

Sankey Diagram: A Method to Visualize Student Flow and Success

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What is a Sankey Diagram?

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui ont été en Russie; le noir ceux qui en sont sortis. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Légar, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davout qui avaient été détachés sur Minsk et Mohilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

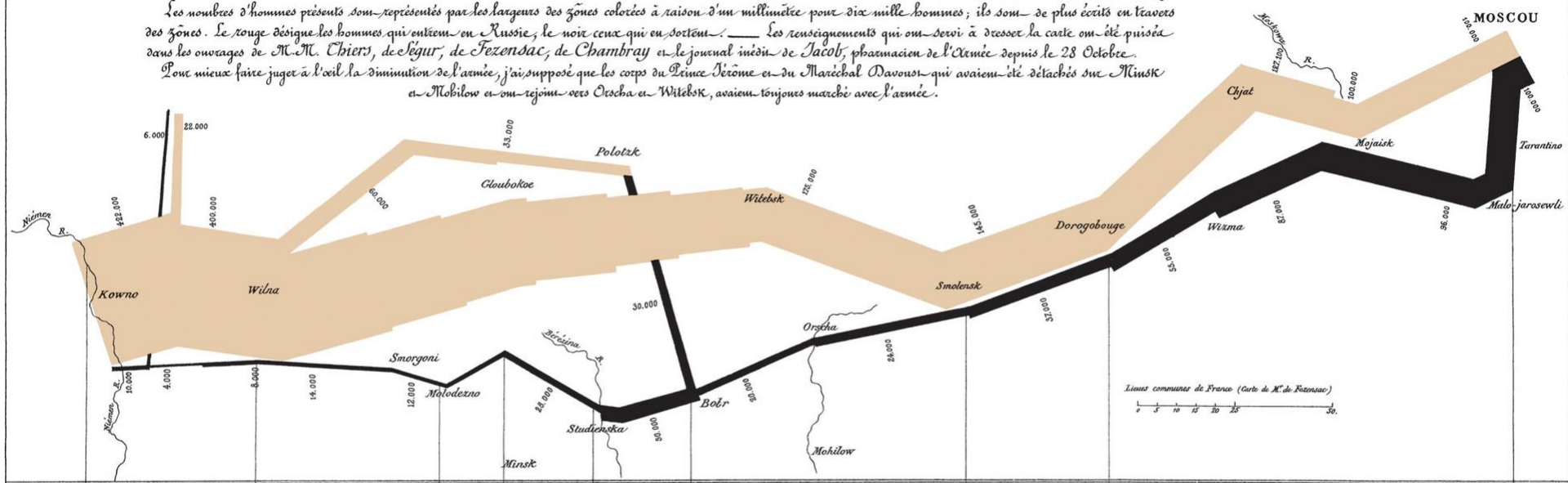
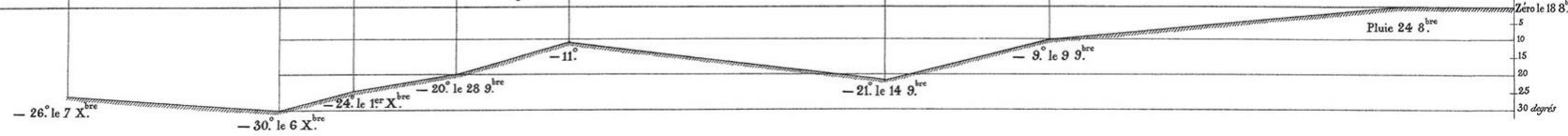


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les Cosaques passent au galop le Niémen gelé.

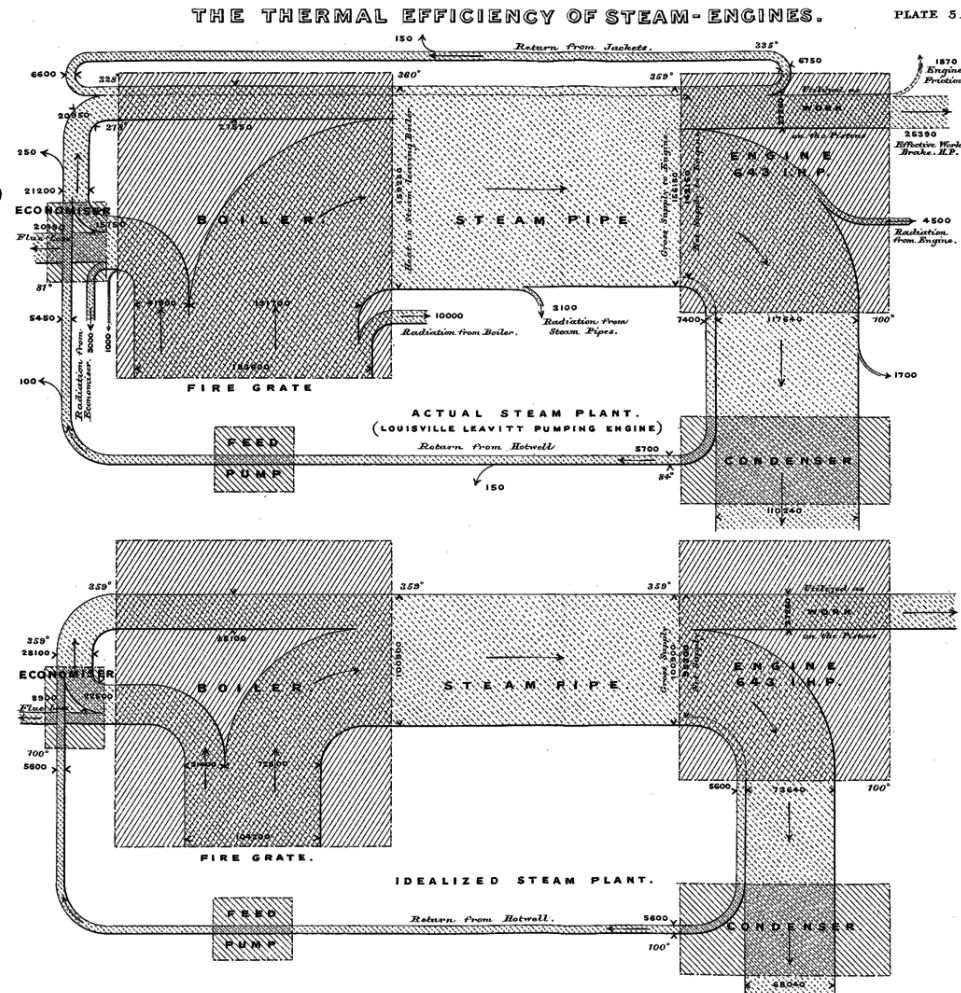


Auget par Regnier, 8, Par. S^{te} Marie. S^{te} O^g à Paris.

