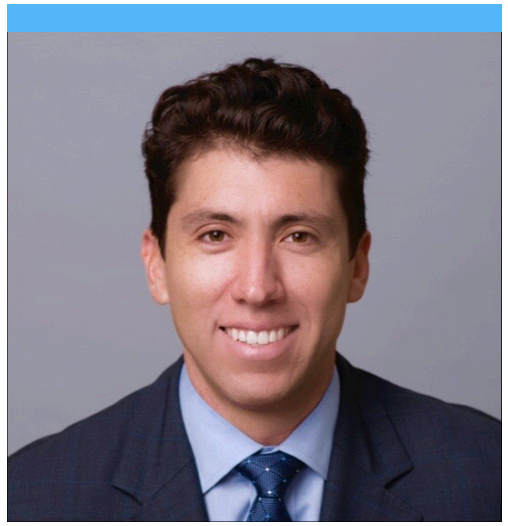
Master Class 3: Advanced Analytics

April 18th, 2023

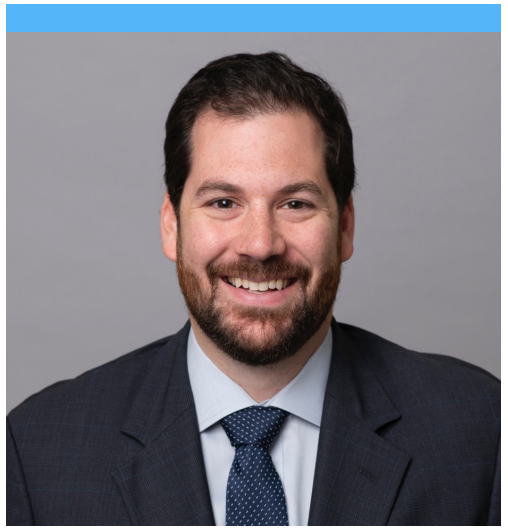
Today's Presenters



Zach Paz

Senior Partner

Chief Product Officer



Pete Starrett

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Agenda

1. Overview
2. Value Proposition and Pricing
3. Scholarship Optimization
4. Location and Geographic Marketing Optimization
5. Skills Trends and Gap Analysis
6. Predict Program Size
7. Predict Margins
8. What’s next?

Advanced Analytics in Higher Education

Budget and Planning

Predict Program Size
Predict Margins
Value Proposition and Pricing

Operations and Marketing

Location Optimization
Geographic Marketing Optimization

Academics

Skills Trends and Gap Analysis

Source: pinclipart.com

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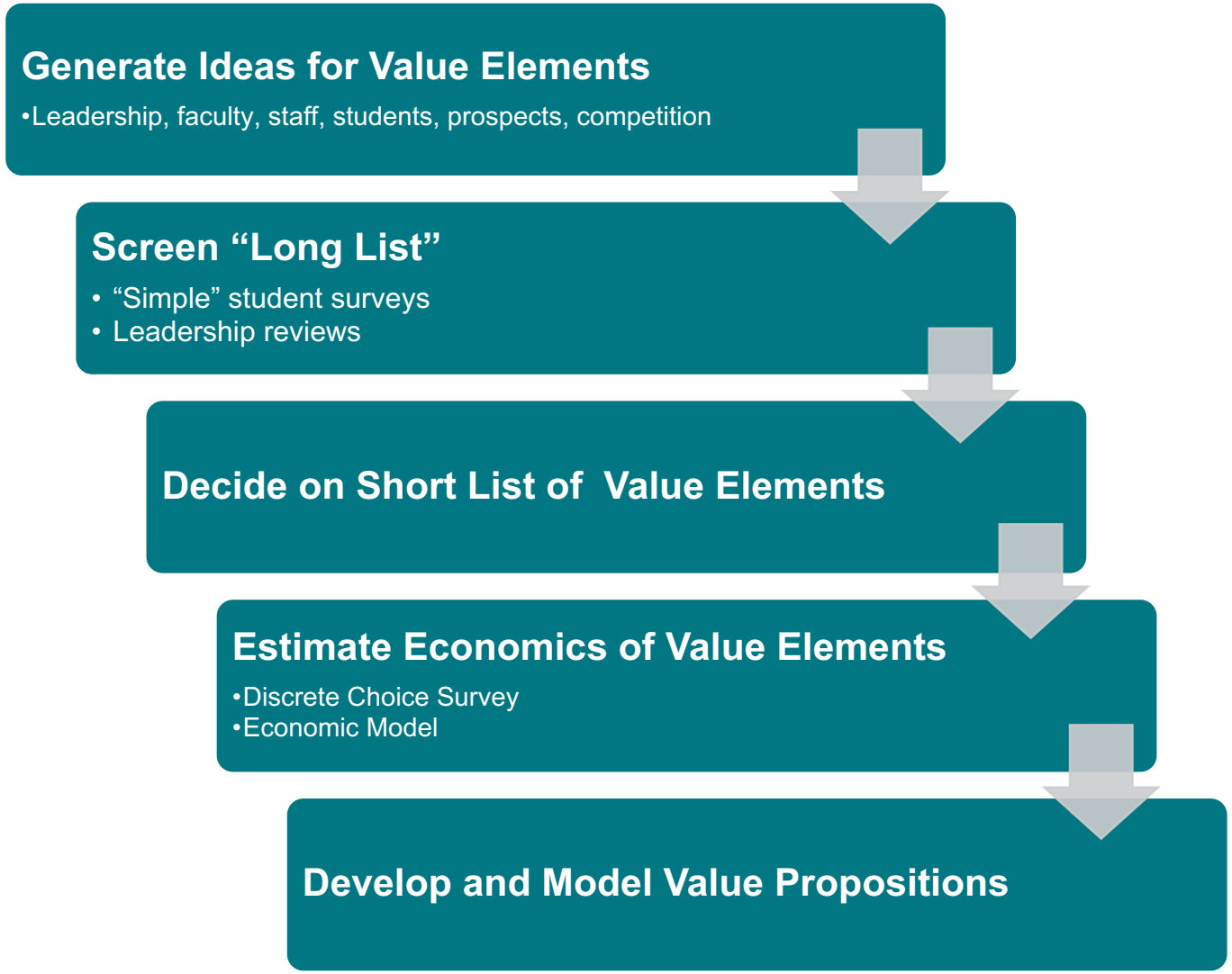
Value Proposition and Pricing

How will changes to our value proposition and pricing affect program demand and margin?

- What value elements are most important to students?
- How price-sensitive is the market?

Value Proposition and Pricing

- Competitor Benchmarking
- Student Preference Research
  - MaxDiff
  - TURF
  - Discrete Choice
- Decision Support System

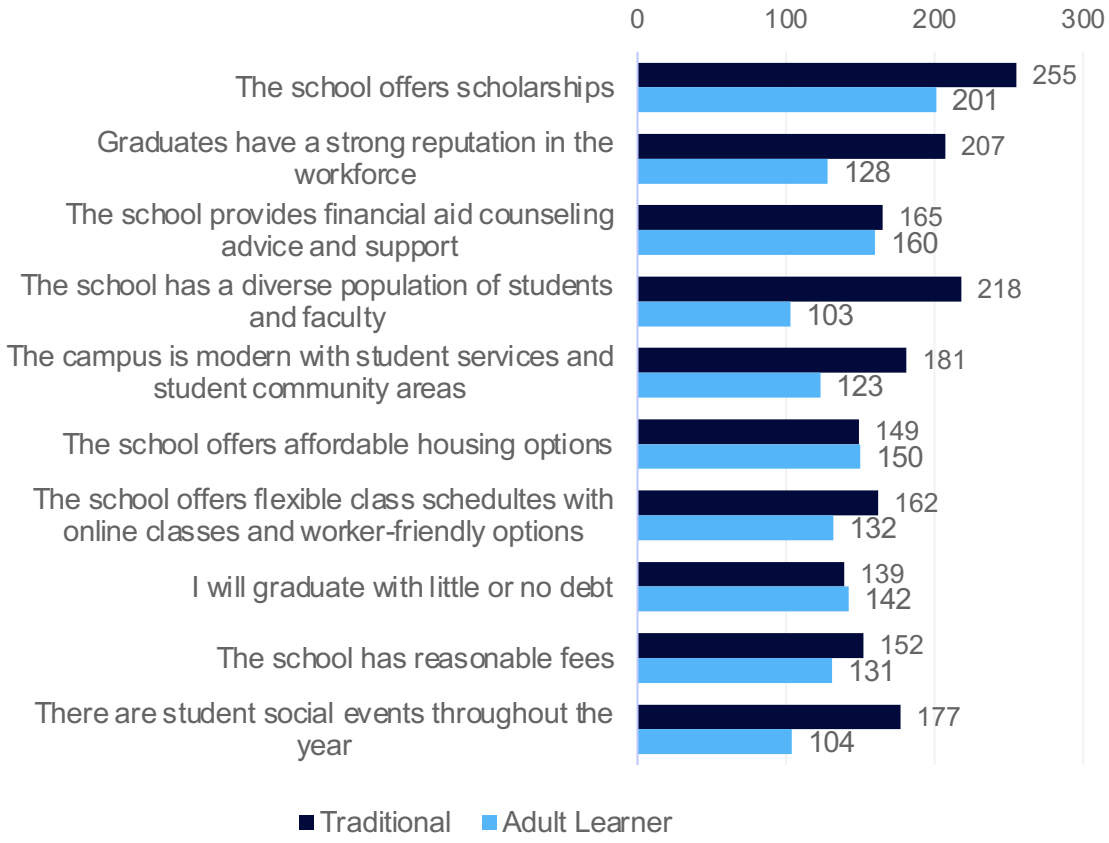


Value Proposition and Pricing: MaxDiff

- Please consider the potential benefits of an **online Master's** degree program. Thinking about your needs and preferences, please select the:
- **ONE** benefit that is **MOST APPEALING**, that would MOST motivate you to consider applying to a school, and the
- **ONE** benefit that is **LEAST APPEALING**, that would LEAST motivate you to consider applying to a school.

