



Reconstructing Institutional Research for 21st Century Needs: A Case Study of Stony Brook University

Braden J. Hosch, Ph.D.

Asst. Vice President for Institutional Research, Planning & Effectiveness

Stony Brook University

International Conference on Higher Education and Innovation

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OVERVIEW

Context

- The importance of context
- University Profile

Office Profile

- History
- Mission and Goals

IR Fundamentals

- Measurement
- Data Management

Tools and Methods

- Internal
- External



STONY BROOK UNIVERSITY PROFILE



STONY BROOK UNIVERSITY





UNIVERSITY PROFILE



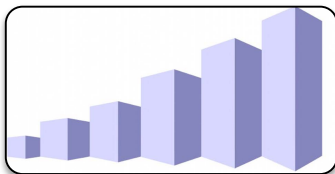
Part of State University of New York System



Co-Manager of Brookhaven National Lab



SUNY Korea (Songdo)



Highly Ranked – *U.S. News & World Report*:
#88 National, #131 Global



ORGANIZATION



West Campus Colleges/Schools

Arts & Sciences
Business
Engineering & Applied Sciences
Journalism
Marine & Atmospheric Sciences
Professional Development

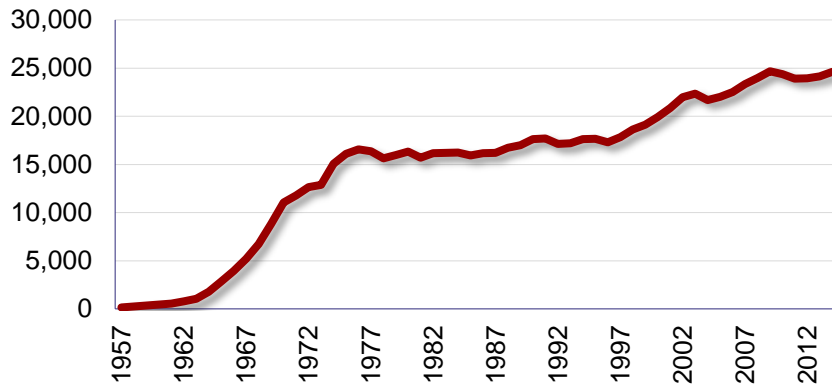
Schools in Health Sciences Ctr

Dental Medicine
Health Tech & Mgt
Medicine
Nursing
Social Welfare

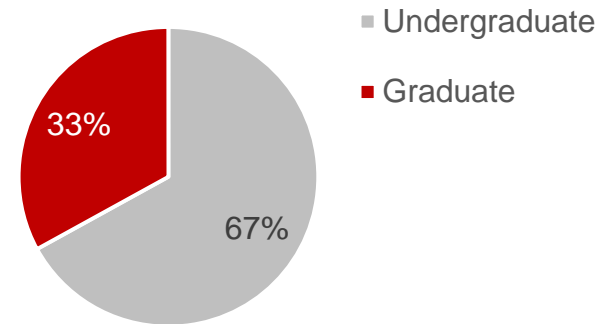


STUDENT AND DEGREE PROFILE

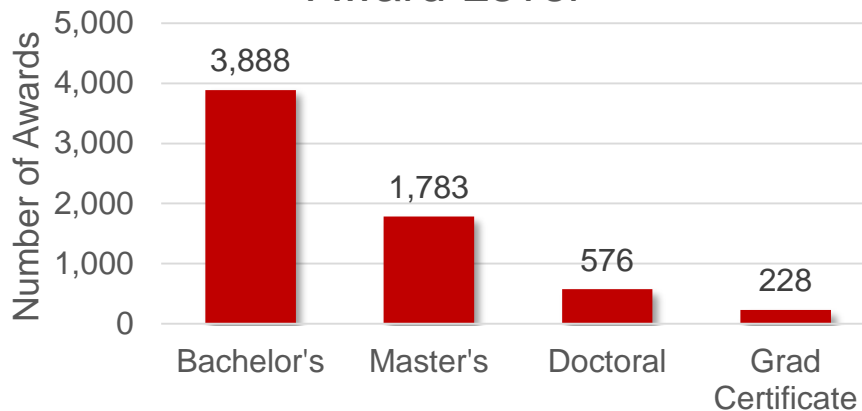
Fall Headcount Enrollment



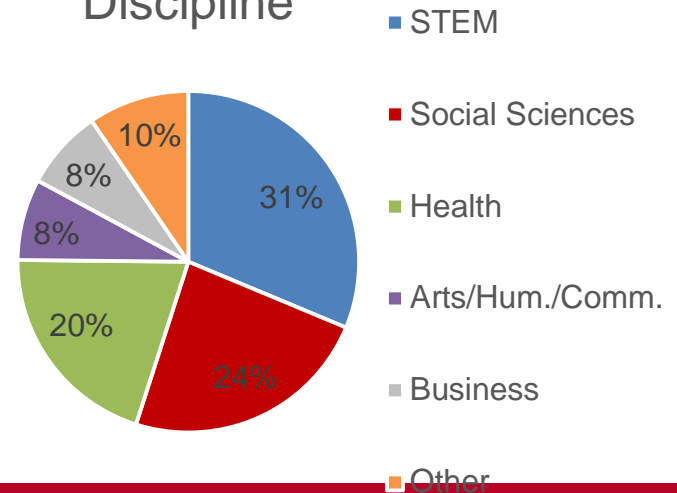
Student Level



Award Level



Discipline





OTHER HIGHLIGHTS

Employees: 14,500, including hospital	Annual Budget: 2.3 billion USD
Faculty: 2,500 Total 1,100 Tenured/Tenure Track	Annual Research Expenditures: 220 million USD
Student-Faculty Ratio: 16:1	Graduation Rates: 50% in 4 years 68% in 6 years



OFFICE OF INSTITUTIONAL RESEARCH, PLANNING & EFFECTIVENESS



HISTORY OF IR TO 2010

Office of Institutional Research

5 FTE* Employees – Director, Assoc. Director, 3 Analysts

Primary tools: SPSS, SAS

Data storage: SPSS files

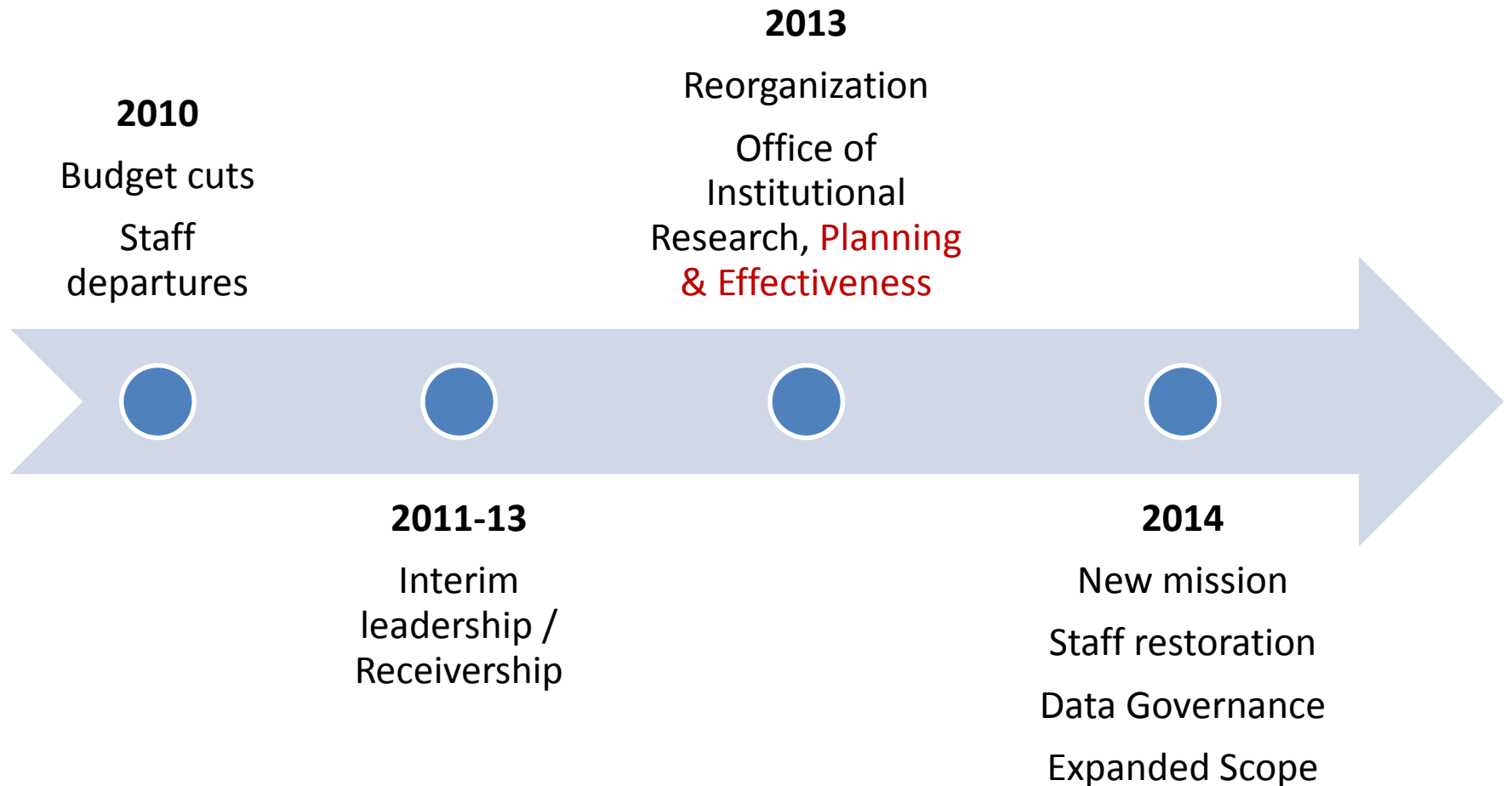
Primary functions:

