Concluding Messages: The Toolbox Revisted: Paths to Degree Completion From High School Through College

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Compared to its predecessor, *Answers in the Tool Box*, the preponderance of the *Toolbox Revisited* story has been on the postsecondary side of the matriculation line. Implicitly, it calls on colleges, universities, and community colleges to be a great deal more interventionary in the precollegiate world, to be more self-reflective about the paths they offer from high school through their own territories. It also calls on them both to fortify their institutional research capacities and integrate them more intimately with academic advising and course scheduling. As noted above, we are witnessing measurable ferment on the high school side of the passage, and as the principles of the *No Child Left Behind* legislation move beyond grade 8, we will see more. The higher education sector cannot sleep through these changes.

To Students as Agents of Their Own Futures

Beyond that fundamental banner of institutional fortification, there are three sets of messages impelled by both studies. The first set is for entering high school students who, when asked, blithely shrug that "of course I'm going to finish college."

1. Just because you say you will continue your education after high school and earn a college credential doesn't make it happen. Wishing doesn't do it; preparation does! So . . .
2. Take the challenging course work in high school, and don't let anyone scare you away from it. Funny thing about it, but you learn what you study, so if you take up these challenges, your test scores will inevitably be better (if you are worried about that). If you cannot find the challenge in the school's offerings, point out where it is available on-line, and see if you can get it that way. There are very respectable Web sites offering full courses in precalculus, introductory physics, humanities, music theory, and computer programming, for example.
3. Read like crazy! Expand your language space! Language is power! You will have a lot less trouble in understanding math problems, biology textbooks, or historical documents you locate on the Web. Chances are you won't be wasting precious credit hours on remedial courses in higher education.
4. If you don't see it now, you will see it in higher education: The world has gone quantitative: business (obviously), geography, criminal justice, history, allied health fields—a full range of disciplines and job tasks tells you why math requirements are not just some abstract school exercise. So come out of high school with more than Algebra 2, making sure to include math in your senior year course work, and when you enter higher education, put at least one college-level math course under your belt in the first year–no matter what your eventual major.
5. When you start to think seriously about postsecondary options, log on to college and community college Web sites and look not so much for what they tell you of how wonderful life is at Old Siwash, but what they *show* you of the kinds of assignments and examination questions given in major gateway courses you will probably take. If you do not see these indications of what to expect, push! Ask the schools for it! These assignments and questions are better than SAT or ACT preparation manuals in terms of what you need to complete degrees.
6. See if your nearest community college has a dual-enrollment agreement with your school system, allowing you to take significant general education or introductory occupational courses for credit while you are still in high school. Use a summer term or part of your senior year to take advantage, and aim to enter higher education with at least six credits earned this way—preferably more.
7. You are ultimately responsible for success in education. You are the principal actor. The power is yours. Seize the day—or lose it!

Given the story lines of *The Toolbox Revisited,* it is obvious that students are partners in their own education fate, and shouldn't wait around for someone else to do something to them or for them.

Public Discourse, Part 1: Dissonant Data and Their Discontents

The second set of messages is for those who engage in public discourse on education in general, secondary-to-postsecondary transitions, and ultimately, degree completion rates (with all stops in-between). We have some problems here.

Foremost among these problems is the sheer volume of dissonant statistics that are thrown around about student

progress, and all the labels of "at risk," "minimal college-qualified," and "failure" that get pasted to populations in the process. The "at risk" labeling default has gone so far as to turn students into "patients," whose "illnesses" must be diagnosed and followed up with early intervention, intensive intervention, and continuous intervention (Seidman 2005, p. 298) that may even continue after graduation—and for "a modest fee" (p. 299). The data dissonance and deficit language cloud perceptions and preclude constructive policy. We all have considerable cleaning up to do.

On any given day, the public will be offered a half-dozen different statistics on high school graduation rates, college-enrollment rates, college completion rates, grades, and time-to-degree. The data will appear in respectable academic journals in articles that were reviewed by peers who often are experts on statistical technique and (at best) novices on the data sources. Or they will appear in publications and on Web sites of respectable organizations, even though they were never reviewed by anyone outside the organization. Anything that appears between respectable covers is taken as authoritative, and once it moves into the mainstream press and onto the home pages, we read the headlines but not the footnotes. Inference runs rampant.[54]

For any of these statistics, we never ask who is in the denominator: that is, who are we counting, and who are we not counting—and how? As a consequence, what often pours out are scare stories that make for good press and bad policy. The bad data-driven scare story, in fact, has become the preferred narrative. We are scared by stagnant high school graduation rates over a 30 year period during which the size of the grade cohorts declined significantly then expanded dramatically with the baby boom echo, and during which we witnessed increased immigration from countries with mandatory school attendance ages much lower than ours. By an alternative view, it's amazing we have maintained a stable high school graduation rate (the quality of high school curriculum aside). The same alternative view could be advanced with reference to rates of postsecondary credentialing: It's remarkable we are maintaining the same degree-granting rates in the face of significantly higher enrollments (unless, of course, we are awarding an excess of cheap degrees).

Dissonance By Age and Season: A Plea for Honest Tracking

The source of many unnerving postsecondary stories is one of the most grievous errors in analyses of student progress: including in the denominator students who started their postsecondary careers at age 29, 36, or 47 along with the mass of students who entered the postsecondary universe at age 18 or 19. Common sense says that a 19-year-old and a 31-year-old are on completely different life trajectories, and the national data from the Beginning Postsecondary Students longitudinal studies back up the common sense. When the newspaper story uses the term, "college students," most adults think of their children, not their brother-in-law or their coworker. Community and four-year college administrators know the difference, and provide academic programs, scheduling and services for those different populations.

But what are they to do when the press and the news Web sites complain that nearly half of entering students do not return for their second year or that the graduation rate is *only* 50 percent (thus assuming everyone else is a dropout), and they are called before legislative committees and boards of trustees to explain? There is an enormous difference by age at entry to the postsecondary system in these measures, and an even greater distortion when one restricts the definitions of what it means to "return to" or "graduate from" to those who started in the fall term, full-time, and who came back to or earned a degree from the same school. That denominator knocks out half of traditional-age students from the calculation, and denies the realities of geographic mobility that the Bureau of the Census—let alone NCES longitudinal studies—has documented for the 20-something population (Schachter 2004; Adelman 2005b). Policies designed to "retain" students who have already moved to another state or who are *de facto* ghosts by not being included in the retention denominator in the first place are, at best, wastes of energy.

