Navigating First-Year STEM Student Persistence:
Insights from Student Experience & Expectations

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1. Background

- The presentation delves into an investigation of the social and behavioral indicators influencing the persistence trajectories of the First-Time-in-College (FTIC) students pursuing STEM degrees.
- Using data from the Beginning College Survey of Student Engagement (BCSSE) as well as institutional records, the study primarily employs logistic regression analyses to the STEM FTIC cohort of Summer/Fall 2021, totaling 2304 students, within a Southeastern R1 university.

2. STEM Persistence Pathways

Type I Retention	First-year STEM students returned to the university in the 2nd Fall.
Type II Retention	First-year STEM students continued to enroll in a STEM program (any eligible major) in the 2nd Fall.
Type III Retention	First-year STEM students persisted in their initial major choice during the 2nd Fall.

3. Research Questions

- RQ1: What percentages of STEM FTIC students were retained in the second Fall?
- RQ2: What are the social and behavioral indicators influencing the persistence outcomes of FTIC students pursuing STEM degrees?

4. Data & Variables

- FTIC cohort of Summer/Fall 2021 pursuing STEM degrees
  - N=2304
- Institutional records (Student Information Database, SID)
  - Demographics: gender, race/ethnicity, first-generation status, honor status, housing type, Pell, scholarship, and athlete status, etc.
  - Grades: high school GPA and SAT scores, etc.
- Beginning College Survey of Student Engagement (BCSSE)
  - Social-behavioral indicators such as:
    - expected engagement in collaborative learning
    - expected discussions with diverse others and
    - hours spent working for pay in the last year of high school, etc.

5. Methods

- To assess the influence of social-behavioral variables on STEM persistence, I conducted logistic regression analyses using PROC LOGISTIC procedure (backward selection) in SAS® Enterprise Guide®.

```
PROC LOGISTIC DATA = WORK.STEM_FYR
PLOTS(ONLY)= ODDSRATIO PLOTS(ONLY)=ROC;
CLASS &CHAR_1 / PARAM=REFERENCE;
MODEL FALL22_STEM_FLG(EVENT='YES')
= &CHAR_1 &NUM_1 /
LINK = LOGIT RSQUARE LACKFIT RSQ CORRB
SELECTION = BACKWARD;
RUN;
```

6. Findings

- Among the 2304 STEM FTIC students who were admitted in Summer/Fall 2021:
  - 2095 (91%) returned to the university in Fall 2022 (Type I Retention)
  - 1820 (79%) continued in a STEM program in Fall 2022 (Type II Retention)
  - 1536 (67%) persisted in their initial STEM majors in Fall 2022 (Type III Retention)
- Significant BCSSE indicators of **Type I Retention** ($p<0.05$)
  - a limited college social circle comprising known friends (-)
  - designation of the current institution as a secondary/tertiary choice (-)
  - spending more hrs working for pay during the last year of high school (-)
- Significant BCSSE indicators of **Type II Retention** ($p<0.05$)
  - less inclined to seek academic help from friends in college (-)
  - spending less time socializing & relaxing in the final year of high school (-)
- Significant BCSSE indicators of **Type III Retention** ($p<0.05$)
  - anticipating heightened engagement in collaborative college learning (+)
  - expecting more academic challenges in college (-)
  - planning to seek more non-academic & non-family/friend help with college coursework (-)
  - spending more hrs working for pay during the last year of high school (-)

Note: (+) refers to positive association, while (-) is negative association.

7. Discussions

- PROC LOGISTIC procedure allows users to request various goodness-of-fit statistics, which can enhance the overall understanding of the logistic regression models.
- By using the backward selection option, we can select the best subset of predictor variables. This process begins with all predictors and progressively eliminates the least significant ones until a predefined stopping point is reached. For this study, backward selection is helpful in identifying the influential social-behavioral indicators of STEM persistence.

8. Acknowledgement

UNIVERSITY of SOUTH FLORIDA