How One University Examined Graduation Rates of Its Undergraduate Student Population

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Paper prepared for the 50th Annual Forum of the Association for Institutional Research, Chicago, Illinois, May 29 to June 2, 2010

Abstract

One measure for gauging a university's level of efficiency is its graduation rate. Graduation rates are typically expressed as a time-to-degree measure as the percentage of full-time, first-time, degree/certificate seeking freshmen who complete their program within four to six years of entering an institution. The time-to-degree measure has two drawbacks: it excludes part-time and transfer students in the calculation of graduation rates and it masks differences in the admissions policies of institutions. While other measures are used to gauge the efficiency or performance of institutions, none are without limitations. As a measure of good practice, institutions should use more than one method of calculating graduation rates than just one method.

Introduction

To be successful in a competitive economy, universities must operate like any business enterprise, where at the end of the fiscal year, their losses are kept to a minimum and their gains are maximized to the fullest extent possible. For many universities, this means striving to increase the number of full-time students enrolled each year without losing too many to attrition by the end of the academic year. For public universities, many are expected to operate at an expected level of efficiency. Attention is frequently drawn to institutions' graduation rates when large numbers of students enrol but don't graduate, for fear that public funds are being wasted on these institutions (Fields, 2005). One measure for evaluating a university's level of efficiency is its graduation rate.

The current practice in the United States is to report graduation rates as the percentage of full-time, first-time, degree/certificate seeking freshmen who complete their program within six years of entering an institution. This methodology was adopted by the National Centre for Education Statistics (NCES), the primary federal entity for collecting, analyzing, and reporting data related to education in the United States. Additionally, all institutions of higher education in the United States are required by law to publish graduation rates in accordance with the federal *Student Right to Know Act* (1990).

The federal government's reporting methodology has been criticized for excluding part-time students (Akst, 2007) and "misrepresenting the experience of transfer students" (Capaldi, Lombardi, and Yellen, 2006; Reindl and Russell, 2004). Any student who enrols as a freshman at one institution and transfers to complete the degree at another, will appear as a failure in the statistics of the first institution and will not appear at all in those of the second (Capaldi, Lombardi, and Yellen, 2006).

The NCES is aware of these methodological concerns and has initiated a feasibility study (Cunningham, Milam, and Statham, 2005) to implement a student unit record system to replace the way it currently collects aggregate-level data through the Integrated Postsecondary Education Data System (IPEDS). The proposed system would collect information on individual students and have the capacity to track these students as they progress through the education pipeline, thereby providing more complete graduate rates.

In an effort to calculate more reliable graduation rates, some universities have adopted alternative methodologies (Gillmore and Hoffman, 1997) and/or try to account for the number of transfer students among those who do not graduate within the six year period.

At the University of Washington, Gillmore and Hoffman (1997) developed a Graduation Efficiency Index (GEI) which they argued was a better measure of efficiency than the federally prescribed graduation rate. The GEI is computed retrospectively for each graduate, and is the ratio of the required to total number of credits earned over the course of a student's education and takes into account the amount of credits that have been transferred, repeated and dropped. The index varies from zero to 100 percent and is applicable to all degree programs and types of students.

When the GEI is computed and compared with the average time to degree, the results show that some students take less time to complete a degree but record a relatively lower efficiency rate, while other students take longer to complete a degree yet record a relatively higher efficiency rate. Clearly, using both the GEI and time to degree gives a more comprehensive picture than using one measure in place of the other (Poch, 1998).

The Problem with Graduation Rates: A Review of the Literature

Graduation rates, regardless of how they are calculated, are a source of contention. Low rates are associated with poor performing institutions while high rates are associated with superior institutions (Gillmore and Hoffman, 1997; Underwood and Rieck, 1999; and Astin, 2005). As Astin (2005) questions, to what extent should institutions be held accountable for the performance of their students? Should institutions with the highest rates be given credit? Should institutions with low graduation rates be blamed?