MOST Appealing Please Check ONE	Benefits of Master's Program	LEAST Appealing Please Check ONE
	One-to-one teaching	
	Physical residency required	✓
	Program length: 24 months	
✓	Weekly course starts	
	Small scholarship	

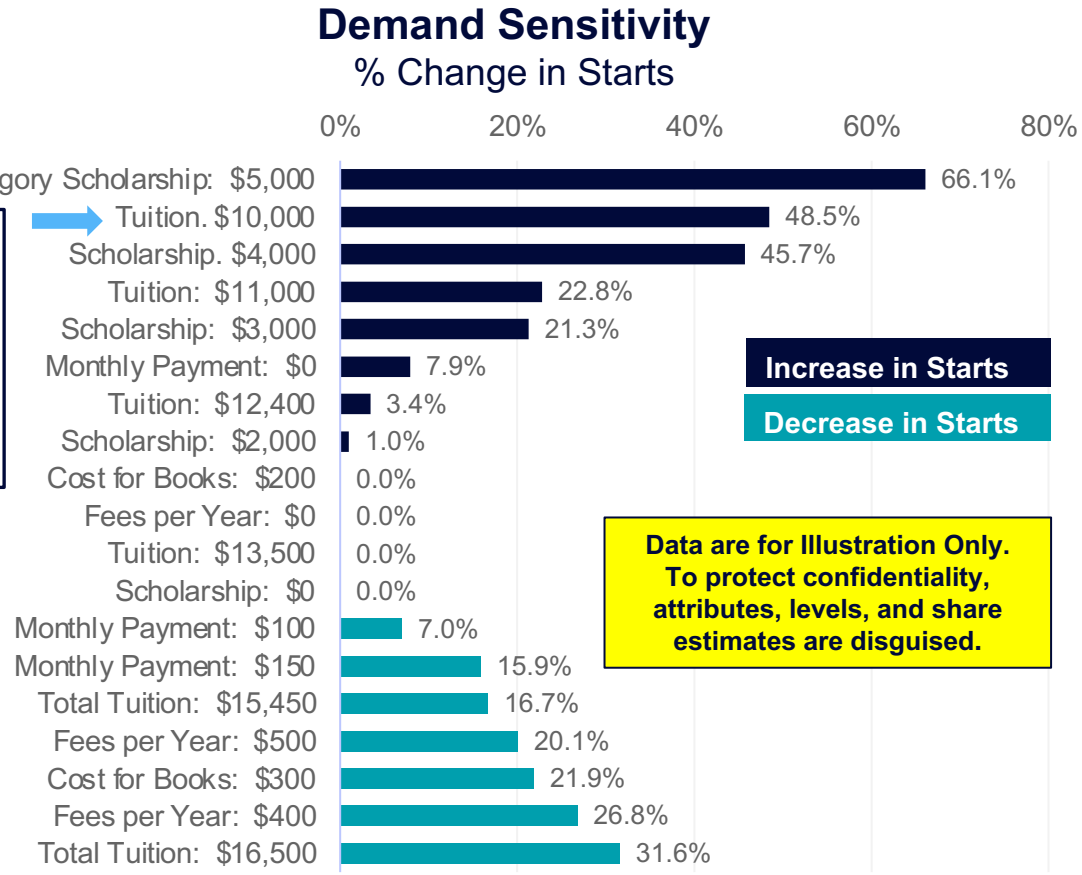
Most Appealing Features
Variations by Student Type
Index Score (Centered at 100)



Value Proposition and Pricing: Discrete Choice

Cost and Features	Institution A	Institution B
Total Tuition	$55,000	$62,000
Program Fees	$1,500	None
Scholarship	$2,000	$5,000
Industry Experienced Faculty	Yes	Yes
Accreditation	Accreditation A	Accreditation B
Program Modality	On-Ground and Hybrid Options	Online with Immersion
Employer Relationship	No	Sponsored Career Fair
Campus Facilities	Best in Class	Standard
Best for you →	o	✓
Would you really consider enrolling in the program selected?		Yes No

To be read: Lowering the tuition to $10,000 would lead to a 48.5% increase in starts.



Value Proposition and Pricing: Decisions Support System

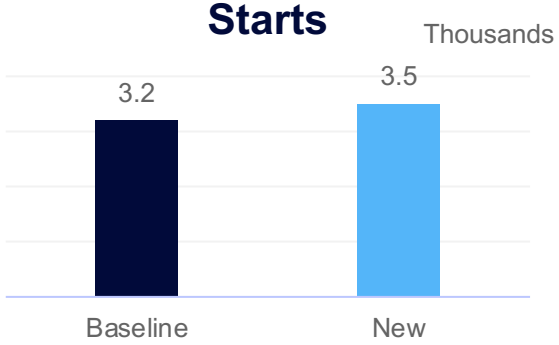
Data are for Illustration Only
To protect confidentiality, strategy details and and results are disguised.

Attributes	CCC	Brand B	Brand C	Brand D
Total Program Tuition	$11,200	$12,500	$16,300	$18,000
Fees	$300	$0	$500	$350
Books	$500	$0	$250	$250
Program Duration (Months)	18	12	18	18
Hours Per Week	8	12	10	9
Required Campus Visits Per week	2	0	3	3
Scholarship	2	0	3	3

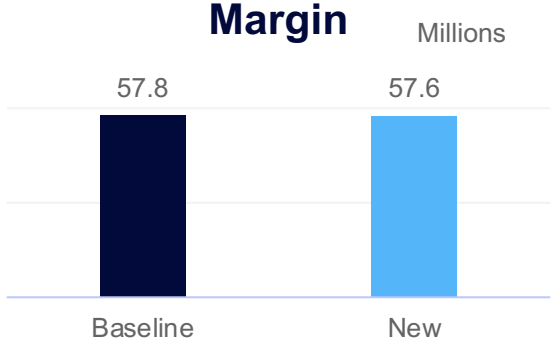
Change Selection

	CCC	Brand B	Brand C	Brand D
Est. Market Share	15%	25%	9%	8%
Est. Starts	990			
Est. Margin ($Millions)	$11.9			

Starts



Margin



Margins:
Competitive Response

Comments

- Decreasing the price one unit increases starts X%.
- However, margin decreases slightly.
- If competitors match this price, margins decrease.
- If competitors continue to raise price, this strategy will gain share.

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Scholarship Optimization

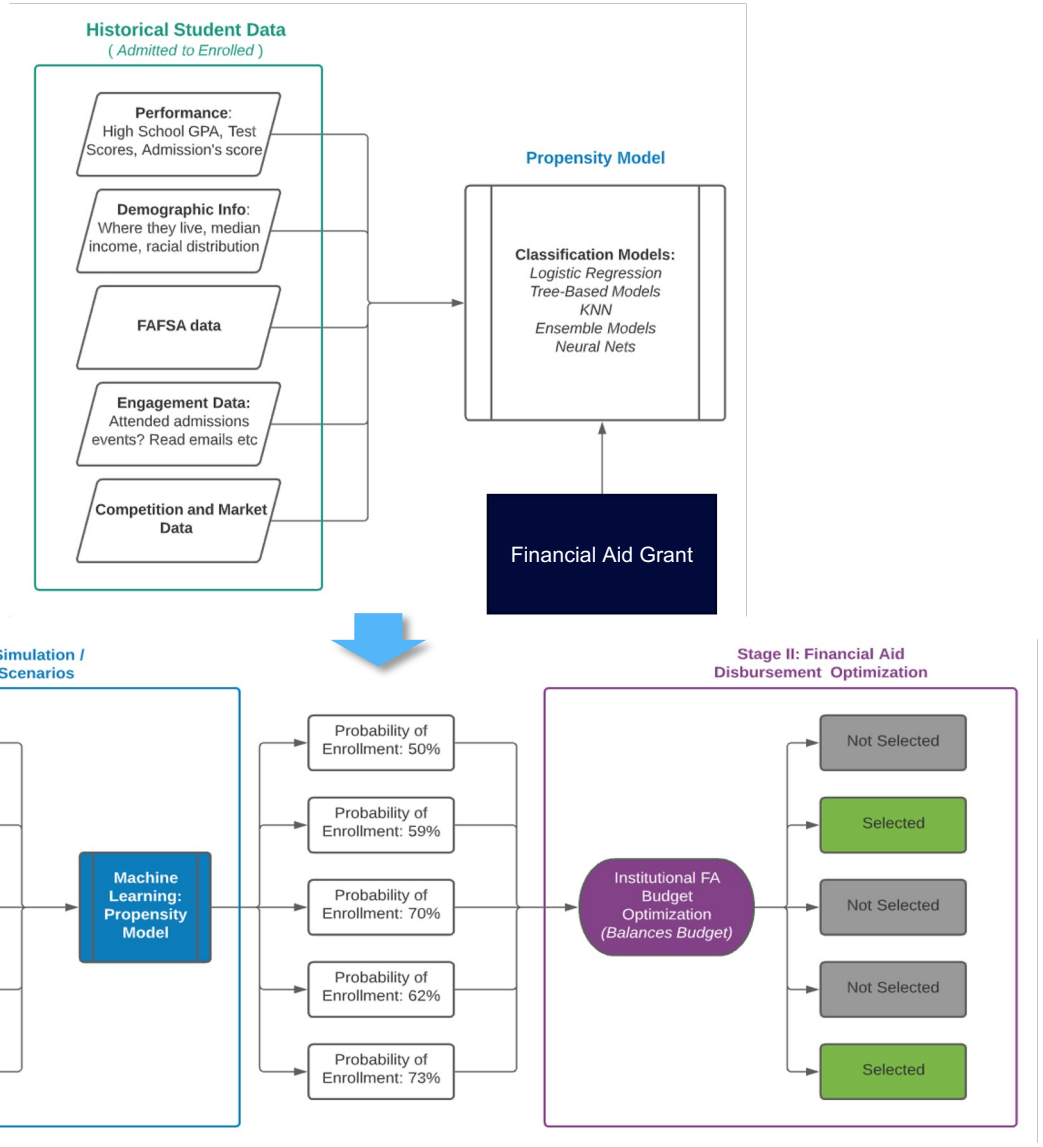
How can we optimize scholarships to increase enrollment?

- Financial aid and scholarship modeling consists of two stages:
  - **Machine Learning:** Propensity to enroll model
  - **Optimization**: Fixed budget disbursement

Scholarship Optimization

Use historical student data to model student's propensity to enroll and willingness to pay.

The results feed an optimization model that tests scenarios to identify the optimum policy for disbursing financial aid.