What is *not* a waste of energy is the task of developing more universal and efficient student tracking systems, and recapturing the headlines from the mongers of scare. There are those who will not accept NCES national longitudinal studies on the grounds that they are samples (no matter how scientific the sampling design), that we can only afford to start one every 6 or 10 years, and then have to wait for people to age and accumulate academic history by which time, the grievance goes, "the data are old." Impatient to simulate instant longitudinal cohorts, they impute sequences of data from different sources and with denominators that include "projections,"

and produce shock data that cannot be validated by any sensible reference points, e.g., that only 18 percent of ninth-graders will earn an associate or bachelor's degree within the subsequent ten years (National Center for Public Policy and Higher Education 2004).[55]

But even the best of state tracking systems and the services of the independent National Student Clearinghouse information system that currently (2005) covers about 2900 institutions (and cites a burgeoning interest in including high schools in the universe), will not produce the wealth of information that a NELS:88/2000 or a Beginning Postsecondary Students study yield. This essay cannot recommend policy in these matters, but it can recommend creativity and cooperation, serious reading of the papers and reports from Florida's tracking system (e.g.,Whitfield and Howat 1999; Goodman, Latham, Copa, and Wright 2001; Goodman, Copa, and Wright 2004; Johnson, Coles, and Thomas 2004), and reflection followed by activistic innovation, and will wager that the long-term results look better than the scare stories assume.

Public Discourse, Part 2: The Language We Use

Language does more than reflect reality—it creates reality as well. There are considerable problems with the language used in describing what happens to students in our education system, and our choice of terms sets boundaries and colors of reality. The boundaries and colors, in turn, condition the terms of policy. Let us illustrate with a few paired terms. These are contrary rhetorics, and this study frankly admits to taking sides in their contention. But it does so in order to urge a positive tone that, not so by-the-way, legislators, superintendents of schools, college presidents and other leaders would prefer to use. The language of leadership is a "can do" language, not a punitive rhetoric.

"Attrition" versus "Persistence."

When "attrition" is the governing term, we worry about students who (it appears) leave school or college, and seek explanations for departure that have included theories of organizational turnover (Bean 1983) and failures of academic and social integration (Tinto 1987). At the first sign of exit—even though the student may return—we turn to negativity. There has to be something wrong here, we say. The student was "at risk," the institution did not respond—we witness a cycle of blame.

When "persistence" is the governing term, we take our directions from students. What did they do that resulted in attainment? What structures of opportunity do we need to offer so that future students can follow the same paths? What do we think works? Can we test it out? This is a far more positive approach. This essay endorses it: Drop "attrition," embrace "persistence"!

"Retention" versus "Persistence."

Institutions "retain"; students "persist." If our language is governed by "retention" all we see are institutions determined to hold on to students, keeping them in places that may be unproductive, at all costs, and for the sake of their public ratings. If our language follows student "persistence," on the other hand, we see those individuals making a series of rational choices that take advantage of the opportunities offered by institutions so as both to discover true interests and reach productive ends. Tinto would not object if the rhetoric of leaving an institution was turned into a saga of discovery. Students may go elsewhere; they may take extended time off from higher education; but ultimately they may judge the change as positive and not a result of failure (Tinto 1987, pp. 132–33). In the rhetoric of "retention," students are passive: Something is done to them, and that "something" assumes a deficit model. Under the rhetoric of "persistence" they are actors shaping their fate, with a model of success in mind. Wouldn't anyone rather have success?

"Pipelines" versus "Paths."

As Bach et al. (2000) noted—and others have followed—there is no linear path to a degree, particularly for students who start out in community colleges. The default "pipeline" metaphor, used to describe presumably linear learning experiences and environmental sequences, is wholly inadequate to describe student behavior. Pipelines are unidirectional closed spaces, and under the "pipeline" metaphor students are passive creatures (as in "retention") swept along or dropping out of the space completely through leaks at the joints. But student behavior doesn't look like that at all: It moves in starts and stops, sideways, down one path to another and perhaps circling back. Liquids move in pipes; people don't.

At the high school level, for example, a student can acquire momentum in science through a combination of statistics and biology, on the one hand, or physics and calculus, on the other. These are different paths, but who is to say that, once in a four-year or community college, these students could not move in very different directions? The students entering a community college with the statistics and biology background thinking they were heading for further study in allied health fields could easily discover business and computer

programming, and transfer to a four-year college to pursue an academic program in management information systems with both quantitative background and empirical habits of mind born of study in the life sciences. The paths to degrees offer many such intersections.

Under the "pipeline" metaphor, we look for easy (sometimes glib) causalities along a single line of explanation. "Paths," on the other hand, allow for multiple analyses and discoveries of tools that suggest (but do not predict) productive routes to education goals. This essay obviously endorses "paths."

Reiterations

Virtually all reviewers of drafts of this study recommended a concluding reiteration of its major themes and conclusions. Three configurations of themes and conclusions stand out in response:

First, there was a story about curriculum, the content of schooling, that was compelling in its secondary school dimensions in the original *Tool Box*, and is even more compelling now on both secondary and postsecondary stages. What you study, how much of it, how deeply, and how intensely has a great deal to do with degree completion. All of this is common sense, but requires equitable execution with emphasis on primary tools, which in this story means that:

- Secondary schools must provide maximum opportunity-to-learn, by which we mean not merely course titles, but course substance. If we seek better preparation for any kind of postsecondary education—occupational, professional or traditional arts and sciences—we have to ratchet up the challenge of content.
- Postsecondary institutions have got to be active players and reinforcers at the secondary school level—particularly in partnership with schools that are not providing or inspiring students—with opportunity to learn at those ratcheted-up levels of content. Pep talks, family visits, recruitment tours, and guidance in filling out application and financial aid forms are not enough.
- Indeed, the first year of postsecondary education has to begin in high school, if not by AP then by the growing dual enrollment movement or other, more structured current efforts (for examples, see Hughes, Karp, Fermin and Bailey 2005). If all traditional-age students entered college or community college with a minimum of 6 credits of "real stuff," not fluff, their adaptation in the critical first year will not be short-circuited by either poor placement or credit overload.

Second, this curriculum story, joined by nuances of attendance patterns that turn out to have significant leverage, continues into higher education. These features of the saga of degree completion are rarely attended to, and all provide tools to enhance completion rates.

- It's not merely getting beyond Algebra 2 in high school any more: The world demands advanced quantitative literacy, and no matter what a student's postsecondary field of study—from occupationally-oriented programs through traditional liberal arts—more than a ceremonial visit to college-level mathematics is called for.
- Academic advisers and counselors have to target every first-time student for at least 20 additive credits by the end of the first calendar year of enrollment. We saw the same consequences in the original *Tool Box*, though now we understand better that the chances of making up for anything less than 20 credits diminish rapidly in the second year. Community colleges have some special challenges here, given increasing rates of transfer among traditional-age students. With 6 credits of dual-enrollment course work, even part-time students can reach 20 redits in the first calendar year, and community colleges enroll the bulk of traditional-age part-time students.
- Excessive no-penalty withdrawals and no-credit repeats appear to do irreparable damage to the chances of completing degrees. This phenomenon was also observed in the original *Tool Box*. Twice advised, institutions might think very seriously about tightening up, with bonuses of increased access and lower time-to-degree.
- More than incidental use of summer terms has proven to be a degree-completion lever with convincing fulcrum. It's part of the calendar-year frame in which students are increasingly participating. Four-year and community colleges can entice students into fuller use of summer terms with creative scheduling.

Third, in contrast to their treatment in the mass of literature on academic progress, students are explicit, rather than implicit, in *The Toolbox Revisited.* They are respected adults playing large roles in their own destinies. What we call "variables" are not bloodless abstractions: they are signs of what students do; and our messages are about where and when the green lights and caution lights will flash along the paths toward degrees. While we trust that school and college actions will not leave them behind, they

have equal responsibilities.

