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Answers in the Toolbox

Academic Intensity, Attendance Patterns and Bachelor's Degree Attainment.

By Clifford Adelman

Answers in the Tool Box is a study about what contributes most to long-term bachelor's degree completion of students who attend 4-year colleges (even if they also attend other types of institutions).

Degree completion is the true bottom line for college administrators, state legislators, parents, and most importantly, students—not retention to the second year, not persistence without a degree, but completion.

This study tells a story built from the high school and college transcript records, test scores, and surveys of a national cohort from the time they were in the 10th grade in 1980 until roughly age 30 in 1993. The story gives them 11 years to enter higher education, attend a 4-year college, and complete a bachelor's degree. In these respects—based in transcripts and using a long-term bachelor's degree attainment marker—this story is, surprisingly, new.

This study was motivated by four developments in higher education during the 1990s:

- ◆ The growing public use of institutional graduation rates as a measure of accountability, and the tendency in public policy and opinion to blame colleges for students' failure to complete degrees and/or for failure to complete degrees in a timely manner.
- ◆ An ever expanding proportion of high school graduating classes entering postsecondary education, and new federal policies encouraging even more students to enter or return to higher education. Our system is being challenged simply to maintain, let alone improve, college graduation rates.

- ◆ The increasing tendency, overlooked in both policy and research, for students to attend two, three, or more colleges (sometimes in alternating patterns, sometimes simultaneously) in the course of their undergraduate careers.
- ◆ The rising heat of disputes involving admissions formulas at selective colleges where affirmative action policies have been challenged. These disputes, carried into the media and hence dominating public understanding, involve two indicators of pre-college attainment—grades/class rank *versus* test scores—without any reference to high school curriculum and its role in the degree completion rates of the mass of minority students.

The story of what contributes most to bachelor's degree attainment works toward six ordinary least squares regression equations that progressively add blocks of key variables following the progress of students from high school into higher education and through the first true year of attendance. The penultimate model (the fifth in the series) accounts for about 43 percent of the variance in bachelor's degree completion. The sixth equation simply indicates that one hits a plateau of explanation at this point. For a story-line such as this, 43 percent is a very high number. A five-step logistic regression then provides both a dramatic underscoring of the principal findings and some enlightening variations.

There are 11 variables in the penultimate linear regression model. The two most important variables, accounting for the bulk of the model's explanatory power are:

- “Academic Resources,” a composite measure of the academic content and performance the student brings forward from secondary school into higher education. This measure is dominated by *the intensity and quality of secondary school curriculum* [see full report].
- Continuous enrollment once a true start has been made in higher education.

In the logistic version of the penultimate model, the same 11 variables (out of 24) are statistically significant, but those displaying the strongest relationships to degree completion (the highest “odds ratios”) are all post-matriculation phenomena: continuous enrollment, community college to 4-year college transfer, and the trend in one's college grades.

Among the 11 variables, the following are not usually found in similar analyses:

- Proportion of undergraduate grades indicating courses the student dropped, withdrew, left incomplete, or repeated.
- A final undergraduate grade point average that is higher than that of the first “true” year of attendance.
- Parenthood prior to age 22.
- Whether the student attended more than one institution and did *not* return to the first institution of attendance, a situation that includes, but transcends, the classical community college to 4-year college transfer pattern.

The only demographic variable that remains in the equation at its penultimate iteration is socioeconomic status, and by the time students have passed through their first year of college, SES provides but a very modest contribution to eventual degree completion. No matter how many times (and in different formulations) we try to introduce race as a variable, it does not meet the most generous of threshold criteria for statistical significance.

Selected Findings

High School Background

- High school curriculum reflects 41 percent of the academic resources students bring to higher education; test scores, 30 percent; and class rank/academic GPA, 29 percent. No matter how one divides the universe of students, the curriculum measure produces a higher percent earning bachelor's degrees than either of the other measures. The correlation of curriculum with bachelor's degree attainment is also higher (.54) than test scores (.48) or class rank/GPA (.44).
- The impact of a high school curriculum of high academic intensity and quality on degree completion is far more pronounced and positively-for African-American and Latino students than any other pre-college indicator of academic resources. The impact for African-American and Latino students is also much greater than it is for white students.
- Of all pre-college curricula, the highest level of mathematics one studies in secondary school has the strongest continuing influence on bachelor's degree completion. Finishing a course beyond the level of Algebra 2 (for example, trigonometry or pre-calculus) more than doubles the odds that a student who enters postsecondary education will complete a bachelor's degree.
- Academic Resources (the composite of high school curriculum, test scores, and class rank) produces a much steeper curve toward bachelor's degree completion than does socioeconomic status. Students from the *lowest* two SES quintiles who are also in the *highest* Academic Resources quintile earn bachelor's degrees at a higher rate than a majority of students from the top SES quintile.
- Advanced Placement course taking is more strongly correlated with bachelor's degree completion than it is with college access.
- Graduating from high school "late" does not influence bachelor's degree completion provided that one enrolls in higher education directly following receipt of the diploma and attends a 4-year college at some time.

