Who Is Number One?

A student seeking a higher educational degree can be excused for feeling overwhelmed by the number of available choices. Top student intellects typically seek out the "top-ranked" schools to hone their skills for the next level. Given the large number of graduate programs, there is a need for a rational way to compare them, yet no objective guide exists. Instead, prospective students may depend heavily on published rankings. Such reliance places undue importance on these rankings since programs compete to attract talented students.

Ranking systems also help graduate programs understand how they compare with other highly regarded programs and what changes might be implemented to improve their quality. A popular source of graduate programs rankings in the U.S. is the annual report released by the *U.S. News & World Report*, but there are many others, each with independent methodologies. The result is ambiguity in the top ranked programs.

Recently, the National Research Council (NRC) published their long anticipated review of graduate programs; the last NRC rankings were issued in 1995. The NRC compiled data from 212 universities during the 2005−06 academic year on 20 different characteristics of a program (*1*). The fact that it took the NRC approximately five years to compile the rankings following the collection of the data illustrates the complexity involved in determining how to rank the programs. The NRC chose to move away from the survey-based system used in 1995, where school reputation was an important component, to the more objective and quantitative method used in the 2010 version. The algorithm factored in faculty research, student acuity, and typical program metrics. Specifically, criteria included faculty publications, citations, and grants; student publications, GRE scores, and diversity; graduation rates, time to graduation, and student job placement. By contrast, *U.S. News & World Report* uses a more subjective method by which deans, program directors, and faculty judge the academic quality of programs in the field. These "selected experts" are asked to rank the programs from 1 (marginal) to 5 (outstanding), and the calculated average is used to score programs (*2*). It is worth mentioning that the survey conducted by the *U.S. News & World Report* is often carried out on an annual basis but likely does not have the quantitative rigor of the NRC ranking; one could argue that annual rankings permit more facile trend assessment while the goal of quantitative rigor puts more meaning into the absolute rank positions.

Multiple methodologies results in ambiguity. Among Ph.D. programs in chemistry, the NRC ranking system identified the Department of Chemistry at the University of California, Berkeley as number one. However, according to the *U.S. News & World Report* there was a three-way tie between the California Institute of Technology, the Massachusetts Institute of Technology, and the University of California, Berkeley for the first position. I am also curious about a further level of complexity in these methods: how "interdisciplinary" programs within departments are considered. For example, should biochemistry and/or chemical biology factor into a "chemistry department" or a "biology department", especially when the distinction blurs from institution to institution (*3*)?

When students consider applying to graduate school, the reputation of the institution is an important factor. However, the first school on a ranking list may not necessarily be the

Data Source: National Research Council & *U.S. News & World Report* (Ranking of the Top Ten Doctorate/Graduate Program in Chemistry)

National Research Council Ranking		U.S. News and World Report Rankings	
Rank	School	Rank	School
1	University of California, Berkeley	1	California Institute of Technology
2	California Institute of Technology	1	Massachusetts Institute of Technology
3	Harvard University	1	University of California, Berkeley
4	Stanford University	4	Harvard University
5	Massachusetts Institute of Technology	4	Stanford University
6	Cornell University	6	University of Illinois, Urbana-Campaign
7	Columbia University	7	Northwestern University
8	University of Illinois, Urbana-Champaign	7	Scripps Research Institute
9	University of Wisconsin, Madison	7	University of Wisconsin, Madison
10	University of Chicago	10	Columbia University
		10	Cornell University

best fit for a particular student. Factors such as school environment, individual faculty, strengths of specific areas of research, and standard of living play a vital role in student success.

So, the answer to "Who is number one?" is clearly different for each student. As the *U.S. News & World Report* Web site suggests, the rankings should be used as no more than a starting point to choosing prospective schools. Additional research into programs on that list and others must be matched to the student's personal requirements and preferences. Do that and the student will have his/her own number one school.

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