Office of Institutional Research and Strategic Analytics (OIRSA)
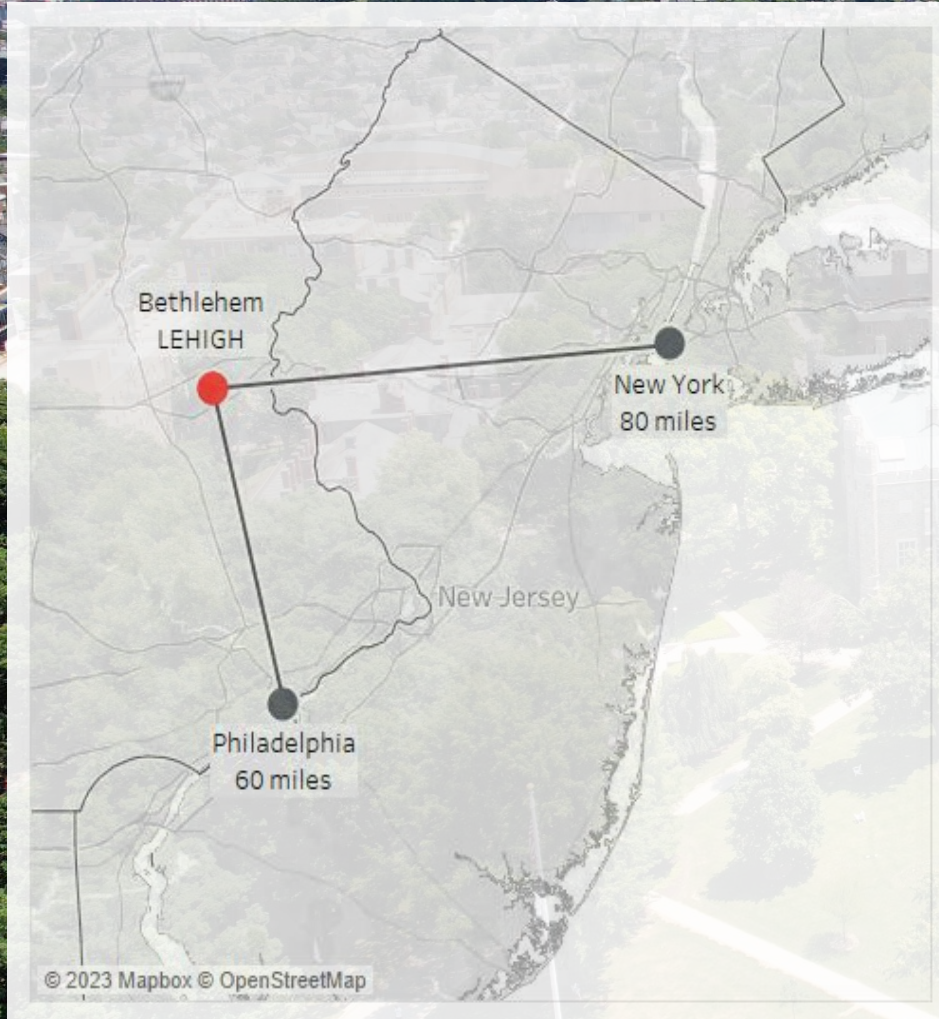

OIRSA | LEHIGH UNIVERSITY

Office of Institutional Research & Strategic Analytics

- Office of Institutional Research expanded in 2017 as a result of Lehigh's Strategic Analytics Initiative
- 9 full-time staff members
- Specializing in 3 areas:
    Institutional Research
    Data Governance
    Strategic Analytics

air forum

About Lehigh University

- Located in Bethlehem, PA
- Around 7,000 total students
  - 5,000+ Undergraduate
  - <2,000 Graduate
- Five colleges:
  - Arts & Sciences
  - Business
  - Engineering & Applied Science
  - Education
  - Health
- Founded by railroad pioneer Asa Packer in 1865
- Adjacent to the former Bethlehem Steel Corporation
- Strategic Plan about to be launched (June 2023)

Bethlehem
LEHIGH

New York
80 miles

New Jersey

Philadelphia
60 miles

© 2023 Mapbox © OpenStreetMap

Agenda - What are we going to discuss?

- Graduate Time to Degree and why this is important data?

- The context of our graduate data and why this task was a challenge

- The methodology - technical details on what we did

- How we are using the data? Dashboard review

- What we learned from the process - adjustments/improvements

- Next steps - annual processing, tracking progress for strategic plan, what steps can we still improve, etc.

Project Goals

1. Gather Time To Degree data for **all masters and doctorate degrees obtained since 2015 graduating class up to most recent class (2022)**.

2. Build an **efficient, explainable, repeatable process**, that could then be applied every year to each new graduating class.

3. Store the data in our data warehouse so that it be easily used for any reporting purpose. *Final data is at the completion level (i.e. attribute of a degree obtained)*

air
forum

Why is graduate data important?

Students

- Transparency in selecting programs - Will I be successful?

- Understand the commitment expected to complete a degree relative to other institutions - How long will it take me?

Program Managers

- Academic planning, funding models, program reviews

- Monitoring the progress and success of students (retention and leave of absences)

- College and program-level needs: grant applications, marketing materials, etc.

