University Analytics & Institutional Research

Time to Graduation and Attrition Rates for Undergraduate Women at the University of Arizona

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Introduction

This research is a University Analytics and Institutional Research (UAIR) and Women in Science and Engineering (WISE) collaboration that explores retention and graduation rates of Female students [1] at the University of Arizona with a focus on STEM programs. Both organizations hope to use data analysis and critical theory to inform decision making for retention and graduation practices at every stage of the student's experience at the university.

For this report, UAIR used undergraduate enrollment data of women from the past 10 years (2011-2021) to understand semester-to-semester retention rates and four and six-year graduation rates through survival analysis and churn prediction analysis. These analyses use student characteristics including demographics (race/ethnicity, first-generation college going student, and age over 25), major type, and financial aid to review differences in a student's experience that might positively or negatively impact their success towards graduation. A table with the breakdown of how majors are categorized as STEM/Not STEM can be found in the Appendix. STEM majors are classified by combining definitions from the Arizona Board of Regents, the National Center for Education Statistics, the Department of Education, and the National Science Foundation.

This research highlights two important considerations with respect to the experience of women in STEM at University of Arizona.

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[1] Female is a term associated with biological sex while woman is a term associated with gender identity. The available institutional data on gender classification is limited to the following: female, male, or unknown. Therefore, this report is limited to students who were identified as female. We acknowledge this excludes students who were not identified as female, but may self-identify as women and includes students who were identified as female but who may not self-identify as women.

Firstly, it demonstrates the utility of taking an intersectional approach to understand the differential experiences of women students (Crenshaw 1991; Hancock 2007). In distinction to a solely gender-based analysis, this intersectional approach disaggregates the category of women to account for the interaction effects of ethnicity, socioeconomic status, first generation status, and age upon student outcomes. This approach reveals greater variability in student outcomes and more nuanced assessment of observed disparities (Bauer et al. 2021). In the context of diversity, equity, and inclusion efforts, intersectional analyses can help to identify compounded disadvantages so as to better strategize the allocation of supportive university resources (Murphy and Williams 2021).

Secondly, this research reiterates the importance of disaggregating STEM (Miner 2019; Fry et al. 2021) Here at the University of Arizona, STEM is a collection of vastly different fields of study with unique institutional cultures and normative academic pathways. Paying attention to these differences can help to inform further qualitative inquiry into why observed disparities exist in some areas but not others and later to derive localized interventions to improve student outcomes. In what follows we summarize key findings from the study followed by related recommendations based on these findings.

Key Findings

The key findings from the analyses show that having a STEM major, specific major groups based on the Times Higher Education World University Rankings (WUR) categories, financial need, certain IPEDS race/ethnicity groups, and first-generation student status are characteristics that contribute to graduation and attrition rates. Other variables, including GPA, time spent in school, and the number of units taken in a semester also contribute to attrition rates. The next three sub-sections outline the results of the analyses.

Survival Analysis - Individual Characteristics

In this analysis, each variable was evaluated individually to explore its impact on six-year graduation rates for female students at the university.

STEM Majors were found to have lower graduation probabilities throughout six academic years. Pursuing a STEM major reduces a female student's chances of graduating in six academic years by 7%.

IPEDS Race/Ethnicity analysis showed that Native American or Alaska Native students, Native Hawaiian or Other Pacific Islander students, and Black or African American students have lower graduation probabilities throughout the six academic school years. Particularly, identifying as Native American or Alaska Native reduces a female student's chances of graduating in six academic years by 53% compared to the baseline White Students. Hispanic students have a 24% less chance of graduating in six years compared to the baseline White Students. Students who did not report their race or identified as White or Asian have higher graduation rates.

Students with Remaining Financial Need (unmet need) were found to have lower graduation probabilities throughout the six academic school years. Students with unmet needs have a 9% reduced chance of graduating in six academic years compared to students who have all their financial need met. Unmet need refers to a student who has remaining financial need after merit and need based financial support is provided.

First Generation students were found to have lower graduation probabilities throughout the six academic school years. Students who identify as first generation have a 25% reduced chance of graduating in six academic years compared to students who are not first generation.

