Graduation Probability Among Undergraduates at Ramkhamhaeng University: Using Data Analytics to Settle the Age-Old Question "*Is [Insert Program Here] A Hard Major?*"

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Abstract

Undergraduate education enrollment is growing worldwide, and the question of "Is [insert field here] a "difficult" major?" still does not have a reliable answer. The objective of this study is to compare the difficulty of 4-years undergraduate programs at Ramkhamhaeng University, using the graduation rate as a proxy measure. The author extracted open-access data on enrollment of the 2017 cohort and the number of graduates in the 2021 commencement from the University's website and analyzed data using descriptive statistics. The author found that more than 32,000 enrolled in the 2017 cohort of undergraduates at Ramkhamhaeng University, with the highest enrollment in the Faculty of Political Science (nearly 10,000). At the 2021 commencement, there were more than 11,000 graduates (overall graduation probability = 36%). The Faculties of Science and Economics had the lowest graduation probabilities (less than 15% each), whereas the Faculty of Political Science had the highest graduation probability (approximately 54%). The low enrollment in the Faculty of Science might have reflected a gap in STEM education in Thailand. Science and Economics could be considered as the faculties with higher levels of difficulty within Ramkhamhaeng University, whereas the Faculty of Political Science could be considered as the opposite. However, the system for program transfers could have introduced bias to the study findings, and the unique context of Ramkhamhaeng University limits the generalizability of the study findings.

Keywords: Major, Field of study, Student graduation, Higher education, Thailand

Introduction

Undergraduate education enrollment is growing worldwide. In 2021, there were approximately 220 million students enrolled in formal post-secondary education worldwide, and the number is projected to grow to 380 million by 2030 (Murthi & Bassett, 2022). With this growth in enrollment, stakeholders in higher education are increasingly pressured to answer the following questions from students who may be uncertain with regard to their choice of discipline: *Is [insert field here] a "difficult" major*?

Difficulty is an inherently subjective construct with no standard approach to its measurement. Previous authors have used measures such as average self-reported hours of study and class preparation (Muniz, 2019), students' ratings of professors (Novik, 2022), or even subjective perception (Conlin, 2023). These findings have been inconsistent, and the academic program difficulty remains an open question.

Four-year graduation rates are often used to measure the performance of universities based on the notion that the higher graduation rate reflects the higher accountability of institutions (Gold & Albert, 2019). The author hypothesizes that four-year graduation rate can also be used to measure the difficulty of academic programs, particularly when the undergraduate education system is flexible and enables enrollment and degree completion at one's own pace. Ramkhamhaeng University is an open university in Thailand with a relatively low-cost and flexible enrollment system, where there is no academic probation or dismissals, students are awarded their degree upon completion of all required coursework, but are also free to change their major at any time after having enrolled for more than one semester (Ramkhamhaeng University, 2017a).. Students who are enrolled in programs where classes generally have low probability of passing may decide to disenroll from the University or change to programs where classes generally have higher probability of passing. Thus, the number of graduates in a given commencement divided by the number of enrolled students four years prior can serve as a rough estimation of the four-year graduation rates, which then can serve as a proxy for the "difficulty" of an academic program. Such findings may be of interest to stakeholders in higher education and social-economic development (Hammoudi Halat et al., 2023; Leonhardt & Chinoy, 2019; Silver, 2023).

Objectives

The objective of this study is to compare the difficulty of 4-years undergraduate programs at Ramkhamhaeng University, using the graduation rate as a proxy measure, based on enrollment data of the 2017 cohort and the number of graduates in the 2021 commencement.

Conceptual / Theoretical Framework

The conceptual framework for this analysis is presented as Figure 1.

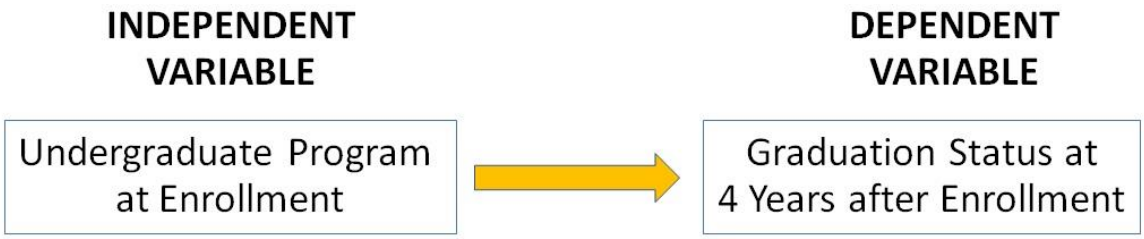

Figure 1: Conceptual Framework

Materials and Methods

Study Design

This study is a cross-sectional study using secondary data from the Office of Academic Services and Assessments at Ramkhamhaeng University.

