"Del Análisis a la Investigación Institucional, un cambio de paradigma en la gestión estratégica de Instituciones de Educación Superior"

TALCA UNIVERSIDAD CHILE

International Seminar of Institutional Research
Universidad de Talca - Chile

# Institutional Research In the United States

Lydia Snover
Massachusetts Institute of Technology
Director of Institutional Research
November 14, 2017

MIT | Institutional Research Office of the Provost

- The American Higher Education System and events that have shaped it
- The growth of Institutional Research for Higher Education
- Challenges for the future
- MIT's experience

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Charla Magistral: "Maduración de la investigación institucional en los Estados Unidos y los retos para el futuro"
Ponente principal: Sra. Lydia Snover
Directora de Investigación Institucional - Instituto de Tecnología de Massachusetts

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## American Higher Education Enterprise

3,000 regionally accredited institutions in the United States with over 17 million students. Higher Education is primarily the business of individual states, privately financed institutions or religious organizations. There is no national university for the United States.

Diversity of Institutions:

- Community colleges, liberal arts, research universities.
- Public, independent, and for-profit
- Religious and secular
- Comprehensive and single-purpose
- Large (50,000+) and small (20 students)

## Events that have shaped Higher Education in the United States

- Morrill Land-Grant Act of 1862
  - Agricultural research, engineering and Military Training
- World War II
- Soviet launch of Sputnik in 1957
- Civil Rights Act of 1964

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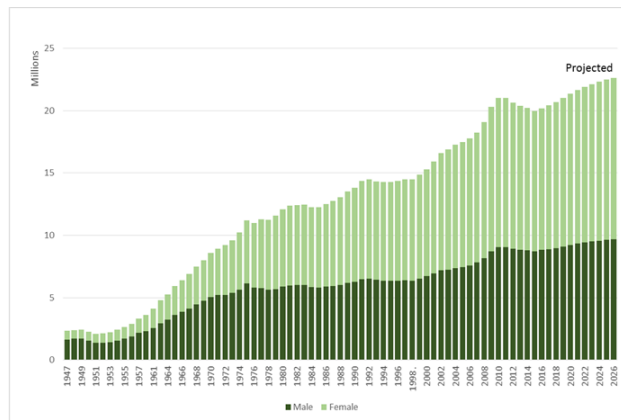Directora de Investigación Institucional - Instituto de Tecnología de Massachusetts

## Morrill Land-Grant Act of 1862

- The US Federal Government granted Land to Universities which they could use or sell and use the proceeds.
- Land Grant institutions are required to have Agricultural research and training, engineering and Military Training.
- All Land Grant Institutions, except MIT and Cornell University, are public institutions.

## World War II

- The GI Bill which provided funding to veterans expanded access to higher education that was independent of background and ability to pay.
- World War II brought an awareness that US military capabilities depended on strength in science and engineering.
- The partnership of the US Government and Universities during World War II generated technical advances that were pivotal to success.
  - Radar
  - Weather forecasting
  - The Manhattan project

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## Growth in Enrollment in Higher Education in the United States post World War II

Projected

Millions

Male    Female

Source: US Department of Higher Education

## Partnership between Universities and the Federal Government continues to expand

- National Institutes of Health
  - 1920's US Public Health Service began it's partnership with universities by funding special cancer studies with the Harvard Medical School.
  - National Institute of Health was created in 1930
  - The NIH invests nearly $32 billion annually in medical research for the American people.
  - More than 80% of the NIH's funding is awarded through almost 50,000 competitive grants to more than 300,000 researchers at more than 2,500 universities, medical schools, and other research institutions in every state and around the world.
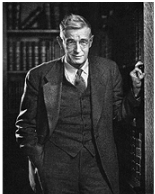
NIH
National Institutes of Health