University Leadership

- Institutional goal to grow the graduate student body while applications and enrollment have been trending downward

- Reduce disparities in Graduate Time to Degree (DI&E Strategic Plan)

- Data driven Deputy Provost for Graduate Education

air
forum

Graduate Data Challenges Faced Across Higher Education

- Reporting standards
  - IPEDS reporting requirements - focus on Undergraduate data
  - Data prep for college rankings - popularity of Undergraduate rankings

- Graduate metrics pushed to back burner due to lack of data transparency and the urgency of reporting on Undergraduate metrics

- Historical program-level data tracking and reporting processes no longer sufficient for University and College-level strategic analytics

air forum

Lehigh's Graduate Programs

What specific challenges we face at Lehigh?

- Grad programs are very decentralized
- Colleges make different curriculum policy decisions
- Very flexible curriculum - a lot of major/degree switching
- Resources - Registrar's Office
- Degree audit software is a black box

- Individual program-level reviews required for degree completions
- Varying levels of curriculum expertise and institutional knowledge between the colleges

How do data issues impact Time to Degree?

- Graduate data not structured as cleanly as Undergraduate data
  - Admit cohorts - makes it hard to identify official starting points
  - Student type - are some students already enrolled in other programs?
  - Class standing, Expected Grad Date, other UG progress measures

- Lack of transparent degree auditing makes it hard to understand what coursework applies to the degree being pursued, especially in situations where students have switched programs or are dual enrolled in multiple programs

- No official designation or classification of what constitutes a substantially related program. Which programs will accept credits from other programs?

Example of Lehigh's Graduate Admissions Data

MATRIC_TERM	ADMIT_CHRT	COLLEGE_	DEGREE_	MAJOR_	ENRL_STUTYP_CODE	
202110	00000000	ED	MED	EDL	F	
202040	00000000	EN	PHD	CHE	F	**First Time**
202020	00000000	ED	EDD	EDL	F	
202140	00000000	BU	MBA	BSAD	F	
202220	2220GRRE	EN	MENG	CHE	C	**Continuing**
202110	00000000	BU	MBA	CORE	F	
202140	00000000	AS	PHD	CHM	F	
202040	00000000	ED	MS	ITEC	F	
202040	00000000	BU	MBA	BSAD	F	
202040	0720GRRE	ED	CERTGR	9999	B	**Readmitted**
202120	2120GRRE	ED	EDD	EDL	B	
202140	0720GRRE	EN	CERTGR	9999	B	
202110	1710GRSP	BU	MBA	BSAD	B	

air forum

Methodology

Let's get to the fun stuff!

# Research and establishing definitions

1. Research: AAU, CGS (PhD completion project), NCES (Survey of Earned Doctorates), etc.

2. Compare information shared by institutions who reported their data: how did they define time to degree and time of entry? how did they report the data?
   a. Time elapsed vs time enrolled/registered
   b. Time of entry: many possibilities
   c. Report by exiting (graduating) cohort vs entering cohort

3. Create definitions that reflect our institutional policies and realities of our data.

Definitions

Time to degree (TTD):

Time elapsed (in years) between the time of entry and time of completion. If student took some time off (approved leave of absence or not) during their program, that time is included in their time to degree.

Time to degree

Time of entry
(Clock starts)

Time of completion
(Clock ends)
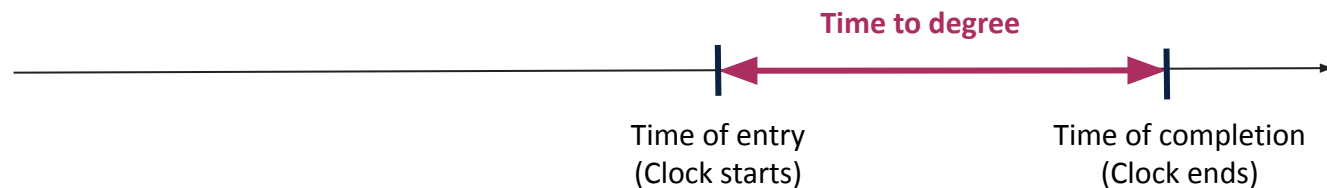
Definitions

Time of completion - *Clock ends:*

Date that the degree is conferred - graduation date.

Time of entry - *Clock starts:*

Start of first semester enrolled in the graduate program they graduated in, or in a substantially related program. If the student continued straight from masters to the doctorate at Lehigh, the time of entry for the doctorate is the start of the masters program. If they had an interruption of at least one semester (*stopout*) since earning their masters, the time of entry is the start of the doctorate program.

Clock restart event:

Event with the potential to reset the time of entry:

- **Student switched to an unrelated graduate program**
- **Student left for more than a semester after completing their master's and before coming back for the doctoral program**
- **Student completed a prior master's or doctorate in a different field of study**

Definitions

Program Curriculum:

Instructional program leading to a degree, with unique completion requirements. It is usually designated as a combination of degree code and major (e.g.: PhD in Chemistry, MEng in Mechanical Engineering) but can be independent from the major (e.g. Flex-MBA). It is an attribute of each enrollment record and of completion records. *Manually calculated because no equivalent field in our Student Information System; Is the level at which most of the reporting of time to degree will be done.*

Substantially related programs

Academic programs that share most of their curriculum requirements. A student who switches from a program to a substantially related program would be able to transfer all or most of their coursework. We will say that substantially related programs belong to the same *program group*, or that their majors belong to the same *major group*.

In practice, how should we identify those?

