The Spaces Between Numbers:

Getting International Data on Higher Education Straight

[Extended Version]

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Finally, the analysis, opinions, and conclusions expressed herein are those of the author, and do not necessarily represent the positions, opinions, or policies of either IHEP of the Lumina Foundation for Education.

NOTICES

Supplementary On-Line Material

The shorter, designed, and printed version of this essay can be found on-line at the IHEP Web site for the Global Performance Project: www.ihep.org/research/GlobalPerformance.cfm
This website also hosts additional materials that were used in the course of this research, in a special folder labeled "International Comparative Data: Supplementary Material" that includes supplementary tables on topics raised in the text that could not be included in the text without disrupting the flow of analysis.

Abbreviations and Special Terms Used in the Text

BFUG	Bologna Follow-up Group
EAG	*Education at a Glance*; annual report of comparative data from OECD
EC	European Commission
EU	European Union
HEI	Higher Education Institution
IPEDS	Integrated Postsecondary Education Data System (annual collection in the United States)
ISCED	International Standard Classification of Education
LFS	Labor Force Survey
LIS	Luxembourg Income Survey
OECD	Organization for Economic Cooperative Development
Tertiary Education	Higher Education
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UOE	UNESCO, OECD, and Eurostat (as joint authors)
5A	ISCED category for bachelor's degree programs and their equivalents
5B	ISCED category for associate's degree programs and their equivalents

Contents

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> "First you have the natural numbers. The ones that are whole and positive. The numbers of a small child. But human consciousness expands. . .The child discovers a sense of longing. . .The negative numbers. The formalization of the feeling that you are missing something. . . . . .and the child discovers the inbetween spaces. Between stones, between pieces of moss on the stones, between people. And between numbers. . .It leads to fractions. Whole numbers plus fractions produce rational numbers. And human consciousness does not stop there. . .It adds an operation as absurd as the extraction of roots. And produces irrational numbers. . . It's a form of madness . . .And by adding irrational numbers to rational numbers, you get real numbers. . . .And it doesn't stop. It never stops."–Peter Hoeg, *Smilla's Sense of Snow*, pp. 121-122.

Prelude

So it is with numbers, and this essay will try to make sense of a series that never ends. This extended version of *The Spaces Between Numbers* assumes a reader with some basic knowledge of comparative international data on higher education and willing to learn more, takes a critical stance toward the information we currently use, and makes some suggestions for rendering the data more convincing, more meaningful, and less burdened by footnotes that are almost never read.

This journey began with the Institute for Higher Education Policy's work on the massive restructuring of higher education across 46 nations in Europe known as the Bologna Process. At the end of that investigation,[1] we were not alone in observing the paucity and inconsistency of data on what would matter most to judging the success of the historic Bologna undertaking: what happens to students, both current and potential, and which countries were ahead of schedule, on-schedule, and lagging in producing the complex set of outcomes sought under the Bologna reforms.

We then turned to the existing comparative international data on higher education, particularly as presented by the Organization for Economic Cooperation and Development (OECD) in the well-known annual *Education at a Glance*, and also by UNESCO, the World Bank, and Eurostat (the central statistics agency for the 27 countries of the European Union). Certainly, one would think, this international data could help fill in the blanks.

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[1]For the most comprehensive of the results of this work, see Adelman C. 2009. *The Bologna Process for U.S. Eyes: Re-learning Higher Education in the Age of Convergence* at www.ihep.org/research/GlobalPerformance.cfm

Instantly, the scope of the search encompassed countries outside of the Bologna Process, including the United States, and, simultaneously, involved data reports and on-line table generators from national statistical agencies and ministries, many of which are not presented in English.[2] There are 30 countries in the OECD, 23 of which are also Bologna Process countries, so the overlap was felicitous to the inquiry. What, in brief, did we find?

- A mess, and this essay will share the highlights of that mess;
- Creative efforts by the international agencies to leap over the mess, but with dubious results, and this essay will share both the challenges to the international agencies and the fog they generate;
- Misreading and misuse of the extant data on the attainment of the U.S. population and U.S. students as presented in the international comparative accounts, particularly *Education at a Glance* (hereafter abbreviated as *EAG*).

Our focus and inquiry expanded, in turn, to larger questions concerning the quality, meaning, and use of international comparative data on higher education. This essay is written principally for U.S. audiences, and is not an academic exercise.

Outline: What This Essay Will Do?

There are some basic rules, guidelines, and standards for cross-national comparisons using large-scale reporting that we would all recognize:

- Out of a complexity of structures in national educational systems, we must find common elements or create aggregations that approximate common elements;

- Out of a complexity of the perception of social categories conditioned by national cultures, languages, and traditions, we must find analogues that cross borders or group national cultures according to common elements used in their social constructs, and seek terms that will translate clearly both into and from the default English of international reporting;

- Out of a wilderness of credentials and awards and formal markers of educational progress, we must create common bracket classifications to determine approximations (though not identities) of similar types and significance.

None of this is easy. So, a first warning to the reader: this essay is not an easy read; it wasn't an easy write, either. Nonetheless, in the course of its pages, it will

[2]With resident competence, translation assistance, and correspondence with colleagues abroad and officials at other nation's ministries and statistical agencies, language was not an issue. For a list of those who kindly assisted, translated, and/or clarified terms and their application, see Appendix C.

(1) Offer some explanations concerning why all nations collect at least some data on basic higher education variables in the first place and why we try to compare those data.

(2) Review the basic terms, templates, and definitions used in comparative data statements about higher education, e.g. Just what is 'tertiary education'? "what is a credential?" and "who and what do we count?" These sound like easy questions. They aren't. At the core of these difficulties lies a flawed international classification system for academic programs and credentials called ISCED (International Standard Classification of Education), the conundrums of which ripple throughout the analysis.

(3) Describe the sources and difficulties of the data used: reports and on-line table generators of national ministries and statistical agencies in 19 countries[3] and four international organizations that attempt to set common grids of reporting over the data produced by national ministries and statistical agencies,[4] even when the agencies themselves are not wholly happy with some of the reported results, a sentiment well reflected in *EAG*'s footnotes. Somewhere in the course of these explications, the reader will begin to experience numerical dizziness.

(4) Indicate why "population ratios" (the percentage of a particular portion of national populations, e.g. 18-24 year-olds or 25-34 year-olds) and "synthetic cohorts" (age groups built around theoretical ages for higher education entry or completion) are used by OECD and UNESCO in particular, and then suggest the ways in which very basic demographic data should serve as a guide to interpretation of these ratios, particularly when time-series (e.g. "In 1995 it was X; in 2005 it was Y") statements are at issue. Population growth and decline is very much part of the background tapestry for interpreting population ratio presentations, and one does not need more than 4th Grade mathematics to sober one's interpretation of change or projected change. We will find, in the course of these considerations, why age is one of the most important variables in international higher education comparisons, though one we hear little about from the U.S. commentariat.

(5) Consider the effects of secondary school structures and pathways on tertiary participation. How does one represent and fairly judge postsecondary access across systems with different structural lines, multiple types of secondary schools ,and what we would call "tracking" mechanisms? Secondary school filters are as important—and as overlooked—as student age

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[3]Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Scotland and the rest of the United Kingdom (they have separate education authorities), and the United States All of these are among the 30 core members of OECD, and all offer accessible data, whether in their native languages, English, or both.

[4]Eurostat, which covers the 27 countries of the European Union; the Organization of Economic Cooperation and Development (OECD), which covers 30 economically advanced democracies (and, occasionally, other "partner" countries), and both UNESCO and the World Bank, which cover everybody.

in evaluating comparative higher education data. It is a mistake to skip over Section 2 of *Education at a Glance*, where these filters are addressed, albeit indirectly.

(6) Examine the definition of populations targeted to produce both (a) a more equitable distribution of participation and completion, and (b) increased participation and completion. The United States is not alone in looking for and improving rates of access, participation, and completion among what we call "under-served" populations. How do we define those populations—and why? How do other nations define them—and why? There are considerable differences here, and we will ask whether it is possible to develop a common template, how one might do so, and what it would look like. As we will see, equity issues are intimately connected with population dynamics (no surprise!). We have something to learn from other countries on this account.

(7) This last item leads into our conclusions and recommendations for what might produce more enlightening and constructive international data on higher education than those currently employed. Just as the 46 countries participating in the Bologna Process have worked toward a greater degree of "convergence" in structures and practices, so we look toward a greater degree of convergence in matters of the numbers that lie behind discourse in a world without borders. This essay is not alone in expressing these sentiments or suggesting alternatives: OECD's Indicators of Educational Systems (INES) group is working to improve both the input data and indicator construction for both entry and graduation rates; Eurostat is particularly self-reflective and self-corrective; and UNESCO, which crafted the international classification of education program levels known as ISCED, is working on long-overdue revisions to that system. It's not that we can tame numbers or that their frames and conditions are immutable, rather that we can all do better to shape them toward attainment of common ends, and to improve "the message content of statistical statements" (Giloman, 2002, p. 46). That's the positive note on which this essay will finish.

1. Truth and Consequences: the Propaganda of Numbers

It seems to be a standard rhetorical convention of reports and declarations on the status of U.S. higher education: an opening statement that compares our participation and degree completion rates to those of other economically advanced countries—and always to our disfavor. It's a way to stir up the competitive juices: we have to be number one–or close to it–or, it is said, our future economic life is at risk. One can cite these reports and statements by the dozens—no, make it hundreds.

Will it surprise anyone in the house that other countries with advanced economies utter similar statements and claim that the United States is ahead of them in higher education? For example, the European Commission has bemoaned the fact that the "average gross enrolment ratio" in higher education for 18-24 year olds in the United States is 81 percent versus 52

percent in the European Union and 49 percent in Japan (European Commission 2005, p.3). Setting aside for now what "gross enrolment ratio" means, the EC seems to be joining us in a rhetorical race to the bottom.

This essay will not spend time addressing all the problems with this rhetoric or its dubious assumptions. We note only: (1) there are no longer rigid national borders in global economic life, so the notion of what the Japanese used to call *ichi ban* (number one) is rather passé; in fact, if other countries are doing better than previously, then we all are doing better; (2) economists have presented a mixed judgment of the relationship between national levels of education, on the one hand, and productivity, productivity *growth,* and economic growth, on the other, and we ought to be more modest in our claims; (3) the idea of one country "ranking" higher than another (even when the differences are negligible and statistical significance impossible to prove, e.g. 42 percent of something versus 39 percent) is a moot exercise;[5] and (4) among advanced post-industrial democracies, the country with one of the lowest levels of higher education attainment, Germany, maintains a fairly robust economy, even in our difficult times. One does not need more than a degree in common sense for these observations. Enough said.

But Let Us Straighten Out the Core Propaganda Before We Begin

From every corner of the U.S. policy world it has been declared that we have "fallen" in our international position in higher education from 1st to 7th or 10th or some other dismal rank in the universe of 30 advanced post-industrial democracies that are members of the Organization of Economic and Cooperative Development (OECD), and that the attainments of our younger generations do not match those of their elders. The metrics on which this collapse has taken place, it is said, run from access to completion rates, and particularly the latter. The claimants base their assertions—so they say—on the bible of international education data comparisons, OECD's annual *Education at a Glance* (hereafter abbreviated as *EAG*).

But as soon as one opens the *printed* 2008 edition of *EAG* and reads the tables for a core issue such as the percentage of the population that has earned higher education credentials, it is obvious that the claims are *rather problematic* in the context of normal U.S. discourse on these matters.

[5]The education index portion of the United Nations' Human Development Index (HDI) is even more egregious on this count with scores ranging from 0.946 to 0.993 for its top ranked nations. We're not sure what these scores mean and whether the differences are either statistically or substantively meaningful. The United States, by the way, is "ranked" 5th—whatever that means. Do we brag that our 0.971 "beat" Russia's 0.956? Or weep that it "lost" to Korea's 0.980? This is a matter for the sports pages.

This essay refers to the *printed* version of *Education at a Glance 2008* released in September 2008, not the on-line "Whoops! We made some mistakes" correction sheets issued, without fanfare, three months later, and which, as of this writing, are impossible to find on the OECD Web site. The printed version, after all, is what moves messages immediately into the propaganda environment. In our primary case, OECD issued just such an on-line correction long after the major media reports on *EAG 2008* had been posted, guaranteeing that few would notice.

The primary case is the presentation of the highest credential earned by age group (*EAG 2008,* Table A1.3a, page 44).[6] In our normal discourse, a "college degree" equals the bachelor's, and bachelor's degree attainment rates are the Dow Jones Industrial Average of U.S. higher education. In Table A1.3a, this level of attainment is referred to as "Tertiary-type A and Advanced research programs," i.e. bachelor's and higher. *EAG* 2008 presents these by what this essay calls a "census population ratio." By age bracket and percentage of the population within that bracket who had earned at least a bachelor's degree by 2006, a 2nd grader could read the printed version of Table A1.3A and show the U.S. rank among the 30 OECD countries as follows:

Table 1: U.S. Rank Among 30 OECD Countries in the Proportion of the Population with Bachelor's or Higher Degrees, by Age Bracket, 2006

Age bracket	Proportion of U.S. population with bachelor's or higher degree	U.S. Rank
Age 55 to 64	33%	1st
Age 45 to 54	34	1st
Age 35 to 44	36	1st
Age 25 to 34	35	2nd

Source: OECD, *Education at a Glance 2008*, Table A1.3a (page 44)

By what perverse alchemy do we convert this to decline and dissolution? That Norway, the first country to restructure its degree cycles to award three-year bachelor's degrees under the

[6]The title of the table, "Population that has *attained* [author's italics] tertiary education," is somewhat ambiguous. Most of the data come from each country's Labor Force Survey under what are called UOE rules (for the U.S., we assume the data come from the Census Bureau's Current Population Survey), and can include tertiary credentials earned-but-not-awarded. Some national system data reports, e.g. Sweden, make this distinction, e.g. students who have completed the requisite credits but have yet to pass their final, degree-qualifying assessments.

Bologna Process beat us among 25 to 34 year-olds in 2006?[7] Are these results too good? Perhaps, but that's not the point.[8]

Other countries' statistical reports can read this annual column very clearly (e.g. Swiss Federal Statistical Office 2006; Bradley et al [Australia] 2008), but our commentariat does not bother to read it at all. The drum-pounders prefer to ignore our conventional reference points, tossing out the Dow Jones, and replacing it with another column in Table A1.3a: a column including all degrees awarded, including sub-baccalaureate credentials, particularly associate's degrees. Not all OECD countries' higher education systems grant sub-baccalaureate *degrees.* When they do, the degrees are generally called "short-cycle" and are labeled within the traditions of the country at issue. Some are offered by the same institutions that grant the equivalent of bachelor's degrees (e.g. the *hogescholen* in the Netherlands); some are considered *part* of the bachelor's degree. In the United Kingdom, the Foundation Degree is offered jointly by universities and Further Education Colleges; in France, the short-cycle *Diplôme universitaire de technologie* (DUT) is offered by institutions that are married to universities across the street. The production of these degrees is particularly strong in Belgium, Canada, France, Japan, Korea, New Zealand, and a half dozen others, powered by institutions whose principal job is to produce those credentials. OECD is very explicit about this, though our avatars of grief choose not to pay attention. They engage in what economists call "confirmation bias," selecting evidence that supports what they want to believe or juggling statistics until they yield an answer that confirms their beliefs. Why do they want to believe that the United States is doing poorly in higher education, using degree production as the measure? To rouse us from an otherwise complacent sleep? We'll leave that speculation for another day.

The production of sub-baccalaureate degrees is particularly weak in the United States, principally because their principal agent, the community college, has taken on many tasks that

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[7]This essay was written prior to the release of the 2009 edition of *EAG*, which repeats this table using 2007 data. Reading only the *printed* editions of *EAG*, the U.S. percentages change so dramatically (e.g. from 33 to 30 percent of the 55-64 age group; from 34 to 30 percent of the 45-54 age group; from 36 to 33 percent of the 35-44 age group) that one would think our bachelor's degree holders (the numerator) are dying at rates far above the rest of the population or that we experienced a massive immigration of unschooled middle-aged people (the denominator) in 2007—or both absurdities. The 2009 table has us tied for 7th place with Sweden and Australia at 31 percent, just below a group of Bologna countries (Denmark, Finland, the Netherlands) which had changed over to the new three-year degree cycles. As this essay notes below, our 2008 position is not likely to last—and the reasons are obvious: demography and Bologna. The number of degrees awarded in Norway actually declined slightly from 2006/07 to 2007/08 (see www.ssb.no/eksuvh_en/tab-2009-05-26-01-en.html. received 8/25/09), which is what one would expect following an initial pop after restructuring degree cycles along Bologna Process lines.

[8]Despite the fact that the producers of international comparative data are supposed to talk with each other, UNESCO's statistics unit had the United States, ranking 14th among OECD countries in "Gross Graduation Ratio" for first degrees at the ISCED 5A level in 2004 (UIS 2006b, pp. 121, 123, 125, and 127). Setting aside what "Gross Graduation Ratio" means, the fact that the U.S. rate, 35 percent, is the same as OECD lists for 2006 indicates how truly bizarre these calculations can be.

comparable institutions in other countries have not assumed, and is under more pressure to facilitate transfer to a four-year college than to generate associate's degrees. Thus, Hauptman and Kim (2009) argue for greater degree production by our community colleges as the principal route to raising our composite international position in attainment. That argument is beside the point here, but there is no question that if our sole interest was in producing more degrees for the sake of a ranking in Table A1.3a of *Education at a Glance*, we would forget bachelor's degrees and push hard as the associate's level. This essay does not deal in such proposed reconstructions: it is sharply focused on the data itself and its contexts.

So if we are to quote the bible of comparative international data to assess our national standing, let's get the chapter and verse correct and clear:

- the United States does very well with population ratios of bachelor's degree attainment; in fact, *at least for now*, ranks rather high;
- the United States does **not** do very well with population ratios covering *all* undergraduate higher education credentials.

Please note: for purposes of this initial air cleaning in the face of negative propaganda, the validity of the census population ratio as a method of international comparison is provisionally accepted. By the time this essay concludes, the reader should consider these ratios—and the ranking statements to which they lead—to be but fractional measures of human capital. The standings of athletic teams offer more content.

We're Not Done with the Negative Propaganda: a Second, More Complex, and More Serious Case of Completion Rates

The second charge leveled against U.S. higher education, and on the basis of a table in *Education at a Glance 2008*, at least focuses wholly on the Dow Jones Industrial Average of higher education: our macro bachelor's *degree completion rate*, compared with those of other countries, is miserable! Let us grant that we can—and should—do better, regardless of what other countries do. But this is a more complex case, and one that reveals some—how should one say—"prejudices" in OECD's presentation. This table has been repeated, without changes, in *EAG 2009*, so it does not fall into the "Whoops! We made some mistakes" bin.

The methodology that brings us closest to details of student pathways is the longitudinal study, which, stripped of all its knowledge potential, and converted to the job of generating a completion rate indicator, is what shorthand calls a "cohort survival" account. Drop-out studies (e.g. Heublein, Schmelzer, and Sommer 2005 for Germany; Morgan, Flanagan and Kellaghan 2001 for Ireland), don't wholly do the job because they are confounded by stopouts, transfers,

and “return rates,” and not all national statistical agencies have such variables in their portfolios (for a U.S. report that takes all these dynamics into account, see Horn 1998). So OECD tries a different approach, and presents its account in *EAG 2008*, Table A4.1 (page 98), for 24 member countries and three others. Despite its potential, we are staring at an unfortunately mysterious and puzzling ledger for a number of reasons:

- Of the 24 OECD accounts, 12 are cross-sectional, hence what are called synthetic age ratios. In such accounts, the people completing degrees in year X (the numerator) are not necessarily those who started out in tertiary education in year Y (the denominator), year Y being X minus the theoretical time to degree assuming full-time attendance and no stop-out periods.[9] The other 12 accounts are “true cohorts,” i.e. either a full census or representative sample (“panels”) of beginning tertiary students in a given year who are followed to a censoring year. The U.S. data, from our Graduation Rate Survey, represent a “true cohort.”

- The date stamp for the table is 2005, but that does not mean that 2005 is the censoring date for each of the cohort histories, whether cross sectional synthetic productions or “true cohorts.” The censoring dates are not indicated in the published table, but a little leg-work and logical deduction can produce some of them—*some* of them.