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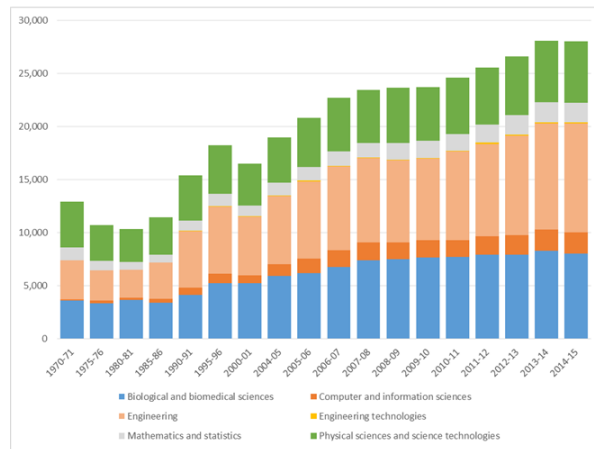
# National Science Foundation

- In 1945, Vannevar Bush authored a report: **Science –The Endless Frontier** that outlined how federally funded scientific research through the establishment of what would become the National Science Foundation, would result in improvements in health care, economic growth and stronger defense.
- 1950 National Science Foundation established
- In the most recent budget NSF's budget was $7.5 billion funding about 9,000 individual research grants.
- NSF is able to take the long view on basic research projects, particularly in physics and astronomy.

# SPUTNIK
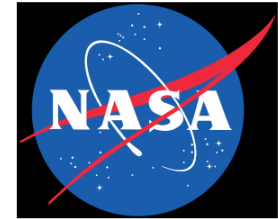
- 1957 Sputnik was followed by establishment of NASA in 1958
- NASA's annual budget is currently $19 billion
- The launch of Sputnik dramatically increased the investment in Science and Technology during the 1960's.

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Doctoral Degrees in Science, Technology, Engineering and Mathematics Awarded in the United States

Source: US Department of Higher Education



# Civil Rights Act of 1964

This act outlaws discrimination based on race, color, religion, sex or national origin and made diversity a priority for higher education. In order to increase diversity in employment, the US had to increase diversity in higher education.
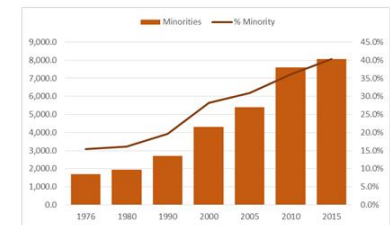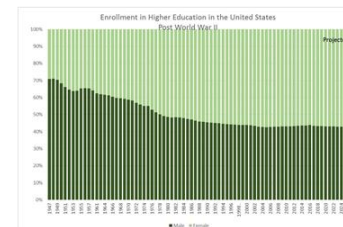
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## The growing importance of data

- The expansion of Higher Education to a larger percentage of the population made it an important segment of the economy.
- The Federal Government's participation in funding students through the GI bill and federal grants and loans was accompanied by the need to document outcomes of the investment.
- The growing partnership of the Federal Government and Research Universities for expansion of basic and applied research is constantly being assessed.
- Although monitoring diversity is required by federal law, it is a priority for universities and colleges.

## US Department of Education National Center for Educational Statistics

- Authorized by the Higher Education Act of 1965 the Higher Education General Information Survey (HEGIS) was developed in 1960's
- HEGIS was followed by an expanded data collection in 1992 Integrated Postsecondary Education Data Survey (IPEDS)

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# HEGIS and IPEDS

- Participation is mandatory for universities and colleges who have students receiving federal financial assistance.
- These data collections require institutions to compile and submit data from different offices: registrar, accounting, human resources, financial aid.
- In conjunction with higher education institutions NCES has established standard data definitions.
- Data is publicly available.

## Emergence of Institutional Research

- Institutional Research offices were created to compile and submit data on behalf of the institution.
- There was an subsequent realization that data submitted to the federal government could also be used for internal purposes.
- Standard data definitions provided meant that institutions could make reasonable comparisons with other institutions.

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# Emergence of Voluntary Consortiums

- During the 1970's voluntary consortiums were established for express purpose of collecting data for benchmarking
    - Members of the Association of American Universities (research universities) established the AAU data exchange
    - A group of highly selective private universities established the Consortium on the Financing of Higher Education (COFHE)
    - A group of ten public universities in the Midwest established the Committee on Institutional Cooperation in 1958 which is now the BIG Academic Alliance
    - Private primarily four year liberal arts colleges established Higher Education Data Sharing (HEDS)

**Consortium on Financing Higher Education**

AAUDE
Association of American Universities Data Exchange

B1G
ACADEMIC ALLIANCE

HEDS

Analysis
admissions
meetings    public issues
colorbook
Members    Data
Benchmarks
COFHE    financial aid
Metrics Research
survey

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# Institutional Research

Institutional research offices are not all the same. They reflect the mission of the institution and priorities of their current administration. There are many common responsibilities.