Imp. Lith. Regnier et Desvres.

Charles Minard's Map of Napoleon's Russian Campaign of 1812: overlaid a Sankey diagram onto a geographical map, created in 1869.

- In 1898, Captain Matthew Henry Phineas Riall Sankey used the diagram to show efficiency of a steam engine



- Fits the needs of today's higher education institutions

How to read a Sankey diagram?

Example: Sankey diagrams for large and/or competitive ECU programs

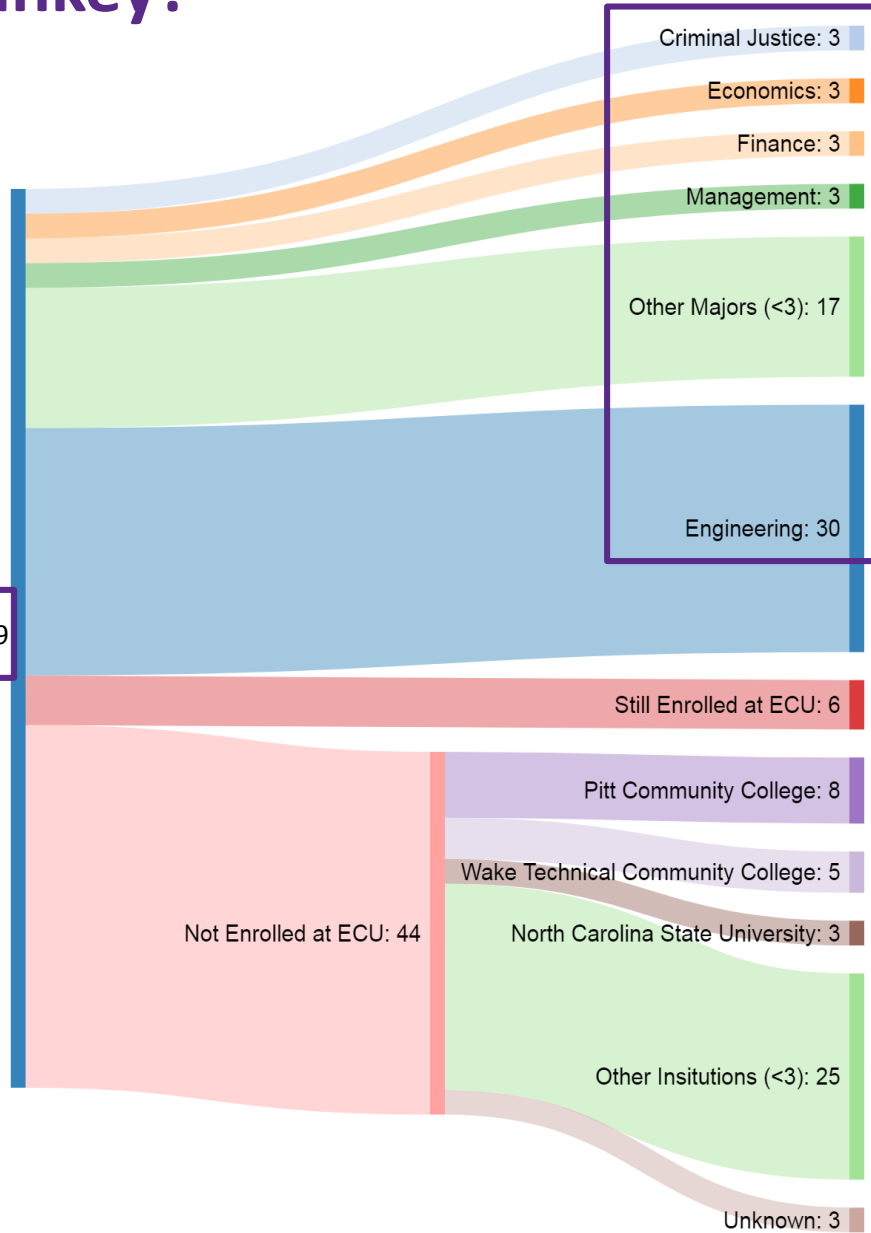
Data and Methodology

- Fall 2010 first-time, first-year student cohort
- Intended major (at Fall 2010 Census Day)
- Student status at the end of the 6th academic year; possible statuses are:
 - **Graduated**
 - **Still Enrolled at ECU**
 - **Not Enrolled at ECU**
- Transfer institutions obtained from National Student Clearinghouse (NSC)

How to read a Sankey?

