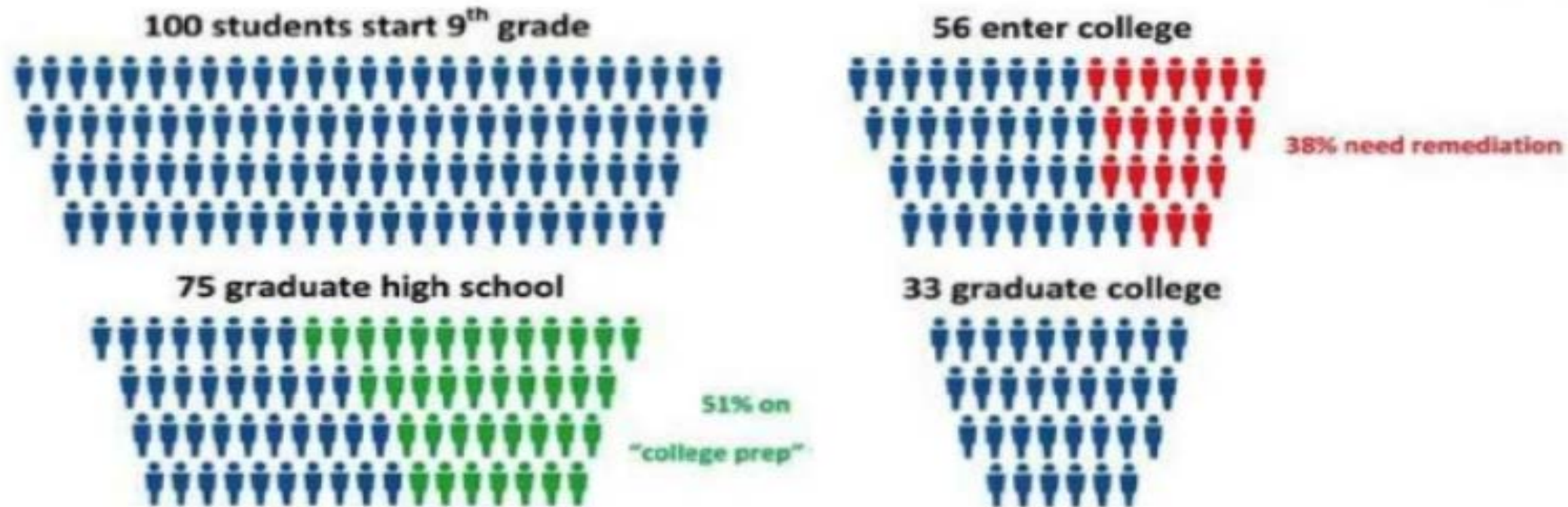


IF YOU WANT TO GO FAR GO TOGETHER

What's your driving question?



U.S. Education Pipeline

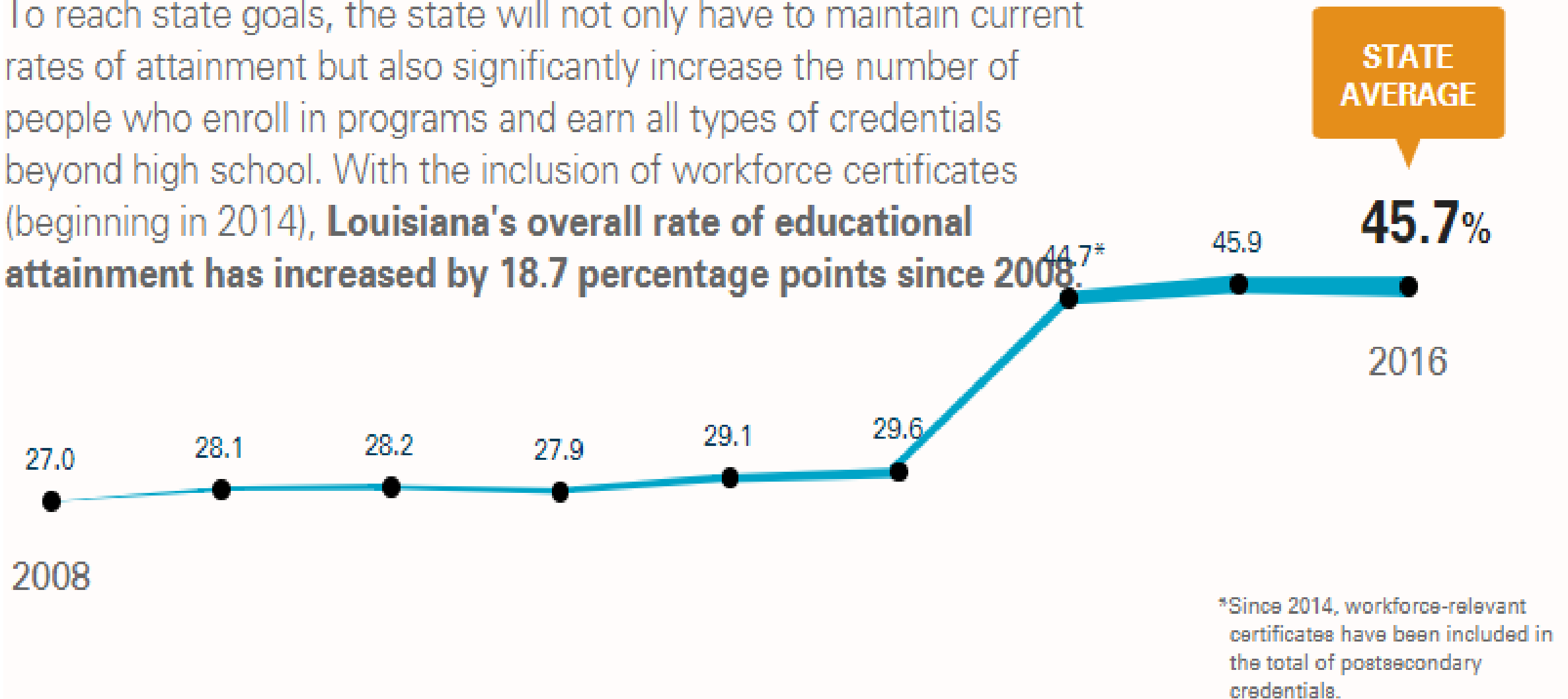


U.S. Department of Education, various studies and reports

<http://www.changemag.org/Archives/Back%20Issues/2011/May-June-2011/first-in-the-world-full.html>