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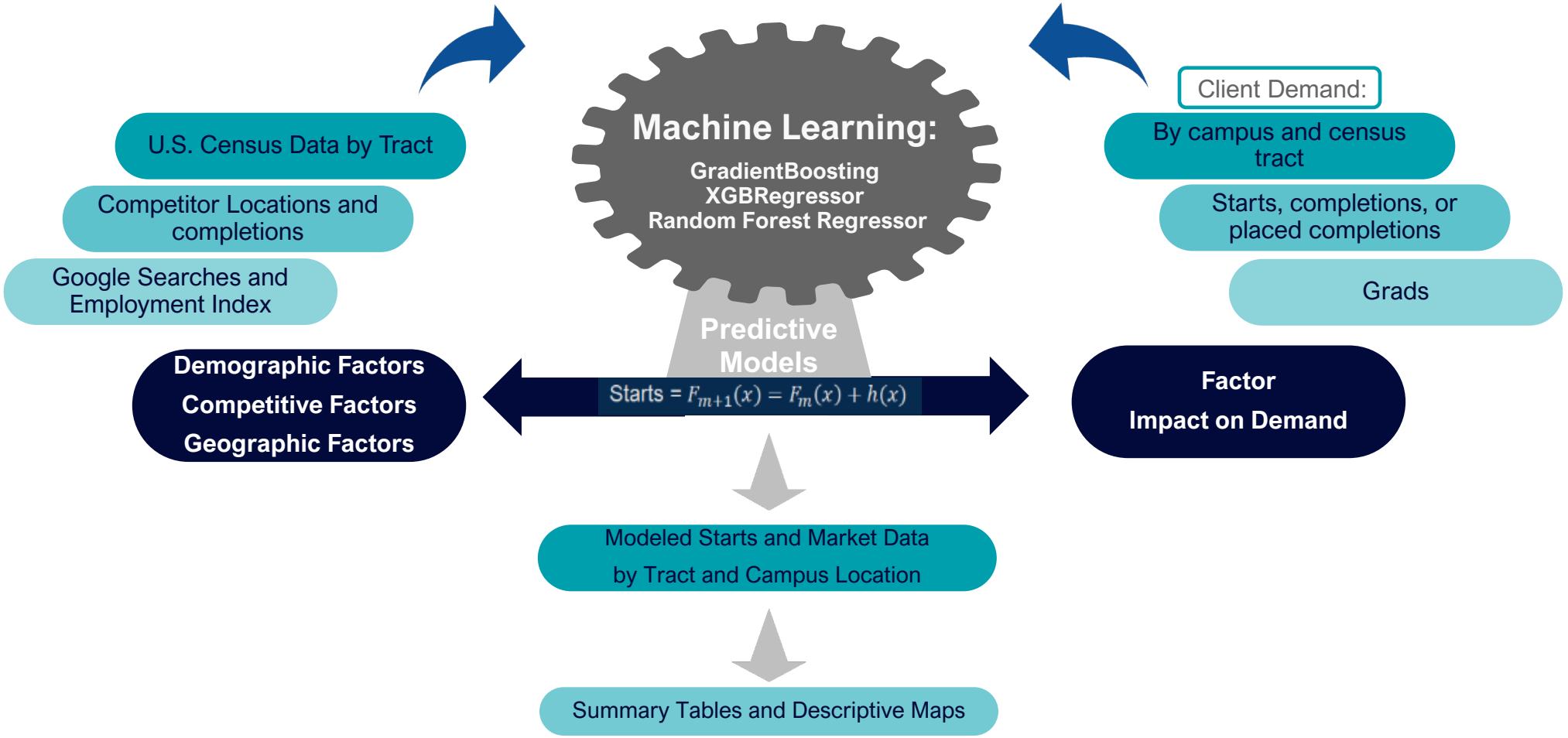
Location Selection

What is the best site for a new campus or regional center?

- Evaluate new locations with your current footprint in mind.
- Cannibalization may influence the overall performance of adding a new campus.
- Often, distance and drivetime are major factors for enrollment.

https://www.artnews.com/art-news/product-recommendations/best-map-pins-1234585155/

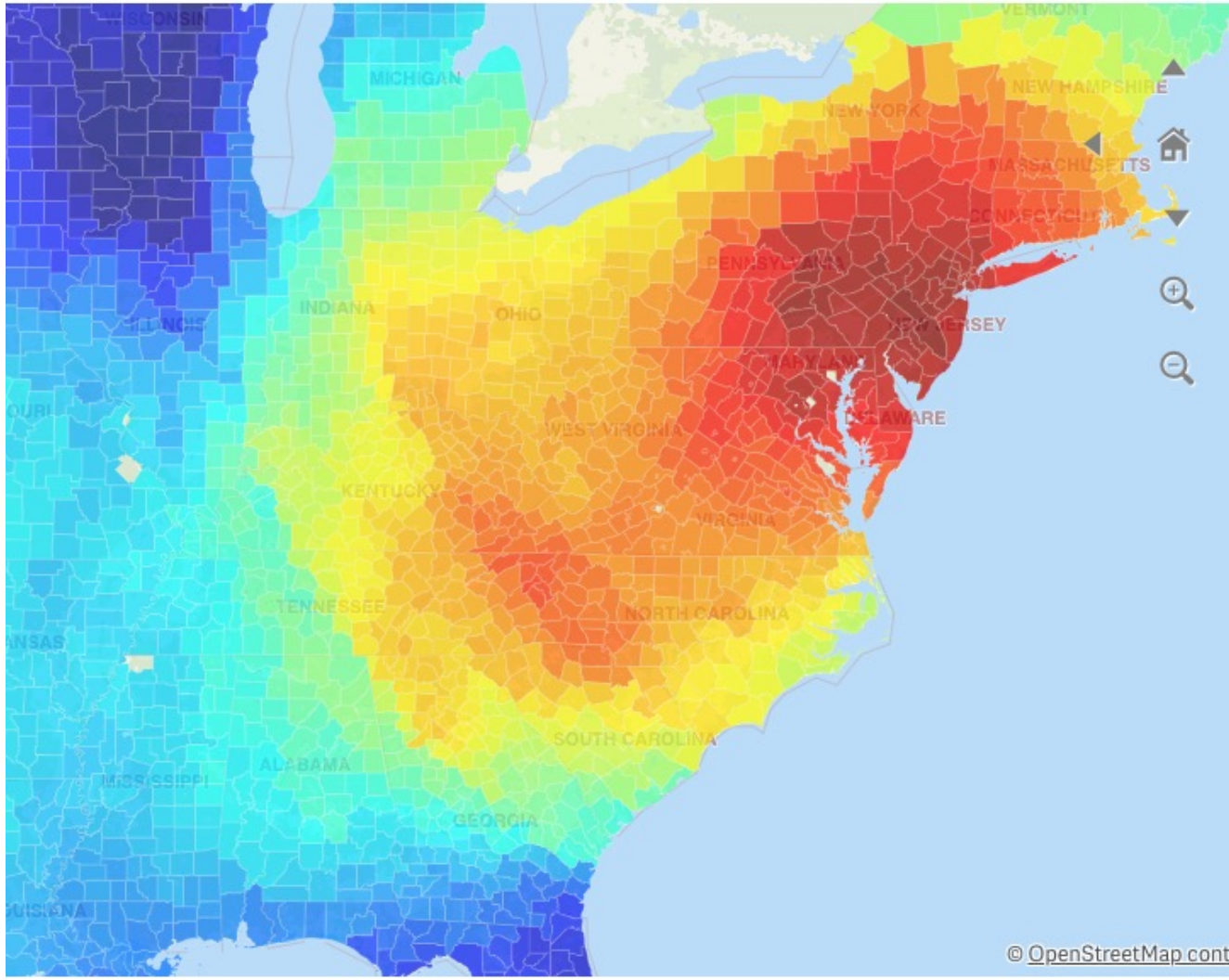
Location Selection Methodology



Location Selection Output

Mapping the results helps visualize the opportunity and tradeoffs.

- Things to consider:
  - Available sites
  - Competitor locations
  - Convenience
  - Crime



Marketing Optimization

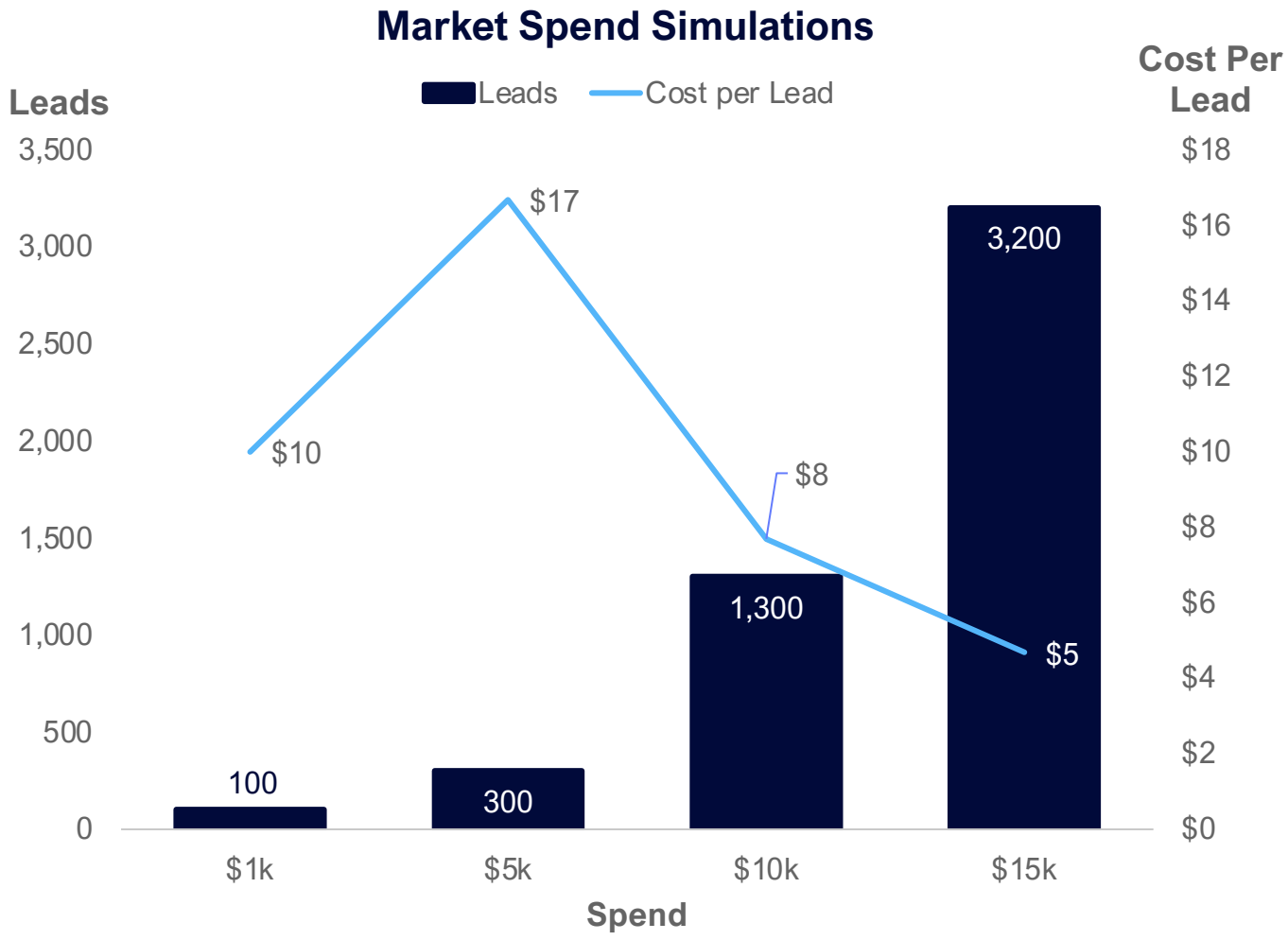
Where should I target program marketing and recruiting resources to maximize returns?

- Evaluate lead opportunity by market.
- Identify spend thresholds by market.
- Simulate spend and lead outcomes.

Marketing Optimization Output

Simulate spend by geography.

- Identify spend requirements and thresholds in each market.
- Spend more efficiently by reducing cost per lead.