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## Common responsibilities of Institutional Research Offices

- Required state and federal data submission
- Accreditation
- Responding to data requests (i.e., ranking organizations)
- Supporting decision making
- Supporting program review
- Monitoring diversity and climate
- Enrollment management and financial aid modeling

## Accreditation in the United States

- The US has six regional accrediting organizations that are private and nongovernmental. These regional organizations are recognized by the US Secretary of Education and the Council for Higher Education Accreditation.
- Each accrediting organization develops its own standards and processes which are reviewed periodically.
- Accreditation is a self-regulatory system which is voluntary on the part of the institution and relies on volunteers to act as peer evaluators.
- Accreditation fulfills two functions: Quality Improvement and Quality Assurance.
- The core of the accreditation process is periodic self studies by institutions and programs.
- The success of the US accreditation process relies on candor and integrity.
- In addition to institutional accreditation, there are discipline specific accreditations, such as ABET for Engineering disciplines.

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## Program Review and Continuous Improvement

- Program Review provides a process for quality improvement.  This process is similar to the accreditation self study process, but is institution specific.
- Assessment is a component of Quality Improvement and Quality Assurance.
- Last fifteen years has seen an increasing emphasis on assessment of learning outcomes.

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## Who's the best?

- Rankings of Universities and Colleges continue to have importance in the United States.
- Rankings depend upon data and metrics that are standardized and accepted by the institutions and the public.  Institutions and ranking/publishing organizations developed the Common Data Set.
  - Student / faculty ratios
  - Retention and Graduation rates
  - Outcomes
    - Percentage of degree recipients pursuing advanced degrees
    - Percentage of degree recipients working after graduation
- Reputation is a component of most rankings

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## US Government 1911 ranking of Colleges



## International Rankings

- Over the last 10 years there has been an emergence of International Rankings
  – Times Higher Education
  – QS
- An unanticipated consequence of these rankings is the development of common data definitions which allow some limited benchmarking

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## The Future

- Higher Education is an international enterprise
- Changes in the modes of instruction have untended consequences for data governance
- Definitions of diversity are changing
- Big Data and predictive analytics!

## Higher Education is an international enterprise

Because higher education systems are country specific comparisons can be very difficult

— Who counts as "faculty"

— What counts as a successful outcome or as an indicator of quality

- Retention and graduate rates are not comparable
- Student selectivity / admissions standards differ dramatically
- Funding mechanisms

The number of international students attending colleges and universities in countries other than their own is significant

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## Many traditional definitions have changed / become less clear

- As the modes of instruction have changed to include on-line/distance learning it is hard to define
  - Who is a student?
  - What is success when only 5% of the participants complete a course?

## Definitions of Diversity continue to expand

- Sex
- Race / Ethnicity
- Citizenship
- National Origin
- Gender identification
- Sexual orientation
- Religion

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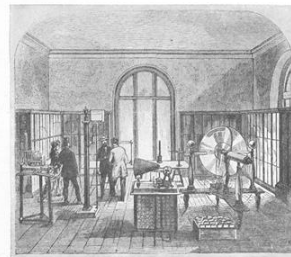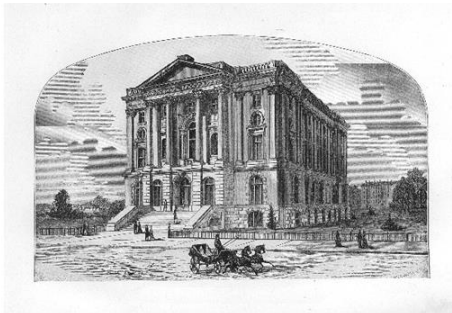
## Focus on Analytics

Many institutions are looking to ways they can better leverage existing institutional data to improve student success, bolster enrollment and enhance reporting.

