It has been more than a decade since the U.S. Congress enacted the Student Right-to-Know and Campus Security Act, which requires colleges and universities to make public their six-year degree completion rates. Like several more recent state “assessment” initiatives, the reasoning behind this federal law was presumably to make higher education institutions more “accountable” by requiring them to collect and disseminate data reflecting institutional “quality” or “performance.”

As someone who has made a good part of his living from assessment activities and who has regularly encouraged college officials to carry out more and better assessments of their students, in recent years I’ve found myself in the rather peculiar position of cautioning administrators and policy makers about the hazards of assessment. Although an institution’s degree completion rate is just one of several potentially misleading assessment indicators in widespread use today, its limitations illustrate a basic weakness inherent in several other popular assessment activities (Astin & Lee, 2003).

WHAT DOES A RETENTION RATE MEAN?

How is a prospective college student (or a college official, for that matter) supposed to interpret a given institution’s degree completion rate? Judging from the authorizing language of the Student Right-to-Know Act, prospective students

*Portions of this article are based on Astin (2004) and Astin & Lee (2003).

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and their parents are being encouraged to make *comparative* judgments about the degree completion rates of different institutions. Institutions with the highest rates, then, are presumed to be superior in some sense to institutions with lower rates. At a minimum, prospective students are implicitly being encouraged to believe that their chances of completing college successfully are proportional to an institution’s degree completion rate: the higher the rate, the better their individual chances at that college or University. In the same way, the faculty or staff of an institution with a relatively high rate of degree completion are encouraged to believe that they are “doing better” with their retention program than are competing institutions with lower rates.

Research recently completed at UCLA’s Higher Education Research Institute (Astin & Oseguera, 2005) shows that such beliefs may be completely unwarranted. In this national study the registrars at 262 baccalaureate-granting institutions that were participants in the Cooperative Institutional Research Program (CIRP) provided four- and six-year degree completion data on some 56,818 students (about 250 randomly selected from each institution) who had completed the CIRP entering Freshman Survey six years earlier.

The institutional variation in six-year baccalaureate degree completion rates was remarkable, ranging from a low of 18% to a high of 96%! But what do these different rates *mean*? More specifically, to what extent can we account for these extraordinary differences in institutional “outputs” on the basis of differing institutional programs, policies, and practices? Can institutions with the highest rates take the “credit”? Should we “blame” certain other institutions for their low rates? On the other hand, to what extent are these institutional differences merely a reflection of “input” differences in different student bodies when they first enroll: their academic preparation, motivation, family background, and so on?

The first step in exploring these questions was to compare each of the 56,818 students’ six-year retention status with their CIRP entering freshman data collected six years earlier.

**PREDICTING DEGREE ATTAINMENT FROM ENTERING STUDENT DATA**

The formulas for predicting degree completion from entering freshman data were derived by conducting stepwise linear regression analyses1 using the 56,818

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1 When the dependent variable represents a dichotomy, some researchers recommend using Logistic rather than Ordinary Least Squares (OLS) regression. However, given that the SPSS software for OLS regression contains some very useful options not available in the Logistic program, and since the two methods produce essentially identical results when degree completion is used as the dependent variable (see Dey & Astin, 1993), we chose to use the more familiar OLS method.
entering freshmen (Fall 1994) for whom four- and six-year retention data had been provided by college registrars in Fall-Winter of 2000-2001. (Since these formulae were derived using first-time, full-time entering freshmen, we do not recommend using them for part-time or transfer students.) Each formula was developed with the dependent variable, degree attainment, scored as “1 (degree attained)” or “0 (degree unattained).” Separate regressions were run for four- and six-year degree completion, as well as for several other options noted below.

Not surprisingly, several entering student characteristics—e.g., secondary school grades, admissions test scores, gender, etc.—prove to be significant predictors of the student’s degree completion status six years later (see below for details). It thus becomes possible to calculate an “expected” six-year degree completion rate for any college or university through the use of weighted aggregates of these relevant entering student characteristics. As it turns out, these longitudinal analyses show clearly that

- an institution’s degree completion rate is primarily a reflection of its entering student characteristics, and
- differences among institutions in their degree completion rates are primarily attributable to differences among their student bodies at the time of entry.

