DARTMOUTH

Out of the Morgue and onto the Operating Table:

Analytics for Strategic Challenges

HEIR Conference, September 2018

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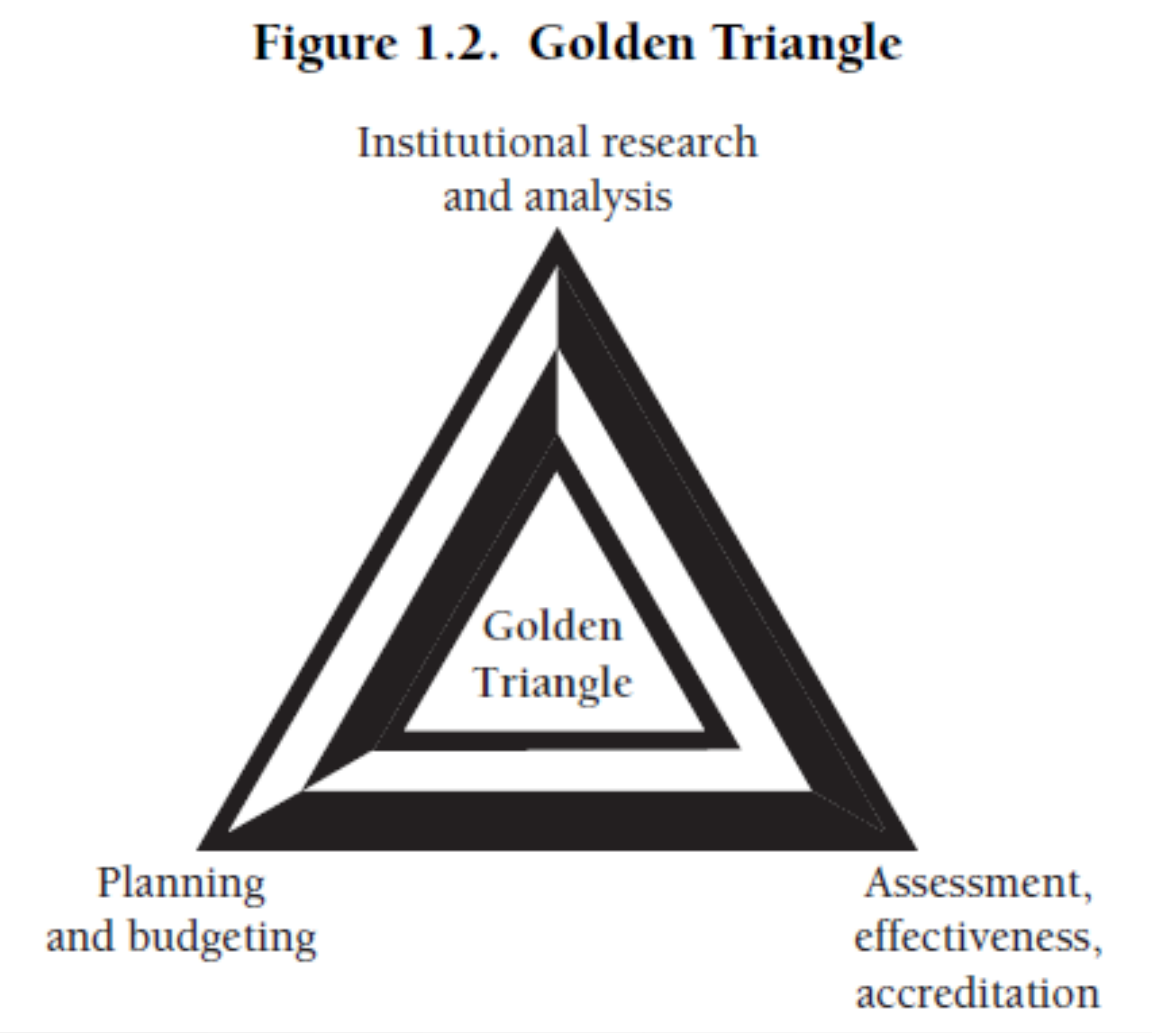
Objectives

- To review the landscape of reporting and analytics within the field of Institutional Research.
- To demonstrate how predictive and other analytics have been used to influence decision-making at a campus.
- To discuss how the field needs to better adjust to meet strategic data challenges.
  - SXSW Edu March 2017: Trends and Predictions for Higher Education

Dartmouth College

- 4-year, private, Ivy League institution, located in Hanover, New Hampshire
- Primarily residential campus for traditional-aged students (18-22)
- Undergraduates = 4,400
- Graduate/Professional = 2,200
  - Guarini School of Graduate and Advanced Studies
  - Geisel School of Medicine
  - Thayer School of Engineering
  - Tuck School of Business

Institutional Research as a Profession



Tier 3
Contextual Intelligence

Tier 2
Issues Intelligence

Tier 1
Technical/Analytical Intelligence

The Foundations and Evolution of Institutional Research (Volkwein, 2008)

"On the Nature of Institutional Research" Revisited (Terenzini, 1993, 1999, & 2013)

Institutional Research as a Profession

- *IR has become synonymous with the office that reports data to the federal government, responds to national surveys, or handles compliance and regulatory reporting. This limited view of institutional research is a tremendous waste of institutional knowledge, technical expertise, and strategic insights*.
- *To build a strong, evidence-based decision culture, institutions must break down data silos, connect people with information, and build the organizational habits and processes that reinforce the use of analytics and data at all levels of the organization. Institutional research professionals are essential partners and catalysts in this work*.

