Welcome to Today’s Webinar

September 15, 2020

Integrated Planning to Build a Thriving Academic Program Portfolio

Part 2 of 3
Instructional Economics: Making Finance-Informed Academic Decisions
Presenters in This Series

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Gray Associates
Integrated Planning to Build a Thriving Academic Program Portfolio

1. **ACADEMIC PROGRAM PORTFOLIO PLANNING:**
   *PREPARING TO THRIVE*
   
   **August 27**
   **2:00 pm EST**

2. **INSTRUCTIONAL ECONOMICS:**
   *MAKING FINANCE-INFORMED ACADEMIC DECISIONS*
   
   **September 15**
   **2:00 pm EST**

3. **FROM ACADEMIC PROGRAM DECISIONS TO RESULTS:**
   *BUILDING AND MANAGING A ROBUST PROGRAM PORTFOLIO*
   
   **October 1**
   **2:00 pm EST**
Agenda

I. Introduction to Direct Instructional Economics

II. Academic Resourcing Models (ARMs)

III. Four Ways to Close a Financial Sustainability Gap
   1. Prune Existing Courses
   2. Resize the Program Portfolio
   3. Redesign Courses
   4. Launch New Programs

IV. Program Importance, Market Scoring, and Learning Quality
COVID-19 has created big Financial Gaps for most Colleges and Universities.

Financial GAP
- **Immediate**: nasty deficits and cash flow problems
- **Before long**: serious departures from financial sustainability

The processes and models we'll discuss today can help institutions quantify and close the gap.
The challenge is not just to survive financially, but to survive as the healthy institution you want to be.

**Typical First Responses to Budget Problems**
("Squeezes, speedups, and cuts will force out dollars.")

- Hiring freezes, early retirement offers, and furloughs; salary, benefits, and expense reductions
- Higher faculty and staff workloads; lower quality and service levels for students, faculty and other stakeholders

Alas, these actions just substitute one problem for another. They’re not sustainable solutions.
Changing your course and program portfolios can mitigate the squeeze and the speedup.
Some basic ideas to remember….

- **Programs** are market-facing activities. They are are the drivers of revenue.
  - Program portfolio decisions determine the institution’s academic direction.
  - **Prospective students** are concerned mainly with programs rather than courses.

- **Courses** deliver the academic outcomes promised by programs.
  - The demand for courses depends heavily on program enrollments (e.g., as influenced by admission targets).
  - The configuration and resourcing of courses, as well as curricula and teaching prowess, help determine the quality of education.
  - Courses drive cost, whereas programs drive revenue.

- **Resizing the program portfolio** can help restore financial sustainability.
  - Deciding which programs should grow, shrink, or stop requires the simultaneous consideration of ...
    - Mission-driven priorities, market factors, and instructional economics.
    - So does the creation of new Programs.
Three steps for restoring an institution’s Operational and Financial Sustainability.

A. Quantify the Financial Gap and apportion it between the Academic and Non-academic parts of the institution.

B. Analyze Non-Academic Operations and identify a Gap-Closing Strategy that minimizes the impact on students, faculty and the institution.

C. Analyze Academic Operations and identify a Gap-Closing Strategy that minimizes the impact on students, faculty, staff and the institution generally.

...and the Processes and Tools for implementing them.

- Program importance (mission) ratings
- Market scoring
- Learning quality
- Academic Resourcing Models (ARMs)
The Road to Sustainability

Three Steps for making the Academic Fundamentals sustainable

1. **Quantify** the Financial Gap and apportion it between the Academic and Non-academic parts of the institution.

2. **Analyze** Academic Operations and identify a Gap-Closing Strategy that minimizes the impact on students, faculty, staff and the institution generally.

3. **Analyze** Non-Academic Operations and identify a Gap-Closing Strategy that minimizes the impact on students, faculty and the institution.

...and the Processes and Tools for implementing them.