1. For the Fall 2010 FTFY cohort, 109 students chose Engineering as their intended major by Fall 2010 Census Day.

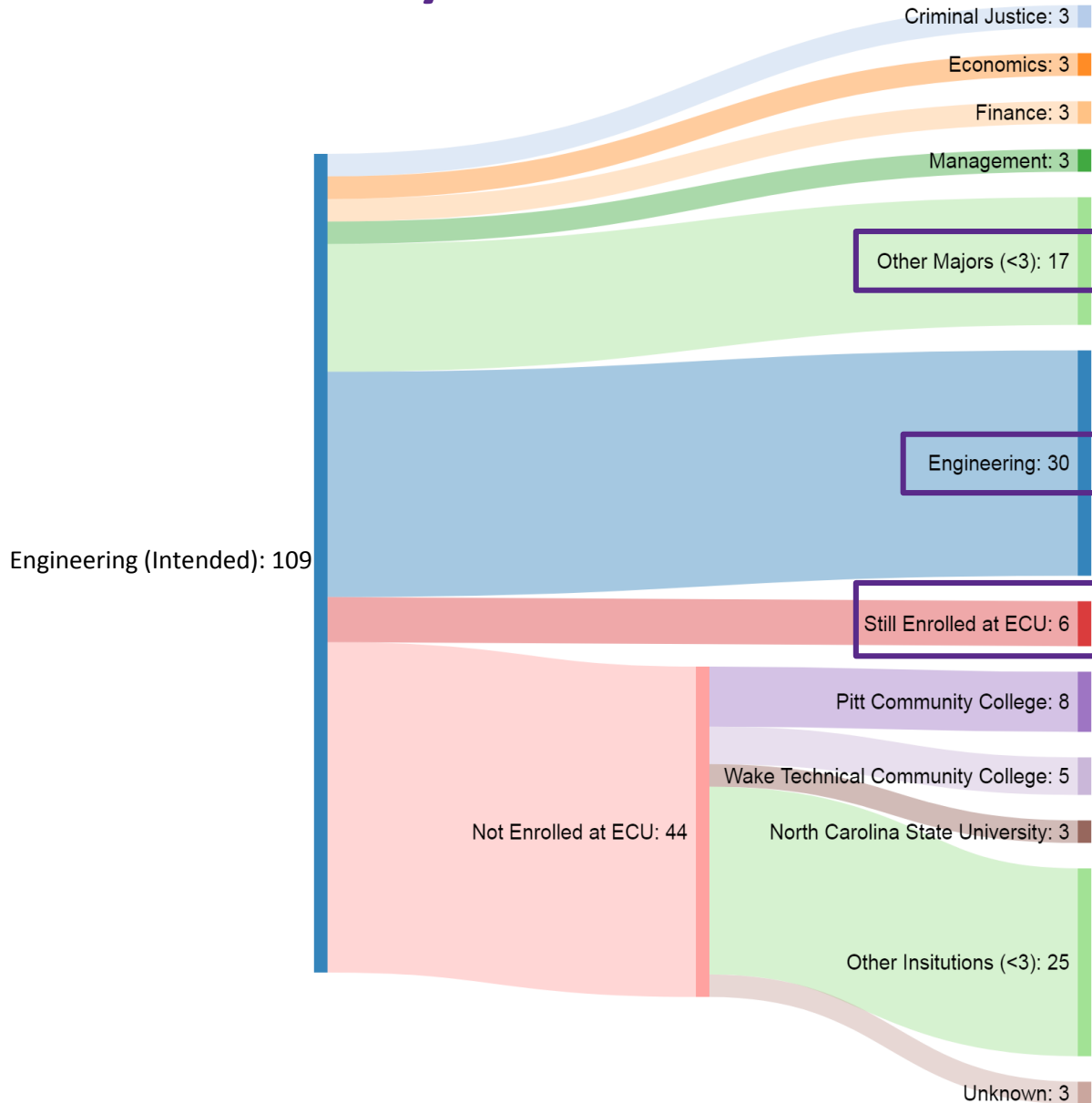
Engineering (Intended): 109



2. These are the students who graduated at ECU with a bachelor's degree within 6 years (students who graduated with a second degree are counted twice).

Disclaimer:
This series of Sankey diagrams do not include all graduates of a major.

How to read a Sankey?

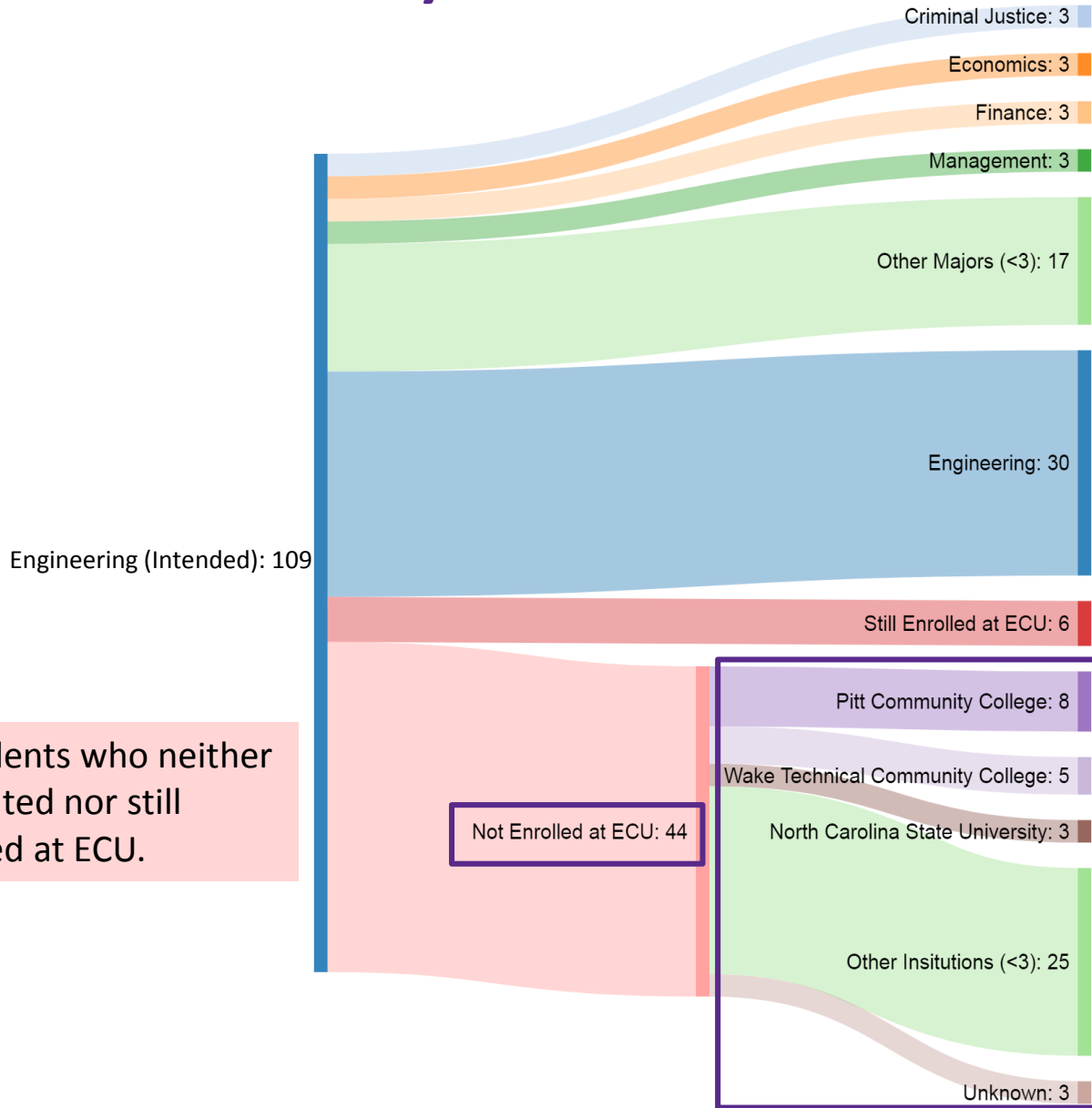


3. Due to space limitation, majors with fewer than 3 students were grouped together.

4. 30 students graduated with an Engineering major in 6 years.