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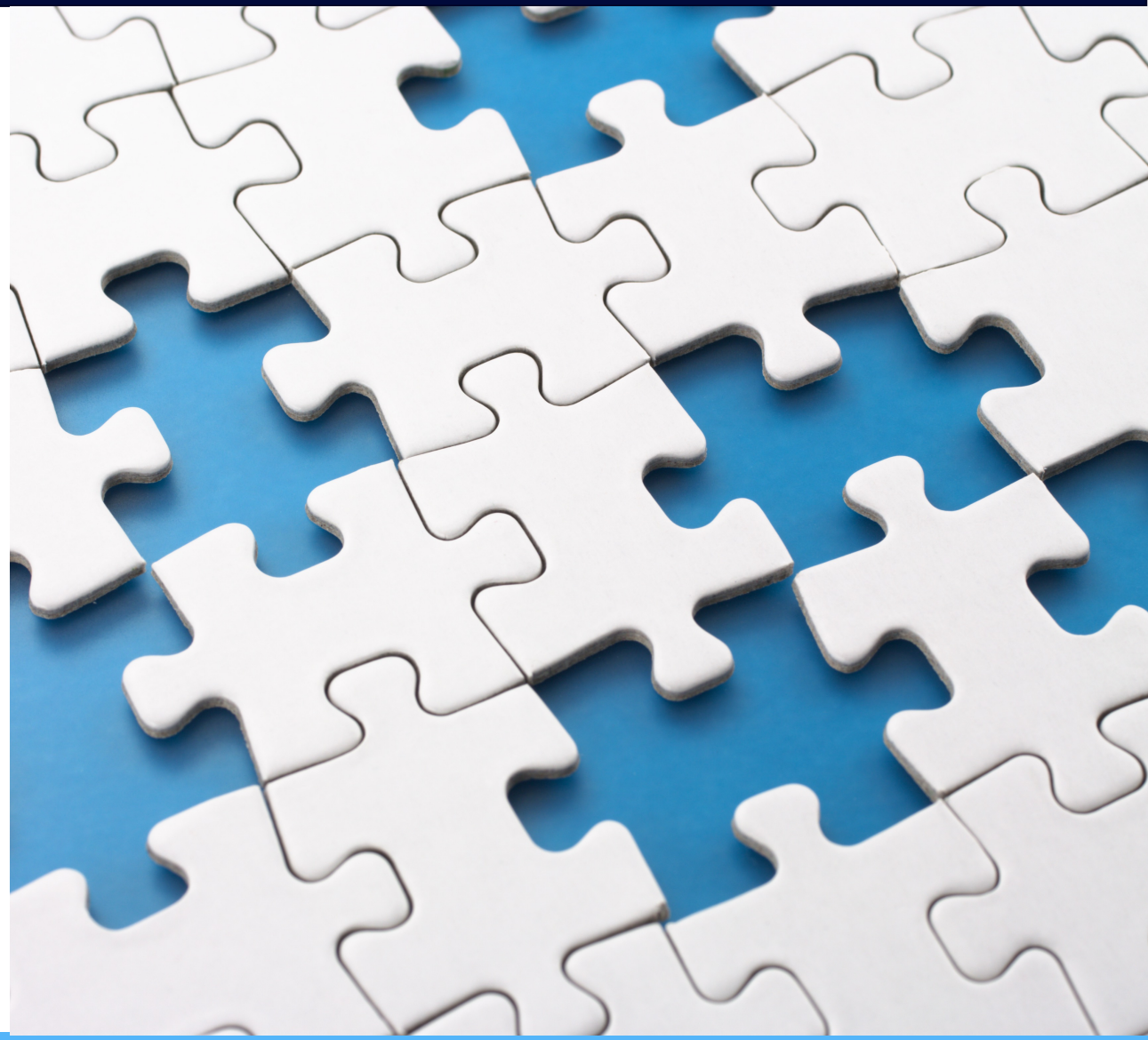
Skills Trends and Gap Analysis

What skills are needed in the workforce?

Does what we teach align with workforce needs?

What skills are we missing in our curriculum?

What new programs should we consider?



Skills Trends

Predicting what skills will be needed in the future is hard, but there is useful information available.

- Use the most current data and research to identify trends.
- Some data to consider include:
  - Job postings data
  - MOOC data
  - Funding sources
  - Publications

Skills Gap Analysis

Skills we teach

Programs

Courses

- Program websites
- Program brochures
- Course descriptions
- Syllabi

Natural Language Processing

Skills Gap Analysis

Skills employers need

Job Postings

- Employer websites
- Job boards

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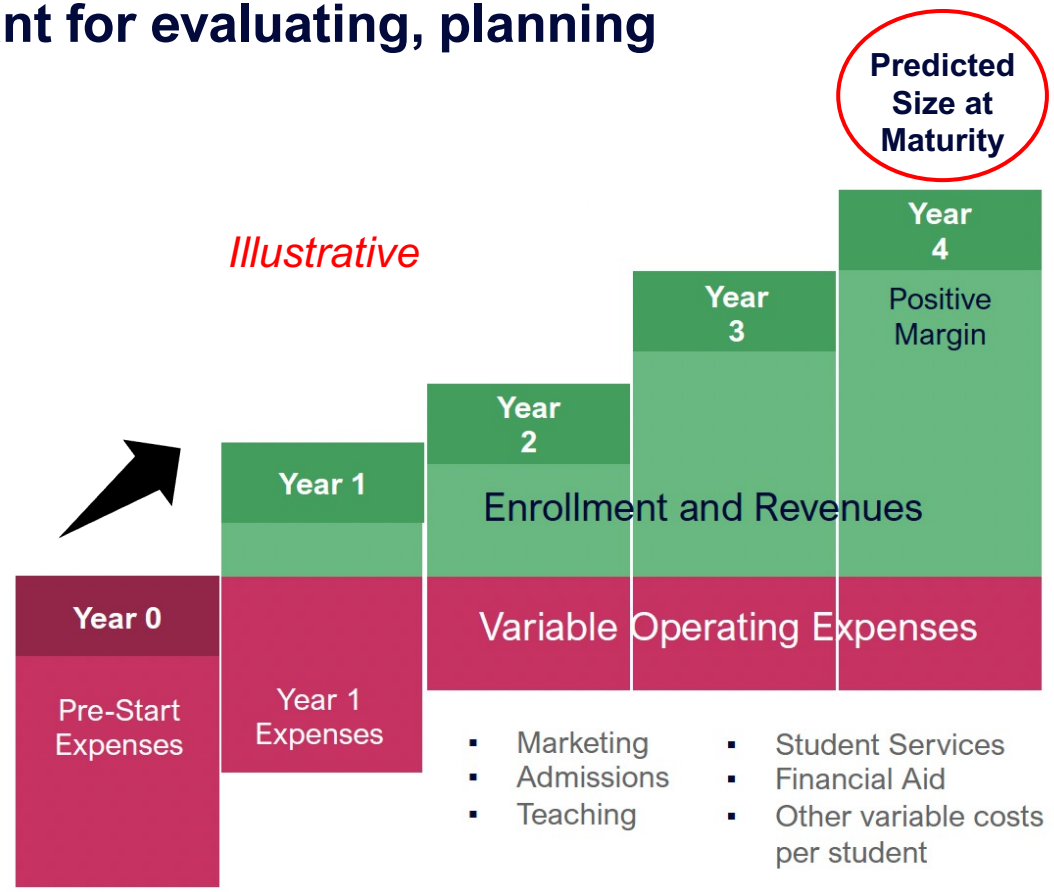
How big is a program likely to be at my school?

Predict Program Size

Understanding program size potential is important for evaluating, planning and budgeting.

- Evaluating
  - Ranking and prioritization
- Planning
  - Relying on previous experiences is risky.
- Budgeting
  - Faculty hiring, facilities, housing
  - Marketing investment
    - Outreach strategy
    - "Knowing when to stop"

