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

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Stony Brook University

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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

Source: Office of Institutional Research, Planning & Effectiveness
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

(225 Degree & Certificate Programs)
STUDENT AND DEGREE PROFILE

Fall Headcount Enrollment

Award Level

Discipline

Number of Awards

Source: Office of Institutional Research, Planning & Effectiveness
## OTHER HIGHLIGHTS

<table>
<thead>
<tr>
<th>Employees:</th>
<th>Annual Budget:</th>
</tr>
</thead>
<tbody>
<tr>
<td>14,500, including hospital</td>
<td>2.3 billion USD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty:</th>
<th>Annual Research Expenditures:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,500 Total</td>
<td>220 million USD</td>
</tr>
<tr>
<td>1,100 Tenured/Tenure Track</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student-Faculty Ratio:</th>
<th>Graduation Rates:</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:1</td>
<td>50% in 4 years</td>
</tr>
<tr>
<td></td>
<td>68% in 6 years</td>
</tr>
</tbody>
</table>
OFFICE OF INSTITUTIONAL RESEARCH, PLANNING & EFFECTIVENESS
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”
2010
Budget cuts
Staff departures

2011-13
Interim leadership / Receivership

2013
Reorganization
Office of Institutional Research, Planning & Effectiveness

2014
New mission
Staff restoration
Data Governance
Expanded Scope
INSTITUTIONAL RESEARCH
FULL-TIME STAFF 2009 - 2016

*FY 2016: 5 FTE, plus 1 requested
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

1. Data Management
2. External Reporting & Accountability
3. Decision Support & Internal Data Requests
4. Research
5. Institutional Effectiveness
6. Strategic Planning Support
INSTITUTIONAL RESEARCH FUNDAMENTALS
VALUES FOR PROJECTS

Accurate
Responsive
Timely
Reproducible
Contextualized
MEASUREMENT CONCEPTS

Definition
Time period
Measurement Point
Documentation
# DATA MANAGEMENT

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat files in organizational silos</td>
<td><strong>Relational data warehouse</strong></td>
<td>Relational data warehouse</td>
<td>Addition of external data sources:</td>
</tr>
<tr>
<td>Manual error checks</td>
<td>Limited quality assurance</td>
<td>Data governance and Quality Assurance</td>
<td>National databases</td>
</tr>
<tr>
<td>Reports from transactional systems</td>
<td>Uneven protocols for data freeze</td>
<td>strengthened</td>
<td>AAUDE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data freeze protocols extended</td>
<td>Academic Analytics</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Federal</th>
<th>State</th>
<th>System</th>
<th>Rankings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary Stats</td>
<td>Summary Stats</td>
<td>Unit Records</td>
<td>Summary Stats</td>
</tr>
<tr>
<td>Enrollment</td>
<td>Enrollment</td>
<td>Enrollments</td>
<td>Common Data Set</td>
</tr>
<tr>
<td>Completions</td>
<td>Completions</td>
<td>Courses</td>
<td>Research</td>
</tr>
<tr>
<td>Financial Aid</td>
<td>Financial Aid</td>
<td></td>
<td>Various</td>
</tr>
<tr>
<td>Graduation Rates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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
Cross-functional task force in 2015 to recommend institutional policies and structures
WEB SITE

Areas for:
About
Data
Reports
Dashboards
Resources

http://www.stonybrook.edu/commcms/irpe/index.html
Headcount Enrollment by Age (Undergraduate and Graduate Students) - Fall 2014

