

Beyond Re-Enrollment: Using Enrollment Projections to Inform the Budget

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Present a Case Study: Loyola Marymount University

Illustrate the Benefits of Logistic Regression in Retention Modeling

Demonstrate the Use of Predictive Modeling for Budget Projections

Loyola Marymount University – Who Are We?



Loyola Marymount University – Who Are We?

Type



Private/Non-Profit/4-year

Jesuit/Marymount/Catholic

Founded 1911

Los Angeles, CA

Students



6,126 Undergrads

2,061 Graduates

1,008 Law School

38% Racial/Ethnic Minority

10% International

Undergraduates



85% Receiving Aid

74% In-State

20 Average Class Size

58 Major Programs

53 Minor Programs

173 Clubs/Organizations

Mission: The Encouragement of Learning, the Education of the Whole Person, the Service of Faith and the Promotion of Justice

Loyola Marymount University – Who Are We?

Michelle Castellanos

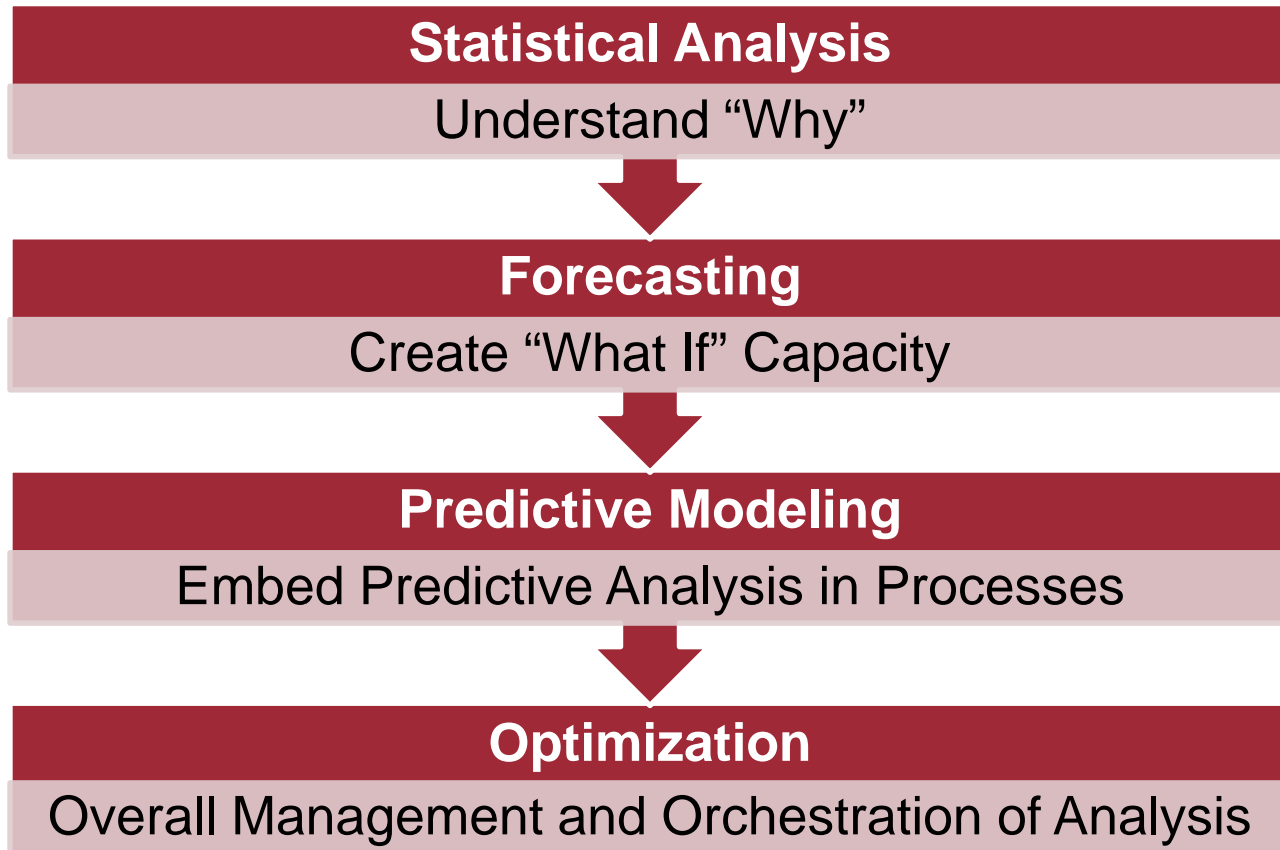
- Institutional Research Associate
- Higher Education/
Educational Psychology
- Research Methods