To put this latter finding in more specific terms: the simple correlation between institutions’ actual four-year degree completion rates and their “expected” rates—based on entering freshman characteristics—is .84, which translates into a squared multiple correlation (or $R^2$) of approximately .70. In other words, more than two-thirds of the variation among institutions in their degree completion rates is attributable to differences in their entering student bodies!

An important byproduct of this research was a set of formulas that institutions can use to compute an “expected” degree completion rate. Two types of formulas are provided (see Astin & Oseguera, 2005): formulas for use by institutions that do not have CIRP data on their entering freshmen, and more complex formulas that utilize CIRP data. There are also separate formulas for institutions that do not have either SAT or ACT scores available on their entering freshmen. The simplest (non-CIRP) formulas—which use the entering students’ secondary school grades, admissions test scores, gender, and race—yield modest predictions ($R^2$ of .13 and .11, respectively, for four- and six-year degree completion), but more accurate estimates ($R^2 = .22$ and .17, respectively) can be computed if additional items from the CIRP entering freshman survey are also used. In other words, the inclusion of other CIRP variables substantially improves the prediction of degree completion over what is possible using only high school grades, test

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2 These formulas and instructions for using them are provided in Astin & Oseguera (2005).
scores, gender, and race. In fact, adding the additional CIRP variables increases the proportion of individual student variance accounted for by 70% for four-year completion ($R^2$ increases from .13 to .22) and by 54% for six-year completion ($R^2$ increases from .11 to .17). Note also that six-year degree completion is, once again, harder to predict than is four-year degree completion.

Of particular interest is the fact that the SAT adds very little to the prediction of four-year completion ($R^2 = .22$ with SAT versus .21 without SAT) or to the prediction of six-year completion ($R^2 = .17$ versus .16). Apparently, when it comes to predicting retention, the other CIRP freshman variables contain virtually all of the relevant information that is contained in the SAT.

**FRESHMAN PREDICTORS OF DEGREE COMPLETION**

Having established that CIRP variables add significantly to the prediction of degree completion, it is now useful to review what these formulas tell us about who is most and least likely to be able to complete his or her undergraduate degrees. CIRP variables were included in the regressions in the following three temporal blocks: 1) entering freshman characteristics (e.g., school grades, test scores, gender); 2) freshman environmental characteristics (e.g., place of residence, financial aid, probable major field of study); and 3) college characteristics (e.g., size, selectivity, type, control). The addition of college characteristics raises the $R^2$ from .22 to .27 for four-year degree completion, but adds very little to the prediction of six-year retention (from .17 to .18).

To simplify the presentation I shall focus the discussion on the variables that predict degree completion within four years. Many of the same entering freshman characteristics that predict degree completion within four years also predict degree completion within six years (see Astin & Oseguera, 2005). So that readers may have some sense of the relative importance of each predictor, each variable’s final standardized regression coefficient (Beta) will be shown in parentheses when the variable is first mentioned. All Betas are highly significant statistically ($p < .0001$).

**Academic Predictors**

As would be expected, measures of the entering freshman’s academic preparation were the strongest predictors of degree completion. While the simple correlations of the student’s average secondary school grade and composite SAT score$^3$

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$^3$ ACT composite scores were converted to SAT equivalents. See Astin & Oseguera (2005) for a conversion table.
with four-year completion were almost identical (.30 and .29, respectively), the final Beta for GPA (.16) was much stronger than the final Beta for SAT (.08). That the test scores are contributing very little to our ability to predict who will drop out is revealed in the final $R^2$: for four-year degree completion the final $R^2$ with test scores included is .27, while the final $R^2$ excluding test scores as predictors is .26. Thus, as already noted, the other CIRP freshman variables appear to contain virtually all of the relevant information that is contained in the SAT.