College Attendance Patterns

- The proportion of undergraduate students attending more than one institution swelled from 40 percent to 54 percent (and among bachelor's degree recipients, from 49 to 58 percent) during the 1970s and 1980s, with even more dramatic increases in the proportion of

students attending more than two institutions. Early data from the 1990s suggest that we will easily surpass a 60 percent multi-institutional attendance rate by the year 2000.

- Students beginning in highly selective 4-year colleges and those starting out in open door institutions have the highest rates of multi-institutional attendance, though for very different reasons.
- The number of institutions attended by students has no effect on degree completion.
- The fewer schools attended, the more likely the student was enrolled continuously, and the less likely a 4-year college was part of the attendance pattern. Students who move from one sector (2-year, 4-year, other) to another are the least likely to be continuously enrolled.
- Sixteen (16) percent of postsecondary students (and 18 percent of bachelor's degree completers) engaged in alternating or simultaneous enrollment patterns. Some 70 percent of this group attended three or more institutions.
- Some 40 percent of students who attended more than one institution crossed state lines in the process, and their bachelor's degree completion rate was higher than that for multi-institutional students who remained within state borders.
- Students who expected to earn a bachelor's degree, started in a 2-year institution, but never attended a 4-year college have a lower SES profile and a considerably lower academic resources profile than students with the same expectations and starting point but who did attend a 4-year school. Family income, however, plays no role in the different attendance patterns of these students.

Degree Completion

- For students who attend 4-year colleges at some time, the only form of financial aid that bears a positive relationship to degree completion after a student's first year of college attendance is employment (principally College Work-Study and campus-related) undertaken (a) while the student is enrolled and (b) for purposes of covering the costs of education.
- The long-term national *system* bachelor's degree completion rate by age 30 for all *students* who attend 4-year colleges is 63 percent; for all those who earn more than 30 credits, the rate exceeds 70 percent. For those who start in highly selective colleges, the rate exceeds 90 percent.
- While only 26 percent of students who began their undergraduate careers in community colleges formally transferred to 4-year institutions, their bachelor's degree completion rate was over 70 percent. The classic form of transfer, in which the student earns at least a semester's worth of credits before moving to the 4-year college, produces a very high likelihood of bachelor's degree completion.
- The mean elapsed time to complete a bachelor's degree for this cohort was 4.72 *calendar* years, or 5 full academic years. For students in the highest quintile of pre-college academic

resources, the mean time was 4.45 calendar years. For students who were continuously enrolled, it was 4.33 calendar years.

- Thirty-nine percent of 4-year college students who were assigned to remedial reading courses completed bachelor's degrees, compared with 60 percent of students who took only one or two *other* types of remedial courses, and 69 percent of those who were not subject to remediation at all.
- Students who attend 4-year colleges and who earn fewer than 20 credits in their first calendar year of postsecondary experience severely damage their chances of completing a bachelor's degree.

Conclusions That Follow from These Findings

- When nearly 60 percent of undergraduates attend more than one institution and 40 percent of this group do not complete degrees, institutional graduation rates are not very meaningful. It is not wise to blame a college with superficially low graduation rates for the behavior of students who swirl through the system.
- Analysis of institutional effects on degree completion is compromised when students attend two or more institutions. One wastes precious research time trying to figure out which type of experience in institution X had an impact if the student also attends institutions Y and Z. There are some exceptions to these principles, e.g. when the second institution involves a study abroad semester.
- When the academic intensity and quality of one's high school curriculum is such a dominant determinant of degree completion, and both test scores and (especially) high school grade point average or class rank are so much weaker contributors to attainment, college admissions formulas that emphasize test scores and (especially) high school grade point average or class rank are likely to result in lower degree completion rates.
- The type and amount of remediation matters in relation to degree completion. Increasingly, state and local policy seeks to constrict-if not eliminate-the amount of remedial work that takes place in 4-year colleges. But there is a class of students whose deficiencies in preparation are minor and can be remediated quickly without excessive damage to degree completion rates.