- Compliance reporting
- Ranking surveys
- Presidential support

“We deal with numbers without the dollar sign”

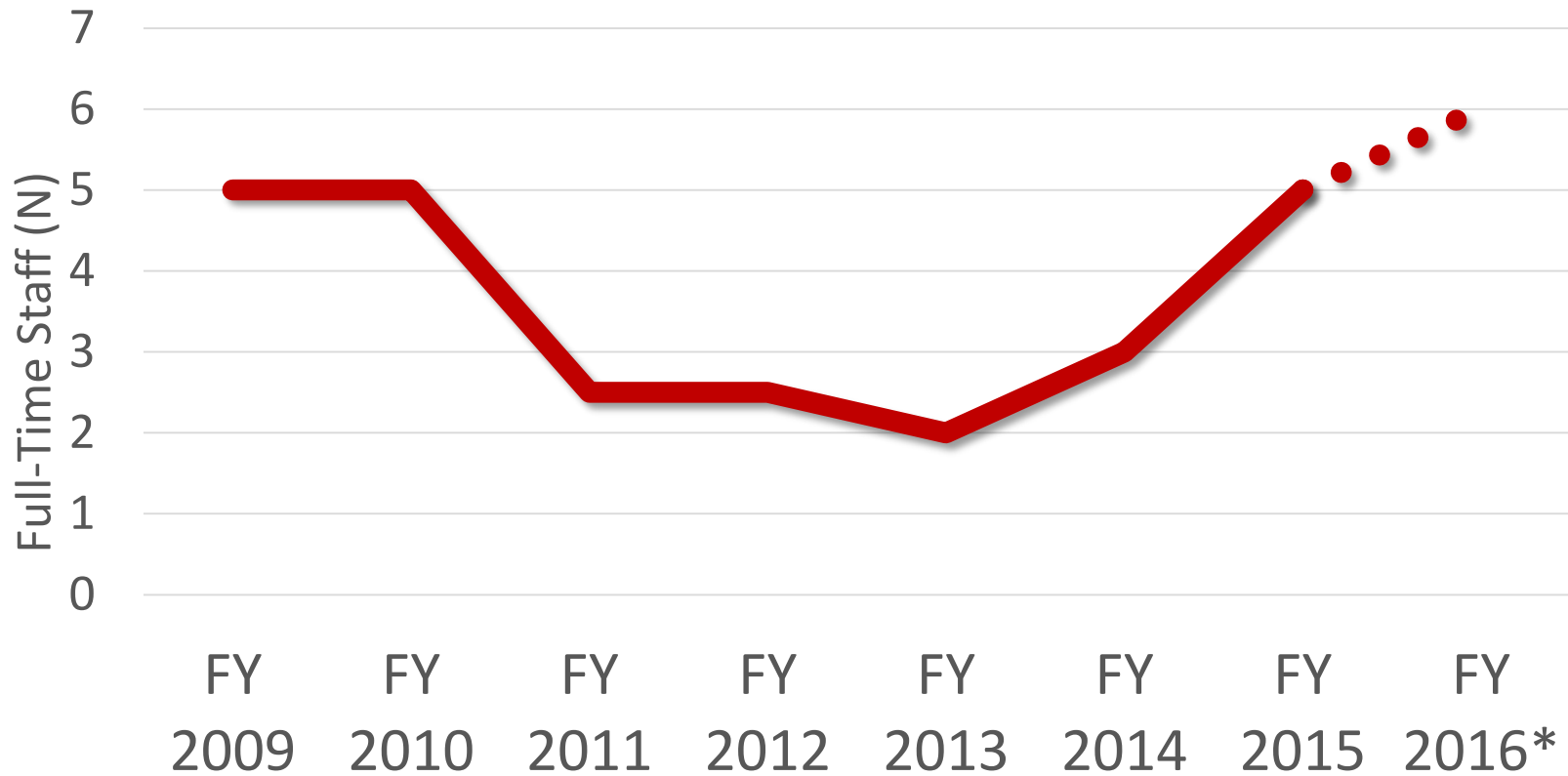


TRANSFORMATION





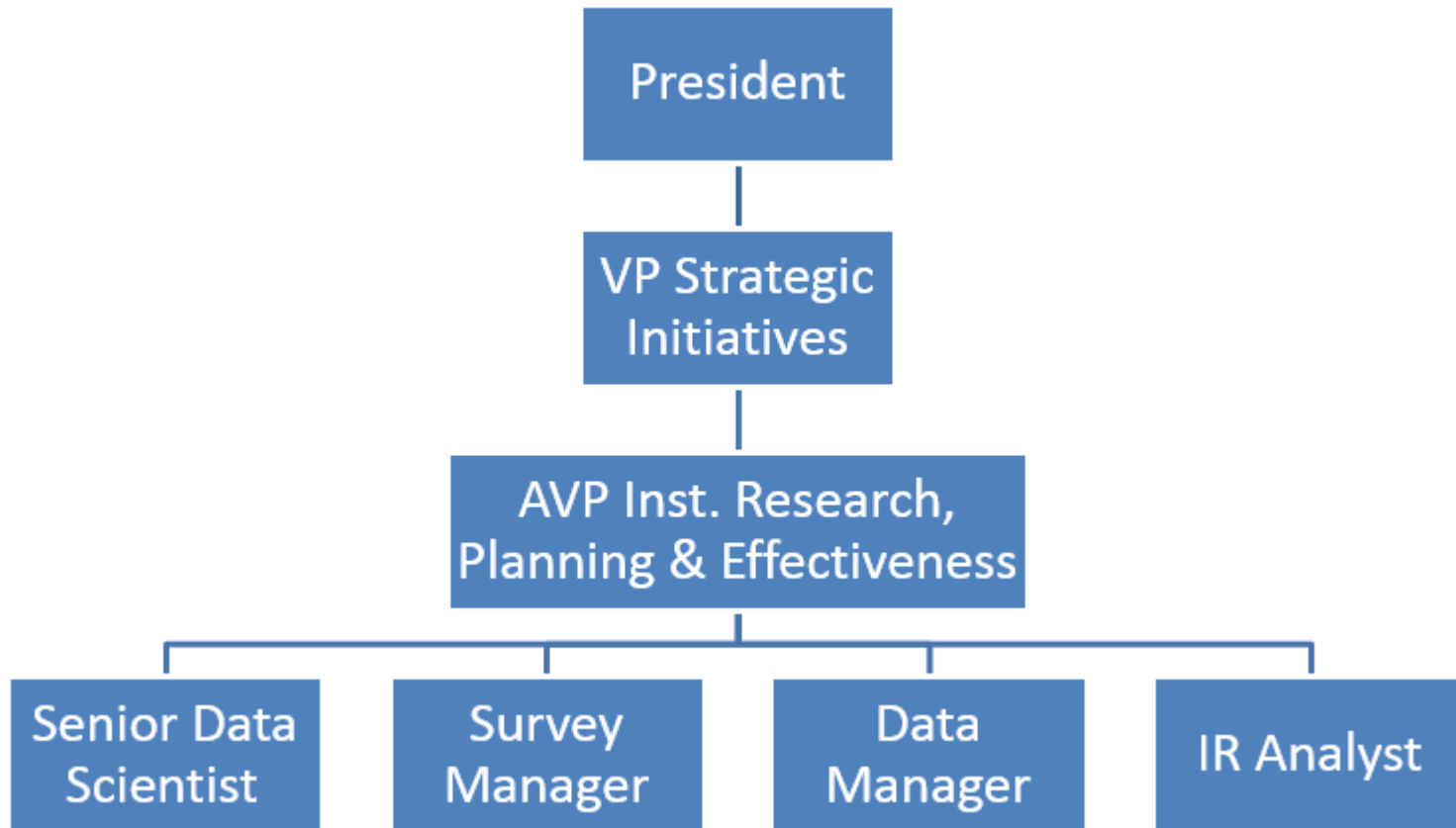
INSTITUTIONAL RESEARCH FULL-TIME STAFF 2009 - 2016