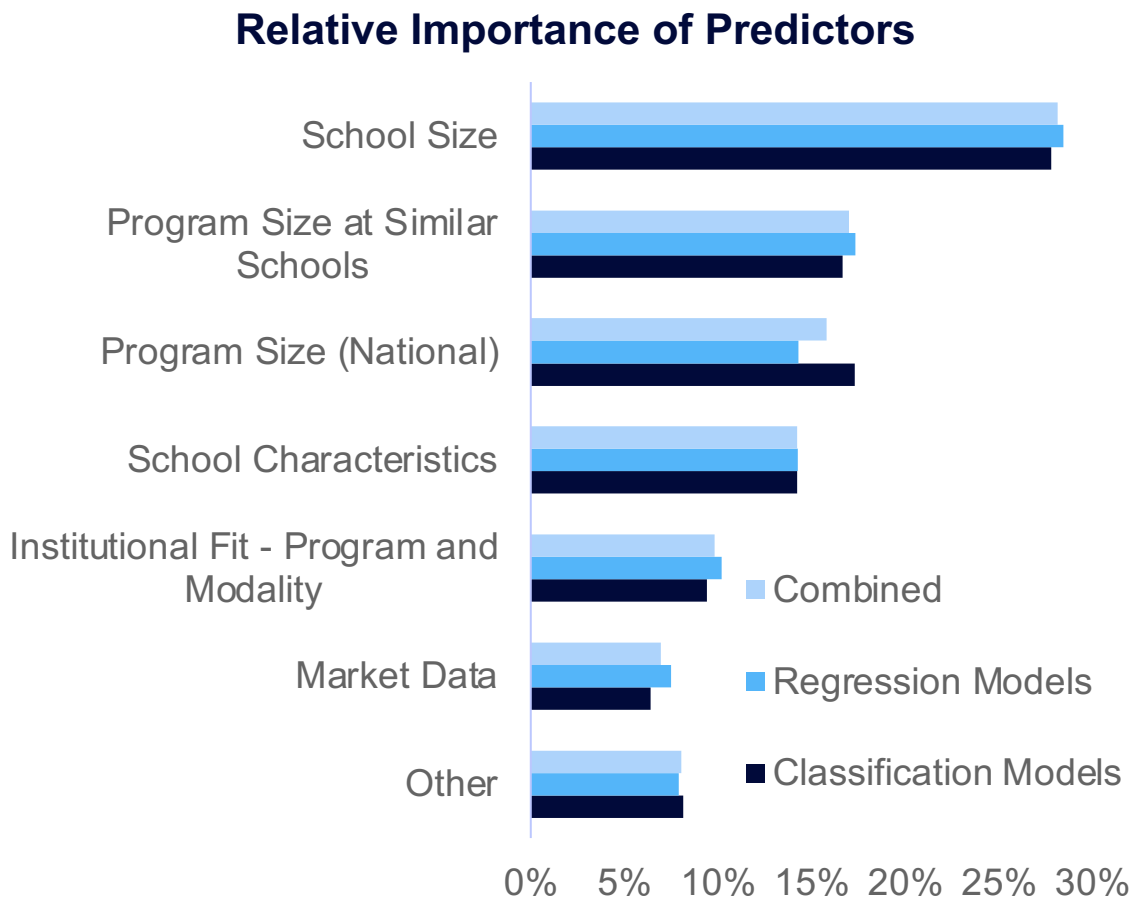


Methodology to Predict Program Size

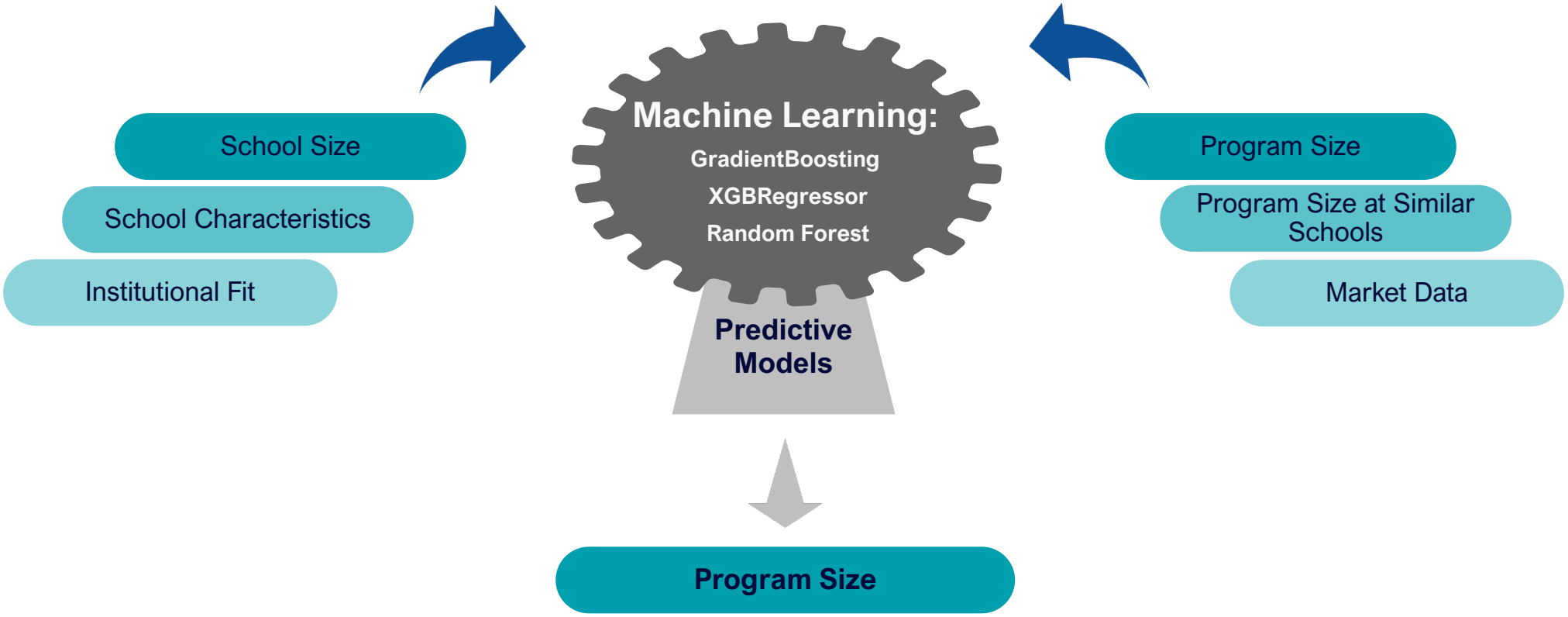
Input

- Completions – not enrollment
- Market data
- Filtered and curated data
- Engineered factors

Illustrative

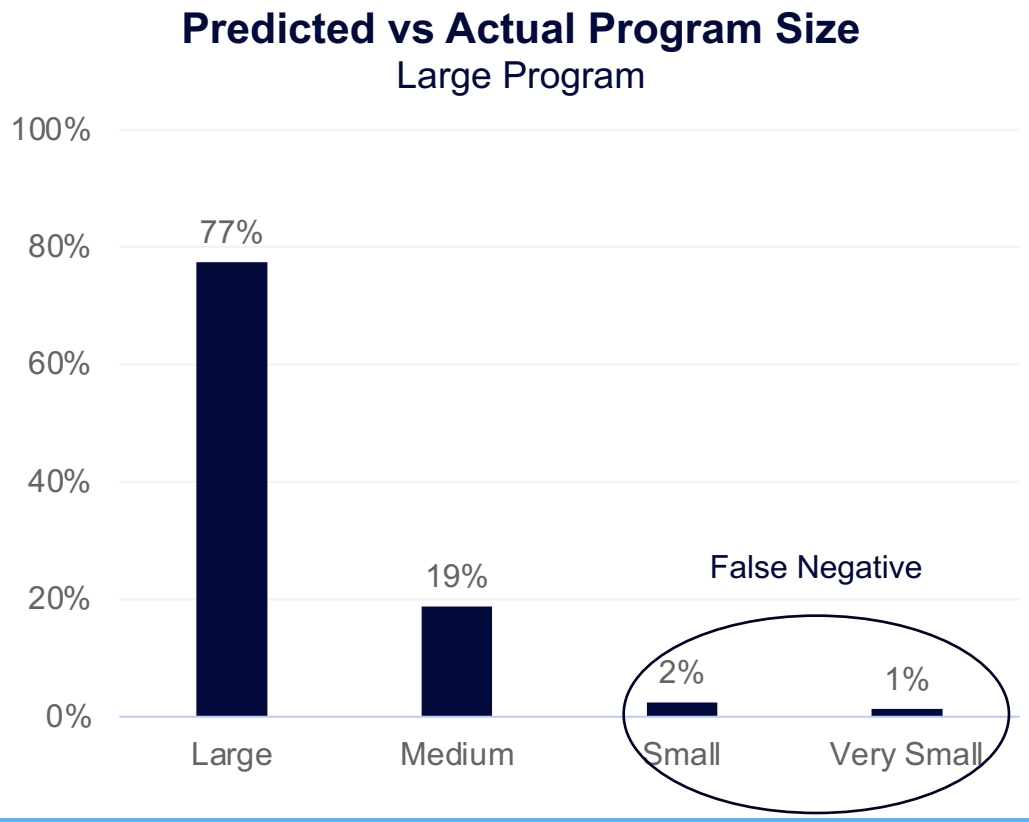


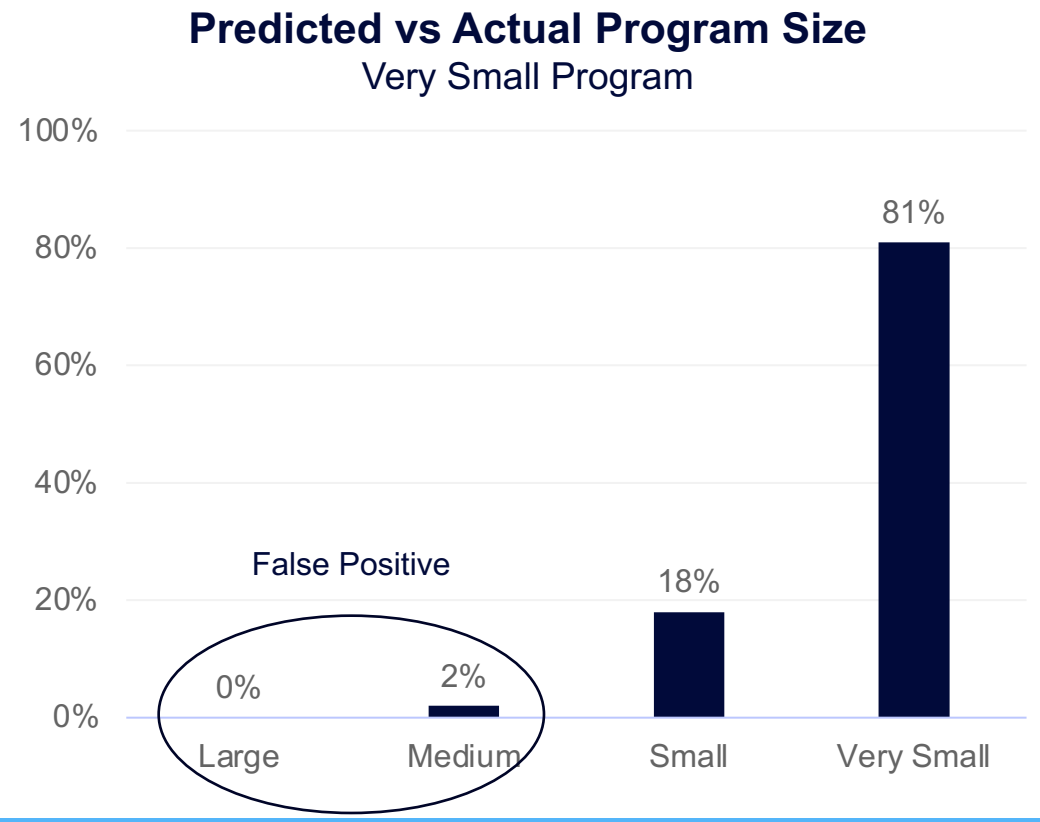
Methodology to Predict Program Size Model



Predict Program Size Output

Advanced analytics can predict program size with over 90% accuracy.