In his analyses of entering student freshmen, Astin (2005) found that more than two-thirds of the variation in degree attainment rates could be attributed to differences in the student body. This means that raw retention rates may be used to penalize institutions that admit less-well-prepared students and reward those that are highly selective in their admissions policies (Astin, 2005). When judging institutional effectiveness, it is important to consider the kinds of students institutions choose to admit. As Astin (2005) believes, any state policy that discourages institutions from admitting less-prepared students basically works against its own interests since these students pose the greatest risk of becoming dependent on the state.

Another problem with graduation rates has to do with their interpretation based on formulas used to calculate *expected* completion rates for institutions. According to Astin (2005), when an institution's actual and expected completion rates are close, within 0-5 percentage points of each other, the institution can be said to have a retention capability that is on par with institutions nationally. If the actual completion rate substantially exceeds the expected rate, then the institution is doing a better job than most in retaining its students. But if the actual completion rate falls substantially below the expected rate, then the institution's capacity to retain its students is relatively poor. What this means is that if two institutions share the same graduation rate of say, 59%, it is difficult to gauge the relative performance of each institution without knowing their *expected* completion rates.

In a related study, Underwood and Rieck (1999) examined four methods for establishing graduation thresholds in order to better interpret graduation rates among institutions. The four methods discussed were the *one standard deviation lower bound method*, the *logit prediction bound method*, the *linear regression method*, and the *logistic regression method*. The *one standard deviation lower bound method* was described as easy to use but contained one weakness of generating a negative graduation threshold if the graduation rates were relatively low for a group of peer institutions. For the *logit prediction bound method*, this had the advantage of adjusting the threshold based on the size of the peer group and because it used the logit transformation, the threshold could never be negative. The *linear regression method* was described as easy to use and accounted for differences in the academic profiles of the

institutions. Its one disadvantage, however, was that it could sometimes predict graduation rates that were unrealistic, values less than zero or greater than 100 percent. The fourth method, *logistic regression*, was described as being able to account for differences in academic profiles of institutions and being able to give predicted graduation rates between zero and 100 percent. Its main drawback, though, was that it was not as easy to use as the linear regression method. As the authors concluded, none of the methodologies are without problems and unfortunately, there are no simple solutions to making such comparisons (Underwood and Rieck, 1999 p. 265).

While no single methodology is flawless, it is hoped that the experience of one university's efforts to report graduation rates using a variation of the NCES methodology will serve as a guide for other universities interested in generating graduation rates from its student records information database.

Purpose

The Office of Planning and Institutional Research (OPAIR), at the University of the West Indies[1], Mona Campus was asked to undertake an analysis of student throughput rates[2] as part of a University-wide initiative involving the three campuses. Each Campus was provided with a template and guidelines for reporting the data. The exercise was intended to develop a consistent methodology for reporting throughput rates among the Campuses and to assist Faculty and Department Heads in monitoring the academic progression of students on a continuous basis.

Methodology

Undergraduate throughput rates were calculated using a time-to-degree measure which tracks entrants from one academic year to the next over a number of years. Incoming cohorts entering in September 2000 to 2004 were tracked up to the period 2007, allowing for a seven-year graduation rate for the initial cohort.

The target population consisted of all undergraduate degree seeking entrants regardless of whether or not it was their first time in university. The time to degree was presented in semesters instead of years and represented only active years of study. Two completion rates were calculated: an on-time completion rate for full-time students who completed their degree within the normal completion time for a program and a final completion rate which reflected the percentage of students completing as at 2007.

Graduation rates were calculated separately for full-time and part-time students. The status of a student was determined by which status was the most frequent over a student's career rather than

[1] The University of the West Indies is a regional public university serving a predominantly Caribbean population. It comprises three main campuses in Trinidad and Tobago (St. Augustine Campus), Barbados (Cave Hill Campus) and Jamaica (Mona Campus). Together, these campuses account for approximately 40,000 student registrations, the majority being undergraduates.

[2] The term *throughput rate* is used at the University of the West Indies to refer generally to the academic progression of students from entry to graduation. It is a *time-to- degree* measure much like the federally prescribed (NCES) graduation rate in the United States. The terms *time-to-degree*, *completion rate* and *graduate rate* are used interchangeably with *throughput rate*.

what their entering or final status was. Where a student spent an equal amount of time studying full-time and part-time, the status in their final semester of study was used.