Christine Keller, AIR Executive Director & CEO

Institutional Research as a Profession

Statement of Aspirational Practice for Institutional Research (AIR, 2016).

1. A Student-Focused Paradigm: Prioritizes the support and acceleration of institutional efforts to improve the student experience and increase student progress and completion.
2. An Expanded Definition of Decision Makers: Empower other stakeholder groups within an institution—particularly faculty, front-line staff, and students—to better leverage information and analytic tools to shape decisions.
3. A Data and Analytics Function: data are diffused with broader access to technology, tools and reporting software with the potential for usable and actionable data analyses by more people. Need for data literacy.
4. Executive Leadership: Executive leader for data & analytics is critical for coordinated institution-wide data strategy.

Example 1: Carnegie Classification

- Basic Classification: Level of Research Activity
  - Published for use in 1973, and subsequently updated in 1976, 1987, 1994, 2000, 2005 and 2010 and 2015.
  - Includes Title IV eligible, degree-granting colleges and universities in the United States represented in the National Center for Education Statistics Integrated Postsecondary Education Data System (IPEDS).
  - R1 (Highest Research Activity), R2 (Higher Research Activity), R3 (High Research Activity)

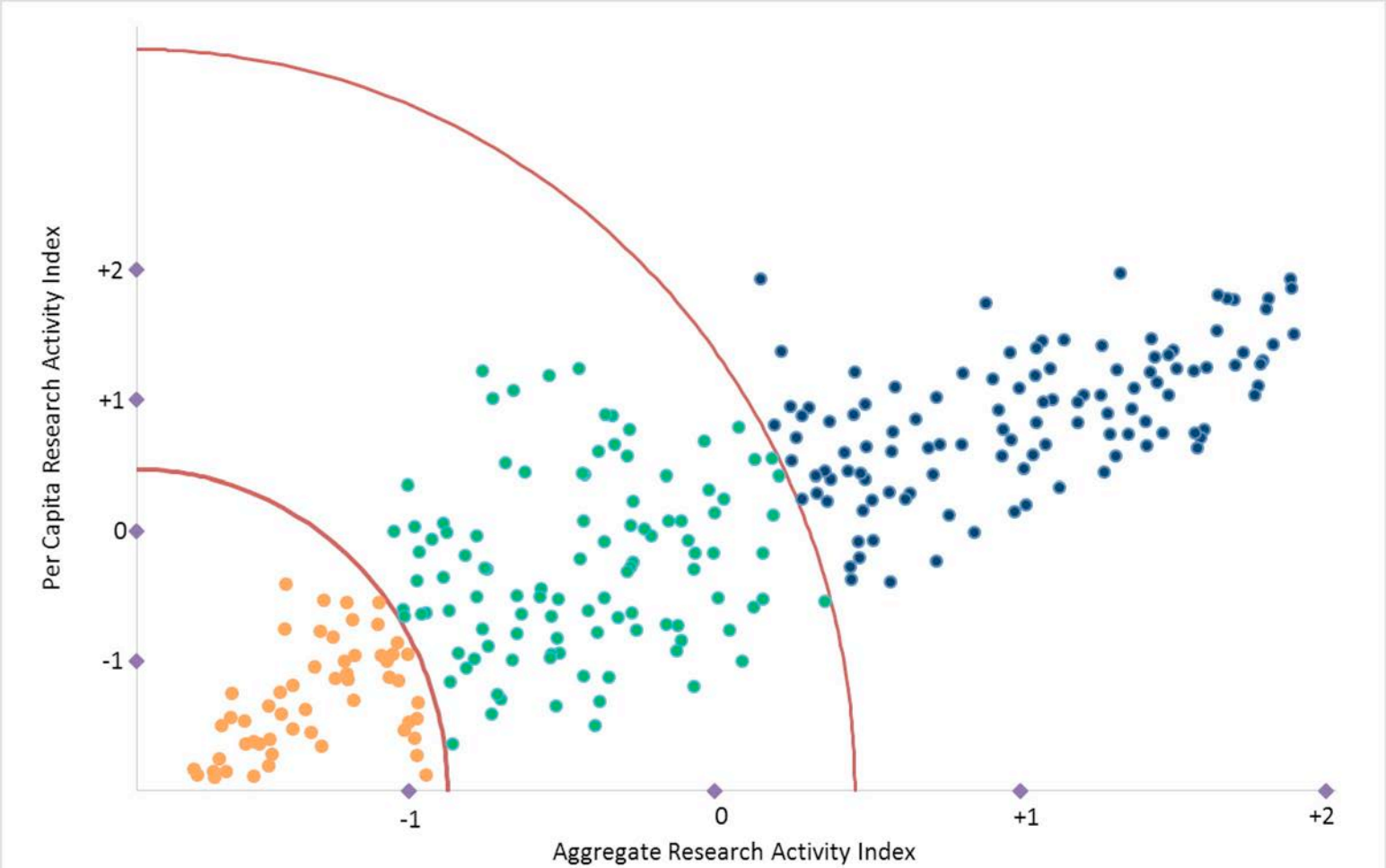
Carnegie Classification (cont.)