Other positive academic predictors include the years of foreign language study and years of physical science study taken in high school (final Betas = .05, .03, respectively) and hours per week spent studying/doing homework (.03). The only negative predictor was the frequency with which students “oversleep and miss a class or appointment” (−.04). Clearly, the student’s chances of completing the baccalaureate degree are affected by “academic” factors other than test scores and school grades. (Keep in mind that these variables—and all other variables to be discussed—predict independently of each other.)

**Demographic Predictors**

The fact that completing the bachelor’s degree in four years is positively related to the father’s level of education (.04) suggests that students who come from well-educated families have an advantage when it comes to completing college. Apparently, the student’s degree of “social capital” plays a role in college completion over and above the effects of academic preparation and other personal factors.

Students are also more likely to complete the degree if they are Jewish (.03), female (.06), or white (.03). No other racial variables proved to be significant.

**Personal Characteristics**

Several measures of the student’s self-concept ended up with small but significant final regression weights. The only self-rating with a positive effect on degree completion is emotional health (.03). Two other self-ratings showed small negative effects: popularity (−.02) and artistic ability (−.05).

Several behavioral measures also had small but significant final Betas: smoking cigarettes (−.05) and working for pay (−.02) both had a negative effects on degree completion (findings that replicate many previous studies; see, for example, Astin, 1975, 1993b), as did hours per week spent in household work/child care (−.03) and reading for pleasure (−.03). Attending religious services (.03), on the other hand, showed a positive effect. All of these effects have been reported in earlier studies of retention (e.g., see Astin, 1993b).

Several measures of the entering student’s expectations for college also produced small final Betas that were statistically significant. Expecting to perform
volunteer work in college showed a positive effect on degree completion (.03), whereas planning to work to help pay expenses while in college yielded a negative effect (–.02). This latter finding is consistent with many previous studies (e.g., Astin, 1993b) showing that working during college reduces the student’s odds of finishing. The expectation of “needing extra time to complete the degree” also showed a negative effect on four-year degree completion (–.04).

Finally, the fact that concern about being able to finance college had a negative effect (–.03) is noteworthy, considering that several measures of financial aid also had significant effects on degree completion.

ENVIRONMENTAL CONTINGENCIES

The CIRP freshman questionnaire includes a number of items having to do with various aspects of the student’s college experience—place of residence, financial aid, and major field of study—that have been shown in previous research to have implications for degree completion. As has been shown in many previous studies, living in a campus residence hall enhances the student’s chances of completing the degree (.06). Three freshman choices of a probable major field of study showed negative effects: allied health professions (–.04), fine arts (–.03), and engineering (–.10). The negative finding with fine arts is consistent with the negative effects, described above, of self-ratings on artistic ability. Again, a number of earlier studies (e.g., Astin, 1975, 1993b) have shown that students with artistic inclinations tend to drop out of college at higher-than-expected rates.

A number of financial aid contingencies appear to affect students’ chances of completing the bachelor’s degree. Positive effects are associated with supporting oneself with savings from summer work (.04). On the other hand, supporting oneself through part-time work off campus shows a negative effect on degree completion (–.03). Once more, these findings replicate earlier research (Astin, 1993b).

EFFECTS OF COLLEGE CHARACTERISTICS

By far the most important college characteristic affecting the student’s chances of completing the baccalaureate degree is institutional selectivity. In fact, its simple correlation with four-year completion ($r = .32$) is stronger than the correlation of any other variable, and its final Beta of .15 almost equals the final Beta for average high school grade, the strongest individual predictor. This finding, which has been reported in many earlier studies (Astin, 1993b), in all likelihood reflects at least two factors: the superior resources of highly selective institutions (including a tradition in many private institutions of graduating as many students
as possible), and the motivating effect of a peer group which has high aspirations and is exceptionally well prepared academically (see Astin, 1993b).

Both types of public institutions—four-year colleges (Beta = –.15) as well as universities (Beta = −.23)—show negative effects on the student’s chances of degree completion within four years. The only other significant effect involved private universities, which show a weak negative effect on four-year completion (−.03).