5. Students from the original cohort who had not graduated but were still enrolled at ECU in 2016.

How to read a Sankey?



6. Students who neither graduated nor still enrolled at ECU.

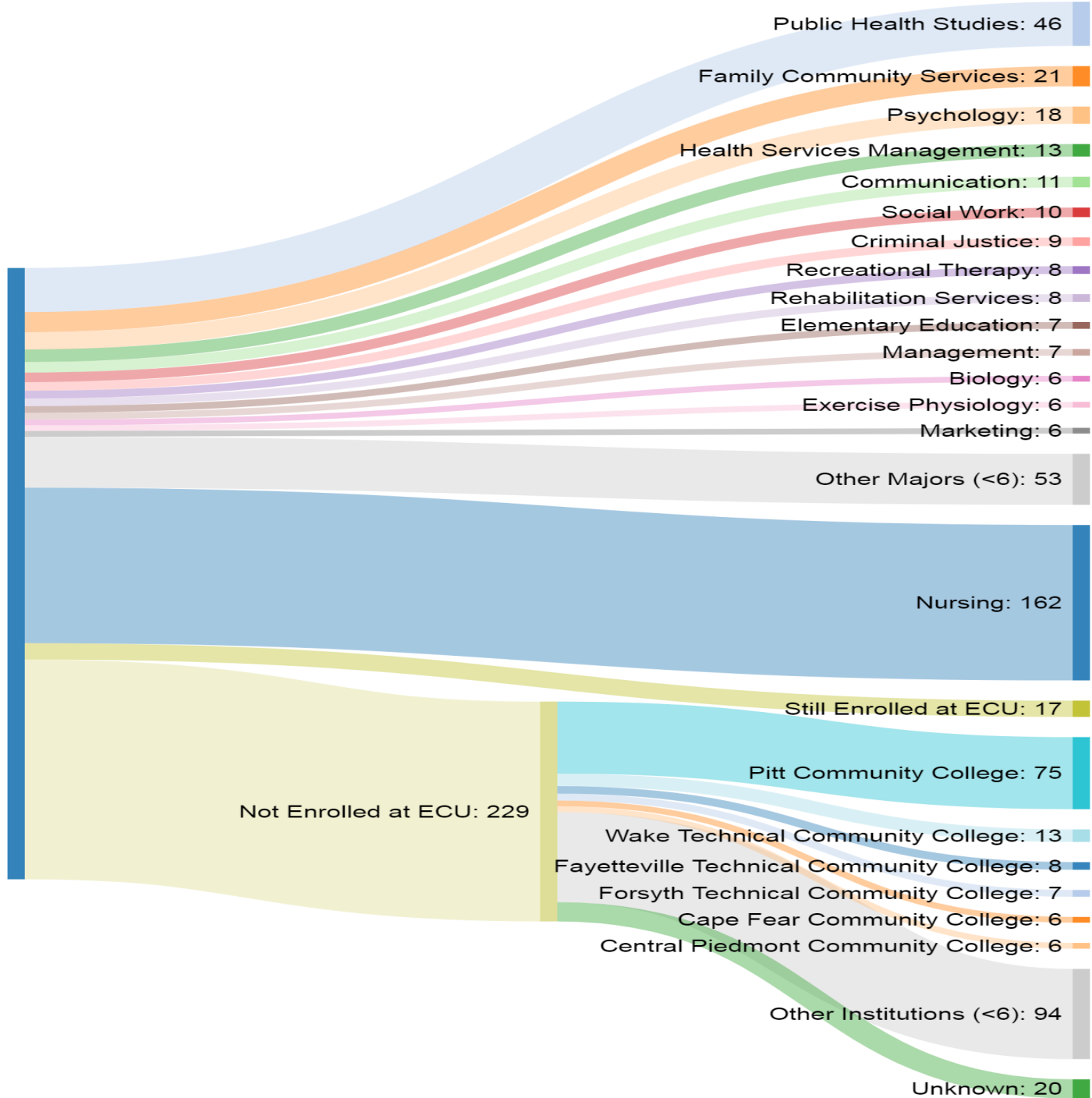
7. Transfer institutions obtained from National Student Clearinghouse. Only the first institution to which a student transferred was included.

Institutions with few transfer-out students were grouped together.