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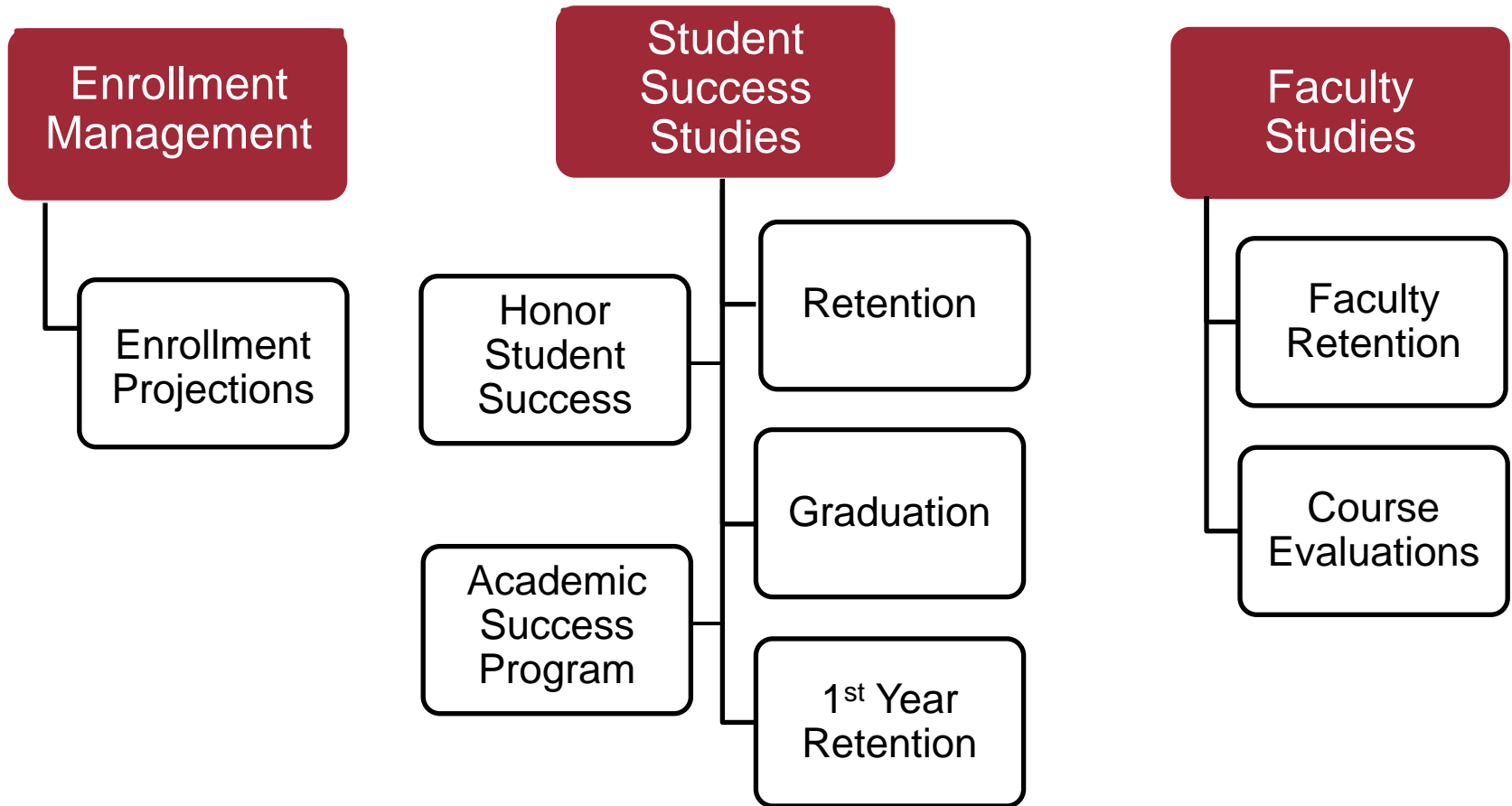
- Institutional Research &
Business Intelligence Associate
- Public Policy Analysis/
Education Policy
- Research Methods

Mission: The Encouragement of Learning, the Education of the Whole Person, the Service of Faith and the Promotion of Justice