*FY 2016: 5 FTE, plus 1 requested



ORGANIZATION CHART: INSTITUTIONAL RESEARCH, PLANNING & EFFECTIVENESS





MISSION AND VISION

Mission

To collect, analyze, organize and communicate data and information to provide a valid, consistent, and accurate understanding of how the institution is advancing its mission in support of its vision to become a top-ranked public research university.

Vision

To establish a world-class institutional research operation and institutional effectiveness system in support of the University's mission.



GOALS

6. Strategic Planning Support

5. Institutional Effectiveness

4. Research

3. Decision Support & Internal Data Requests

2. External Reporting & Accountability

1. Data Management





INSTITUTIONAL RESEARCH FUNDAMENTALS



VALUES FOR PROJECTS

Accurate

Responsive

Timely

Reproducible

Contextualized



MEASUREMENT CONCEPTS

Definition

Time period

Measurement
Point

Documentation



DATA MANAGEMENT

To 2008	2008-2013	2014-16	2016
Flat files in organizational silos	Relational data warehouse	Relational data warehouse	Addition of external data sources:
Manual error checks	Limited quality assurance	Data governance and Quality Assurance strengthened	National databases
Reports from transactional systems	Uneven protocols for data freeze	Data freeze protocols extended	AAUDE Academic Analytics



PRINCIPAL DATA TYPES

Administrative Enterprise Data
(PeopleSoft)

Survey Data
(NSSE, student opinion, alumni)

Environmental Data
(IPEDS, rankings, data exchanges)

Administrative Ancillary Data
(Blackboard, Social Media)



EXTERNAL REPORTING/ACCOUNTABILITY

Federal	State	System	Rankings
Summary Stats	Summary Stats	Unit Records	Summary Stats
Enrollment	Enrollment	Enrollment	Common Data Set
Completions	Completions	Courses	Research
Financial Aid	Financial Aid	Completions	Various
Graduation Rates		Financial Aid	
Human Resources		Summary Stats	
		Applied Learning	
		Non-Credit	
		Student Surveys	



INTERNAL TOOLS AND METHODS



INTERNAL TOOLS

Data Warehouse

- Internal Reporting & Analytics

Web site

- Internal & External Communication
- Static & Dynamic Pages

Dashboards

- Compact Communication / Monitoring



SOFTWARE

Basic Tools

MS Excel
MS Office

Google Drive
Adobe Acrobat

Statistical

SPSS (base)

AMOS
Decision Trees
Missing Data

SAS

Specialized

Tableau
Visual Analysis

QGIS

Circos, Google
Charts

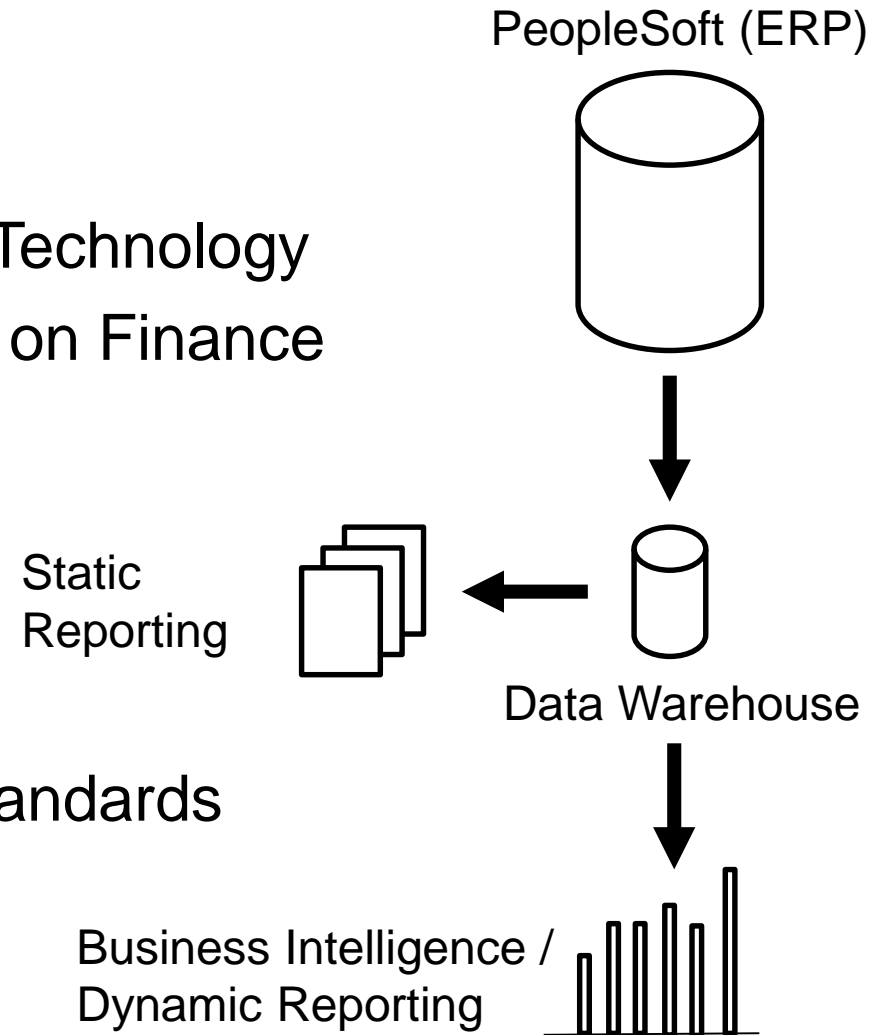


DATA WAREHOUSE

Managed by Unit in Information Technology
Campus Support with Emphasis on Finance
Daily Updates from PeopleSoft
Internal Decision Support