- Program importance (mission) ratings
- Market scoring
- Learning quality
- Academic Resourcing Models (ARMs)
We’ll start with **Academic Resourcing Models (ARMs)**, which provide the data needed for good decision making.

**Quantify** the Financial Gap and apportion it between the **Academic** and **Non-academic** parts of the institution.

**Analyze Academic Operations** and identify a Gap-Closing Strategy that minimizes the impact on students, faculty, staff and the institution generally.

**Analyze Non-Academic Operations** and identify a Gap-Closing Strategy that minimizes the impact on students, faculty and the institution.

Program importance (mission) ratings

Market scoring

Learning quality

Academic Resourcing Models (ARMs)
The models are rooted in "Direct Instructional Economics."

Academic Resourcing Models

- Direct Instructional Economics (e.g. enrollments, classes, unit costs, tuition)
- Course-Level Input
- Department-Level Input
- Direct Shared Costs (e.g. Academic Deans)
- Accounting System
- Indirect Support and Administrative Costs

The models are rooted in "Direct Instructional Economics."
Direct instructional economics models produce **Course-Level** data on revenues, cost and margin, which is easily rolled up to **Programs**.

**Illustrative: Direct Instructional Cost per Student Credit Hour**

- **Median course costs** $217 per SCH
- **1 in 5 courses costs at least** $531 per SCH – **2.5x the median**

Min: $-$

10%: $79

20%: $104

30%: $133

40%: $172

50%: $217

60%: $266

70%: $364

80%: $531

90%: Max

$5,497
Instructional economics are critical for virtually all academic resourcing decisions. (Hint: it's not because financial considerations should dominate decisions.)

- All programs should further the university’s mission directly and/or by making money.
- Making money feeds the cross-subsidy pool.
- Cross subsidies support what markets won’t – advancing the mission.

Contrary to the conventional wisdom in academe, close attention to margin enhances the realization of the mission.
## Academic Resourcing Models (ARMs)

Basic structure of the **Academic Resourcing Models (ARMs)** that reduce the direct instructional economics concepts to practice.

### Crosswalk between Program and Course Enrollments

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</table>

| Course Enrollments | 27 | 19 | 71 | 21 | 11 | 14 | 28 | 15 | 24 | 31 | 46 | 27 | 56 | 20 | 70 | 27 | 24 | 22 | 38 | 24 |

*Shared courses coupled with discrete sectioning produce interactions among programs that need to be considered.*

**Key Variables**

**Activity**
- Instructional mode
- Enrollments
- Credit hours
- Course section counts and average class sizes
- Instructor type

**Financial**
- Revenue
- Cost
- Margin

**Data**
- come from existing IT systems
Three Steps for making the Academic Fundamentals sustainable

1. Quantify the Financial Gap and apportion it between the Academic and Non-academic parts of the institution.

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...and the Processes and Tools for implementing them.

- Program importance (mission) ratings
- Market scoring
- Learning quality
- Academic Resourcing Models (ARMs)
Academic Resourcing Models

Episodic Decisions
- Gap Closing
- Gen Ed Design
- Redesign of Courses
- Redesign of Program Curriculum

Routine Decisions
- Faculty Hires
- Course Scheduling
The four options for changing course and program portfolios

1. Prune existing courses
2. Resize existing programs
3. Redesign existing courses
4. Create new programs

These actions will influence operations and financial results starting next year.

These actions won't produce results until at least the year after next.

Cost-cutting is important, but the big money lies in the Program Portfolio.
A Framework for Restructuring

The four options for changing course and program portfolios

1. Prune existing courses
2. Resize existing programs
3. Redesign existing courses
4. Create new programs

Change the Course Portfolio.
Change the Program Portfolio.

These alternatives influence mainly Cost.
These alternatives influence Revenue and Cost.

Cost-cutting is important, but the big money lies in the Program Portfolio.

Course and Program Portfolios are the main drivers of academic operations.

These actions will influence operations and financial results starting next year.
These actions won't produce results until at least the year after next.
Curricular sprawl can be a big problem.