- Classification variables
  - Research & Development Expenditures: Higher Education Research & Development Survey (HERD)
    - Science & Engineering (R&D for S&E)
    - Non-Science & Engineering (R&D for Non-S&E)
  - Science & Engineering (S&E) Research Staff: Science and engineering postdoctoral appointees & other non-faculty research staff with doctorates. Survey of Graduate Students and Postdoctorates in Science and Engineering
  - Doctoral Degrees. IPEDS Completions Survey
    - STEM
    - Social Sciences
    - Humanities
    - Other Fields
  - Full-time instructional staff at the rank of assistant, associate, or full professor. IPEDS Human Resources Survey

Carnegie Classification (cont.)

- With the 2015 update, Dartmouth shifted from R1 to R2. This was not the first time we had shifted between R1 and R2 status.
- Our office was tasked with understanding and replicating the results.
- A series of dashboards were designed to help determine what it might take for Dartmouth to return to R1 status in the next update.

Carnegie Classification (cont.)



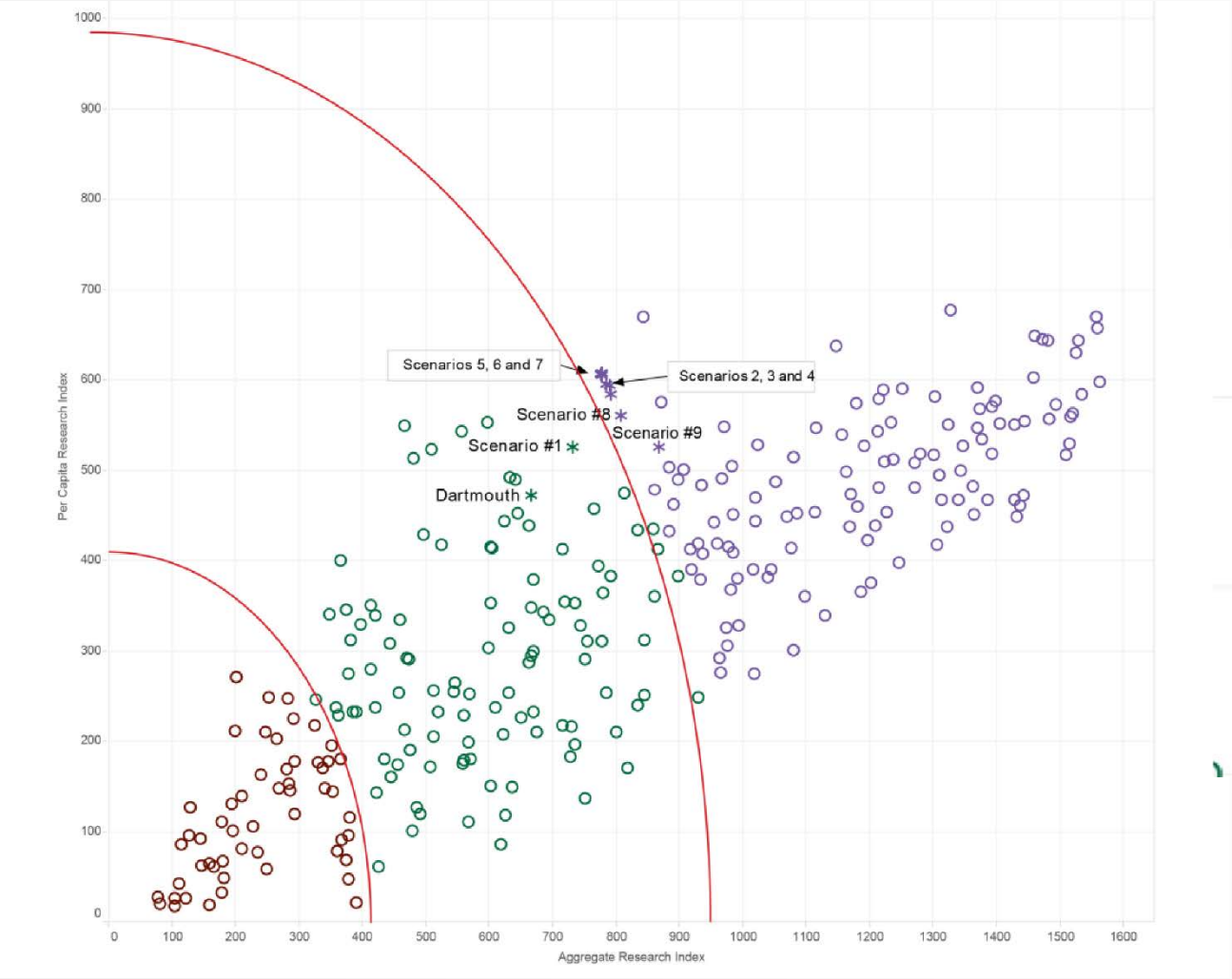
Note: The plotted points are based on the raw index scores. Standard deviation points are provided on each axis as reference points.