Louisiana's progress

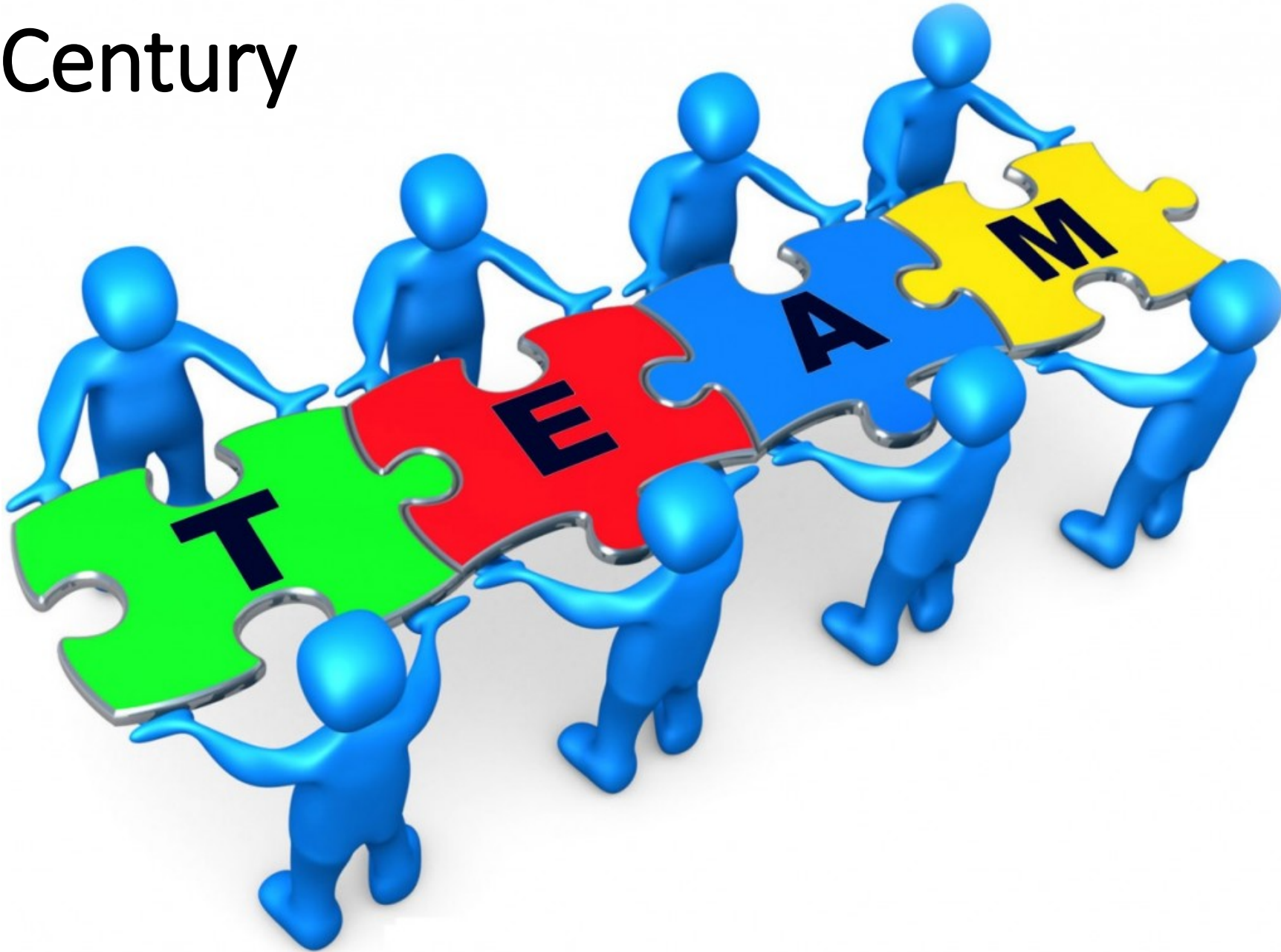
To reach state goals, the state will not only have to maintain current rates of attainment but also significantly increase the number of people who enroll in programs and earn all types of credentials beyond high school. With the inclusion of workforce certificates (beginning in 2014), **Louisiana's 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?