Study Setting: About Ramkhamhaeng University

Ramkhamhaeng University is a public, knowledge market university with open-door policy in Thailand. The flagship campus is located in Bangkok, Thailand. The main academic faculties of the University include Law, Business Administration, Humanities, Education, Science, Political Science, Economics, Mass Communication, and Human Resource Development(Ramkhamhaeng University, 2019). The author excluded the Faculty of Education from the analyses due to changes in admission procedures and curriculum being offered during the 2017 academic year. Undergraduate education at Ramkhamhaeng University differs from other universities with relatively low tuition fees, optional class enrollment, lack of academic probation or dismissal, and policy for credit transfer and re-enrollment (Table 1). In addition to the programs at the Main (Bangkok) campus, the University also offers distance education at regional campuses although with only four majors available (Law, Management, Political Science, and Mass Communication). Graduation data did not disaggregate for Main vs. regional campus status. Thus, the author decided to include enrollment data from all regional campuses in this analysis.

Table 1: Features of Ramkhamhaeng University vs. Selected Higher Educational Institutions Offering 4-Years STEM Degrees in Thailand

Domain	Kasetsart University	Thammasat University	Mahidol University	Ramkhamhaeng University
Tuition Fees for students in regular programs	12,900 to 17,300 THB per semester	13,800 to 21,100 THB per semester	20,000 to 50,000 THB per semester	25 THB per semester hour. Total approximately

Domain	Kasetsart University	Thammasat University	Mahidol University	Ramkhamhaeng University
				1,000 to 1,500 THB per semester
Enrollment spaces	Limited	Limited	Limited	No limit
Lecture and Lab Participation	Mandatory	Mandatory	Mandatory	Optional
Secondary education background	STEM programs open only to those who studied science and mathematics in high school	STEM programs open only to those who studied science and mathematics in high school	STEM programs have high school GPA and admission test scores requirements	Applicant with high school or equivalent qualification can apply to any program
Procedures for Changing Majors	Permission required from Deans of outgoing and incoming faculties	Permission required from Deans of outgoing and incoming faculties	Permission required from Deans of outgoing and incoming faculties	Possible with a routine visit to the Office of Academic Services and Assessments
Class assignments	Given, graded as part of the overall grade for a given class	Given, graded as part of the overall grade for a given class	Given, graded as part of the overall grade for a given class	Given in some classes, but not graded and submission is optional.
Academic Probation and Dismissal	Probation in case of GPA of less than 2.00. Dismissal in case of GPA of less than	Probation in case of GPA of less than 2.00. Dismissal in case of GPA of less than	Probation in case of GPA of less than 2.00. Dismissal in case of GPA of less than	No probation or dismissal. Failures (F) grades not included in the final transcript

Domain	Kasetsart University	Thammasat University	Mahidol University	Ramkhamhaeng University
	1.50, or GPA of less than 1.75 for 2 consecutive semesters	2.00 for 3 consecutive semesters	1.80 for one academic year, or 2 consecutive academic years with GPA of less than 2.0	
Re-examination	At the instructor's discretion	At the instructor's discretion	At the instructor's discretion	Available for every registered class
Credit Transfer from other Post-Secondary Institutions	At the discretion of the program committee chairperson with approval by the Dean of the Faculty	At the discretion of the Dean through the Faculty Board's approval	Requires approval from the Program Committee as well as the Rector	Yes. Standard policy exists with regard to credit transfer
Re-enrollment for students who do not complete degree within 8 years	Provision available. No standard procedures exist.	No standard procedures exist	No standard procedures exist	Yes. Standard procedures exist with regard to credit transfer

Sources: (Kasetsart University, 2020, 2023; Mahidol University, 2021; Ramkhamhaeng University, 2017d, 2017a; Thammasat University, 2018)

Data Collection

The author accessed publicly-available data from the Office of Academic Services and Assessments at Ramkhamhaeng University(Ramkhamhaeng University, 2024b) regarding number of registrations at the Main (Bangkok) and regional campuses during the first semester of the 2017 academic year(Ramkhamhaeng University, 2017b, 2017c). The author also accessed data on graduation of the class of 2021(Ramkhamhaeng University, 2024a).