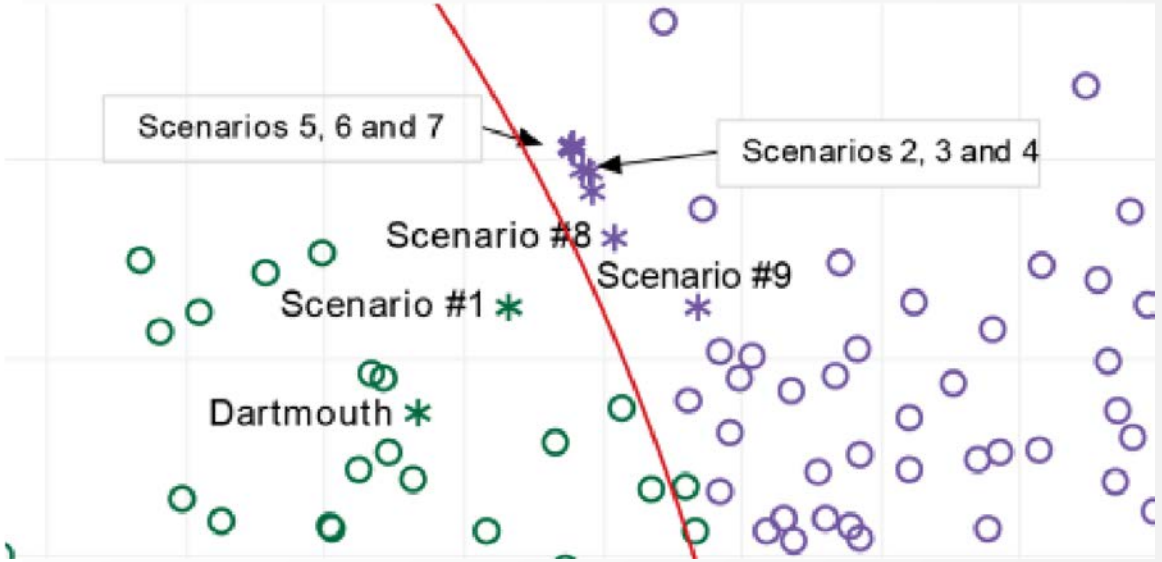
Blue: R1: Doctoral Universities - Highest research activity

Aqua: R2: Doctoral Universities - Higher research activity

Orange: R3: Doctoral Universities - Moderate research activity

Carnegie Classification: “What-If” Scenarios





Carnegie Classification: "What-If" Scenarios (cont.)

		R&D for S&E (1000s)	R&D for Non-S&E (1000s)	S&E Research Staff*	Humanities Doctoral Degrees	Social Sciences Doctoral Degrees	STEM Doctoral Degrees	Other Fields Doctoral Degrees	Per-capita R&D for S&E (1000s)	Per-capita R&D for Non-S&E (1000s)	Per-capita S&E Research Staff*	Full-time Faculty Total	Aggregate Research Activity Index	Per-Capita Research Activity Index	Distance (standardized)
R1 (Highest Research Activity): 2015 Descriptives	N	115	115	115	115	115	115	115	115	115	115	115	115	115	115
	Minimum	5,719	725	32	0	1	27	0	29.3	1.1	0.0	195	842.9	273.9	0.3
	Maximum	2,227,536	123,734	7,297	179	129	589	229	1,283.6	93.0	5.0	3707	1,562.5	676.9	1.9
	Mean	411,742	21,672	604	51	44	202	87	277.9	16.1	0.4	1447	1,201.1	489.2	1.0
	Median	319,818	14,914	387	45	37	152	76	234.3	11.7	0.3	1413	1,209.8	490.1	1.0
R2	**Dartmouth**	**184,785**	**2,896**	**244**	**0**	**3**	**91**	**1**	**270.2**	**4.2**	**0.4**	**684**	**665.7**	**471.9**	**-0.1**
R2	**Scenario 1**	875,881	2,896	244	0	3	91	1	1280.5	4.2	0.4	684	731.4	525.8	0.1
R1	**Scenario 2**	184,785	46,141	244	0	3	91	1	270.2	67.5	0.4	684	791.2	583.9	0.3
R1	**Scenario 3**	203,264	43,440	244	0	3	91	1	297.2	63.5	0.4	684	789.8	593.6	0.3
R1	**Scenario 4**	221,742	28,960	244	0	3	91	1	324.2	42.3	0.4	684	784.1	595.7	0.3
R1	**Scenario 5**	240,221	23,168	244	0	3	91	1	351.2	33.9	0.4	684	778.4	604.7	0.3
R1	**Scenario 6**	258,699	20,272	244	0	3	91	1	378.2	29.6	0.4	684	778.0	607.2	0.3
R1	**Scenario 7**	277,178	18,245	244	0	3	91	1	405.2	26.7	0.4	684	775.7	606.2	0.3
R1	**Scenario 8**	221,742	10,000	244	0	13	121	1	324.2	14.6	0.4	684	807.6	560.4	0.3
R1	**Scenario 9**	554,355	3,000	244	0	33	166	1	810.5	4.4	0.4	684	867.1	525.8	0.4