- The beginning years for the cohorts, on the other hand, are indicated, and they range from 1995 to 2003, though one doubts that some of those dates are true beginning years. How one derives a bachelor’s completion rate in 2005 of 72 percent for an entering cohort in 2003 (Australia), for example, particularly when the methodology is cross-sectional, is one of those many *EAG* mysteries we will leave alone. Of the true cohort histories, seven began in 1995 or 1996, both of which are credible beginning years for survival rate calculations that could extend to 2005.

- If the beginning year is known and the censoring date is unknown, we simply cannot determine how many years are accounted for in each country’s student history, hence cannot judge their comparability. France and Switzerland are the only countries on the list whose entries are explicit in the dates of cohort history: 1996 for beginning and 2001 ending for Switzerland, i.e. a five year history for students in 1st cycle degree programs; and, for France, 1996 beginning, 2003 ending, i.e. a seven-year history, for students in both 1st cycle degree (*licence* or

[9]This is an “elapsed time” measure, not an “enrolled time” or “credit-equivalent time” measure. The other measures may be more justified empirically, but do not make for easy international comparisons.

licence professionelle, comparable to the bachelor's) and what are called ISCED 5B programs (more on that below) comparable to our associate's. The French completion rates for those seven years–64 percent for 1st degree and 78 percent for 2-year ISCED 5B degrees such as the DUT and BTS in France[10]—are very credible.

In a personal communication, OECD offered details on length of cohort history that one doesn't see even in its footnotes: four, five, and "six or more" years. While one should be grateful for this heretofore undisclosed information, neither the variations nor the range are acceptable. "Six or more" is a meaningless construct: "more," after all, can be 7, 9, or 11. The term for cutting all accounts to produce the same period of judgment is "Winsorizing," and if these assessments were Winsorized to 6 or 7 years, let us say, we would have the beginnings of justifiable comparisons.

- Neither Table A4.1 nor its footnotes in Annex 3 provide the sources for the data cited. Some of them have been ferreted out, as will be obvious below. Equally helpful, OECD provided a set of standard form spreadsheets recording data from eight of the countries that used a "true cohort" method. These are particularly valuable because they demonstrate what an international data reporting operation such as *EAG* is up against in trying to make sense of the spaces between numbers. Table 2 presents a translation of the input to OECD for *EAG 2008* Table A4.1, removing foreign students where they were included, and indicating whether the cohort survival rates included part-time, as well as full-time students.

There are a number of oddities in this table, e.g. New Zealand, the population of which is half the size of Sweden's and a lot less than Switzerland, reports an obviously inflated number of entrants and graduates (it is conceivable that they are adding multiple cohorts, but we can't tell). Switzerland reports two cohorts, one for pre-Bologna Process legacy degrees and the other influenced by the shorter expected time frame of Bologna 1st cycle (bachelor's) degrees, except one cannot determine the duration of the Swiss tracking period for the latter. Such oddities only add to the fog of comparison.

[10]And this is a case where the *EAG* report is close enough to a ministry report (MESR 2007, p. 245) of a 76 percent DUT completion rate to validate at least one line in the table.

Table 2: Background OECD Spreadsheet Data for Table A4.1, Countries Using a "True Cohort" Reporting Method for 1st Cycle (Bachelor's) Degree Completion

	Beginning Year	# Domestic Entrants	# Domestic Graduates	Rate	Duration	Enrollment Intensity
Denmark	1995	26,553	21,570	81%	6 years	FT only
Finland	1995	24,943	18,013	72	10 years	Unclear
Italy	1998-99	273,385	126,369	46	Unknown	FT only
Netherlands	1997-98	91,641	59,968	65	7 years	FT and PT
			65,287	71	9 years	FT and PT
New Zealand	1998	35,245	20,239	57	Unknown	FT and PT
Sweden	1995-96	30,061	20,991	70	6 years	FT only
Switzerland	1996	11,683	7,971	68	6+ years	FT and PT
	2000	8,703	6,392	73	4+ years	
United States	1999	1,268,887	709,785	56	6 years	FT only

Source: Background spreadsheet data provided by OECD.

The U.S. data in this table stand out as the worst on the lot, and for reasons that OECD does not tell the reader. Our true cohort statistics used for this table come from the IPEDS (Integrated Postsecondary Education Data System) Graduation Rate Survey, and are the *only* data represented, whether cross sectional or true cohort, that are *institutional* rates as opposed to *system* rates.[11] In other words, of 24 representations, ours is the only one that counts you as a graduate *only if* you earned your degree from the *same institution* in which you began. Those who thrive by bemoaning the comparatively poor performance of U.S. higher education will never mention this discrepancy—nor does OECD.

[11]Even on its own institutional-based terms, it turns out that the U.S. completion rate is a bit diluted by the inclusion, in our Graduation Rate Survey, of associate's degrees awarded by bachelor's degree-granting institutions. The 56 percent figure includes these degrees. Without those students in either numerator or denominator, according to Tom Snyder of the National Center for Education Statistics (who, as our representative to *EAG*, is extraordinarily knowledgeable and thoughtful about all the issues raised in this essay) the bachelor's institutional completion rate would be 57.1 percent. A minor difference, to be sure, but just another indication of how complexified these data turn out to be.

When our National Center of Education Statistics sent in a *system* graduation rate figure to OECD for inclusion in *EAG 2008*, it was buried in Annex 3, page 46 (available only on-line through a separate URL). The rate was taken from the Beginning Postsecondary Students Longitudinal Study of 1995/96 - 2001, a six-year measurement, and was confined to a bachelor's degree outcome (thus filtering out those associate's degrees that somehow sneak their way into our Graduation Rate Survey). The proportion of our students who started in a four-year college and earned a bachelor's degree from *any* four-year college, i.e. system graduation rate, for that period was 63 percent, as opposed to the 56 percent indicated on Table A4.1.

Somehow, though, this study was described in Annex 3 as "somewhat older," even though seven of other nations' cohort histories used in Table A4.1 began in the same year. How Sweden's 1995-96 is current and the U.S. data's 1995-96 is "old" is, euphemistically, another one of those *EAG* mysteries. Let the reader decide what is going on and how it feeds our penchant for negative propaganda.

Does a system graduation rate change our standing on this tortured list? As Table 3 demonstrates, it certainly does. So, an honest presentation would say that our 6-year system bachelor's degree graduation rate is comparable to France's 7-year rate, modestly below those of Sweden and the Netherlands at 6 and 7 years, and modestly below Iceland and Norway at 9 and 10 years. One suspects that if we took a 7 or 8-year system rate, it would be the same as those in these other countries.

Table 3: U.S. System Bachelor's Completion Rate Compared to a Selection of True Cohort Completion Rates from Other Countries in *Education at a Glance 2008*

Country	Basis of Rate	Completion rate for 5A Degrees	Years of Tracking
United States (before)	Institutional	56%	6
United States (after)	System	63	6
France	System	64	7
Iceland	System	66	9
Norway	System	67	10
Sweden	System	69	6
Netherlands	System	65	7
		71	9

Sources: *Education at a Glance 2008; Education at a Glance 2008,* Annex 3; and background spreadsheets provided by OECD.

But the madness of numbers doesn't stop here. As long as *EAG 2008* did not provide the sources of the Table A4.1 data, the Web sites and reports of the national ministries and statistical agencies themselves were examined to find something comparable—if not identical in form and dates—to what one reads in *EAG*. This is not a case in which the international organization uses its own estimates because national data are missing or because they require adjustments to fit into an internationally imposed template. All international organizations in the comparative indicator business acknowledge that there will be inconsistencies between the national and the comparative, even, as the United Nations' *Human Development Report 2008/2008* phases it, "substantial differences" (p. 221). But Table A4.1 does not appear to be a case of missing data or an imposed template. Yet somehow, we find differences, some of them substantial (Sweden), some less so. Our Table 4 presents some notable cases of divergence between OECD reports and national reports. The reader will note that ministries do not always present the data the same way, e.g. binary systems (those with a class of universities and a class of what are called polytechnics or "universities of applied sciences") are more interested in sectoral survival rates. One might reasonably expect countries to submit the same data to OECD that they use in their published national reports, but that does not seem to be the case.

Outside this collection of data one finds other typically confusing accounts. For example, in a somewhat dated analysis of its university sector, Ireland claimed a 68 percent on-time completion rate and another 15 percent "late completers" (Morgan, Flanagan, and Kellaghan 2001), but it's not clear what either "on-time" or "late" means, and even less clear what OECD or Eurostat would do with such numbers. It is obviously from Table 4 that the Netherlands can offer 7 and 9 year cohort completion rates. The Swedes can go out to 11 years, and the United States can offer 4, 6, and 8 ½. If a notional time to degree is four years and an empirical average time to degree is five years, at what point do we all take a "late" measure?

Such questions aside, with all these variations, if we drew a simple vector chart of "true cohort" ISCED 5A (bachelor's level) completion rates by duration of cohort history, and plugged in both ministry reports and *EAG 2008* data (where cohort history is known), we would observe a fairly tight cluster of 63 to 69 percent completions within 6 to 9 year boundaries. The point is that if most major OECD countries are producing what we would call "college graduates" at roughly the same rate in roughly the same time span, then rate comparisons are irrelevant, and we ought to be asking other questions—questions about traditional and alternative paths to participation in tertiary education, about inclusion of what, today, are low-participation populations, about the distribution of knowledge, about potential proxies for the quality of degrees. This essay will reinforce such questions in its recommendations for making comparative international data more meaningful and relevant to national policies.

Table 4: OECD versus National Ministries on Cohort Completion Rates for 1st Cycle Degrees

	EAG 2008, Table A4.1			Ministry or Nat. Statistical Agency		
Country	Start Year	Tracking Years	Rate	Start Year	Tracking Years	Rate
Finland	1995	10*	72%			
University sector				1998	7.5	58%
Polytechnic sector				1998	7.5	70
Sweden	1995-96	6*	69%			
Full-time students				1995-96	7	54%
All students				1995-96	7	44
Netherlands	1997-98	7*	65%			
		9*	71%			
University students: full-time				1997-98	7	61%
University students: part-time				1997-98	7	31
University students: all				1997-98	7	57
Hogescholen students: full-time				1997-98	7	66
Hogescholen students: part-time				1997-98	7	51

Note: *Tracking years were not indicated in the *EAG* table, but were derived from back-up spreadsheets. SOURCES for national statistics agency data: Finland: Statistics Finland release at http://www.stat.fi/fil/opku_2006_2008-05-08_tie_001-en,_p.2; Sweden: Statistics Sweden 2006. *Universitet och högskolor: Genomströmning och resultat I högskolans grundutbildning t.o.m. 2003/04. [Higher education: throughput and result in undergraduate education up to 2003/04 inclusive]*, p. 47. Stockholm: Author; the Netherlands: Centraal Bureau voor de Statistiek 2009. *Jaarboek onderwijs in cijfers 2009*. The Hague: Author, pp. 206 and 222.

1.1 Analogous Accounting: Contrary to Conventional Wisdom, It's Possible

This essay will examine (below) a variety of features of international comparative data on the core common benchmarks for higher education—access rates, participation, and completion—that lead to dizziness and dismay. Most would conclude that "analogous accounting," that which leads to reasonable frameworks for comparisons, is nigh impossible.

But at this point, it may be profitable to illustrate what analogous accounting means, and our case comes from Denmark. The Danish central statistical office offers a service through Statbank.dk called "cohort analysis." It is a parsimonious way to see what happens to a cohort of students who receive various kinds of secondary school diplomas. One can pick a year of secondary school "graduation," and add up to nine years of subsequent history. The results are expressed in numbers, not percentages, and, because of the Danes' consciousness of such things, one can filter by citizenship and ancestry. A table presenting the consolidated results for the history of the two major groups of 1998 upper secondary school graduates[12] in Denmark nine years later in 2007, accompanied by a brief narrative, can be found in the "Supplementary International Data Tables" accompanying this essay at:
www.ihep.org/research/GlobalPerformance.cfm

What we learn from these data is, first, that in Denmark it is possible for students coming out of one of the core "vocational" upper secondary school tracks ("commercial" or "technical") to enter 1st cycle degree programs, and that roughly half of them did so. Second, that Denmark sports a 94.2 percent upper secondary school cohort participation rate in something postsecondary, and, in terms of true higher education levels, a 71.1 percent participation rate. As for first degree completion (the equivalent of bachelor's), it's 40.4 percent of the upper secondary cohort.

How does this account different from the Danish "true cohort" reported in *Education at a Glance 2008*, for which an 81 percent first ISCED 5A degree (bachelor's or higher) attainment rate of full-time students only over six years is claimed? StatBank.dk offers a secondary school graduating cohort (technically, a *gymnasium* with both general and vocational tracks), not a higher education entry cohort, so it includes those who didn't continue their education, those who never entered an institution offering the equivalent of a bachelor's degree, and, no doubt, some marginally prepared students who would not have attended full-time. So of course the completion rate will be lower. But there are virtues to this presentation:

- we know the students graduated from secondary school in the same country as they entered higher education (an important issue, as we will see, for countries hosting a measurable percentage of international students),
- they are all of roughly the same age, and
- there is no opportunity to filter either numerator or denominator, e.g. by full-time/part-time.

[12]There is a third group which attend wholly vocational and apprenticeship programs classified as ISCED 3C (secondary school preparation that leads directly to the labor market). European Commission data have them constituting 48 percent of Danish secondary school students. Only 5 percent continue to tertiary education.

No, they did not necessarily enter tertiary education directly from secondary school. In Denmark, as in other Scandinavian countries, "gap years" are common, but a nine-year history should capture the delayed entry population.

The ideal comparison to what the Danes offer, from a U.S. point of view, is a similar "grade cohort" from our most recently completed grade cohort longitudinal study, the so-called NELS:88/2000. The dates are a little different, the time period is slightly different, and the basis of data different (the U.S. data come from transcripts, the Danish from administrative records), but Table 5 is what we mean by analogous accounting.

Table 5: Comparing Educational Markers of U.S. and Danish Secondary School Graduating Cohorts Over a 9-year Period

	NELS:88/2000 (U.S.)	Denmark "Grade Cohort"
Secondary school graduating year	1992	1995
Closing year of longitudinal account	2000 (December)	2004
Number of years of cohort history from the point of secondary graduation	8.5	9
Participation rate in any type of postsecondary education	82.6%	94.2%
Participation rate in higher education	79.8	71.1
Bachelor's/higher as a percent of the whole cohort	35.8	40.4
Bachelor's/higher as a percent of all higher education enrollment	44.7	56.8
Short-cycle (including associate's) and bachelor's degrees as a percent of all higher education enrollment	52.5	67.7
Bachelor's/higher as a percent of those earning any credits in bachelor's programs	65.6	65.5

Notes: "Any type of postsecondary education" includes, for the United States, students whose only schools of attendance were non-degree sub-baccalaureate (analogous to the Danish postsecondary "vocational" category), as well as all higher education (including 2-year degree granting institutions), and all programs in which the bachelor's degree or its equivalent (there are three equivalents in Denmark) is awarded.
Sources: United States: CD #2003-402 from the National Center for Education Statistics; Denmark: Statbank.dk on-line table generator.

This type of presentation is possible only because (a) the tracking history is long enough to capture the late entry or "gap years" common in Denmark, and (b) both countries have ISCED 4 sectors (postsecondary non-degree granting vocational or trade schools), ISCED 5B sectors (community colleges in the United States and *Erhvervsakademiet* and technical colleges in Denmark), and ISCED 5A sectors. Within a comparison such as this, each country can evaluate the effectiveness of its system in producing credentials in light of its own system nuances, conditions, and dynamics. Given those conditions, the comparisons in Table 5 are not surprising at all, e.g. the Danes have a larger postsecondary vocational system (ISCED 4) while the United States has a larger community college (ISCED 5B) sector.

The bottom line question: of all students enrolled at some time in a bachelor's degree-granting institution, what proportion earned the bachelor's degree within roughly nine years of graduating from secondary school? The difference between 65.6 percent in the United States and 65.5 percent in Denmark is zero—zero—and a fairly decent guide as to what advanced post-industrial nations can (or should) expect. In fact, we can add these numbers to what we already know from the seven-year French history (64 percent), and seven-year accounts from Finland, the Netherlands and Sweden we observed in Table 9, and come up with a credible measure:

Roughly two out of every three students from a plurality of OECD countries who study in programs awarding the equivalent of a U.S. Bachelor's degree will earn the degree within 8 years of entry. When national authorities have that benchmark, they can then turn their attention to (a) the one-third of their ISCED 5A students who do not earn their first degree, and (b) the nature of secondary school pathways that best describe who does *not* enter tertiary education at all, and suggest ways to recapture some of this population within national structures and processes.

They will do so not to compete for a better "ranking" in *EAG* presentations, but for the sake of improving the knowledge-and-skill levels of both national and international workforces.

If every OECD country could produce the data marked for Denmark and the United States in Table 10, we would have a lot more clarity on the comparative paths of traditional-age secondary school graduates than we now possess.

2. How did this start? What did we find?

The research for this essay began with a seemingly simple challenge: using information from national ministries and statistical agencies, build a spreadsheet with the most recently available single year numbers for 20 member countries of OECD for the following data points:

- Total tertiary (higher) education enrollment; and, of this total, the total number of part-time students.
- For programs and awards comparable to U.S. associate's degrees:
  - Total enrollments, and total part-time enrollments
  - Total beginning students
  - Total degree awards
- For programs and awards comparable to U.S. bachelor's degrees:
  - Total enrollments, and total part-time enrollments
  - Total beginning students
  - Total degree awards.

The reason for starting with numbers—and not percentages—was to identify and understand the raw materials that surely must be used by international organizations such as OECD and UNESCO in building comparative indicators of higher education participation and attainment. The process was both enlightening and frustrating:

> Enlightening: There is some exemplary and thorough work in the ministries and statistical agencies of other countries. The Dutch and Swedes, for example, are extraordinarily painstaking and usually consistent. The Italians are very clear in their definitions of who is counted. The Norwegians offer some very revealing takes on credit generation and flows of students into and out of the country (the Germans do that, too). The French provide very credible retention and, along with the Italians, what we would call change-of-major data.[13] One simply learns a great deal about national traditions, nuances, and priorities in the course of working through this material.
>
> Frustrating: Too often, the data are not presented by degree level. The reference years differ from country to country. One finds two or three different figures for the same phenomenon coming out of different authorities in the same country (e.g. in the United Kingdom and Denmark). Key data, e.g. number of beginning students, are missing in some cases. Data are presented by institutional type in some countries (Japan), a combination of institutional type and program in others (France), and by credential type in others (Canada). We get, variously, "graduation rates," "expected success rates," "survival rates," and "completion rates" and are not sure of what is what. OECD tries to help with definitions that, to be kind, are either meaningless or opaque:
>
> > Completion = "number of degrees awarded per 100 students enrolled in a given year";

[13]For French university students in 2005-06, 9.6 percent changed program between their first and second year (MESR 2007, p. 211); for Italian students in any year of undergraduate study in 2004/05, 20.9 percent changed program (MUIR 2006).

Graduation Rate = “the ratio of tertiary graduates to the population at the typical age of graduation multiplied by 100";
Survival Rate = “the number of graduates divided by the number of new entrants in the typical year of entrance.”
(Van Stolk, Tiessen, Clift, and Levitt 2007, p. xii)

From this fog bank and in their usage in comparative reporting, these terms get scrambled to the point of incoherence.

One could go on (and this essay will cite more cases below).

Kaiser, Hillegers, and Legro (2005) may have been able to produce a database consisting of some of the same spreadsheet data points for 10 countries, but our efforts wound up in chaos due to missing, dissonant, and unusable numbers, for example:

- Spain combined 1st and 2nd ISCED 5A degrees (bachelor’s and master’s); Finland did the same with its polytechnics’ degrees (but not its university degrees), both cases illustrating a principal problem with the current ISCED system discussed below.
- Austria’s data for universities were dated 2007 while its data for *Fachhochschulen* were dated 2005; the same phenomenon cropped up in Irish data for universities and Institutes of Technology. In other words, it was impossible to arrive at a consolidated system accounting for the same year.
- Different UK sources offered considerably divergent numbers for Foundation Degree recipients, thus rendering an ISCED 5B completions account moot.