Using Analytics to Improve Performance



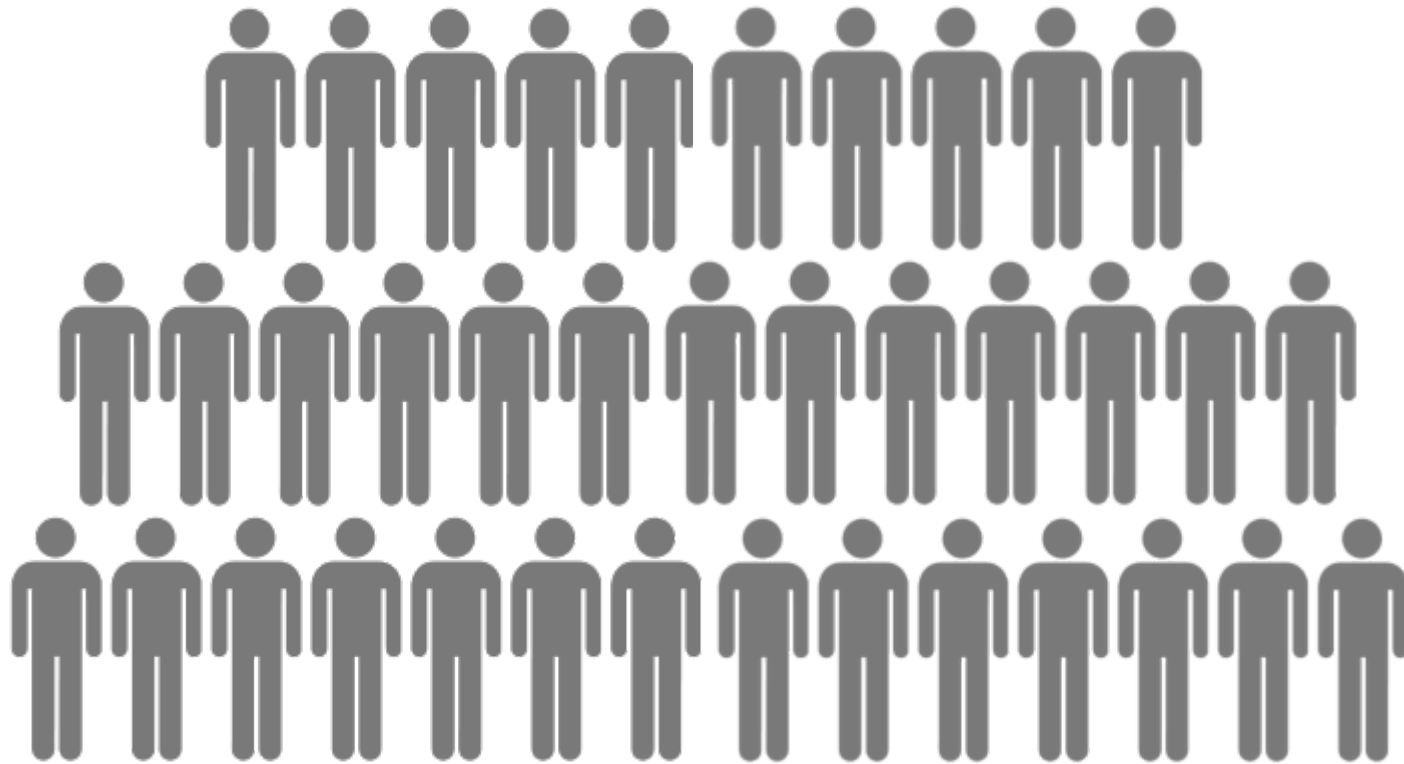
A Selection of Our Research Studies



Case Study: Enrollment Projections and the Budget

How Many Students Can We Expect to Re-Enroll Next Term/Year?

How Much Institutional Aid Should We Allocate for Students?



