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Are the Graduation Requirements Working? Developing Data Insights about Course Counts and Credit-Hour Completion

Marcia Preston, Assistant Director Institutional Research
Han Nguyen, Research and Assessment Analyst

SAIR 2025

MORE THAN READY.
LOYOLA READY.

OUTLINE

1. Project Background
2. Brainstorming Process
3. Methodology & Study Design
4. Data Process
5. Results & Reporting Format
6. Practical Uses & Next Steps
7. Q&A

PROJECT BACKGROUND

38-course count graduation requirement at Loyola-Maryland

"All students must complete **at least 38 three- or four-credit courses** and 120 credits to earn an undergraduate degree from Loyola. Each student's curriculum is comprised of core, major, and elective courses."

PROJECT BACKGROUND

Data Request from Assistant VP Institutional Effectiveness and Academic Assessment

"In OAA, we are trying to evaluate the 38-course count graduation requirement. I would like help in determining what would be appropriate variables to shed light on this and am open to changing this question. We are wondering whether the 38-course count has any impact on students' ability to complete their undergraduate degrees on time. We are thinking about it from a perspective of student success. One of the questions I can think of to get at this is "For those undergraduate students who take more than 4 years to graduate, are there data points that would help us understand the impact, if any, of the 38-course count on their ability to graduate on-time? (e.g., major program(s), minor program(s), number of total credits attempted, number of total credits successfully completed, degree(s) awarded, etc.)."

BRAINSTORMING PROCESS

IR's initial questions:

- What data files would we use (or join together) to answer this question?
- What additional data do we wish we had?
- What variables would we investigate (any beyond the ones OAA mentions, like GPA, student type (transfer/first time), etc…)?
- Does this include transferred or alternatively earned courses (e.g., AP or IB credits)?
- Are there a certain number that need to be GenEd?
- Are there a certain number that need to be within the major?
- Are there any other specific requirements within the 38-course count (e.g., Math, Diversity, Writing, etc.) that might be low-hanging fruit for initial analyses?

BRAINSTORMING PROCESS

Questions we want and can answer:

- What percentage of students in each group (and what number) are on track/off track with their course work each year?
- How many courses do students have when they graduate?
- How many credit hours do students have when they graduate?
- Does having multiple majors/minors impact any of this?
- Other variables we can consider – major, minor, GPA, first gen, gender, race, in/out of state, commuter, pell-eligible, etc…

BRAINSTORMING PROCESS

Institution's Data Limitation:

- No automated report of completed courses; verification is still a manual transcript review.
- Transfer and study abroad credits are not fully transparent—often recorded as blocks (e.g., one 15-credit entry) rather than individual courses.

How can IR help?

- Capture course count and credit-hour count that students *satisfactorily* completed at Loyola using census files.
- Produce reports with actual numbers of how many students graduated on time vs. not on time with the number of courses/credit hours they completed.

METHODOLOGY & STUDY DESIGN

Assumptions

- 3 credits = 1 course
- “Transferred” = both courses that students started with prior to coming to Loyola (AP Credits) and transfer courses (e.g. taken at home over summer break).
- Completed courses did not include grades: Failure (F), Incomplete (I), Audit (L), Repeated Failure (RF), Withdrawal (W), No Credit (NC), Repeated No Credit (RNC), Failure to Withdraw (FW), Satisfactory (S), Unsatisfactory (U), Excluded F (XF), Pass (P)

Note: Due to COVID pandemic in Spring 2020, some students elected to take their classes Pass/Fail. We included courses with a Pass grade from that semester only.
*When calculating the completed credits based on census files, we also included P grades according to documentation from the undergrad academic catalogue

METHODOLOGY & STUDY DESIGN

Credit Hour Counts

Cumulative Credits (from Enrollment Census files) reports the cumulative credit hours from the previous term. Example: Spring 2020's *Cumulative Credits* hows cumulative credits earned through Fall 2019.

Advantages

- Captures **transfer credits** and other prior credit hours already posted in Student Information System (SIS).
- Adjusts automatically once **study abroad credits** are finalized (initially coded as a 15-credit block, later updated with actual course values).

Limitations & Workarounds

For the **final semester**, credits must be calculated manually from courses with passing grades and added to the current cumulative credit hours. Any transfer credits posted after that point would not be included.