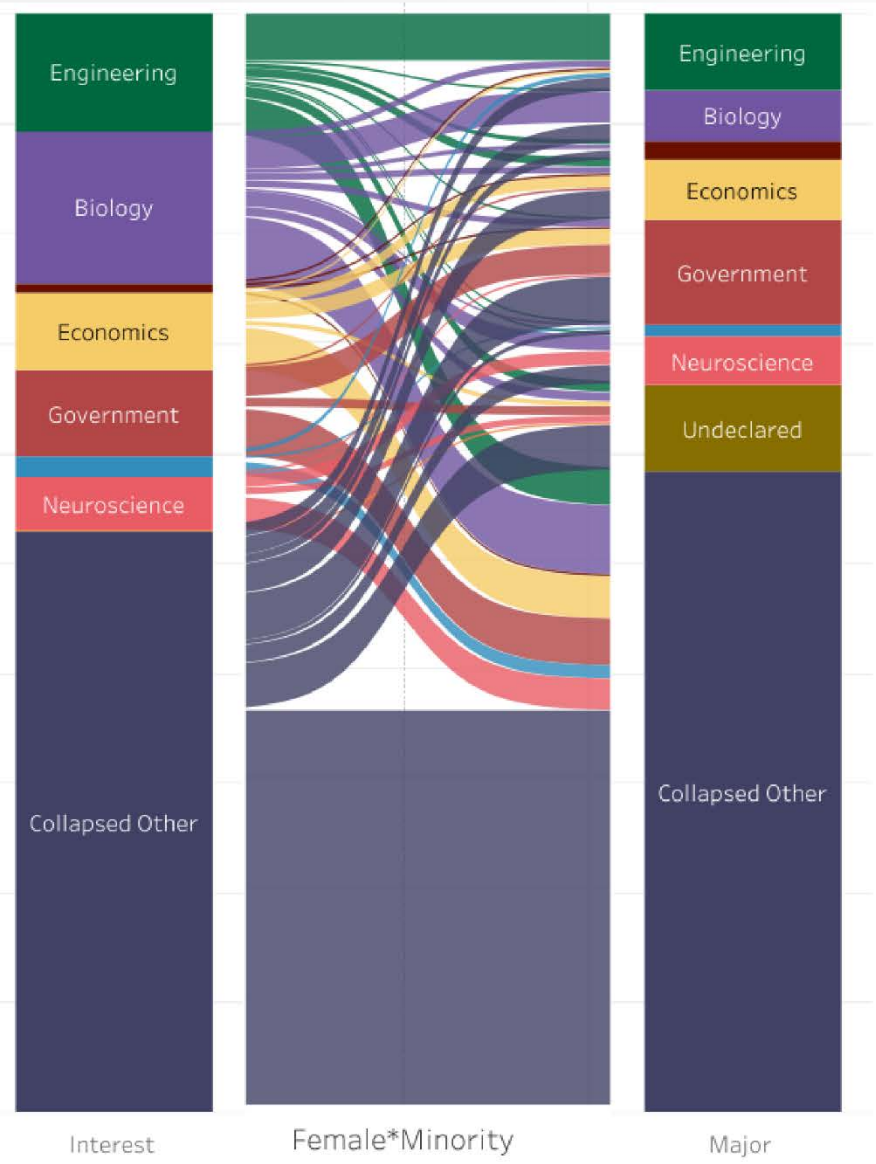
“What-If” to “What Next?”