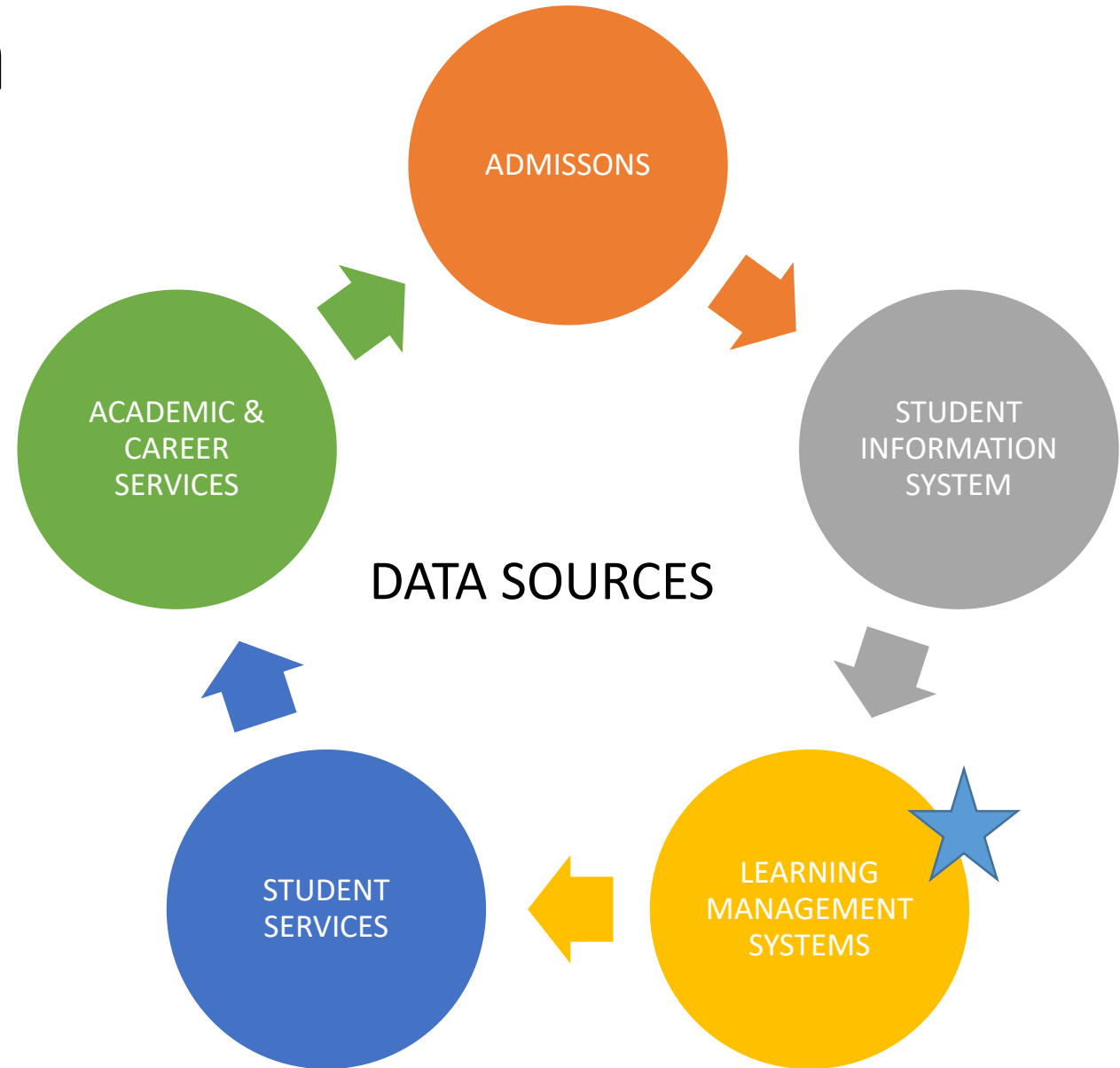
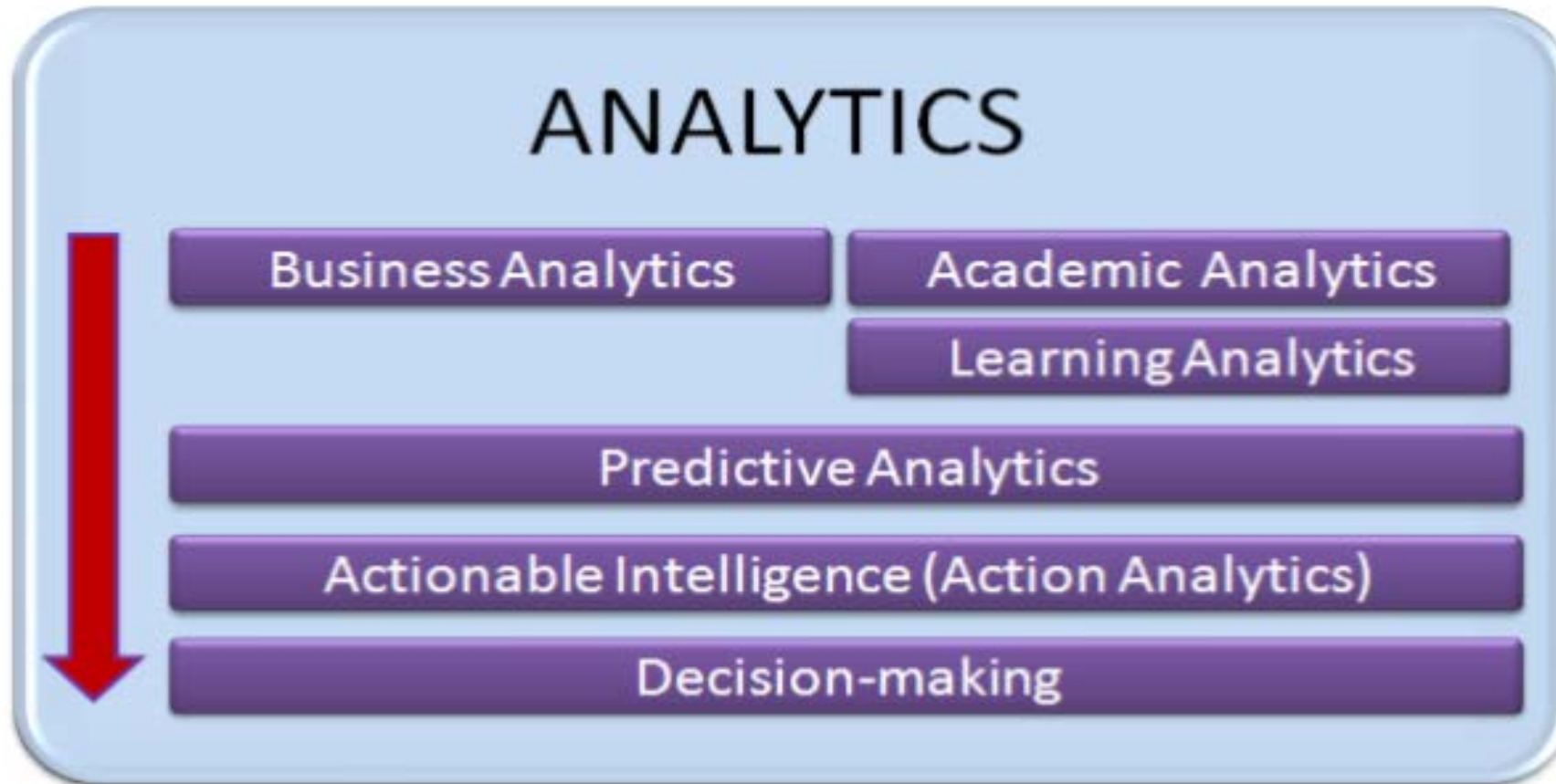
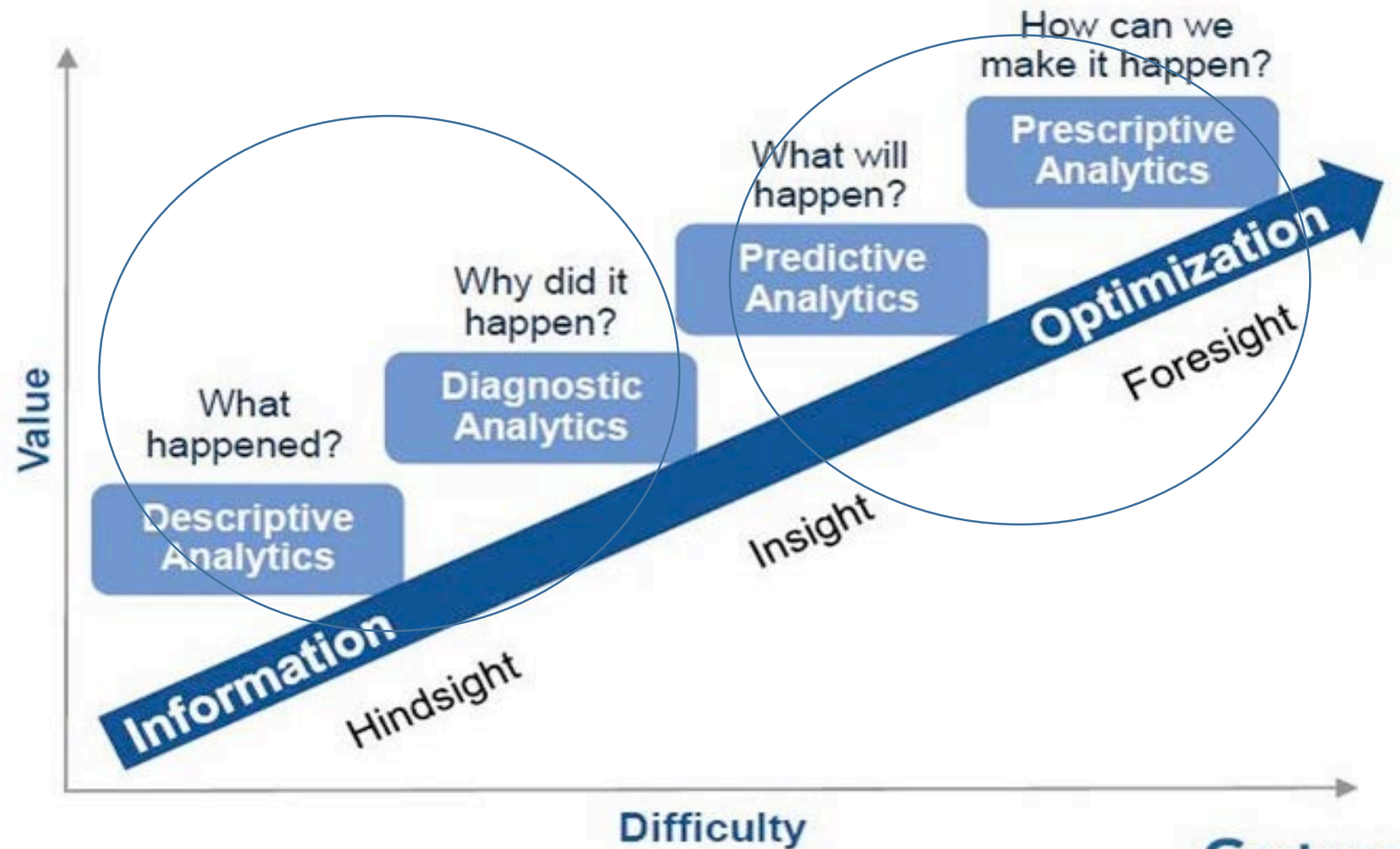