Legacy

These are limited beginnings of change in the terms of the enterprise with which any reader of this document is concerned. They are honest terms and do not pretend to predict, rather help us draw a background tapestry against which we can judge just how well we are doing for our children as they cross the cusp of adulthood. The terms derive from the story; the story derives from the wisdom of the U.S. Department of Education in establishing and maintaining its longitudinal studies; and our subsequent discussions and enlightenment derive from the leadership of the National Center for Education Statistics in executing those studies and providing us with archives of information that are the envy of other nations. All of this constitutes an unmatchable legacy.

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Endnotes

54 For example, consider the following statement in a respectable publication: "One of the key reasons that low income students have such low completion rates in postsecondary education is that many work long hours in order to be able to afford college. They struggle to balance work with part-time enrollment in college…" (Allen, Goldberger, and Steinberg 2004, p. 22). The data source for this assertion is the National Postsecondary Student Aid Study of 2000, a one-year snapshot that includes no "completion rate" data. Analyses of the NPSAS 2000 data files show that the statement does not reach the threshold of justification unless one divides the population by age bracket. At that point, one finds that, and among traditional-age students (presumably the group referenced by the scare), poor kids are no more likely to be working longer hours at their jobs than anyone else, though they are more likely to use their wages for education expenses. That, at least, is an honest statement- for a snapshot population. And it is not what we really would want to know.

55 There has never been a national longitudinal study of ninth-graders. But we do have a national longitudinal study of eighth-graders--the

NELS:88/2000-- with transcripts, not imputations, projections, and dubious math. If we follow these eighth-graders, including high school dropouts, all the way through to age 26, ultimately 34 percent earned either an associate or bachelor's degree (see the full account offered in Appendix L, table L12). That percentage at least puts us in range of doing better. If we accept the putative (and utterly false) 18 percent, we risk abandoning all hope and effort.

Exhibit 1.

Tables Referenced in the Executive Summary and Concluding Messages of *The Toolbox Revisted: Paths to Degree Completion From High School Through College*

Table 1.

From Macro to Micro: Contraction of the Universe of 1988 Eighth-Graders to the Universe Subject to Analysis in *The Toolbox Revisited*

Description of Universe	Percent	Descending weighted N[a]
A. Initial universe of 1988 eighth graders	100.0	2.93M
B. Of (A), those who were inthe 12th grade in 1992	83.6 (0.98)	2.45M
C. Of (B), those who continued to postsecondary education at any time through December 2000	81.7 (1.28)	2.0M
D. Of (C), those who presented complete high school transcripts, test scores,[b] complete postsecondary transcript records, and socioeconomic status information	80.5 (1.01)	1.61M
E. Of (D), those who attended a four-year college at any time	73.5 (1.00)	1.19M
Net percentage of 1988 eighth-graders in the universe	41	1.19M
Net percentage of 1992 12th-graders in the universe	51	1.19M

[a]Like other NCES longitudinal studies, the NELS:88/2000 cohort is a stratified sample, in which each student is assigned a weight to represent other similar students in the cohort (see Curlin, Ingels, Wu, and Heuer 2000).

[b] See definition of SRTSQUIN in Glossary.

NOTES: Standard errors are in parentheses.

SOURCE: National Center for Education Statistics: NELS:88/2000 postsecondary transcript files (NCES 2003-402 and Supplement).

Table 2.

For Each of Four Definitions of the Universe of Students in the NELS:88/2000, Percentage Distribution by Gender, Race/Ethnicity, Socioeconomic Status Quintile, and Second Language Background

Demographic variable	1988 eighth-graders	All 1992 survey participants	All 1992 12th-graders who entered postsecondary education	1992 12th-graders who attended a four-year college at any time and met other criteria to be subjects of this study[a]
Gender				
Men	49.7 (1.01)	49.9 (0.83)	46.5 (0.93)	48.8 (1.27)
Women	50.3 (1.01)	50.1 (0.83)	53.5 (0.93)	51.2 (1.27)
Race/ethnicity				
White	71.7 (1.50)	71.5 (1.30)	74.9 (1.29)	78.2 (1.31)
African-American	12.9 (1.26)	12.7 (0.94)	10.3 (0.90)	9.4 (1.03)
Latino	10.5 (0.87)	10.4 (0.84)	9.1 (0.88)	7.0 (0.72)
Asian	3.5 (0.32)	3.7 (0.31)	4.8 (0.43)	4.7 (0.42)
American Indian	1.4 (0.43)	1.7 (0.55)	0.7 (0.23)	0.6 (0.18)
Second language background				
Nonnative speaker of English	8.6 (0.68)	10.1 (0.83)	10.0 (0.90)	7.4 (0.67)
Native speaker of English from a second language household	3.3 (0.33)	2.7 (0.21)	2.4 (0.23)	2.2 (0.28)
Socioeconomic status quintile				
Highest quintile	21.3 (0.92)	21.1 (0.88)	29.1 (0.88)	38.5 (1.52)
2nd quintile	20.8 (0.79)	21.0 (0.69)	25.3 (0.88)	26.4 (1.24)
3rd quintile	20.7 (1.10)	19.8 (0.68)	20.2 (0.73)	17.7 (0.85)
4th quintile	19.6 (0.83)	19.2 (0.66)	15.4 (0.61)	11.7 (0.59)
Lowest quintile	17.6 (0.93)	18.9 (0.85)	10.0 (0.73)	6.8 (0.50)

[a] 12th-graders with known socioeconomic status and high school records (transcripts and test scores), who graduated from high school by December 1996, and attended a four-year college at any time.

NOTES: Standard errors are in parentheses. Columns for gender, race/ethnicity, and socioeconomic status quintile may not add to 100.0 percent due to rounding.

SOURCE: National Center for Education Statistics: NELS:88/2000 postsecondary transcript files (NCES 2003-402 and Supplement).

Table 6.

Percentage of 1992 12th-Graders Who Attended High Schools that Offered Courses[a] in Statistics, Trigonometry, and Calculus, by Race/Ethnicity, and Socioeconomic Status Quintile

Demographic group	Percentage attending high schools that offered: Calculus	Trigonometry	Statistics
Race/ethnicity			
White	58.6 (1.67)	76.9 (1.29)	27.7 (1.62)
African-American	50.8 (4.14)	67.0 (3.90)	19.5 (2.71)
Latino	44.6 (4.04)	59.9 (3.55)	18.2 (2.44)
Asian	61.3 (4.31)	71.9 (3.61)	30.1 (3.94)
Socioeconomic status quintile			
Highest quintile	71.6 (1.93)	83.1 (1.64)	34.0 (2.30)
2nd quintile	56.2 (2.32)	73.2 (2.13)	27.1 (2.01)
3rd quintile	54.1 (2.39)	71.4 (2.33)	24.9 (1.92)
4th quintile	49.3 (2.46)	70.3 (2.28)	20.3 (1.80)
Lowest quintile	43.5 (2.86)	63.7 (2.66)	18.5 (2.06)

[a] Responses are based on surveys of school administrators and math teachers of NELS students in 1990. Where the administrator did not answer the question, the math teachers did not indicate that they taught the subject, and students did not earn any credits inthe subject, the calculation assumes that the school did not offer the subject. This approach may underestimate the percentage of high schools offering the subjects at issue.