The experience sheds considerable light on the impetus for international organizations to step in and create templates to harmonize all the dissonance of national habits. So we have some sympathy for OECD, UNESCO’s statistics unit, Eurostat, and the World Bank, and even more sympathy in light of the current dynamics of higher education systems, particularly those attendant on degree-cycle changes in the 46 Bologna Process participating countries.

However, that sympathy is suspended when one starts reading the footnotes and formulas created by the international arbiters of higher education data, realizing just how much statistical gymnastics are involved, trying to get our heads around their “virtual cohorts,” watching their publications and table generators disagree with each other (even when they have agreed to observe the same rules), and, most critically, comparing the results of their formulas with data that address the same issues from the most thorough and transparent of the national ministries and statistical agencies.

Conclusion: When students and their attainments are the subject, there is too little meaning in the comparative data, and too much variance in its *credibility*. Some of it is okay; a lot of it isn't; and the international organizations are not ignorant of its shortcomings. There has to be a better way, one uncluttered by footnotes, exceptions, arcane conditions, and definitions on which the sun has long set. The spaces between numbers cry out for simplicity, clarity, real meaning, and utility in addressing the challenges all national higher education systems face. This essay will make some suggestions. Everyone has to give a little.

Forebears and U.S. Sources

Before starting into a text that will cover the checklist with which this essay began, some critical acknowledgments of forbears in efforts either to untangle or make better sense of the universe of higher education numbers, and an equally critical acknowledgment of our domestic sources and data workforce.

Forebears: In terms of the basic impetus for using comparative education data, Barro and Lee (2000) are more than forebears: they are our principal theoretical and empirical touchstone. They built and analyzed massive time-series data bases across over 100 countries to test economic hypotheses that we assume as dogma, and that turn out to be something less. In the parameters of the issues raised by this study, both Kaiser and O'Heron (2005) and Wellman (2008) are also key forebears. Each of these set out to examine one piece of or perspective on international data conundrums. Kaiser and O'Heron scoured gross raw numbers in European data, described differences between ministry and Eurostat reports, attempted to explain those differences (which, in some cases, could not be explained), pointed to problems in definitions of such core statistical variables as entry rates, participation, and graduation rates, and evaluated alternative indicators for these phenomena. Wellman touched on a number of the issues raised in this essay, but did so to explain to U.S. readers how OECD calculations were arrived at (including those for finance and R&D investment), honed in on differences between the templates for U.S. data and those used by OECD, and provided a valuable guide for those first venturing onto this field. Let us call Wellman's work the prerequisite course, for U.S. readers, to our current excursion.

U.S. sources and data workforce. Work on the Web sites of other national ministries and statistical bureaus has confirmed the author's prejudice: our National Center for Education Statistics is the most comprehensive national education statistical agency on this globe, hands down. And, for over three decades it has nurtured contractor work forces to gather and shape higher education data sets ranging from the comprehensive full-census Integrated Postsecondary Education Data System (IPEDS) to three types of longitudinal studies that are the envy of other nations: grade cohort studies starting in high school and running for 12-14 years, six-year beginning postsecondary students studies, and 10-year follow-ups of bachelor's degree recipients. All of these are based on rigorous stratified sampling designs, all of them

sport very high (80+ percent) response rates, and all are subject to intense technical review procedures. Yes, there are some longitudinal studies that include education variables in other countries (Australia, France, Italy, Sweden, and the United Kingdom are noted examples), but few that extend education tracking into higher education (see Kardaun and Loeve 2005). One doesn't see anything else like the U.S. studies in terms of sample sizes, length of study (Australia excepted), or unobtrusive data (e.g. high school and college transcripts in the grade cohort studies) and multiple perspectives (interviews with students' parents)—anywhere. Of course, we spend a lot of money on this information that other countries might not be willing to spend.

Despite these prejudices, this essay will not suggest that the rest of the world–even the rest of OECD countries—mimic NCES, its statistical standards, variable definitions, study designs and procedures, or habits—or try to reproduce something resembling our large and well-developed Institutional Research workforce. In fact, in the recommendations of Section 11, the reader will note some ways we suggest that NCES itself might reshape its traditions to bring about a greater degree of convergence in reporting practices on the field of tertiary education.

Our second source of domestic data lies in the U.S. Bureau of the Census, specifically through the American Community Survey (ACS) and the Current Population Survey (CPS). The former is based on annual interviews with about 2 million individuals; the latter is a monthly survey of about 50 thousand households and offers an Annual Social and Economic Supplement based on a sample of approximately 78 thousand households. Will it surprise anyone that these two sources in the same U.S. agency will produce different estimates of the level of education attainment in the United States? Yes, there are differences in population coverage and time: CPS data are slightly more recent and will pick up a higher number of bachelor's degrees, while ACS includes the military and institutionalized populations, within which are lower numbers of college graduates. NCES could not adjudicate the difference without a cloud of footnotes.

Our observations: (1) the problems of international comparative data in higher education start right at home, including the necessity of footnotes that no one reads; and (2) one can find cases like this in every country in which there is more than one statistical reporting agency or association, e.g. the Netherlands, Denmark, and the United Kingdom. In fact, for some indicators used by OECD in *EAG,* our Bureau of Labor Statistics is the responding agency, so, in fact, there are three official sources for the data that the United States pumps into international comparisons in education—and to the extent to which National Science Foundation data are cited, there may be four. OECD says that it uses CPS data for *Education at a Glance* (*EAG 2008*, Annex 3, p. 11)**,** but the point is not which data source within a country wins or loses, rather what gets fed into the maw of the international comparative data we so loosely cite. Such cases fuel our sympathy for international organizations that try to make unified sense of it all.

3: Basic Scope, Units of Analysis, Terms, and Questions

Our scope of comparisons and analyses in comparative international higher education data is confined to advanced post-industrial democracies on the grounds that they all have well-developed higher education systems that function and evolve with relative independence. At previously noted, 23 of the 30 OECD member states are European, hence the European prominence in our text. One might argue that we should include Israel, Brazil, and other OECD "partner" countries (which are sometimes included in OECD presentations)—all of which meet most of the criteria for inclusion, but they have limited historical participation in the data series to which we must refer.

Giloman (2002) offers three "reference levels" for education indicators that can be re-labeled as units of analysis:

- Micro-level: student, teacher, other individual
- Meso-level: institutions, schools
- Macro-level: systems, social and political dimensions

From Gilomen's perspective, the macro-level is of primary importance, though indicators on this level "are a tool for systemic monitoring rather than for in-depth evaluation," and "raise more questions than they answer" (p. 42). Our perspective is that of the micro-level and its aggregations. Specifically, that means students and their educational histories: potential students, beginning students, continuing students, completing students. Student histories are normally and most prominently invoked in international comparisons. Institutions turn up on this playing field principally in comparative rankings, and that is not our concern (nor are major facilitative features of higher education systems such as finance, governance, and R&D). To be sure, student histories swiftly migrate to the Macro-level when one considers what the Bologna Process of higher education reform in Europe calls the "social dimension," and certainly the prime reason national higher education systems produce student-level data is precisely what Giloman means by monitoring.

As for terms: we will find some difficulties with the most basic terms of student histories, and these difficulties are reflected in the data reported by national ministries. Even when the 27 countries of the European Union report to a central international organization, Eurostat, according to a manual of rules and definitions (UOE 2005, 2007) designed to minimize distortions of data, not only are they inconsistent in observing the rules, but frequently live by their own definitions. Eurostat calls all of its rules "recommendations," knowing full-well that not all reporting countries can observe the exact letter.

Probably the most critical definition is that of higher education itself (known, internationally, as "tertiary education"). The definition is embedded in the ISCED taxonomy advanced by

UNESCO. We will spend some time on the ISCED system and its problems in Section 6 below, but at this point it can be noted that ISCED draws a line between programs that are "postsecondary but not tertiary" and those that are higher education, using criteria such as purpose, length, and enabling (in terms of subsequent education) features of the program. ISCED Level 4 programs are "postsecondary but not tertiary," and award credentials that are not considered degrees. ISCED Level 5 and 6 programs award degrees, from the level of our associate's degree to the Doctorate.

Right away, one notes a problem with the definition of "beginning student." In the United States, we call them "beginning *postsecondary* students," and include ISCED Level 4 in our own national accounting. But the United States does not report ISCED Level 4[14] data for purposes of international comparisons. It is not clear that other countries (Canada, Korea, Russia, and Japan, in particular) exclude *de facto* ISCED Level 4 students from any data category when reporting to the core international organizations. OECD itself has noted this problem in the case of Canada whose higher education enrollment data is judged as "inflated" (see *EAG 2008*, Annex 3, p. 26).

Beyond that problem lies the way beginning students are defined. We say that the student has never before been enrolled in an institution of higher education. The Netherlands defines a beginning student as a first time enrollee at a particular institution (even though the student may have attended one or more institutions in the past[15]). In fact, there are three kinds of beginning students (*instroom*) in Netherlands' data: (1) the student is enrolled once in the same institution; (2) the student is enrolled twice in the same *type* of school but in different institutions; and (3) the student is enrolled in the same institution, but in a different program from the one in which the student began. The Italians, on the other hand, are very careful to say that they count only those who are entering the university system for the first time (*immatricolati per la prima volta al sistema universitario*), specifically excluding those who enter after interrupting studies or finishing another program (*interrotto o concluso un altro corso accademico*). Chaos reigns, at least in the European numbers, when Eurostat advises countries that cannot produce data on truly new entrants, to use "the best substitute available" (UOE Manual, p. 17). The upshot: lack of comparability of entry rates.

[14]In the United States, ISCED 4 would cover non-degree programs of trade schools, which remain in our national data reporting system so that their students may be eligible for Federal financial aid. Even though a measurable portion of community college students are not seeking degrees, they are all counted as higher education students under the ISCED system, generating an obvious distortion in comparative accounts.

[15]In fact, in the *hogescholen* sector, 18 percent of entering students had previously earned another bachelor's degree. When they earn a new degree, are they counted again? It's not clear.

And the effects of these variable definitions for "first time" are reflected in reported data, e.g. Statistics Canada cannot tell us precisely how many beginning students there are in the Canadian system; the UK's Higher Education Statistics Agency presents tables for first time students in 2006 that add to either 328k or 455k, depending on how you read them (HESA 2006) while the UK's Department of Innovation, Universities, and Science reports 281k (DIUS, 2009), and Eurostat shows 463k for entering students in the United Kingdom. All four of these numbers depend on who is being counted, and as what. For the Australians, there is a 30 percent increase in the gross number of "commencing" students when internationals are added to domestics. At a certain point in these inquiries, dizziness sets in.

As for our core questions: perhaps it's not so much a matter of the questions we ask, rather of the questions we *should* ask?

Why do we compare national student-level histories? One doesn't hear this often, but in a world that has moved beyond economic borders, our tertiary students are headed into the same labor market, whether cooperatively in place and time, or in cyber-commerce or cyber knowledge-production. International mobility is a fact of life in advanced post-industrial democracies—and you don't have to leave your desk to be mobile. Should not we desire some benchmarks of our students' level of preparation for this economic order?

At present, we have half-measures of human capital. Think about it: when one looks across tables measuring educational attainment in a range of countries there is no substantive reference point. Or, as the once popular song asked, "is that all there is?" As Barro and Lee (2000) might put it, these measures do not account for "the skills and experience gained by individuals after their formal education," nor do they offer any insight into the knowledge and skills actually obtained at different levels of schooling. And if you don't have these, what convincing measure of human capital *do* you have? In the Age of Twitter, our understanding of human capital has advanced beyond Gary Becker's enthroned 1964 formulation, though there are too many education analysts who cling to the original formulations as rigid dogma. We should now know too well that there are caps on human capital effects.

Should we also not want to have some benchmarks for the inclusiveness of higher education systems everywhere? We would ask for measures of inclusiveness not because educational attainment is one of the component variables in socioeconomic status and its analogues, hence plays an important role in social research, but because most advanced post-industrial countries are extremely conscious of their geodemography, demographic projections, and at least verbal commitments to their citizens. As Schneider (2008) observes, when comparative questions are asked in social research, one too frequently finds very different reference points for education variables, hence very cloudy results. So she sets forth some sophisticated methodological questions: which of the various measures we use "displays the highest predictive power relative to the country-specific measure?" and which of these measures "shows least variation across

countries in terms of loss of relative explanatory power?" (p. 4). When it comes to policy objectives of including traditionally under-served populations, these are critical questions to guide both national planning and the provision of opportunity to learn.

3.1 So just where *do* we stand?

Our rhetoric assumes a direct—and, it seems, exclusive—correlation between education and national economic health and status, as if nothing else matters. Common sense says otherwise. In fact, as DeLong, Goldin, and Katz (2003) demonstrated, the higher a nation's average years of schooling, the less education contributes to productivity and productivity growth, but the historical evidence is fragmentary and complex, and the jury is still out. It may be sobering to take a moment and consider other factors bearing on comparative national economic health in relation to the education benchmarks we use. In other words, put the issue of our world standing in the context of the dominant economic argument for higher levels of higher education participation and completion: we will stimulate economic growth; we will be more economically competitive; our economic future is at stake. It's a conceptual weave of the mutual-dependencies of education and economic vitality.

In that light, consider the World Economic Forum's *Global Competitiveness Report 2008-2009* (Schwab and Porter 2008). In a composite indicator of "competitiveness," the United States ranks #1 out of 134, followed by Switzerland, Denmark, Sweden, Singapore, Finland, Germany, the Netherlands, Japan, and Canada (all but Singapore are OECD countries). At the top of the development chain are "innovation-driven economies," and when the 134 countries are ranked on this score, the United States is, again, #1. The *New York Times* ran a short piece about the Global Competitiveness Index in its business section (October 8, 2008), but otherwise no major U.S. daily publication outside of the electronic business press noticed (as opposed to media in the United Kingdom, Brazil, Ireland, China, Japan, Norway, and Korea). Maybe we just don't want to know that a respected multi-national survey comes up with a positive image for us.

For our purposes, what is more important about the *Global Competitiveness Report* is first, its definition of "competitiveness," to wit:

> *"the set of institutions, policies, and factors that determine the level of productivity of a country,"*

adding a linked set of sequences that flow from productivity: "sustainable level of prosperity" and "rates of return on investment" that, in turn, drive growth rates (p. 3).[16] Second, what follows from this conceptual nest are 12 "pillars" of the Global Competitiveness Index, of which "higher education and training" is only one (others include labor market efficiency, financial market sophistication, and technological readiness). How does the GCI rank us in higher education and training? Fifth, behind Finland, Denmark, Sweden, and Iceland (not exactly large, diverse, and growing populations). And what are the components of that ranking? Enrollment (but not completion) rates, "the quality of education as assessed by the business community," and "the extent of staff training" to ensure "constant upgrading of workers skills to the changing needs of the evolving economy" (p.5). However incomplete this indicator might strike us, it is more substantive than simple accounts of the proportion of different age groups that entered tertiary education or completed tertiary degrees.

With not much effort, the reader can tell that arriving at a competitive economic position in a global environment involves a great deal more than higher education, starting with infrastructure and macroeconomic stability. In reviewing the *Global Competitiveness Report* and focusing on its "market efficiency" pillar, Guest (2009) attributes the U.S. ranking, in part, to American consumers, who not only spend more than others, but are more willing to experiment with what they buy and provide sufficient feedback to manufacturers and service providers to improve products and services. The illustrative case is the Ipod, which started as a clumsy device, and with the public giving Apple sufficient grief to provoke redesign and a subsequent global hit. The connection between these traits and the degrees we award is, at best, oblique.

Guest also reminds us that U.S. firms spend a lot more on R&D than those in other countries, whether that work is outsourced or not. Here we find a solid connection to higher education, but only at the top of the research university chain. Looking at cutting edge technologies in cloud computing or genomics, for example, the firms involved all cluster around the knowledge-generating university centers, and work closely with them. These regional clusters, as Reichert (2006) has pointed out, are dependent for the degree of their competitiveness not merely on their R&D environments, but also on "business environment, human resources and skills base, demand volume and accessibility of the region" (p. 11), let alone government leadership in facilitating and supporting the linkages of these components. So, yes, the quality of the knowledge workforce and knowledge centers is a major component of competitiveness, but it does not stand alone.

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[16]It's not merely a case of "country," rather locations within countries that offer both attractive cultural and social life, policy support for enterprise, and concentrated flows of information and capital that make a difference. As Michael Porter (1990) exhaustively demonstrates, there is a significant difference between "competitive advantage" and "comparative advantage," with the latter now rendered less convincing in our global economy. "Merely using the resources available, or assembling more resources, is not enough for prosperity" (p. xii).

4. Serious Business I: The Economic Nexus

We asked some basic questions before, but purposefully left the most poignant phrasing and explanation to lead off a more focused treatment of our economic assumptions, and to anchor our consideration in Barro and Lee's (1993 and 2000) analyses and insights:

> **Why does academic policy-support research try to measure comparative educational attainment?**
>
> Because it wants to reach some confidence in the relationship between national (public and private) investment in our principal human capital institutions (schools and colleges), and both economic outcomes and social change. Reaching that confidence, however, is not an easy task, because "human capital is multifaceted and includes a complex set of human attributes, and the stock of human capital held by individuals is hard to measure with precision in a quantitative form. Educational attainment is at best a proxy for the component of the human capital stock obtained at schools" (Barro and Lee 2000, p. 3). Put another way: even if comparative higher education attainment is a somewhat diminished engine of economic understanding, we nonetheless reach.

Barro and Lee (1993) built a data base covering 129 countries over a 25-year period (1960-1985), and first demonstrated that models of the relationship of human capital to economic growth differed significantly in developed versus developing nations, with the assessment of the latter hobbled by lack of data and instability in legal institutions, fiscal policy, monetary policy, and trade. Barro and Lee's estimate model is something they call a "perpetual inventory method." They take census or survey accounts of education attainment as "benchmark stocks," and entrants at each level of schooling as "flows that are added to the stocks with an appropriate time lag" (p. 3). This is a more sophisticated version of the "virtual population ratio" presentations one sees in OECD data, and that are examined in Section 8 below.

The Barro and Lee approach results in first, an estimate of participation at each of three levels of schooling (none, primary, secondary, and higher) that is then is qualified by completion ratios at each level, i.e. completed higher, did not complete higher. In other words, they combine access and attainment on the same continuum. In addition to participation, Barro and Lee also determined median years of schooling for the population 25 years and older (which means that the range extended beyond working life), but they were bothered enough by "years of schooling" as an indicator that their 2000 revision took account of estimates of those repeating grades (below the tertiary level) and changes in school duration within countries, e.g. changes in mandatory attendance years at different levels. This kind of adjustment will come into play in 2012 in Germany, when pre-collegiate time contracts from 13 to 12 years in a majority of the German states (*Länder*). One could say that, in country X, 80 percent of the age-relevant population has completed secondary schooling while in country Y, only 60 percent has

completed, and country Y looks worse. But if country X requires only 3 years of secondary school, while country Y requires 5, the results are more ambiguous.

More to the point, Barro and Lee are very explicit about the fact that content and quality are missing from educational attainment data. Years of schooling are meaningless without measures of their content. Participation and completion rates do not describe the distribution of knowledge and skills. If one wishes to make the connection between education and productivity, they stress, one needs measures of "other aspects of human capital" such as "numeracy, logical and analytical reasoning, and various types of technical knowledge" (1993, p.5). Indeed, beyond years and levels of schooling is a Hanushek and Kimko (2000) analysis, with which Barro concurs: "scores on international examinations—indicators of the quality of schooling capital," particularly in science and reading (well, the former would be highly improbable without the latter) matter more (p. 23)—and that's what never could be accounted for in OECD and UNESCO population ratio data. Hanushek and Kimko call this "labor force quality," and that's what nations truly seek, hence the value in focusing on the content and competence-challenge of schooling and degree programs independent of the proportion of the population that has reached X years/level of schooling. We may talk, in the United States, about "doubling the numbers"; other nations talk about doubling the skill levels. We will return to this objective in our recommendations, though without reference to test scores.