Figure 1. Conceptual Framework of Analytics in Business and Higher Education



Analytics in Higher Education: Establishing a Common Language
Angela van Barneveld, Kimberly E. Arnold, and John P. Campbell ELI White Paper 2012
<http://net.educause.edu/ir/library/pdf/ELI3026.pdf>

Analytics: Evolving From Hindsight to Foresight

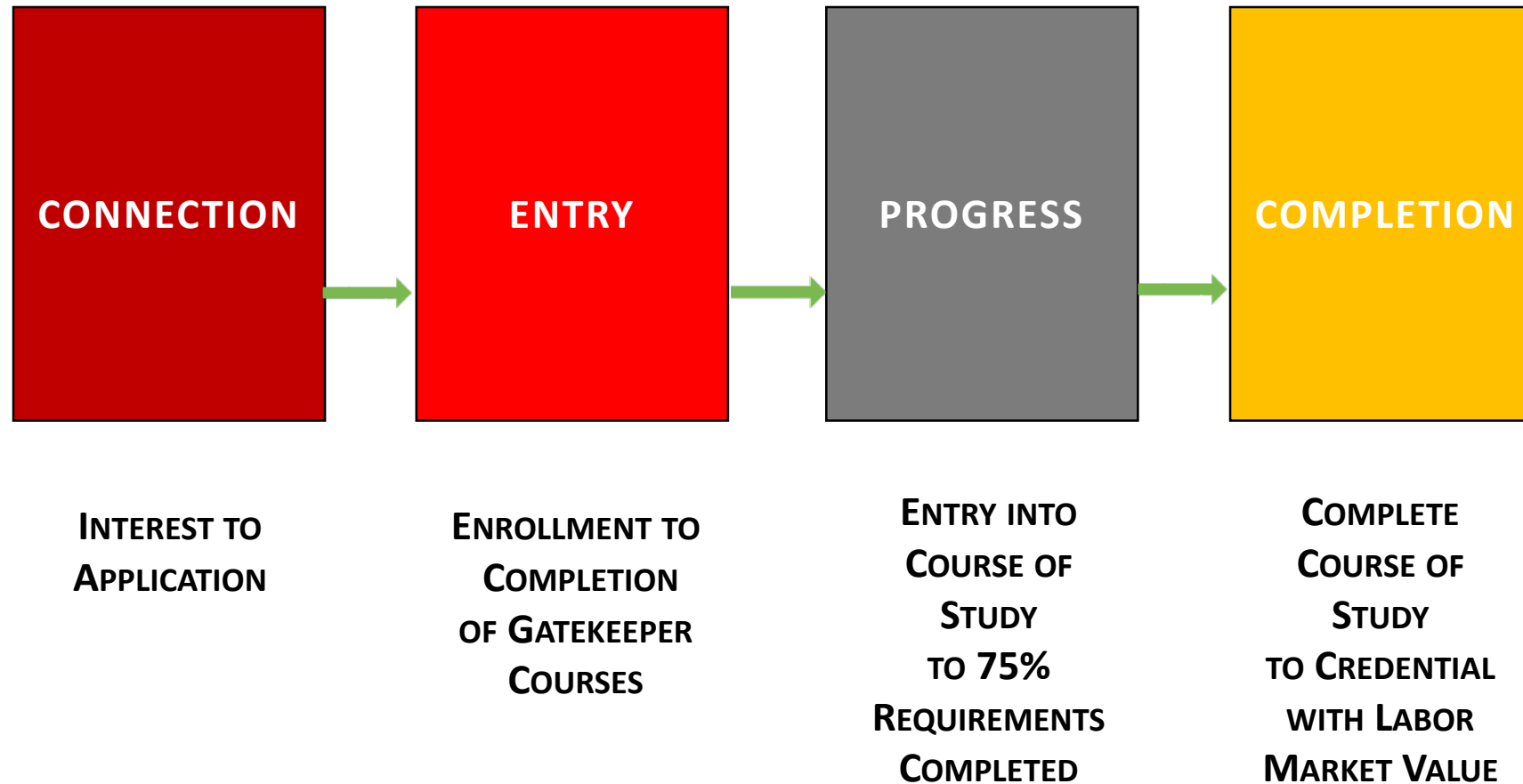


Gartner Analytics Model retrieved August 15, 2016.

<http://timoelliott.com/blog/2013/02/gartnerbiemea-2013-part-1-analytics-moves-to-the-core.html>

Gartner.

