

Course Profile

Five offerings of a first-year course, "Engineering 100: Introduction to Engineering, Blimp Section"

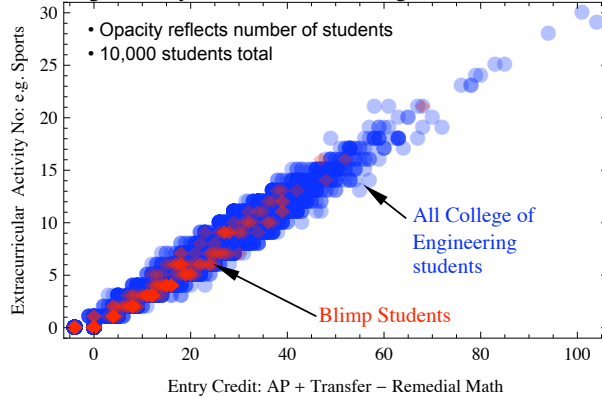
- Incorporated extensive and experiential Design-Build-Test-Compete pedagogy
- Emphasis on Aerospace Engineering
- Excellent teaching evaluations, but expensive in instructor commitment and resources

Course features

- Sequence of two Design-Build-Test-Compete projects (balloon and radio controlled blimp)
- Coupled technical and communications (foundational labs, reports, oral presentations)
- Dedicated lab, ~ \$100/student in lab disposables

Student Entry Profile

Fig. 1: Entry Profile of Col. of Eng. Students: 2000–08



Comparison metrics include

- Entry scores (high school GPA; ACT/SAT scores)
- Preparation (math level)
- Advanced preparation (AP and transfer credit)
- Extracurricular activities (sports, music, other)
- Subsequent grades

Student Performance

Fig. 2: Performance of Fall Eng 100 Students: 2004–08

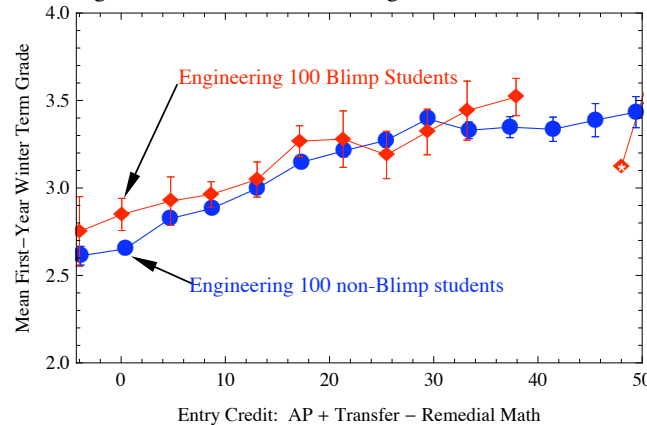
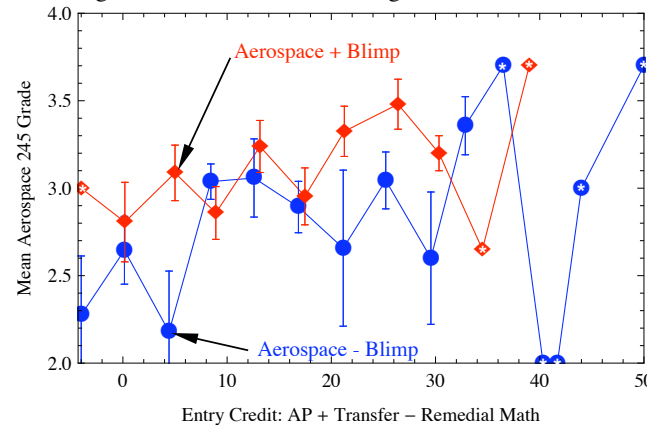


Fig. 3: Performance of Fall Eng 100 Students: 2004–08



Aggregate fall sample sizes for Figures 2 an 3

- 5000 College of Engineering students
- 300 Blimp students

Error bars: One standard deviation of the mean

No Error Bars: (♦, ●) Represent a single student

Discussion

- Student performance generally improved by participation in the Design-Build-Test-Compete blimp course in both
 - Following winter term GPA
 - Later term entry Aerospace Engineering course (Aerospace Engineering 245)
- Insufficient data
 - at higher levels of entry credit
 - to determine most valuable type of transfer credit (e.g., technical or non-technical)
- 10% of Fall College of Engineering students placed in UM remedial math (negative entry fraction)
- Entry credit and extracurricular activities
 - Predictor of mean performance, levels out at 30 credits
 - Some students with very large values
 - Unexplained correlation
 - Absolutely zero outliers!

Conclusions

Better performance of Engineering 100 blimp students in subsequent courses

- Equivalent to 2–3 AP courses (before entry to UM)
- More significant for students with less entry credit
- More pronounced for Aerospace students.

Most prominent discriminators in performance of all College of Engineering first-year students

- Credit at the time of entry to UM
- Lowest of SAT or ACT scores

Correlation of number of academic credit transferred to UM for CoE students with number of sports, music, and other activities in high school

Acknowledgments

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