METHODOLOGY & STUDY DESIGN

Course Counts

- We re-use the total credit hours at the end of each year and divide it by 3 to calculate the total courses at the end of each year.
- Just like with credit-hour counts in the final semester, we used our census file and grades file to determine the number of credits completed with an acceptable grade and divided that by 3 to get the number of courses taken in the final semester

METHODOLOGY & STUDY DESIGN

Student Population

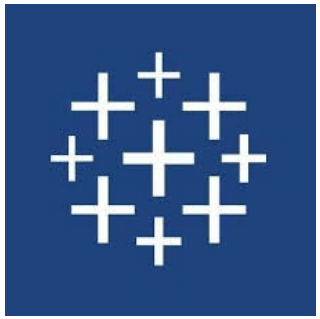
- First-Time, Full-Time (FTFT) student cohorts (e.g. 2018 FTFT, 2019 FTFT)
- Undergraduates
- Continuously enrolled at Loyola (or without hiatus reports)

Comparison Groups

1. Less than 120 credits, did not graduate by the end of Year 4
2. 120 or more credits, did not graduate by the end of Year 4
3. Graduated by the end of Year 4

DATA PROCESS

Project Tools



DATA PROCESS

Datasets

Census Combined

Census data from SIS on all students enrolled in each semester with the course details.

Census Grades

Census data from SIS on the courses' grades for students who enrolled in each semester.

FTFT Cohorts

Census data from SIS on the population of first-time, full-time (FTFT) undergraduate students.

DATA PROCESS

Phase 1: Data Foundation Building

Data Merge

- Merge Census Combined Files
- Merge Grades Files
- Merge FTFT Cohort Files

Data Filter

- Filter the merged Census Combined file to the students in the FTFT Cohort group
- Filter the merged Census Grades file to the students in the FTFT Cohort group

Data Consolidation & Segmentation

- Join filtered Census Combined data and filtered Census Grades data
- Split up the master data into two groups: hiatus vs. non-hiatus
- Export the datasets to data files

DATA PROCESS

Phase 2: Data Transformation

What we have	What we want
Course-level data for each student per semester	• Total credit hours at the end of each year • Total courses at the end of each year • Whether student had multiple majors • Whether student had minor(s) • Whether student ever changed their major • Number of major changes if there is any • Whether student ever studied abroad • Student group

DATA PROCESS

Student Group

1. Less than 120 credits, did not graduate by the end of Year 4
2. 120 or more credits, did not graduate by the end of Year 4
3. Graduated by the end of Year 4

Student Group Field Calculation for FTFT 2018

IF [grad_term] <= “22/SP” THEN 3
ELSEIF [total_credit_hrs_yr4] >= 120 THEN 2
ELSEIF [total_credit_hrs_yr4] < 120 THEN 1
END

→ **Incorrect data**

Example: Student 001 from FTFT 2018 cohort graduated in Fall 2022 (22/FA) with 120 credits at the end of year 4.

→ **Expected Student Group: 2**

→ **Assigned Student Group: 3**

DATA PROCESS

Semester and Year	FTFT 2018	FTFT 2019
Summer Year 1	18/SU	19/SU
Fall Year 1	18/FA	19/FA
Spring Year 1	19/SP	20/SP
Summer Year 2	19/SU	20/SU
Fall Year 2	19/FA	20/FA
Spring Year 2	20/SP	21/SP
Summer Year 3	20/SU	21/SU
Fall Year 3	20/FA	21/FA
Spring Year 3	21/SP	22/SP
Summer Year 4	21/SU	22/SU
Fall Year 4	21/FA	22/FA
Spring Year 4	22/SP	23/SP

DATA PROCESS

Semester and Year	FTFT 2018	FTFT 2019
Summer Year 1	182	192
Fall Year 1	183	193
Spring Year 1	191	201
Summer Year 2	192	202
Fall Year 2	193	203
Spring Year 2	201	211
Summer Year 3	202	212
Fall Year 3	203	213
Spring Year 3	211	221
Summer Year 4	212	222
Fall Year 4	213	223
Spring Year 4	221	231

DATA PROCESS

Student Group

1. Less than 120 credits, did not graduate by the end of Year 4
2. 120 or more credits, did not graduate by the end of Year 4
3. Graduated by the end of Year 4

Student Group Field Calculation for FTFT 2018

IF [grad_term] <= “22/SP” THEN 3
ELSEIF [total_credit_hrs_yr4] >= 120 THEN 2
ELSEIF [total_credit_hrs_yr4] < 120 THEN 1
END

IF [grad_term_key] <= 221 THEN 3
ELSEIF [total_credit_hrs_yr4] >= 120 THEN 2
ELSEIF [total_credit_hrs_yr4] < 120 THEN 1
END

DATA PROCESS

Student Group

1. Less than 120 credits, did not graduate by the end of Year 4
2. 120 or more credits, did not graduate by the end of Year 4
3. Graduated by the end of Year 4

Student Group Field Calculation for ~~FTFT 2018~~ every FTFT

IF [grad_term_key] <= [Spring Year 4] THEN 3
ELSEIF [total_credit_hrs_yr4] >= 120 THEN 2
ELSEIF [total_credit_hrs_yr4] < 120 THEN 1
END

DATA PROCESS

Student Group Field Calculation for every FTFT

IF [grad_term_key] <= [Spring Year 4] THEN 3
ELSEIF [total_credit_hrs_yr4] >= 120 THEN 2
ELSEIF [total_credit_hrs_yr4] < 120 THEN 1
END