<table>
<thead>
<tr>
<th>Age</th>
<th>Undergraduate</th>
<th>Graduate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 &amp; younger</td>
<td>3,188</td>
<td>1</td>
<td>3,189</td>
</tr>
<tr>
<td>19</td>
<td>2,826</td>
<td>1</td>
<td>2,827</td>
</tr>
<tr>
<td>20</td>
<td>3,155</td>
<td>18</td>
<td>3,173</td>
</tr>
<tr>
<td>21</td>
<td>2,914</td>
<td>161</td>
<td>3,075</td>
</tr>
<tr>
<td>22</td>
<td>1,633</td>
<td>664</td>
<td>2,297</td>
</tr>
<tr>
<td>23</td>
<td>880</td>
<td>852</td>
<td>1,732</td>
</tr>
<tr>
<td>24</td>
<td>509</td>
<td>963</td>
<td>1,462</td>
</tr>
<tr>
<td>25-29</td>
<td>841</td>
<td>2,783</td>
<td>3,624</td>
</tr>
<tr>
<td>30-39</td>
<td>332</td>
<td>1,700</td>
<td>2,032</td>
</tr>
<tr>
<td>40-49</td>
<td>120</td>
<td>624</td>
<td>753</td>
</tr>
<tr>
<td>50 or older</td>
<td>73</td>
<td>370</td>
<td>443</td>
</tr>
<tr>
<td>Total</td>
<td>16,480</td>
<td>8,127</td>
<td>24,607</td>
</tr>
</tbody>
</table>

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
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.

### Enrollment By Level

<table>
<thead>
<tr>
<th>Academic Level</th>
<th>Fall 2011</th>
<th>Fall 2012</th>
<th>Fall 2013</th>
<th>Fall 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st Major</td>
<td>2nd Major</td>
<td>Undup Total</td>
<td>1st Major</td>
</tr>
<tr>
<td>Junior</td>
<td>3,290</td>
<td>228</td>
<td>3,298</td>
<td>3,375</td>
</tr>
<tr>
<td>Senior</td>
<td>5,809</td>
<td>788</td>
<td>5,809</td>
<td>5,673</td>
</tr>
<tr>
<td>Undergraduate Non-Matric</td>
<td>130</td>
<td>130</td>
<td>219</td>
<td>219</td>
</tr>
<tr>
<td>Grand Total</td>
<td>15,785</td>
<td>1,152</td>
<td>15,785</td>
<td>15,837</td>
</tr>
</tbody>
</table>
INTERACTIVE VISUALIZATIONS

Degree Outcomes by Initial Major Freshmen Entering in Fall 2007

Major Migration, Freshmen Entering in Fall 2010
EXECUTIVE DASHBOARD

Source: Stony Brook Executive Dashboard
Graduation and Retention Rates

1-Year Retention Rates

- 2011 cohort: 89.9%
- 2012 cohort: 90.1%

#25 (out of 34 public AAUs)

4-Year Graduation Rates

- 2007 cohort: 45.1%
- 2009 cohort: 46.1%

#27 (out of 34 public AAUs)

6-Year Graduation Rates

- 2007 cohort: 65.9%

#32 (out of 34 public AAUs)

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

Source: Stony Brook Executive Dashboard
Analysis of general education course success to forecast policy impact

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
INSTITUTIONAL ANALYTICS

College Comparison

9 Colleges 17,544 Students

Selected Colleges:
- College of Arts and Sciences
- College of Business
- College of Engineering & Applied Sciences
- Marine Sciences
- Provostial Area
- School of Health Technology & Management
- School of Journalism
- School of Nursing
- School of Social Welfare

College of Arts and Sciences
10,765 Students
- Low: 32%
- Med: 42%
- High: 21%
- N/A: 4%

College of Business
1,113 Students
- Low: 23%
- Med: 52%
- High: 21%
- N/A: 5%

Source: Educational Advisory Board Proprietary Tool
STUDENT-LEVEL ANALYTICS

Student Success Collaborative Screenshot

OVERVIEW

ACADEMIC SUMMARY

Political Science
College of Arts and Sciences

- Course: ANT104
- Grade: F
- Spring 2014

- Risk: High
- Notifications: 0
- Most recent enrollment: Fall 2014
- Cum GPA: 2.43
- Total Credits: 52.00
- Sophomore
- Institution Credit Completion %: 77%
SOCIAL MEDIA ANALYSIS

- Private social network for admitted students within Facebook, hosted by Uversity

- 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

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%
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

Sort/translate
- Identify data that matter
- Translate into actionable information

Validate
- Ground analyses in integrity & ethics
- Assure quality

Collect
- Attach new data to traditional data
- Extend archiving protocols

Learn
- Develop skill sets
- Apply new methods
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?

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