

Analysis of U.S. News Graduation Rate Performance for Technological Institutions

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Abstract

This report contains an analysis of the U.S. News College National Rankings. It specifically focuses on the Graduation Rate Performance metric, which is used in the Rankings as a measure of whether colleges and universities enhance student achievement and increase the six-year graduation rate of these institutions relative to a predicted rate.

We analyze the performance of the roughly 200 U.S. News National Universities list for this Graduation Rate Performance metric over a five-year period from 2011 to 2015. Within this National group we specifically focus on the performance of technological institutions to investigate an hypothesis that the currently-deployed graduation rate prediction algorithm is not a good predictor for the performance of this group of institutions.

The results of our analysis support this hypothesis as the actual six-year graduation rates of technological institutions is consistently much lower than the predicted graduation rates for these institutions by 4-7 percentage points. This result is in sharp contrast to the overall results for Graduation Rate Performance across all non-technological institutions where the average actual graduation rate is 1-2 percentage points higher than what is predicted. The resulting discrepancy between the two groups is 6-8 percentage points for each of the five years of the study.

There are two possible explanations for this significant discrepancy in predicted and actual graduation rate performance. It is possible that technological institutions are indeed underperforming in the value that these institutions add in enhancing student achievement, although such a large and consistent “underperformance” across many institutions seems unlikely. Rather, these results suggest that the U.S. News prediction algorithm for Graduation Rate is not appropriate for technological institutions and needs to be re-examined in light of the results from this study.

1 Introduction

The results of the U.S. News Best Colleges Rankings are of much interest each year. Institutions themselves have significant interest in their own rankings as well as understanding whether the methodology employed in compiling the rankings is appropriate and done correctly. There are many types of colleges and universities in the U.S. with the rankings reflecting classifications of these institutions into National Universities and National Liberal Arts Colleges as well as regional groupings of each type. Other types of institutions are not separately accounted for in the rankings. One such type are technological institutions, which have a focus on science and technology.

In examining the performance of such institutions in the National Universities list over the past few years, it was observed that many of these technological institutions do not appear to perform as well as other institutions on one of the key performance metrics employed in the rankings methodology¹.

This metric is the Graduation Rate Performance, which accounts for 7.5% of the ranking for each institution. Quoting from the 2015 methodology description regarding this metric:

“For the second year in a row, the graduation rate performance indicator has been used in all of the Best Colleges ranking categories. This indicator of added value shows the effect of the college’s programs and policies on the graduation rate of students after controlling for spending and student characteristics, such as test scores and the proportion receiving Pell Grants. We measure the difference between an institution’s six-year graduation rate for the class that entered in 2007 and the rate we predicted for the class.

If the institution’s actual graduation rate for the 2007 entering class is higher than the rate U.S. News predicted for that same class, then the institution is enhancing achievement, or overperforming. If an institution’s actual graduation rate is lower than the U.S. News prediction, then it is underperforming.”

Given the importance of this metric in the overall rankings and the observation that a number of technological institutions appear to not do as well, we conducted a systematic study to both understand how all institutions performed on this metric and specifically how technological institutions fared. We focused our study on the roughly 200 institutions in the National Universities list over a five-year period from 2011 to 2015 (using the most recently released results).

2 Methodology

Apart from obtaining the performance of institutions in the National Universities rankings over the past five years, we also needed to identify the set of “technological institutions” for the focus of our study. We identified two sets of such institutions and report on results for each set.

The first set consists of U.S. News National Universities who are members of the Association of Independent Technological Universities (AITU)². Eleven (roughly half) of the members of

¹A description of the methodology is available at: <http://www.usnews.com/education/best-colleges/articles/2014/09/08/how-us-news-calculated-the-2015-best-colleges-rankings>

²More about the organization and members are available at <http://www.theaitu.org/about.html>

the AITU are in the list of National Universities. These eleven member institutions are: California Institute of Technology (Caltech), Carnegie Mellon University (CMU), Case Western Reserve University, Clarkson University, Drexel University, Illinois Institute of Technology, Massachusetts Institute of Technology (MIT), Polytechnic Institute of NYU, Rensselaer Polytechnic Institute (RPI), Stevens Institute of Technology, and Worcester Polytechnic Institute (WPI).

In order to consider a larger set of technological institutions, the second set consists of the eleven AITU institutions as well as nine other institutions from the National Universities list that have “Tech” or “Mine” in the institution name. These additional nine institutions are: Colorado School of Mines, Florida Institute of Technology, Georgia Institute of Technology, Louisiana Tech University, Michigan Technological University, Missouri University of Science & Technology, New Jersey Institute of Technology, Texas Tech University, and Virginia Tech. The resulting “Tech” set consists of a total of 20 institutions.

3 Results

In our analysis we first studied the Graduation Rate Performance for all National Universities over the past five years. The results of this analysis are shown in Table 1.

Table 1: Graduation Rate Performance for U.S. News National Universities

Year	Count Institutions	Ave. Perf.	Performance	
			% Over	% Under
2011	197	+1.0	60	36
2012	202	+1.1	56	35
2013	204	+1.0	56	37
2014	206	+1.4	57	34
2015	202	+1.2	56	36

The results show that each year the average Graduation Rate Performance for the roughly 200 institutions is approximately +1 indicating that on average the Actual Graduation Rate exceeds the Predicted Graduation Rate by one percentage point. The latter two columns in Table 1 show that 55-60% of institutions overperform with a higher-than-predicted graduation rate. Just over a third underperform with the remaining institutions performing as predicted.