INTERVENTIONS TIMING: Completion by Design Measuring Loss and Momentum Points



Types of Student Success Data

Pre-enrollment	Academic	Motivation and Self-efficacy	Use of Support Services	Student Engagement
<ul style="list-style-type: none">• Demographics• High school grade point average• Parents' experience with college• Test scores	<ul style="list-style-type: none">• Class attendance• First semester grades• Grades in select core courses• Login to student web portal• Midterm grades• Registration for next semester• Use of learning management system	<ul style="list-style-type: none">• Comfort with academic ability• Depression• Financial issues• Homesickness• Lack of friends or connections	<ul style="list-style-type: none">• Advising• Career services• Counseling• Disability support• Financial aid• Health center• Library• Tutoring	<ul style="list-style-type: none">• Athletic team affiliation• Campus membership• Campus residency• Campus Wi-Fi usage• Dining center• Leadership roles• Participation in campus programs• Recreation center

Metrics for Online Success

- Readiness
- Engagement
- Persistence
- Satisfaction

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 who a data scientist is, is equally hard. So here is a little cheat sheet on 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

DOMAIN KNOWLEDGE & SOFT SKILLS

- ☆ Passionate about the business
- ☆ Curious about data
- ☆ Influence without authority
- ☆ Hacker mindset
- ☆ Problem solver
- ☆ Strategic, proactive, creative, innovative and collaborative

PROGRAMMING & DATABASE

- ☆ Computer science fundamentals
- ☆ Scripting language 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/Pig
- ☆ Custom reducers
- ☆ Experience with xaaS like AWS

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, D3.js, Tableau



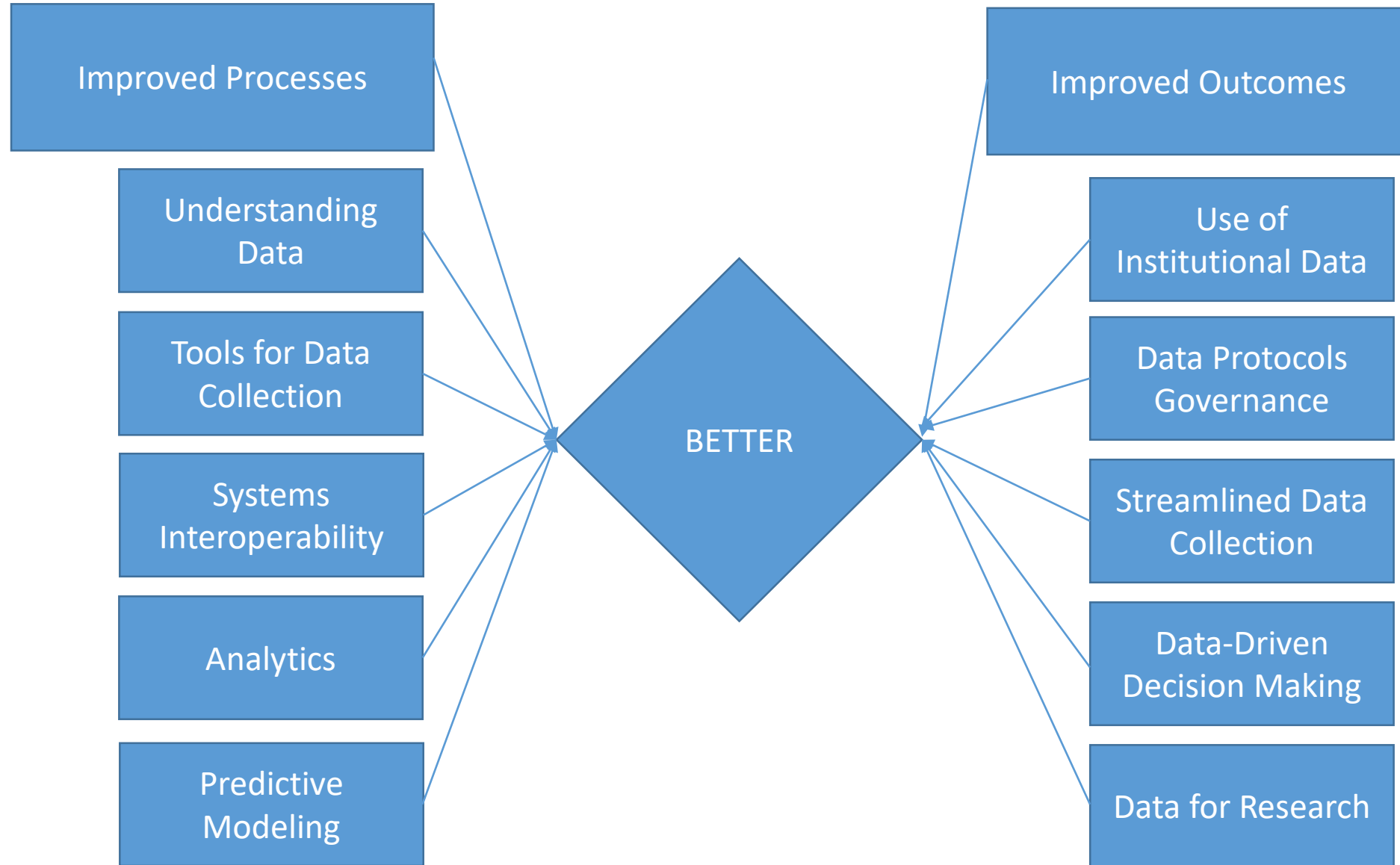
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(c) Krzysztof Zawadzki

Moving to Insight and Action



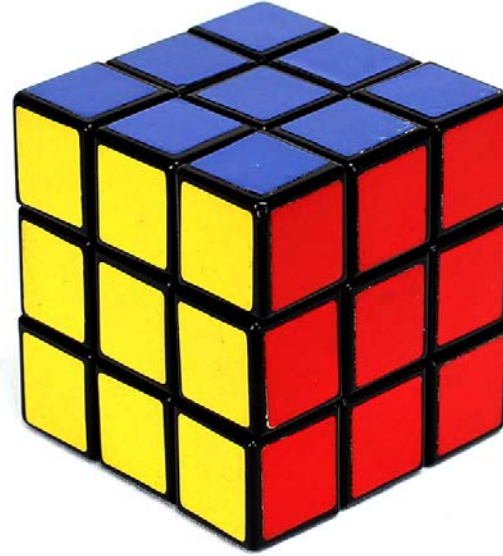
Big Data Analytics Outcomes



How many interventions do you have?

SOLVING THE INTERVENTION RIDDLE

**INTERVENTION
OPPORTUNITIES**

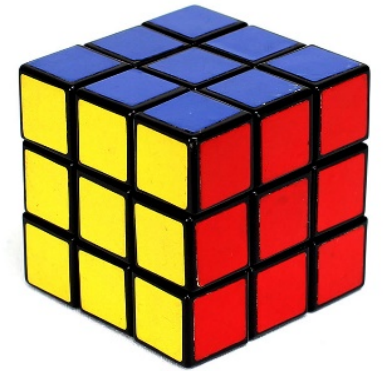


**INTERVENTION
TYPES**

**INTERVENTION
TRIGGERS**

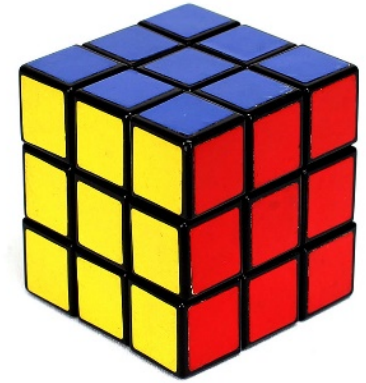
INTERVENTION OPPORTUNITIES FOCUSING ON RISKY TARGET GROUPS

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



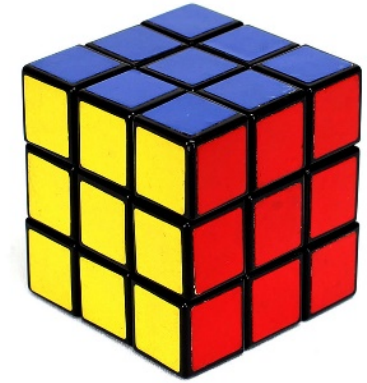
INTERVENTION TRIGGERS: WHY DO STUDENTS LEAVE?