These data were reported as aggregates and published each semester by the Office of Academic Services and Assessments. Permission was not required to access the study data.

Data Management

All available data from the source were in PDF format, thus the author developed a spreadsheet for data entry and perform data entry manually with no double entry due to lack of time and available human resource. All sums in the original PDF document were double-checked with manual calculation on spreadsheet during data cleaning as both a way to verify the sums and to detect possible data entry errors.

Data Analysis

After data cleaning, the author excluded programs that did not accept enrollment by students in the 2012 cohort from the analyses. The author also excluded programs with fewer than two enrollments by the 2012 cohort throughout the 2012 to 2015 academic years from the analyses. The author used univariate descriptive statistics, calculated by spreadsheet. All analyses were disaggregated by faculty, subject major, and semester.

Ethical Consideration

This study did not involve any personally-identifiable information at the individual level, and thus likely does not fall under the criteria for human subject research. The author nonetheless requested and received permission to conduct this secondary analysis from the Human Research Ethics Unit, Faculty of Medicine, Prince of Songkla University (REC.64-141-18-2).

Results

In the 2017 cohort at Ramkhamhaeng University, more than 32,000 students enrolled, three-fourths of whom were at the Main Campus in Bangkok (*Table 2*), the vast majority in the social sciences and humanities (Law, Political Science, Mass Communication, Humanities) and just over 3 percent at the Faculty of Science. At the 2021 commencement, there were more than 11,000 graduates, thus the overall graduation probability was 36 percent. There were wide variations in graduation probability by Faculty, as well as within each faculty. Science and Economics were the faculties with the lowest graduation probabilities, whereas Political Science was the faculty with the highest graduation probability.

Table 2: Number of Registered Students in the 2017 Cohort and Number of Degree Recipients in the Class of 2021 at Ramkhamhaeng University's Main and Regional Campuses

Faculty and Programs	Main, Semester 1/2017	Regional, Semester 1/2017	Total Semester 1/2017	Grads, Class of 2021	Four-year graduation probability
Faculty of Law (all majors)	**5,518**	**3,070**	**8,588**	**3,025**	**35.2%**
Faculty of Business Administration (all majors)	**5,405**	**1,604**	**7,009**	**1,571**	**22.4%**
Management	1,104	1,604	2,708	675	24.9%
Finance and Banking	345	-	345	54	15.7%
Marketing	993	-	993	274	27.6%
Accounting	1,637	-	1,637	355	21.7%
Advertising and Public Relations	93	-	93	9	9.7%
Service Business Management	439	-	439	32	7.3%
Human Resources Management	233	-	233	79	33.9%
International Business	345	-	345	55	15.9%
Tourism	216	-	216	38	17.6%
Faculty of Humanities (all majors)	**3,776**	**-**	**3,776**	**849**	**22.5%**
English	1,918	-	1,918	399	20.8%
Thai	322	-	322	124	38.5%
History	142	-	142	58	40.8%
French	34	-	34	10	29.4%
German	50	-	50	8	16.0%
Philosophy	40	-	40	21	52.5%
Sociology and Anthropology	163	-	163	91	55.8%
Information Studies	46	-	46	6	13.0%
Spanish	25	-	25	9	36.0%
Russian	10	-	10	2	20.0%