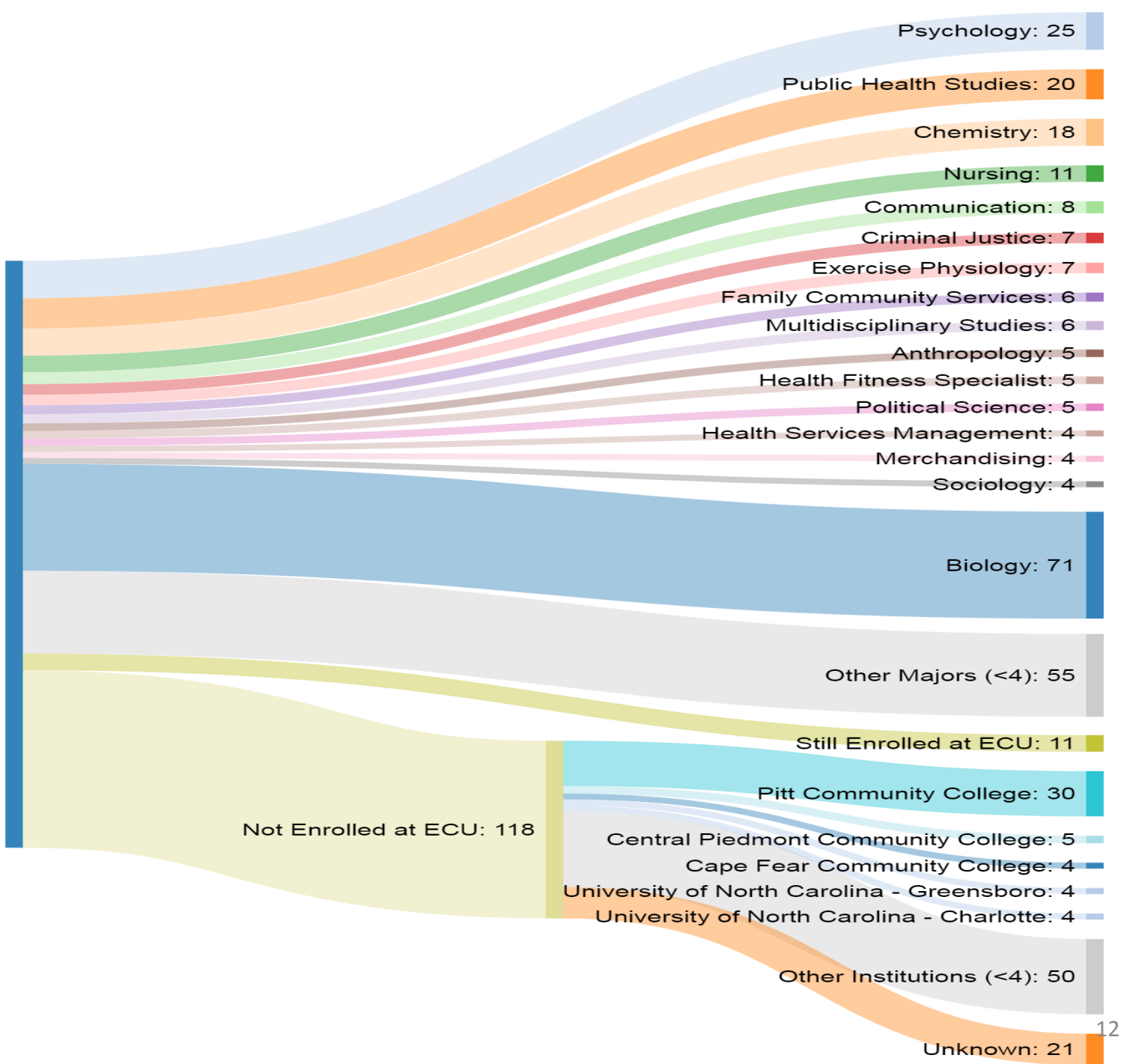
Selected degree pathway Sankey diagrams

All based on Fall 2010 first-time, first-year student cohort

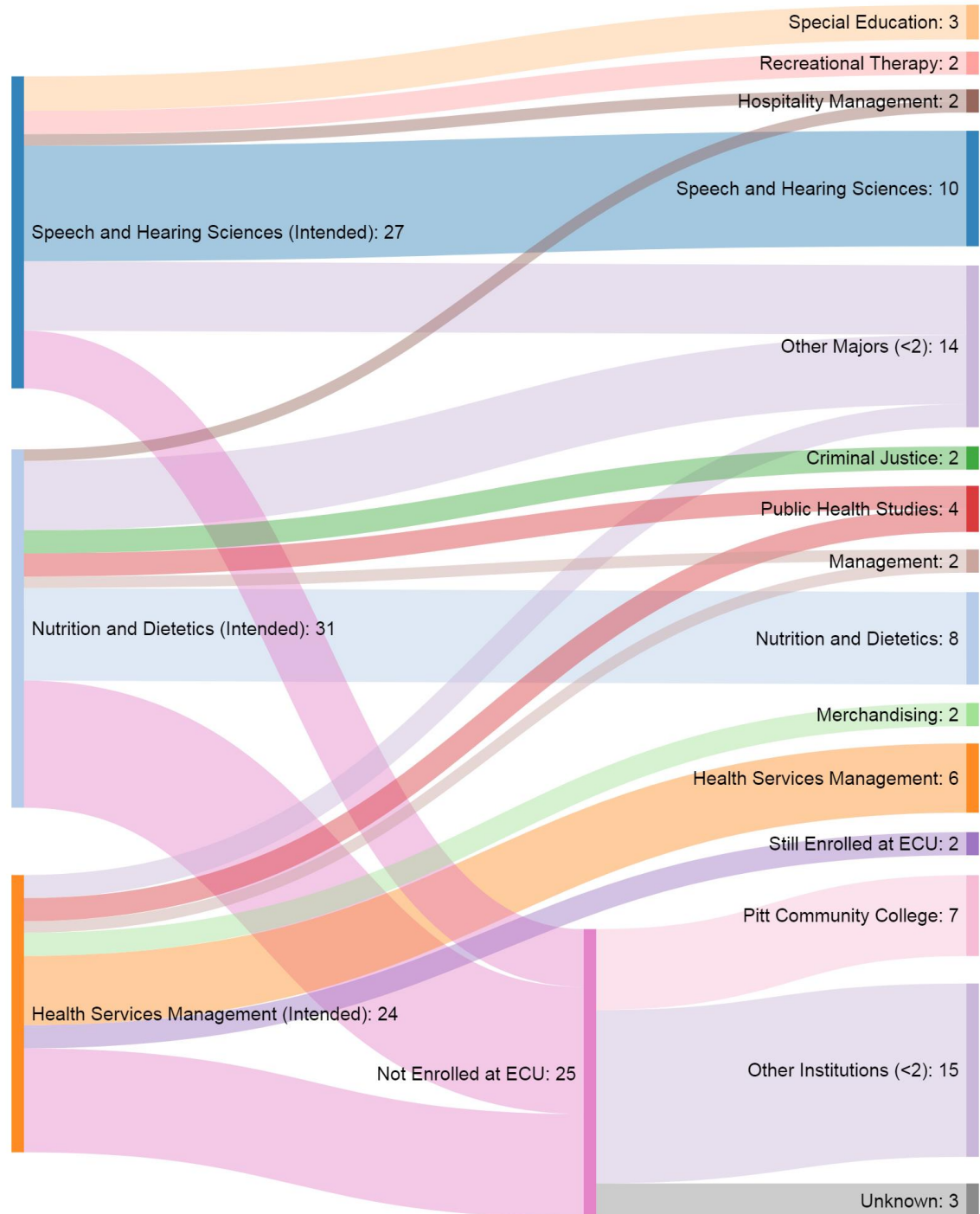
**Nursing
(Intended):
637**



**Biology
(Intended):
390**