- 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

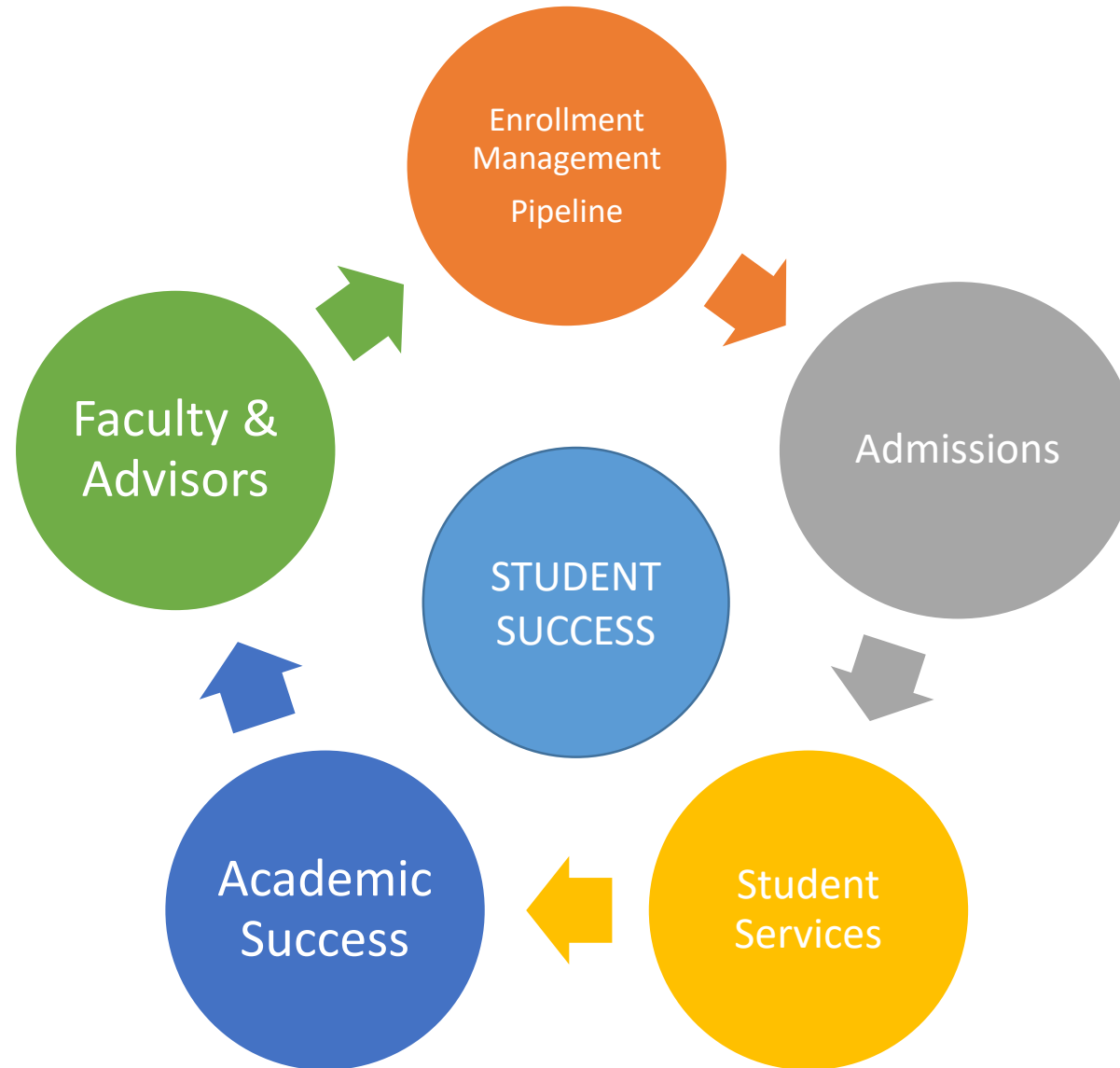


INTERVENTION TYPES

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



Federated Knowledge: Strategy, Insights, Interests



