Exploring Undergraduate Transfer Student Pathways and Success in Microbiology

Jennifer Drew, Alexandria Ardissone and Eric Triplett
Our Aim Today

• Model our process of connecting to STEM
• Our connection is to increase access, participation, and success in STEM
• Understand the **transfer pathways** in STEM
• Micro online and on-campus 2+2 transfer program
On-Campus Majors (non-transfers, FTICs)

On-Campus Transfers

Online Transfers

Florida Public 2-year Institutions (statewide)

4-year institution

High School
3 Main Pathways

On-Campus Majors (non-transfers, FTICs)

On-Campus Transfers

Online Transfers

Florida Public 2-year Institutions (statewide)

High School

Captures 86% of all Micro majors
TRANSFER STUDENTS

2-Year Public Institution to 4-Year Institution
2+2 Transfer Students

- Challenging to analyze – collection of data, metrics
- Diverse students with unique challenges of their own
- Transfer gap – 13% of students who start an A.A. program earn a B.S. in 6 years
- Lower retention than their FTIC peers
- Transfer gap is wider for URM students:
  - > 50% of Latino 2-yr students are interested in B.S. degree, only 6% complete within 6 years
2+2 Students

Diversity and Challenges

- Women
- URM
- Lower income
- Working adults
- Financially independent
- Veterans
- Parents
2+2 Students

Diversity and Challenges

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- URM
- Lower income
- Working adults
- Financially independent
- Veterans
- Parents

Nontraditional Students (or Adult Learners)
Nontraditional Students

- 24 years or older
- Part-time enrollment
- Financially independent
- Fulltime employment (> 35 hr per week)
- Have dependents (younger or older)
- Single parents
- GED instead of HS diploma

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- Up to 75% of all B.S. seeking students are nontraditional
- 6-year completion rate is 48.9% for nontraditional (vs. 64.7% for traditional)
- Policies and models designed for traditional students

Role of Online Education

• Increases accessibility and broadens participation in general, but especially for nontraditional students?
• Expanding reach beyond our own borders and collaborating with community colleges
• Retention is lower than on-campus face-to-face programs
Challenges and Gaps for STEM

• 40% with a STEM B.S. have attended a community college
• 20% with a STEM B.S. transferred from a 2-year institution into 4-year program
• Lower retention and higher attrition than non-transfer peers
• URM in STEM have lower completion rates
• Difficult to study because of lack of resources, consistent reporting
• Gap in research of understanding 2+2 pathway
• National call for new pathways and entry points for STEM
Gaps in Understanding Pathways

- STEM
- Nontraditional
- Online
- Women
- URM
Microbiology and Cell Science

MCS HYBRID ONLINE 2+2 TRANSFER PROGRAM
• 1st hybrid online STEM degree offered by a land-grant institution
• 2-yr students transfer into 4-yr program without relocating
• Courses, curriculum, and instructors are the same as on-campus program
• Began with Miami Dade College, largest minority-serving institution in the country and expanded statewide
• All lecture courses are online
• ALL LAB COURSES ARE FACE-TO-FACE
Development of a Distance Education Program by a Land-Grant University Augments the 2-Year to 4-Year STEM Pipeline and Increases Diversity in STEM


CBE—Life Sciences Education • 15:ar50, 1–10, Fall 2016

Broadening Participation of Women and Underrepresented Minorities in STEM through a Hybrid Online Transfer Program

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Think big
Online Bachelor of Science in Microbiology & Cell Science

University of Florida
MCS Online Program

A STEP up for the life sciences
#1161177

Florida Pathways to Success
#1643780

Broadening the STEM Pipeline with Research Experiences in Agricultural Sciences
#06367

Bootcamp Labs

Successful Integration of Bootcamp Lab in a Hybrid Online STEM Program – Manuscript accepted 2019
MULTIPLE PATHWAYS
Transfer Students not the Traditional Student

On-Campus Majors (non-transfers, FTICs)

On-Campus Transfers

Florida Public 2-year Institutions (statewide)

Online Transfers

High School

Captures 86% of all Micro majors
On-Campus Majors (non-transfers, FTICs)

N = 302
50.3%

On-Campus Transfers

N = 160
26.7%

Florida Public 2-year Institutions (statewide)

N = 138
23.0%

High School

N = 600
Transfer students, particularly online, are more diverse.
All pathways enroll more women than men.
Transfer students are older. More nontraditional students in transfer cohorts.

Age at entry (years)

GROUP
- FTIC
- OC-TR
- ONL-TR

p-value <0.001; ANOVA
First time students (non-transfers) have higher GPA than transfer students.
Transfer students have lower retention

- FTIC (N=124): 76.6% Graduated, 12.1% Persisting, 11.3% Unenrolled
- On-campus TR (N=65): 46.1% Graduated, 53.9% Persisting, 0% Unenrolled
- Online TR (N=38): 50% Graduated, 7.9% Persisting, 42.1% Unenrolled

*4 year retention rates
Who is retained?