Two additional indicators were calculated as part of the graduation rates. These were the average time to complete (in active semesters) and the average time to complete (in total semesters). *Active semesters* subtracted time off for leave while *total semesters* included time off for leave.

Students who did not graduate in the period under investigation were identified as either ongoing or under the attrition rate. The attrition rate included the percentage of students required to withdraw, the percentage of students who voluntarily withdrew, and the percentage of students who transferred from their program.

Presentation of Graduation Rates

An IR and IT officer collaborated on the project to generate the required information from the student records database. The data needed to conform as closely as possible to a prescribed template for presenting the graduation rates. This template appears in Table 1.

Table 1: Template for the Presentation of Graduation Rates

Year of Entry	Status	Faculty	Degree	Group/Major	Duration (Years)	Size of Cohort	GRADUATION RATES BY SEMESTER								ATTRITION RATES			
							Completion in 2 Semesters (%)	To	Completion in 14 Semesters (%)	% Completing On-Time Full-Time Only	Final Completion Rate (%)	Average Time to Complete (Active Sem.)	Average Time to Complete (Total Sem.)	% Ongoing 2+ Years After Expected Completion Time	% Required to Withdraw	% Voluntary Withdrawals	% Transfer	Attrition Rate
2000	FT	Hum.	B.A.	**All**	3	386				64.0	86.0	6.5	6.6	6.2	1.6	6.2		7.8
2000	FT	Hum.	B.A.	**All-Females**	3	303				66.7	88.1	6.4	6.5	5.6	1.0	5.3		6.3
2000	FT	Hum.	B.A.	**All-Males**	3	83				54.2	78.3	6.7	6.9	8.4	3.6	9.6		13.3
2000	FT	Hum.	B.A.	African and Asian Studies	3	2				50.0	100.0	5.5	7.0					
2000	FT	Hum.	B.A.	French	3	9				66.7	100.0	6.6	8.1					
2000	FT	Hum.	B.A.	History	3	103				79.6	89.3	6.2	6.3	4.9	1.0	4.9		5.8
2000	FT	Hum.	B.A.	Library and Communication Studies	3	24				58.3	91.7	6.7	6.8	4.2		4.2		4.2

As Table 1 shows, the template provides sufficient detail for the reader to see the particular program and the size of the entering cohort, the duration of the program and the percentage graduating by semester as well as cumulatively. Graduation rates are also provided by sex and by major field of study.

Findings

The exercise resulted in useful information. When data were summarized by faculty, the on-time completion rates by faculty ranged from lows of 30% in Pure and Applied Sciences to highs of 80% in Education (Table 2).

Table 2.

Faculty/Degree	Program Duration	Full-Time First Degree Entrants % Completing On-Time			
		Year of Entry			
		2000		2001	
		Cohort	Rate	Cohort	Rate
Humanities -B.A.	3 years	386	64	331	60.1
Education - B.Ed.	2-3 years	175	82.3	164	84.1
Medical Sciences-MBBS	5 years	100	74	107	62.6
Pure & Applied Sciences-B.Sc.	3 years	201	32.8	254	37.4
Social Sciences - B.Sc.	3 years	530	59.2	540	59.8

The completion rates of full-time First degree entrants improved markedly two or more years after the expected completion time. As Table 3 shows, the final completion rates ranged from lows of 60% in Pure and Applied Sciences to highs of 90% in Education.

Table 3.

Faculty/Degree	Program Duration	Full-Time First Degree Entrants Final Completion Rate (as at 2007)			
		Year of Entry			
		2000		2001	
		Cohort	Rate	Cohort	Rate
Humanities -B.A.	3 years	386	86	331	85.2
Education - B.Ed.	2-3 years	175	92	164	94.5
Medical Sciences-MBBS	5 years	100	84	107	73.8
Pure & Applied Sciences-B.Sc.	3 years	201	59.7	254	68.5
Social Sciences - B.Sc.	3 years	530	87.5	540	88

There were no drastic differences in the average time to complete with regard to leave of absences. As Table 4 shows, when leave of absences were subtracted from the time to complete in semesters, this reduced the time to complete by, on average, .1 semesters.

Table 4.