Programs/majors offered by the same department. Supplemented with a manually maintained list of programs in different departments that can be considered substantially related.

Developing the methodology

Data Sources

- Graduate completion data
- Graduate enrollment history
- Prior graduate degrees obtained

Extract and join data →

**Prepared data
Enrollment level**

Identify changes in enrollment, stopouts, degree completions, etc

Aggregate →

**Prepared data
Degree Completion level**

Aggregate →

**Prepared data
Enrolled program level** - for review purposes

Completion records with **automated TTD (no clock restart event)**

Completion records needing **manual review (enrollment pathway includes clock restart event)**

Meet with graduate programs experts in each college to discuss these "manual review" records and any changes in the methodology.

air forum

Phases of the project

| Phase 1 | Phase 2 | Phase 3 |

Pilot Project. We don't know what we don't know.

Scope: 1 graduating class (2015). ~700 records. May-October 2022.

Pilot extension. Test the initial logic and see if it holds. Explore a larger amount of records to identify more complex situations.

Scope: 4 graduating classes (2015-18). ~3,000 records. November-March 2023.

Finalize the methodology

Scope: 8 graduating classes (2015-22). ~ 5,500 records. April 2023-current

An iterative process
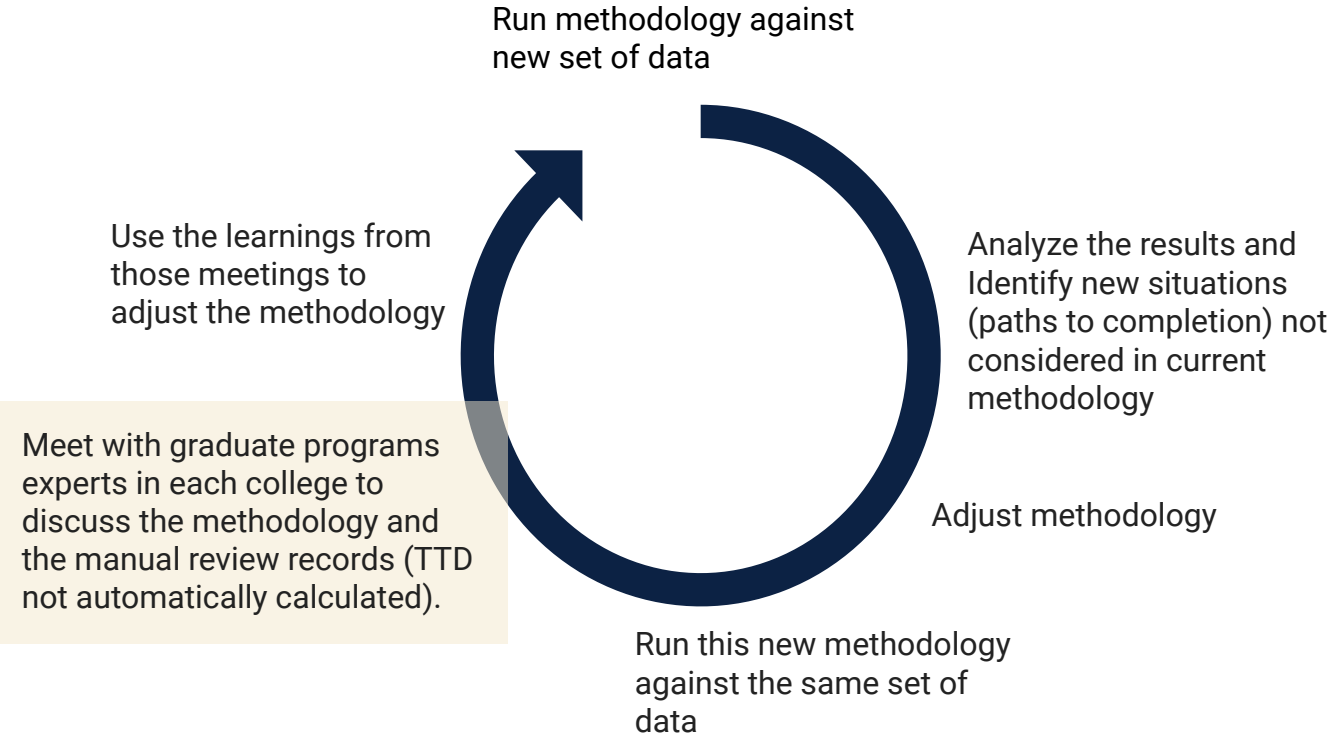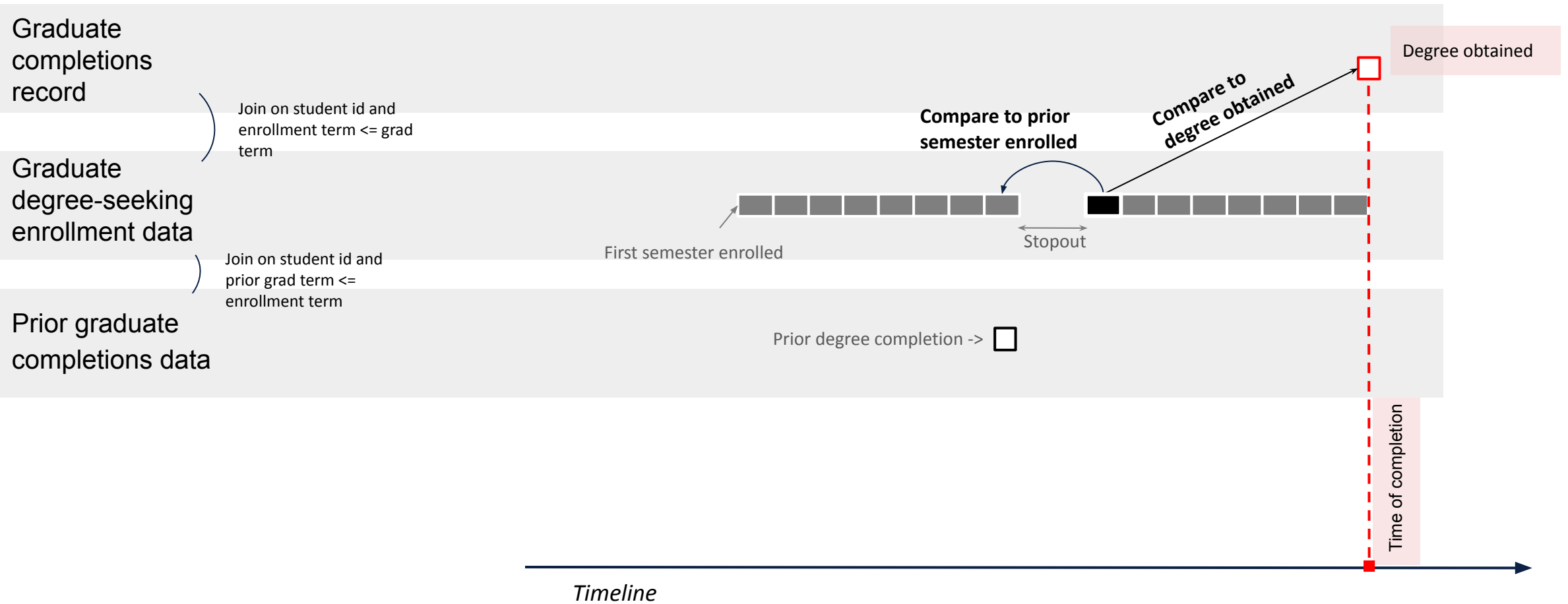
Run methodology against new set of data