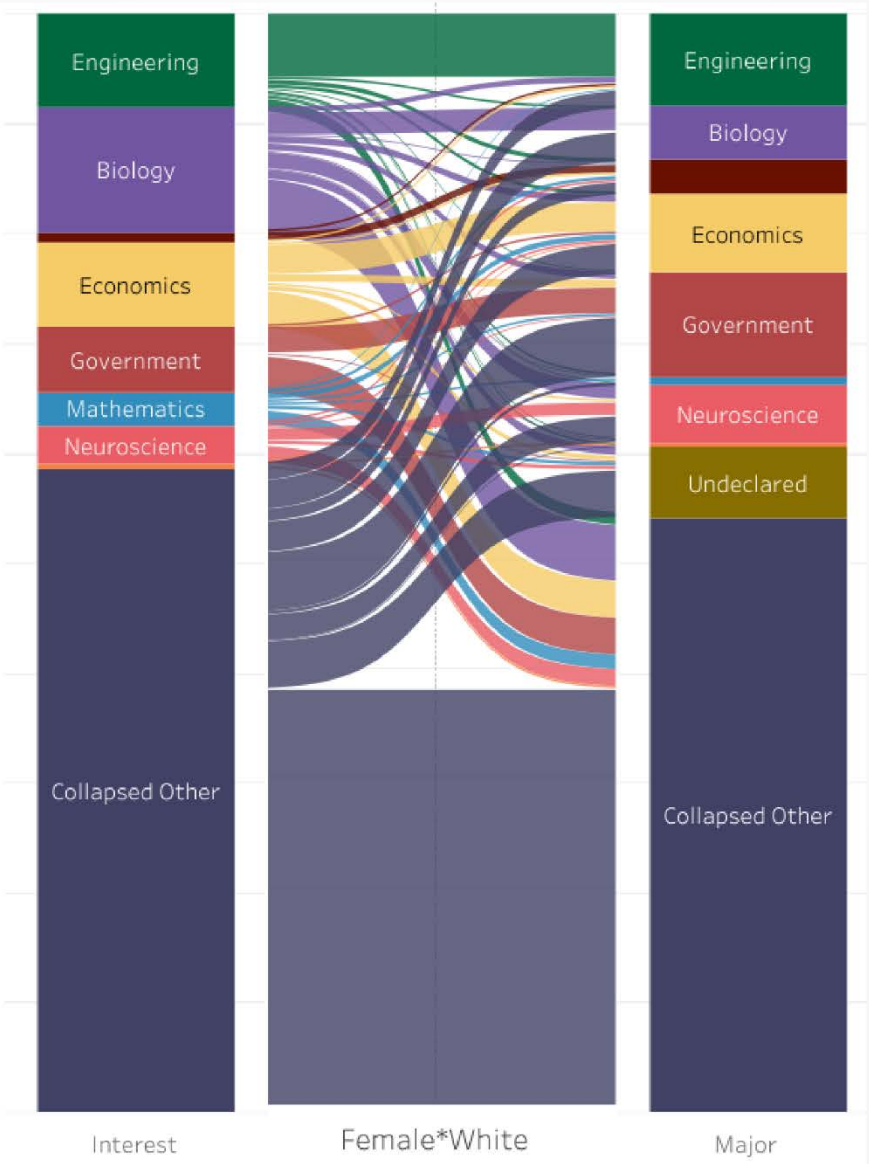
- Scenarios were used with the new Vice Provost of Research to more closely examine the R&D expenditure data.
- A group of administrators from across campus discussed and debated these data and also the impact on a federally-mandated submission to the U.S. Department of Education’s National Center for Education Statistics’ (NCES) Integrated Postsecondary Education Data System (IPEDS), specifically the Finance Survey.
- Changed subvention and other accounting for research expenditures in the HERD survey to more accurately represent the level of research activity. Confirmed the changes would not adversely impact US News and World Report Financial Resources ranking.

Example 2: Student Success in Engineering

- The goals were to help uncover challenges for first-generation students and investigate potential yield issue (students who indicated an academic interest in engineering but did not declare it as a major).
  - One of the unique aspects of the Engineering major is that students do not take their first engineering course until their sophomore year.
- The purpose of the Dartmouth Emerging Engineers (DEE) program is to provide support and mentoring to underprepared students to improve the first-year experience of students with an interest in engineering.
- The DEE project had been in place for a couple of years without any substantive discussion of success measures.