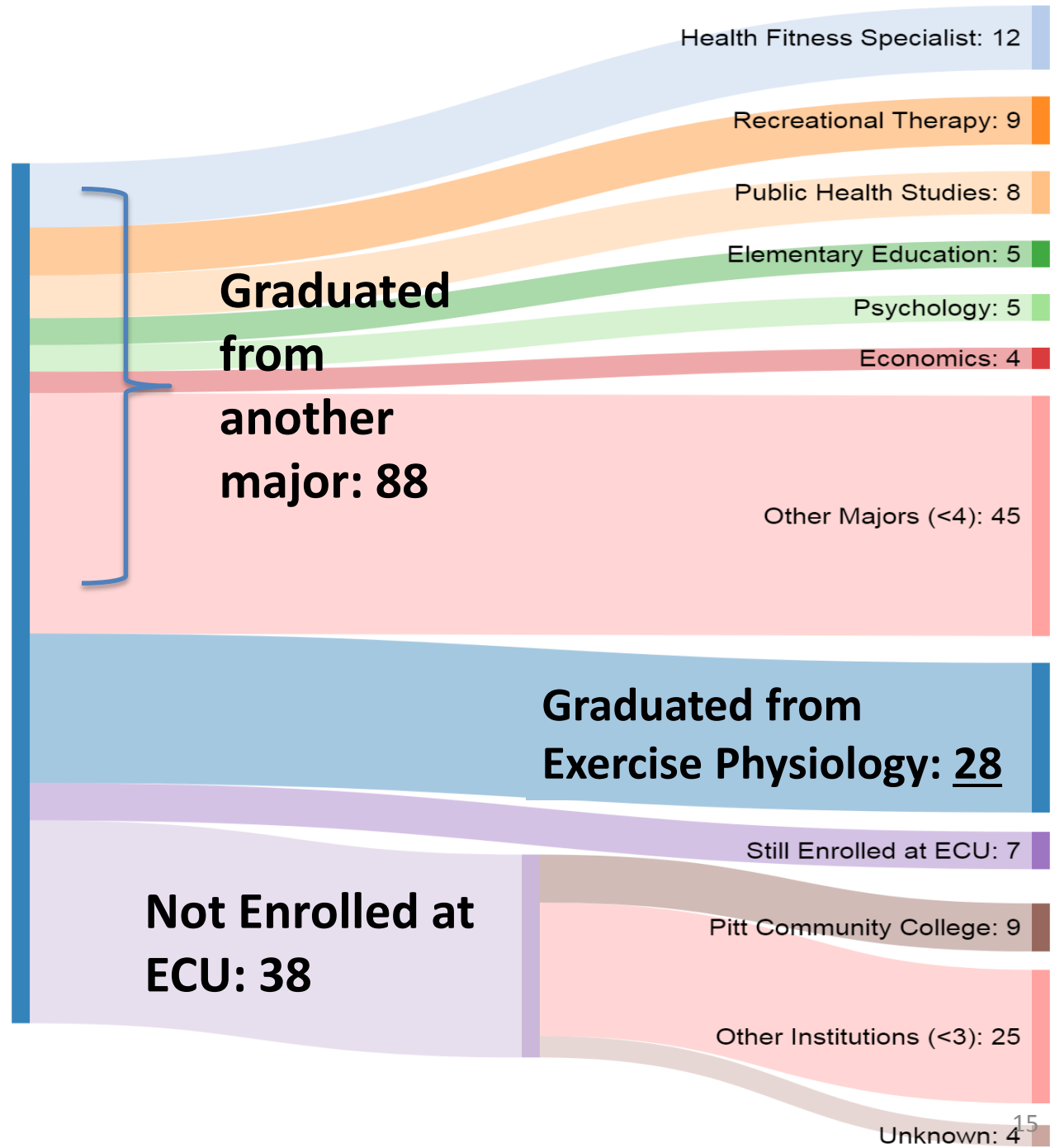


Selected programs from College of Allied Health Sciences



Add quantitative analyses to Sankey diagrams

For the Fall 2010 FTFY cohort, **161** students chose Exercise Physiology as their intended major by Fall 2010 Census Day.