Table 2 shows the same results except that the set of institutions is separated into two groups—AITU and non-AITU. There are eleven AITU institutions analyzed each year except 2015 when Polytechnic Institute of NYU did not appear in the National Universities list.

These results show significantly different results between the two groups. Each year, the vast majority (80-100%) of AITU institutions underperform relative to their predicted graduation rate. The average difference between actual and predicted graduation rate is in the range of 4 and 7 percentage points. With the AITU institutions removed from the National University list, the performance of the remaining non-AITU institutions improves a bit relative to results shown in Table 1. The difference in average Graduation Rate Performance between AITU and non-AITU institutions is statistically significant using a 95% confidence interval.

Table 2: Graduation Rate Performance for AITU and Non-AITU Institutions

Year	AITU Institutions				Non-AITU Institutions			
	Count Institutions	Ave. Perf.	Performance		Count Institutions	Ave. Perf.	Performance	
			% Over	% Under			% Over	% Under
2011	11	-6.8	0	91	186	+1.4	63	32
2012	11	-6.8	0	100	191	+1.6	59	31
2013	11	-4.9	9	82	193	+1.3	59	34
2014	11	-3.9	18	82	195	+1.7	59	32
2015	10	-4.3	10	90	192	+1.5	59	33

Table 3 shows the same results with the set of institutions divided into Tech and Non-Tech groups. There are 19 such Tech institutions three of the years and 20 in the other two years. In 2011 Louisiana Tech University did not appear in the list; in 2012 Missouri University of Science & Technology did not appear; and, as previously noted, in 2015 Polytechnic Institute of NYU did not appear in the National Universities list.

Table 3: Graduation Rate Performance for Tech and Non-Tech Institutions

Year	Tech Institutions				Non-Tech Institutions			
	Count Institutions	Ave. Perf.	Performance		Count Institutions	Ave. Perf.	Performance	
			% Over	% Under			% Over	% Under
2011	19	-5.8	11	79	178	+1.7	65	31
2012	19	-5.6	16	84	183	+1.8	60	30
2013	20	-4.5	10	80	184	+1.6	61	32
2014	20	-3.8	20	75	186	+2.0	61	30
2015	19	-4.5	16	84	183	+1.8	61	31

The nature of the results is similar to those shown in Table 2 with again the majority (75-85%) of Tech institutions underperforming relative to their predicted graduation rate. The average difference between actual and predicted graduation rate is between 4 and 6 percentage points. With the Tech institutions removed from the National University list, the performance of the remaining non-Tech institutions improves even more relative to results shown in Table 2. Again, the difference in average Graduation Rate Performance between Tech and non-Tech institutions is statistically significant using a 95% confidence interval.

4 Summary

Figure 1 summarizes the average Graduation Rate Performance for the groups in Tables 1-3. These results show that technological institutions consistently perform 6-8 percentage points worse than their non-technological counterparts for the Graduation Rate Performance metric in the U.S. News Best Colleges Rankings.

There are two possible explanations for this significant discrepancy in predicted and actual

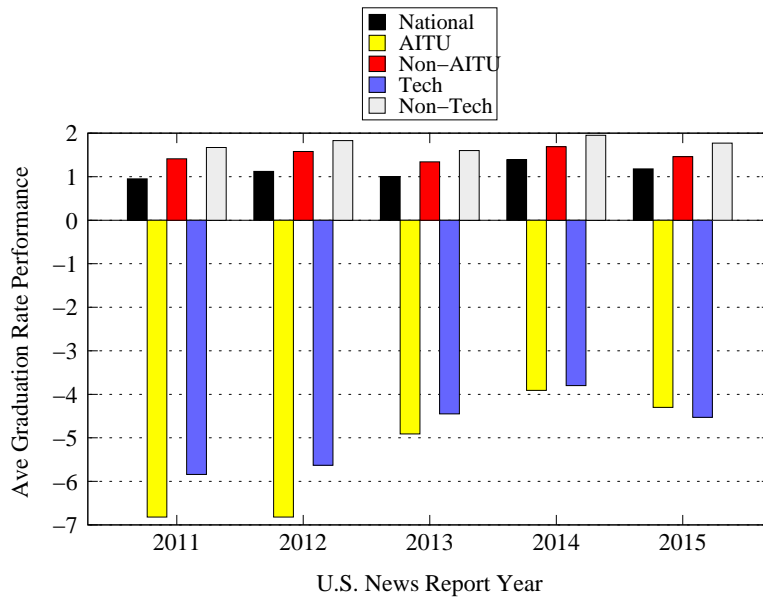


Figure 1: Average Graduation Rate Performance

graduation rate performance. It is possible that technological institutions are indeed underperforming in the value that these institutions add in enhancing student achievement, although such a large and consistent “underperformance” across many institutions seems unlikely. Rather, these results suggest that the U.S. News prediction algorithm for Graduation Rate is not appropriate for technological institutions and needs to be re-examined in light of the results from this study.

5 Future Work

The results from this work raise additional questions for future work. One question is whether there are other groups of institutions, beyond technological, for which graduation rates are not being accurately predicted causing institutions in these groups to unduly benefit or suffer in terms of their rankings. Similarly, the results raise another question of whether the actual graduation rates, which themselves have an 18% weight in determining an institution’s U.S. News Ranking, can even be directly compared in an accurate manner for different types of institutions.