NOTES: Standard errors are in parentheses.

SOURCES: National Center for Education Statistics: NELS:88/94 (NCES 96-130), and NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Table 13.

Logistic Account of Factors Associated with Earning a Bachelor's Degree in the History of 1992 12th-Graders Who Attended a Four Year College at Any Time: Postsecondary Entry Phase.

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Delta-p
Intercept	-4.2124	0.6588	2.02	0.01	
Academic Resources quintile	**0.5541**	**0.0715**	**3.54**	**0.01**	**0.1283**
Socioeconomic status quintile	**0.2859**	**0.0643**	**2.03**	**0.10**	**0.0662**
Education expectations	0.3462	0.2032	0.78	*	*
No delay of entry	**0.9161**	**0.2224**	**1.88**	**0.10**	**0.2121**
Selectivity of first institution	0.4470	0.2301	0.89	*	*
Acceleration of credits	0.1904	0.1196	0.73	*	*
Race	-0.4709	0.2130	1.01	*	*
Gender	-0.4627	0.1540	1.37	*	*
Parenthood	-0.9639	0.4597	0.96	*	*

* Variables did not meet threshold criterion for statistical significance.

NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by root design effect = 2.19. G^2 = 5060.17; *df* = 4913; G^2/df = 1.030; X^2 (df) = 1101.0 (9); pseudo R^2 = 0.2127; percent concordant predicted probabilities = 78.5

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 Supplement.).

Table 15.

Logistic Account of Factors Associated with Earning a Bachelor's Degree in the History of 1992 12th-Graders Who Attended a Four Year College at Any Time: First Postsecondary Year Performance

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Delta-p
Intercept	-3.5834	0.6054	3.33	0.01	
Academic Resources quintile	**0.3419**	**0.0699**	**2.75**	**0.01**	**0.1283**
Socioeconomic status quintile	**0.2879**	**0.0569**	**2.84**	**0.01**	**0.0662**
Education expectations	0.4040	0.1794	1.27	*	*
Selectivity of first institution	0.4059	0.1979	1.15	*	*
No delay of entry	0.8153	0.2779	1.65	*	*
Low credits in first year	**-1.5299**	**0.1669**	**5.15**	**0.001**	**-0.3372**
First-year grades	**0.9919**	**0.1541**	3.62	**0.01**	**0.2186**
College-level math in first year	0.3603	0.1479	1.37	*	*
Any first-year remediation	0.4963	0.1722	1.62	*	*
Race	-0.3471	0.1906	1.02	*	*
Gender	-0.3414	0.1372	1.40	*	*
Parenthood	-1.0277	0.3965	1.46	*	*

* Variables did not meet threshold criterion for statistical significance.

NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by root design effect = 1.78. G^2 = 4411.64; *df* = 4764; G^2/df = 0.926; X^2 (df) = 1516.37 (9); pseudo R^2 = 0.2893; percent concordant predicted probabilities = 83.3

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 Supplement.).

Table 17.

Percentage of 1992 12th-Graders with Complete Postsecondary Records Who Persisted in Postsecondary Education from Their First Calendar Year of Enrollment to a Second Calendar Year, by Type of Institution First Attended, and of Those Who Persisted, Percentage with Lagging First-Year Performance

				Of those who persisted, first-year performance indicators:	
Student group	Persisted	Earned one-year certificate	Did not persist	Less than 20 credits	In lowest GPS quintile
All 12th-graders	89.7 (0.57)	0.9 (0.13)	9.4 (0.55)	33.2 (1.12)	17.4 (0.81)
Type of first institution					
Four-year college	95.2 (0.59)	0.1 (0.03)	4.7 (0.59)	15.9 (0.91)	15.2 (0.86)
Comm. college	84.0 (1.12)	0.4 (0.10)	15.6 (1.11)	60.7 (1.93)	21.5 (1.76)
Other sub-baccalaureate	71.5 (3.06)	14.8 (2.52)	13.7 (2.01)	31.4 (5.17)	11.9 (2.70)
All with standard high school diploma by December 1996 who attended a four-year college at any time	95.8 (0.50)	0.1 (0.03)	4.2 (0.50)	21.9 (0.98)	15.5 (0.88)
Type of first institution					
Four-year college	95.2 (0.59)	0.1 (0.03)	4.7 (0.59)	15.9 (0.91)	15.2 (0.86)
Comm. college	97.9 (0.87)	2.1 (0.87)	#	44.0 (2.93)	15.7 (2.72)
Other sub-baccalaureate	Low N[a]	Low N[a]	Low N[a]	Low N[a]	Low N[a]

Rounds to zero.

[a] reporting standard not met.

NOTES: Standard errors are in parentheses. Row totals for the three persistence/retention columns may not add to 100.0 percent due to rounding. Weighted N for all 12th-graders with complete postsecondary records: 1.88M; for all 12th-graders with complete postsecondary records who attended a four-year college at any time and who earned a standard high school diploma by December 1996: 1.38M

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).

Table 20.

Of 1992 12th-Graders Who Earned a Standard High School Diploma by December 1996 and Attended a Four-Year College at Any Time, Course Participation Rates by the End of the Second Year Following Initial Enrollment in Postsecondary Education, by Ultimate Degree Status

	Percentage of students who earned credits by the end of the second year following initial enrollment.	
Course	Earned bachelor's	Did not earn bachelor's
English composition	82.3 (1.03)	53.4 (1.40)
General psychology	61.5 (1.18)	32.2 (1.19)
General biology	35.2 (1.24)	12.4 (0.87)
Introduction to sociology	34.4 (1.12)	19.6 (1.08)
U.S. history surveys	32.6 (1.22)	14.9 (0.97)
Micro/macroeconomics	30.3 (1.14)	9.3 (0.88)
General chemistry	30.1 (1.05)	7.5 (0.74)
College algebra	26.7 (1.20)	13.9 (0.94)
U.S. government	25.3 (1.12)	10.4 (0.74)
Calculus	23.7 (1.11)	3.2 (0.43)
Precalculus	22.4 (0.95)	5.8 (0.68)
Oral communication	20.4 (1.03)	11.0 (0.72)
Introduction to philosophy	18.9 (1.05)	5.0 (0.49)
Literature: general	18.9 (1.03)	5.0 (0.56)
Spanish: intro and intermed	18.8 (1.01)	5.9 (0.61)
Western civilization	17.0 (0.93)	6.5 (0.62)
Introduction to computing[a]	15.8 (0.90)	10.9 (0.81)
Introductory accounting	15.7 (0.81)	7.2 (0.56)
Statistics (mathematics)	14.4 (0.79)	3.7 (0.68)
World civilization	12.1 (0.93)	4.0 (0.50)
General physics	12.1 (0.83)	2.3 (0.42)
Public speaking	11.2 (0.78)	6.2 (0.67)
Music appreciation	10.9 (0.84)	3.8 (0.45)
Drama criticism/history	10.7 (0.73)	2.9 (0.46)
American literature	10.3 (0.71)	1.7 (0.28)

[a] This is not "introduction to computer science."