Faculty and Programs	Main, Semester 1/2017	Regional, Semester 1/2017	Total Semester 1/2017	Grads, Class of 2021	Four-year graduation probability
History for Tourism	133	-	133	11	8.3%
Chinese Language	440	-	440	64	14.5%
Japanese	453	-	453	46	10.2%
Faculty of Science (all majors)	**768**	**-**	**768**	**78**	**10.2%**
Mathematics	73	-	73	3	4.1%
Statistics	12	-	12	-	0.0%
Chemistry	48	-	48	7	14.6%
Physics	35	-	35	7	20.0%
Biology	62	-	62	11	17.7%
Computer Science	251	-	251	9	3.6%
Operations Research	3	-	3	1	33.3%
Materials Technology	4	-	4	6	150.0%
Food Technology	50	-	50	11	22.0%
Electronics Technology	31	-	31	3	9.7%
Biotechnology	9	-	9	4	44.4%
Environmental Science	52	-	52	5	9.6%
Agricultural Technology	41	-	41	10	24.4%
Information Technology	97	-	97	1	1.0%
Faculty of Political Science (all majors)	**7,106**	**2,752**	**9,858**	**5,329**	**54.1%**
Faculty of Economics (all majors)	**328**	**-**	**328**	**41**	**12.5%**
Faculty of Mass Communication Technology (all majors)	**1,390**	**374**	**1,764**	**714**	**40.5%**
Mass Communication	1,390	374	1,764	714	40.5%
Faculty of Human Resources Development (all majors)	**307**	**-**	**307**	**83**	**27.0%**
TOTAL	**24,598**	**7,800**	**32,398**	**11,690**	**36.1%**

Conclusions and Discussion

In this secondary data analysis, the author extracted data on enrollment and graduation at Ramkhamhaeng University, an open university and one of the largest universities in Thailand. The author analyzed the data using descriptive statistics to gain insights on the difficulty of academic programs as measured by graduation probability. The findings of this study should yield insights for stakeholders in higher education, and social and economic development.

Using graduation probability as a proxy measure for program difficulty, it is possible that the Faculties of Political Science and Mass Communication had majors with the lowest level of difficulty within the 2017 cohort at Ramkhamhaeng University, whereas the Faculties of Science and Economics had majors with the highest level of difficulty. However, the graduation probability reported in this study could have been confounded. Ramkhamhaeng University's graduating class is based on the year of graduation conferral and not enrollment. Thus, the number of graduates did not include only members of the cohort that enrolled four years prior, but also members of earlier cohorts who graduated late and members of later cohorts who graduated early. This issue may be particularly common in programs with relatively low number of enrolled students and graduates. For example, if the BS (Statistics) program graduated just one student instead of none for the 2017 commencement, the graduation probability would have risen from 0 percent (0/12) to approximately 8 percent (1/12). Similarly, had 50 students enrolled in the BA (Spanish) program instead of 25, the graduation probability would have changed from 36% (9/25) to just 18% (9/50), i.e., from among the "easier" programs to among the "more difficult" programs at the Faculty of Humanities. Future studies should consider aggregating data from multiple years into a period cohort spanning a range of enrollment years and graduation years, which may help to partially account for this delayed and early graduation effect

One additional issue that should be considered is the overall low number of enrollment and graduates in the Faculty of Science, which offered programs in STEM (science, technology, engineering, and mathematics) fields. Enrollment and retention of STEM students at the tertiary level have been a chronic issue in both developed and developing economies (Graham et al., 2013; Toven-Lindsey et al., 2015). The undergraduate education system at Ramkhamhaeng University can be regarded, to an extent, as a natural experiment in education when barriers to STEM education were removed. The system at Ramkhamhaeng should have overcome the traditional barriers regarding financial concerns (Casanova et al., 2023; Costello et al., 2023), grade-related issues (Casanova et al., 2023), demographic and socioeconomic characteristics (Costello et al., 2023), and lack of academic opportunities (Costello et al., 2023). Yet just over three

percent of the students chose a science program. The existing gaps could be either competition from other disciplines (Wernick & Ledley, 2020) or additional social-psychological factors that are unique to STEM fields (Xie et al., 2015). Future studies should consider in-depth primary data collection and analyses of STEM students who remained in their program, transferred to other programs, or disenrolled from Ramkhamhaeng University to gain further insights, which can be potentially useful to relevant stakeholders.

The strength of our study is the approach in combining separate registration and graduation data to yield insights on graduation probability. However, a number of limitations should be considered in the interpretation of our study findings. Firstly, we did not take faculty transfer during the course of study into account due to lack of program-specific data. This could have led to over-estimated graduation probability for certain Faculties and under-estimated probability at others. Secondly, Ramkhamhaeng University tends to attract non-traditional students compared to other institutions, students are known to engage in full-time work in parallel with their studies, and those who do not finish their degree on the first attempt may re-enroll and continue their studies at a later date. This specific context may limit the generalizability of the study findings.

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