FTFT	Student ID	Course	Term Key	Grad Term Key	…	Total Credit Hrs – Yr 4
2018	000001	SN*103	183	221	…	152
2018	000001	PL*201	183	221	…	152
…	…	…	…	…	…	…
2018	000001	PY*244	221	221	…	152

DATA PROCESS

Student Group Field Calculation for every FTFT

IF [grad_term_key] <= [Spring Year 4] THEN 3
ELSEIF [total_credit_hrs_yr4] >= 120 THEN 2
ELSEIF [total_credit_hrs_yr4] < 120 THEN 1
END

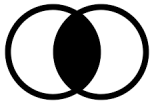
FTFT	Student ID	Course	Term Key	Grad Term Key	…	Total Credit Hrs – Yr 4	…	Spring Year 4
2018	000001	SN*103	183	221	…	152	…	221
2018	000001	PL*201	183	221	…	152	…	221
2018	000001	…	…	221	…	152	…	221
2018	000001	PY*244	221	221	…	152	…	221

DATA PROCESS

Semester and Year	FTFT 2018	FTFT 2019
Summer Year 1	182	192
Fall Year 1	183	193
Spring Year 1	191	201
Summer Year 2	192	202
Fall Year 2	193	203
Spring Year 2	201	211
Summer Year 3	202	212
Fall Year 3	203	213
Spring Year 3	211	221
Summer Year 4	212	222
Fall Year 4	213	223
Spring Year 4	221	231

DATA PROCESS

FTFT	Summer Year 1	Fall Year 1	Spring Year 1	Summer Year 2	Fall Year 2	Spring Year 2	Summer Year 3	Fall Year 3	Spring Year 3	Summer Year 4	Fall Year 4	Spring Year 4
2018	182	183	191	192	193	201	202	203	211	212	213	221
2019	192	193	201	202	203	211	212	213	221	222	223	231



FTFT	Student ID	Course	Term Key	Grad Term Key	…	Total Credit Hrs – Yr 4
2018	000001	SN*103	183	221	…	152
2018	000001	PL*201	183	221	…	152
…	…	…	…	…	…	…
2018	000001	PY*244	221	221	…	152

DATA PROCESS

Useful Field Calculations

Most Recent Term:

{ FIXED [student_id]: MAX([term_key]) }

Term order:

{ PARTITION [student_id]: { ORDERBY [term_key] ASC: RANK_DENSE()}}

DATA PROCESS

Ever had multiple majors/minor(s)?

Had multiple majors most recently:

IF [term_key] = [most_recent_term] AND ISNULL([major2]) = FALSE
THEN 1
ELSE 0
END

Had minor most recently:

IF [term_key] = [most_recent_term] AND ISNULL([minor1]) = FALSE
THEN 1
ELSE 0
END

DATA PROCESS

Ever changed major(s)

Student ID	Term	Term Order	Major 1	Major 2
000001	22/SU	1	UD	
000001	22/FA	2	PS	DA
000001	23/SP	3	PS	DA
000001	23/FA	4	DA	PS
000001	24/SP	5	DA	

This student did change their major(s), and they changed 2 times

DATA PROCESS

Ever changed major(s)

Combined Major

```
IF ISNULL([major2])
THEN [major1]
ELSE [major1] + ", " + [major2]
END
```

Combined Major - Reverse

```
IF ISNULL([major2])
THEN [major1]
ELSE [major2] + ", " + [major1]
END
```

DATA PROCESS

Ever changed major(s)

Previous Combined Major

{ PARTITION [student_id]: {ORDERBY [term_order] ASC: LOOKUP([combined_major], -1)}}

Student ID	Term	Term Order	Major 1	Major 2	Combined Major	Combined Major Reverse	Previous Combined Major
000001	22/SU	1	UD		UD	UD	*Null*
000001	22/FA	2	PS	DA	PS, DA	DA, PS	UD
000001	23/SP	3	PS	DA	PS, DA	DA, PS	DA, PS
000001	23/FA	4	DA	PS	DA, PS	PS, DA	DA, PS
000001	24/SP	5	DA		DA	DA	PS, DA

Major Change Flag

IF [term_order] = 1 THEN 0
ELSEIF [term_order] != 1 AND ([combined_major] = [combined_major_previous] OR [combined_major_reverse] = [combined_major_previous]) THEN 0
ELSE 1
END

DATA PROCESS

Ever changed major(s)

Number of Major Changes

{ FIXED [student_id]: SUM([major_changed_flag])}

Ever changed major(s)

IF [num_major_changed] >= 1
THEN 1
ELSE 0
END

DATA PROCESS

Ever studied abroad

Study Abroad Course

IF [course] = "ML*111“ THEN 1
ELSEIF [course_prefix] = "LE" OR [course_prefix] = "LL" OR [course_prefix] = "LR“ THEN 1
ELSE 0
END