- Big Data
- Predictive Analytics
- Machine Learning / Nature Language Processing to turn qualitative information into quantitative data
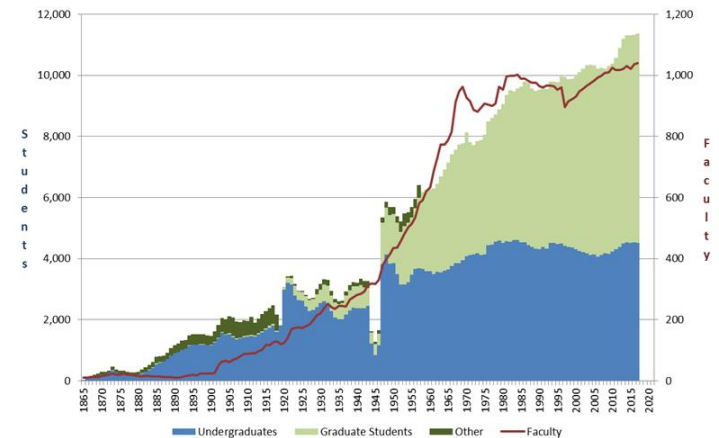- Can predictive analytics improve outcomes for students or reduce risk for institutions.
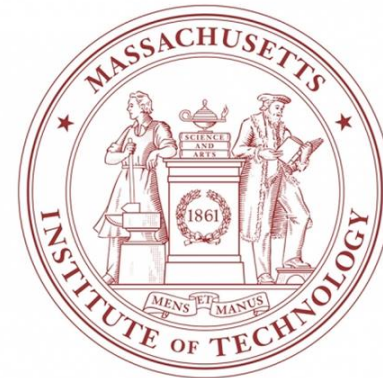
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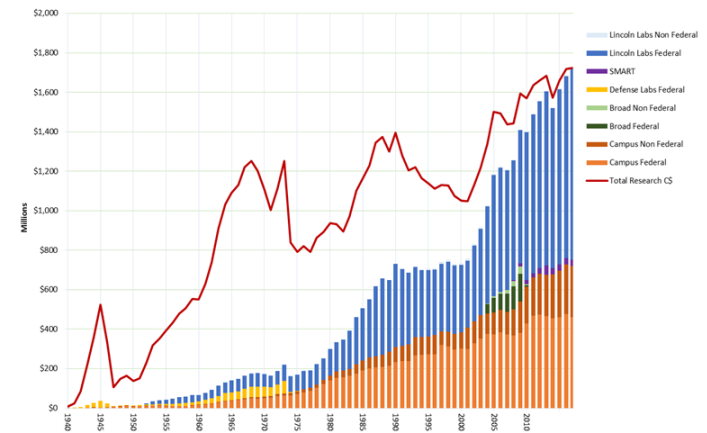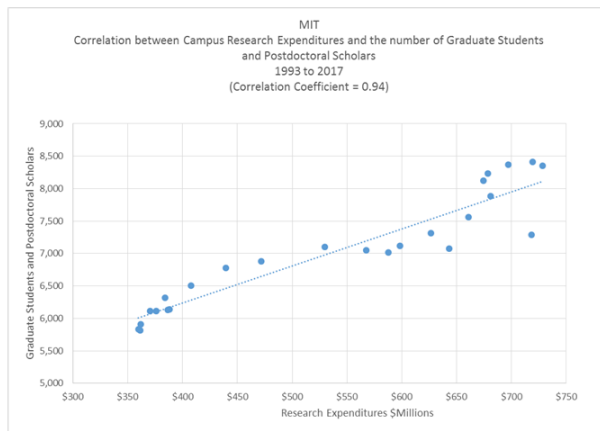
Growth of International Students at MIT
1884 - 2017
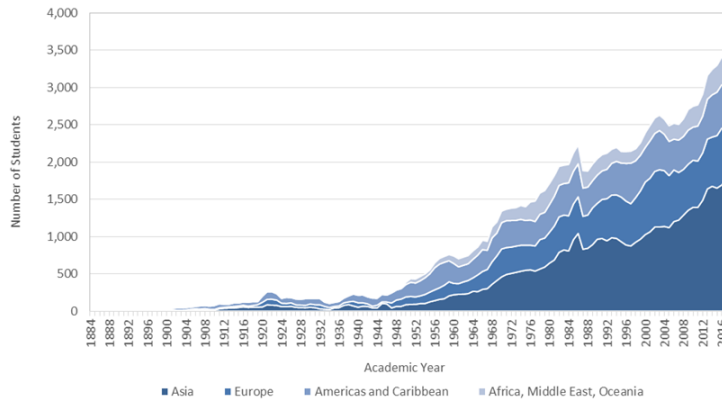