EVALUATING INSTITUTIONAL DEGREE COMPLETION RATES

Any college or university that wishes to assess its own capacity to retain students can thus compare its actual retention rate with its expected rate using the entering student characteristics just described.4 When the two rates are close—say within 0-5 percentage points of each other—the institution can be said to have a retention capability that is on par with institutions nationally. If the actual rate substantially exceeds the expected rate, then the institution is doing a better job than most in retaining its students. Or, if the actual rate falls substantially below the expected rate, then the institution’s capacity to retain students is relatively poor.

Being able to calculate an expected degree completion rate puts your actual degree completion rate in an entirely new light. As an example, take two of the 262 institutions, both located in the Midwest, that have actual six-year degree completion rates that are essentially identical: 56% (a public university) and 55% (a liberal arts college). Without any other information, one might be tempted to conclude that these institutions are “equally effective” in retaining their students. However, when we look at their expected rates, we are forced to draw an entirely different conclusion: whereas the liberal arts college’s expected degree completion rate of 68% is substantially higher than its actual rate, the public university’s expected rate of only 40% is considerably lower than its actual rate. What this means, in effect, is that the public university is doing an excellent job retaining its students, while the liberal arts college is doing a relatively poor job, even though their actual degree completion rates are virtually identical!

An even more extreme example involves two liberal arts colleges—one on the West coast and the other on the East coast—that have identical expected rates of degree completion rates of 59%. What this means is that, when it comes to “dropout-proneness,” their entering student bodies are essentially identical. Their...

4 Although formulas are available that use institutional characteristics as predictors, it is more useful for an individual institution to use the formulas that do not include institutional characteristics (see Astin & Oseguera, 2005).
actual rates, however, paint a very different picture: The East coast college’s actual degree completion rate turns out to be 77%, fully 18% above expectation, compared to the West coast college’s actual rate of only 26%, which is 33% below expectation. Clearly, this latter college might well want to take a critical look at its retention problem. By contrast, the East coast college might well have something to teach the rest of us about effective approaches to undergraduate retention.

These examples are, of course, exceptions to the general rule, since for most institutions, expected and actual degree completion rates correspond rather closely. Thus, for fully 40% of the 262 institutions, actual and expected rates are within 5 percentage points of each other, and for nearly two-thirds of the institutions, the two rates are within 9 points of each other.

THE PROBLEM IS NOT JUST WITH DEGREE COMPLETION RATES

Let’s assume that the faculty of an institution wants to do more than merely evaluate its degree completion in simplistic terms: “It’s too low, we need to raise it.” Instead, let’s assume that they want to understand why the actual rate is “too low” in order to take some kind of remedial action. If they are at all familiar with the literature on undergraduate retention (e.g, Astin, 1975; Pascarella & Terenzini, 1991; Tinto, 1993), they might well wonder if their institution’s relatively poor capacity to retain students has something to do with their students’ level of “involvement” (Astin, 1975, 1984; Kuh, Schuh, Whitt, Andreas, Lyons, Strange, Krehbiel, & MacKay, 1991), “engagement” (Kuh et al., 1991), or “commitment” and “integration” (Tinto, 1993). These various constructs all refer to the amount of physical time and effort and level of psychological investment and commitment that the student devotes to the college experience. A great deal of empirical evidence suggests that the greater the student’s level of involvement or engagement, the greater the chances of degree completion. Indeed, it was this clear-cut pattern of research findings on the effects of many different types of student involvement that initially gave rise to the theory of involvement (Astin, 1975, 1984).