NOTES: Standard errors are in parentheses. Weighted N for bachelor's recipients = 935k; for those who did not earn bachelor's = 513k. All row estimate comparisons are significant at p<.05.

SOURCE: National Center for Education Statistics: NELS:88/2000 postsecondary transcript files (NCES 2003-402 and Supplement).

Table 21.

Of 1992 12th-Graders Who Earned a Standard High School Diploma by December 1996 and Attended a Four-Year College at Any Time, Participation Rates in Lower-Divsion Course Category Aggregates and Average Number of Credits Earned in Each Aggregate by the End of the Second Year Following Enrollment in Postsecondary Education, by Ultimate Degree Status

	Earned bachelor's degree by December 2000		**Did not earn bachelor's degree by December 2000**	
Course aggregate[a]	Percentage completing credits	Average credits earned	Percentage completing credits	Average credits earned
College-level writing	84.5 (0.95)	4.96 (.046)	68.8 (2.05	4.83 (.091)
Oral communication	35.6 (1.21)	3.38 (.054)	26.2 (1.59)	3.15 (.080)
Computer-related	24.5 (1.03)	3.42 (.057)	17.2 (1.52)	3.31 (.091)
Intro biological sciences	42.1 (1.25)	5.21 (.088)	22.3 (1.53)	4.96 (.160)
Intro physical sciences	40.2 (1.15)	7.46 (.142)	15.8 (1.33)	5.79 (.223)
College-level mathematics	70.5 (1.20)	6.30 (.103)	37.5 (1.87)	5.34 (.225)
Core history	56.0 (1.27)	3.04 (.132)	34.6 (1.82)	4.13 (.099)
General psychology	61.5 (1.18)	3.33 (.030)	42.0 (1.95)	3.32 (.082)
Micro/macroeconomics	30.3 (1.14)	4.69 (.088)	13.1 (1.35)	3.86 (.112)
Humanities except literature	38.2 (1.24)	4.20 (.140)	19.1 (1.50)	3.55 (.124)
Literature	45.1 (1.30)	4.48 (.087)	19.8 (1.39)	3.84 (.144)
Core social sciences	62.6 (1.27)	4.57 (.080)	42.8 (1.85)	4.22 (.115)
Visual/graphic arts	17.3 (0.96)	5.12 (.230)	10.1 (0.98)	5.47 (.488)
Foundation business	19.9 (0.88)	5.17 (.120)	14.2 (1.41)	4.86 (.227)

[a]For a listing of courses under each aggregate, see Appendix 1.

NOTES: Standard errors are in parentheses. Weighted N for those who earned bachelor's degrees: 935k; for those who did not earn bachelor's degrees: 513k.

SOURCE: National Center for Education Statistics: NELS:88/2000 postsecondary transcript files (NCES 2003-402 and Supplement).

Table 24.

Logistic Account of Factors Associated with Earning a Bachelor's Degree in the History of 1992 12th-Graders Who Attended a Four Year College at Any Time:

Postsecondary Attendance Patterns

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Delta-p
Intercept	-4.6208	0.7114	3.68	0.001	
Academic Resources quintile	**0.3648**	**0.0773**	**2.67**	**0.02**	**0.0804**
Socioeconomic status quintile	**0.2790**	**0.0621**	**2.55**	**0.05**	**0.0615**
Education expectations	0.5165	0.1985	1.47	*	*
No delay of entry	**0.9468**	**0.3064**	**1.75**	**0.10**	**0.2087**
Selectivity of first institution	0.5176	0.2155	1.36	*	*
First-year grades	**0.9295**	**0.1687**	**3.12**	*	**0.2049**
College math in first year	0.3121	0.1608	1.10	*	*
Any first-year remediation	0.3261	0.1876	0.99	*	*
Low credits in first year	**-1.1934**	**0.1853**	**3.65**	**0.001**	**-0.2712**
Classic community college transfer	**0.9518**	**0.2252**	**2.40**	**0.05**	**0.2097**
Four-to-four transfer	**0.7020**	**0.2271**	**1.75**	**0.10**	**0.1547**
Multiple schools	**-0.7509**	**0.1908**	**2.23**	**0.05**	**-0.1655**
Summer-term credits[a]	**0.6517**	**0.0866**	**4.26**	**0.001**	**0.1436**
Ever part-time	**-1.6067**	**0.1551**	**5.87**	**0.001**	**-0.3545**
Race	-0.3481	0.2096	0.94	*	*
Gender	-0.2955	0.1498	1.12	*	*
Parenthood	-0.8677	0.4246	1.16	*	*

* Variables did not meet threshold criterion for statistical significance.

[a] Set in three bands: 0, 1-4, and more than 4

NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by root design effect = 1.76. G^2 = 3749.31; *df* = 4759; G^2/df = 0.788; X^2 (df) = 1984.37(17); pseudo R^2 = 0.3813; percent concordant predicted probabilities = 88.1

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 Supplement.).

Table 25.

Three Trends in Postsecondary Grade Point Average (GPA) of 1992 12th-Graders Who Attended a Four-Year College at Any Time Through December 2000 and Offered Complete Postsecondary Records, by GPA at Three Points in Time, Average Undergraduate Time, and Percentage Earning Bachelor's Degree

	Average GPA					
GPA trend	First calendar year	First two calendar years	At the end of undergraduate career	Average elapsed undergrad time	Percentage earning bachelor's degree	**Percentage of all in group**
Rising	2.43 (0.30)	2.64 (0.28)	2.93 (0.18)	4.76 (0.57)	73.5 (1.80)	**37.0 (1.09)**
Flat	2.72 (0.25)	2.63 (0.27)	2.73 (0.26)	4.79 (0.59)	65.5 (1.63)	**43.9 (1.10)**
Falling	3.09 (0.29)	2.90 (0.29)	2.70 (0.30)	4.92 (0.81)	63.8 (2.38)	**19.1 (0.89)**

NOTES: Standard errors are in parentheses. Column for percent of all in group may not add to 100.0 percent due to rounding. Weighted Ns: rising GPA = 415k; flat GPA = 486k; falling GPA = 215k.
SOURCE: National Center for Education Statistics: NELS:88\2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).

Table 26.