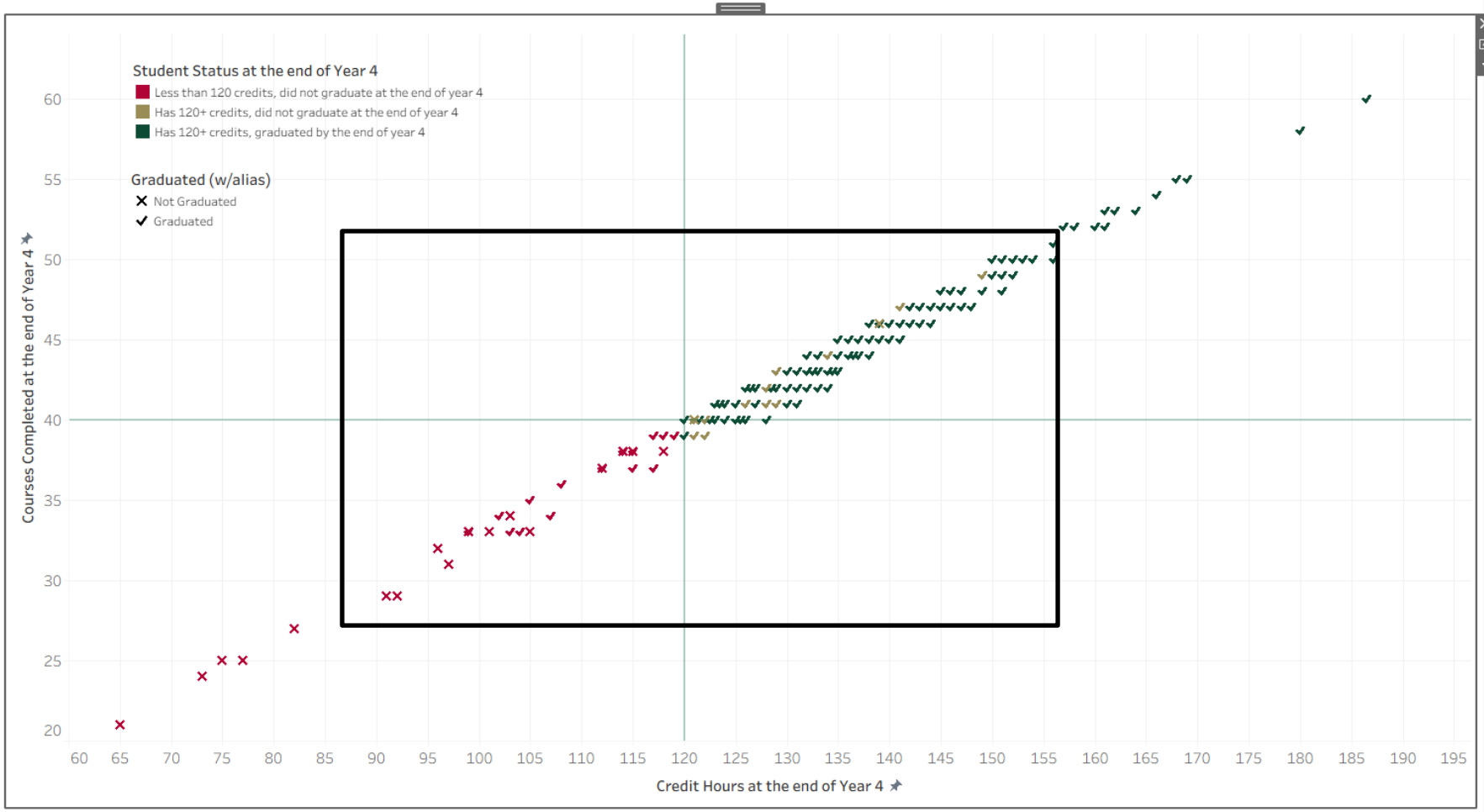
Ever studied abroad

{FIXED [student_id]: MAX([study_abroad_course])}

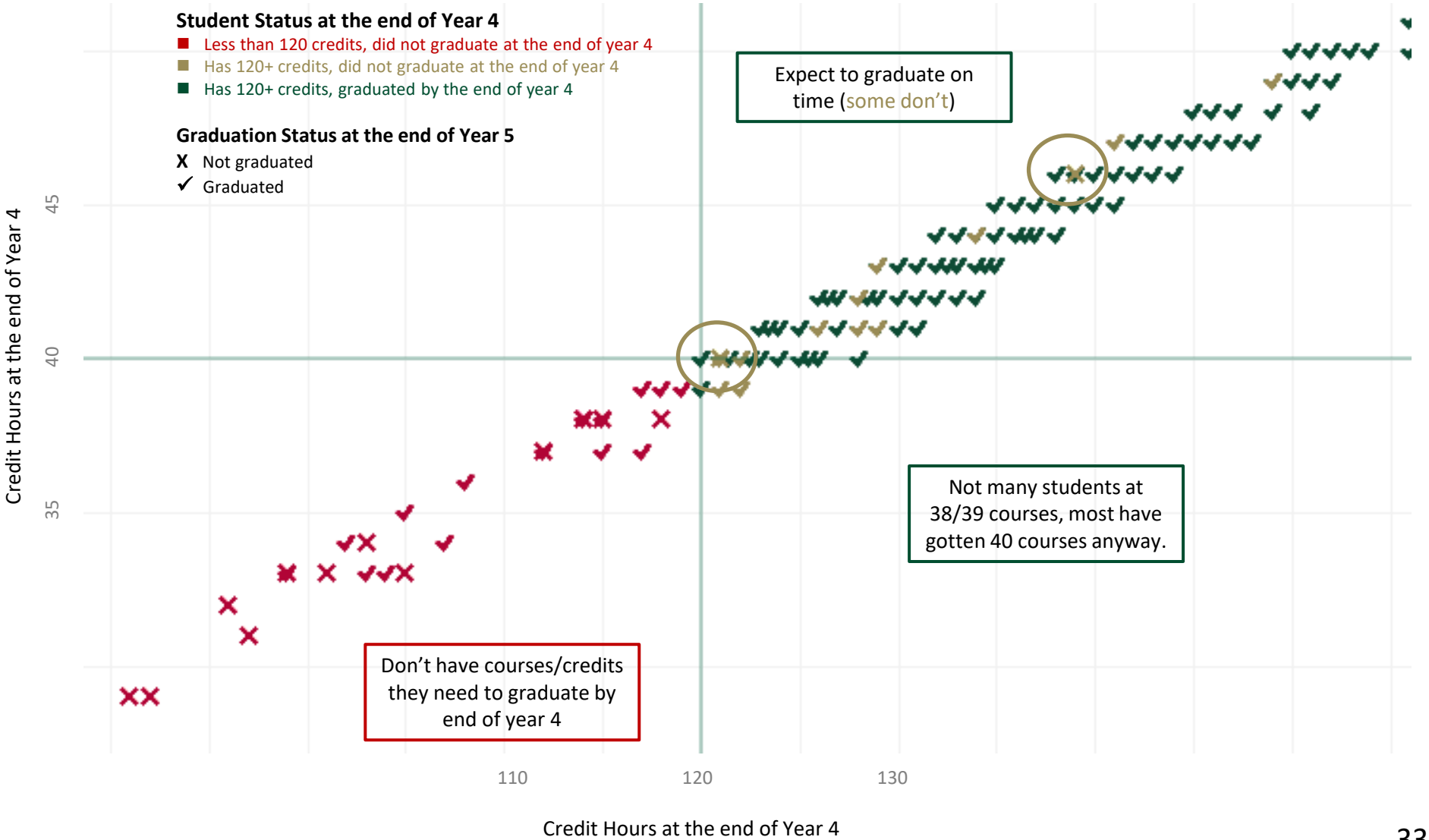
RESULTS & REPORTING FORMAT

RESULTS

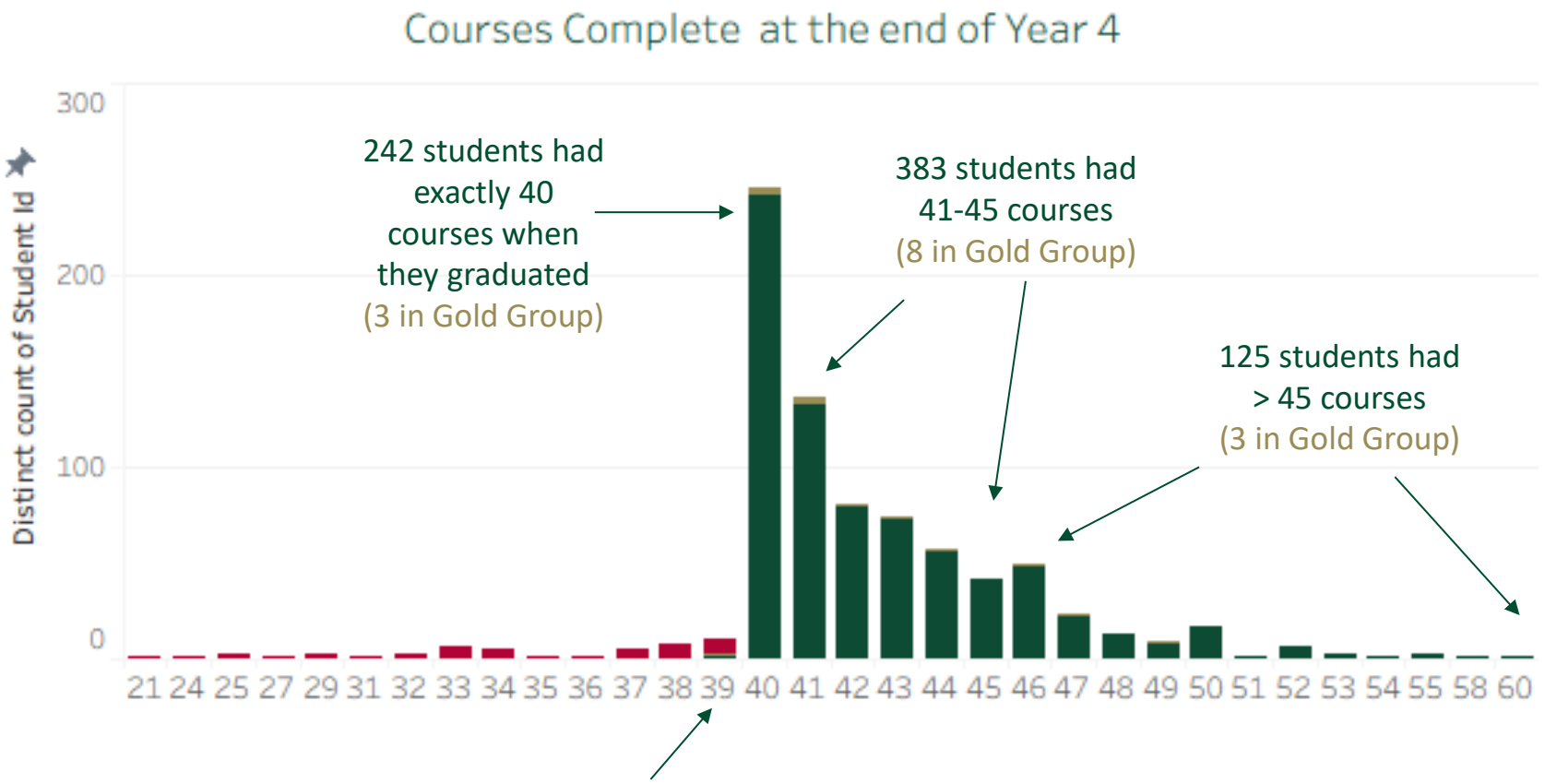
Courses and Credits Completed at the end of Year 4 by Student Group



RESULTS


Student Status at the end of Year 4