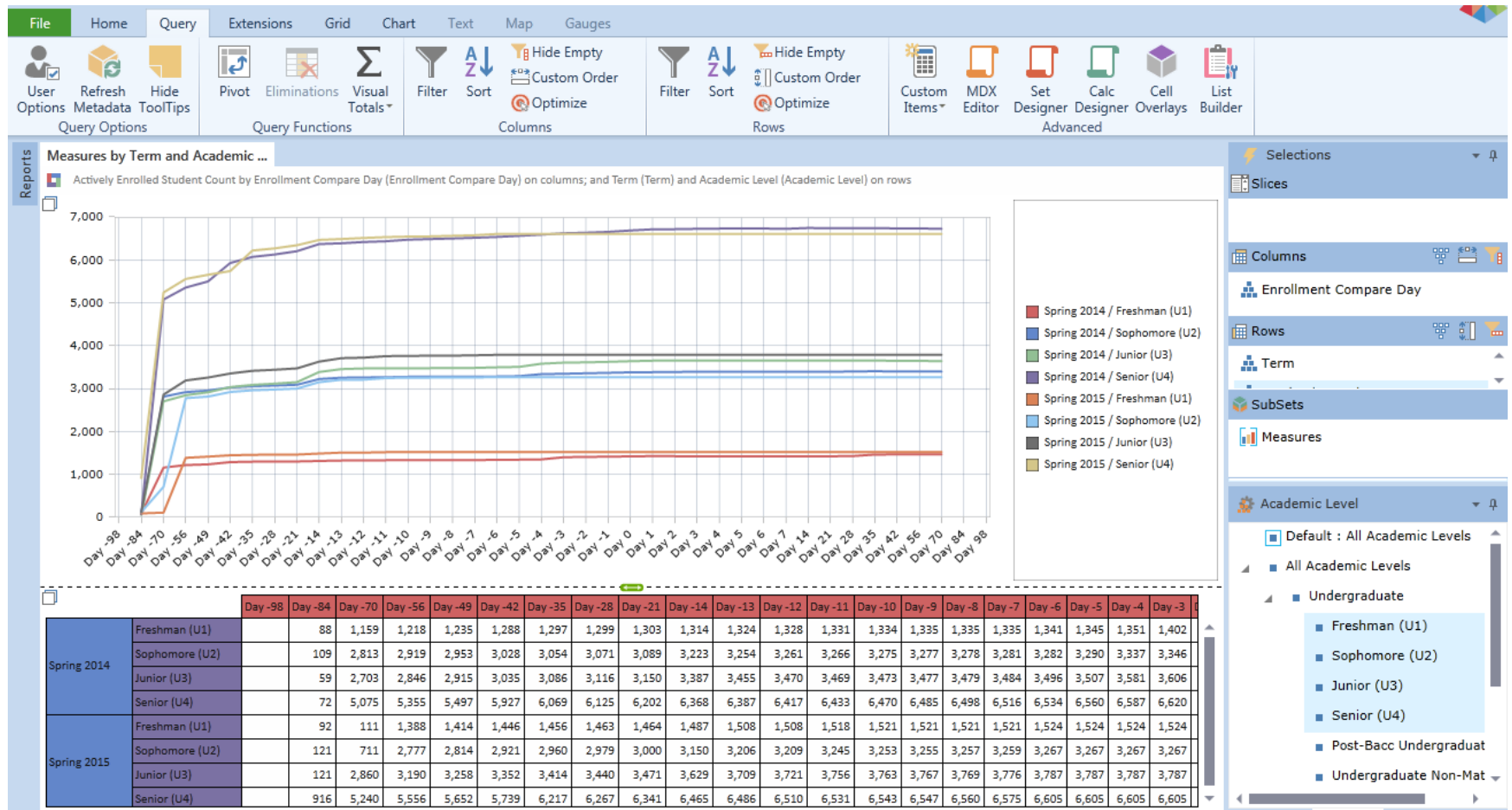
Current Limitations

Not aligned with external data standards
Important data does not freeze
Data governance