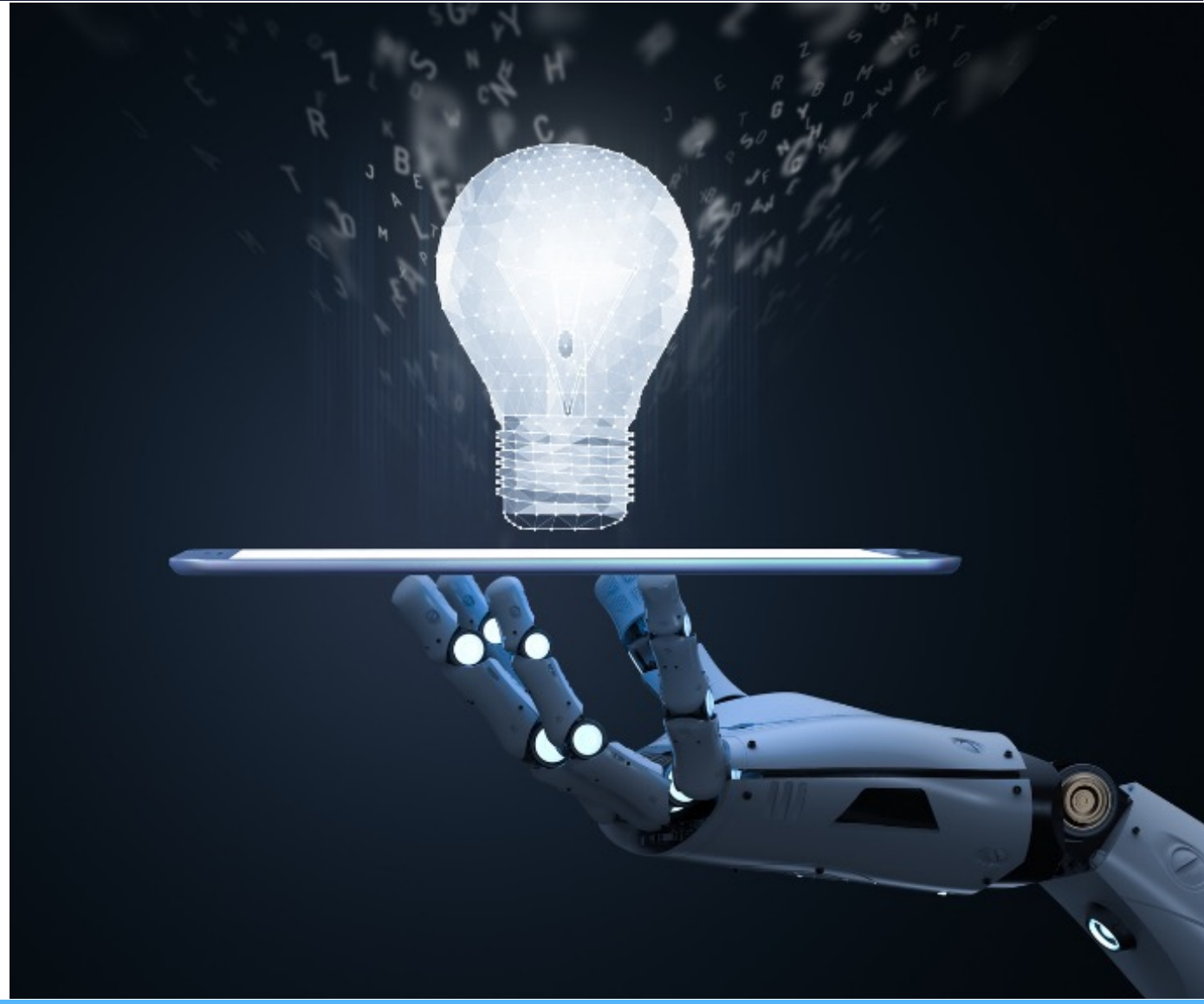




Predict Program Size

Keep this in mind:

- Enrollment multiplier
- Maturity
- Cannibalization
- Modeling limitations
- Size category versus number



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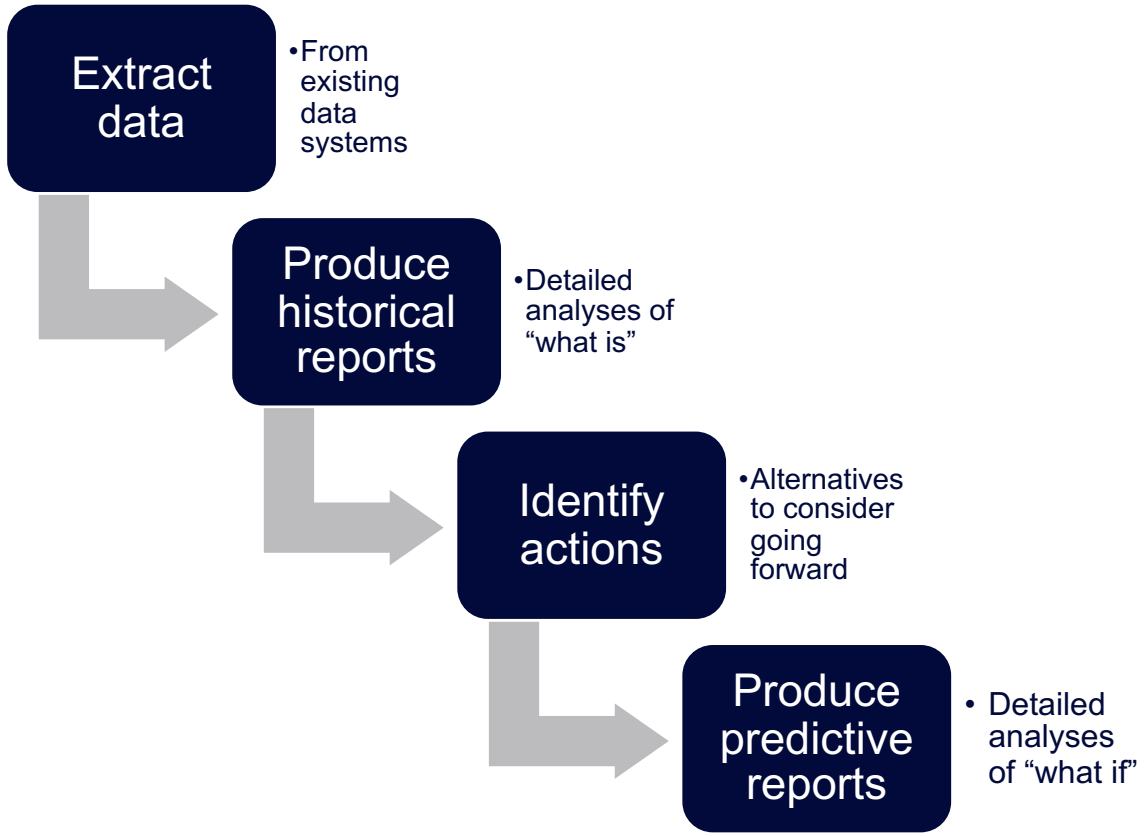
Predicting Margins

What-if analysis requires progression from a Historical AR Model to a Predictive AR Model.

- Test alternative portfolio actions for their effects on course enrollments, credit hour generation, and section counts…

… which allows the prediction of revenues, costs, and margins for programs and courses.



Predicting Margins

Enrollments by Program and Course

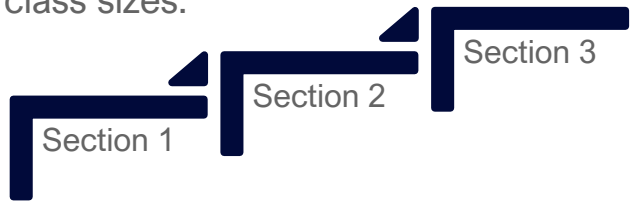
1	1	2	3	4	5	6	7	8	9	10	11	12	Course Enrollments
AC 101	0	0	0	0	0	1	0	0	0	2	24	0	27
AC 270	0	3	1	0	0	0	0	0	0	1	14	0	19
AN 111	2	2	6	32	2	4	1	1	0	10	9	2	71
AN 201	0	0	5	8	1							0	21
AN 361	0	1	3	1	0							0	11
AN 370	0	1	2	4	0	0	0	0	0	6	1	0	14
ART 105	0	0	17	1	0	4	0	0	0	6	0	0	28
ART 120	0	0	7	0	0	2	0	0	0	5	1	0	15
ART 155	0	0	1	18	1	1	0	0	0	3	0	0	24
ART 204	0	0	18	5	0	3	0	0	0	5	0	0	31
ART 207	1	0	4	0	0	0	40	0	1	0	0	0	46
ART 240	3	0	3	1	0	2	17	0	0	1	0	0	27
ART 280	5	1	3	1	0	1	42	3	0	0	0	0	56
ASL 105	6	0	1	3	0	0	10	0	0	0	0	0	20
BA 110	5											0	70
BA 165	5											0	27
BA 215	6											0	24
BA 248	6											0	22
BA 265	16	1	2	5	0	1	1	12	0	0	0	0	38
BA 270	7	5	0	8	0	0	3	1	0	0	0	0	24

Effects of changes…

Enrollment changes for each course must be converted to integer without changing the new total program enrollment.

Predicted Course Attributes

Section counts: based on user-specified minimum, ideal, and maximum class sizes.



Activity Variables

- Student enrollments
- Student credit hours (SCH)
- Number of primary sections
- Average class size

Financial variables

- Cost (depends on section count)
- Revenue (depends on SCH)
- Margin (revenue – cost)

Predicting Margins

How will changes in enrollment affect margins?

- Should you grow a small program?

Program	Scenario	Students Base
Mathematics	10	22

Change In Students

10

Change In Revenue

$211,874

Change In Cost

$438

Change In Contribution

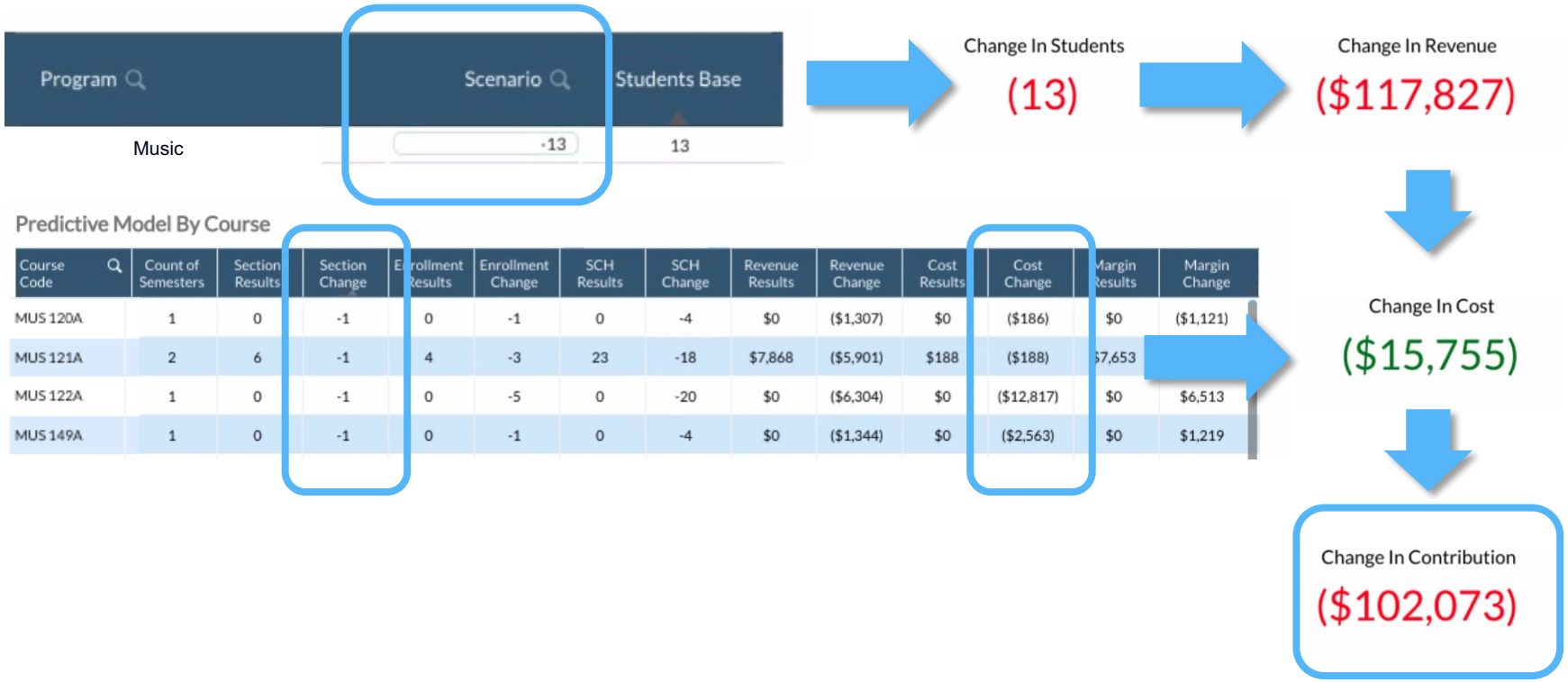
$211,435

Predictive Model By Course

Course Code	Count of Semesters	Section Results	Section Change	Enrollment Results	Enrollment Change	SCH Results	SCH Change	Revenue Results	Revenue Change	Cost Results	Cost Change
ANT 102S	1	2	1	3	1	12	4	$4,432	$1,477	$1,903	$952
ANT 103S	1	2	1	5	2	20	8	$7,036	$2,814	$2,784	$1,392
ANT 265S	1	2	1	2	1	8	4	$2,300	$1,150	$918	$459
ANT 270S	1	2	1	2	1	8	4	$2,150	$1,075	$965	$483