Analyze the results and Identify new situations (paths to completion) not considered in current methodology

Adjust methodology

Run this new methodology against the same set of data

Use the learnings from those meetings to adjust the methodology

Meet with graduate programs experts in each college to discuss the methodology and the manual review records (TTD not automatically calculated).

air forum

Example case 1

Graduate completions record

Join on student id and enrollment term <= grad term

Graduate degree-seeking enrollment data

Join on student id and prior grad term <= enrollment term

Prior graduate completions data

Master_MENG_Energy Systems Engineering
Summer 2019-Spring 2020

Master_1-MBA
Summer 2020-Spring 2021

Degree obtained: Master_1-MBA

Clock restart event

Degree obtained: MENG_Energy Systems Engineering

Time of entry

Time of completion

Timeline

Time to degree
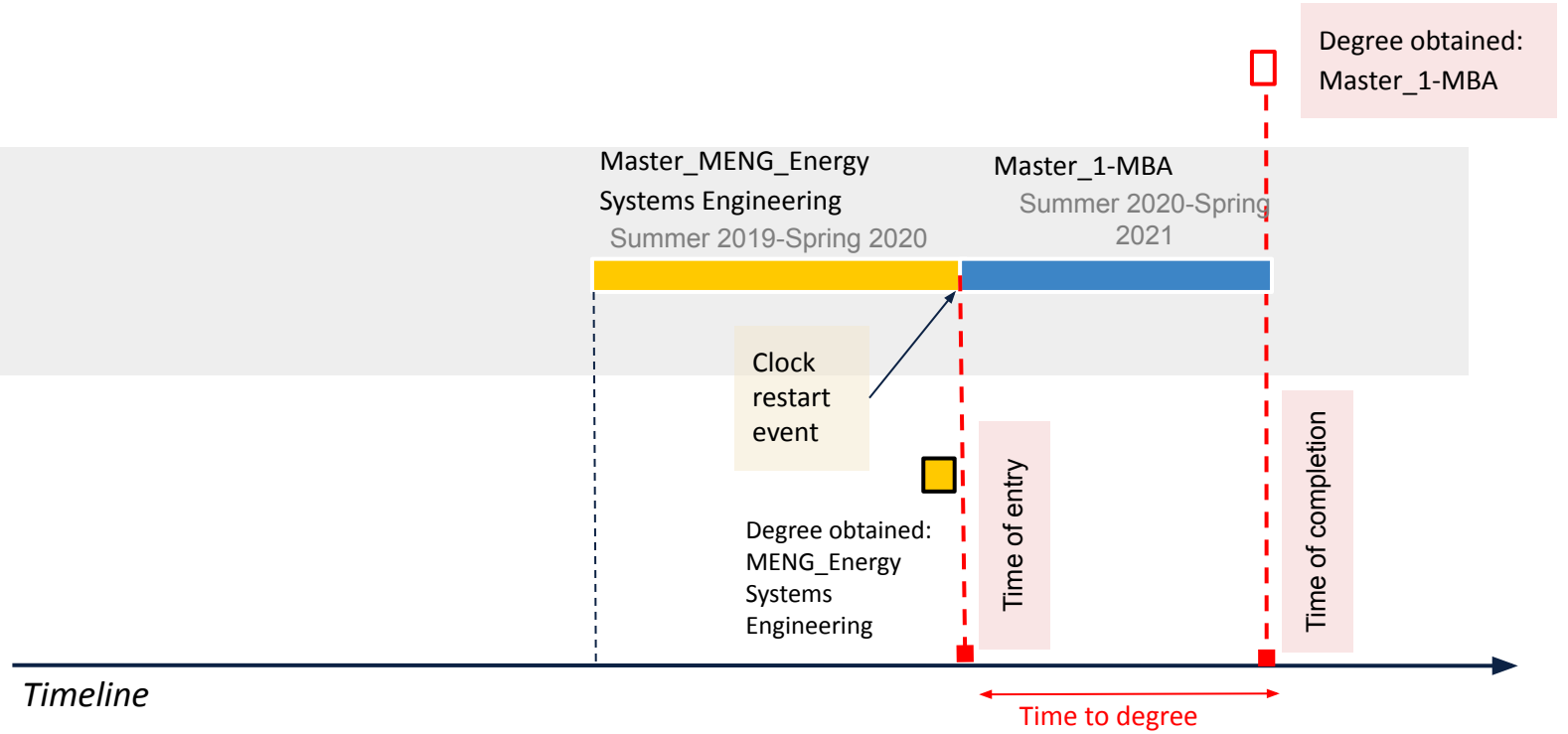
Program Curriculum Pursued	First term	Last Term	Compare to graduating program	Prior GR Completion	Clock Restart Event
Master_MENG_Energy Systems Engineering	201920	202010	Unrelated program		
Master_1-MBA	202020	202110	Same program	202010-Master_MENG_Energy Systems	Prior completion: 202010 - Master_MENG_Energy Systems Engineering and change from unrelated program