World War II transformed MIT from a Regional
Technical School to a Research University

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# Institutional Research @MIT

- The IR function was established in 1986 in large part to support physical planning.
- Currently Institutional Research is part of the Office of the Provost. The Provost is MIT's chief academic officer.
- 10 staff



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## Major Functions of Institutional Research at MIT

- MIT Historical Databases
- Productivity measures for MIT faculty and staff
- Graduate education measures
- Diversity
- Survey administration and analysis
- Consortia
- Rankings
- Federal, state and organizational reporting
- Accreditation
- MIT Briefing Book – Washington Office
- **Program Review**

## Three specific topics

- Program Review
- Consortia
- Rankings

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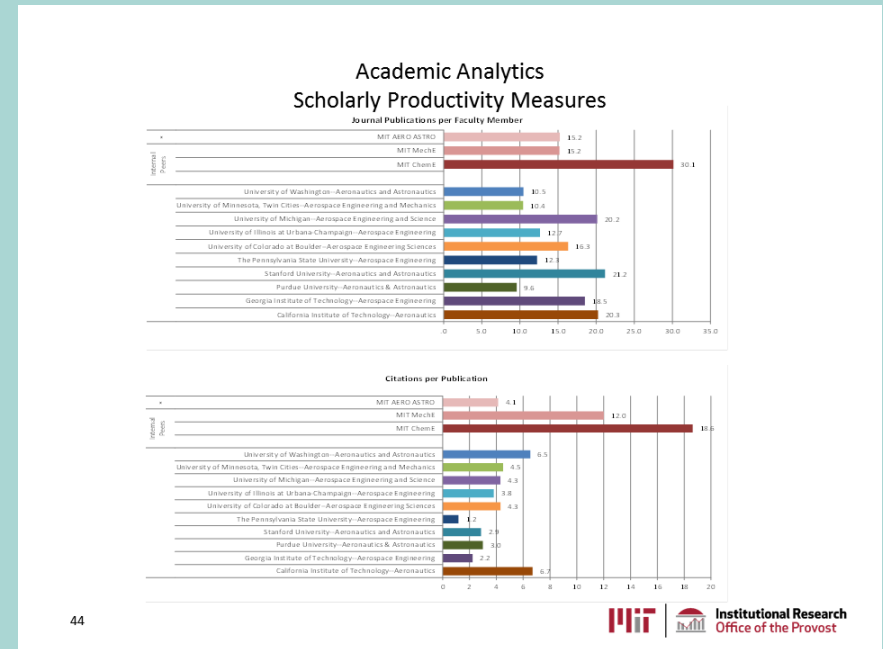## Program Review at MIT Visiting Committees

- MIT has an established program review process that was initiated in 1875
- Currently every 2 years every academic department has an external committee made up of about 17 members
- There are approximately 425 distinguished professionals, including scientists, engineers, entrepreneurs, executives, and educators, many of whom are graduates of the Institute who members of MIT's visiting committees
- Each of the 31 visiting committees normally meets for one-and-one-half days
- The committees operate as advisory groups to the MIT Corporation and the administration, offering appraisal, advice, and insight on each academic program and on other major activities at the Institute
- Committee recommendations and ideas are conveyed to the Corporation, senior administration, department heads and faculty through oral and written reports and on-going assessments

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## Issues of interest to Visiting Committees

- Undergraduate and graduate educational programs; postdoctoral scholars
- Graduate Admissions – selectivity, diversity, outcomes
- Department resources including quality and quantity of space, graduate student funding, research funding
- Faculty: renewal and recruitment
- Research: breadth and depth; Is MIT sufficiently involved in emerging areas of research?
- Competition: who are the department's closest peers and how does MIT compare?