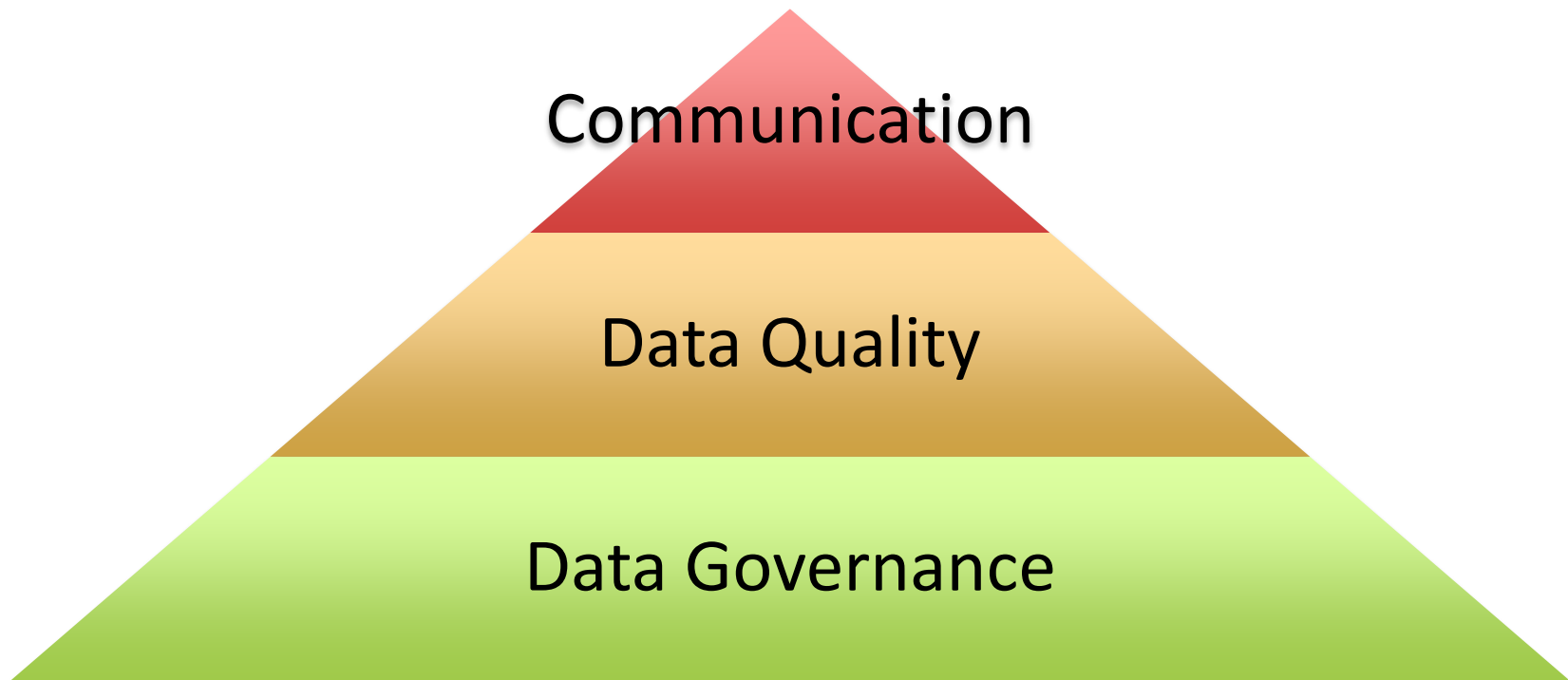
PYRAMID ANALYTICS



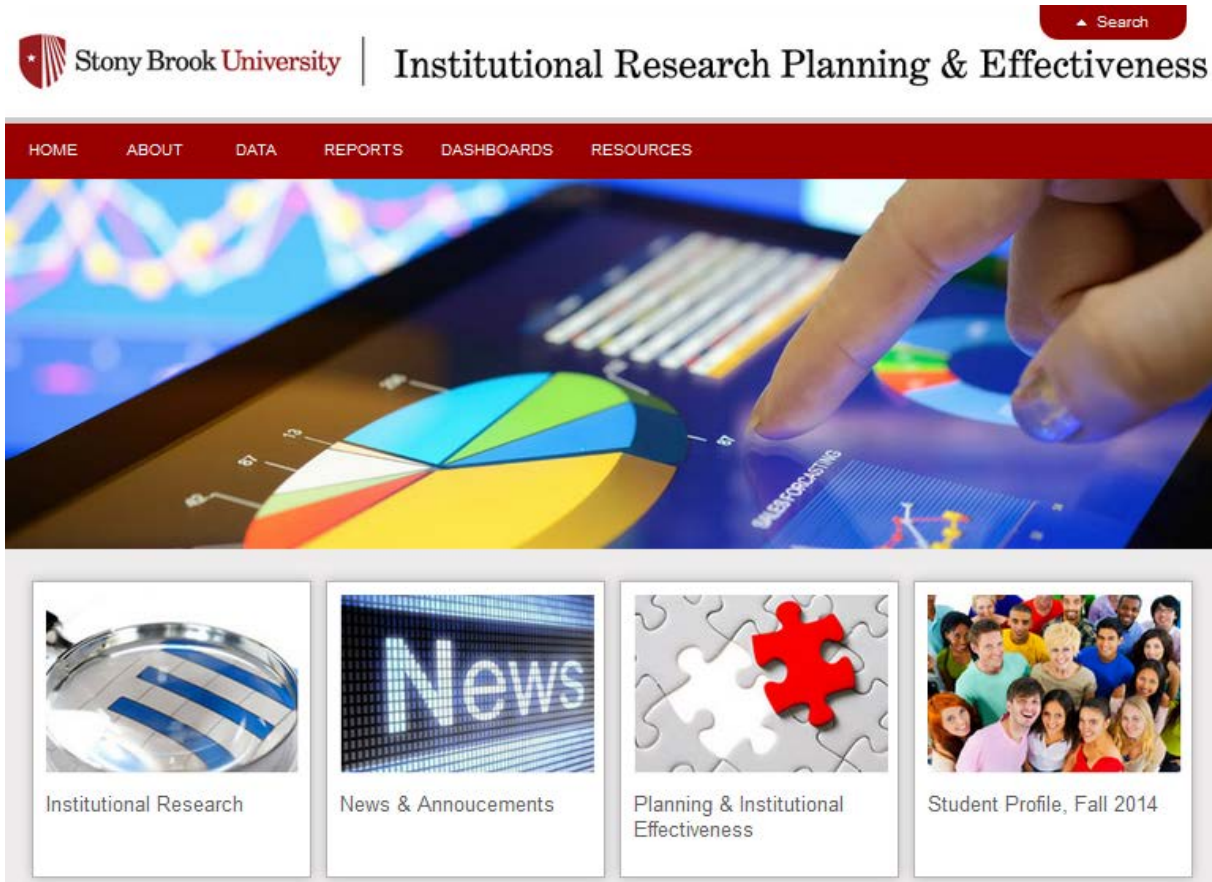


STRENGTHENING DATA INFRASTRUCTURE

Cross-functional task force in 2015 to recommend institutional policies and structures



WEB SITE



Stony Brook University | Institutional Research Planning & Effectiveness

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Institutional Research

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Planning & Institutional Effectiveness

Student Profile, Fall 2014

Areas for:

About

Data

Reports

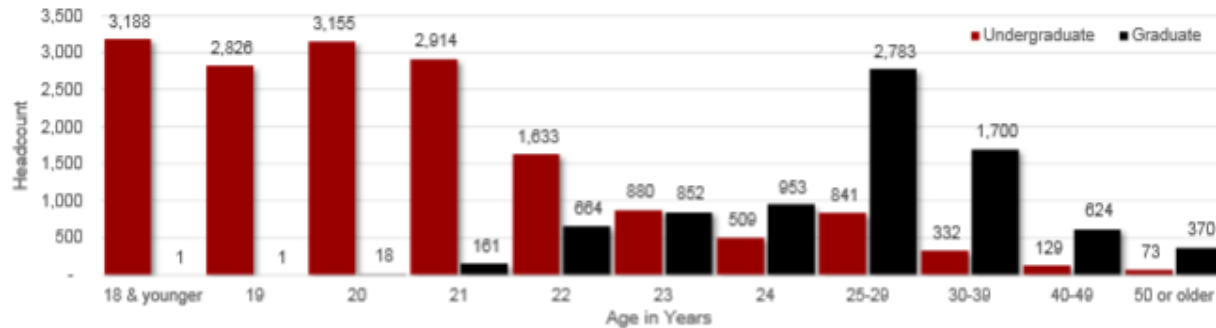
Dashboards

Resources



STATIC WEB PAGES

Headcount Enrollment by Age (Undergraduate and Graduate Students) - Fall 2014



Age	Undergraduate		Graduate		Total	
	N	%	N	%	N	%
18 & younger	3,188	19%	1	0%	3,189	13%
19	2,826	17%	1	0%	2,827	11%
20	3,155	19%	18	0%	3,173	13%
21	2,914	18%	161	2%	3,075	12%
22	1,633	10%	664	8%	2,297	9%
23	880	5%	852	10%	1,732	7%
24	509	3%	953	12%	1,462	6%
25-29	841	5%	2,783	34%	3,624	15%
30-39	332	2%	1,700	21%	2,032	8%
40-49	129	1%	624	8%	753	3%
50 or older	73	0%	370	5%	443	2%
Total	16,480	100%	8,127	100%	24,607	100%

Age is calculated as of the institution's census date (Day 15 of the fall semester, Sept. 16, 2014), following requirements for IPEDS reporting.

Prepared by the SBU Office of Institutional Research, Planning Effectiveness
 Source: Student term view from the data warehouse. Age calculation based on census date (9/16/14)
 November, 2014



INTERACTIVE WEB PAGES

[IRPE Home](#)
[Contact Us](#)

Fall Undergraduate Headcount Enrollment by Major

Fall headcount enrollment is a common measure used to characterize the size of the student population at an institution. Fall headcount enrollment statistics appear on College Navigator and other federal reports and represent the University's official enrollment statistics. Counts for first majors reported here will add to the official total undergraduate enrollment reported to IPEDS. Counts for second majors and unduplicated totals are also provided. At the major level, the sum of first and second majors will add to the unduplicated total, which represents the total number of students pursuing that major as of the fall census date. At the College/School level, unduplicated totals will be equal to or less than the sum of first and second majors; the difference between the unduplicated total and the number of 1st majors represents the number of students with a first major outside of the College/School. At the university level, the unduplicated total equals the number of first majors.

College/School

Major Field

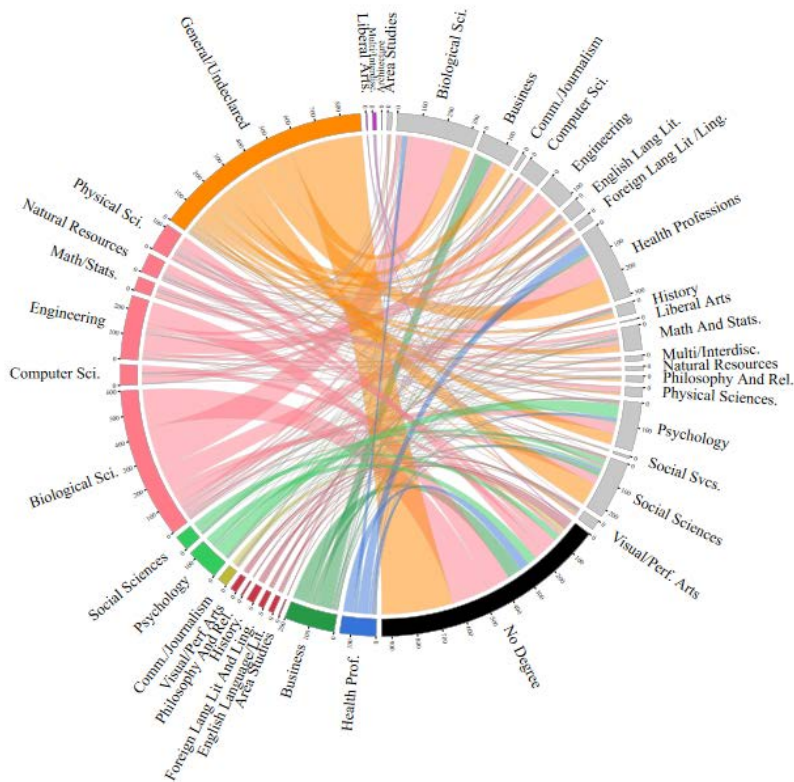
Enrollment By Level

Academic Level	Term / Type											
	Fall 2011			Fall 2012			Fall 2013			Fall 2014		
	1st Major	2nd Major	Undup Total	1st Major	2nd Major	Undup Total	1st Major	2nd Major	Undup Total	1st Major	2nd Major	Undup Total
Freshman	3,350	21	3,350	3,443	7	3,443	3,043	13	3,043	3,116	16	3,116
Sophomore	3,200	117	3,200	3,127	77	3,127	3,392	83	3,392	3,314	105	3,314
Junior	3,298	228	3,298	3,375	233	3,375	3,841	204	3,841	3,819	244	3,819
Senior	5,809	788	5,809	5,673	679	5,673	5,448	729	5,448	5,921	701	5,921
Undergraduate Non-Matric	130		130	219		219	268		268	310		310
Grand Total	15,785	1,152	15,785	15,837	998	15,837	15,992	1,029	15,992	16,480	1,066	16,480