Example case 2

Graduate completions record

Join on student id and enrollment term <= grad term

Graduate degree-seeking enrollment data

Join on student id and prior grad term <= enrollment term

Prior graduate completions data

Doctorate_PHD_Learning Sciences & Technology
Fall 2009-Fall 2011

Doctorate_PHD_Teaching Learning & Technology
Fall 2012 - Fall 2015

Degree obtained: Master_MS_Learning Sciences & Technology

Master_MS_Learning Sciences & Technology
Spring 2016

Time of entry

Time of completion

Timeline

Time to degree

Enrollment pathways and TTD calculation
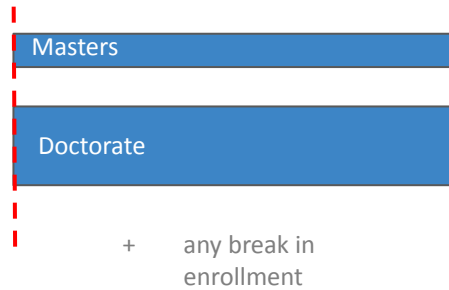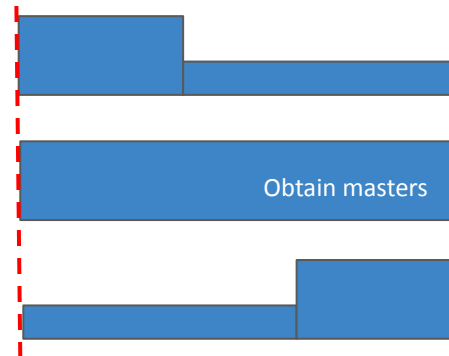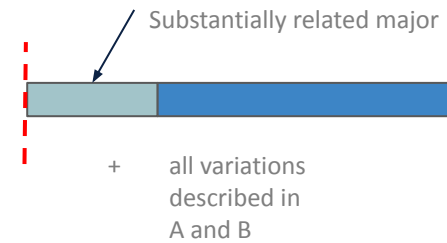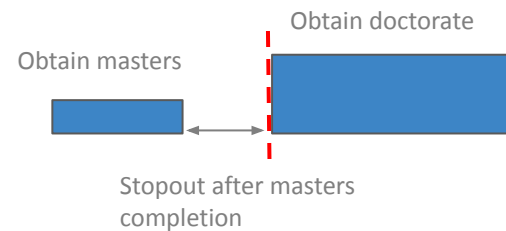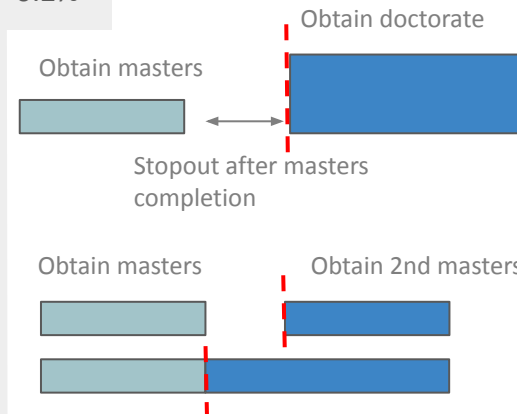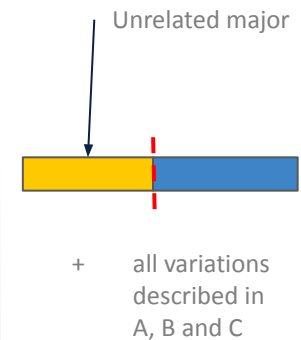
Identifying "non-standard" time to degree