What We Learned: Variables to Discard

Examples of stock building-block variables that are discarded because of weak architecture:

- Highest level of parents' education. As reported by students, these data are uneven and unreliable. In the most recent of the national longitudinal studies, the *highest* degree of agreement between students and parents on this score was 72 percent in the case of fathers with "some college." One out of six students would not even venture a guess as to their parents' education.

- “Persistence” defined in temporal terms, e.g. from the 1st to 2nd year of college. Transcripts reveal an enormous range in the *quality* of arrival at the putative 2nd year: some 30 percent of those who were “retained” or “persisted” arrived with either less than 20 credits or 3 or more remedial courses.
- “Academic track” (sometimes called “college preparatory”) in secondary school curriculum, whether reported by students or by schools. When the transcripts for a third of the students on the “academic track” show 8 or fewer Carnegie units in core academic subjects, it is obvious that the transcripts—not the label—must be the source of judgment.
- “Part-time” enrollment in postsecondary education. Students change status from term to term. Part-year enrollment may be more important than light credit loads. Most importantly, students change status within a given term, by dropping, withdrawing from, or leaving incomplete large portions of their credit loads. The “DWI Index” (ratio of drops/withdrawals/incompletes to total courses attempted) derived from transcript records is far more important than what the student says in an interview about full-time/part-time status.

... and Variables Reconstructed

- Academic intensity and quality of high school curriculum. This is the most elaborate construction in the study. It includes Carnegie units in 6 academic areas, accounts for highest mathematics studied, remedial work in English and math, and advanced placement. The construction results in a criterion-referenced scale with 40 gradations.
- Educational aspirations. Traditionally defined on the basis of a single question asked in the senior year of high school. Reconstructed on the bases of 6 pairs of questions asked in both 10th and 12th grades, and on the principles of consistency and level. The result is a statement of “anticipations,” not “aspirations.”
- First institution/date of attendance in postsecondary education. Redefined from college transcript data to exclude false starts and incidental attendance in the summer following high school graduation.
- Transfer. The classic form of community college to 4-year college transfer is now a sub-set of a larger multi-institutional attendance pattern universe defined here in terms of 9 sets of institutional-type combinations. Transfer as we knew it has been replaced by what one might call “portfolio building.” But the classic form of transfer is an extremely effective route to bachelor’s degree completion.

What We Learned: Principles to Guide Research and Evaluation

- Institutions may “retain” students, but it’s *students* who complete degrees, no matter how many institutions they attend. So follow the student, not the institution.
- Common sense can tell us what’s likely to be important at every step toward the degree. A fierce empiricism will validate common sense.

- Before one accepts a variable simply because it has been used for decades or because a federal agency paid for it, one must examine the bricks and mortar of that variable very carefully. Where the architecture is faulty, the data must be fixed or the variable discarded—or one will never tell a true story.
- We should not compute bachelor's degree attainment rates for people who never set foot in a bachelor's degree-granting institution.
- The most useful data lie in the details, not the generalities.

The monograph concludes with “tool box” recommendations to those who execute policy regarding both pre-college opportunity-to-learn and post-matriculation advisement. The tool box metaphor is a logical consequence of the analysis. It says that if we are disappointed with uneven or inequitable outcomes of postsecondary education, we must focus our efforts on aspects of student experience that are realistically subject to intervention and change. We do not have tools to change intentions or perceptions, or to orchestrate affective influences on students' decisions. The events of students' life course histories through their 20s lie largely beyond the micromanagement of collegiate institutions. But we do have the tools to provide increased academic intensity and quality of pre-college curricula, to assure continuous enrollment, to advise for productive first-year college performance, and to keep community college transfer students from jumping ship to the 4-year institution too early.

The recommendations thus address dual enrollment, direct provision of secondary school curriculum by college instructors, an 11-month rolling admissions cycle for all 4-year colleges, using Internet situated courses to keep college students continuously enrolled (even for one course), implementation of institutional policies restricting the extent of course withdrawals/ incompletes/repeats, realistic credit loads, and advisement that is both sensitive and sensible.

The story and its analyses are derived from and apply to a cohort whose history covers the period 1980-1993. There is another and more contemporary cohort whose history, beginning in 1988, is still in progress. Will the story-line change? Will the analyses be validated? Will we have attained greater equity in degree-completion rates for minority students? Have attendance patterns become even more ~~complex, and more or oriented toward competences and certifications as opposed to degrees?~~ Only a full data-gathering for this cohort in the year 2000 and the collection of its college transcripts in 2001 will tell.

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