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## Background Information provided in advance of meeting

- Agenda is developed by the head of the department and the chair of the visiting committee
- Department generates data in support of specific agenda items
- Institutional Research provides three reference documents to the Head of the Department, Chair of the Visiting Committee and selected Senior Officers
  - Department Profile
  - Strategic Indicators
  - Student Assessment and Outcomes
- Provide context through comparative data



Academic Analytics
Scholarly Productivity Measures

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## Comparing Survey responses
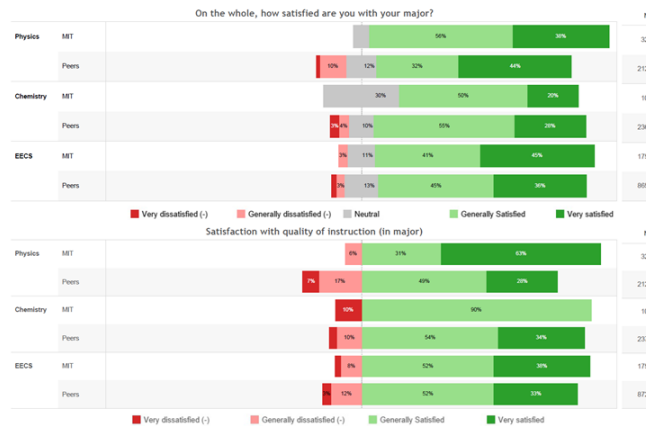


## MIT is an active member of many consortia which provide valuable comparative data

- Association of American Universities (AAU) 60 US and 2 Canadian members. AAU was established in 1900
  - AAU Data Exchange was established in the 1970s. The AAUDE data warehouse is housed and administered at MIT.
- Consortium on the Financing of Higher Education (COFHE) has 35 members and is located at MIT. COFHE was established in the 1970's
  - MIT administers a number of recurring surveys for COFHE
- Coalition for the Next Generation of Life Sciences – Transparency for Graduate Education

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## MIT is interested in Universities outside the United States

- Over 40% of our tenured and tenure track faculty have international origins and their experiences with higher education outside the US influences their actions and attitudes at MIT.
- Over 40% of our students studying for advanced degrees are international and their experiences with higher education outside the US influences their expectations.
- Over 60% of our postdoctoral scholars are international and their experiences with higher education outside the US influences their expectations.
- MIT has existing and potential institutional collaborations with universities outside the US.
- MIT faculty have many international research collaborations and the numbers continue to increase.

## International Data without an International Educational Agency/Authority

- Metrics – There is no International/World Department of Education.
  - The development of standard data metrics has been taken on by ranking agencies, by providing definitions in their data collections.
    - Understandings of many metrics differ by country; i.e., faculty and instructional staff.
    - To the extent that these metrics are aligned, they provide insight about international institutions that MIT might collaborate.
  - International rankings have a huge reliance on bibliographic metrics that are defined by publishers like Elsevier

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# International Reputational Data

- Reputational Data
  - Provides insight as to MIT's reputation in specific areas of the world
  - Provides insight as to how MIT's reputation compares to US and International peers
  - Specific disciplinary reputation is of great interest to department heads and faculty
- Sources include (Institutions can purchase data)
  - QS
  - Times Higher Education
  - US News Global rankings



QS Academic Reputation Dataset – Major Discipline
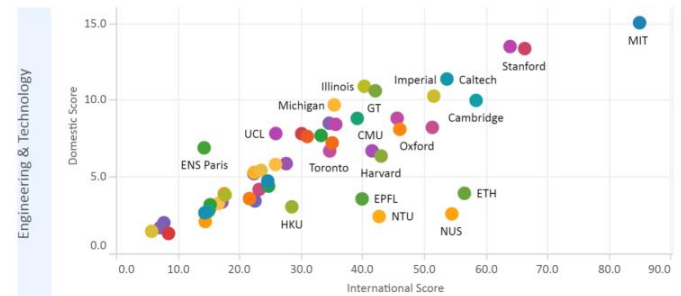
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Data Analytics: Machine learning to document collaboration
http://collaboration.mit.edu/

Any Questions?