Longer TTD

Student completed more requirements between time of entry and time of completion than required for the degree they obtained

Student started at the doctoral level and then switched to masters *(non-primary)*

Exit with masters in lieu of doctorate or masters obtained en route to doctorate *(non-primary)*

Most of the credits were earned in a prior program and transferred over. *(Transferred coursework - non-primary)*

Student pursuing two graduate degrees at the same time *(dual degree)*
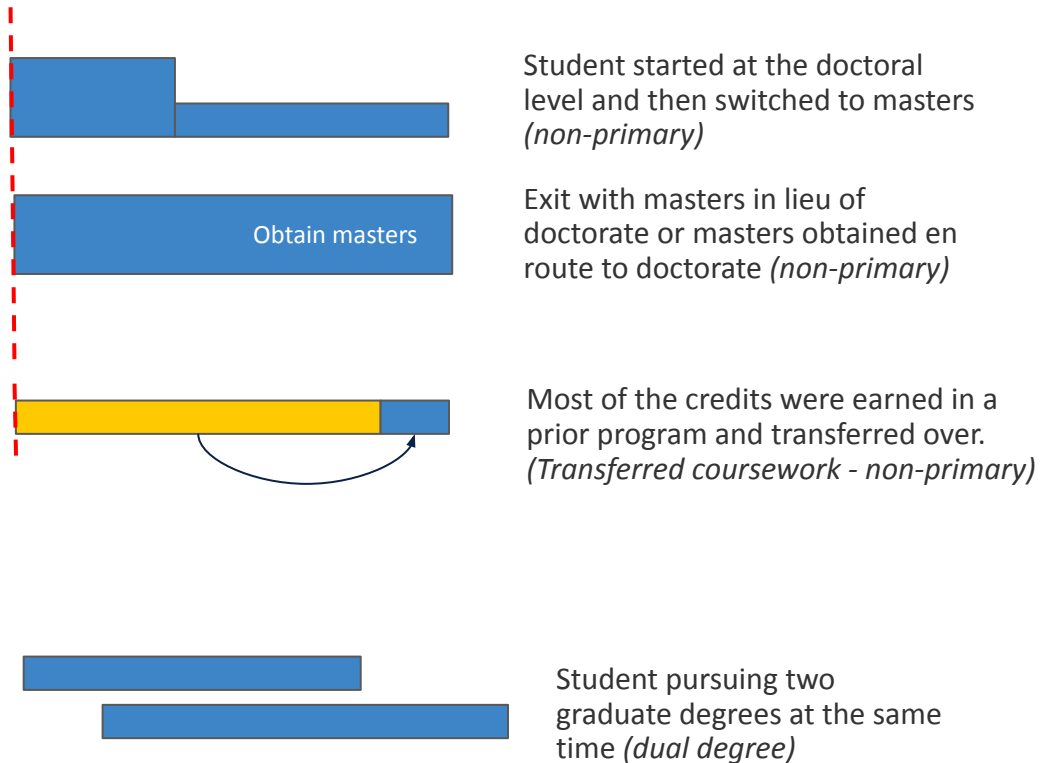
Shorter TTD

Student completed fewer requirements between time of entry and time of completion than required for the degree they obtained

Student had completed the masters at Lehigh and left for at least a semester before coming back for doctorate *(Transferred coursework)*

Some credits were earned in prior program and were transferred over. *(Transferred coursework)*
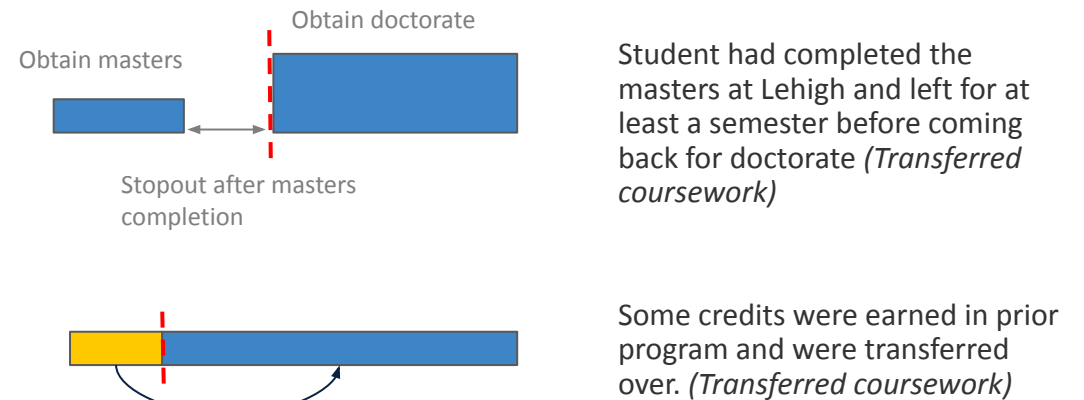
Storing the TTD data

STUDENT_ID	DEGREE_ID	GRADUATING_PROGRAM _CURRICULUM	GRAD_CLASS	GRAD_DATE	ENRL_PATHWA Y_CODE	TTD_CALCULATION	TTD_CATEGORY	ENTRY_DATE	ELAPSED_TIME_ TO_DEGREE
1	1	Master_1-MBA	2021	2021-05-24	D	Manual	Standard	2020-05-25	1.00
2	1	Master_MS_Learning Sciences & Technology	2016	2016-05-23	C	Automated	Non-Primary	2009-09-01	6.73

Sharing the data

Building charts, reports and dashboards

Diversity, Inclusion and Equity Strategic Plan

Sharing the Data - University Leadership

Longitudinal view, by college, for a selected degree type.