Predicting Margins

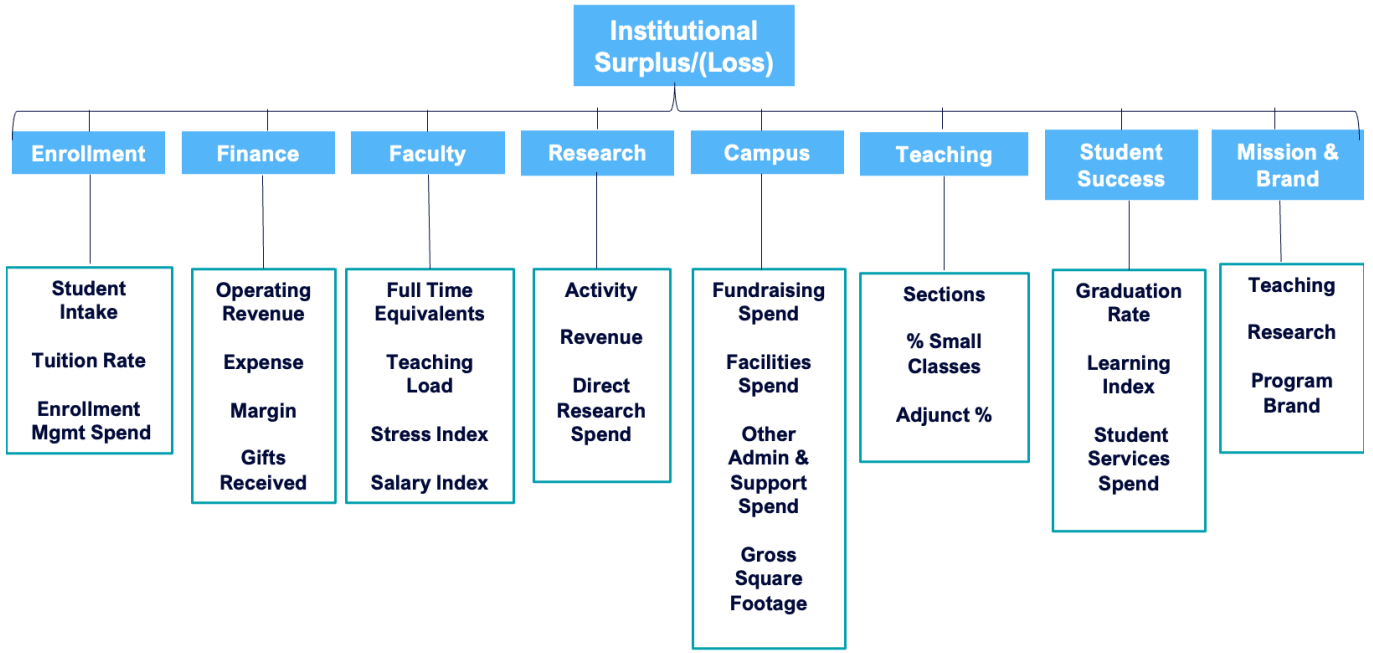
Cutting small programs does not always save money.



Planning Model

The model marries the two essential elements of strategic planning colleges and universities.

1. **Multiyear Financial Planning** to address environmental trends and pricing & salary policies, and to set budget expenditure limits.
2. **Detailed Analysis** of the tradeoffs needed when one is setting budgets for **academic and supporting activities** in the context of **program markets** and the College's overall **financial constraints**.



Planning Model: Inputs

The model includes 30+ input variables.

- Primary Planning Variables
  - Items under direct control of the college's decision makers
  - Examples: tuition and fee rates, faculty full time equivalents (FTE's), target adjunct faculty usage rate

- Expectations Variables
  - Items that may be influenced by decision makers, but not directly controlled by them
  - Examples: gift receipts, overall student completion (i.e., graduation) rate

- Forecast Variables
  - Items not at all controllable by decision makers
  - Examples: endowment total returns, overall student demand score

Planning Model: Outputs

Output Variables:

Outputs	Base Year 2022	Budget Year 2023		Transition Year 2024		Transition Year 2025		Transition Year 2026		Transition Year 2027	
Net Income / (Loss)	$21,087,260	-13.0%	$18,355,793	-15.8%	$15,462,981	0.0%	$15,467,788	4.7%	$16,195,734	15.0%	$18,622,179
Endowment Ending Balance	$85,490,000	-0.8%	$84,805,250	-0.9%	$84,017,788	-1.1%	$83,112,206	0.0%	$83,112,206	0.0%	$83,112,206
Average Section Size	16.7	8.5%	18.1	-2.3%	17.7	-6.4%	16.5	-0.1%	16.5	-0.1%	16.5
Faculty Teaching Load	4.9	-5.8%	4.6	2.7%	4.8	5.4%	5.0	-0.6%	5.0	1.6%	5.1

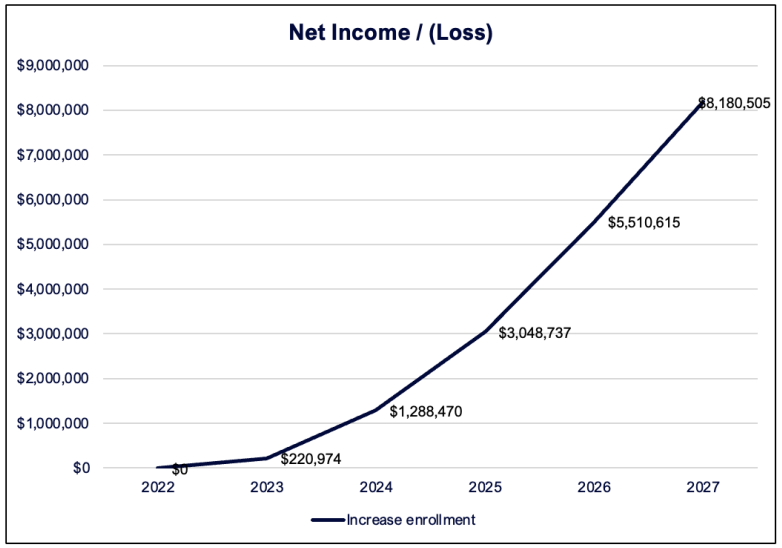
- Academic Activity, Economic, and Other Operating Variables
  - Examples: student FTE's, course enrollments, faculty and adjunct course sections
- Financial Variables
  - Examples: revenues, costs, and margins for programs, courses, and operation units
- Capital Account Variables
  - Examples: endowments, reserves, facilities

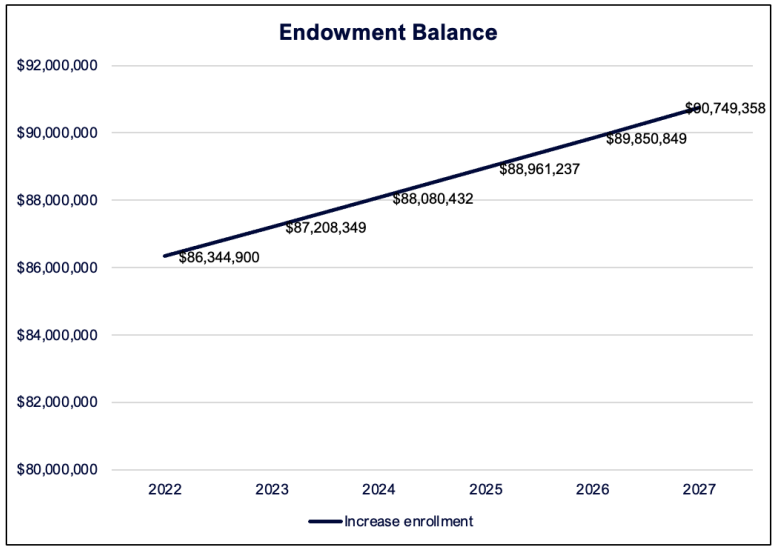
Sample Scenario

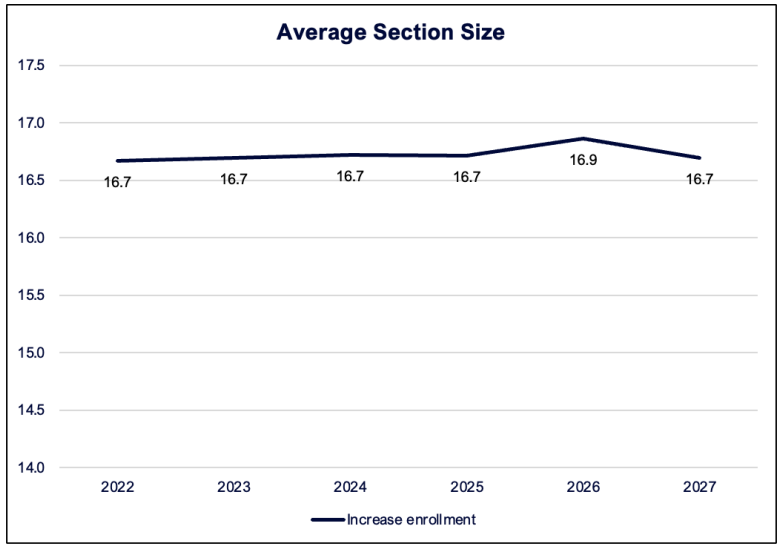
What happens to the financials if Contemporary U grows enrollment and costs increase?