Faculty/Degree	Program Duration	Full-Time First Degree Entrants Average Time to Complete in Active & Total Semesters (as at 2007) Year of Entry 2000 Cohort	Active Semesters	Total Semesters	2001 Cohort	Active Semesters	Total Semesters
Humanities -B.A.	3 years	386	6.5	6.6	331	6.5	6.6
Education - B.Ed.	2-3 years	175	4.2	4.3	164	4.2	4.2
Medical Sciences-MBBS	5 years	100	10.2	10.2	107	10.2	10.2
Pure & Applied Sciences-B.Sc.	3 years	201	7.0	7.1	254	6.9	7.0
Social Sciences - B.Sc.	3 years	530	6.6	6.7	540	6.5	6.7

Note: Active semesters subtracts time off for leave. Total semesters includes time off for leave.

As for student attrition, the attrition rate in all faculties was largely explained by students voluntarily withdrawing from a program (Table 5). The voluntary withdrawal rate was highest in Pure and Applied Sciences, at 17% to 28% over the period. In the case of Pure and Applied Sciences and Medical Sciences, student records revealed that two-thirds of students voluntarily withdrew from a program in order to transfer to another program or campus, and that almost all of these students graduated. The remaining one-third of withdrawals was based on financial or academic reasons and persons who dropped out of a program (for unknown reasons) and did not re-register for up to two years.

Table 5.

Faculty/Degree	Program Duration	Full-Time First Degree Entrants % Required and Voluntary Withdrawals (as at 2007) Year of Entry 2000 Cohort	Req'd to Withdraw	Volun. Withdrawal	2001 Cohort	Req'd to Withdraw	Volun. Withdrawal
Humanities -B.A.	3 years	386	1.6	6.2	331	0.6	8.5
Education - B.Ed.	2-3 years	175	0.0	4.0	164	1.2	2.4
Medical Sciences-MBBS	5 years	100	2.0	2.0	107	0.9	14.0
Pure & Applied Sciences-B.Sc.	3 years	201	4.5	28.4	254	6.3	17.3
Social Sciences - B.Sc.	3 years	530	0.8	6.2	540	0.7	5.4

Among part-time First degree students, the throughput rates revealed that these students were concentrated in the Social Sciences and Humanities and among these two disciplines, 60%-70% of students completed their degree part-time within six to seven years (Table 6).

Table 6.

	Part-Time First Degree Entrants Final Completion Rate (as at 2007)			
	Year of Entry			
	2000		2001	
Faculty/Degree	Cohort	Rate	Cohort	Rate
Humanities -B.A.	160	65.6	133	60.2
Education - B.Ed.	52	92.3	27	100.0
Pure & Applied Sciences-B.Sc.	10	20.0	12	50.0
Social Sciences - B.Sc.	402	73.9	488	71.7

Part-time students required more time to complete a program compared with the average time to complete for full-time students (see Tables 4 and 7).

Table 7.

	Part-Time First Degree Entrants Average Time to Complete in Active & Total Semesters (as at 2007)					
	Year of Entry					
	2000			2001		
Faculty/Degree	Cohort	Active Semesters	Total Semesters	Cohort	Active Semesters	Total Semesters
Humanities -B.A.	160	8.0	8.5	133	7.5	8.1
Education - B.Ed.	52	4.3	4.4	27	4.4	4.7
Pure & Applied Sciences-B.Sc.	10	10.0	11.5	12	9.3	9.5
Social Sciences - B.Sc.	402	8.9	9.5	488	9.0	9.3

The part-time attrition rate also revealed that voluntary withdrawals were largely responsible for student attrition and that this was noticeably higher in the Humanities and Social Sciences (Table 8).

Table 8.

Faculty/Degree	Part-Time First Degree Entrants % Required and Voluntary Withdrawals (as at 2007)					
	Year of Entry					
	2000			2001		
	Cohort	Req'd to Withdraw	Volun. Withdrawal	Cohort	Req'd to Withdraw	Volun. Withdrawal
Humanities -B.A.	160	1.9	27.5	133	1.5	23.3
Education - B.Ed.	52	0.0	3.8	27	0.0	0.0
Pure & Applied Sciences-B.Sc.	10	0.0	50.0	12	0.0	25.0
Social Sciences - B.Sc.	402	2.5	13.9	488	4.3	12.3

In the Humanities, approximately half of the voluntary withdrawals were explained by students who transferred to another program in the Social Sciences or Education while the other half of students dropped out of a program for unknown reasons and did not re-register for two years.