Doctorate degrees obtained in the graduating classes of 2015-22, by college
Count of degrees and median time to degree
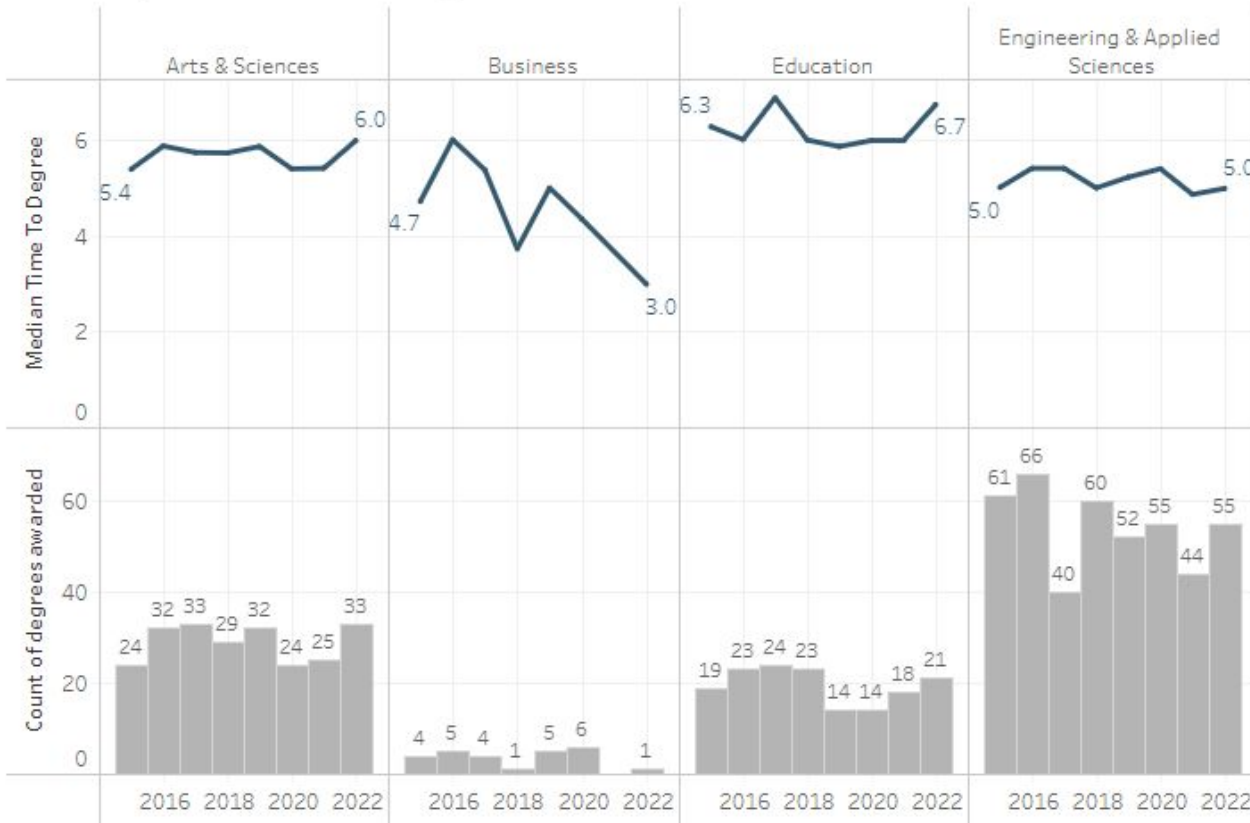
All years combined, by college.

Time to degree (median and interquartile range), by college and degree level
Based on graduating classes 2015-22. Count of degrees awarded provided in parenthesis
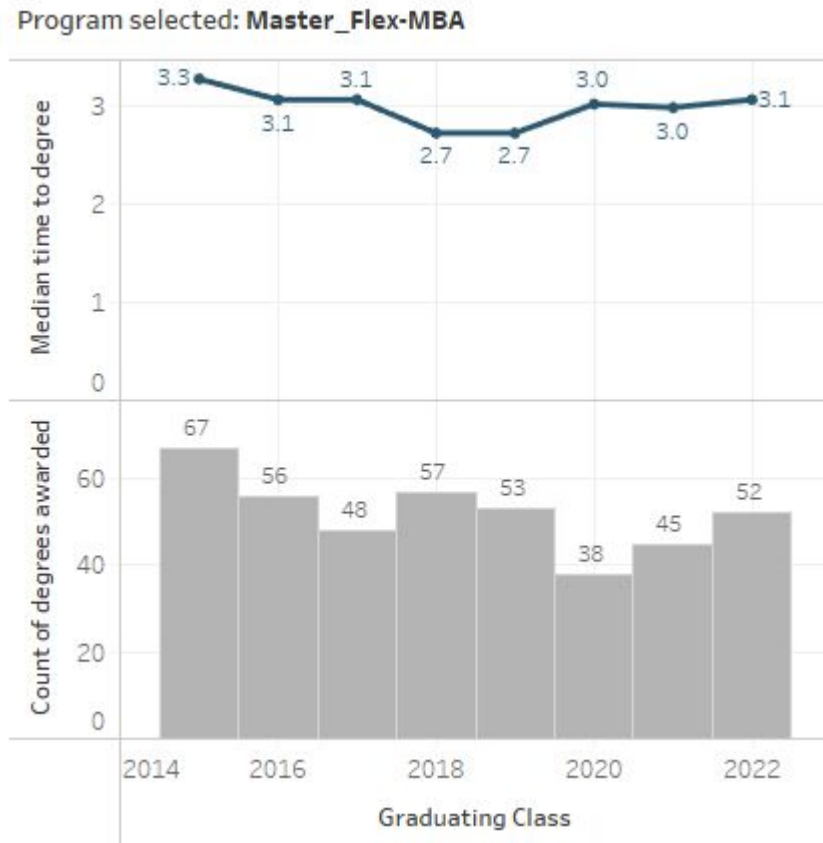
All years combined, by demographic group.