FTIC (N=124)

- 76.6% Graduated
- 12.1% Persisting
- 11.3% Unenrolled

On-campus TR (N=65)

- 50% Graduated
- 46.1% Persisting
- 0% Unenrolled

Online TR (N=38)

- 42.1% Graduated
- 53.9% Persisting
- 7.9% Unenrolled

17% 30% 42% URM

- 54% Women
  - 30% Persisting
  - 58% Unenrolled

- 14% URM Women
  - 10% Persisting
  - 26% Unenrolled
Transfer Students graduate with lower GPA

![Box plot showing graduating GPA by group]

- **FTIC**: Light blue boxes
- **OC-TR**: Black boxes
- **ONL-TR**: Red boxes

The diagram indicates that students in the FTIC group have a slightly higher average graduating GPA compared to those in the OC-TR and ONL-TR groups.
Transfer students are not the ‘traditional’ student
more diverse
more women
older
lower GPA
lower retention

How can we help?
Florida Pathways S-STEM Initiative

• NSF Award in 2017
• Miami Dade College is partner
• Providing substantial need-based scholarships to **full-time** transfer students (on-campus or online)
• Intention is to decrease time to degree, enhance success, increase retention, decrease debt and loans
• Provides research and other student support activities
• Research aim - study the multiple STEM 2+2 transfer pathways – predictors of success, design intelligent interventions
Eligibility Criteria:

1. Be a University of Florida, College of Agricultural and Life Sciences, Microbiology and Cell Science (MCB) undergraduate major who transferred with an A.A. from a 2-yr degree-granting Florida state college. Students who meet this criteria can be enrolled in the online or on-campus transfer tracks.

2. Be a US citizen, permanent resident, national or refugee at the time of application submission as stipulated by NSF.

3. Have a minimum GPA of 2.5.

4. Be enrolled full-time (12 credits).

5. Demonstrate financial need based on the FAFSA.
ONLY CAPTURING 39% OF ELIGIBLE TRANSFER STUDENTS. WHY?
needs assessment

112
Spring 2019 US
Transfer Students (J)

On-Campus

67
US Citizens

56
GPA ≥2.5

47
Full-time (≥12 credits)

34
Financial Need

Online

45
87% remaining, 13% lost

39
24% remaining, 62% lost

11
22% remaining, 2% lost

10
51% remaining, 19% lost

70% remaining, 13% lost

84% remaining, 16% lost

51% remaining, 19% lost
Key Findings:

• Only 39% (N=44) of the MCB transfer student population met all eligibility criteria to receive an S-STEM award Spring 2019.

• The proportion of eligible on-campus transfer students is more than two-fold higher than that of online students (p value < 0.05).

• 44% of online transfer students are ineligible to receive an S-STEM award solely due to enrollment status (< 12 credits).

• 12% of S-STEM scholars become ineligible because of part-time enrollment.
Online Transfer students are primarily part-time
What about GPA?

- For on-campus students, GPA is associated with full-time status
- NOT the case for Online students
Part-time enrollment of online transfer students does not affect outcome.
Conclusions

• Online 2+2 transfer students 9X more likely to enroll <12 credits than on-campus counterparts...
• ...despite this, have higher retention.
• Both online and on-campus 2+2 completers have similar time-to-degree, but online 2+2 completers have higher GPA.
• At 4 years, over half of on-campus transfer students have left major, so there is definite room for improvement in both tracks of transfer students
• Nontraditional Students need nontraditional approaches
Next Steps

- Requesting policy change to reconsider the definition of full-time for online students and adjust the minimum course load criteria to 8 credits.
  - 10 additional online student could have been awarded, doubling the number of women and URM students.
- Allow transient courses taken by 2+2 transfer students to count towards total semester credits for full-time status
- Conduct a survey of all students to identify motivations for enrolling full- vs. part-time. (does the online structure post a barrier to full-time enrollment?)
- Further identify factors as predictors of success (including at the course level) to improve retention for both tracks of transfer students.
Long-term tracking & broader impact

- Gathering tracking data – where are they now?
  - Institutional resources (exit survey and clearinghouse)
  - External tracking service

- Develop in house surveys and methods – qualitative follow up with students who have graduated and left

- New and unexpected directions for STEM education research - bootcamp labs, better understanding traditional and nontraditional pathways
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Valencia College
Online Graduates vs. Unenrolled Students

- Proportion of students by race:
  - Graduate:
    - Asian
    - Black (non-Hispanic)
    - Hispanic
    - Native American/Alaskan Native
    - White
    - Unknown

- Proportion of students by sex:
  - Graduate:
    - F
    - M

- Box plots for:
  - Average Course Load
  - Number of semesters enrolled
  - Transfer GPA
  - UF GPA

StatusGroup:
- Graduate
- Unenroll
Challenge: How to evaluate retention?

- At what time point? (4 years post transfer does not equal 4 years post on-campus enrollment)
- For non-transfers who change majors, do we track them when they declare as freshmen? 3rd year major? - Use data strategically
- Institutions report overall retention for non-transfers
- Most data is collected and published for 4 year and 6-year rates
- IPEDS just recently started to collect and publish transfer student retention as 8-year rates
IPEDS now reports on 4 types of students

https://nces.ed.gov/ipeds
IPEDS now reports on 4 types of students:

- **First-Time, Full-Time (FTFT):** 66.4%
- **First-Time, Part-Time (FTPT):** 42.1%
- **Non-First-Time, Full-Time (NFTFT):** 58.5%
- **Non-First-Time, Part-Time (NFTPT):** 21.8%

[Source: https://nces.ed.gov/ipeds]
Challenge - How to Evaluate Other Metrics and Resources to Consider

• 13% complete the 2+2 journey within 6 years (National Student Clearinghouse Research Center)
• Estimated that 35 – 50% 6-year graduation rate for online BS program (no clear repository for this metric)
• Estimated 48% attrition for STEM BS undergrads (NCES)
• 80% for STEM transfer students with a A.A. at 4 years (Institutional Research)