In an unpublished 2001 paper, Barro justly argues that no simple relationship between education and economic growth can be isolated. High fertility rates, for example (such as that in the United States, Mexico, France, and Ireland among OECD countries), come "at the expense of growth in output per person," a perfectly common sense conclusion. When one puts fertility together with other variables, including education level, Barro concludes that "the ultimate effect of more schooling on the level of [national] output. . .is finite" (Barro 2001, p. 21). On the other hand, where increased schooling at higher levels (secondary and tertiary) carry weight is in affecting growth "by facilitating the absorption of new technologies–which are likely to be complementary with labor educated to these higher levels" (p. 22). In a counterpoint involving the same variables, Hannum and Buchmann (2003) concluded that technological advances have a greater effect on human capital investment, hence education, than vice versa. The relationship of tertiary education enrollment (however computed and represented) to Gross National Product/per capita were not very impressive across the 102 countries Hannum and Buchmann studied (p. 3). Even more broadly, however one measures educational expansion (numbers of students, public investment, etc.), there is a genuine question as to what comes first in the horse/cart relationship of economic growth and education.

How does all this fit into our critique of the way international comparative data on higher education are presented and used? First, because different methodologies that attempt to reconcile national conditions produce different assessments. Second, because the different assessments are pumped into statistical models of standard economic measures. Barro (2001)

found OECD *over*-rating tertiary educational attainment for Belgium, Canada, France, Germany, Greece, Ireland, Korea, Norway, Spain, Sweden, Switzerland, and the United Kingdom, and *under*-rating tertiary attainment for Austria, Italy, New Zealand, and the United States (pp. 39 - 40). When it came to arriving at the average years of schooling in its member countries, OECD estimates were higher than those of Barro and Lee's three-decade (1965-1995) data base for every single country on the list, sometimes by dramatic margins,–for example, OECD says 12.7 years for the Netherlands; Barro and Lee's data show 9.0 years; OECD says 11.2 years for Spain; Barro and Lee show 5.8. If such discrepancies cited were minor, we wouldn't worry about them, and would worry less about their role in human capital policy development.

This excursion will not attempt to adjudicate these discrepancies. There are some technical differences in OECD's methodologies and universe compared with Barro and Lee's, but these are minor, and should not result in data estimate spreads of the magnitude observed. Barro and Lee have provided a clear explication of their formula for determining average years of schooling (even though they do not favor this measure) as an indicator of national education attainment, whereas the OECD specifications are neither as straightforward nor as transparent. Another standard assumption of the economic role of education is that when one turns to personal effects, the more education the higher one's income, no matter what national economy in which one works and lives. But we have a large black box called "occupation" that stands between education and income, and, as Ganzeboom and Treiman (1996) pointed out, one finds distinct differences of employment status (hence, income) within the same occupation, and large between-country differences when one considers such common labels such as "self-employed" or "supervisor." Ganzeboom and Treiman's contribution to the way we think about our standard assumption was thus to open the black box to ask what "attributes of occupations. . .*convert* [author's italics] a person's education into income" (p. 212). To answer this challenging inquiry, their analysis of complex data sought "to maximize the *indirect effect* [author's italics] of education on income through occupation and to minimize the *direct effect* [author's italics] of education on income, net of occupation (with both effects net of age)" (p. 212). Their common-sense finding, that "occupations are somewhat more homogeneous with respect to education than with respect to income," is more than enlightening in considering attainment indicators, since attainment, accompanied by the content of education, limits the range of occupations into which individuals can move, and these limitations aggregate in national economies. This conclusion opens up the importance of examining not merely degree production, by field, but post-degree occupation, by field of degree—something we rarely see in international comparative data (though individual national ministries, e.g. from Australia, France, the Netherlands, the United Kingdom, and the United States) provide general employment status data by field of degree.

The reader should sense that the economic nexus for judging the educational topography of nations cannot be avoided in our judgments. Neither can the demographics.

5. Serious Business, II: The Demographic Nexus

The most under-rated and often ignored factors that should influence our presentation and interpretation of comparative international data are demographic. And the most important demographic data for higher education lie in the age distribution of national populations, current and projected. To grasp the basic facts of the case, let us walk through Table 6 for 29 OECD countries plus Russia.

The 30 countries are listed in order of gross population. All data come from the World Bank's 2008 World Development Indicators CD, and a comparison row for the United States drawn from our Census data (which, in its projections of the gross U.S. population to 2025, disagrees with the World Bank by a mere 9 million people—don't ask!). What should we see?

- The United States is the largest ship in the OECD harbor. To compare what does, can and could happen in this country with Denmark, Finland, Ireland, or New Zealand requires a considerable stretch of judgment—though that doesn't seem to prevent us (this essay included) from issuing judgments.

- Not only are we the largest ship, but we are on track to add more people over the next 15 years than any other OECD country—nearly three times what Mexico will add, over three times what Turkey will add, and 320 times what Finland will add. No matter what we do in education, as Barro and Lee would observe, our GDP per capita is headed south.

- Furthermore, the projected *percentage* increase in our population is impressive despite our size. Our 0.9 percent annual growth rate is tied with Australia for the 4th highest in this OECD universe, and is principally a product of above-replacement fertility (2.0 or higher) and net migration. Canada may have a higher net migration rate, but also evidences a much lower fertility rate. Mexico ties with us in fertility, but obviously evidences a negative net migration rate. So just in North America, we are looking at three different growth stories.

Table 6 isolates the population 25-34 years old and its projection to 2025 on the grounds that, as children of time in every country, this is the period during which the summative judgment of our educational attainment is normally pronounced, and, in contemporary discourse, nations are judged on how many and what proportion have been brought through the tertiary level.[17]

[17]This choice of age bracket to benchmark progress is supported by others, for example, the Swiss Federal Statistical Office (2006).

Table 6: Population Growth Rates and Projected Changes in OECD Countries and Russia

Country	Pop in	Pop in	Diff	Pct	2010 pop	2025 pop	Diff.	Pct.	Growth	Fertility	Net
	2010	2025		Difference	25-34	25-34		Difference	Rate	Rate	Migration
	(millions)	(millions)			(millions)	(millions)			2010 (pct)	2010	2010
United States	310.21	348.34	38.13	12.3%	42.45	46.59	4.14	9.8%	0.9	2.1	4.1
Russia	139.08	127.13	-11.95	-8.6	22.99	14.39	-8.60	-37.4	-0.6	1.3	0.4
Japan	126.59	118.34	- 8.25	-6.5	16.21	12.27	-3.94	-24.3	-0.2	1.3	0.4
Mexico	108.52	122.21	13.69	12.6	17.14	19.52	2.38	13.9	1.0	2.1	-3.4
Germany	81.83	79.17	-2.66	-3.3	9.72	8.96	-0.76	-7.8	-0.2	1.4	1.8
Turkey	76.52	87.95	11.43	14.9	13.13	13.63	0.50	3.8	1.2	2.2	-0.1
France	62.06	65.01	2.95	4.8	7.86	7.82	-0.04	-0.5	0.4	1.9	1.6
UK	61.29	64.54	3.25	5.3	7.77	7.99	0.22	2.8	0.4	1.8	2.1
Italy	58.67	57.31	-1.36	-2.3	7.14	6.16	-0.98	-13.7	0.0	1.4	2.6
S. Korea	48.87	48.75	-0.12	-0.2	7.56	6.47	-1.09	-14.4	0.2	1.1	-0.1
Spain	44.89	46.38	1.49	3.3	6.96	4.69	-2.27	-32.6	0.7	1.4	2.8
Poland	37.75	36.08	-1.67	-4.4	6.32	4.29	-2.03	-32.1	-0.2	1.2	-0.7
Canada	33.67	37.76	4.09	12.1	4.69	4.97	0.28	6.0	0.8	1.5	5.8
Australia	21.38	24.41	3.03	14.2	2.94	3.21	0.27	9.2	0.9	1.8	4.8
Romania	21.09	19.42	-1.67	-7.9	3.36	2.17	-1.19	-35.4	-0.5	1.3	-1.9
Netherlands	16.45	16.79	0.34	2.1	1.93	2.07	0.14	7.3	0.2	1.7	1.8
Greece	11.17	11.15	-0.02	-0.2	1.65	1.22	-0.43	-26.1	0.1	1.3	2.7
Portugal	10.71	10.69	-0.02	-0.2	1.62	1.18	-0.44	-27.2	0.3	1.4	2.3
Belgium	10.58	10.85	0.27	2.6	1.32	1.31	-0.01	- 0.8	0.2	1.7	1.9
Czech Rep.	10.21	9.99	-0.22	-2.2	1.59	1.11	-0.48	-30.2	0.0	1.3	1.4
Hungary	9.91	9.41	-0.50	-5.0	1.52	1.15	-0.37	-24.3	-0.4	1.3	1.0
Sweden	9.21	9.74	0.53	5.8	1.12	1.21	0.09	8.0	0.4	1.8	2.7
Austria	8.35	8.46	0.11	1.3	1.07	1.01	-0.06	-5.6	0.3	1.4	2.4
Switzerland	7.55	7.79	0.24	3.2	0.93	0.97	0.04	4.3	0.3	1.4	2.7
Denmark	5.46	5.53	0.07	1.3	0.63	0.72	0.09	14.3	0.2	1.8	1.1
Slovak Rep.	5.38	5.26	-0.12	-2.2	0.92	0.65	-0.27	-29.3	0.0	1.2	0.4
Finland	5.31	5.43	0.12	2.3	0.68	0.65	-0.03	- 4.4	0.2	1.8	1.1
Norway	4.76	5.19	0.43	9.0	0.58	0.69	0.11	19.0	0.6	1.8	3.4
Ireland	4.52	5.26	0.74	16.4	0.76	0.67	-0.09	-11.8	1.2	1.9	4.3
New Zealand	4.31	4.79	0.48	11.1	0.56	0.65	0.09	16.1	0.8	2.0	2.4
U.S. Rank	1	1	1	5	1	1	1	5	4(T)	2 (T)	4

SOURCE: World Bank: 2008 World Development Indicators.
NOTE: Where net migration data from the World Bank were Missing, they were taken from the Migration Policy Institute's data hub.

Net migration by age bracket is too variable to factor into existing populations (Le Bras 2008), but one can assume that most of these people are already in the pipeline to 2025. While we

can observe that the United States ranks first in numbers and fifth in percentage growth in this age group, the more interesting story for our assessment of international performance lies elsewhere. Why?

- In the 25-34 age group, 10 of the 30 countries will experience shrinkage of 20 percent or more over the next 15 years (Table 6). Russia, Spain, Romania, Poland, and the Czech Republic will see declines of over 30 percent! These are huge contractions of the denominator in census population ratio methodologies. They lead to a simple 4th grade math question: what happens to a fraction—hence percentage—when the denominator declines dramatically and the numerator is not threatened to a similar extent, particularly in light of the lagging impact of decline (Vincent-Lancrin 2008)? If these countries do absolutely nothing, the percentage of the target age group participating in tertiary level education will rise, and the percentage of the age group who have earned degrees will also rise. Austria illustrates the principle: the World Bank projects a 9 percent decline in the 25-34 year old population to 2025, while, separately, the Austrian ministry has projected a 5 percent increase in the proportion 18-21 year-olds entering higher education in that year (BMBWK 2005, p. 122).

- Conversely, countries with notably increasing denominators in this age group—particularly the United States—will witness declines in both participation and attainment rates unless they can increase participation and attainment by an amount exceeding the underlying population growth. In the case of the United States, that means we would have to increase our core outcome measures by at least 9.8 percent by 2025 just to remain where we are, irrespective of comparative rankings. There is simple math here, not madness.

The reader should begin to sense that population change is not necessarily constant from one age bracket to another, and a careful reading of tables will evidence considerable volatility in some cases. Demographic projections are always in motion. Famines, tsunamis, and wars that result in involuntary migration are not regular events. Fertility rates, mortality, ageing models, etc. are perpetually in flux (Preston, Heuveline, and Guillot 2000), so that a number one reads today can change in a few months. To anticipate such variations, the U.S. Census Bureau always offers three levels of projection—high, middle, and low—each based on a different model of the core variables.

To assert that demography is important for planning in higher education everywhere is an understatement. While the table in Appendix C hones in on the 25-34 age group, planners with details of the provision of schooling on their minds instinctively ask about younger age groups. For example, Eurydice and Eurostat (2009) offer critical data concerning projected changes for the 10-14 age group (the age of beginning momentum toward tertiary level education) in the

European Union to 2020. The 27 EU countries will see a 14.9 percent decline in the population of this group from its 2000 level, with only Ireland and Spain showing significant increase (11.4 percent and 9.5 percent respectively), bare increases in the Netherlands and Denmark, and everyone else in free fall (40+ percent in Poland, Romania, and Bulgaria). European fertility rates may have ticked up in 2009 (Marcu 2009), but that has yet to save the day for future assumptions.

Let's get these data straight, too:

If 35 percent of our current 42.45 million 25-34 year-olds hold a bachelor's degree (15 million) and the population of that age group is slated to rise to 46.6 million by 2025, then we need 16.3 million bachelor's degrees—1.3 million more than at present—in that age group in 2025 just to stay at 35 percent. This should not be a difficult task. It translates to an average of 87,000 more bachelor's degrees a year over 15 years, or 5.4 percent more than our current annual production of 1.6 million. Our current rate of increase, according to NCES, a factor of simple population growth, is about 50,000, leaving a net of about 37,000 for that extra annual effort. Other countries with declining population bases will have an even easier time raising the proportion of their populations with degrees comparable to the bachelor's.

Every percentage point difference in the estimate of the bachelor's degree attainment rate of our 25-34 age population translates to roughly 470k degrees, or about 31,300 per year. If our primary concern is keeping up with the declining Joneses of this world, then we will have to raise our census proportion target to, let us say, 40 percent, and produce another 156,500 (5 x 31,300) bachelor's degrees annually beyond simple replacement at 35 percent. If our primary concerns are with the quality of the additional degrees to be awarded and the inclusiveness of the population to whom they are awarded, then it may be wiser not to battle the declining Joneses for the sake of a comparative population ranking, rather to fulfill our own goals for equity and accountability for student learning.

In reporting and comparing participation and attainment ratios, the international organizations such as OECD and UNESCO most commonly use a labor force age bracket of 25-64. To illustrate the distortions that such an approach generates, consider two cases: Spain, where no less than three major structural overhauls of the country's educational system took place during the lives of the current 25-64 year-old population, and with more changes to come in Spanish higher education's transition to Bologna Process degree cycles (Ortiz 2008); and South Korea, where the Korean War basically declared "school is out!" from 1950 - 1953, "school is imperfectly in session" until 1960, technical junior colleges will open in 1964, and higher education is a limited phenomenon until the 1980s. Hence, the older age bracket within the 25-64 year old markers for Korea naturally shows a much lower tertiary participation and completion rate. The neglect of basic history in analyses of time series attainment such as

those of Spain and South Korea (e.g. in Hauptman and Kim 2009) is unfortunate, and this judgment can be extended to time series data from any country that, at some time in the past half-century, emerged from dictatorship or experienced war on its own soil—8 of the 30 OECD members.

National traditions also interact with age to produce different bulges in participation and completion rates. The question of when students enter higher education, illustrated for 20 OECD countries in Table 7, requires context for judging what appear to be considerable variations. Across Scandinavian countries, one notices higher percentages of older beginning students. These are largely the result of both screening by entrance examinations and a habit of taking some "gap years" after secondary school leaving and prior to tertiary entrance. For Finland, for example, only 40 percent of secondary school graduates qualify for immediate entrance by examination. As Kilipi (2008) observes, "most [Finnish] students have to take one or several gap years before they can continue in tertiary education" (p.274). In Germany and Austria, all 18 year-old males are required to perform either six months of military service or 12 months of civilian service, and that obviously will push up the proportion of students starting out at age 20 or above (though, as previously noted, the German case will change in 2012, when the number of years of pre-tertiary schooling declines*)*. Ireland and Portugal both have special provision for support of students entering higher education at age 23 or older, and while these provisions don't seem to affect the distribution of entering students' age for Ireland, there is an obvious bump up for Portugal (which shows 26,151 students enrolled under these provisions in 2007-08). The French data for entering students in 2007-08 (*nouveaux bacheliers dans l'enseignement supérieur*) are referenced to those who passed one of the *baccalaureat* examinations in 2007, a proxy for truly first time students that misses older beginning students, but the age distribution is provided only for those entering the university sector (and the age brackets do not match those used by Eurostat).

For all planning, higher education authorities require actual numbers, not population growth adjusted percentages, and actual numbers in terms of the origins, geography, and social characteristics the students of the future are likely to be. Every national authority needs to establish planning parameters in terms of likely foreign students and their countries of origin, domestic students by region and regional population density (e.g. isolated rural, a major concern of all advanced democracies bent on increasing access), and age bracket (particularly in light of lifelong learning agendas). While some national data series offer these numbers, we have yet to construct a meaningful comparative scaffolding for the realities they represent.

Table 7: Beginning First Academic Degree Students for 20 Selected OECD Countries, by Age bracket, 2006

Country	Total N	15-19	20-24	25-29	30+
Austria	41,234	33.5%	52.6%	8.5%	5.5%
Australia	234,175	53.7	27.4	7.6	13.0
Czech Republic	69,251	35.4	46.3	6.8	11.5
Denmark	36,354	6.8	63.2	14.0	15.9
Finland	49,874	25.3	47.6	10.7	16.3
France	308,397	82.1	N.A.	N.A.	N.A.
Germany	341,639	21.0	64.6	10.1	4.4
Greece	65,053	63.5	13.4	13.1	10.0
Hungary	90,285	38.0	33.5	13.2	15.2
Ireland	24,746	75.8	15.7	4.4	4.0
Italy	334,650	61.1	21.0	14.8	0.0
Japan	617,850	91.2	3.1	Low N	Low N
Netherlands	115,540	55.5	31.6	4.7	8.2
Poland	491,411	42.3	46.2	4.9	6.6
Portugal	69,983	49.4	25.1	10.0	15.4
Spain	223,566	63.3	23.1	6.8	6.8
Sweden	84,086	17.7	50.3	12.6	19.4
Switzerland	34,536	19.6	53.6	11.3	15.5
United Kingdom	462,921	58.2	21.1	6.5	14.2
United States	2,657,338	58.3	22.1	6.6	13.0

Notes: (1) Both the Austrian and UK data include 20 year-olds with the 15-19 bracket. (2) Volatility could be illustrated in the case of Spain, where, within one year, first-time students increased by 32 percent, with the proportion over 25 rising from 13.6 percent to 24.5 percent of the total. (3) Data for France unavailable from Eurostat, so taken from MESR sources for 2007. Age distribution available only for university sector. (4) Australian total enrollment figure from the ministry. (5) Rows may not add to 100.0 percent due to rounding and minor “unknown” percentages.
Source: Eurostat. http://epp.eurostat.ed.europa.eu/protal/page/portal/education/data/database

6: Serious Business III: ISCED, a Misconstructed Classification as Scaffolding

Some would demur that we have a scaffolding for our more general tasks of comparative presentation of national education systems in a classification taxonomy, ISCED, the International Standard Classification of Education. Very well, but think about the nature of classification. As Ganzeboom and Treiman (1996) point out, classification is (at least) a two-stage operation. The first stage is empirical: you gather all the phenomena under consideration, drill down to cases that illustrate what the labels for those phenomena represent, and begin to move the pieces around on the basis of "what goes with what." It's more of a challenge than factor analysis. Then, as the authors put it for occupations (but it applies to degrees and academic programs as well), the empirical objects are "recoded into measures of a more manageable size and . . .relevance" (p. 202). The International Standard Classification of Education, ISCED, however, was not derived so empirically, though perhaps it should be (see Schneider [ed.] 2008).

For all its faults, there is no way around ISCED, and no question that the faults are in process of being corrected principally as a result of its misconstruction and misapplication in tertiary level education. The correction is being driven even more by the Bologna Process in Europe, under which 46 countries are converting all previous tertiary education credentials to a three cycle structure that we, in the United States, know well: Bachelor-Master-Doctorate. Bologna countries that offer "short-cycle" degree programs (comparable to our associate's) may think of them as part of the bachelor's, but report them separately.