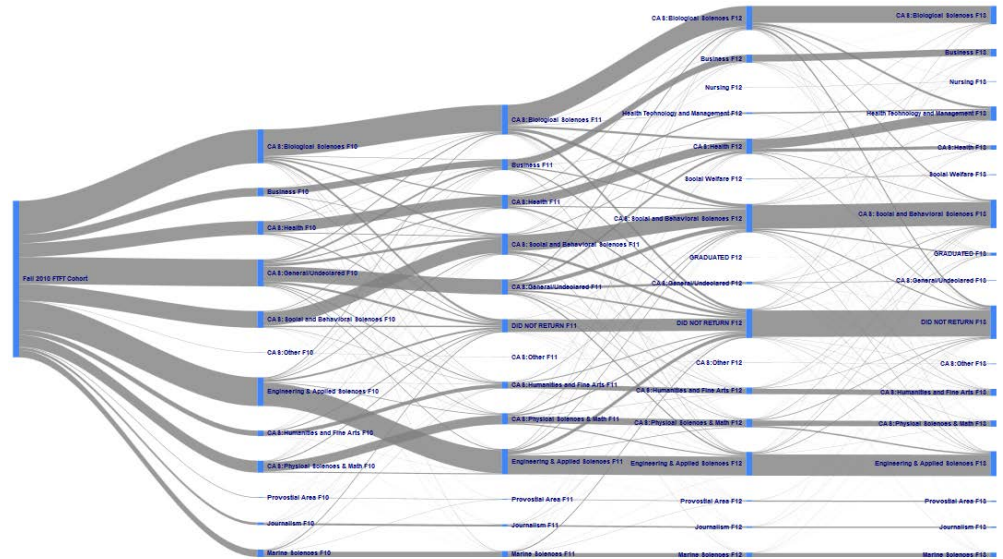


INTERACTIVE VISUALIZATIONS

Degree Outcomes by Initial Major Freshmen Entering in Fall 2007



Major Migration, Freshmen Entering in Fall 2010















EXECUTIVE DASHBOARD

★ Executive Dashboard

[Dashboard Home](#)

				
Admissions	Alumni	Financial Aid	Graduation/Retention Rates	Finance
				
Rankings/Benchmarks	Research	Students	Student Charges	Index/Report Archive



Graduation and Retention Rates

1-Year Retention Rates

2011 cohort	2012 cohort
89.9	90.1

#25
(out of 34 public AAUs)

4-Year Graduation Rates

2007 cohort	2009 cohort
45.1	46.1

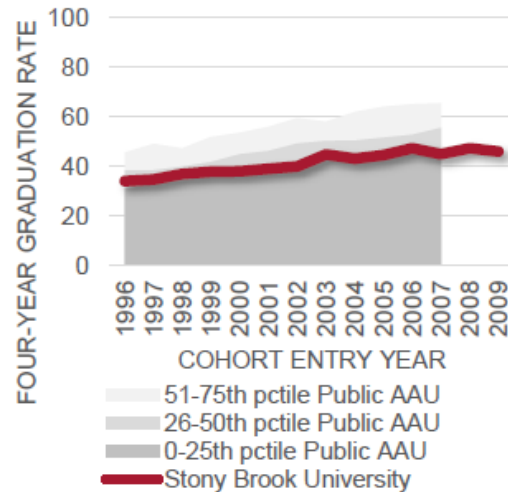
#27
(out of 34 public AAUs)

6-Year Graduation Rates

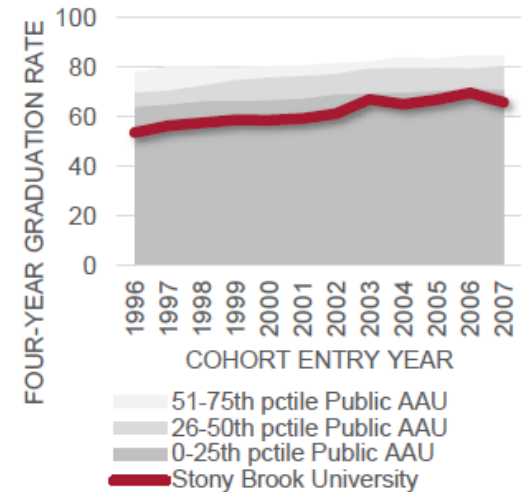
2007 cohort
65.9

#32
(out of 34 public AAUs)

4-Year Graduation Rate



6-Year Graduation Rate



Jump to:

[Interactive charts](#)

Selected Reports:

- [Update Brief \(2014\)](#)
- [4-Year Graduation Rates by Major \(2014\)](#)
- [4-Year Graduation Rates by Entering Survey Responses \(2014\)](#)
- [MD Completion Rates](#)



RESEARCH

Research reports and briefs support institutional needs and priorities

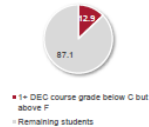


Analysis of DEC Course Grade Distributions as a Proxy for Stony Brook Curriculum Requirement for Courses to be Passed with Grade of C or Better, Fall 2011 – Spring 2013

This brief examines the potential impact of the Stony Brook University Curriculum requirement effective fall 2014 that general education courses must be passed with a grade of C or better through an analysis of student performance in DEC courses in four semesters, fall 2011 – spring 2013, inclusive. For each semester, between 1,600 and 2,100 unduplicated students – about one out of eight undergraduates – earned grades in DEC courses below a grade of C but above a grade of F, and would be affected by the new requirement. Students from traditionally underrepresented race/ethnicity groups and those from disadvantaged socioeconomic backgrounds disproportionately fell into this category.

Table 1. Students earning DEC course grades below C but above F

Term	Undergraduate enrollment		Students earning one or more course grades below C but above F in a DEC course	
	N	%	N	Pct of total
Fall 2011	15,968	2,107	13.2	
Spring 2012	15,225	2,208	14.5	
Fall 2012	15,203	1,918	12.6	
Spring 2013	15,327	1,810	11.8	
Average	15,631	2,011	12.9	



Based on their performance in DEC courses, African American students and Hispanic students would be disproportionately affected by the general education grade requirement. Percentage differences in the table below appear small, but about one out of six white students would be affected by the requirement, while about one out of nine white students would be affected.

Table 2. Students earning DEC course grades below C but above F, by race/ethnicity

	Average Undergraduates		Students earning one or more course grades below C but above F in a DEC course			
	Avg. N ¹	Pct.	Avg. N ²	Pct.	Difference	p value ³
Asian	3,785	24.3	469	23.3	-1.0	ns
Black/African American	959	6.1	176	8.7	2.6	<0.0001
Hispanic of any race	1,527	9.8	273	13.6	3.8	<0.0001
White	5,840	37.4	684	34.0	-3.4	0.0016
Others	311	2.0	44	2.2	0.2	ns
Non-Resident Alien	1,497	9.6	176	8.8	-0.8	ns
Race/ethnicity unknown	1,704	10.9	190	9.4	-1.5	0.0309
Grand Total	15,631	100.0	2,011	100.0		

¹Column adds to 15,633 due to rounding
²Column adds to 2,012 due to rounding
³sample t test

Analysis of general education course success to forecast policy impact



Preference for Stony Brook University Among Entering Freshmen as Reported on the CIRP Freshman Survey Compared to Highly Selective Public Universities (2012)

Prepared by the SBU Office of Institutional Research, Planning & Effectiveness, May 13, 2014

The CIRP Freshman Survey administered to students during orientation (Fall 2012) asked students to indicate what choice Stony Brook University was in their college selection process. Among respondents, 44.6% of entering freshmen rated SBU as 1st choice (2012 Freshman CIRP Survey). This figure is low compared to other institutions.