Benefits of the Institutional Research Exercise

The calculation of student throughput rates using the time-to-degree method proved to be a useful exercise for understanding the trajectory of students at Mona as well as providing a better understanding of the student information system. Given the fact that students' attendance patterns are rarely continuous and linear and students change status from term to term (Adelman, 1999), it was important to address some of these complexities in the methodology (see Tables 1 and 2 in the Appendix).

The Graduation Rate template provides university administrators with enough detail at the level of major to monitor the progression of students from semester to semester and to see what factors are contributing to a student's or program's attrition rate. Administrators can see which majors are more popular among the student population and which majors are associated with superior on-time completion rates. At Mona, the size of cohorts, by major, ranged from 1 to over 100 entrants, providing valuable information on which programs could be considered for future rationalization based on their popularity and on-time completion rates.

One drawback of the template though is that students who transferred to another institution and subsequently graduated are represented in the attrition rate. What this means is that some manual effort is required by having to contact other institutions to see whether a student who transferred there subsequently graduated. In the United States, the National Student Clearinghouse is a good resource for institutions interested in tracking their outgoing transfer students to learn whether or not they graduated from another institution.

Comparing the Time-to-Degree with Other Measures of Graduation Rates

When compared with other measures of graduation rates, the time to degree has one advantage by incorporating a number of additional indicators which reflect the complex trajectory of students. These indicators include an on-time completion rate, average time to complete *with* and *without* leave of absences taken, the percentage of students ongoing, and among those who have not graduated, the percentage who were required to withdraw, the percentage who voluntarily withdrew and, where possible, the percentage of students who transferred to another institution.

The on-time completion rate adds a level of efficiency by identifying the proportion of students who completed their degree on time versus the proportion of students who completed within 150% of normal time to completion.

Compared with the Graduation Efficiency Index (GEI), the time to degree may be a less reliable measure of efficiency by relying on the enrolment status of students rather than the number of credits gained, but the template is able to provide a wealth of information on various aspects of enrolment (leave, withdrawals, percentage ongoing) which may be equally important to administrators.

Compared with regression models, the time to degree does not provide information on predictor variables or the kinds of students who are more likely to graduate. This information may be useful from an admissions perspective if a decision is taken to be more selective of entrants to the UWI, Mona.

Conclusion

This paper has examined some of the issues surrounding graduation rates and how the University of the West Indies, Mona examined its graduation rates as part of an internal exercise. Graduation rates were calculated based on a time-to-degree measure with information provided by gender, faculty, and major field of study. While the template used for presenting the information was sufficiently detailed, it may not be practical for busy administrators who would prefer to be informed of important findings and any proposed remedial action. Additionally, explaining any of the factors behind the attrition rate is a largely qualitative exercise involving analysis of individual student records which can be time consuming. As a result, the IR Office of the Mona Campus will pursue alternative methods of calculating graduation rates including:

- a Graduation Efficiency Index; and
- Expected Completion Rates using the HERI methodology.

In addition, regression analyses will be conducted to identify student characteristics that are positively associated with degree completion. Existing research (Arredondo and Knight, 2005; Astin 2005; Wohlgemuth et al., 2007) has examined personal, academic and environmental variables such as ethnicity, gender, high school average, financial aid, living on campus and a student's level of engagement at university.

In the United States, gauging a student's level of engagement may be obtained from surveys such as the National Survey of Student Engagement and in particular, from variables such as the amount of time

students spend studying each week and the frequency with which they attend classes. At the University of the West Indies, a Student Experience Survey was conducted in March 2010 which captured the experiences of first, second, and final year undergraduate students. The information obtained from this survey has informed administrators of much needed interventions to improve student satisfaction and retention rates.

Implications of Study

As the debate continues in the United States about the methodology and implications of graduation rates, this paper outlines a number of alternatives for institutions and policy makers to consider.