Result of a Collaborative Effort

2008

- Developed an Enrollment Projections Model

2011

- Began Using the Model to Inform Aid Projections

2016

- Performed an Extensive Re-Evaluation of the Model

Methods of Estimating Re-Enrollment

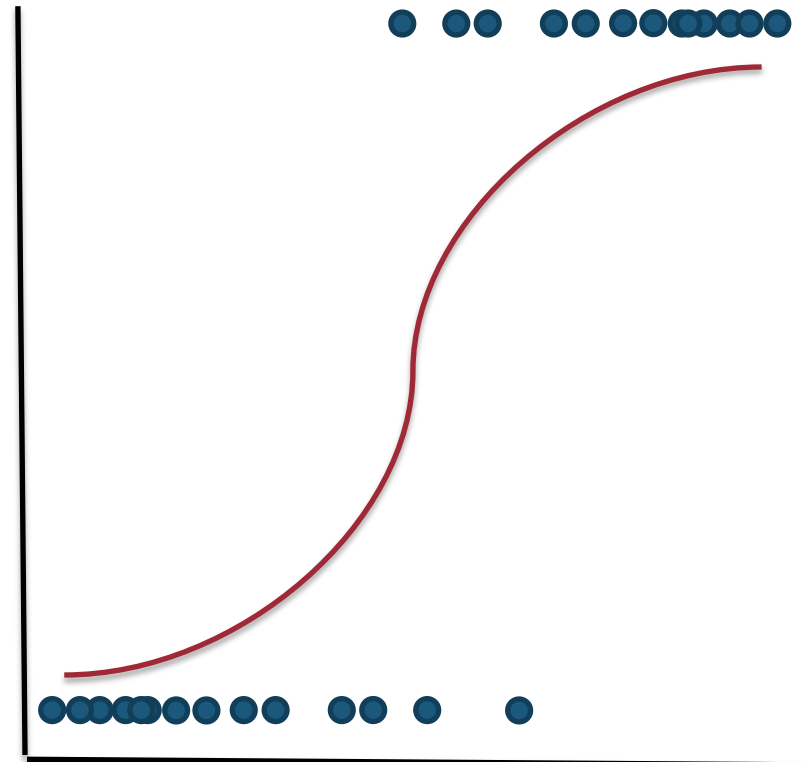
Aggregated Approach

Vs.

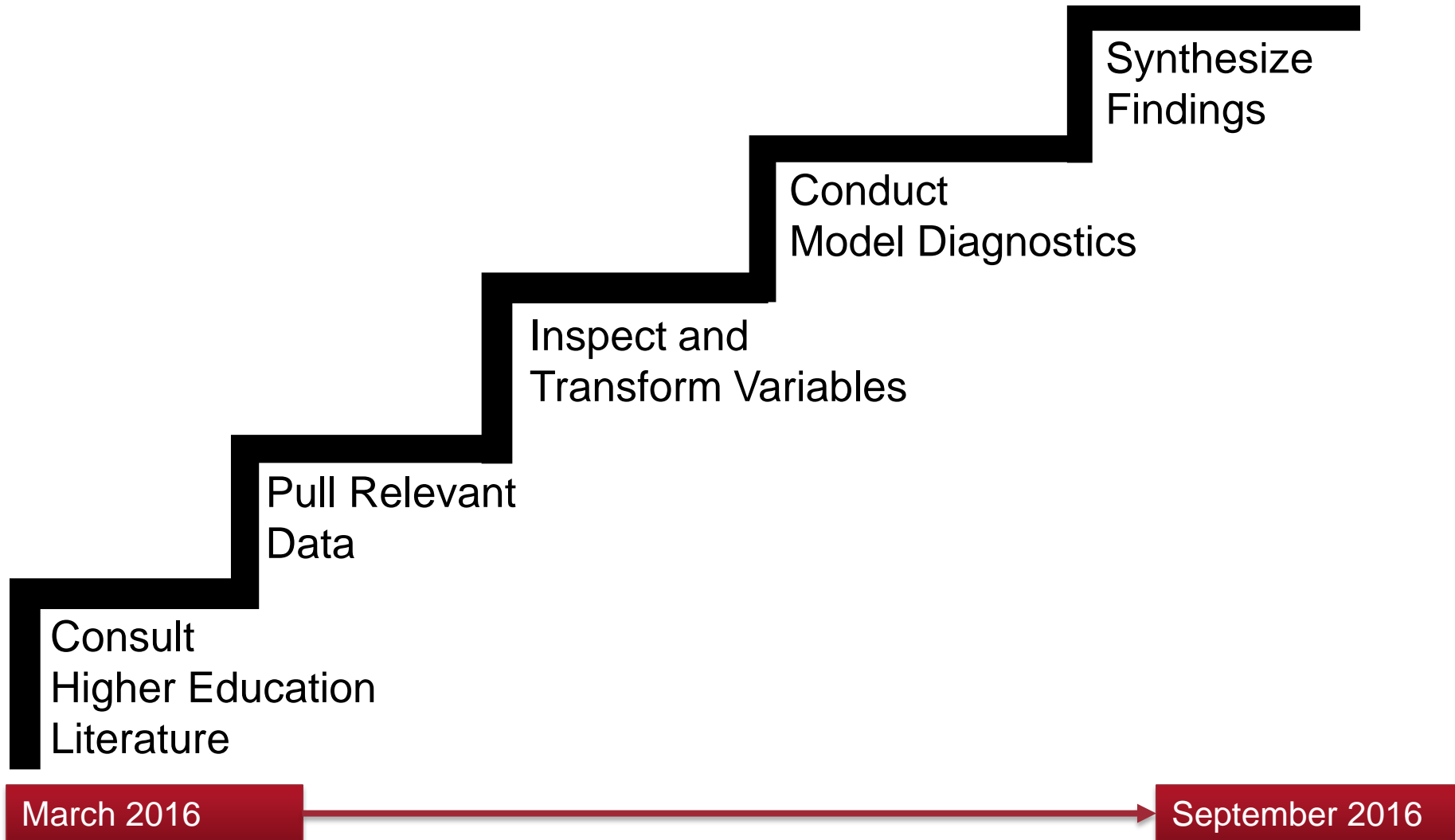
Predictive Approach

$$\begin{aligned} & \sum_{t=1}^N FF_{Retention\ Rate\ 2t} \times FF_{Cohort\ N-t} \\ + & \sum_{t=1}^N SF_{Retention\ Rate\ 2t+1} \times SF_{Cohort\ N-t} \\ + & \sum_{t=1}^N FT_{Retention\ Rate\ 2t} \times FT_{Cohort\ N-t} \\ + & \sum_{t=1}^N ST_{Retention\ Rate\ 2t+1} \times ST_{Cohort\ N-t} \end{aligned}$$