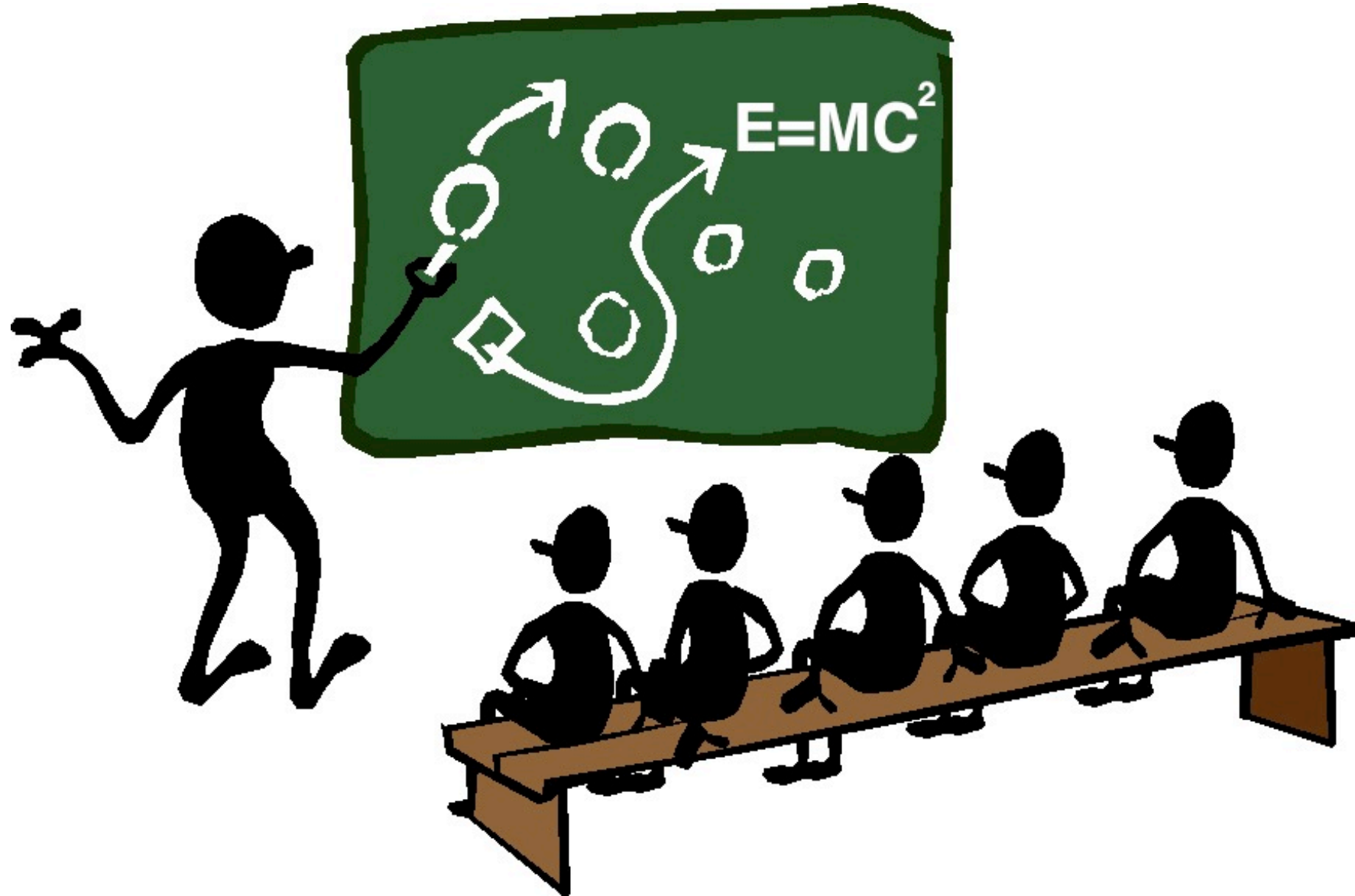
Metrics Are Easy; Insight is Hard

“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

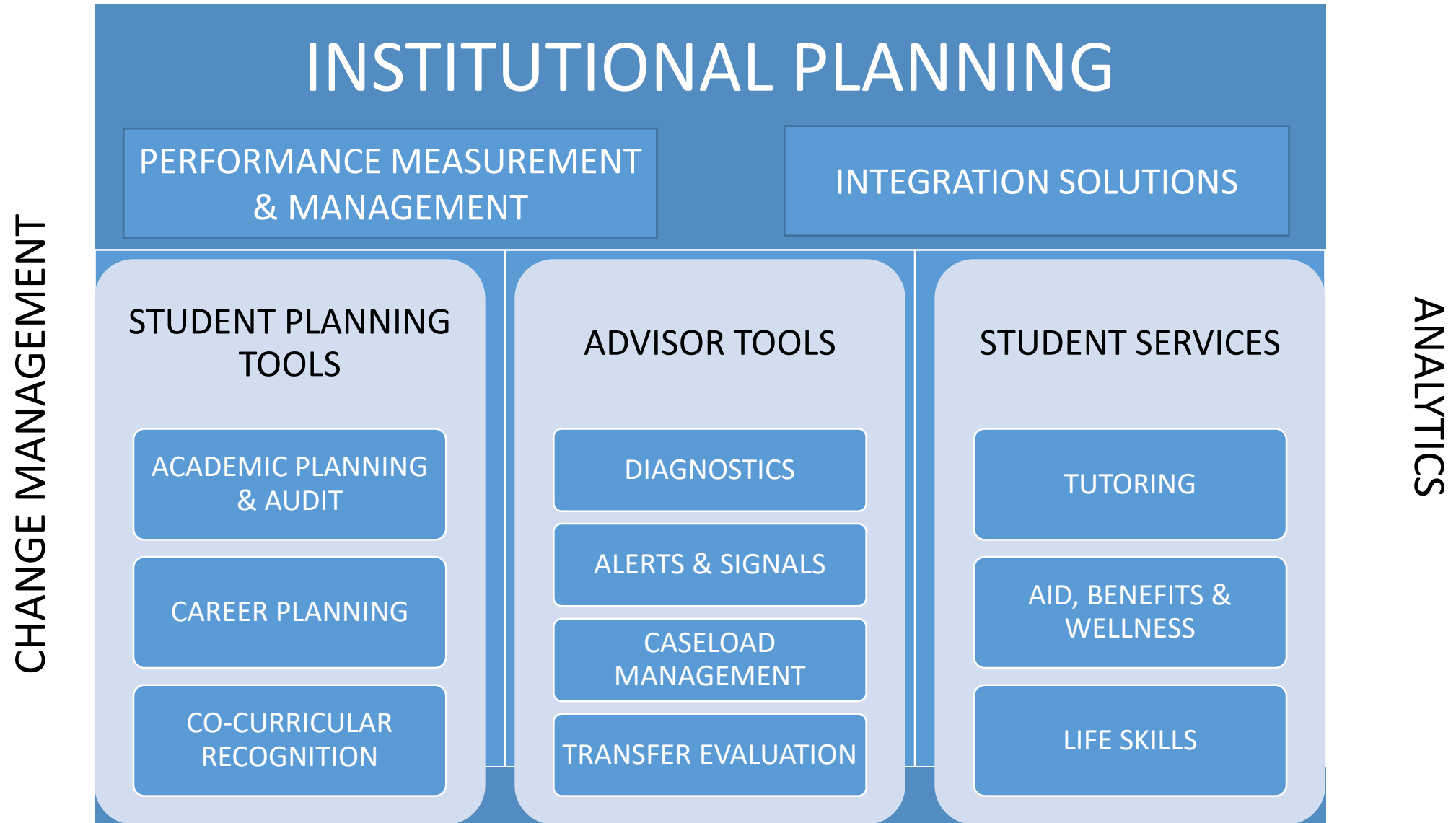
EXAMPLE: CHANGING THE PLAYBOOK

- **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?