Logistic Account of Factors Associated with Earning a Bachelor's Degree in the History of 1992 12th-Graders Who Attended a Four Year College at Any Time: Extended Postsecondary Performance

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Delta-p
Intercept	-5.8188	0.7996	4.12	0.001	
Academic Resources quintile	**0.3147**	**0.0799**	**2.23**	**0.05**	**0.0667**
Socioeconomic status quintile	**0.3066**	**0.0628**	**2.77**	**0.02**	**0.0650**
Education expectations	0.3825	0.2075	1.04	*	*
No delay of entry	0.7798	0.3208	1.38	*	*
Selectivity of first institution	0.4103	0.2225	1.04	*	*
Any first-year remediation	0.2969	0.1920	0.88	*	*
Low credits in first year	**-1.0822**	**0.1957**	**3.13**	**0.01**	**-0.2294**
Classic transfer	**0.8391**	**0.1273**	**2.12**	**0.05**	**0.1779**
Four-year to four-year transfer	**0.7192**	**0.2285**	**1.78**	**0.10**	**0.1525**
Multiple schools	**-1.0523**	**0.2005**	**2.97**	**0.01**	**-0.2231**
Summer-term credits[a]	**0.5299**	**0.0900**	**3.34**	**0.01**	**0.1123**
Ever part-time	**-1.6696**	**0.1599**	**5.92**	**0.001**	**-0.3539**
Cumulative college math credits[a]	**0.5456**	**0.0994**	**3.11**	**0.01**	**0.1157**
Trend in grades	**0.5813**	**0.1119**	**2.94**	**0.01**	**0.1232**
First-year grades	**1.1619**	**0.1860**	**3.54**	**0.01**	**0.2463**
Gender	-0.3518	0.1578	1.26	*	*
Parenthood	-0.9058	0.4318	1.19	*	*

* Variables did not meet threshold criterion for statistical significance.

[a] Set in three bands: 0, 1-4, and more than 4

NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by root design effect = 1.76. G^2 = 3355.32; *df* = 4632; G^2/df = 0.745; X^2 (df) = 1965.7(18); pseudo R^2 = 0.3984; percent concordant predicted probabilities = 89.3

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 Supplement.).

Table 27.

Logistic Account of Factors Associated with Earning a Bachelor's Degree in the History of 1992 12th-Graders Who Attended a Four Year College at Any Time:

Final Factors, with Complete Academic History

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Delta-p
Intercept	-7.6637	0.8827	4.89	0.001	
Academic Resources quintile	**0.2766**	**0.0847**	**1.84**	**0.10**	**0.0583**
Socioeconomic status quintile	**0.2974**	**0.0685**	**2.45**	**0.05**	**0.0627**
Education expectations	0.4162	0.2211	1.06	*	*
No delay of entry	0.7848	0.3515	1.26	*	*
Selectivity of first institution	0.4436	0.3432	1.03	*	*
First-year grades	**1.1020**	**0.1119**	**3.14**	**0.01**	**0.2323**
Low credits in first year	-0.6553	0.2165	1.71	*	*
Classic comm. college transfer	0.7186	0.2488	1.63	*	*
Four to four transfer	0.6832	0.2509	1.53	*	*
Multiple schools	**-0.7306**	**0.2174**	**1.89**	**0.10**	**-0.1540**
Summer-term credits[a]	**0.5628**	**0.0553**	**3.25**	**0.01**	**0.1186**
Ever part-time	**-1.1739**	**0.1009**	**3.71**	**0.01**	**-0.2474**
Cumulative college math credits[a]	**0.4993**	**0.1075**	**2.62**	**0.02**	**0.1053**
Trend in grades	**0.5879**	**0.1211**	**2.74**	**0.02**	**0.1240**
WRPT ration[b]	**-2.3078**	**0.4246**	**3.06**	**0.01**	**-0.4865**
Continuous enrollment	**2.0601**	**0.2211**	**5.25**	**0.001**	**0.4343**
Gender	-0.3233	0.1715	1.06	*	*
Parenthood	-0.8511	0.4627	1.04	*	*

* Variables did not meet threshold criterion for statistical significance.

[a] Set in three bands: 0, 1-4, and more than 4

[b] Ratio of withdrawal (W) and no-credit repeat (NCR) grades to all grades received.

NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by root design effect = 1.76. G^2 = 2993.12; *df* = 4595; G^2/df = 0.651; X^2 (df) = 2260.53(18); pseudo R^2 = 0.4382; percent concordant predicted probabilities = 91.8.

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 Supplement.).

Table 29.

Seven Steps of a Logistic Regression Model with Bachelor's Degree Attainment by Age 26 or 27 as the Outcome for 1992 12th-Graders Who Attended a Four-Year College at Any Time

	Background		Entry		First Year		Financing		Attendance Patterns		Extended Performance		Final Factors	
	Param.[1]	Delt-p	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p
Intercept	-4.28		-4.21		-3.58		-3.59		-4.70		-5.85		-7.94	
Academic Resources	0.644***	0.1492	0.554***	0.1283	0.342***	0.754	0.336*	0.075	0.371*	0.081	0.312*	0.066	0.277~	0.058
Anticipations	0.627		0.346		0.404		0.339		0.553		0.386		0.416	
SES quintile	0.291~	0.0675	0.286~	0.0662	0.288***	0.0635	0.290*	0.065	0.282*	0.062	0.307**	0.065	0.297*	0.063
Race/ethnicity	-0.409		-0.471		-0.347		-0.350		-0.370		X		X	
Gender	-0.463		-0.463		-0.341		-0.338		-0.280		-0.349		-0.323	
Parenthood	-1.576		-0.964		-1.027		-1.029		-0.913		-0.933		-0.851	
1st institution was selective			0.447		0.406		0.396		0.493		0.399		0.444	
No delay entry			0.916~	0.2121	0.815		0.785**	0.175	0.980~	0.216	0.825		0.785	
Acceleration		0.190			X		X		X		X		X	
Low credits					-1.53+	-0.337	-1.52+	-0.338	-1.19+	-0.263	-1.058**	-0.175	0.655	
1st-year grades					0.992***	0.2186	0.988**	0.221	0.916***		1.148***	0.243	1.102**	0.232
1st-year remediation					0.496		0.497		0.319		0.295		X	
1st-year college math					0.360		0.367		0.318		X		X	
Work-study							0.179		X		X		X	
Multiple schools									-0.751*	0.166	-1.052	-0.223	-0.731~	-0.154
Classic transfer									0.952*	0.208	0.839*	0.178	0.719	
Summer credits									0.654+	0.144	0.530***	0.112	0.563***	0.119
Ever part-time									-1.61+	-0.354	-1.67+	-0.353	-1.17***	-0.247
Four-to-four transfer									0.702~	0.155	0.719~	0.152	0.683	
GPA trend											0.566**	0.119	0.588*	0.124
Cumulative college math											0.521*	0.110	0.499**	0.105
WRPT ratio[a]													-2.31***	-0.487
No stop													2.02+	0.426

Table 29, continued.

Seven Steps of a Logistic Regression Model with Bachelor's Degree Attainment by Age 26 or 27 as the Outcome for 1992 12th-Graders Who Attended a Four-Year College at Any Time

	Background		Entry		First Year		Financing		Attendance Patterns		Extended Performance		Final Factors	
	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p	Param.	Delt-p
Root design effect	2.17		2.19		1.78		1.78		1.76		1.76		1.76	
G^2	5315.44		5060.17		4411.64		4396.88		3749.31		3452.61		2993.12	
df	4919		4913		4764		4763		4759		4632		44595	
G^2/df	1.081		1.030		0.926		0.923		0.788		0.745		0.651	
X^2 (df)	1074.9 (5)		1101.0 (9)		1516.4 (11)		1519.1 (12)		1984.2 (17)		1965.7 (17)		2260.5 (18)	
Pseudo R^2	0.204		0.213		0.289		0.292		0.381		0.398		0.438	
Percent concordant probabilities predicted	77.5		78.5		83.3		83.4		88.1		89.3		91.8	

[1] Param. = Parameter; Delt-p = Delta-p

[a] Ratio of withdrawal (W) and no-credit repeat (NCR) grades to all grades received.