First, universities interested in examining their graduation rates in detail may consider replicating the internal exercise performed by the University of the West Indies, and where institutions suffer low graduation rates based on the time-to-degree methodology, could calculate a Graduation Efficiency Index or expected completion rates to see whether these alternative methods present favorable results.

For policy makers, graduation rates need to be interpreted in the context of a number of factors, one being whether or not the institution is public or private and how selective it is of its student population. Where performance funding is a practice of any state, time-to-degree measures do not necessarily reflect the *efficiency* of a given institution as may a Graduation Efficiency Index, and among highly selective institutions with high graduation rates, these institutions may not be performing optimally if their actual completion rates fall below their expected completion rates when using regression analyses.

And finally, until such time that IPEDS is replaced by a student unit record information system, a good resource for tracking transfer students is the National Student Clearinghouse.

APPENDIX

Table 1: Guidelines and Checklist for Computing Throughput Rates

Guidelines Submitted	Checklist
1. Only active years (or parts thereof) are to be counted.	Active Semesters=subtract time off for leave Total Semesters=include time off for leave
2. Completion rates are to be computed over a horizon that extends two years beyond the expected normal time to graduation (*i.e.*, five years for 3-year degrees and seven years for 5-year degrees and so on).	On-Time Competion Rate calculated for Full-Time Students. Final Completion Rate up to 7 Years (14 Semesters).
3. Transfers to a program (whether intra-Faculty or cross-Faculty) are to be counted as part of the cohort. Students who transfer to another program are to be excluded from the original cohort.	Students who transferred out of original program included in "% Transfer" or "% Voluntary Withdrawals" under Attrition Rate.
4. Persons admitted to a program with advanced placement from a Tertiary Level Institution or Overseas University are to be excluded from the intake cohort.	Incoming transfer students were retained in the original cohort.
5. Persons who enter an undergraduate program on a full-time basis are to be treated as full-time students throughout, even though in their final semester they may be deemed to be part-time students because of a reduced credit load of courses needed to complete degree requirements.	Full-time/Part-time status based on which status was the most frequent over the student's period of study. If equal, then the status in the final semester was used to determine the overall status of the student. Throughput rates were calculated separately for Full-Time and Part-Time students.
6. On-time completion rates are to be computed only for full-time students because of the difficulties inherent in defining a standard expectation of time-to-complete for students enrolled in part-time, distance delivery and evening programs.	On-Time Completion Rate calculated for Full-time students. Part-time students included in the Final Completion Rate.

In addition to the six guidelines above, seven other factors needed to be taken into consideration for the computation of the throughput rates:

Table 2: Other Factors to Consider for Computing Throughput Rates and Checklist

Other Factors for Consideration	Checklist
A. ***Leave of Absence***: where a student is granted formal leave of absence and returns to complete the program at the end of that period.	Retained in analysis if enrolled anytime between 2000 and 2004.
B. ***Compulsory Withdrawal from Program***: where a student is required to withdraw from a program due to unsatisfactory progress but is subsequently re-admitted.	Retained in analysis if enrolled anytime between 2000 and 2004.
C. ***Readmission to Program***: where a student unofficially absents himself/herself from a program for a period of time, but is subsequently allowed to resume his/her duties.	Retained in analysis if enrolled anytime between 2000 and 2004.
D. ***Transfers***: where a student transfers within and between faculties and transfers from one Campus to another.	Incoming transfer students retained in cohort. Outgoing transfer students identified in "% Transfer" or "% Voluntary Withdrawals" under Attrition Rate.
E. ***Admission with Advanced Placement***: where a student enters a program with credits earned from another institution.	Incoming transfer students retained in cohort.
F. ***Accelerated Completion***: where a student takes advantage of UWI Summer School offerings and enrolment in courses in other universities to earn credits towards the completion of the program for which he/she is enrolled.	Retained in cohort.
G. ***Change of Status***: where a student's status is changed, for example, from distance mode to face-to-face delivery.	Incoming transfer students were retained in cohort. Outgoing transfer students were identified in "% Transfer" or "% Voluntary Withdrawals" under Attrition Rate.

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