ISCED is designed to account for and to facilitate reporting of those who are in the educational system. It is not designed for a description of the educational attainment of entire populations, in school and out-of-school, so when considering participation data and its social dimension (under-served populations), ISCED is not much help. The current version of ISCED classifies all education in six levels, with Level 6 reserved for the Doctorate, and Level 5 for *all* other higher education programs. ISCED has evolved with a wilderness of auxiliary criteria and sub-categories, some of which are applied in different ways by OECD, UNESCO, and the EU's Labor Force Survey. It is widely acknowledged that ISCED 5, the core of higher education, easily wins the confusion prize. The principal problems lie in placing bachelor's and master's degrees in the same category (5A), which then gets broken up by an auxiliary criterion of length of program, and, in some countries' interpretations, by program orientation (academic or occupational, phrased in ISCED guidelines as "theoretical" or "professional"). The second complexifying criteria at ISCED level 5 derives from an overall principle of orientation in the ISCED system, namely, the varying "destinations" of students completing a given level program. One side of the destination criterion means "access," i.e. qualification to proceed to another

ISCED level. Another side seems to mean residual behavior, i.e. if the program (at the secondary or higher levels) does not qualify you to move on, then you go to the labor market. It is assumed by ISCED that all 5A degrees provide access to level 6, the research/doctoral. That clearly is not the case.

Another problem at the level of ISCED 5A is that of what we would call first-professional degrees (e.g. law, medicine, dentistry, etc.) and what might more broadly be conceived as degrees in the regulated professions in other countries. While medicine, for example, is universally recognized as a long degree in a regulated profession, it is treated as a first degree in most other countries, whereas we treat it as a second degree. Law is also treated as a first degree in other countries, though it is a shorter program than medicine. For us, it is a second degree. In neither case do we consider the degree on the same level with an ordinary U.S. master's degrees—yet that is the way the ISCED system classifies them.

The sorting at ISCED 5 begins at a level labeled 5B. As noted at the outset of this essay, we can think of 5B as a home for our associate's degree programs. Level 5B means short-cycle (less than 3-year credentials) some of which qualify one to move on to destination 5A and some which do not (hence leave a residual to the labor market). But in order to make such a distinction, one would have to classify each discipline's programs in a country, and nobody would pretend to take on that task. Yet there is no question that some 5B credentials do not provide access to 5A. In the United States, an Associate of Applied Sciences (AAS) degree in HVAC (Heating, Ventilating, and Air Conditioning) is definitely not a transfer degree, and similar examples can be found in Japan, Canada, and among the French 2-year BTS (*Brevet de technicien supérieur*) programs.

The UOE Manual (2007), with instructions for data reporting, offers a set of reference points and decision rules so complex that countries can wind up reporting the same phenomena (entrants, completions) in different ISCED categories. First, a 'level' of education is broadly defined with reference to

> "the gradations of learning experiences and the competencies built into the design of an educational programme. Broadly speaking, the level is related to the degree of complexity of the content. . .This does not, however, imply that levels of education constitute a ladder. . .It also does not preclude the possibility that some participants in educational programmes at a given level . . .may have previously successfully completed programs at a higher level. (p. 83)

Well, obviously it's tough to generate unambiguous determinations of levels across diverse systems, so, in addition to typical program duration, the UOE Manual offers other proxy measures, including typical starting age, typical entrance requirements, future education eligibility for those who complete a program at a given level, and curricular orientation (occupationally specific or general). ISCED-97 also requires that 5A programs be a minimum of 3 years, provide entry to high skills professions or research activities, and staff the instruction with faculty holding advanced degrees. But then: "It is only by combining national degree structure with other tertiary dimensions. . .that enough information is available to group degrees and qualifications of similar education content" (p. 110). Those concerned with the content of degrees, particularly under the Qualifications Frameworks required of all 46 Bologna Process participating countries, must wonder what those "other tertiary dimensions" might be.

Are we all following this now? If so, we recognize, even after all these qualifications, that bachelor's and master's degrees are still in the same classification bin. ISCED's "solution" to this problem is to allow labeling of 5A degrees as 1st degree and 2nd degree, and to add the criterion of general duration of program (medium or long term) to the classification. In the days before the Bologna Process engendered a convergence of European practices, the upshot was illustrated by Figure 1, an extract from UNESCO's *ISCED 97* (pp. 113 - 116):

Figure 1: Pre-Bologna Degree Program Classifications in *ISCED 97*

Medium Term	**Medium and/ or Long Term**	**Long or Very Long**
Polytechnics (Finland)	CPGE (France)	Universitäten (Ger.)
Licence (France)	Diplôm d'ingenieur commercial (FR)	Master's (Australia)
Hogescholen programs (Netherlands)	Corsi de Laurea (Italy)	Shushi (Japan)
Candidatus magisterii (Norway)	Daigaku Gakubu (Japan)	Master's (Mexico)
Diplomatura (Spain)	Bachelor's (Mexico)	Nachdiplom (Switz.)
Bachelor's (UK)	University programmes (Czech)	JD, MD, etc. (US)
Bachelor's (US)	Kandidatuddannelser (Denmark)	

This is a strange collection, even for 1999, when the Bologna declaration was signed. The list includes distinct degree programs, classes of institutions (implying that all degree programs of the Finnish Polytechnics, Dutch *hogescholen* and German universities are to be treated the

same way[18]), and partial programs (the CPGE in France is a two-year, post high school preparatory program for high performing students on the way to the elite *Grandes écoles*, and classified by the French as a lower-level general tertiary way-station). Not all UK bachelor's degrees are 3-year (engineering and architecture, for example, are at least 4-year degrees). Not all German *Diplom* (the legacy university degree) are long term (5 - 6) year undertakings. One can instantly see the possibility for confusion when all of these degree programs are under the same classification umbrella. Where one has degree programs that require a prior ISCED 5A degree as a criterion for entrance, as do the U.S. first professional programs in law, medicine, dentistry, and veterinary medicine, they are not only second degrees, but degrees of a second magnitude. If the European medical degrees are classified as de facto 2nd degrees (even though they are the first degree earned), well, so should U.S. medical degrees. And how should Poland, which is now offering a post-bachelor's U.S. model medical program as one of its options for medical degrees, classify the credential awarded?

There is clearly internal pressure in the ISCED system to expand to 7 levels, and make a new Level 6 home to master's and first professional degrees (we will later argue for 8 levels). The new ISCED mapping,[19] program and qualifications-based, is expected to designate 5B as a shorter program, but will not require length of program as a determinant. Ambiguity will obviously remain.

7: Who Gets Counted, as What, and Why?

As previously noted, the UOE Manual (2005, 2007) is the recognized guideline for national statistical agencies in reporting higher education data to the core international organizations. We start out right away with another challenge. Eurostat's instructions and forms for the UOE data collection begin with a series of inquiries to responding country authorities as to whether there have been any changes of a significant order compared with the previous year in:

- The education system of the country itself, for example, the disappearance of short-cycle degrees in Austria as a by-product of Bologna Process reforms.

- Coverage of the data collection, for example, if programs—such those of private providers—are now included or excluded.

[18]Among the national systems in this study, Austria, Finland, Germany, the Netherlands, and Portugal are all *officially* "binary," that is, there are two types of institutions—universities and "universities of applied sciences" (sometimes called polytechnics)—in each. There are also some *de facto* binary systems, but that subject is best set aside.

[19]OECD's INES group has indicated that the target release for the revised ISCED will be 2011.

- Methodology, for example, if a template from a national longitudinal study (based on a sample) is projected on full census data.

. . .and, if so, to indicate which of the core UOE surveys were affected, and which ISCED levels were affected (with estimates of percentages or absolute numbers). So, does Eurostat keep a cumulative record of the nature and frequency of reported changes? Eurostat personnel say no. Without a record of reporting changes, and even in light of Eurostat instructions on how to deal with shifts from legacy to Bologna degrees (Mejer 2006; Eurostat 2008), it is difficult to explain volatility in reported data, e.g. from the Czech Republic for first cycle (bachelor's) degree awards between 2000 - 2006, including a 37 percent increase in degrees between 2004 and 2006, though OECD makes special mention of this Czech phenomenon in *EAG 2008* (p. 79). One might have added an even more dramatic 102 percent increase in the number of bachelor's degrees awarded in Finnish universities between 2005 and 2007 (the number of degrees awarded in the larger polytechnic sector remained stable during those years), the result of the last steps of change-over to Bologna degree cycles.

A second rule of note applies to beginning students and is embodied in instructions for "Annual Intake by Level of Education and Programme Destination." The responding national statistical agency is instructed to provide data for

- "Total students enrolled, of which
  - New entrants
  - Re-entrants
  - Continuing students

and

- For new tertiary entrants, of which
  - Previous education at the other tertiary level [5A, 5B]
  - Without previous education at the tertiary level "

Is the distinction between "new entrants" and "re-entrants" always observed? No, as OECD acknowledges for Ireland and Switzerland in those little-read footnotes (*EAG 2008*, Annex 3, pp. 19-20). And how many countries will count, as part of their completion rate, students who move from ISCED 5B to ISCED 5A programs (common in the case of the French DUT degree and the UK's Foundation Degree—cases where the national statistical agencies report continuation rates[20])? Does Eurostat know? No. This is a question analogous to community college/4-year

[20] 22 percent for the DUT (MESR 2007, p. 185), and 54 percent for the Foundation degree (Higher Education Funding Council for England [HEFC] 2008 http://www.hefce.ac.uk/pubs/hefce/2007/07_03/default.htm).

transfer rates in the United States, a not exactly unimportant measure of system efficiency. But in the EU, as an Austrian Ministry's statistics official remarked, within country transfer (permanent or temporary) "doesn't draw the same interest in official data as does international mobility."

Lastly, there is the matter of graduates. Basically, in UOE reporting, "graduates" are whatever a country says they are, students who meet criteria for "successfully completing an educational programme during the reference calendar year" (p. 18). Does "successfully complete" mean the award of a credential? In so many words, maybe: "a successful outcome should result in certification which is recognised within the educational system and the labour market" (p. 18). Does that allow for traditional intermediate credentials? Is the Swedish Diploma counted for "graduation," and if so, as what? Is the Canadian "college post-diploma" counted, and, if so, as what? In these cases, it's up to Sweden and Canada. Statistics Sweden puts its bottom line for undergraduate awards in 2005/06 very clearly:

> "59,100 degrees were taken by 53,000 individuals, which means that many students took more than one degree . . .The number of students graduated for the first time 2005/06 was 43,600, indicating that many students had a previous degree." (http://www.scb.se/templates/Publikation_198399.asp; received 12/7/2007)

One rarely finds national statistical agencies as open about this. The statement itself is a touchstone for the considerable variation in potential inputs to OECD, Eurostat, and UNESCO formulas and reportings.

The Swedish data indicate that there is an obvious difference between "graduates" and "graduations" (and, as we will see, "completions"), and the UOE Manual makes the reporting requirements very clear: no double-counting allowed for "graduates," but when students earn credentials in more than one program, each case is a "graduation," and the student can be counted two or three times. This issue turns up only when one examines comparative international data on degrees by field, an inquiry that lies beyond the boundaries set for this essay.

Some of the skepticism about comparative international data is justified by ambiguities and inconsistencies surrounding the question of just who is being counted. These turn up in both key categories of indicators—participation and completion—put forth by the international organizations that post the data. Here we begin to encounter "synthetic" or "virtual" population ratio methodologies and presentations. That is, instead of direct numbers of real people and percentages from individual national ministries and statistical agencies, the international

organization—be it OECD, UNESCO, or Eurostat—offers a proxy formula to represent what happens in tertiary education relative to a specific age bracket that is presumably common to all countries, but isn't.

We begin with an indicator that U.S. readers rarely see. It is a UNESCO product: the Gross Enrollment Ratio (UNESCO also produces a Gross Completion Ratio that is more problematic and is best set aside). The Gross Enrollment Ratio (GER) applies to all levels of ISCED 5 and 6, i.e. everything from associate's to Ph.Ds. It expresses the percentage of a country's population in a theoretical age-group for tertiary participation—generally, the first five years following the normative secondary school graduation age—that is actually enrolled in tertiary programs. One assumes that this definition excludes students who are—let us put it simply—visitors, i.e. they are not counted in a country's base population or in its student population. But it is not clear that this is the case. Such individuals (think "foreign students" or "non-resident aliens") could be in the numerator of the ratio, but not the denominator.

One also assumes that the numerator includes students enrolled in Open Universities in those countries which have them (e.g. the United Kingdom, Finland, Japan, Korea, Netherlands, Spain), but it is not clear that Open University students are always included in national data, so there is a genuine question of whether they are acknowledged in a GER. For example, in an otherwise very thorough Netherlands data system, the only information we have on this group is that there were 13,700 students enrolled in the Open University in 2008, of whom 5,100 were "first year," 9,400 studying for some kind of diploma, and that 36 percent came to the Open University from the *hogescholen* (HBO) sector and 16 percent from the university sector. After this initial count and portrait, however, we don't know what happened to them, nor can we tell if UNESCO picks them up in its ratio. On the other hand, we know Open University students are included in the United Kingdom's HESA Student Record system, so they are in all reports for at least publicly funded institutions of higher education.

In order to determine the GER, one needs a full and accurate census enrollment number, including all types of institutions, public and private, and all enrollment intensities, full-time and part-time. It is fair to say that not all countries can fulfill these requirements and not all countries fill them in the same way. For one key component of an enrollment ratio variable, part-time status, the author could find no data in ministry reports or on statistical agency Web sites for Denmark, Finland, France, Germany, Italy, Portugal or Spain. Do such students exist? We know from the *Eurostudent III* surveys (Orr, Schnitzer, and Frackmann 2008) that they are alive and well, we know from reports from other countries (e.g. Ireland, Netherlands, Poland,

Sweden, and the United Kingdom) and from Eurostat's perceptive account of four kinds of part-time students (Eurostat 2009, pp. 61-74) that they are a significant presence, and we know that if U.S. higher education did not embrace part-timers, our access rates would be miserable.[21]

A prime data problem in this regard is that the definition of a part-time student differs from country to country. A pan-European definition is beyond theoretical reach because the European Credit Transfer System (ECTS) has an insufficient history to allow for a uniform calculation. The part-time student in Sweden is a one-course per term student, however many credits that involves, but the Swedish one-course student, responding to the *Eurostudent III* survey question, "Which description best fits your current status as a student?" will respond "full-time." How else would one explain the *Eurostudent III* datum that only 7 percent of Swedish students are part-time (p. 50) when Ministry data show over 20 percent are *kursstudenter* (Statistics Sweden 2006)? In Poland, part-time ("extramural") means more than 60 percent but less than 80 percent (Dąbrowa-Szefler and Jabłecka-Prysłopka 2006, p. 25). In the United Kingdom, the empirical average for part-time students is in the range of 40 to 60 percent of the full-time load (Boorman, Brown, Payne, and Ramsden 2006). *Eurostudent III* (Orr, Schnitzer, and Frackmann 2008) took a different approach to part-time status by asking students how many hours in a week they spent on classroom activities, personal study time, and paid jobs, then defined *de facto* part-time any student who spent 20 or fewer hours per week on academic matters. By this criterion, for example, roughly 20 percent of Austrian students and over 30 percent of Finnish students are part-time (p. 52), though 100 percent in both cases claimed formal full-time status (p. 50).

How (and whether) part-time students enter UNESCO's GER remains an open question. Comparability also depends on the definition of the academic/calendar year. UNESCO says that calculations since 1998 have been on a calendar year basis, but most countries' education statistical systems are constructed with academic year brackets.

The problems with the GER are evident in its very definition. Counting total tertiary enrollments, from short-cycle to doctoral, i.e. ISCED 5B through ISCED 6, and setting that against an age group that, in most countries, is confined to the 18-23 or 19-24 age brackets, produces

[21]The UOE Manual's instructions for data collection doesn't help all that much in providing a definition of part-time status. Basically, it sets a 75 percent of full-time load as a ceiling, but extends that ratio to a full-year of instruction, and includes under part-time, "a student who is *expected* [author's italics] to be in the programme for less than the full school year" (p. 38). One naturally asks how a national reporting agency can identify student enrollment status by "expectation"?

Table 8: UNESCO 2007 Gross Enrollment Ratios (GER) and Tertiary ISCED Distribution for Selected Countries

	GER	Percent ISCED 5B	Percent ISCED 5A	Percent ISCED 6
Australia	75	16	81	4
Austria	51	9	84	7
Belgium	62	51	47	2
Canada	NA	NA	NA	NA
Czech Republic	55	9	85	7
Denmark	80	13	85	2
Finland	94	0	93	7
France	56	25	72	3
Germany	NA	NA	NA	NA
Greece	91	35	61	4
Ireland	61	29	68	3
Italy	68	1	98	2
Japan	58	23	75	2
Korea (South)	95	36	63	1
Mexico	27	3	96	1
Netherlands	60	0	99	1
New Zealand	80	27	71	2
Norway	76	1	97	3
Poland	67	1	97	1
Portugal	56	1	94	5
Romania	58	1	96	3
Russia	75	20	78	2
Spain	69	13	83	4
Sweden	75	5	90	5
Switzerland	47	18	74	8
Ukraine	76	17	82	1
United Kingdom	59	22	74	4
United States	82	21	77	2

Source: http://statis.uis.unesco.org/unesco/TableViewer/tableView.aspx

artificially high ratios since older students are in the numerator, but not the denominator. The denominator in these cases is a “synthetic”; the numerator is not.

UNESCO tries to dilute the misrepresentation by offering a distribution of enrollments by ISCED level, but (a) that really doesn’t answer the question of who is counted, particularly when students attend more than one type of institution and when the multi-institutional combination

includes both ISCED 5B and 5A programs (in the United States, that combination would account for a *third* of traditional age students), and (b) plunges us right into the heart of ISCED fog, as the student who earns the bachelor's degree in the spring and enters a master's program in the fall is counted twice in ISCED 5A under calendar year reporting, and the criteria for ISCED 5B (length of program or occupational orientation) are inconsistently applied. In Section 11, this essay will argue for a different way of calculating and presenting enrollment data, but the reader should see what the current data look like, hence Table 8.

For two major countries in Table 8, Canada and Germany, the distribution is surprisingly unavailable. And if it is unavailable by UNESCO accounts then it must also be unavailable to OECD and Eurostat, since they presumably follow the same rules. Yet in both OECD's *Education at a Glance* and in Eurostat's on-line table generators, one can find at least a modified version of a GER for these countries. As our slang would have it, "Go figure!"

So how does the United States rate an 82 GER (4th highest in this presentation)? A lot of older students in the numerator. The same observation holds for countries were the median starting age for tertiary education is in the 23-25 range (Scandinavians, generally). For all countries on the list in which students change institutions during a single year, the student is counted twice in enrollment data (for United States, horizontal transfer at the four-year college level is not insignificant). Then you have the obvious phenomena of variable definitions of what is 5B versus 5A. Where we know there are established short-cycle degree programs (United States, France, United Kingdom, Japan, Korea, Ireland), we are generally not surprised at what we see for ISCED 5B. But the Netherlands has 55 experimental Associate's degree programs running, and UNESCO says they have 0 percent ISCED 5B enrollments (to be sure, enrollments in these new programs in 2007 were low, but that deserves at least a footnote). Portugal is a similar case (about five thousand candidates for the short-cycle *Bacharelato)*, though diplomas and not degrees are the dominant awards in about 250 short-cycle programs offered by both universities and polytechnics, while Belgium historically has classified more than half its tertiary programs as 5B.

Given the increased international mobility of tertiary students, let alone internal migration rates in advanced post-industrial economies, one of the most significant questions about who is counted center around those who are not native to the country and system at issue, and these now deserve our special attention.

7.1: Non-native Students: Who Gets Credit?

While the overall volume of students enrolled outside their country of origin is low world-wide at roughly two percent of all students, it is concentrated in a handful of countries, conditioned by language and ex-colonial relationships, and (with notable exceptions of Australia and Austria) higher at the master's, first professional (in the United States), and doctoral levels than the bachelor's (European Commission 2007, p. 77). Austria is a case where specific programmatic circumstances explain the volume: *Ausländer* comprise 18.5 percent of all enrollments, and nearly a third of beginning enrollments, principally as a by-product of (a) German-speaking students coming into medical programs from Germany and Switzerland, and (b) the draw of universities dedicated to the fine, applied, and performing arts.