Decades of course proliferation have produced tangled and inefficient course portfolios ("curricular sprawl").

Enrollment is no surrogate for margin or importance: don't just cut the small courses.

Some courses have excess capacity, others don't, so where the displaced students go matters greatly.
Curricular sprawl can be seen in class size distributions...

Courses by Level and Class Size

Note the very large number of 400-level courses (dark blue) with 10 students or less.
Efficiency gaps can be quantified. Less efficient curricula reflect more sprawl and are more likely to need pruning than more efficient ones.

The Efficiency Gap = IDEAL CLASS SIZE minus ACTUAL CLASS SIZE.

The Curricular Efficiency Index = 36%

Cost saving if 100% efficiency were possible = 58%

Courses that **exceed their ideal class sizes** (not shown) may put quality at risk and/or reflect unsustainable workloads.
Curricular Efficiency (CE) takes concerted effort and planning.

One question is whether the resulting student-faculty ratio will be consistent with peer institutions.
Benchmarking provides comparison to peers

**Cost/SCH by Course Level, Sample**

- 90th percentile: 7.74k
- Third quartile: 5.21k
- Median: 4.68k
- First quartile: 1.62k
- 10th percentile: 4.85k

**Cost/SCH by Course Level, Client Only**

Source: Gray Associates Academic Economics Benchmarking Consortium
Pruning: The Larger Picture

Benchmarking provides comparison to peers

Difference in Average Cost/SCH, Client vs. Sample

STEM PROGRAMS: ILLUSTRATIVE

Source: Gray Associates Academic Economics Benchmarking Consortium
Not All Small Courses Lose Money

Course size is not a great surrogate for contribution margin.

Course Contribution by Size (SCH)
This simple table helps prioritize course pruning candidates.

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<th>Margin</th>
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<tr>
<td>Medium</td>
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<tr>
<td>High</td>
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<table>
<thead>
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<th>Margin</th>
<th>Low or negative</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
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<td>Sustain as a cash cow?</td>
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<tr>
<td>Medium</td>
<td>Redesign? Share (Import)?</td>
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<tr>
<td>High</td>
<td>Grow? Share (Import)?</td>
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</table>

Importance to Mission: Low, Medium, High
Margin: Low or negative, Low, Medium, High

Actions:
- Sustain as a cash cow?
- Eliminate? Consolidate?
- Redesign? Share (Import)?
- Grow? Share (Import)?
- Share (Export)?
- Subsidize? Share (Import)?
Results

The goal: a functional and well-ordered curriculum.
A Framework for Restructuring

The four options for changing course and program portfolios

1. Prune existing courses
2. Resize existing programs
3. Redesign existing courses
4. Create new programs

These actions will influence operations and financial results starting next year.

These actions won't produce results until at least the year after next.

These alternatives influence mainly Cost.

These alternatives influence Revenue and Cost.

Change the Course Portfolio.

Change the Program Portfolio.

Course and Program Portfolios are the main drivers of academic operations.

Cost-cutting is important, but the big money lies in the Program Portfolio.
These five attributes define a university's Program Portfolio:

- **Mission**: Importance to the curriculum or discipline
- **Market**: What students want and will pay for, What employers and grad schools value
- **Margin**: Money the program makes or loses
- **Size / Overlap**: Enrollment and course sharing among programs
- **Academics**: How good is the program’s outcome quality?
Charts like this are helpful in workshops on program portfolio resizing.

Key:
- Bubble area is proportional to program Size (credit hours generated).
- Darker fill indicates greater Importance (mission contribution).
- Overlap and Academics are not shown.
### Program Review Workshop

E.g., a day-long retreat to judge importance, review the market and margin data, and decide which programs to **grow**, **shrink**, **sustain**, or **stop**.