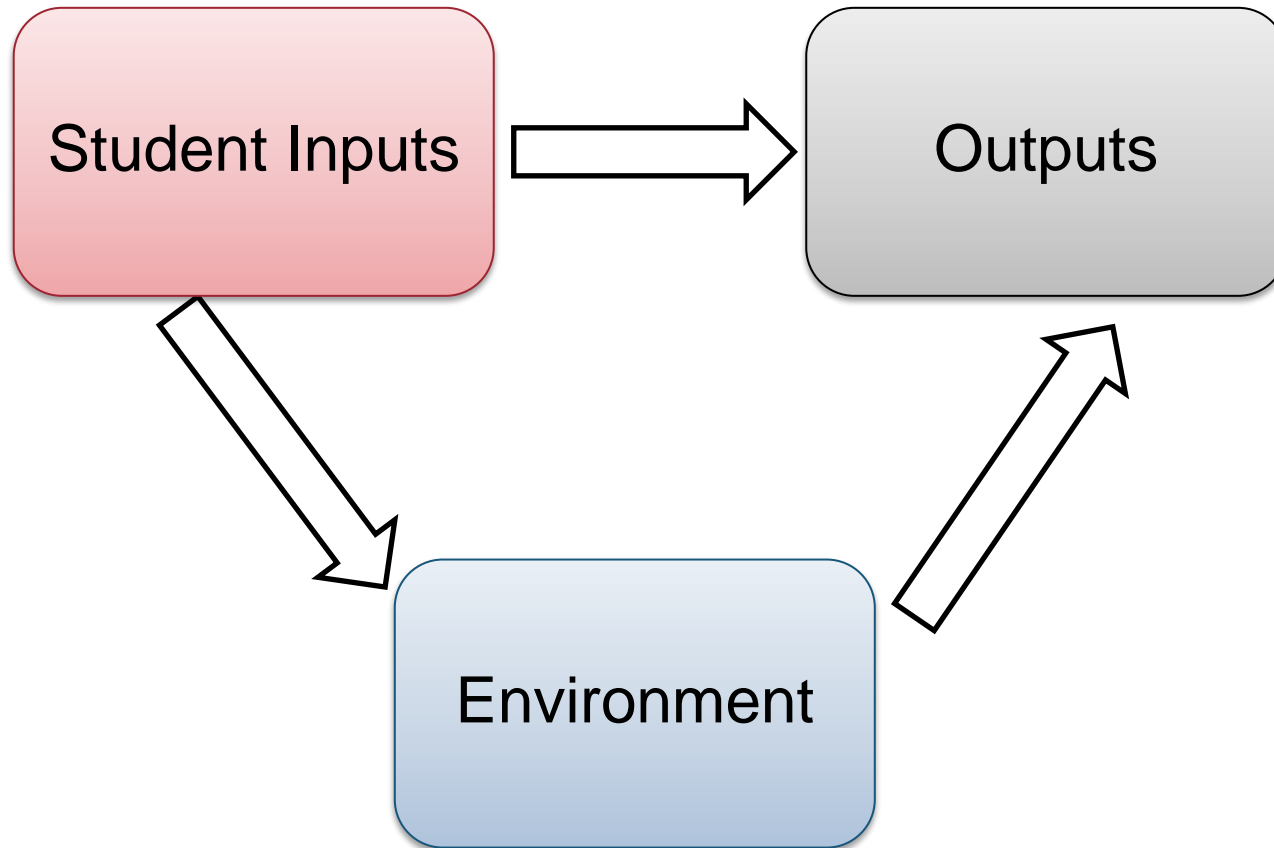
= 1-Year Re-Enrollment Estimate



Multifaceted Research Process



Theory of Student Involvement



Student Input Variables

Demographic Characteristics

- Age
- Gender
- Race/Ethnicity
- Disability Status
- Family Income
- Parents' Education
- Home Residence

Pre-College Characteristics

- High School GPA
- SAT/ACT Score

Environment Variables

Academic Experiences

- Entry Type
- College
- Switched College
- Double Major
- Switched Major
- College GPA
- Units Withdrawn
- Part-Time Student
- Enrolled Hours
- Terms Enrolled
- Class Standing