How internationally mobile students are defined, and the differences they make in enrollments, major programs, and degree completions can be notable and meaningful in a particular country's data presentation. OECD has become increasingly sensitive to this issue, as a reader of *EAG 2008* cannot help but observing.[22] The UOE Manual offers two basic choices on this matter for data collection systems: country of "permanent or usual residence" and country of prior education (p. 15). Country of citizenship, it is advised, "would only be used in the last resort, and reported separately. . ." (p. 15), and OECD warns that definitions based solely on citizenship result in over-estimates. Nonetheless, Australia, Austria, the Czech Republic, Japan, Norway, Slovak Republic, Spain, Sweden, and the United Kingdom define international students by residence, and foreign students by citizenship. It's not clear which takes preference or whether a non-citizen resident is counted twice. One would add that nationality cannot be used as a sorting construct for international/foreign when there are large and long-resident immigrant groups, e.g. Francophone North and West Africans in France, Turks in Germany, Caribbeans in the United Kingdom and the Netherlands.[23]

The European Commission's data on international student mobility are particularly poignant when the question of how students from outside the country of study are credited when they earn degrees is raised. The country of origin may not know that the student has earned a degree for some years (if at all). In the meantime, the country in which the degree is awarded gets the credit. Under this accounting, the host country's population participation ratios "suffer" (because it cannot include foreign students in a numerator representing domestic enrollments),

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[22] *EAG 2009* (received after this essay was completed) has gone further, adding tables illustrating the proportion of population entry ratios and bachelor's-equivalent graduation rates accounted for by "foreign" students (see Chart A2.5, p. 53 and Chart A3.4, p. 68). These are welcome additions.

[23] Even so, Netherlands' education accounting defines *allochtonen* (essentially, minorities) as those with at least one parent born outside the Netherlands, and these, in turn, are divided by Western and Non-Western (Centraal Bureau voor de Statistiek 2004).

but its cohort survival rate gains. Too, countries that export a significant percentage of students "lose," while those that import "win"—at least when degree completion is the topic.

OECD simultaneously offers both the most constructive way out of these dilemmas and enough ambiguity to guarantee inconsistent application. The illustrative case: the group of students who are immigrants and permanent residents of a country, no matter what their current citizenship status. OECD basically says: you can count these students as if they were the same as domestic students or you can create a separate category for them if they received "their prior education in another country" (*EAG*, Annex 3, Indicator C3, page 13). Contributing countries can choose which fork in the road to take. For purposes of analyzing access, participation, and completion, "prior education in another country" would be a rather critical variable for societies with high net migration rates. In the matter of counting beginning students, administrative records are not going to show how much tertiary education non-natives had in their native countries prior to enrollment in the host nation. Austrian reporting makes this distinction very clear: at the bachelor's degree level, a third of Austria's "beginning" foreign students in 2005 were not true first timers. It is possible that other countries also make this distinction, but one would have to hunt through reams of microdata to make that determination.

In judging the performance of a national system—not against others but against itself (which is what really matters)—one needs to separate out those for whose preparation the system is not responsible from those for which it is responsible. And that means a decision rule in terms of how much of the"prior education" would be considered in sorting, a criterion OECD leaves open. Finland, the Netherlands, Switzerland, and Germany observe the "prior education" criterion.

Of these, the German data presentations are most revealing about the ways in which foreign student presence and degrees can be treated by international accounts. The Germans offer a very clear definitional line here that settles such questions (or should settle them): they distinguish between those "foreign" students (*Ausländer*) who earned their *high school qualifications* in Germany (a group that includes immigrants, refugees, and even third generation immigrant students who maintain their original national citizenship) and those who earned their high school qualifications elsewhere. The terms are *Bildungsinländer* and *Bildungsausländer*. So, for example, of foreign students enrolled at all levels in 2004/05, 59,678 (or 3 percent of all students) were *Bildungsinländer*, and 186,656 (or 9.5 percent of all students) were *Bildungsausländer* (DeStatis 2005, p. 35). As for German students enrolling in other countries (all levels) in 2003, we're looking at 61,782 or 35 students for every 1,000 native Germans enrolled at home (p. 39). One can see the questions remaining even after these lines are established: (1) are the German students enrolling in other countries included in the numerator of domestic tertiary participation ratios?; (2) are the *Bildungsausländer* included in

domestic population numerators for domestic attainment ratios ?; (3) are the *Bildungsausländer* included in both numerator and denominator for graduation rate data?

All the guidelines for convergence don't seem to make much of a difference in national data reporting. Table 9 presents a sample from national statistical agency and ministry Web sites that report enrollments and completions for non-native students. Obviously, even with these, the account is incomplete, but one can estimate that, in this sample of OECD countries, at the

Table 9: Categories and Proportions of Non-Native Students in Selected Countries

Country	Terms used for "Foreign" students[24]	Sector	Bachelor	Master	Doctorate
			"Foreign" Percentage of Enrollments		
Denmark:	Not of Danish ancestry	All	10.8	11.3	N.A.
France:	*Étranger*	All	10.5	20.0	38.9
UK:	Non United Kingdom	All	8.9	39.7	41.1
			"Foreign" Percentage of Graduates		
Germany:	*Ausländer*	University	10.6	42.4	N.A.
		Fachhochschulen	5.9	N.A.	N.A.
Netherlands:	*Allochtonen*	University	24.2% of all levels		
		Hogescholen	25.9% of all levels		
Denmark:	Not of Danish ancestry	All	9.5	10.4	N.A.
UK:	Non-UK Domiciled	All	12.7	52.9	43.2
Australia:	Overseas	All	26.3	57.3	24.2
United States	Non-resident alien	All	3.0	11.2	28.0

Sources: all data in this table are drawn from ministry sources of the countries listed, which can be found in Appendix B.

[24]"Not of Danish ancestry" aggregates sub-categories of immigrants and "descendants"; the Netherlands' *Allochtonen* aggregates sub-categories of Western and non-Western; and the German *Ausländer* is confined to those who earned secondary school credentials in other countries.

level of the first undergraduate degree (the rough equivalent of our bachelor's), approximately 10 percent of the student enrollments and graduates (though not in the United States) come from other countries. When international comparative indicators are promulgated, one needs clear rules as to where they go, particularly when population ratios are the preferred method—and to those ratios we now turn.

8: Synthetic Ratios and Virtual Cohorts

Indicators are the means for fulfilling the challenges set out at the beginning of this essay: out of complexity, they seek to tell a common story. They find ways to reconcile vastly different systems of accounting, cultural definitions, traditional national reference points, idiosyncrasies of institutions, and nuances of behavior through common templates.

The most preferred form for social indicator presentations is the census population ratio. These ratios—for tertiary education entry, participation, and attainment—are most prominent in OECD's *Education at a Glance*. Their apparent simplicity guarantees quotation in the trade press, the general press, and by policy-makers everywhere. Eurostat, on the other hand, is more likely to present absolute numbers for a topic, e.g. students enrolled in tertiary education. Most of what Eurostat labels as "indicators"—e.g., median age of tertiary students or share of women among tertiary students—are not really indicators unless one turns them into time series and presents relative percentage changes against a common benchmark. As soon as Eurostat raises the topic of participation in tertiary education by age bracket, however, one finds an indicator formula, with inputs from national statistical agencies.

Whatever their form, one has to emphasize that, with very few exceptions (the U.S. Graduation Rate Survey among them), those input data are estimates based on samples, and not on a full census. To its credit, *Education at a Glance* provides details on the national sources used in tertiary participation and attainment indicators, albeit in Annex 3, thus escaping the notice of most readers. Of the 17 OECD countries that employ national labor force surveys as their primary source for higher education information on these themes, 14 provide data on the nature and size of their samples, ranging from 15,000 to 300,000 households (see the on-line collection, "Supplementary Tables," in the folder labeled, "International Comparative Data: Supplementary Material," at www.ihep.org/research/GlobalPerformance.cfm). In this respect, they are no different in basic methodology from our Current Population Survey or American Community Survey.

That means careful sample design, refined with each iteration, and appropriate weights to replicate the population at issue. The accuracy of those design weights can be enhanced in a

"model-assisted approach. . [with]. . .a set of auxiliary variables for which the totals in the finite target population are known" (van den Brakel and Bethlehem 2008, p 5), but that is about as far as national statistical agencies will depart from traditional sampling and weighting methodologies. They are hardly novices, but hardly risk-takers, too. Age is one of the most prominent of the "auxiliary variables" used in the design weights and data estimates, though that doesn't mean that it is always used well. Why?

All the indicators to which we pay attention hinge on the definition of "age," and across the international organizations that build the indicators, we find a variety of terms and definitions for that reference point. For example, for presentation of entrance to tertiary education, Eurostat prefers the term, "notional age," defined for ISCED 5 as "the age of a new entrant who has started and completed all previous educational levels in the notional period for doing so" (Eurydice and Eurostat 2007, p. 47) So the notional ages of entry for European area countries are all listed as 18 or 19 (Turkey is 17), even though, as Table 7 above (page 36) demonstrates, the empirical age of entry varies considerably from that reference point. In a table presenting beginning students as a proportion of those at the "notional age," only those entering ISCED 5B or ISCED 5A programs for the very first time are covered (p. 47). That sounds fine until one remembers that 5A includes master's degrees, that (as we are advised by a footnote) re-entrants in Belgium and Ireland are counted as new entrants, and that, as Eurostat admits, "there is a ten-year median age span" in Europe for ISCED 5B students (p. 58). The tertiary entrance rates in this table range from 48 percent in Austria to 91 percent in Sweden, with counter-intuitive figures in between. It is hard to learn anything constructive from this representation.

Three types of population ratios are used in international comparative data on higher education:

- The census population ratio, a straightforward fraction in which the numerator and denominator are unmanipulated raw numbers of an unambiguous grouping, and the provider of both numerator and denominator is a nation's census.

- A synthetic age ratio, under which population groups are defined by age in relation to a given event, e.g. secondary-school leaving, receipt of a first-cycle (bachelor's) degree. The age assigned to the event is asserted as "theoretical.," i.e. in the nation at issue, this is the age at which, theoretically, the event occurs. The denominator is provided by the nation's census. The numerator comes from the national statistics authority and/or the ministry responsible for education, following the definitions and instructions in the UOE Manual.

- A virtual cohort ratio, under which population groups are defined by moving averages or sums of their behavior over time with respect to the phenomenon of interest, and the moving averages are those of "typical" (not theoretical) age bands.

We have already invoked a few census population ratios. The other ratios are more challenging. When we work through their formulas, from entry to graduation, our observation that age is the most significant demographic reference point in both the generation and presentation of comparative data is consistently reinforced. But one doesn't see the age reference points in tables based on synthetic ratios or virtual cohorts in *Education at a Glance* (though you *may* find them in *EAG's* on-line appendices).

Since very few countries sponsor longitudinal panels, i.e. de facto cohort tracking systems, the easiest calculations of completion rates, for example, rely on population-based measures. OECD defines "completion rate" as "the ratio of the number of students who are awarded an initial degree to the number of new entrants to the level *n* years before, *n* being the number of years of full-time study required to complete the degree" (*EAG 2008*, Glossary, p. 3).[25] Problem (and OECD acknowledges this later in Annex 3 of *EAG 2008*): there is no uniform length of a degree program in any of the systems whose data are presented, and, in the middle of the degree cycle transitions of the Bologna Process in Europe, a majority of those systems are changing lengths of degree programs. So what does one do? Create a weighted ratio, that is, the proportion of beginning students in 3-year programs who finished in three years, the proportion of beginning students in 4-year programs who finished in four, etc.? in five? etc. How would that be matched against another system that is all 3-year? All 4-year? etc. While the UOE Manual requires a weighted average for countries using a theoretical graduation age metric (p. 27), as a lead in to our recommendation for a better way to do this, it's advisable to ask these questions rhetorically because it is not clear who follows directions and who doesn't.

The established alternative involves a combination of "net entry rates" and "gross graduation rates," which proved to be messy, but was ensconced in comparative reporting until problems with full-time and part-time status and ISCED 5B versus 5A accountings began to require more footnotes than the calculations were worth. Perhaps in response, OECD moved from population ratios to virtual cohorts to determine a "net graduation rate." The definition is offered in the Glossary for *EAG 2008*: "Net graduation rate measures the percentage of persons within

[25]Given customary terminology juggling in international comparative matters, "completion rate" differs from "graduation rate" though it is related, with some variation, to "survival rate" (see pp. 19-20 above).

a virtual age cohort who obtain a qualification from a given level of education, thus being unaffected by changes in population size or typical graduation age. The net graduation rate is calculated by dividing the number of graduates at each single year of age, by the population at that age, and summing these over all the ages" (p. 9).

Let's see how this works, and set up a simulation for a "virtual age cohort." Imagine a country in which the empirical "typical" age of ISCED 5A first degree graduation is 26, and that the average notional time to complete the first degree is 4.5 years. Access rules were changed in this country in 2000 to the effect of bumping up the entering population, but the traditional-age population was shrinking so that the number of entering students started declining in 2002. By OECD's reasoning, these changes should not affect the net graduation rate. The country can demonstrate that 96 percent of the first ISCED 5A degree graduates in 2007 were between the ages of 24 and 33. Take those 10 years and see if Table 9 is what OECD has in mind (one can't really tell from the description in the Glossary to *Education at a Glance)*.

Table 9: Simulation of OECD's Alternative Formula for a Synthetic-Based "Net Graduation Rate" in an Imaginary Country

Age in 2007	24	25	26	27	28
Numb. of Graduates at that age	56,000	58,000	63,000	64,000	60,000
Population of that Age	146,000	148,000	155,000	157,000	149,000
Percent Graduates	38.4%	39.2%	40.6%	40.8%	40.3%
Age in 2007	29	30	31	32	33
Numb. of Graduates at that age	40,000	29,000	11,000	6,000	3,000
Population of that Age	146,000	144,000	148,000	151,000	144,000
Percent Graduates	27.4%	20.1%	7.4%	4.0%	2.1%

One can add all the graduates and all the age-specific populations in Table 9, divide, and come up with 26 percent. Or one can take all the ratios for each age year, divide by 10 and come up with 26.2 percent. Does it work? Yes, provided that the census is accurate for both graduates and population *by single age year*, and that all countries are counting the same kind of person.

However sound the simulation, there are bumps in this procedural road. Kaiser and O'Heron (2005) pointed out, for example, that "the broader the age range" used for the ratio, "the more difficult it is to get the data" (p.44). One might add that it is difficult to say what the results mean if the underlying age bracket dynamics differ between countries that experienced population spurts in the 1990s (Ireland), dramatic expansions of their higher education systems in the 1990s (Finland), or at least temporary contractions of higher education systems when tuition was introduced (Austria in 2001). Virtual age cohorts would neither smooth out nor explain the effects of these variations in the pavement. And how does a 26 percent virtual completion rate advise a nation's policy-makers and academic leaders? The number is empty and void, and calls for us to look away from current practices and toward indicators that might help nations actually do something to achieve their higher education ends.

9: Slouching Toward Future Data, I: the Role of Secondary School Structures and Processes

A continuing theme in judging international data on higher education covers the multiple paths through secondary school systems, some of which lead to higher education (and even within that broad category, to different kinds of higher education) and some of which don't, with those populations subsequently subject to lifelong learning analyses and potential later entry points through non-traditional routes (e.g., Assessment of Experiential Learning and bridge programs). In one sense, these are access issues, and bear on our judgment of opportunity for tertiary education in whatever country is at issue. Our considerations under both secondary school connections and inclusion have less to do with current international comparative data than with its future possibilities.

In another sense, these tracks should affect the way one judges the through-puts of the higher education system. Here we face an old observation: the more restrictive the lines of entry, the greater the likelihood that those who enter will complete. Japan offers the classic case: the entrance examination is the sound barrier: once broken, everybody graduates. The population ratios used by OECD thus do not reflect so much on a nation's effort in higher education as on a nation's gross education template, and in that template, the size and historical weighting of components of the national economy play notable roles in our interpretation. Germany is an obvious case: a manufacturing export-oriented economy that requires a large skilled crafts and mid-level technical workforce, hence strong vocational and apprenticeship sequences that do not lead to tertiary degrees. There is obviously nothing wrong with this in the context of the German economy in 2009. Given demographic projections and growth of the service sector, German needs will likely be somewhat different by 2025.

Then there are structural interactions that influence indicators at both secondary and tertiary levels, and are subject to the question Eurostat asks at the outset of the UOE survey: what has changed in your system this year? Consider the multi-tracked Italian secondary school system: *Licei* (academic), *Istituti Tecnici* (occupational: white collar), *Istituti Professionali* (occupational: skilled blue collar), and specialized schools for future teachers and artists. Prior to 2001, Italian secondary school students aspiring to be teachers were not required to be on the academic track. But in that year the law changed, and college degrees were required for entry to the teaching profession. Consequence: a notable redistribution of enrollments across the secondary school tracks (Cappellari and Lucifora 2007 p. 8), and, in time, a redistribution of fields in *Laurea* accounting.

This essay is not the occasion to examine comparative data on secondary education, but it is legitimate to ask, as a background reference point, how one might judge the dynamics of pathways through secondary education in terms of their effect on core tertiary education indicators? With that question, the ISCED classification system comes roaring back into the picture in assessing secondary school pathways and in determining the nature of what we might call the "qualifying population" for higher levels of education. There are three parallel sub-categories (read "tracks") at both lower secondary (ISCED 2) and upper secondary (ISCED 3) levels:

- General academic (A)
- Pre-vocational/technical (B)
- Direct vocational or technical ©

At both levels, direct vocational or technical programs (2C and 3C) are designed to lead directly into the labor market and out of the education ladder, though 3C can also open a path to a postsecondary-but-not tertiary step (ISCED level 4) and then to the labor market. At both levels, what are called "pre-vocational" or "pre-technical" (in the United States, these are known as "career and technical" curricula), are designed to lead to the labor market through an intermediate step, i.e. 2B leads to 3C to the labor market; 3B leads to 5B (short-cycle tertiary education) to the labor market. Once students are on the A track in lower secondary school, though, they stay on the A track right into university programs.

If only it were that simple. The European Commission uses a marker for "completion of . . . upper-secondary education" as the equivalent of a national goal, though applied, collectively, to 27 countries (EC 2007, p. 33). And what is "upper-secondary"? In order to reach the EU's goal of 85 percent completion, it is obvious that upper-secondary direct vocational programs are included along with the tertiary education preparatory tracks. Only 10 countries of the EU 27

had met the goal as of 2007, partly because in some countries (Czech Republic, Austria, Slovakia, Belgium, Netherlands, Slovenia, Finland, and Romania), the proportion of the age cohort enrolled in pre-vocational and direct vocational tracks is above 60 percent, and the direct vocational track (3C) is more likely to lead directly to the labor market than anywhere else.

Some of the data on 3C programs push us to consider contradictory information on tertiary enrollments, while other data on 3C reinforce our assessment of the current state of access. For example, if half the upper secondary students in Belgium are enrolled in ISCED 3C programs (p. 57), how does one account for the UNESCO's 62 percent claim of tertiary access (see Table 4 above)? So there must be some leeway in the interpretation of ISCED 3Cs. Barro and Lee (2000) are not as euphemistic: ISCED classifications, they write, "do not fully reflect the heterogeneity of education systems, in particular of vocational and non-academic educational training, across countries" (p. 18) That should be obvious.

The underlying question for international data comparisons focuses on the proportion of secondary school students who qualify to enter tertiary education under national rules, guidelines, and customs. All of these control the direct flow. The Dutch illustrate—and in an exemplary manner—with an "education matrix" of annual "enrolment flows" from every level of education, with tracks, from primary to university (Centraal Bureau voor de Statistiek 2007). The initial population of 1.6 million in elementary school flows forward, backwards, and out of the system at each level and within each track ("vocational stream," senior general secondary, pre-university, and vocational). The flow is further complexified in auxiliary tables that add in categories of special education and part-time status at each stop. Across all these flows, one watches not only the tertiary education "qualifying population" contract, but the potential for separate bins of non-qualifiers to be pulled back into tertiary education at a later point. Other countries offering three secondary school tracks (e.g. Portugal, with academic/general, technical, and vocational) could perform similar analyses. It's a variation on Barro and Lee's "perpetual inventory" methodology.

The German case adds another dimension to any nation's potential matrix-type analysis of flows from secondary into tertiary education, namely, that not all secondary school graduates who qualify for entrance to tertiary education actually enroll. For example, among *Gymnasium* graduates in 2000 who also passed the *Abitur* examination (that guarantees admission to higher education), 78 percent actually had enrolled as of 2005. The residual group constitutes another bin for second chance students.