“**We’ve made great progress! Now, how can we quantify the plan?**”

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#### Data Table & Workshop Results

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**Sum/Weighted averages**

- Students: 2,352
- Mission: 2.40
- Market: 50.28
- Margin: $303

* Blanks mean the workshop generated no preference.
Quantification Involves “What-ifs”

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

- **Extract data**
  - From existing data systems

- **Produce historical reports**
  - Detailed analyses of "what is"

- **Identify actions**
  - Alternatives to consider going forward

- **Produce predictive reports**
  - Detailed analyses of "what if"

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

Test alternative portfolio actions for their effects on course enrollments, credit hour generation, and section counts...
Course Overlaps

Most programs share courses due to curricular design, gen-ed, and student preferences. These are the fractions of student credit hours that overlap among programs in our test institution. (Many schools will exhibit considerably more overlap than shown here.)

As noted earlier, shared courses coupled with discrete sectioning produce interactions among programs that should be considered when evaluating portfolio change.
Steps in Program Resizing

The goal is to identify the **Margin** improvements needed for financial sustainability while minimizing the adverse effects on **Mission**, **Market**, and **Quality**.

Start by assembling data on the five program attributes discussed earlier.

1. **Select which program(s) to change.**
2. **Calculate the change in contribution margin.**
3. **Predict the change in section counts, and thus costs.**
4. **Predict the change in revenue.**
5. **Decide on the direction and amount of change.**

Continue circling: add new changes to the mix until the workshop is satisfied with the result.

**How much to:**
- Grow?
- Shrink?
- Sustain?
- Stop?
- (Consolidate or reconfigure?)

A Predictive Academic Resourcing Model will provide the needed activity, cost, and revenue estimates.

**Using judgment to determine the changes is fine. But finding the right combinations of enrollment moves is like finding a needle in a haystack.**
Finding the Right Resizing Mix

Directional indications will inform conversations about resizing.

### Key to Actions

#### Amount of Change
- Users preset the overall enrollment change (=0 here)
- Preset at 20 students per iteration (use smaller steps for modest short-term changes).
- Overall change is limited to +/- 20%, or minus the base enrollment if it's less than the step size.

#### Rules of Thumb
- **Average margin**: boost enrollment for highest-margin “Grow” and unlabeled programs; cut them for the smallest-margin “Shrink” and unlabeled programs.
- **Incremental margin**: as above except using incremental instead of average margins.

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<thead>
<tr>
<th>Program</th>
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<tr>
<td>1 Business</td>
<td>288</td>
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<td></td>
<td></td>
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<td>486</td>
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<td>60</td>
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<tr>
<td>4 Chemistry and Biochemistry</td>
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Cumulative margin change ($ thousands): $332 $255
### Finding the Right Resizing Mix

Directional indications will inform conversations about resizing.

#### Key to Actions

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**Cumulative margin change ($ thousands):**

<table>
<thead>
<tr>
<th>1 iter.</th>
<th>6 iter.</th>
</tr>
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<tbody>
<tr>
<td>$332</td>
<td>$563</td>
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<tr>
<td>$255</td>
<td>$1,338</td>
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</table>

#### Rules of Thumb

- **Average margin:** boost enrollment for highest-margin “Grow” and unlabeled programs; cut them for the smallest-margin “Shrink” and unlabeled programs.
- **Incremental margin:** as above except using incremental instead of average margins.

#### Optimizer

- **1-iter:** first iteration from our new LP procedure now in development.
- **6-iter:** six LP iterations.
- **Weights:** 40% Mission; 10% Market; 50% Margin.

---

Gray Proprietary
Results for the Alternative Actions

Graphs from the Optimizer with the Rules of Thumb superimposed.

**Tabular Results**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Base Values</th>
<th>Rules of Thumb</th>
<th>Optimizer 1 iter.</th>
<th>Optimizer 6 iter.</th>
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</thead>
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<td>Avg. M 2.42</td>
<td>2.46</td>
<td>2.50</td>
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<tr>
<td></td>
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<td>Incr. M 2.43</td>
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<tr>
<td>Weighted avg. Market</td>
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<td>Avg. M 51.1</td>
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<tr>
<td></td>
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<td>$20,198</td>
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</tbody>
</table>
A Framework for Restructuring

The four options for changing course and program portfolios (All depend heavily on Academic Resourcing Models.)