NOTES: Keys to significance levels ~ = .10; * = .05; ** = .01; + = .001. X = variable did not meet criterion to be carried forward.

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).

Table 30.

Bachelor's Degree Completion Rates for Students Who Began in Four-Year Colleges According to Three Different National Longitudinal Studies of the 1990s

	Percent completing bachelor's degree		
Bachelor's degree completion modes	NELS:88/2000 1992-2000	Cooperative Institutional Research Project (CIRP) 1994-2000[a]	Beginning postsecondary students 1995-2001
Bachelor's from same school in 4 years	30.9 (1.14)	36.4	33.1 (1.3)
Bachelor's from a different school in 4 years	3.0 (0.30)	Not available	2.3 (0.3)
Bachelor's from same school in 6 years	52.9 (1.27)	57.6	53.7 (1.2)
Bachelor's from a different school in 6 years	11.3 (0.79)	Not available	8.1 (0.4)
Bachelor's from same school in 8.5 years.	55.3 (1.24)	60.6[b]	Not available
Bachelor's from different school in 8.5 years	14.1 (0.84)	Not available	Not available
Total degree completion:	69.3 (1.16)	60.6[b]	61.8 (1.2)

[a] As reported in Astin and Oseguera (2002). Standard errors are not available.

[b] In Astin and Oseguera, this cumulative figure includes students who were still enrolled at their institution of first attendance at the end of six years.

NOTES: Standard errors for the NELS:88/2000 and BPS95/96-2001 are in parentheses.

SOURCES: National Center for Education Statistics: NELS88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement) and Beginning Postsecondary Students Longitudinal Study, 1995/96-2001, Data Analysis System (NCES 2003-173). Astin and Oseguera (2002).

Table 32.

Hypothetical Cumulative Consequences of Variables Critical to Bachelor's Degree Completion for 1992 12th-Graders Who Earned a Standard High School Diploma by December 1996, Attended a Four-Year College at Any Time, and Whose Postsecondary Records Were Complete, by Race/Ethnicity

Cumulative conditions	**White**	**African-American**	**Latino**	**Asian**	**All**
1) Baseline, no conditions	**67.6 (1.18)**	**52.1 (4.26)**	**45.4 (3.74)**	**67.9 (4.71)**	**64.6 (1.12)**
2) No delay of entry	71.0 (1.22)	54.6 (4.49)	50.5 (3.79)	68.2 (4.89)	67.9 (1.15)
3) No delay, top 40 percent of high school curriculum, and highest high school mathematics above Algebra 2	85.6 (1.50)	65.9 (8.57)	69.2 (6.33)	91.5 (1.96)	84.1 (1.40)
4) No delay, top 40 percent of high school curriculum, and more than four credits in summer terms	90.6 (1.31)	84.6 (5.95)	69.2 (8.12)	92.6 (2.27)	89.1 (1.30)
5) No delay, top 40 percent of high school curriculum, more than four credits in summer terms, and 20 or more credits in first calendar year of attendance	92.6 (1.23)	88.2 (5.28)	71.9 (9.07)	93.9 (2.16)	91.4 (1.24)
6) No delay, top 40 percent of high school curriculum, more than four credits in summer terms, 20 or more credits in first calendar year, and less than 10 percent of grades were withdrawals or no-credit repeats	95.5 (0.98)	94.3 (4.62)	79.4 (11.1)	95.3 (2.20)	94.6 (1.07)

NOTES: Standard errors are in parentheses. Weighted Ns for each cumulative steop: (1) 1.45M; (2) 1.33M; (3) 712k; (4) 621k; (5) 310k; (6) 273k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Appendix F.
Gradations of Academic Intensity of High School Curriculum

The following figure sets forth the 31 gradations (in descending value) of academic curriculum intensity and quality as used in the development of the Academic Resources index and variable for the NELS:88/2000 cohort. The figures in the boxes represent the minimum rounded number of Carnegie units required for the gradation on a given *row*. Where a cell is empty, there are no minimum requirements. Where a cell indicates "none" (for remedial math and remedial English), it means that no remedial work is allowed for that gradation. Where the cell for AP courses indicates zero, that means the student did not take any AP courses, not a minimum. For the NELS:88/2000 cohort, computer science was not nearly as widely offered as it is today. Therefore, computer-related credits were brought into play only to disaggregate lumps in the distribution. Total high school academic credits is an empirically-derived factor that comes into play only in the very lowest gradations.

The basic five-subject credit thresholds were constructed in the course of examining the edited, coded transcript data for students who were known high school graduates with graduation dates through Dec. 31, 1996. The editorial process paid particular attention to all cases that showed less than 16 total high school credits. Where the evidence strongly suggested dissonance with other variables in the student's record, all transcript records from that student's *school* were examined. Where no standard credit metrics were found, they were adjusted with reference to state standards for high school graduation (Medrich, Brown, and Henke 1992), and major components (e.g., mathematics, English, etc.) multiplied or divided by as much as (but no more that) two. For example, when a group of students from the same high school showed 40-45 Carnegie units in a state that required 20 for an academic diploma, the editorial process cut those 40-45 units in half-across all subjects in which they were given. The editorial process also Windsorized cases of total Carnegie unit counts above 32, adjusting the major components down one-by-one, and dropped fragmentary transcripts with less than 6 Carnegie unit counts.

As noted in the parallel appendix in the original *Tool Box:*

> These gradations of academic intensity and quality are based on the history of one national high school class that was scheduled to graduate in 1982. The next graduating class for which we possess similar data is that of 1992. While the specific number of Carnegie units, APs, and remedial indicators might change, the basic form and principles of the gradations will probably not change, the basic form and principles of the gradations will probably not change. This presentation of the possibilities of high school curricular attainment is criterion-referenced: theoretically, *everybody* can reach gradation level #1 (p. 114)

The account of curriculum for the class of 1982 had 40 gradations. This account, for the class of 1992, has 31. One implication of the shrinking number of gradations is that, in fact, more students were moving up the academic intensity ladder, clustering at high criterion-referenced levels.

Table F1 presents the actual mean number of Carnegie units earned in core academic fields, irrespective of the theoretical thresholds, for students in each of the five quintiles of academic intensity derived from the 31 more detailed gradations.

Appendix F, Figure 3.