	Education Planning	Counseling and Coaching	Risk Targeting and Intervention	Transfer and Articulation
Legacy ERP / SIS / LMS	ellucian	ORACLE PeopleSoft	JENZABAR Canvas	Bb D2L moodle
Vendor Solutions	connectedu campuscruiser	MICROSOFT Dynamics CRM campuslabs	hobsons Starfish Educational Advisory Board	parchment Nuventive
Homegrown Solutions	eAdvisor Sinclair's MAP Valencia's LifeMap Austin Peay's Degree Compass	SSP Central Piedmont's Online Students Profile	Course Signals Predictive Analytics Reporting (PAR)	
Direct to Students	connectedu		PERSISTENCE + PLUS	CollegeTransfer.Net

Student Success Technologies



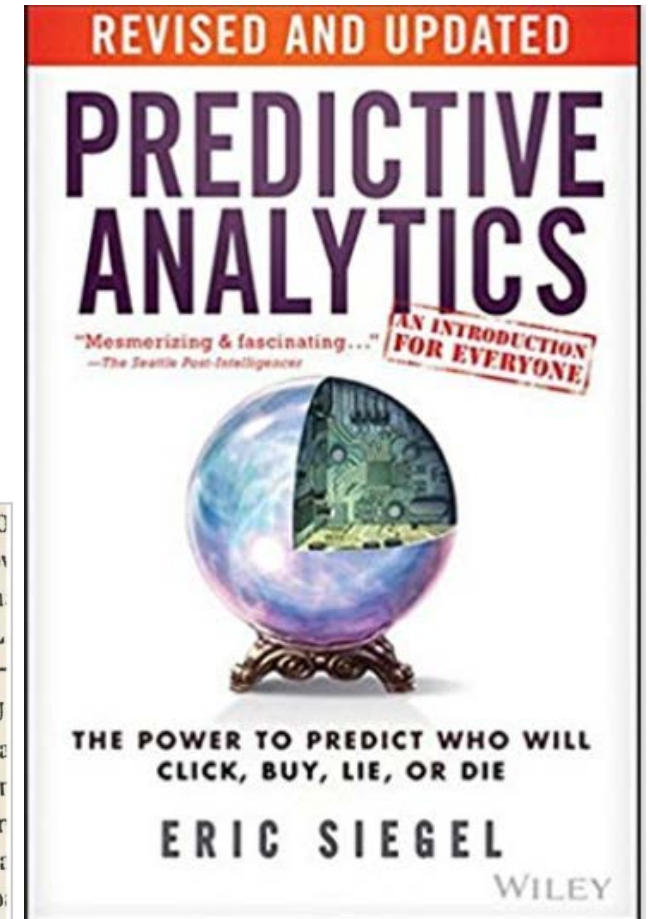
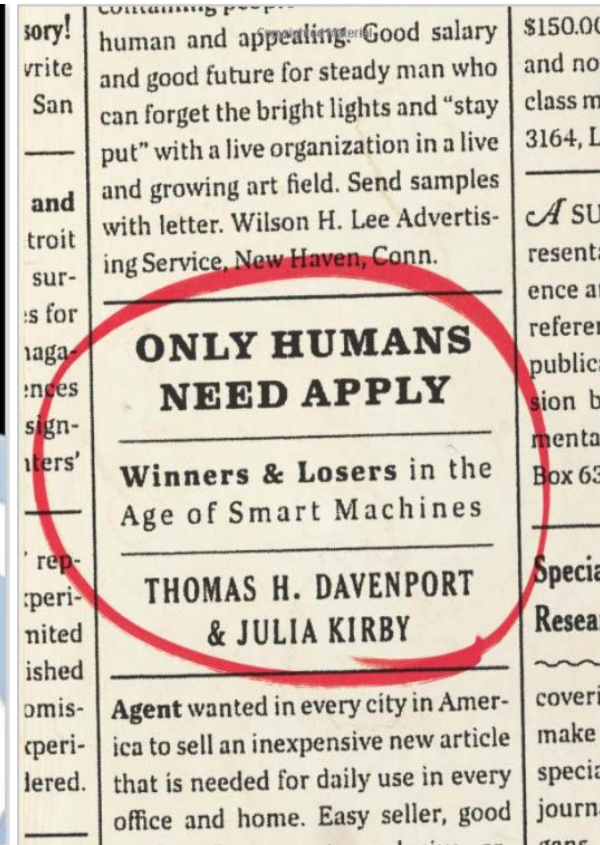
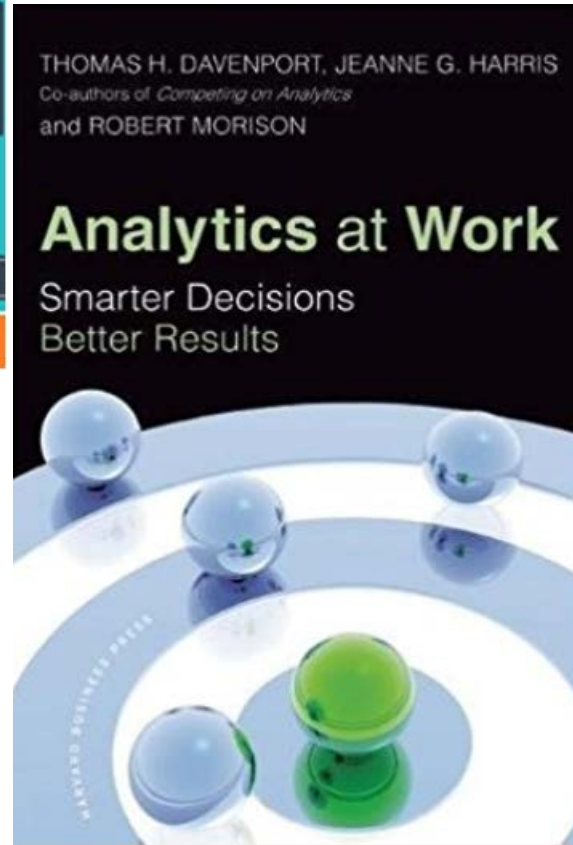
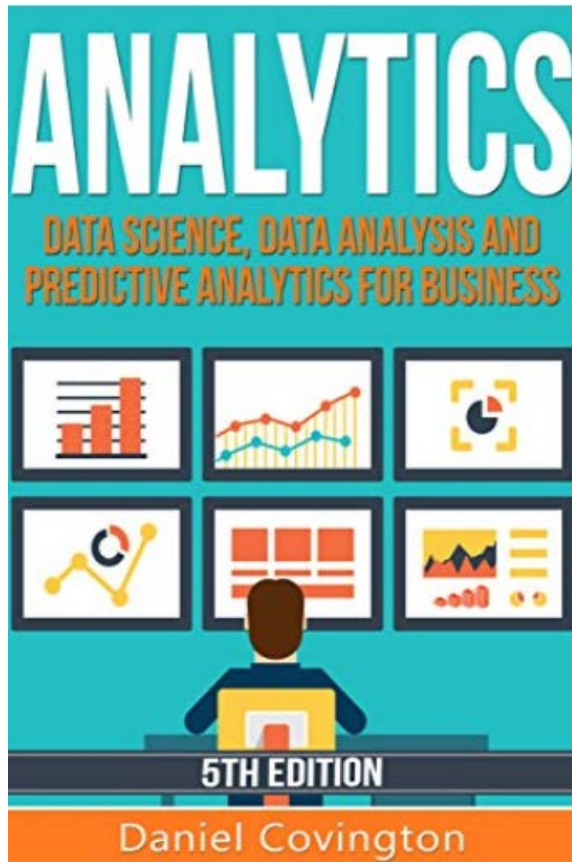
LESSONS LEARNED

- 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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