1. Prune existing courses
2. Resize existing programs
3. Redesign existing courses
4. Create new programs

These actions will influence operations and financial results starting next year.

These actions won't produce results until at least the year after next.

Course and Program Portfolios are the main drivers of academic operations.

Cost-cutting is important, but the big money lies in the Program Portfolio.

These alternatives influence mainly Cost.
These alternatives influence Revenue and Cost.

Gray Proprietary
Sources of ideas for new course designs
(The instructional economic data will help identify candidate courses.)

- Faculty lead the course redesign projects, ideally (now) with the aid of professional staff.
- They will obtain a surprising amount of insight by looking beyond their immediate experience.
- Most redesign projects reduce cost, and also produce better learning.
Hybrid configurations can improve learning and reduce cost.

As an example, consider sharing courses with other institutions.

Source: Massy, *Honoring the Trust*, Figure 5.3
The four options for changing course and program portfolios (All depend heavily on Academic Resourcing Models.)

1. Prune existing courses
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Course and Program Portfolios are the main drivers of academic operations.

These actions won't produce results until at least the year after next.

These alternatives influence Revenue and Cost.

Cost-cutting is important, but the big money lies in the Program Portfolio.
#4: Create New Programs

1. Examine institutional priorities and competencies, plus market data, to identify a shortlist of new program possibilities.

2. Develop a preliminary curriculum plan to identify the courses the new program’s students would likely take.

3. Use the Predictive Academic Resourcing Model to estimate the program's revenues, costs, and margins, taking course overlap and excess capacity into account.

4. Decide which program(s) to offer; refine the curriculum and marketing plan, recheck the economics, and prepare an implementation plan.
Three Steps for making the Academic Fundamentals sustainable

Quantify the Financial Gap and apportion it between the Academic and Non-academic parts of the institution.

Analyze Academic Operations and identify a Gap-Closing Strategy that minimizes the impact on students, faculty, staff and the institution generally.

Analyze Non-Academic Operations and identify a Gap-Closing Strategy that minimizes the impact on students, faculty and the institution.

...and the Processes and Tools for implementing them.

Program importance (mission) ratings
Market scoring
Learning quality
Academic Resourcing Models (ARMs)
### Example: A Simplified Importance Rating Scheme

<table>
<thead>
<tr>
<th>Program</th>
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</table>

- Identify the 3 best and 3 worst items in the list of programs; assign them to the High and Low categories.
- Continue with the remaining items until none are judged as especially high or low.
- Assign the remaining items to the Medium category. (The categories need not end up being of equal size.)
Teaching and Learning Quality: the Elephant in the Room

There are few good learning metrics.

There's a real danger that money issues will drive down quality.

But we now have good economic models.

So, how can we give quality its due?

We need concepts and data to push back against quality erosion.
Integrated Planning to Build a Thriving Academic Program Portfolio

1. ACADEMIC PROGRAM PORTFOLIO PLANNING: PREPARING TO THRIVE
   - August 27
   - 2:00 pm EST

2. INSTRUCTIONAL ECONOMICS: MAKING FINANCE-INFORMED ACADEMIC DECISIONS
   - September 15
   - 2:00 pm EST

3. FROM ACADEMIC PROGRAM DECISIONS TO RESULTS: BUILDING AND MANAGING A ROBUST PROGRAM PORTFOLIO
   - October 1
   - 2:00 pm EST
Upcoming Events

Integrated Planning to Build a Thriving Academic Program Portfolio

October 1 | Part 3 of 3
From Academic Program Decisions to Results: Building and Managing a Robust Program Portfolio

September 17 | Webinar
Out of the Fire and Into the Future: Insights on Essential Planning Strategies Post COVID