Curriculum Components of the 31 Gradations of the High School Academic Intensity Measure of the NELS:88/2000, by Carnegie Unit Minimums

Gradation	English	Math	Science	Foreign Langs	Hist and Soc Stu	Highest Math	Remed Math	Remed English	APs	Computer Science	Total Academ Units
1	3.75	3.75	>2.0*	>2.0	>2.0	>Alg2	None	None	>1	>0	
2	3.75	3.75	>2.0	>2.0	>2.0	>Alg2	None	None	>0		
3	3.75	3.75	>2.0	>2.0		>Alg2	None	None	0	1.0	
4	3.75	3.75	3.0	>2.0	>2.0	>Alg2	None	None			
5	3.5	3.0	2.0	2.0	2.0	>Alg2	None	None	>1		
6	3.5	3.0	2.0	2.0	2.0	>Alg2	None	None	>0		
7	3.5	3.5	2.0	2.0	2.0	>Alg2	None	None	0	0.5	
8	3.5	3.0	2.0	2.0	2.0	>Alg2	None	None	0	1.0	
9	3.0	3.0	2.0	2.0	2.0	Alg2	None	None	>0		
10	3.5	3.5	2.0	2.0	2.0	Alg2	None	None	0	>0	
11	3.5	3.5	2.5	2.0	2.0	Alg2	None	None	0		
12	3.0	2.0	1.0		1.0	>Alg2	None	None	>0		
13	3.0	2.5	2.0	1.0	2.0	>Alg2	None	None	0		
14	3.0	2.5	2.0*		2.0	>Alg2	None	None	0		
15	3.0	2.5	2.0*	2.0	2.0	Alg2	None	None	0	>0	
16	3.0	2.5	2.0	2.0	2.0	Alg2	None	None	0		
17	3.0	2.5	1.0	1.0	2.0	<Alg2	None	None	0		
18	3.0	3.0	1.5	1.0	1.5	<Alg2		None			
19	2.5	3.0	1.5	1.0	1.5	Alg2	None				
20	2.5	2.5	1.5	0.5	1.0	<Alg2			0		≥ 12
21	2.5	2.5	2.0		1.0		Net 0			>0	≥ 12
22	2.5	2.5	1.0		1.0		Net 0			>0	≥ 12
23	2.5	2.0	2.0		1.5	<Alg2	Net 0				≥ 12
24	2.5	2.0	2.0		1.5	<Alg2	Net 0			1.0	

Appendix F, Figure 3, continued.

Curriculum Components of the 31 Gradations of the High School Academic Intensity Measure of the NELS:88/2000, by Carnegie Unit Minimums

Gradation	English	Math	Science	Foreign Langs	Hist and Soc Stu	Highest Math	Remed Math	Remed English	APs	Computer Science	Total Academ Units
25	2.5	2.0	1.0		0.5	Alg2	Net 0	None			
26	2.5	2.0	1.0			<Alg2	None	None			≥12
27	2.5	2.0	1.0		1.0		Net 0				
28	2.5	1.5	1.0		0.5		Net 1				
29	2.5	1.5	1.0		0.5						
30	2.0	1.0	0.5		0.5						
31											≥6

NOTES: (1) Net 1 means the sum of total mathematics credits minus remedial mathematics credits was 0.5 or less, i.e., if remedial math appeared at all on a student's transcript, it was a major presence; Net 0 means the sum of total mathematics credits minus remedial mathematics credits was more than 0.5, i.e. if remedial math appeared at all on a student's transcript, it was a minor presence.
(2) The figures in the cells for English, math, science, foreign languages, and history and social studies represent the minimum rounded number of Carnegie units required for the gradation on a given row. Where a box is empty, there are no minimum requirements.
(3) An asterisk in a cell for science credits indicates core laboratory science (biology, chemistry, and physics).
(4) The reference points for highest level of mathematics studied in high school are higher than Algebra 2 (>Alg2), Algebra 2 (Alg2), and less than Algebra 2 (<Alg2). Where there is no entry in the cell, there is no highest mathematics requirement for that row.
(5) Minimum requirements for total high school academic Carnegie units, e.g., ≥12 and ≥6, come into play only in the very lowest gradations of the curriculum distribution.
(6) When the distribution of students across these 31 levels is weighed and then aggregated to quintiles, the quintile breaks are as follows: 1-8 (highest quintile), 9-15 (2nd quintile), 16-20 (3rd quintile), 21-25 (4th quintile), and 26-31 (lowest quintile).
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Appendix F, Table F1.

Of 1992 12th-Graders with Complete High School Transcripts, Mean Carnegie Units Earned in Core High School Academic Fields, Percent of Students Whose Highest Level of High School Mathematics was Above Algebra 2, and Mean Number of Advanced Placement (AP) Courses, by Quintile of Academic Curriculum Intensity

	Core high school academic curriculum fields							
Academic curriculum intensity quintile	English	Math	Core lab science	Foreign languages	History and social studies	Computer science	Percent with highschool math above Algebra 2	Total AP courses
Highest	4.27	4.10	3.20	3.09	3.70	0.74	96.4	0.644
2nd	4.17	3.81	2.71	2.23	3.62	0.56	64.7	0.068
3rd	4.23	3.11	1.99	1.98	3.47	0.59	0	0.003
4th	4.10	2.98	1.36	0.74	3.44	0.61	0.71	0.019
Lowest	3.43	1.81	0.94	0.62	2.82	0.28	0.05	0.006

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Appendix L, Table L12.

Percentage Distribution of Final (December 2000) Education Status of 1988 Eighth-Graders, by Type and Timing of High School Diploma (if Any), and Including Those Who Did Not Earn High School Diplomas

Secondary/postsecondary status	**Percent**
1) Earned high school diploma by July 1992 and	
Earned at least a bachelor's degree	29.1 (0.94)
Associate degree was highest earned credential	4.7 (0.28)
Certificate was highest earned credential	2.8 (0.24)
No degree, but still enrolled in 2000	4.6 (0.33)
No degree, not enrolled in 2000	23.6 (0.79)
Never entered postsecondary education	13.1 (1.10)
2) Earned standard high school diploma *after* July 1992 and	
Earned at least a bachelor's degree	0.2 (0.12)
Associate degree was highest earned credential	0.3 (0.14)
Certificate was highest earned credential	0.2 (0.04)
No degree, but still enrolled in 2000	0.4 (0.14)
No degree, not enrolled in 2000	1.9 (0.29)
Never entered postsecondary education	1.6 (0.23)
3) Earned GEDs or certificates of attendance and	
Earned at least a bachelor's degree	0.1 (0.03)
Associate degree was highest earned credential	0.2 (0.05)
Certificate was highest earned credential	0.4 (0.14)
No degree, but still enrolled in 2000	0.8 (0.22)
No degree, not enrolled in 2000	2.8 (0.38)
Never entered postsecondary education	3.9 (0.46)
4) Others	
Did not graduate from high school, but entered postsecondary	1.0 (0.42)
Did not graduate from high school, no postsecondary	6.7 (0.65)
Indeterminable high school graduation status	1.7 (0.37)

NOTES: Standard errors are in parentheses. Percent column may not add to 100.0 due to rounding. Weight used throughtout this table is the F4BYWT with a base year (1988) flag. F4BYWT covers NELS:88/2000 students who were in both the base year (1988) sample and the 2000 follow-up survey sample. Weighted N=2.93M.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).