Less than 120 credits, did not graduate at the end of year 4
Has 120+ credits, did not graduate at the end of year 4
Has 120+ credits, graduated by the end of year 4
Graduation Status at the end of Year 5
X Not graduated
✓ Graduated
Expect to graduate on time (some don't)
Not many students at 38/39 courses, most have gotten 40 courses anyway.
Don't have courses/credits they need to graduate by end of year 4
Credit Hours at the end of Year 4
45
40
35
110
120
130
Credit Hours at the end of Year 4

RESULTS



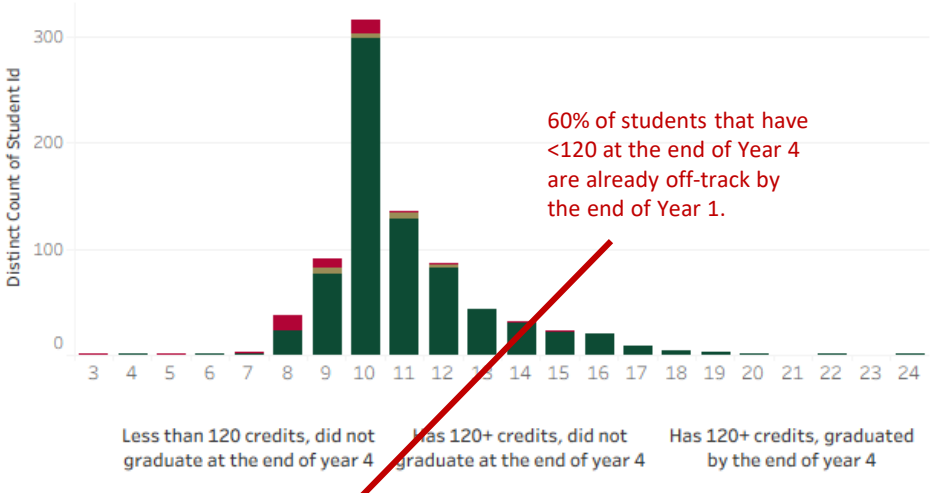
8 had 39 courses (but not 120 credit hours) and didn't graduate at the end of year 4

2 had 39 courses (and at least 120 credit hours) but didn't graduate at the end of year 4