The Swedish case also argues for second chance structures. Consider, first: of those born in 1985, for whom the highest level of schooling prior to higher education was:

Pre-gymnasium (lower secondary school)	14%
Gymnasium, <2 years	36
Gymnasium, =>2 years	12
Upper 2ndary <3 years	18
Upper 2ndary =>3 years	19

(Sveriges Officiella Statistik 2006, p. 6)

Of those who completed either any upper secondary program, 50 percent had enrolled in higher education by 2005/06; of those whose secondary experience ended in a Gymnasium, just under 40 percent had enrolled; of those who's pre-college education was limited to pre-gymnasium, only 10 percent had enrolled (p. 11). In light of these data—let alone the Swedish government's proposal to ensure that "50 percent of those born in any given years shall have embarked on university level studies by the age of 25" (Regeringskansleit 2005, p. 5)—how UNESCO comes up with a Gross Enrollment Ratio of 75 percent for Sweden, 90 percent of which are in ISCED 5A programs (see Table 7 above) is beyond imagination, even if one creates synthetic cohorts. That aside, what is more important for our purposes is to note that each of the non-participating populations comes with a different configuration of learning experiences, and Swedish strategy to bring some of these students into the tertiary system at a later point in their lives is adapted to the likelihood of those learning experiences. Some students will be recruited for community-based education bridge programs, others will be invited into a university on a provisional, part-time basis (these are called *kursstudenter* because, initially, they take one course at a time).

Then there are the national examinations. We could spend a few doctoral dissertations on them. Some are tertiary entrance (Finland, Portugal), some are secondary school leaving, some serve both functions. They are all subject-based, and none of them look like either the SAT or ACT. Examined carefully, they tell us what each national system considers "qualified" to mean, i.e. from their prompts, one can deduce the learning outcomes expected of secondary school graduates. In an international qualitative comparison, teams of subject matter experts could try to match and rank them by degree of challenge. One doubts such an attempt will ever be made, particularly given the number of language borders to be crossed and reconciled.

We are interested in the examinations for other reasons: how they work to sort and direct students within their national systems. For the most part, what we think serve as turnstiles to higher education are actually secondary school leaving exams. The French *Baccalauréate* is just such a case, but one in which there are three types of examinations, with distinct routes for subsequent education. Of the *Baccalauréate général* students, everybody continues to higher education. Of the *Baccalauréate technologie* recipients, about 75 percent continue, with a

plurality into ISCED 5B programs. Of the Bacc Series *professionelle*, only about 22 percent continue, with *Sections de technicien supérieurs* schools and their ISCED 5B credentials as their dominant destination (MESR 2008b).

The UK system, too, uses GCSE and A-level examinations in individual subjects as school leaving requirements, but the A-levels also serve to place the student in a priority line for selection to their universities of choice. In a plurality of European countries the entrance rules are comparatively simple: pass the exam and you can attend any institution you wish and in any field, subject to *numerus clausus*, i.e. seats available. The entrance process in the United Kingdom is both centralized and more complex. The student accumulates "tariff points" on a University and Colleges Admissions Service (UCAS) ledger, based on how many A-levels were passed and with what grades, courses taken in secondary schools, and other factors. UCAS then plays a pivotal role in prescribing the student's options.

The entrance process in Portugal is also centralized, but with the student expressing six preferences for a combination of institution and preferred field, selecting from a portfolio of national exams (ENES) those that are in harmony with the field, and from all that, plus a secondary school diploma, grades, and *numerus clausus* at the institutional end, selected appropriately. The Portuguese case holds further interest in that there is a clear line drawn for the qualifying population of secondary school graduates and their subsequent enrollment rates in tertiary level education (both ISCED 5A and 5B programs). By age bracket in 2001 (granted, these data a bit old for the task): 19 percent of graduates 24 and younger had enrolled in tertiary level education, 44 percent of those 25-34 years old, 46 percent of those 35-44 years old, and 55 percent of those 45 and older (Ministério do Trabalho e da Solidariedade Social 2006, p. 34). What this sequence clearly implies is that the older generations of "qualifying" students were not subject to the current more rigid selection process. The Portuguese case illustrates that, for purposes of time series in international comparative data based on "qualifying populations," one would have to take account of all changes in admissions policies and practices over time. This essay suggests that if we start tracking with two groups—the present traditional-age generation for "qualifying students," and the most recent past generation, e.g. 25-34 year-olds, of non-qualifying students—more distinct, consistent, justifiable, and reliable indicators of participation, mode or path of entry, and completion will emerge.

The sorting out of a "qualified" population is not a dichotomous affair. If nations are ultimately interested in a more equitable distribution of tertiary participants, let alone in increasing their numbers, the non-qualifying group divides by performance (European Commission 2004). Students evidencing low levels of literacy as teenagers are judged truly "disadvantaged," and require a different set of interventions than those who can later take advantage of second

chance options through preparatory year programs (Canada), bridge programs (United Kingdom), those community-based education programs leading to part-time provisional enrollment in Sweden, or through large-scale processes for recognition of prior experiential learning (the *Validation d'Acquis de l'Experience*, or VAE, in France). The latter groups can be counted and aggregated in an inclusion metric, something we don't see now, even in Eurostat's exemplary recent work on indicators of access by social background in Bologna-participating countries (Eurostat 2009)—and which is a great deal more instructive than census population ratios or virtual cohort markers.

So in a not surprising way, consideration of the sorting mechanisms of secondary education raises links to OECD's PISA (Program for International Student Assessment[26]) reading literacy scores. If a country evidences 20 percent or more of its 15 year-olds reading at the lowest levels on the PISA scales (basically, at or below the level of simple inference in the national language), then one should not be surprised at low ISCED 5 participation rates for traditional-age cohorts. In keeping with the spirit of cohort matrix history observed in Netherlands data, and Barro and Lee's perpetual inventory continuum that combines access and attainment at each level of education, these data should be part of a revised comparative tertiary access map. The reader will find a table indicating proportions of 15 year-olds in 20 European countries reading at the lowest levels of the PISA scale in 2006, along with de facto high school status drop-out rates, a notable step away from tertiary education, in our on-line collection of supplementary tables at www.ihep.org/research/GlobalPerformance.cfm.

Why raise the secondary school pathways topic in an essay on comparative higher education data? First, because it leads to suggestions for future indicators of (a) the volume of populations that fall out of the tertiary education qualifying bin, and (b) the proportion of those students later "recaptured" by each country's system through alternative mechanisms. Second, because secondary school pathways lead directly to the inclusion issue.

10: Slouching Toward Future Data, II: Looking for Inclusiveness

If we recall Barro and Lee's model of education stocks and flows, and reflect on the streaming functions evident in secondary education in many countries, there is no doubt that, as OECD itself has concluded, the population inequities we observe in higher education are a direct outgrowth of lapses and exclusions in pre-collegiate schooling (Santiago, Tremblay, Basri and Arnal 2008). When "eligibility opportunities" (p. 17) are restricted at pre-tertiary levels, the

[26] A standardized assessment program administered to 15 year-olds in participating countries, and with a battery including reading, mathematics, and scientific literacy.

effects are likely to be observed in tertiary education. What happens when higher education systems expand—and dramatically? Are previous exclusions overcome?

In an OECD country context, the jury is out on this core question, principally because (a) countries took on tertiary expansion from different levels of stock, (b) expanded at different rates, and (c) introduced alternative structures and processes for the provision of tertiary education (e.g. private institutions, part-time status, new classes of non-universities, procedures for recognition of prior experiential learning). These measures may only have moved inequities to another level. For example, in some countries, ironically (e.g. Poland and Slovenia), one finds discriminatory tuition for part-time students—full-timers attend free of tuition, part-timers pay. These charges are particularly ironic because part-time status is seen by an increasing number of Bologna-participating countries as a way to increase access for those previously in limbo.

Looking at the case of Italian expansion in both university locations (satellite campuses) and new degrees programs in the 1990-2000 period and their impact on participation and completion rates of the population 30 years old or younger, Bratti, Checchi, and de Blasio (2007) demonstrated a positive impact on access, but no effect on degree completion, with a tripartite social class variable (working class, petite bourgeoisie, and bourgeoisie) as the principal sub-group focus. From this classic class perspective, educational attainment was still an inter-generational phenomenon, governed principally by parents' level of education. As for the causal relationship, there is always an unresolved question of whether the expansion lead to increased access or whether increased demand forced the expansion.

If the Italians looked at participation (and completion) by social class, if the Netherlands records participation for non-Western *allochtonen* by first and second generation status (CBS 2004), the United Kingdom focused on combinations of race and socioeconomic status (SES) in a basic assessment (National Audit Office 2008) of the contributions of a number of public agencies to increasing higher education participation to 50 percent of the 18 to 30 age group, but moved beyond the standard nostrums of demographic analysis to a distinct UK approach in geocoding. Interestingly, for our purposes, the UK analysis excludes the effects of prior preparation, even though it recognizes "prior attainment is the over-riding determinant of entry to higher education," and that "many who do not participate in higher education do not value its benefits and instead opt for the identity, social status, and income derived from employment." (p. 16). Common sense.

What did the Comptroller and Auditor General find?

- Lower SES groups in the United Kingdom were significantly under-represented, whether identified by income or neighborhood participation (geocoding). But geocoding showed a higher rate of participation in the decade since 1998 for the most deprived neighborhoods and a notable narrowing in the gap with posh neighborhoods. Given the fact that SES was missing in too many cases,[27] one can suggest that geocoding is more effective than demographically-driven policy.

- Minority students are not only well represented in the aggregate, but more likely to enter higher education than white students. Black populations are under-represented among what UK calls "young" (20 and less) entrants, but "well-represented at ages 21-29," reflecting "later entry to higher education" (p. 14), an observation that again underscores the important of age distributions in the assessment of sub-group student histories.

- White students from low SES backgrounds are the most under-represented group and their participation rates remain static.

- In all this, while concern is expressed, no data are presented for "mature" students "from low participation neighbourhoods with no previous higher education qualification" (p.43).

As noted at the outset, the United States is not alone in seeking greater inclusiveness in higher education. Virtually all OECD countries look for under-represented populations, and devise strategies to increase their participation in higher education. The "social dimension" action line of the Bologna Process in Europe is focused hard on the mechanisms for increasing access, second chances, and alternative routes into tertiary level education. The definition and accounting for these populations, however, differs by world area, and sometimes, by country.

Historically, the principal participation concern of OECD countries was with the proportion of women in tertiary education, by ISCED level and degree program. Indeed, all presentations of data, both national and comparative, emphasize the gender variable. Increasingly, though, this topic is taking another turn: women are now the majority of just about everything everywhere (physical science, engineering, computer science, and technology fields excepted). We're all starting to worry about men, not as a proportion of enrollees (this is not a half-full/half-empty glass), but in terms of population participation and completion rates.

[27] An observation shared at a transnational level by Santiago, Tremblay, Basri, and Arnal 2008, p.21.

Of greater concern, but not in comparative data presentations, are sub-population categories singled out by national authorities, and, in this respect, others are not like us. Analysts of U.S. higher education generally confine their representation questions by income and race/ethnicity (and sometimes, by first-generation status). The reason for our concern with participation and completion rates for low-income students is fairly simple: there is a dollar sign on every college door, often followed by a substantial net price. In most other OECD countries (save Canada,[28] Japan, and Korea), this cost is not an issue since tuition is either free or minimal. One is not surprised, then, by high "access" rates in Finland and Sweden, for example, where tuition is an unthinkable concept. To the extent to which cost of attendance is an issue, it is focused principally on ancillary matters, housing in particular. *Eurostudent III* (2009) has well documented varying degrees of financial strain for current students across 21countries, with students working from 10-20 hours per week in 10 countries, and 20 or more hours in 3 others (p. 121). By U.S. standards, this degree of work commitment is low, but then again, we have a dollar sign at every door.

But the bottom line is that the majority of OECD countries do not focus on income to identify under-participating populations. In fact, they do not collect data on income in the context of tertiary education at all, and fragmentary data on other demographic features. The "social data" in Europe, in particular, come from sources other than the national agencies, e.g. the Eurostat Labor Force Survey (LFS), Eurostudent, and Luxembourg Income Survey (LIS), which is particularly rich with microdata but covers only 17 countries and produces data usually lagging by three years. As the Bologna Process Follow-Up Group on the Social Dimension and Mobility marked, there is no "comprehensive data collection [in Europe] on the social dimensions of higher education." (BFUG 2007, p. 19)

Race/ethnicity is justly a primary concern in the United States because of the size and growth of racial/ethnic minority populations—on track to become the majority population well before the end of the current century. We are a nation of immigrants, and continue to be; most others in OECD are not (Canada and Australia are stand-out exceptions). That should be obvious from the spreadsheet of Table 6. And we are a nation with a long-standing African-American population, swelled in recent years (depending on how one classifies these data) by immigrants from Ethiopia, Somalia, and Nigeria in particular. Over 60 percent of our projected increase in the 25-34 age group to 2025 will be Latino, a projection justified by what is already in the

[28]Tuition and fees at public institutions in Canada are determined by Provincial governments and range, for example, from C$2,786 at the University of Winnipeg in Manitoba to C$8,095 for engineering students at the University of Western Ontario. Students in Quebec attend free unless they fail either five general courses or seven vocational courses.

pipeline.[29] And with this, a notable Asian expansion (12.9 percent of the projected increase), and measurable additions from eastern Europe and the Middle East, comes a sizeable group of NNSEs (Non-Native-Speakers of English). The challenges we face for higher education inclusion of all these populations, in their varying characteristics, are both considerable and multi-faceted.

But all that does not mean we cannot learn from the ways in which other countries identify and target low-participating populations. Language, we know, creates reality as well as it reflects reality, and language in this case creates policy realities. Think, for a moment, with the way the Council of the European Union and the European Commission (2004) define "disadvantaged" in education? Unlike the US, there is no explicit mention of income, race/ethnicity (in France it is almost forbidden to identify anyone by race), or non-native speakers of national languages, rather

- "People with low levels of literacy or qualifications"
- "Groups living in disadvantaged areas or outlying regions"
- "People with learning difficulties or with disabilities" (p.27)

Students with disabilities are more of a mainstream, highlighted concern across EU countries than they are elsewhere in the OECD universe. But there are universal problems in comparative statistics, not merely in the definition of "disabilities," but also with self-disclosure. The Scottish Funding Council (2007), for example, notes that 9 percent of students in Scottish colleges and 6 percent in other higher education institutions disclosed a disability, yet of the number of students in special programs and those requiring "extended learning support" only half had disclosed either a learning difficulty or disability (p. 24). When one gets to this commonly-referenced social dimension, proxy measures will not offer convincing answers as to trends in improved participation.

The most intriguing and instructive of these definitions is the second,[30] because it leads to geocoding, and more than any other methodology, geocoding tell you precisely where to drive when you go out to fix a problem. One can observe its policy effects in Poland in the 1990s,

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[29] To compute the statistic, the reader can go to www.census.gov/population/www/projections, pull down the spreadsheets for each non-Hispanic race/ethnicity group where "combination" is indicated, add the figures for the 25-29 and 30-34 groups for each, first in 2010, then in 2025. Repeat for all Hispanics. Determine the changes, add the columns, and compute percentage. The author's result was 62.6 percent

[30] Australia, which also includes students from non-English speaking backgrounds and indigenous populations among its inclusion target, refers to isolated populations as "remote."

where private institutions were encouraged to open in isolated rural areas; and in Finland in the 1990s, when the higher education system increased by a third with the establishment of 11 new polytechnic universities (AMKs), some in areas that had never previously seen an institution of tertiary education.

In more urbanized environments, and in its most sophisticated formulations in the United Kingdom,

> "the full extent of participation inequalities is revealed by using neighborhood level geographies such as census wards. These show that there are broad and deep divisions in the changes of going into HE according to where you live.. . .Maps of local participation patterns—such as those presented through POLAR [a geocoding system now in its second iteration, POLAR2] . . .—reveal that many cities and towns are educationally divided. . ." (HEFC 2005, pp. 10-11).

The next level of zoom for this analysis is the postcode within the incorporated unit, and, though a lifestyle analysis program called MOSAIC, to housing types ("Council flats, low rise council, Victorian low status, Town houses and flats, Stylish single"–Ramsden 2007, p. 8). While we're sure community planners and sociologists everywhere could come up with local culture versions of this taxonomy of the built environment as a proxy for economic status, one doubts that an international standard-setting team could arrive at a consensus on a generalized version.

The various geodemographic analyses don't always mean that one will find what one expects to find. Scotland developed a "Scottish Index of Multiple Deprivation (SIMD) applied to over 6000 data zones (low income was one of the measures, but defined by tax bracket), and crossed this measure with an "Age Participation Index" to sharpen the focus for targeted interventions. When the Scots analyzed these phenomena by region, however, they concluded that students from the highest SIMD group are actually under-represented, whereas those from the lowest two quintiles of SIMD are "slightly over-represented." (Scottish Funding Council 2007, p. 21). But what Scotland teaches us for a more sophisticated analysis of low-income/low-SES participation is to make it relative to the distribution within geographic area. For example, take the SES distribution of Cook County, IL and match it against the SES distribution of those from Cook County attending/entering higher education. If 38 percent of the overall SES distribution is in the lowest quintile, and 36 percent of the higher education population is in the lowest quintile, for example, you have a relative match. If the proportion participating in higher education was 20 percent, it would be a signal of significant under-representation; 50 percent would indicate positive momentum in an otherwise under-represented group.

Not that analysts in the United States haven't tried geodemographics. But the closest they have come to the precision of POLAR or SIMD data zones (Noland, Davis, and Kelly 2007) has been the county as the unit of analysis, arbitrary weightings of components of "educational need," and a substantial ignorance of migration, which, in the United States, involves 15 percent of the population moving across county lines every year (Schachter 2004). What emerges looks more like a board game than a serious targeting of low-participation populations. Cook County would not, in fact, be a unit of analysis under the UK or Scottish methodologies.

In comparative data that identifies and quantifies low-participation populations for inclusion in tertiary level education, geodemographic analysis is appealing because it is built on relatively common definitions across borders. With the exception of levels of parental education (used by the Dutch ministry, for example, as proxies for social class), most of the other social category options—class and occupation for the most prominent examples— offer too much cultural variance. And none of the social category options, including race/ethnicity and second language dominance, tell policy-makers where to go when they jump in their cars to go out, analyze, and fix the problem.

In terms of current and future indicators of inclusion, there are a number of problems with social categories that push us toward geodemographic analysis:

1. Are we describing the student or the student's parents? If all potential tertiary students are traditional age, then we are describing parental characteristics. But in a number of countries one finds significant numbers of older potential students who are, in U.S. financial aid terms, "independent." In fact, most interventions to recapture those who did not qualify for tertiary entrance upon upper secondary school graduation are focused on older populations who would be "independent," carrying their own social and economic markers. To mix the two groups —parents of traditional-age students and older students themselves—clouds our analysis of the types of disadvantage that render populations "low-participating."

2. With the exceptions of race/ethnicity, first language, and parents' highest level of education, the standard socioeconomic characteristics we use are not necessarily fixed. The French, for example, employ a short taxonomy of parents' occupations as a proxy for degree of disadvantage (*défavorisée*) in their analysis of the "second chance" DAEU (*Le diplôme d'accès études universitaires*) program. One of those "occupations" is unemployed, with its here-this-year-gone-the-next status. And in the economy of 2009, we have plenty of unemployed professionals, nearly all of whom hold tertiary degrees, to pass

around. Portugal, on the other hand, sticks with parents' highest level of education, which, within each national context, is less ambiguous.

3. The same social characteristic may be an impediment in one country but not in another, or, depending on its mode and intensity, may actually be an advantage. The classic example is native language. A non-native speaker of the national language in country X may be a native or near-native speaker in country Y. And to the extent to which that non-native speaker is fully bilingual, not only are they at an advantage, but are likely to perform better in school.

4. Sources and completeness of data on social and economic characteristics are problematic except when they are unobtrusive. Geodemographic analysis is unobtrusive; everything else requires surveys, and is subject to non-response.

Our brief exploration of the social dimension of higher education is intended to prod national authorities to shape and agree on the types of data that can be rolled into indicators that cross borders with minimum footnotes. It is time to make some specific suggestions on this playing field.

11: Can We Fill the Spaces Between Numbers? Some Suggestions.

Smilla, with whom this essay began, was a mathematician, a talent that came in handy in rooting out mystery. But it wasn't merely a talent: her constant reflections on the spaces between numbers were schooled. In an icy maelstrom of an action drama, she could step back and ask what was learned from a continuous ratcheting up of apparent chaos.