Involvement on Campus

- Greek Life
- Organizations:
 - Academic
 - Service
 - Cultural
 - Entertainment
 - Political
- On-Campus Housing
- Living Learning Communities

Financial Aid

- Non-Need-Based Aid
- Need-Based Aid
- Student Loans
- Parent Loans
- Work Study

Re-Enrollment

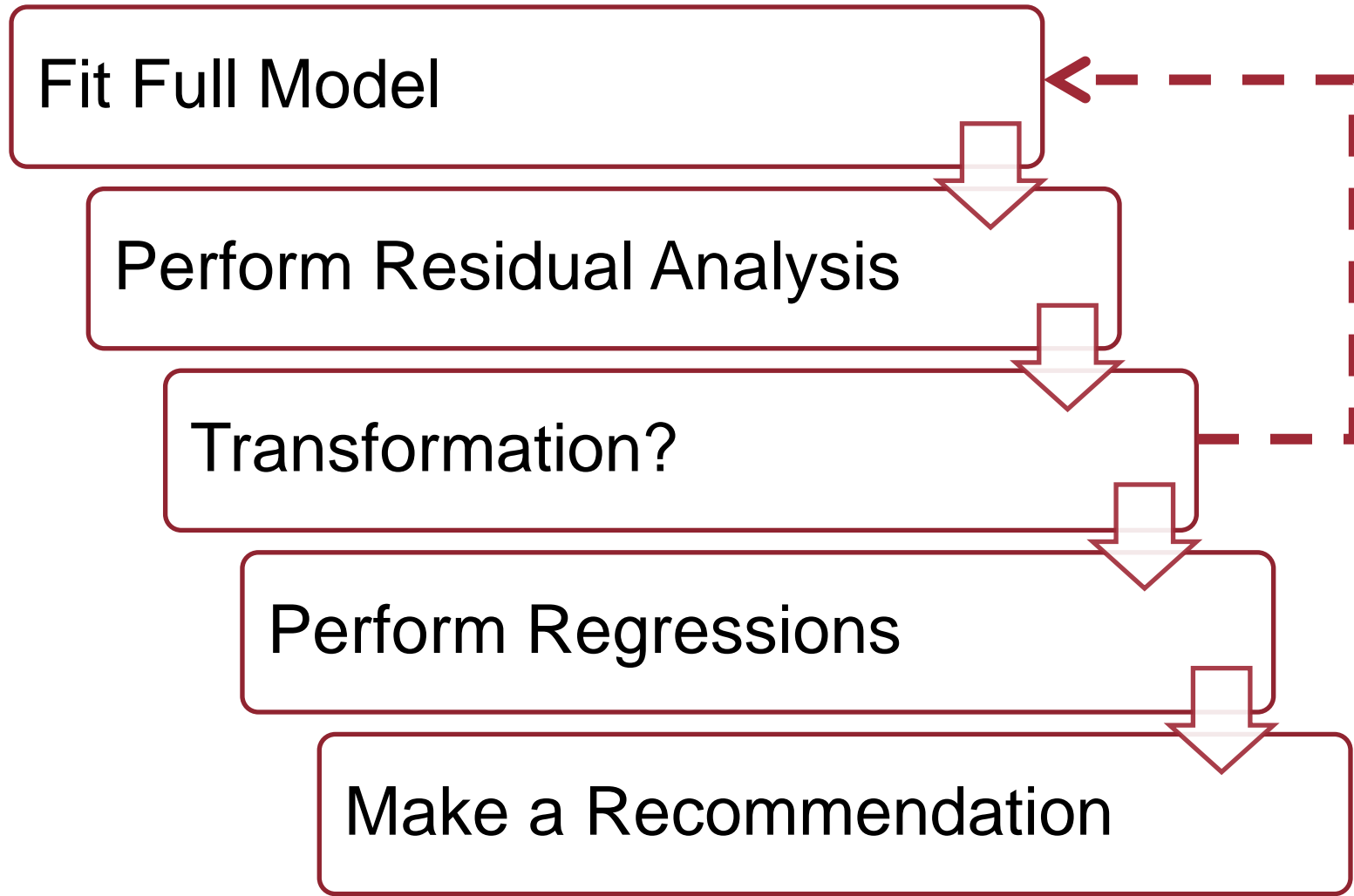
One-Term

One-Year

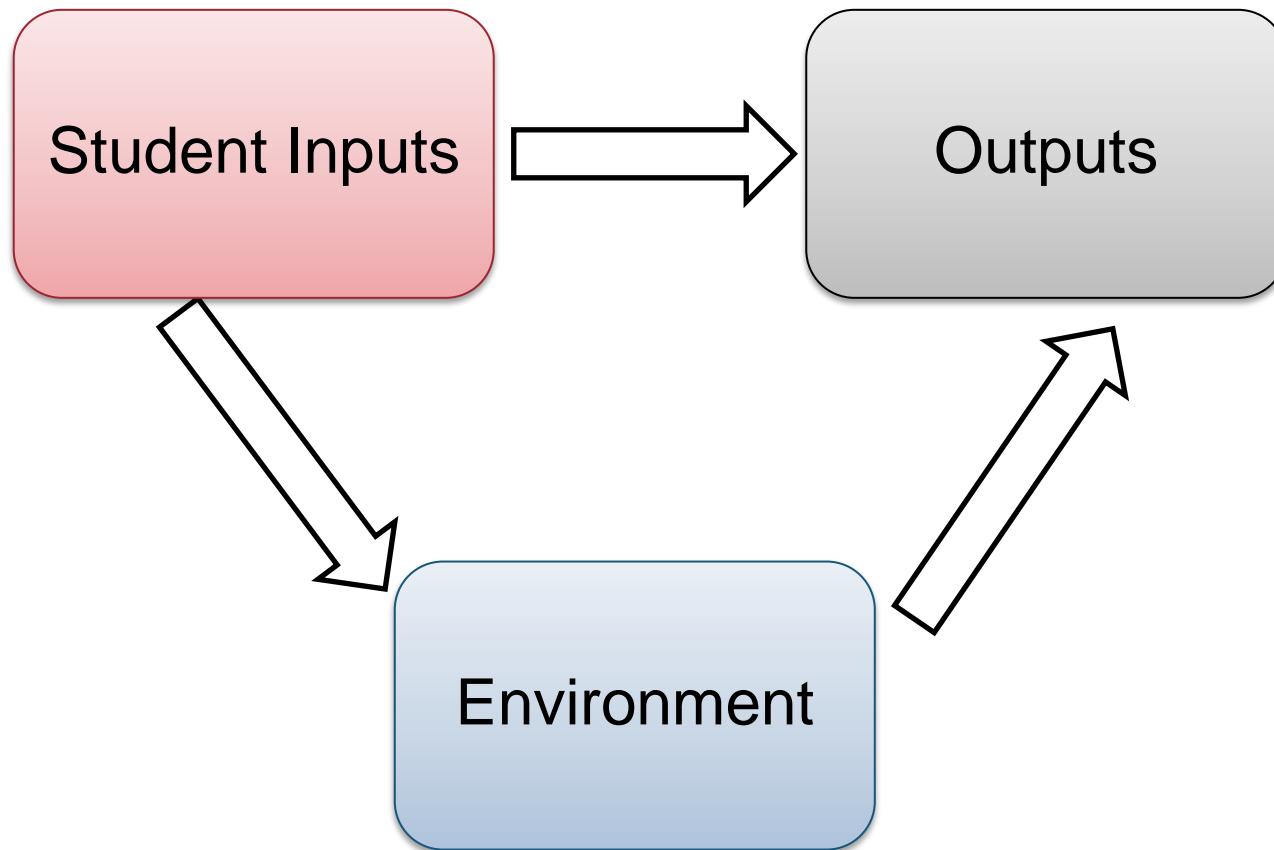


Logistic Regression Allows Us to Model the **Probability That Students Will Re-Enroll** Based on Specific **Individual Characteristics and College Experiences**, Holding All Else Constant

Model Building Process



Theory of Student Involvement



Findings: 1-Year Retention

Student Inputs

- Race/Ethnicity
- Disability Status
- Family Income
- Home Residence
- High School GPA
- SAT/ACT Score