1 graduated at the end of year 4 (with 39 courses) and 120 credit hours

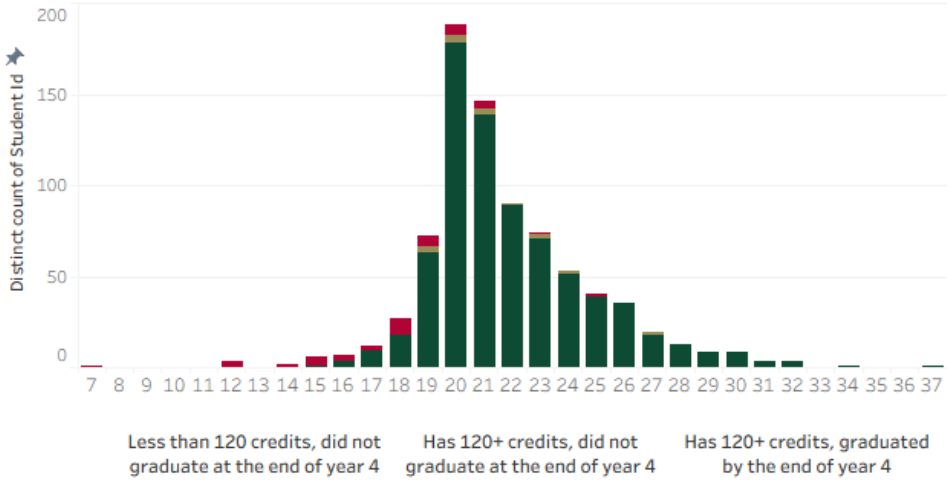
What percent and how many students are on-track vs. off-track by year?

Courses Complete at the end of Year 1



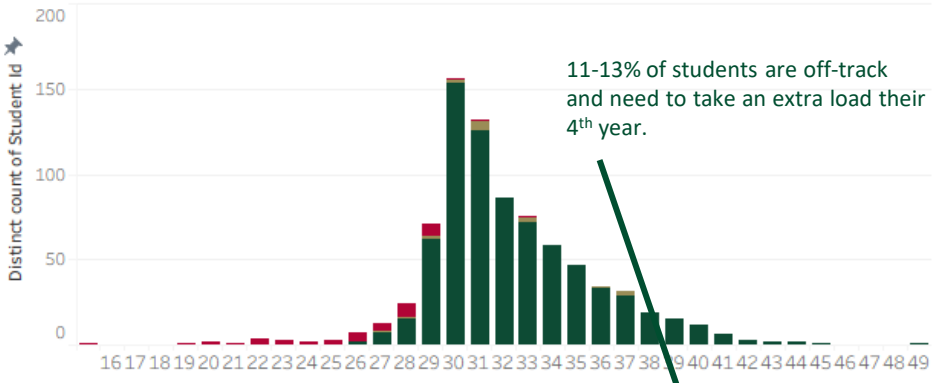
10 or more	40% (n=18)	69% (n=11)	86% (n=648)
less than 10	60% (n=27)	31% (n=5)	14% (n=103)

Courses Complete at the end of Year 2



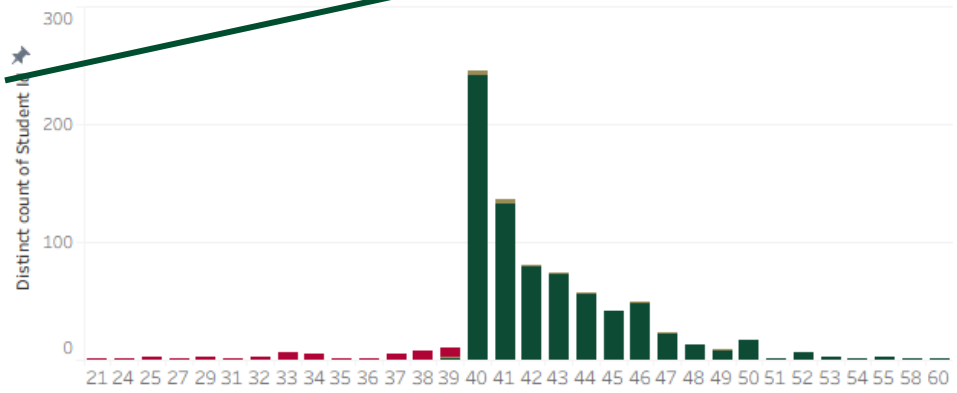
20 or more	27% (n=12)	81% (n=13)	87% (n=657)
less than 20	73% (n=33)	19% (n=3)	13% (n=94)

Courses Complete at the end of Year 3



30 or more	7% (n=3)	75% (n=12)	89% (n=665)
less than 30	93% (n=42)	25% (n=4)	11% (n=86)