Time to degree (median and interquartile range), by demographic group, for selected degree level
Based on graduating classes 2015-22.
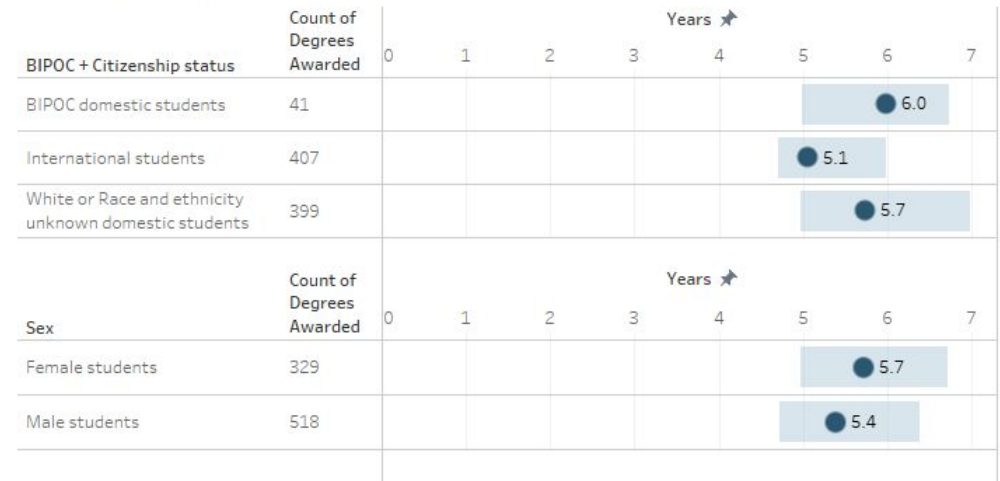
Sharing the Data - Students & Program Managers

Longitudinal view, selected program
(e.g. Masters Flex-MBA)

All programs in a given department, all
years combined

Program selected: **Master_Flex-MBA**

Time to degree (median and interquartile range), by program. Selected department: **Biological Sciences**; Selected degree type: **Doctorate**
Graduating classes 2015-22.

Prgm Curriculum	Count of Degrees Awarded	Years
Doctorate_PHD_Biochemistry (CAS)	5	5.7
Doctorate_PHD_Biology	4	5.7
Doctorate_PHD_Cell & Molecular Biology	15	6.0
Doctorate_PHD_Integrative Biology	12	5.7

Coming soon: Dashboard for internal use by graduate program managers
where a single program can be selected and user can access
program-specific time to degree information.

air forum

What we learned & next steps

No project is ever finished!

What we learned

- More complex task than anticipated. Need to keep decreasing the % of records requiring manual review
- Constantly evolving data infrastructure and curriculum policies - TTD methodology will need to keep evolving as well
- Forced into becoming the experts for time to degree at our institution
- Built partnership with graduate program managers
- Built partnership with Registrar's Office

air
forum

Next Steps

- Yearly process of calculating TTD for each new graduating class

- Improve graduate data definitions and data governance in general

- Other graduate metrics we are planning on tackling (more forward looking - student success prediction)

  - Identifying students at risk of timing out

  - Graduate leave of absence

  - Graduate completion/attrition rates

air forum

Thank you for joining us!
Any additional questions?
Contact us at oir@lehigh.edu

Q & A

Links and external resources

- Lehigh's DI&E Strategic Plan Progress Measures: https://www2.lehigh.edu/diversity-inclusion-equity/plan-progress

- AAU: Great resource to find lists of individual institutions sharing their TTD data or multi-institution initiatives
  https://www.aau.edu/education-community-impact/graduate-education/phd-education-initiative/data-transparency
  https://www.aau.edu/sites/default/files/AAU-Files/PhD/09.23.19_Institutional_Efforts.pdf
  https://www.aau.edu/sites/default/files/AAU-Files/PhD/10.18.18_Multi-Institutional_Efforts.pdf

- CGS: PhD Completion Project, Master's Completion Project
  https://cgsnet.org/data-insights/diversity-equity-inclusiveness/degree-completion/
  https://www.phdcompletion.org/

- NSF -National Center for Science and Engineering Statistics, Survey of Earned Doctorates
  https://www.nsf.gov/statistics/srvydoctorates/#sd
  https://ncses.nsf.gov/pubs/nsf22300/report/path-to-the-doctorate#time-to-degree

air
forum