Environment

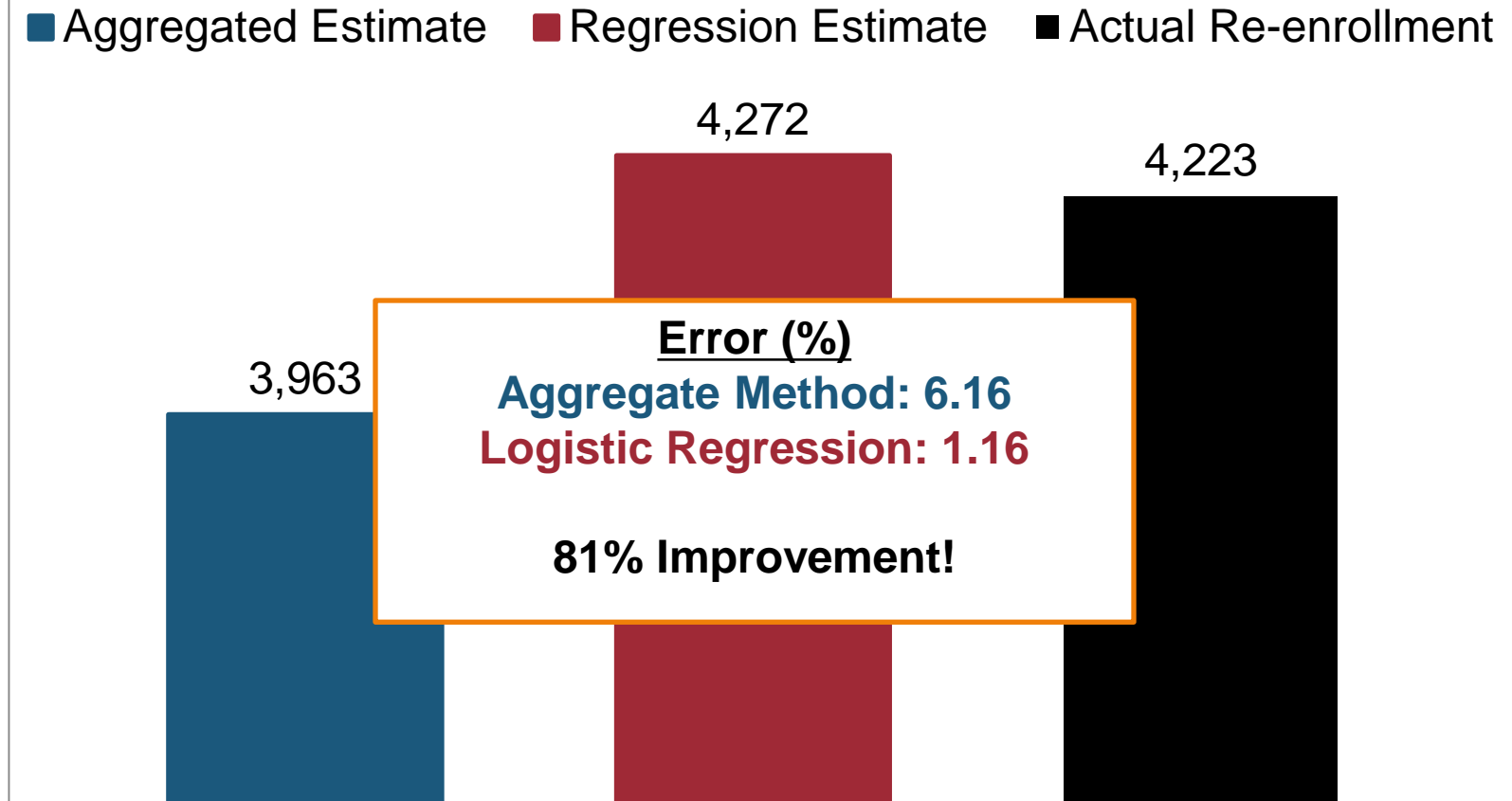
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69% of Undergraduates Who Enrolled in Fall 2015 Will Re-Enroll in Fall 2016

Predictive Model Outperforms Aggregated Approach

Student Retention: Fall 2015 to Fall 2016



Model Application: Projecting Student Aid

$$\textit{Student Aid Projection} = \sum_{i=1}^N \textit{Retention Probability}_i \times \textit{Aid}_i$$

- Continue to invest in cross-institution collaborations
 - What's on the horizon?
 - How can we help?
- Move beyond the “why” of statistical analyses
 - Create “what if” capacity
 - Embed predictive analysis into processes



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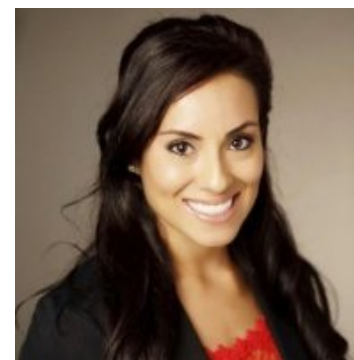
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Astin, A. W. (1993). *What matters in college? Four critical years revisited*. New York, NY: Jossey-Bass

Montgomery, D.C., Peck, E.A., Vining, G.G. (2006). *Introduction to linear regression analysis*. Hoboken, NJ: John Wiley & Sone, Inc.

Norris, D.M. & Baer, L.L. (2013) *Building organizational capacity for analytics*. Washington, DC: EDUCAUSE

Other Helpful Resources

UCLA: Statistical Consulting Group.

Stata Topics: Logistic (and Categorical) Regression.

http://www.ats.ucla.edu/stat/stata/topics/logistic_regression.htm/

Hosmer, D. W., & Lemeshow, S. (2005). Model-Building Strategies and Methods for Logistic Regression *Applied Logistic Regression* (pp. 91-142): John Wiley & Sons, Inc.

Hosmer, D. W., & Lemeshow, S. (2005). Assessing the Fit of the Model *Applied Logistic Regression* (pp. 143-202): John Wiley & Sons, Inc.

Thank You!

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