**Exercise
Physiology
(Intended):
161**

Avg. 1st-Year GPA: 3.0

Avg. HS Weighted GPA: 3.67 Other Majors/Still Enrolled: 95

Avg. SAT: 1045

Avg. ACT: 20.9

Avg. 1st-Year GPA: 3.5

Avg. HS Weighted GPA: 4.01 Exercise Physiology: 28

Avg. SAT: 1093

Avg. ACT: 22.6

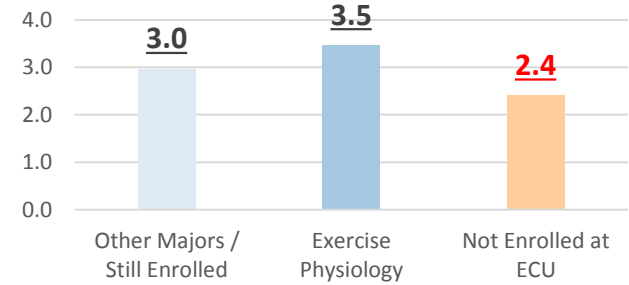
Avg. 1st-Year GPA: 2.4

Avg. HS Weighted GPA: 3.41 Not Enrolled at ECU: 38

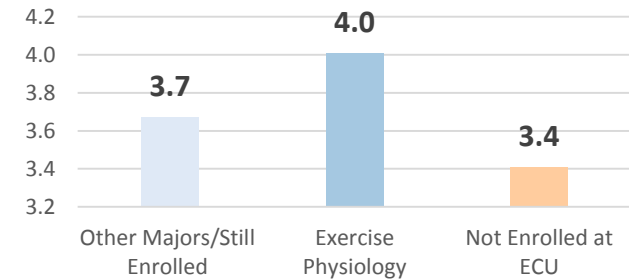
Avg. SAT: 1038

Avg. ACT: 22.7

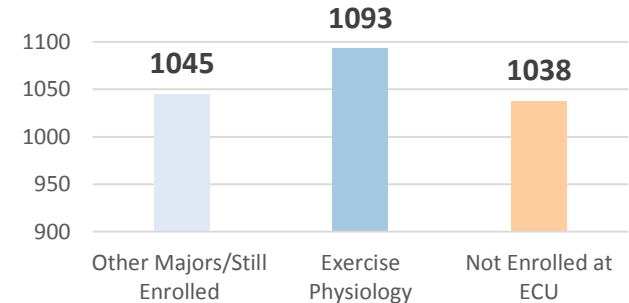
First Year Cumulative GPA



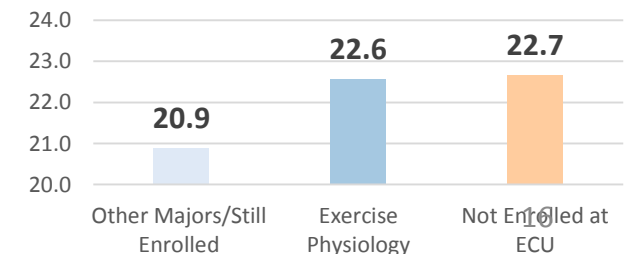
HS Weighted GPA



SAT



ACT



Sankey diagrams with annual snapshots

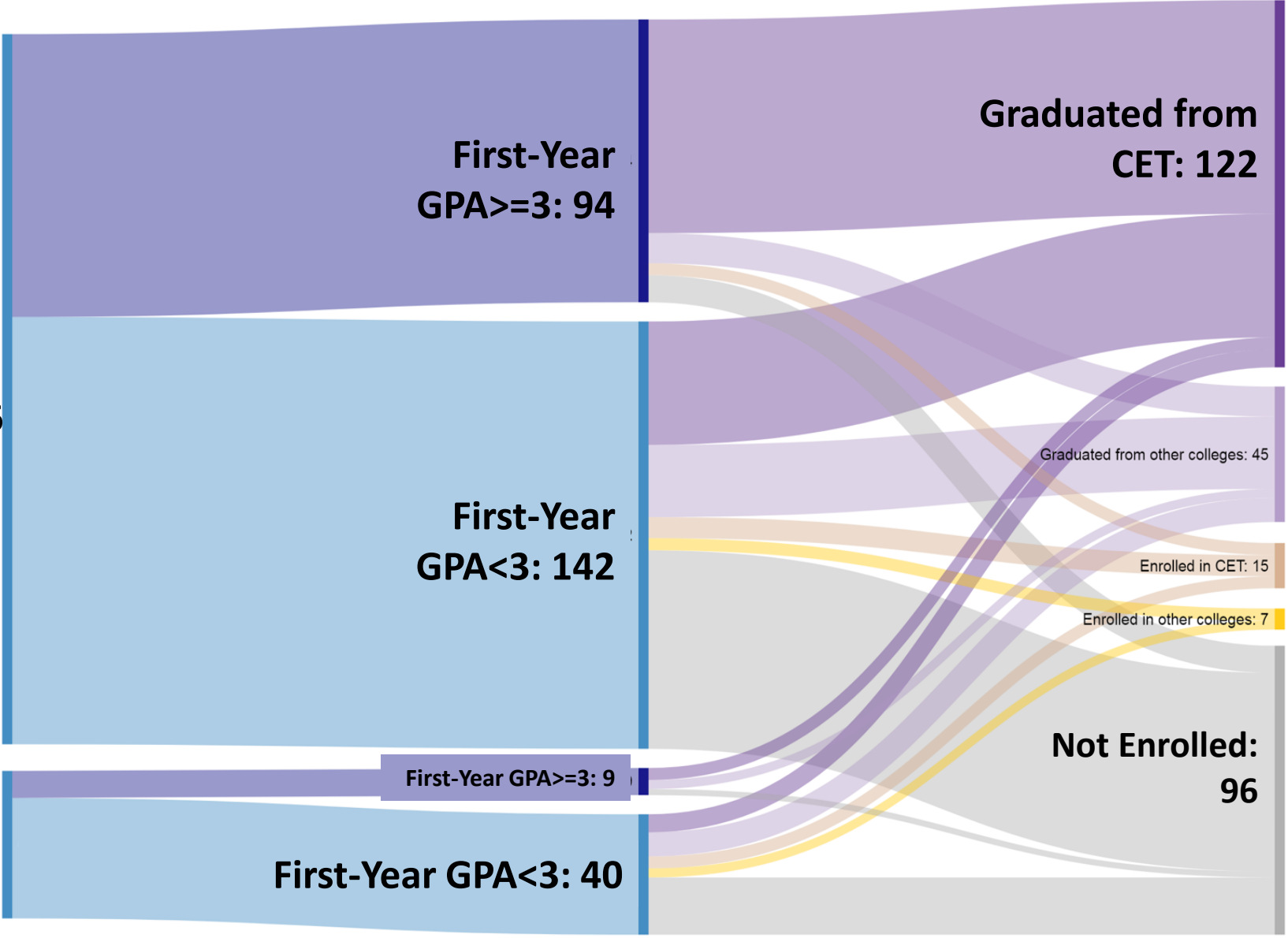
Fall 2012
Census Day

End of 1st Year

End of 6th Year

Admitted
Major: 236

Intended
Major: 49



College of Engineering and Technology: Fall 2012 first-time, first-year admitted or intended majors



