

Physics Education Research (PER) seminar: first-year seminars: what are they good for?

Michael L Allen
mlfa.astro@gmail.com

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Goals for today's seminar

- 1 Understand the goals of typical first-year seminars (FYS).
- 2 Understand the various types of FYS.
- 3 Understand the relevance of FYS (audience, instructors, institution).
- 4 Understand where Physics 188 fits into all of this.

Background

- The idea seems to have originated in the 1880s.
- By the middle of the 20th century, FYS were almost extinct.
 - Faculty were disenchanted with what they perceived as baby-sitting.
- Interest in FYS returned en masse with the college entrance of the Baby Boom generation.
 - Featured a much wider diversity of student than colleges were used to (diverse in all aspects).
- Today, FYS are offered at 90+% of US colleges.
 - At more than half of these, 90+% of all students enroll in one.
- The average size is 30 students.
- There is a large literature on FYS, but much of it is narrative/anecdotal, little is quantitative/empirical.
 - This talk is motivated by the recent publication of a large, quantitative meta-analysis of FYS (Permzadian & Credé 2016).

What is a first year seminar?

- It is a course designed to help students make the transition to college by developing their social and academic skills.
 - Identify stress (stress = when perceived demands exceed coping resources).
 - Inform students of expectations.
 - Teach coping strategies.

Academics: the college skill set

- Declarative knowledge, i.e., what needs to be done: identify performance goals, set goals, be aware of one's own progress towards goals.
- Procedural knowledge, i.e., how to do it: how to study effectively and efficiently, how to manage time, how to seek help.
- Motivation: be willing to put in the time and effort required to achieve goals.

How do we measure the effectiveness of FYS?

- The two most common measures are first year GPA, and first year retention.
- These two have profound implications for the institution:
 - students with higher GPAs make less use of institutional resources (e.g., remediation, counseling),
 - it is cheaper to retain current students than recruit new ones,
 - most students who drop out of college do so before entering their 2nd year, so the first year retention rate is a good indicator of graduation rate.
- There are many variables that affect first year GPA and retention rate that must be accounted for.

Variables in play

- Variables related to the FYS:
 - content, integration with the major, instructor, length, grading, target population.
- Variables related to the institution:
 - global drop-out rate, types of degree awarded, admissions standards, ethnic profile, proportion living on-campus, institution size.
- Other variables exist, but I will not discuss them here.
- Treatment of the variables: classified as either discretely varying or continuously varying, e.g.,
 - the college type can be either a 2-year or 4-year (discrete),
 - the length of the course can vary (continuous).

Discussion of variables related to the FYS

As you read these, think about which of the choices would be the more effective in raising (i) GPA, and (ii) retention.

- Types of FYS:
 - basic study skills: grammar, note-taking,
 - orientation: to college resources and policies,
 - academic: skills like critical thinking, writing, speaking,
 - discipline: introduction to specific majors,
 - hybrid: a combination of the above.
- Structure of FYS:
 - linked with other classes (a learning community),
 - stand alone.

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Discussion of variables related to the FYS (cont'd)

- Instructors of FYS:
 - faculty, or admin staff
 - grad student, or undergrad student,
 - trained, or untrained.
- Length of FYS:
 - measured by contact hours or granted credit.
- Grading of FYS:
 - letter grade,
 - pass/fail.
- Target population of FYS:
 - academically unprepared students,
 - entire first year cohort.

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Discussion of variables related to the FYS (cont'd)

- Institutional characteristics:
 - 2-year
 - 4-year
 - acceptance rate (continuously varying variable)
 - public college
 - private college

Results

- Aggregate results reveal that FYS generally have either no effect, or only a small positive effect upon first year GPA and retention.
- Disaggregated results reveal that some FYS are more effective than others, some highly so.
- The next two slides discuss results related to GPA, and results related to retention.

Results: improving first year GPA

When reading these, think about which effects are in agreement with your prediction, and which are contrary.

- Hybrid-type are more effective than orientation-type.
- Faculty & admin instructors are more effective than student.
- Trained instructors are more effective than untrained.
- 2-year college effect was more positive than the 4-year college.
- Private college effect was more positive than the public college.
- Shorter seminar (i.e., fewer credits) was more effective than longer.
- Smaller institution effect was more positive than larger institution.

Note: some variables have no measurable effect on first year GPA, e.g., stand-alone courses are more effective than the learning community model at a level just under the statistical significance threshold.

Results: improving first year retention

- Orientation type are more effective than hybrid (opposite of the GPA result).
- Faculty & admin instructors are more effective than student.
- Seminars that target all students are more effective than those that target only underprepared students.
- 2-year college effect was more positive than the 4-year college.
- Private college effect was more positive than the public college.
- Smaller institution effect was more positive than larger institution.

Note: some variables have no measurable effect on first year retention.

How to interpret the results?

- The results are consistent with other studies that show that academic performance is more strongly linked to stable attributes (e.g., personality, intelligence, preparedness) than to short-term interventions.
- The positive effect of FYS upon retention was stronger than first year GPA, indicating an important role played in students' adjustment to college.
- Small changes can have big effects: the data indicate that an effective FYS can increase first year retention rates by 5%, representing a substantial number of students and amount of monetary investment.

Best practices in FYS

- ① To improve first year retention, the most effective FYS orient students to college, are taught by faculty/admin, target all incoming students, and are stand alone courses.
- ② To improve first year GPA, the most effective FYS are hybrid-type (i.e., orientation, study skills, introduction to the major), and are taught at 2-year colleges.

Where does Physics 188 fit into this?

- Oldest FYS in the WSU catalog (others include AMDT, Bio Eng, Chem, Neurosci, Psych, Univ)
- Hybrid design:
 - Textbook: “Your college experience”, by Gardner et al.
 - Graded assignments on WSU resources, learning styles, note-taking, time management, study skills.
 - Introduction to faculty & research.
 - Reflective essays: “How could I see myself in this research area?”
- Taught by (untrained) faculty.
- Targets all incoming students (required for the BS Physics degree).
- Stand alone course.

What is the reaction to Physics 188?

Students report ...

- an understanding of what is expected of them in this course,
- an appreciation of the weekly feedback on assignments,
- a desire that the instructor be present at more class meetings,
- a preference for lab tours over ppt lectures,
- a lower-than-average work load compared with other 100-level courses,
- the textbook is of below-average value,
- the individual lectures vary greatly in comprehensibility.

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What is the reaction to Physics 188? (cont'd)

The instructor reports ...

- the original intent of Physics 188 was to expose incoming students to Physics as a major in their first semester,
- our model was adopted by many other FYS at WSU,
- the students are a combo of true first-years and college transfers (two-thirds / one-third),
- some students put much more work into the course than others,
- combined group lectures with Physics 501 negatively affect undergraduate comprehension and morale,
- a failure rate of about 10% (2 in 20 enrollees),
- very roughly half or fewer of enrollees go on to major in physics.

Future research

There is a nascent group of FYS instructors who propose studying the first year experience at WSU.

- What is the profile of FYS at WSU?
- What data on effectiveness exists?
- What data should be collected?
- What can we do to improve FYS at WSU?

The end.