Returning to our hypothetical college where the faculty has judged the actual degree completion rate to be too low, let us assume that the faculty decides to administer the National Survey of Student Engagement (NSSE), and finds that their students’ level of engagement is also relatively low. They might then be tempted to conclude, “we must be doing something wrong that discourages our students from getting involved.” But is this a proper interpretation? In much the same way that a relatively low degree completion rate might be primarily attributable to entering student characteristics, is it also possible that a relatively low level of student engagement or involvement might likewise be a reflection more of entering student characteristics than of institutional policy and practice?
Information bearing on this question was provided by another recent CIRP study (Astin & Lee, 2003) that used “input” data collected from 21,366 students when they were entering freshmen at 224 baccalaureate-granting institutions and follow-up data collected from the same students four years later when they were seniors. The follow-up survey included 15 “engagement” items, similar to those used in the NSSE survey, that had been “pretested” four years earlier when the students first entered college. As it turns out, the study demonstrates that all forms of student engagement—as reflected in the follow-up survey—are shaped, at least to some extent, by the students’ characteristics when they first start college.

Take, for example, what is perhaps the prototypic form of “student engagement” that relates to degree completion: how much time students spend studying and doing homework. In the sample of 224 institutions, average scores obtained by the students on this engagement measure show a tremendous amount of variability, ranging from a low of only 3.6 hours per week at one institution to a high of 17.5 hours per week at another. (The median score is about 8.0 hours per week.) More important is the finding that the simple correlation between expected and actual hours spent studying is .76. In other words, well over half of the observed variation among institutions in this form of engagement can be attributed to differences in entering freshman characteristics rather than to differences in the institutions’ capacity to “engage” students in academic work.

To illustrate how misleading comparative “engagement” scores can be, consider some institutions with very high scores. At one highly selective technological university, the typical senior spends 15.8 hours per week studying and doing homework. Can this institution then take “credit” for being a “highly engaging” institution? Not necessarily, since in this particular case the institution’s expected score (based on the characteristics of these same students when they entered as freshmen) is almost exactly the same: 15.9 hours per week. In other words, this institution manages to engage its students at precisely the level that would be expected from their entering characteristics; it neither adds to nor detracts from its students’ propensity for engagement.

Now let’s look at an elite private university whose seniors’ level of academic engagement is considerably above average: 11.5 hours per week. While the faculty of this institution might well be satisfied with such a relatively “high” figure, they might experience a much different reaction if they also looked at the data on these same students when they initially entered as freshmen. Thus, when we use entering freshman data to compute this university’s expected score, it turns out to be 14.0 hours per week, which is fully 2.5 hours per week higher than its seniors’ actual level of engagement in studying and doing homework! In other words, there appears to be something in the program or environment of this elite private university that detracts from its students’ investment of time in academic work.
To take still another example, there is one highly selective eastern liberal arts college that also has a very high “expected” score of 14.3 hours of studying or homework per week, but whose actual score is even higher at 17.5 hours per week! This college, in contrast to the first two, is indeed an “engaging” institution, since it appears to enhance its entering students’ already-high propensity for academic engagement. Not surprisingly, this college’s actual degree completion rate of 77% substantially exceeds its expected rate of 59%. Under these conditions, there is good reason to assume that this college is very effective at retaining its students at least in part because it is also very effective at engaging its students.

Similar interpretive problems occur at all other levels of student engagement. Take, for example, the case of three different medium-sized institutions (enrollments from 4000-6500) located in the Middle Atlantic states. One of these, a nonselective state college, has what seems like an unremarkable median score of 8.2 hours per week that its students spend studying and doing homework. However, when this figure is viewed in light of the student’s expected score of only 5.0 hours per week, this former teachers college turns out to be a highly engaging institution! The second institution, a Roman Catholic university, shows the reverse pattern: an expected rate of 8.3 hours per week, but an actual rate of only 5.6 hours per week! The third institution, a public college, has an expected rate of engagement (8.0 hours per week) that almost matches its actual rate (8.3 hours per week).

As was the case with degree completion rates, these near-matches between expected and actual rates of “student engagement” are the norm. In other words, for most institutions, actual rates correspond fairly closely to expected rates. What this means, in effect, is that

- most institutions whose students are “highly engaged” should not “take the credit” for engaging their students at such a high level; and
- most institutions whose students exhibit mediocre or low levels of engagement should not be “blamed” for failing to engage their students at a higher level.

