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Targeting Undergraduate Students for Surveys: Lessons from the Academic Pathways of People Learning Engineering Survey (APPLES)

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What is APPLES?

In April 2007, the Academic Pathways of People Learning Engineering Survey (APPLES) was administered to students who were currently studying engineering or had considered studying engineering at four American undergraduate institutions.

The main objective of APPLES is to broaden our understanding of how students navigate their education and begin to form identities as engineers. APPLES is part of the Academic Pathways Study (APS), a cross-university, multi-method study that systematically examines how engineering students navigate their education.

APPLES focuses on three key themes:

- 1) Persistence in engineering
- 2) The varying experiences of engineering students over the course of their undergraduate education
- 3) Differences in experiences, perceptions, and confidence related to gender.

Sampling Plan

In developing the APPLES sampling plan, 2004 ASEE data was used to identify undergraduate engineering populations by academic standing and institution. The strata identified in this table indicate the specific sub-groups of interest, based on preliminary findings from analyses of the Persistence In Engineering survey data. Female students, ethnic minorities, and part-time students were oversampled.

Our primary strata were academic class (freshmen through seniors) and persistence. Student recruitment methods varied at the four institutions. An incentive of \$4 per individual respondent was paid through an online financial transaction company.

APPLES Constructs

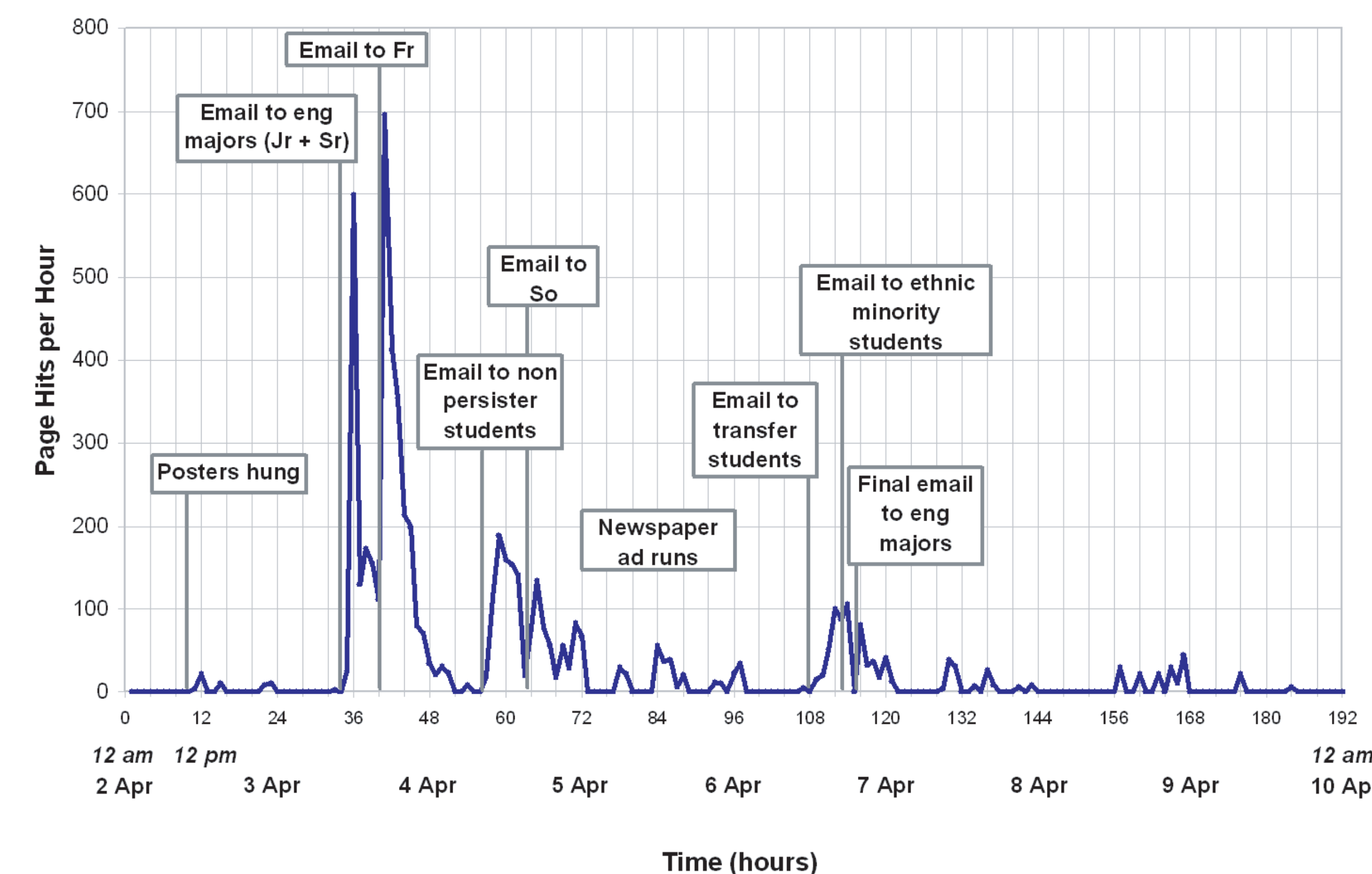
With 842 valid responses, APPLES validates findings from the longitudinal Persistence in Engineering (PIE) Survey, a hallmark component of the APS and the foundation of the design of APPLES. The following are Cronbach's alpha scores for several selected **PIE** and **APPLES** constructs:

- Motivation (financial): **.76/.82**
- Motivation (social good): **.70/.64**
- Motivation (family influence): **.85/.87**
- Confidence in math and science: **.83/.82**
- Confidence in professional & interpersonal skills: **.84/.80**
- Extracurricular fulfillment: **.85/.82**
- Curriculum overload: **.81/.78**
- Academic disengagement - Liberal arts: **.58/.88**
- Academic disengagement - Engineering: **.70/.86**
- Frequency of interaction with instructors: **.69/.74**
- Satisfaction with instructors: **.84/.72**

Analyses of these constructs by gender, persistence in engineering, and other strata are ongoing and will be shared in future findings from the APPLES research study.

Primary Strata	Targeted Responses	Valid APPLES Responses
All	560	842
Freshmen	100	185
Sophomore	100	155
Juniors	100	241
Seniors	100	241
Non-persisters	100	88
Female students	100	155
Secondary Strata		
Ethnic minority students, International students, Part-time students, Transfer students		

Implications for Future Survey Deployment



The above figure illustrates the impact of specific recruitment efforts on survey response rates, as represented by server activity. Based on these response patterns, we determined that a 5 day period (Monday to Friday) was the optimum period of deployment. Targeted emails were quite effective but other interventions such as newspaper ads and posters were useful in raising awareness but did not individually increase response rates.

What's next for APPLES?

A second iteration of APPLES will be deployed in early 2008 to a stratified sample of approximately 20 universities in the U.S. Capturing the views of over 5,000 engineering students, APPLES 2 will be among the largest engineering education surveys of undergraduates.