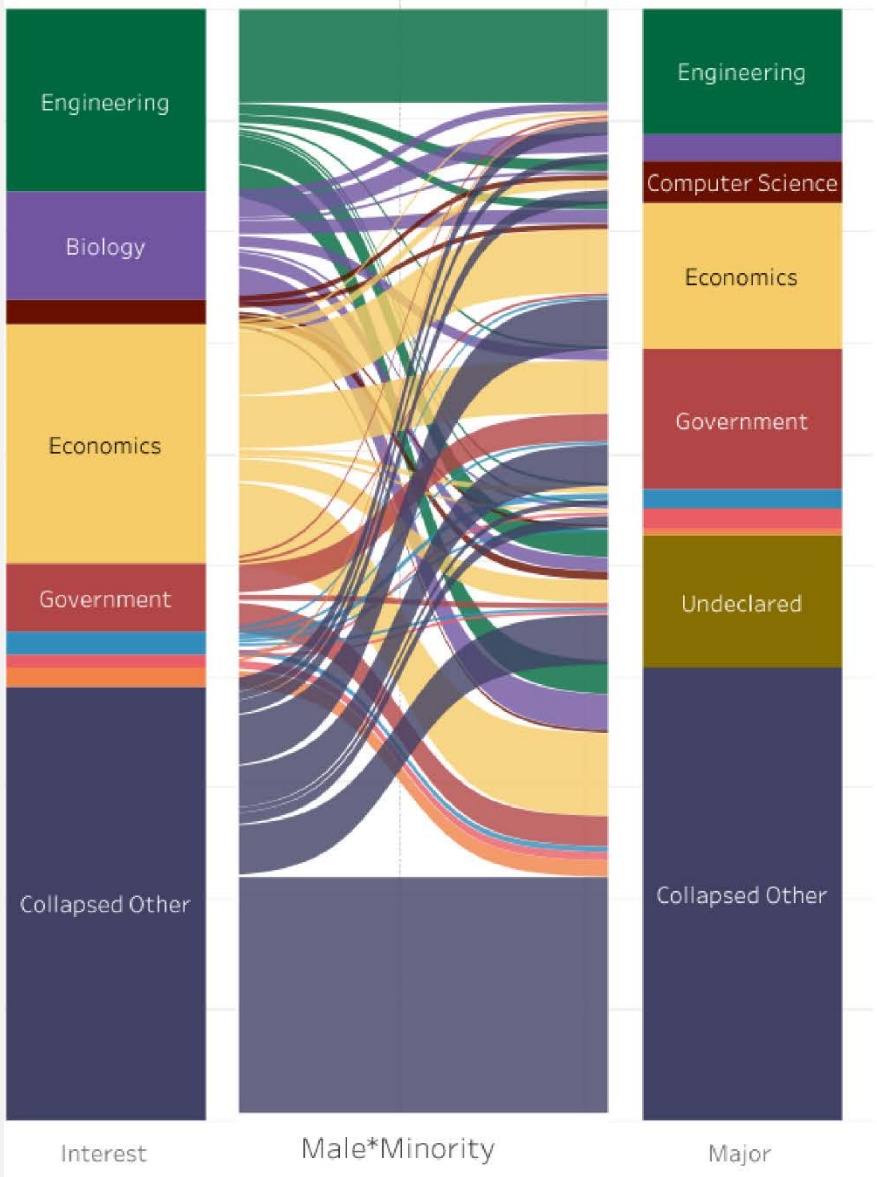
Academic Interests & Majors: Females

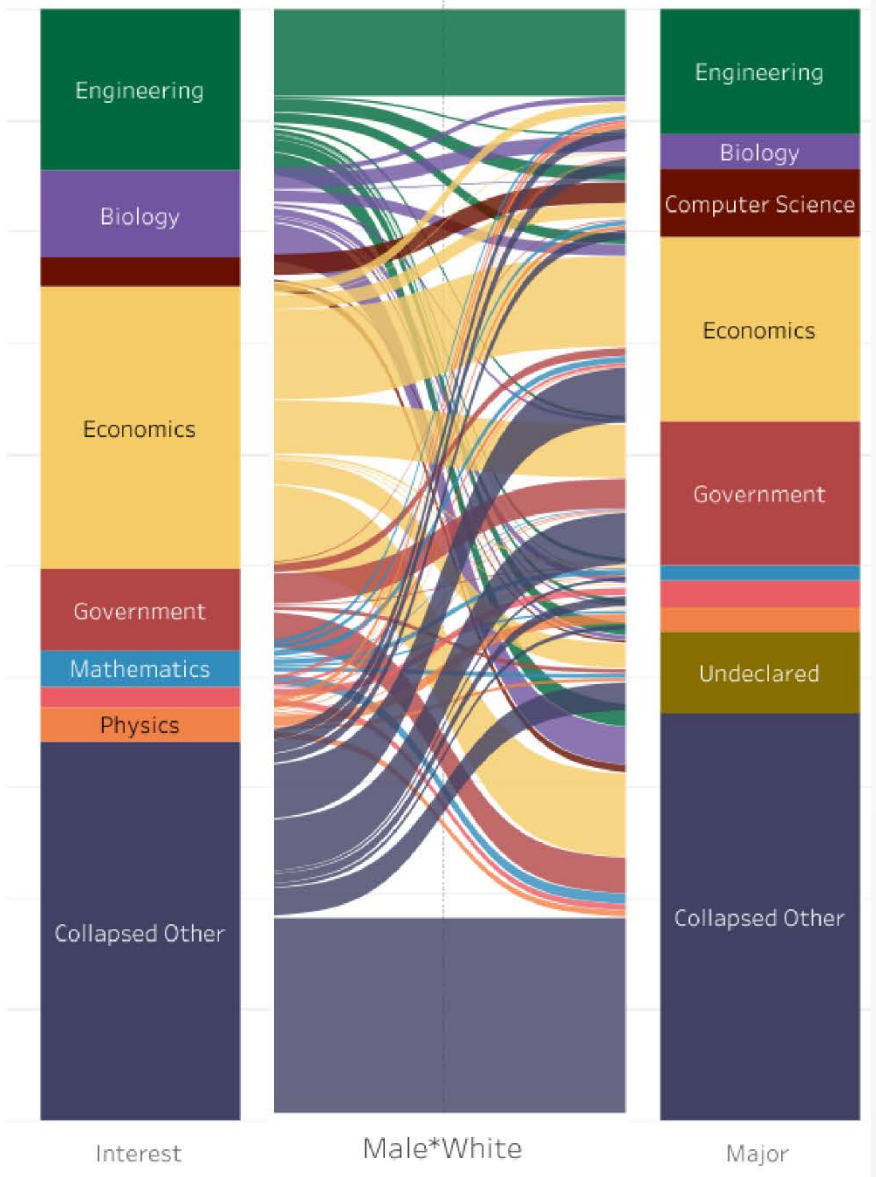




Among females, similar percentages were interested in engineering (11% minority vs 9% white) **but a lower percentage of minority females ultimately majored in engineering (40%) compared to white females (68%).**