- 63.6% of entering freshmen at highly selective public universities rated their institution as their first choice.

- 63.1% of entering freshmen at all public universities rated their institution as their first choice.

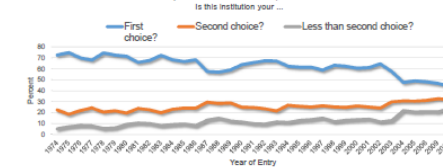
This number has decreased over time:
- 1970s: 69-74% - 2000s: 47-64%
- 1980s: 67-71% - 2012: 45%
- 1990s: 59-67%

The decrease in the percentage of students indicating Stony Brook is their first choice appears to coincide with increased selectivity. Student who indicate SBU was lower on their list of top choices actually exhibited higher graduation rates.

Percentage of SBU Freshmen Rating SBU as First, Second & Third Choice (2012)

Survey Year	Response (N)	Choice: Is this college your...					
		First choice?	Second choice?	Third choice?	Less than third choice?	More than third choice?	Did not answer?
Stony Brook University	1,204	44.6	31.8	0.0	13.9	10.3	
Highly Selective Public Universities	29,265	63.6	23.1	0.0	7.9	5.4	
All Public Universities	40,550	63.1	23.4	0.0	8.1	5.4	

Responses of SBU Freshmen, 1974-2012



Four-Year Graduation Rate by Choice Ranking of SBU (2009 CIRP Freshman Survey)

Survey Year	Choice: Is this college your...			
	First choice?	Second choice?	Third choice?	Less than third choice?
Response (N)	469	326	119	70
Four-Year Graduation Rate	45.6	46.6	57.1	52.9

Data Source: CIRP Freshman Survey Trends file



Graduation Rates by Initial Major: Descriptive Statistics and Limitations

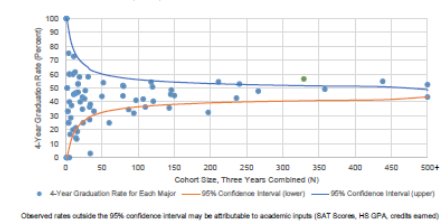
Prepared by the Office of Institutional Research, Planning & Effectiveness
March 10, 2014

This report presents four-year graduation rates of full-time, first-time students at the department or major level and examines limitations of these rates as indicators of organizational effectiveness or as units of analysis to identify effective practices. Three important factors fatally limit the utility of graduation rates at the program level:

- The number of students in each major is relatively small leading to a wide range of uncertainty about the calculated rate. For the freshmen entering SBU in 2007, 2008 and 2009 combined, the median number of entering students in each major was just 20 students, which equates to a 95% confidence interval of about +/- 19 percentage points.
- The academic qualifications of entering students vary widely by major, while the median SAT score for students in programs during this period was 1185, the 25th to the 75th percentile of programs was +/- 45 points and the full range was 1060-1395.
- The entering major of students is measured at the 15th day of their very first semester, because 50% of students who start in a declared major (including areas of interest and general/undeclared majors) complete a degree subsequently change their major, this figure does not necessarily reflect the effectiveness of the program.

These factors suggest that a 4-year graduation rate is unlikely to serve as a valid or reliable indicator for program effectiveness. Similarly, as a unit of analysis for identifying promising practices to promote student success, an uncontextualized program-level graduation rate may prompt development of faculty policy because of false positive and false negative results that emerge from an optical review of the data.

Figure 1. 4-Year Graduation Rates by Size of Entering Cohort, Grouped by Major Cohort Size, Three Years Combined (2007, 2008, 2009)



Stony Brook Univ. as 1st, 2nd, 3rd choice of admitted students, 1971-2012

4-year graduation rates by initial major and limitations



EXTERNAL TOOLS AND METHODS



STUDENT SUCCESS COLLABORATIVE

INSTITUTIONAL ANALYTICS

College Comparison

9 Colleges
17,544 Students

Selected Colleges:

- College of Arts and Sciences
- College of Business
- College of Engring & App Sci
- Marine Sciences
- Provostial Area
- School of Health Tech & Mgt.
- School of Journalism
- School of Nursing
- School of Social Welfare

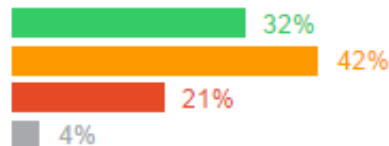
Colleges

Predicted Risk Level: ■ Low ■ Med ■ High ■ N/A

College of Arts and Sciences

[View Majors](#)

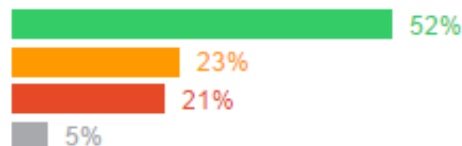
10,765 Students



College of Business

[View Majors](#)


1,113 Students





STUDENT-LEVEL ANALYTICS

Student Success Collaborative Screenshot



Sally Student

ID: XXXXXXXXX
Age: 20
DOB: XX/XX/1994

- Overview
- Success Progress
- Term Details
- History

OVERVIEW

ACADEMIC SUMMARY

Risk HIGH ?


Political Science
College of Arts and Sciences

Most recent enrollment
Fall 2014

<p>COURSE GRADE of D/F</p> <p style="font-size: 2em; font-weight: bold;">1</p>	<p>REPEATED COURSES</p> <p style="font-size: 2em; font-weight: bold;">0</p>	<p>COURSE WITHDRAWALS</p> <p style="font-size: 2em; font-weight: bold;">0</p>
<p>ANT104 Grade: F Spring 2014</p>	<p><i>There were none in this student's history</i></p>	<p><i>There were none in this student's history</i></p>

Notifications	0
Cum GPA	<u>2.43</u>
Total Credits	<u>52.00</u>
Institution Credit Completion %	<u>77%</u>

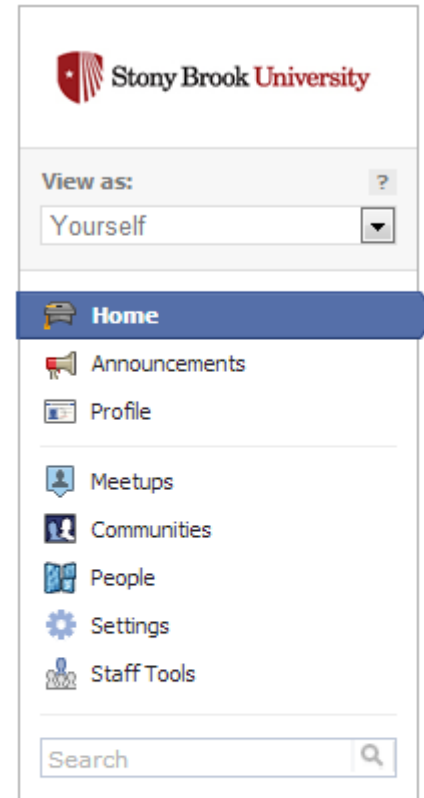
Sophomore





SOCIAL MEDIA ANALYSIS

- Private social network for admitted students within Facebook, hosted by Uiversity
- Students build their own communities around shared interests
- Native mobile apps and multichannel announcements