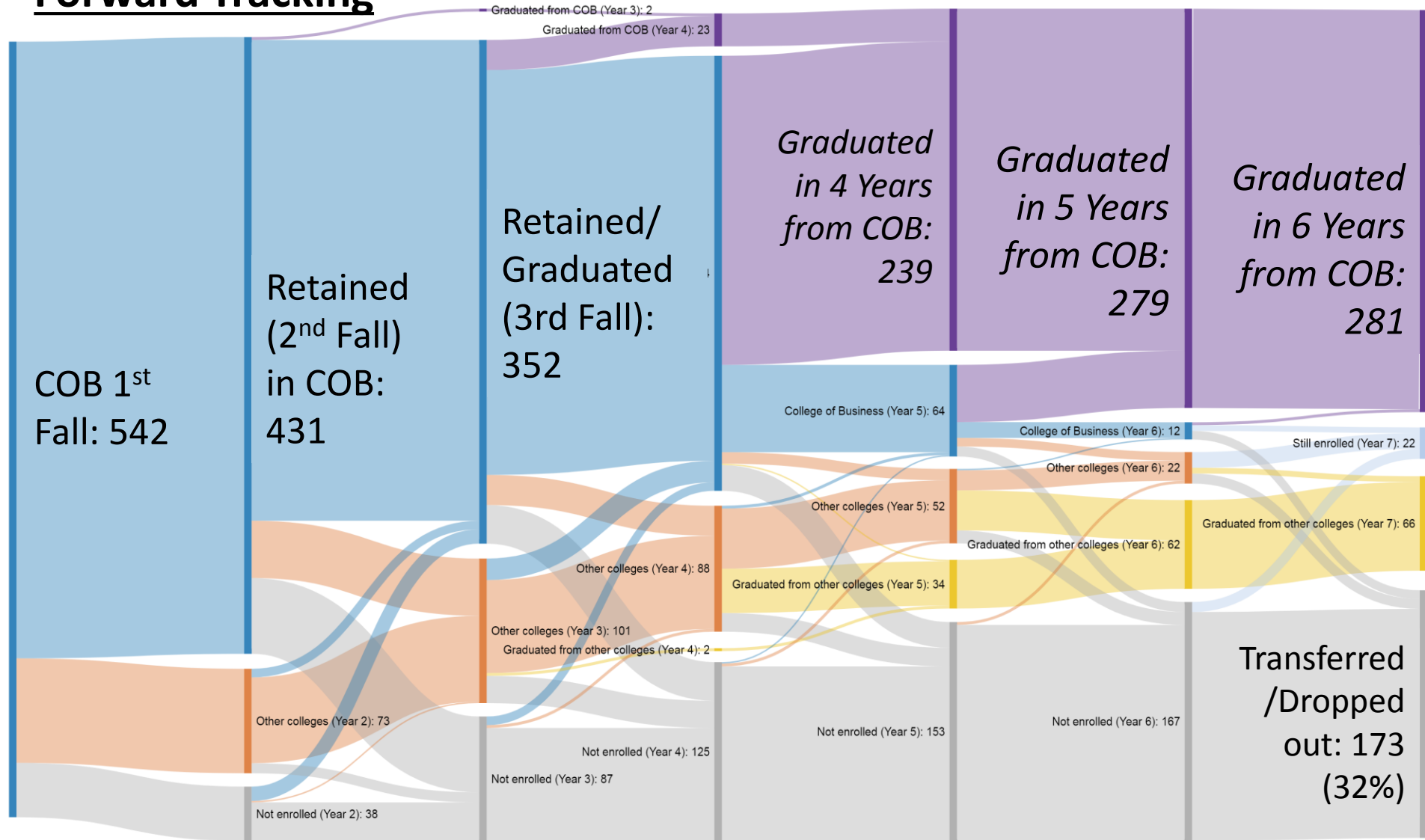
CET Key Insights

- For the Fall 2012 First-time Full-time cohort, 63.5% graduated from ECU in six years.
- At the end of six years, 43% of CET admitted/intended students graduated from CET; 16% graduated from another college; 8% were still enrolled at ECU.
- Students admitted to CET at the beginning of their first fall semester:
 - 40% earned a GPA ≥ 3.0 at the end of the first year.
 - **First-year GPA ≥ 3.0** : about 70% graduated from CET in six years:
 - **First-year GPA < 3.0** : about 30% graduated from CET in six years; and almost 50% transferred or dropped out

CET Key Insights (con.)

- Students with an Intended CET major at the beginning of their first fall semester
 - 18% earned a GPA ≥ 3.0 at the end of the first year.
 - **First-year GPA ≥ 3.0** , about 30% graduated from CET in six years.
 - **First-year GPA < 3.0** , under 20% graduated from CET in six years; and 50% transferred or dropped out.

Forward Tracking



College of Business: Fall 2012 first-time, first-year admitted or intended majors (Snapshots taken on Fall Census)

281 Started as a COB major

3rd Fall

5th Fall

Back Tracking

Management (Year 1): 140

Accounting (Year 1): 51

Finance (Year 1): 18

Gen Business (Year 1): 13

Marketing (Year 1): 55

MIS (Year 1): 4

Enrolled in other colleges (Year 1): 212

Management (Year 3): 151

Management Accounting (Year 3): 57

Accounting (Year 3): 24

Finance (Year 3): 67

Gen Business (Year 3): 9

Marketing (Year 3): 81

MIS (Year 3): 18

Enrolled in other colleges (Year 3): 84

Graduated from COB (Year 3): 2

Graduated in 4 Years from COB: 391

Graduated in 6 Years from COB: 493

Management (Year 5): 25

Management Accounting (Year 5): 9

Accounting (Year 5): 1

Finance (Year 5): 16

Hospitality Management (Year 5): 29

Marketing (Year 5): 16

MIS (Year 5): 5

Enrolled in other colleges (Year 5): 1

212 Started Elsewhere



Fall 2012 first-time, first-year students who graduated from COB in 6 years (including students who started at another college)

COB Key Insights

- At the end of six years, 493 of the Fall 2012 first-time first-year students graduated with a degree from COB.
 - 281 (57%) started as an admitted or intended major at COB in their first fall
 - 212 started in a different college
- Students started as a COB major:
 - Management, 140; Accounting, 51; Finance, 18; General Business, 13; Marketing, 55; and MIS, 5

COB Key Insights (cont'd)

- Change of major in six years:
 - Almost 45% of Marketing students changed major between the 1st fall and the 3rd fall
 - When COB students switched majors, they often chose another major within COB
 - As many as 84 students majored in a field outside of COB in their third fall semester, but half of them managed to graduate in four years.

Summary and future work

Summary

- The Sankey diagram can be a powerful tool to depict and identify student success pathways.
- Data collection, correct interpretation, and further analysis are essential to maximize the impact of Sankey diagrams.
- The involvement of stakeholders (YOU!) is also crucial.

Future Work

- Communicate with ECU stakeholders on the creation and interpretation of Sankey diagrams.
- Update Sankey diagrams for most recent student cohorts.
- Find a secure way to post interactive Sankey diagrams online for ECU internal review

Questions?