Academic Interests & Majors: Males

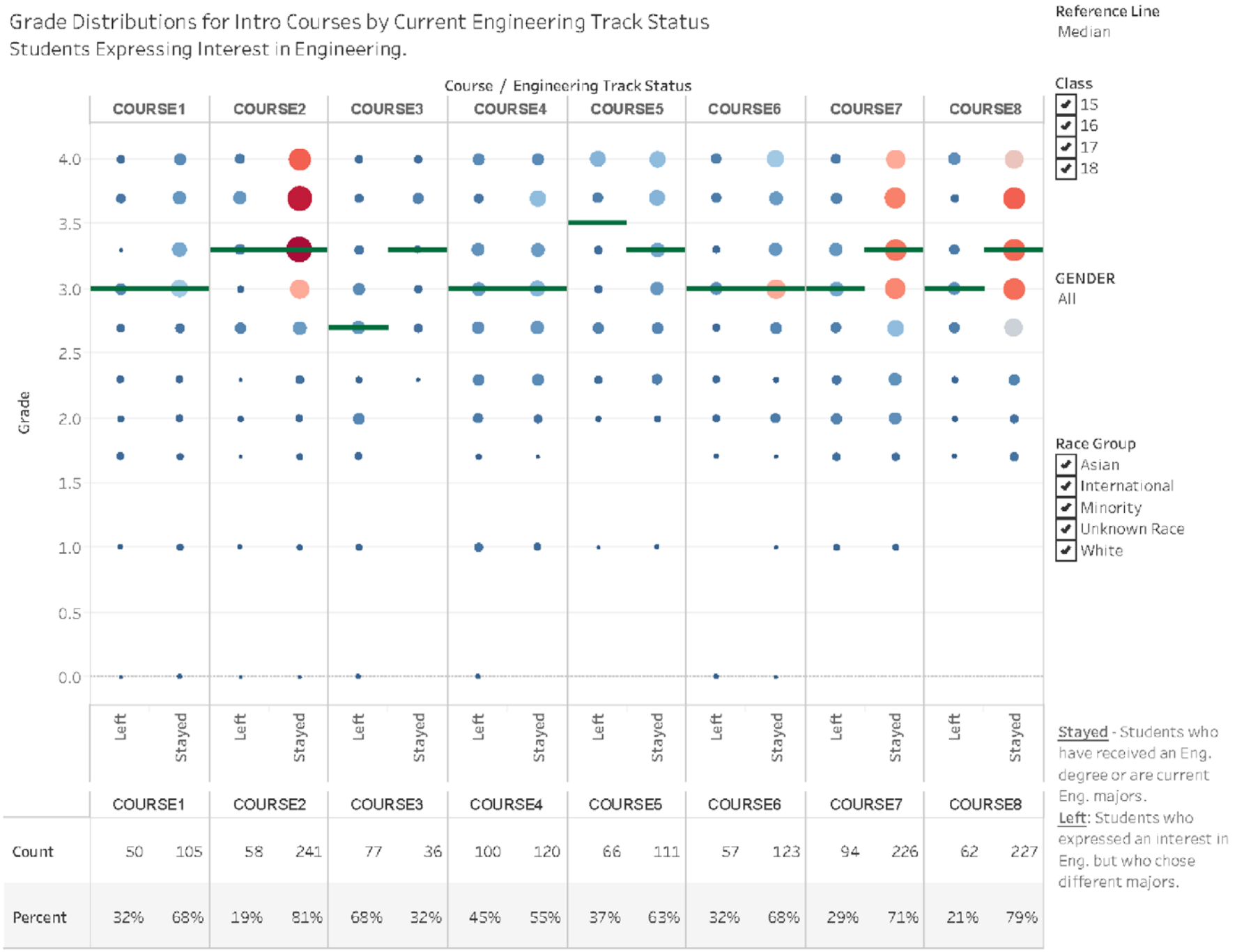




Similar to the interest pattern among females, similar percentages of males interested in engineering (16% minority vs 14% white) compared to white females; **however, unlike minority females, nearly equal percentages of minority males ultimately majored in engineering (52%) compared to white males (54%).**

Clearly, COURSE3 stood out among those who **Stayed** in ENG vs. those who **Left**.

The results were used to conduct further outreach to students enrolled in this course as well as to ensure at least one tutor on-hand was well-versed in this area.



	COURSE1		COURSE2		COURSE3		COURSE4		COURSE5		COURSE6		COURSE7		COURSE8	
Count	50	105	58	241	77	36	100	120	66	111	57	123	94	226	62	227
Percent	32%	68%	19%	81%	68%	32%	45%	55%	37%	63%	32%	68%	29%	71%	21%	79%

Summary & Discussion

- The field must spend more time in analytics arena vs. reporting. How? What barriers exist? How have you overcome them?

What?

- What data?
- Where is it?
- Who owns it?
- Is it reliable?

So What?

- Why should leadership care?
- What more do we need to learn?

Now What?

- How do we share this information?
- What are our next steps?

Thank You

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