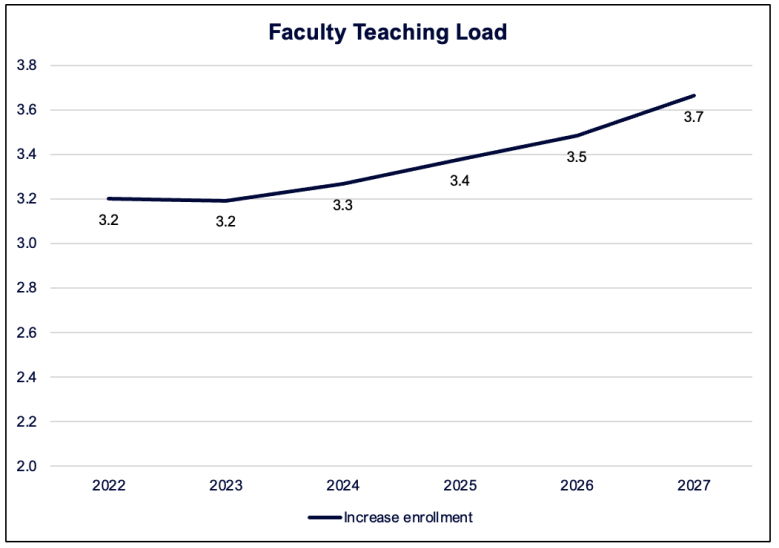
- 4% annual increase (22% overall over 5 years) in student enrollment (intake FTE)
- 3% annual increase in administrative spend

Illustrative







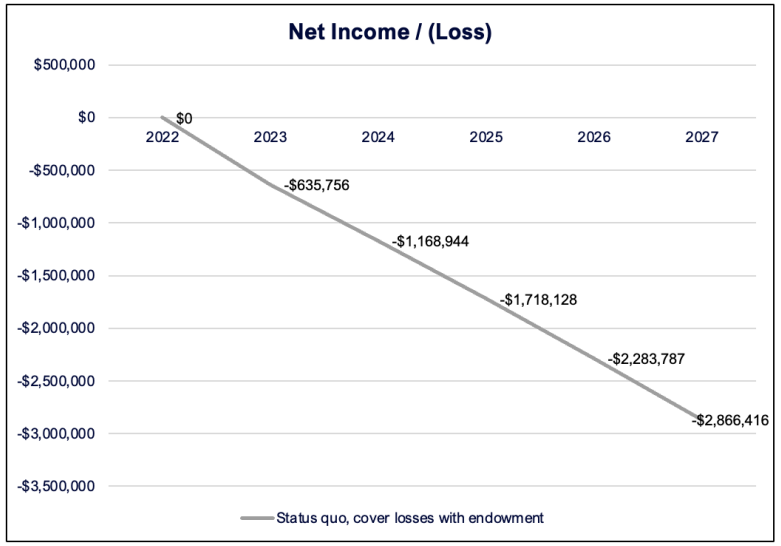


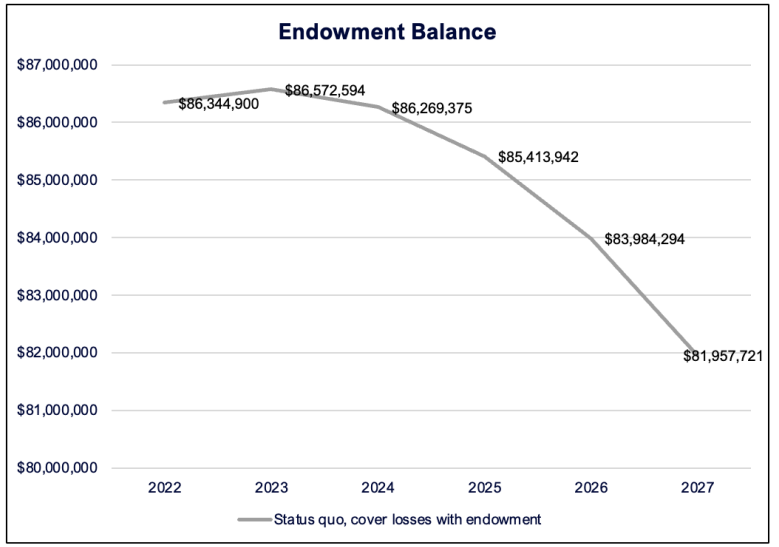
Sample Scenario

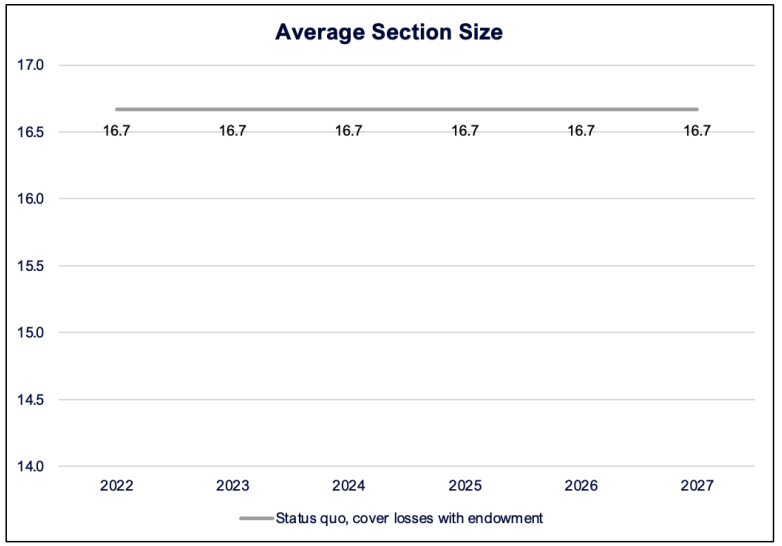
What happens to the financials if Contemporary U's costs continue to rise, and enrollment does not change?

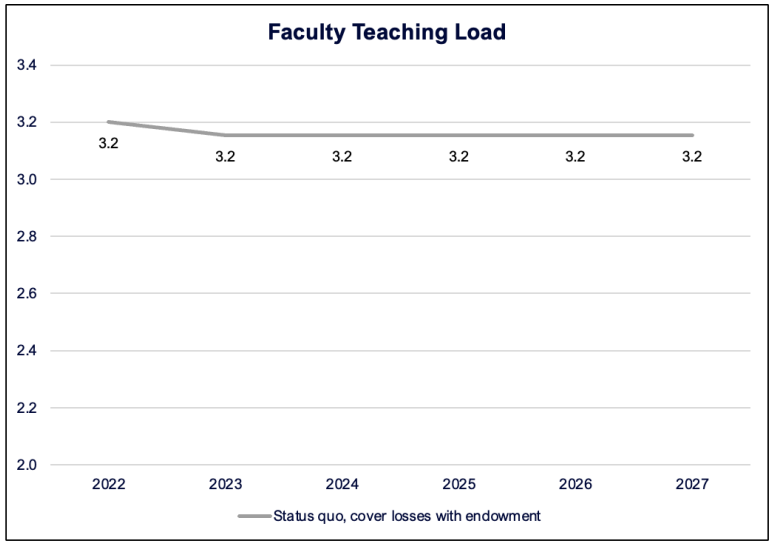
- No change in enrollment
- 3% annual increase in administrative spend
- Draw on endowment to cover losses

Illustrative





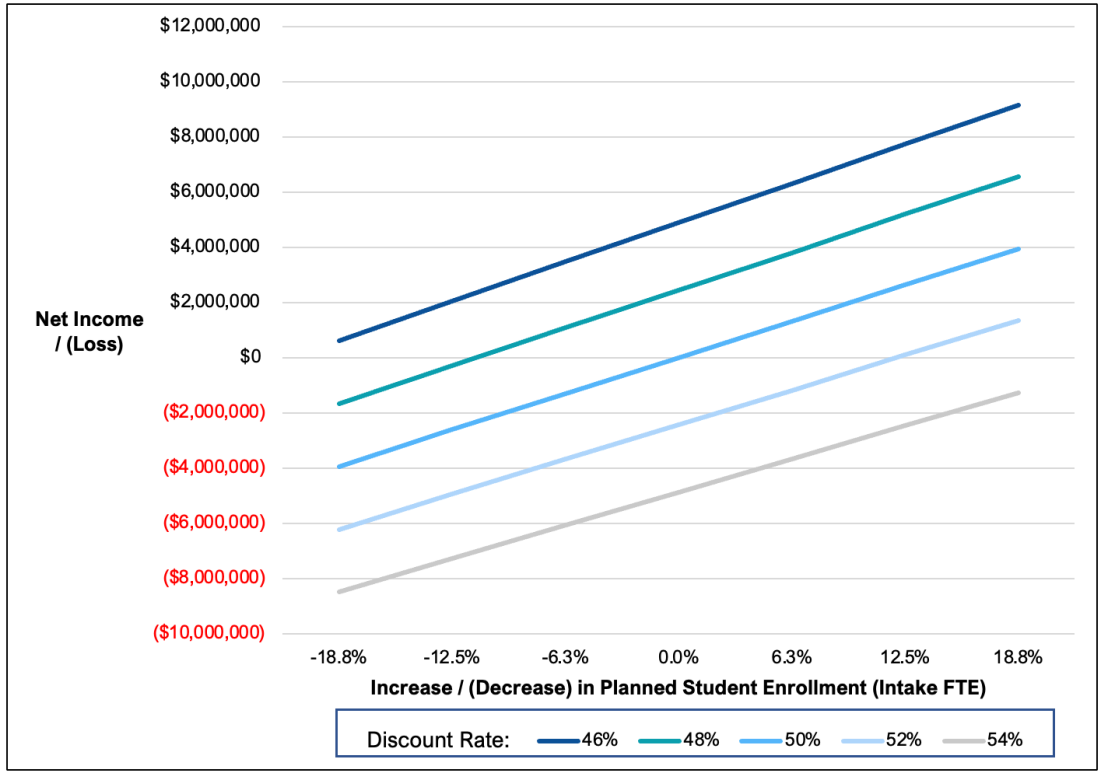




Sample Strategy

What happens to the financials if Contemporary U increases or decreases scholarships? How many students are needed to improve these outcomes?

- In this example, Contemporary U broke even in the most recent year (shown in the center of the matrix as a 50% discount rate and 0% enrollment change).
- If Contemporary U increases the discount rate from 50% to 52%, then it will need to increase enrollment by nearly 12.5% to cover the decrease in net revenue per student.



Illustrative

Net Income / (Loss)

Discount Rate	Increase / (Decrease) in Planned Student Enrollment (Intake FTE)						
	-18.8%	-12.5%	-6.3%	0.0%	6.3%	12.5%	18.8%
46%	$617,283	$2,055,907	$3,484,530	$4,890,154	$6,306,777	$7,742,401	$9,154,025
48%	($1,656,620)	($272,490)	$1,101,640	$2,452,770	$3,814,900	$5,196,030	$6,553,160
50%	($3,930,524)	($2,600,887)	($1,281,250)	$0	$1,323,023	$2,649,660	$3,952,296
52%	($6,204,427)	($4,929,284)	($3,664,141)	($2,421,998)	($1,168,854)	$103,289	$1,351,432
54%	($8,478,331)	($7,257,681)	($6,047,031)	($4,859,381)	($3,660,732)	($2,443,082)	($1,249,432)

Agenda

1. Overview
2. Value Proposition and Pricing
3. Scholarship Optimization
4. Location and Geographic Marketing Optimization
5. Skills Trends and Gap Analysis
6. Predict Program Size
7. Predict Margins
8. What’s next?

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Demand Trends Webcast: Bachelor's Programs	***Thursday*** **April 27th at 2 pm ET**

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