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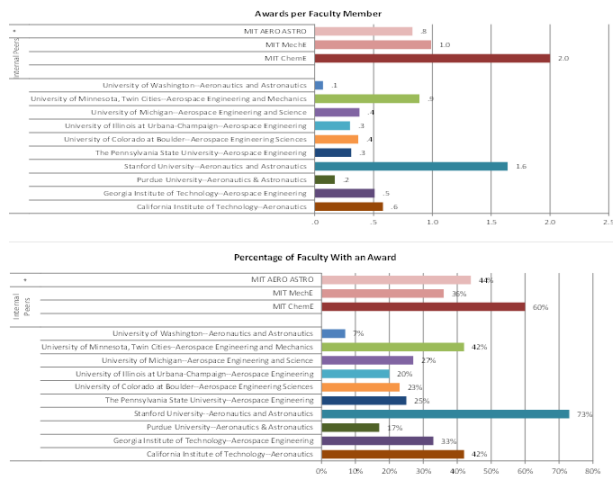de Instituciones de Educación Superior"

## On Line Learning

- MIT IR acts as the Trustee for data generated by MITx courses which use the Edx platform.
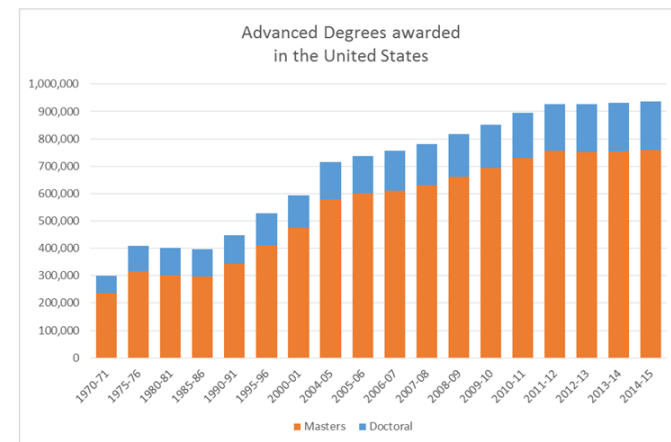- Researchers are using this data to study student learning.

## Sources of Comparative Data

- United States Department of Education: Integrated Postsecondary Education Data Survey (IPEDS) – student enrollment, degrees conferred
- United States National Science Foundation Surveys on Higher Education Research and Development Expenditures and Graduate Student Support
- Rankings at the discipline level
- Reputational data at the discipline level
- Metrics on faculty productivity and recognition using data from Academic Analytics
- Results from consortia student surveys (select peer schools)

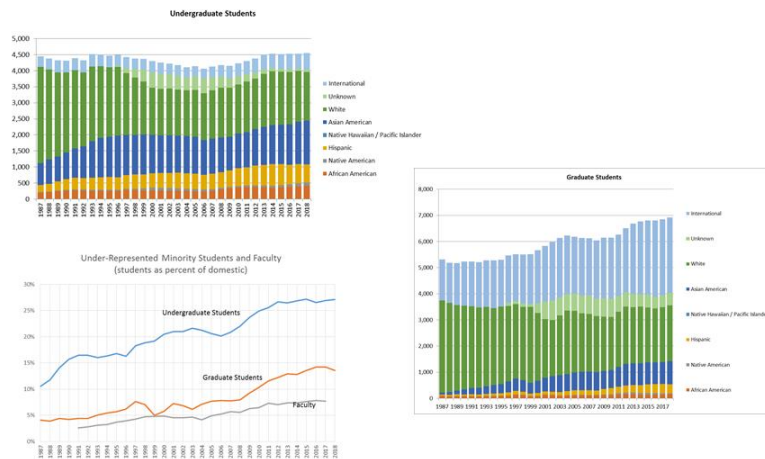Charla Magistral: "Maduración de la investigación institucional en los Estados Unidos y los retos para el futuro"
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Diversity

## Common Activities of Institutional Research Offices

- Compiling data from institutional sources (database management / data warehousing)
  - Data Governance
- Surveys of students and staff
- Analysis
  - Creating metrics
  - Predictive analytics (enrollment management)
  - Statistical analysis

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