ENROLLMENT PROBABILITIES

App provides rank and probability to enroll
Categorizes students for outreach

MOST LIKELY TO ENROLL | **ON THE FENCE** | **LEAST LIKELY TO ENROLL**

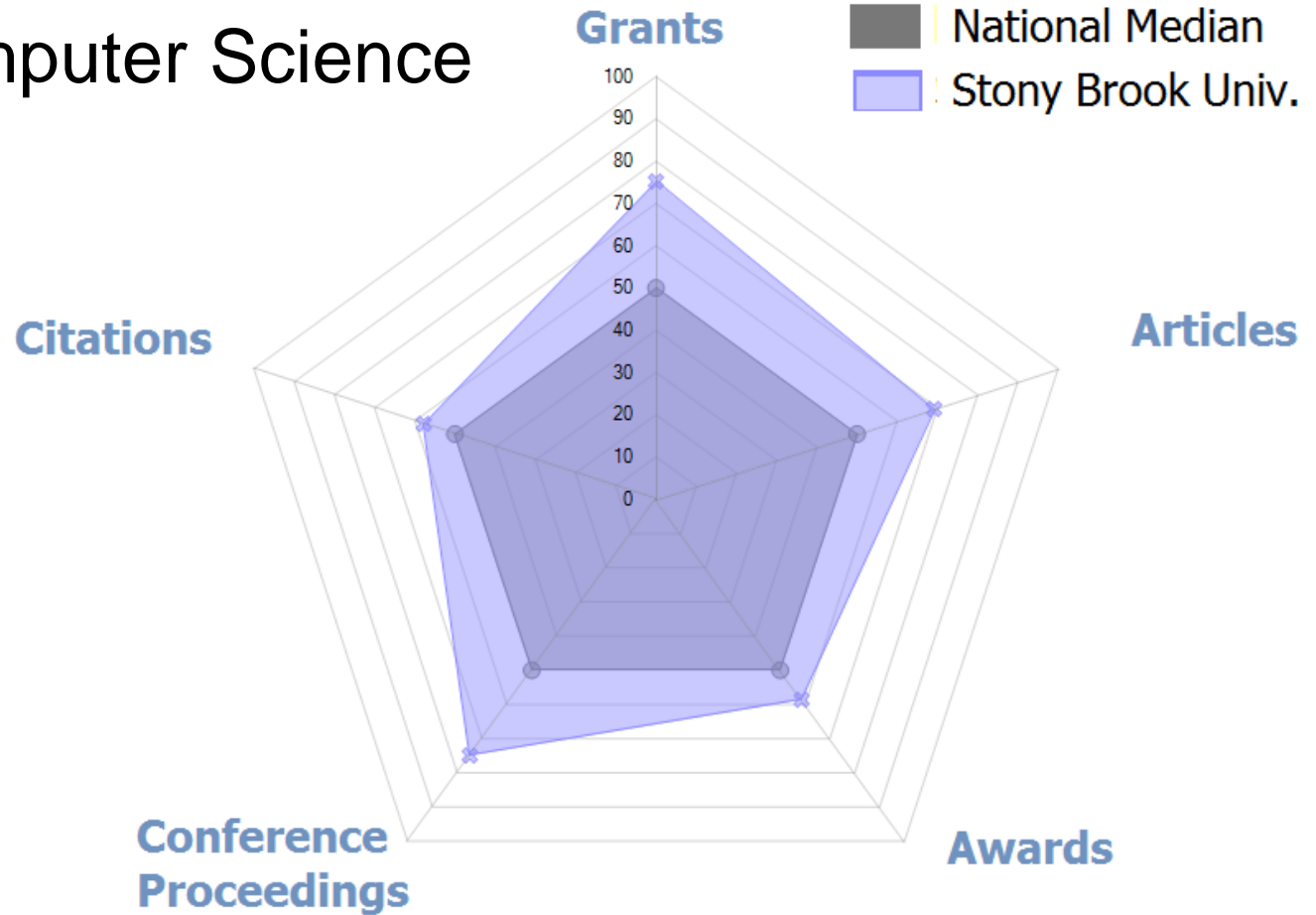
	Mark Miller Joined 78 days ago Major: Design From: Austell, GA	60%
	Jorge Espinoza Joined 80 days ago Major: Biology From: Detroit, MI	54%
	Lauren Roush Joined 90 days ago Major: Nursing From: Los Angeles, CA	42%





ACADEMIC ANALYTICS

Dept. of Computer Science



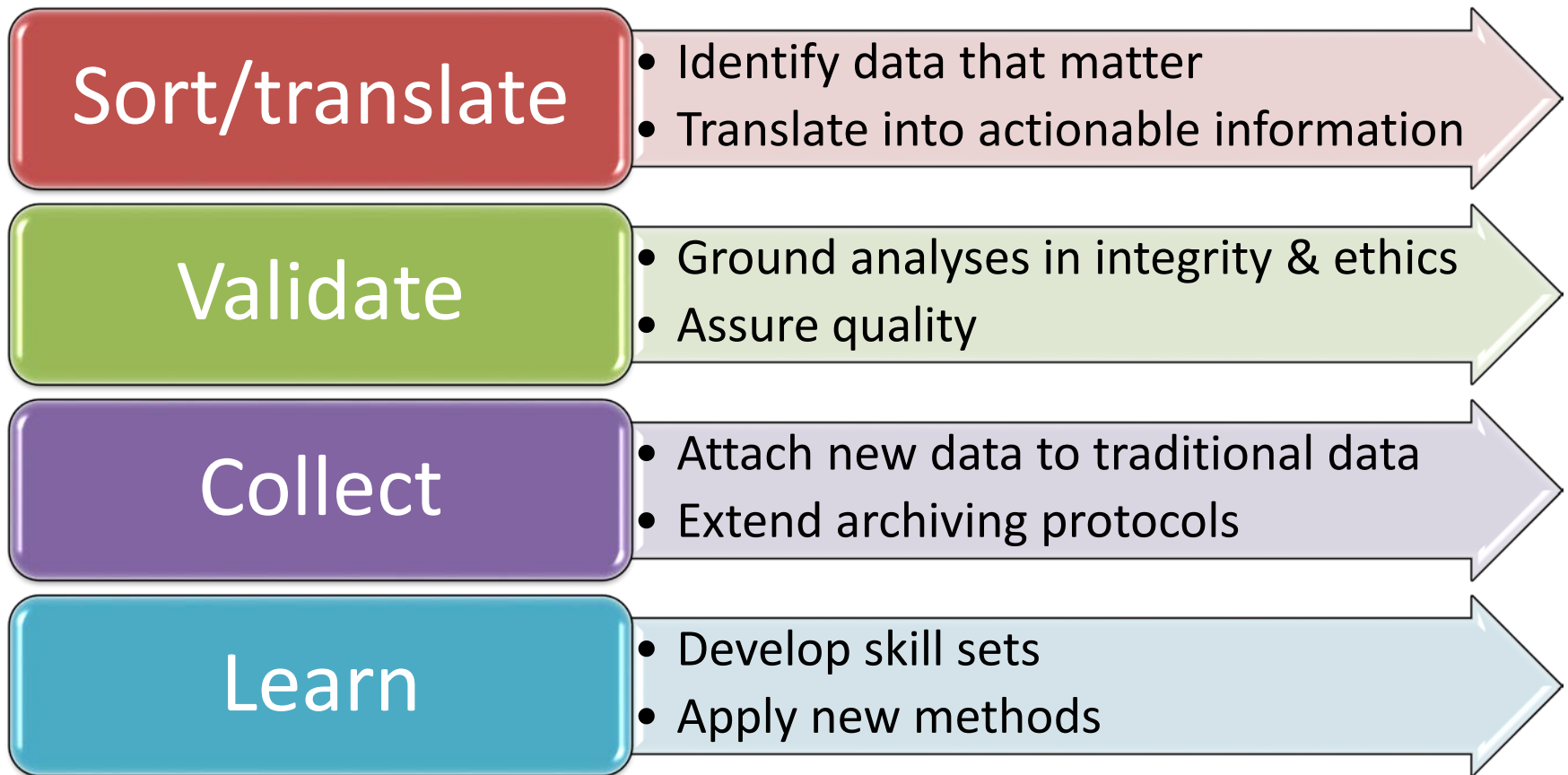


LIMITATIONS

- Extensive use of transactional data means results are not replicable
- Third party algorithms prevent easy validation; some models do not follow generally accepted data mining practices (training, validation, test)
- Difficulty of data cleaning in external databases



EVOLVING ROLE OF IR IN BIG/NEW DATA





BUILDING A STRONG IR FUNCTION

Build a firm foundation

Definitions

Data Governance

Data Management

Master the **regular communication** of quality descriptive statistics

Develop capacity for inferential statistics, forecasting, modeling, and data mining



QUESTIONS?

Contact Information:

Dr. Braden J. Hosch

Stony Brook University

Braden.Hosch@StonyBrook.edu

+1 (631) 632-6210



Stony Brook
University