So what was learned here? First, that there are three linked states-of-being for comparative social data of any kind: macro-economic, demographic, and communications. Of these, the communications environment is the driver of interest. Public, policy-support analysis, and policy-maker understanding is a snapshot affair. A single bar-chart with two sentences of gloss passes for definitive statements despite all the ellipses inherent in such presentations. The upshot is a world of cartoon-like propaganda. Policies and programs created on the basis of such shallow and often misleading information risk both unintended and non-consequences.

In terms of a bill of particulars, we learned that:

- We have a complex and imperfect system of comparative international data on higher education.

- National traditions and habits resist attempts at reconciliation by international reporting organizations.
- There is an obvious lack of coordination among agents of data gathering and reporting within the same borders, resulting in noticeable inconsistencies. Too many countries cannot track individual students, so wind up estimating true first-time students, participation, and completion.
- A majority of post-industrial democracies reporting higher education data under international protocols are in the process of considerable change in their underlying higher education structures, principally as a by-product of Bologna Process reforms, hence there is a good deal of volatility in the data observed.
- International reporting organizations have developed seemingly rational methodologies to lend consistent shape to data, but with results that are too often opaque.
- The published data tables and narratives in *Education at a Glance*, in particular, require enough qualifications to generate on-line appendices more voluminous than the document itself.
- Missing information, documentation, and explanations remain in *EAG* even after all the appendices and footnotes. While these are available through personal contacts and inquiries, it shouldn't have to be that way.

So what might be done? Recognize, first, that some of the following issues are already being addressed by the international reporting organizations, which are increasingly conscious of existing shortcomings and lapses, and are increasingly challenged by analysts who read their tables, glosses, and footnotes very carefully. That said, there would be three objectives in reconstruction:

1. Simplicity, hence transparency. That means putting everybody on the same scales and observing the same definitions. National agencies that do not observe the definitions should not see their data reported for the indicators in question. No more ambiguity, no more latitude, e.g. a "graduate" is whatever the country wants it to be. No more "notional" age, when age is such an important demographic variable. Systems should have (and many of them do) empirical age data for entering, enrolled, and graduating students.
2. Condensed comprehensiveness. This objective sounds like an oxymoron. What it means is putting all information necessary for interpreting a table in the table itself and not in half-accessible appendices. Tables should be stand-alone creatures. They are duplicated, after all, and distributed at policy meetings as single pages without footnotes, or (more commonly) they are extracted on

PowerPoint slides, again, without footnotes. So, for example, if *EAG* is presenting a table of cohort survival rates, it should make room for a column indicating the precise number of years for which the cohort in question was tracked, and provide explicit time-markers, i.e. beginning year, censoring year.

3. More meaningful indicators. Attainment rates mean nothing without their social dimensions, i.e. categories of inclusiveness. Participation rates mean little without a filter for the *qualifying* population and a clear definition of "qualifying," and, as Kaiser and O'Heron (2005) note, our existing measures do not identify the types of access and participation pathways in play. Age and gender distributions, the current "social dimension," are easy and traditional, but do not address the nature or location of the populations with which all nations are most concerned. And, as the Bologna Process in Europe has demonstrated, simple attainment is no longer the exclusive feature of interest when the topic of the content of degrees is raised.

Indeed, the Bologna Process looms as a powerful driver of reforming comparative higher education data. Bologna is the largest and most ambitious restructuring of higher education ever undertaken, moving, since 1999, across 46 countries, and affecting 4000 institutions and 18 million students. From its inception, Bologna has been bereft of student-level data, a disappointment recognized at virtually every biennial meeting of the education ministers of those nations, for student histories will constitute the ultimate measures of success of Bologna's core reforms. Their participation, progress, attainment, and subsequent mobility and labor market status will be the primary arbiters of a decade's efforts to bring convergence to the tertiary systems of Europe. And the degree to which these measures can be joined by non-European OECD countries would produce a new class of comparative indicators that will carry more meaning than the population ratio and virtual age cohorts we now stumble through.

But population is still a governing feature of comparative analysis, particularly in light of aging societies and shrinking youth cohorts. As Yonezawa and Kim (2008) point out, higher education institutions in Japan and Korea have already experienced excess capacity (pp. 204-205), and other systems are sure to follow. What does one do with excess capacity, the by-product of system massification? Japan has merged some of its public universities, and the projections for Korea estimate the closing of roughly 100 HEIs by 2020. Other countries might respond to similar pressures with aggressive recruitment and support of foreign students, subsidies for domestic students to continue to 2nd and 3rd cycle degrees (Japan and Korea, as Yonezawa and Kim demonstrate, currently evidence very low rates of continuation from bachelor's to graduate programs), and/or adding programs to recapture, at later points in their lives, students who originally did not qualify for tertiary entrance, i.e. become more inclusive.

Traditional data reporting and indicator construction will not shed light on policy decisions addressing these dramatic changes. Other indicators are necessary.

The Bologna Process Follow-up Group in Europe recognizes the same pressures in light of an aging Euro-population and a shrinking traditional-age pool for higher education. The response goes beyond lifelong learning mantras, structures, and processes to the challenge of preserving "solidarity between generations." (BFUG 2008. p. 13) As for lifelong learning itself, the statement is worth italics because it reinforces the emphasis of this essay on the need for data marking inclusion by recapturing low-participation populations at later moments in life:

> "Widening access and diversifying the body of learners are objectives that are met through the implementation of student centered learning and *through flexible learning paths connected to qualifications frameworks and to recognition of prior learning. . .* This will entail a mainstreaming of lifelong learning in institutions of higher education and will call for changes in the legislative framework. . ."

One doesn't achieve such objectives without data guidance, and beyond the default reporting of entrants, enrollments, and completions for the new Bologna distribution of degree cycles, what the Bologna countries need for evidence non-Bologna countries also need. Call them "non-standard indicators." They are included below, among our more discrete suggestions:

ISCED. We know that this system is under review and reconstruction, but enter a plea here for the following gradations in tertiary education (obviously including new categories):

Level 8:	Doctoral
Level 7:	Long-cycle professional (e.g. medicine) and post-baccalaureate first-professional
Level 6:	Master's and post-baccalaureate certificate programs
Level 5A:	First cycle degrees, i.e. bachelor's or their equivalent
Level 5B:	Short-cycle degree programs

Schneider (2008, pp. 319-322) also proposes 8 ISCED levels, but in a far more complex framework with two or three subcategories at each level except the Doctoral/Advanced Research. Our recommendation argues against clouding the task with program duration, program orientation, or institutional type, particularly within the 1st cycle. Both national ministries and international comparative reporting organizations have enough difficulty with existing sub-categories. Dividing space by space yields darkness. At the same time, though, we must acknowledge that ISCED is, in fact, a ladder that assists in the construction of other policy and

program-relevant indicators that we do not see now, e.g. rates of cohort progression from one rung to the next. Call these "penetrability" indicators (see below).

Participation and Inclusiveness. Neither Gross Enrollment Ratios nor census participation ratios are as instructive for policy purposes as setting the denominator to students who completed upper secondary school in the country at issue, and by "completed" is meant "was awarded a diploma" (Portugal does this now, and by age blocks). Call this the basic qualifying population, as it is the population for which the education system of the country is responsible. It includes academic track, general track, and vocational track upper secondary students. It can be divided by traditional and non-traditional routes (a bi-modal presentation). Once this basic system responsibility metric is established, one can create derivative indicators by high school track and by national examination status (where these exist). One can also establish virtual age blocks, e.g. 20 - 24, and, within them, social dimensions, to illustrate the changing volume and nature of the qualifying population. One then asks, "of the qualifying population, what proportion enters short-cycle degree programs and 1st cycle degree programs (a) immediately following qualification and (b) within [let us say] three years?" That should be simple, clear, and without footnotes. The qualifying population then becomes the core of cohort histories.

The second virtue of a "qualifying" flag is that separate analyses can be presented for non-qualifying students, thus opening up the potential for data that capture the extent to which they enter the tertiary system at later points in their lives, a critical piece of both the inclusiveness objective of the social dimension of higher education and lifelong learning objectives.

In fact, participation is the primary category under which inclusiveness data can and should be set. Given the various definitions of low-participation populations observed in the literature and policy documents of OECD countries, it is suggested that each country develop (if it has not done so already) education participation data for the following:

- isolated populations, a concept requiring agreement on a geodemographic definition;
- students with disabilities, a concept requiring agreement on a clear set of parameters;
- resident ethnic minority populations, divided as appropriate (Western and non-Western in some countries, Asian and non-Asian in others, and bi- or tri-modal combinations that include Caribbean or Latin American in still others) as well as indigenous minority (applicable in the United States, Canada, Australia, and some Scandinavian countries);

- parental education levels, set as tertiary, upper-secondary, and less than upper secondary;
- family income by quintiles.

—and then negotiate final common parameters. Australia, for example, has used isolated populations, indigenous populations, and students with disabilities, and set targets for each group, first in terms of access, and then in retention and completion against the rates for their opposites among higher education students, e.g. the retention rate for isolated rural students should be at least 90 percent of that for "metropolitan" students; the completion rate for indigenous students should be at least 90 percent of that for non-indigenous students (Bradley *et al* 2008, p. 45). Ireland has also set "participation targets," though expressed in terms of percentages of the undergraduate population, for students with disabilities, "mature" students, and those from "lower socio-economic groups" (National Office for Equity of Access to Higher Education 2007, p. 13). Though it does not set targets for minority group participation, the Netherlands would face *at least* tri-modal reporting for its *allochtonen* since its largest minority group consists of Dutch-speaking Caribbeans from Surinam and the Antilles (Wolff 2003). The data gathered under these dimensions should look ahead toward time-series indicators so that nations can map rates of improvement in access to tertiary education.

Other categories are more difficult. Even if nations agreed on occupational categories, for example, they would be applied to the parents of traditional-age students and to older students themselves, and placing those two groups in the same bin holds no logical water. So one could not use a category such as "mid-level professional" without leaving a trail of ambiguity.

Cohort Tertiary Histories. Many of these are born of Bologna objectives for increased flexibility in higher education systems. They include what this essay calls "penetrability indicators," i.e. measures of student movement from one tertiary ISCED level to another.

- Continuation from 1st cycle to 2nd cycle degrees (in U.S. terms, from bachelor's to graduate degrees), by field, and type of institution. Germany does this now (see Minks and Briedis 2005, p. 85), and the author's work with ministry data reports suggests that Canada, France, Japan, the Netherlands, Switzerland, and the United Kingdom provide at least some of the requisite data, and could offer a full portrait. So can the United States with some minor modifications to the Baccalaureate and Beyond longitudinal studies. When European countries moved from long first degrees to the bachelor's + master's cycle, the question of whether students would move directly from the new bachelor's degrees into the labor market or maintain their previous longer-term study vision but parse it out

over two degree levels became critical to assessing the effects of the degree-cycle reform. If the master's degree is becoming the new standard end-point for basic tertiary education, we want to know where that is happening and in what fields. A February 2009 *Flash Eurobarometer* special survey showed half of current bachelor's candidates across 31 countries intended to continue directly to Master's programs (Gallup Organization 2009, p. 45). Change of field from 1st to 2nd cycle degrees, along with international mobility (1st degree in country X; 2nd degree in country Y) add texture to the basic datum.

- Continuation from short-cycle to 1st cycle degrees in national systems that offer both. Three data points constitute the story: completion of the short-cycle degree, continuation to the 1st cycle, and completion of the 1st cycle. France can offer these data now for the DUT, the United Kingdom for the Foundation degree, the Japanese for Junior College "new graduates," and the United States for the associate's. Canada, Korea, and Portugal should all be in line to do the same. We may call this phenomenon "transfer," but the story it tells is one of vertical penetrability.

- Accounting for non-traditional points of entry and progress in national systems. This is a difficult territory, as it covers entrance and enrollment volumes through bridge programs, special preparation-year programs, recognition of prior experiential learning, open universities, provisional status, etc. These are all catch-bins for those who either were not in the qualifying population at the time it was defined or who had entered tertiary programs but left without credentials at an earlier point in their lives. National systems willing to use this indicator of flexibility and (potential) means of inclusiveness would have to agree on the contents of a single bin of reporting.

- As a by-product of all of the above, along with an irreconcilable range of practices in accounting for entering students, the author suggests dropping all indicators that label "first time" tertiary students (except in true cohort completion rate indicators), and replace it with "first year" students at the degree level in question. There are simply too many national variations on "first time" to yield coherent data.

- Of lesser priority are accounts of change-of-institution, change of sector (where applicable in binary systems), and change of major field during students 1st cycle degree history. The data presentation of the Dutch ministry (OCW 2007) indicates that the raw material is present; one finds cross-sectional estimates in

Germany (Heublein, Schmelzer, and Sommer 2005) that hint at the ability to produce this information; and we know that U.S. longitudinal studies can produce data for all these attendance pattern features. Why pay attention on a comparative basis? These are all measures of student mobility internal to national systems.

Degree Quality: It is suggested that, when tables of attainment or graduation rates are presented by the international organizations, a column should be added to indicate whether the country in question has implemented (not "thinking about it" or "working on it") a qualifications framework for its degrees. QFs do not guarantee the quality of degrees, of course, and do not necessarily spell out every benchmark a student must reach to qualify for an award, but they do mark a degree of quality assurance by the national system. One recognizes that, in some countries (Canada, the United States) the national authority does not possess the authority to adopt a degree qualifications framework, and in still other countries (Korea) the majority of institutions of higher education are private and beyond the reach of ministries. Nonetheless, whether we judge them as meaningful statements or not, national degree qualifications frameworks have now been adopted and "self-certified" by seven OECD countries (Australia, Denmark, Germany, Ireland, the Netherlands, Sweden, and Scotland and the England/Wales/Northern Ireland separately) and others are sure to follow, in part because it is a Bologna Process requirement in Europe.

Program Delivery: At the present moment, data on the nature, extent, and sources of eLearning in tertiary education are minimal and chaotic. To assess the international penetration of these technologies, someone out there, with the primary sponsorship of OECD and UNESCO, should organize the national ministries to gather and present data on the order of:

Number of programs conducted entirely by eLearning technologies;
- by degree level; institutional type; and disciplinary field;
- with total student enrollment in those programs;
  - by urbanicity of student location;
  - by age of student;

Number of institutions or consortia offering discrete courses by eLearning technologies;
- number of courses offered by degree level;
- number of courses offered by disciplinary field;
- volume of enrollments (this will not be a headcount)

The search for comparative distance education data, though, would not be undertaking merely for the sake of evaluating broadband access. The author would wager that it is also one of the measures of inclusion, since it offers both isolated populations and working adults who may have been by-passed for tertiary opportunities to advance their educational qualifications.

One could continue, but these suggestions, the author contends, would add measurable meaning to comparative indicators, and provide much needed assistance to higher education planners everywhere. That would be a start.

The United States is not exempt from reform. We are part of the convergences suggested here, too, and could present a much clearer picture of what we do in higher education with some basic changes in the ways we shape and report our data. Some of these are obvious and won't take much to execute; others are more radical. In a very politic phrasing, it is suggested that we consider:

- Submitting only *system*, and not institutional, graduation rates based on our Beginning Postsecondary Students longitudinal studies, and not worry that we produce such data only every 6 years or so. Rather a full and honest accounting that lags the day than a current but distorted half-account. This account can be divided by enrollment intensity: full-time, part-time, and mixed.

- If we insist on submitting graduation rates only for full-time students who earned their degrees at the same four-year institution at which they began, then (a) cut out all associate's degrees awarded by those institutions as completion markers, and (b) develop and submit a separate accounting for part-time students.

- At the present time, the United States is one of very few countries that does not present an age distribution for entering students. We can do it on the basis of the sample in the Beginning Postsecondary Students longitudinal studies, and if we are confident of what we see of it in annual IPEDS enrollment reporting, there is no reason for holding back.

- In what would be a major overhaul of our data, re-scope all sub-baccalaureate populations by program status. What does that mean? At the present moment, for example, all our entering community college students are assumed to be degree-candidates. They are not, and everyone who has worked over community college data knows that. So, our annual IPEDS survey should ask all institutions that award associate's degrees to report entering and enrolled

students as either workforce development certificate candidates (for an ISCED 4 ledger line), wholly remedial/ developmental education students (for an ISCED 3A ledger line), non-degree continuing education students (ISCED 4), and degree-candidates (ISCED 5B)[31]. Then, for international comparative data, submit only the ISCED 5B population for purposes of entering, enrolled, and graduating calculations. Other countries' institutions devoted to short-cycle degrees generally do not house non-degree candidate populations. Our community colleges are compared unfavorably with them when the putatively tertiary population is diluted by other missions. There is nothing wrong with those missions: they just don't belong in international comparative data on what is recognized as higher education. Filter the population as indicated, and the United States will find its enrollment ratios down and its graduation rates up. Surprise?

What did we *not* cover in this essay?

It is obvious, first, that this essay focused almost exclusively on what we, in the United States, would call "undergraduate" education data. Graduate and research-oriented data are both important and certainly part of comparative international, but including them would leave readers even dizzier than they are after all the undergraduate variations, knots, contradictions, and dead-ends have been elucidated. In Smilla's terms, they are still the spaces between stones, and subject to another lengthy exposition. The same judgment can be levied on the topics of faculty, finance, and governance.

But one missing topic is worth more than passing reference.

As part of the American rhetorical bad-news bent, we also like to compare numbers and percentages of students in other countries studying and earning degrees in (a) engineering, and (b) scientific fields. We do this to stir competitive juices, too, and as a leverage point for increased funding of STEM programs and students. It should surprise no one that we are not the only country with this interest.

[31]The author would go much further, and set a threshold of more than 6 additive credits attempted in the first calendar year of attendance for a student at any level to be reported as a beginning student. One-course-good-bye students might be classified and tracked in a separate category, as the Swedes do.

But we do not examine carefully what fields are aggregated under "engineering," or how the various sciences, applied sciences, and technology fields are treated in data systems other than our own. OECD and Eurostat may issue rules for data submission of field distributions (Andersson and Olsson 1999), but these are aimed at aggregates, not the components of aggregates.

So, for the most prominent example, the "engineering" aggregate includes architecture, construction management, and "building." Urban Studies is a sub-category of architecture under this scheme, and ultimately becomes "engineering." Surely, common sense would exclaim, "they are kidding, of course." No, they aren't—and any more than the classification of Geography as a natural science under UOE rules. How does one know whether enrollments or credentials justify the aggregate label of "engineering"? By selecting samples of institutions offering such degree programs in each OECD country (and others), visiting their Web sites and reviewing curricular program specifications. It goes without saying that reading knowledge of many LOTEs (Languages Other Than English) is required for this task. The author picked some samples within his linguistic capacity, and while this policy brief is not the place for complex analysis of this issue, the reader can be assured that some of what is aggregated as "engineering" is decidedly *not* engineering by U.S. standards.

To put it briefly: a revisit of what are currently listed as STEM fields—and the modes of presentation of STEM data—by the international communities concerned with education in these fields is called for.

Closing the Spaces

One hesitates to quote politicians in the course of an academic inquiry, and one does so gingerly when the field is international. But French President Nicolas Sarkozy indirectly offered us some strong guidance this fall in attacking "*la religion du chiffre*," the religion of statistics, in both our discourse on economic and social affairs, and the very apparatus we have established to produce those statistics (*Le Monde*, Sept, 14, 2009). The world has changed at the speed of Moore's Law in the past two decades, but what we measure and the way we measure has not changed. It is not only what and how we measure, but the forms in which we present our holy findings. The formulas produce averages, Sarkozy observed, adding that when all one sees are averages, one never uncovers inequalities.

Education at a Glance, UNESCO Bulletins, and Eurostat reports are not going away, and will not be overhauling methodologies in which they have invested years of work, or breaking with presentations that carry histories of a decade or more. Once a communication becomes a

touchstone, it carries momentum and expectations. Specific tables have fan clubs, and fans do not like to be disoriented or disappointed by changes in the play book.

But there is no question that, given the extent of current reconstructions of tertiary level education across most OECD countries and their imitation by non-OECD countries, along with what we recognize as dramatic demographic change, and a universal concern with low-participating populations, we all need more meaningful indicators than our international arbiters currently provide. Tinkering at the edges of current data collection will not provide that meaning, but the national statistical agencies are capable of providing it. We are, to twist Smilla a bit, missing something that is too important to miss—and, with a little work, we will find it in the "inbetween spaces."

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Appendix B
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Appendix C:

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