In short, these findings suggest that any effort to interpret a discrepancy between expected and actual degree completion rates in terms of concepts like the students’ level of involvement or engagement are likely to be misleading unless entering student characteristics are taken into account.

**CONCLUSION**

These results demonstrate clear that it makes little sense to examine any institution’s “retention rate” without also taking into account the level of academic preparation of the students who enroll. Indeed, more than two-thirds of the variation in degree attainment rates among institutions can be attributed to
differences in the students who enroll. Under these conditions, raw retention rates may unfairly penalize those institutions that admit less-well-prepared students, and bestow undeserved credit on those that are highly selective in their admissions policies. The real question of “institutional effectiveness,” especially as it relates to degree completion, cannot be adequately addressed without considering the kinds of students who initially enroll. For this and other reasons (Astin, 1993a, 1996), the Federal Student Right-to-Know and Campus Security Act, which requires institutions to report raw degree completion rates without simultaneously reporting data about the students when they enrolled, should be seriously questioned. Similarly, efforts at the state level to make institutions more “accountable” by comparing their raw retention rates are misguided, at best, and perhaps even detrimental to state interest. The danger of such state policies is that they discourage institutions from enrolling relatively poorly prepared students in order to maximize their raw retention rates. In any state that strives to promote the quality of economic and social life for all its citizens, being able to effectively educate the less well-prepared student should be given high priority, since such students pose the greatest risk of eventually becoming dependent on the state. All states, in other words, have a vested interest in raising the educational level of their under-prepared students to the maximum. Therefore, any state policy that discourages institutions from admitting and educating under-prepared students basically works in opposition to long-term state interests.

The national studies cited in this essay also make it clear that raw degree completion rates or one-shot cross sectional assessments of enrolled college students’ level of “engagement” are very difficult to interpret unless the institution also has access to relevant information about these same students when they first entered college. Faculty, administrators, and educational policy makers who lack the relevant input information on a college’s students are thus confronted with a dilemma: how much of our institution’s degree completion rate or of its students’ level of “engagement” should be attributed to institutional policies and practices, and how much should be attributed to the characteristics of the students when they enroll? In any given institution, it is very difficult to answer such a question without entering data on each student. Further, although the degree of risk associated with assigning institutional “credit” or “blame” for high or low outcome scores probably depends on the particular outcome being assessed, there appears be virtually no student outcome measure which is entirely risk-free. Indeed, for outcomes such as degree completion, scores on standardized tests, and many forms of student involvement or engagement, it would appear that the majority of variation among institutions is attributable to entering freshman characteristics rather than to institutional policies or practices (Astin & Lee, 2003).

The obvious solution to this dilemma is for institutions to collect relevant information on their students when they first matriculate. Such data would then
provide a basis for learning how much students actually change after entering college, a kind of “value-added” information which comes much closer to assessing institutional quality or effectiveness than raw degree completion rates, average levels of engagement, or other kinds of stand-alone “outcome” assessments of the enrolled undergraduates. This longitudinal approach to assessment, of course, has been integral to the design of the Cooperative Institutional Research Program since its inception 40 years ago.

Finally, if we want to go beyond merely judging or ranking institutions on the basis of their degree completion rates or their capacity to engage students—a popular (but, in my view, highly dubious) pastime—the real question for educators then becomes: how do we facilitate and enhance student engagement and degree completion? Here is where the exceptions to the rule take on increasing significance: what is it about certain institutions that enable them to engage or retain their students at higher-than-expected levels? What is it about certain other institutions that causes their students to disengage or drop out, that is, to demonstrate lower-than-expected levels of engagement and degree completion? If educational leaders and policy makers really want to get serious about institutional improvement, these are the kinds of questions that we should be exploring in our institutional assessment and retention programs. And the most direct and effective way for assessment specialists to assist in this endeavor is to engage their institutions collaboratively in longitudinal assessments of student learning and development.

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Direct reprint requests to:

Dr. Alexander Astin
UCLA
Graduate School of Ed. & Info. Studies
405 Hilgard Avenue
Los Angeles, CA 90095-1521