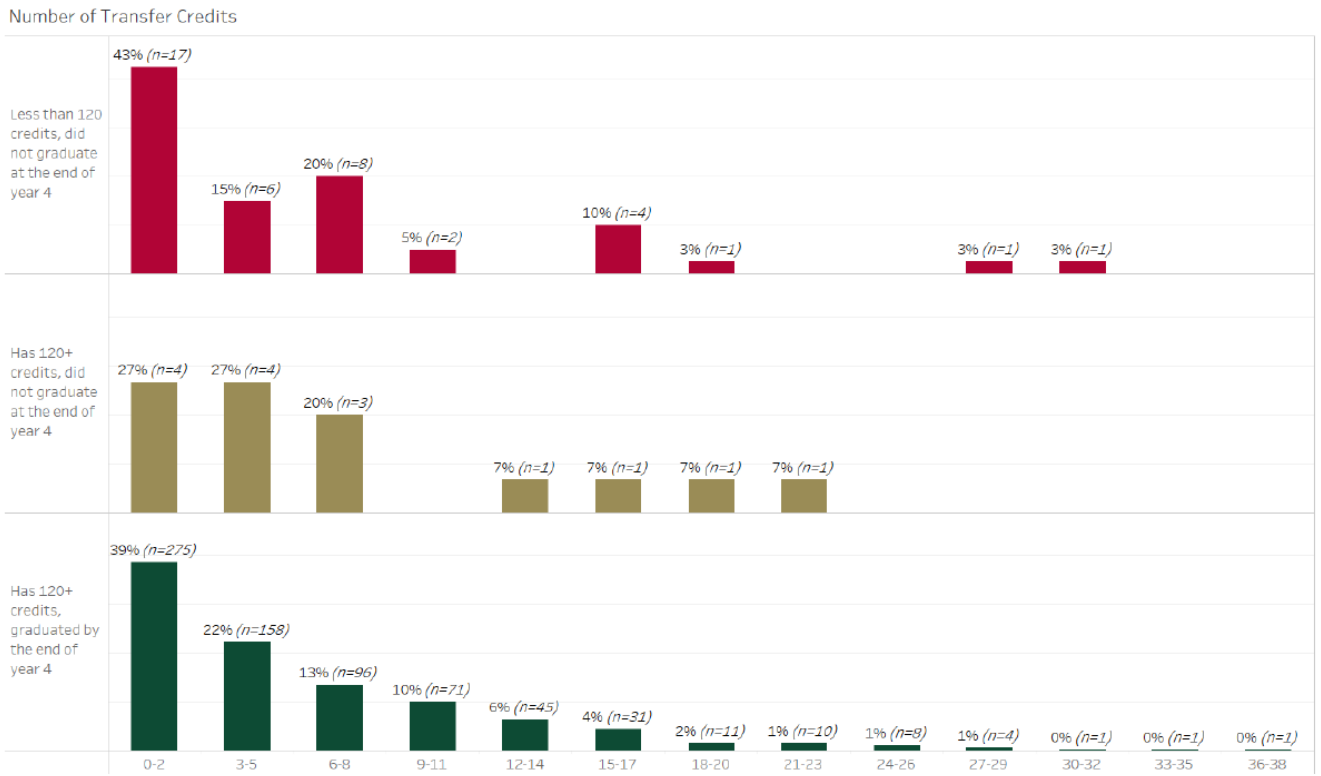
Courses Complete at the end of Year 4



40 or more		88% (n=14)	100% (n=750)
less than 40	100% (n=45)	13% (n=2)	0% (n=1)

RESULTS

Are students taking credits elsewhere and transferring them in?



- Most students are not transferring in credits.
- Of those students who transfer in credits, most are only transferring in one or two courses (3-8 credits)

How do the three groups of students differ by factors related to their program or major? *(Study abroad, Multiple Majors, Changed Majors, #of Major changes, School)*

Higher percentage of students that graduated in 4 years studied abroad (31%).

This group had more students with multiple majors (19%)

Higher percentage of students that graduated in 4 years have a minor (50%).

These two groups had more major changes (81% and 84% change at least once).

PRACTICAL USES & NEXT STEPS

Practical Uses & Learning Outcomes

- Translating policies into data – i.e. evaluating graduation requirements
- Tackling complex / open-ended data requests
- Data Challenges and how we overcame them in Tableau & R
- Sharing insights via reports & dashboards

How was this used at Loyola?

- Discussed internally within Academic Affairs
- Academic Affairs Leadership Team Summer Retreat, presented by Associate Provost (Provost, Associate Provosts, Deans)

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Q&A

MORE THAN READY.
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THANK YOU!

Marcia Preston
mlpreston@loyola.edu

Han Nguyen
hgnguyen2@loyola.edu

Loyola-Maryland Institutional Research Office
https://www.loyola.edu/department/institutional-research/

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TERM ENCODING

Spring (XX/SP) → encoded as **XX1**
Summer (XX/SU) → encoded as **XX2**
Fall (XX/FA) → encoded as **XX3**

Tableau Prep

```
IF CONTAINS([term], 'SU') THEN LEFT([term], 2) + '2' // Summer
ELSEIF CONTAINS([term], 'FA') THEN LEFT([term], 2) + '3' // Fall
ELSEIF CONTAINS([term], 'SP') THEN LEFT([term], 2) + '1' // Spring (next year)
END
```

term	term_key
21/SP	211
20/FA	203
25/SU	252