THE World University Rankings (WUR) Categories showed that students in the fields of Physical Sciences, Computer Science, and Arts and Humanities have lower graduation rates throughout the six academic school years. Particularly, being a student in the field of Physical Sciences reduces the chance of graduating by 24%, being a student in the field of Computer Science reduces the chance of graduating by 14%, and being a student in the field of Arts and Humanities reduces the chance of graduating by 19% compared to the baseline of Psychology Majors. Students in the fields of Business and Economics, Law, and Education and Social Sciences have higher graduation rates.

Pell Grant Recipients (at any point) In the multivariate survival analysis, where all characteristics were analyzed together, female students who received a Pell Grant at any point in their academic career had a higher likelihood of graduation. If a female student received a Pell grant at any point in their academic career, there was a 15% positive affect on graduation rates. Pell Grant recipients were not found significant in the individual survival analysis.

Survival Analysis - Multivariate Cox Regression Analysis for Graduation Probability

In the analysis of cross characteristics where the characteristics above were evaluated together on their impact on graduation rates, **female students who identify as First Generation, Black or African American, Native American or Alaska Native, or Hispanic or Latina; have remaining financial need after financial aid and other loans are dispersed; or who are in Arts and Humanities, Physical Sciences, or Computer Sciences majors have a have a lower likelihood of graduating in six academic years.** The STEM Major flag did not show a particular effect on graduation rates when all characteristics were analyzed together.

Attrition (Churn) Analysis

The churn analysis shows which characteristics put female students most at risk of early attrition in their academic career. **Cumulative GPA and time since entry are the strongest characteristics for attrition. Without considering grades, time, or units taken, the World University Rankings (WUR) Categories, including Arts and Humanities and Physical Sciences, First Generation status, Residency, and STEM Majors are top variables that contribute to attrition rates. This analysis is different from survival analysis and only evaluates attrition rates.**

Data

The data was sourced from the University's Enterprise Data Warehouse and includes undergraduate student enrollment and grade characteristics as well as self-reported demographic characteristics from UAccess Student. The data was limited to undergraduate students who self-identified as female in UAccess Student upon entry in their first term at the university. The data is additionally limited to first-time full-time undergraduate students who entered in a Fall term on the Main campus and only includes Fall and Spring terms, beginning with Fall 2011 and ending with Spring 2022.

In total this data represents 37,875 unique students, with one row per student per term and major. The data includes all majors (not only primary majors); it is also not limited to only students in STEM. After cleaning and processing, the dataset was limited to Main Campus degree-seeking first-time full-time female undergraduate students who entered in a Fall semester and were enrolled for six academic years or less, this resulted in 37,164 unique students. A summary table of the proportions by characteristic is shown below.

Characteristic	Group	% of Students
STEM Distinction	STEM Major	31%
	Non-STEM Major	69%
IPEDS Race/Ethnicity	Asian	6%
	Black or African American	3%
	Hispanic or Latina	25%
	International	3%
	Multiracial	5%
	Native American or Alaskan Native	1%
	Native Hawaiian or Other Pacific Islander	0%
	White	55%
	Not Reported	1%
The WUR Academic Majors	Arts and Humanities	14%
	Business and Economics	14%
	Clinical, Pre-clinical and Health	14%
	Computer Science	2%
	Education	4%
	Engineering and Technology	4%
	Law	1%

Characteristic	Group	% of Students
	Life Sciences	18%
	Physical Sciences	4%
	Psychology	8%
	Social Sciences	12%
First Generation Student	First Generation	30%
	Not First Generation	70%
Residency	Arizona Resident	63%
	Domestic Resident	34%

Many variables were used in the full analysis, but this report will only include variables that showed statistical significance. The variables that were statistically significant ($p <= .05$) in the analysis include:

- IPEDS Race/Ethnicity is based on self-reported race/ethnicity in UAccess Student upon entry to the university. A description of IPEDS race/ethnicity can be found in the Appendix.
- Times Higher Education World University Rankings Category (WUR Category), which categorizes majors into academic disciplines; majors are unique to each term the student is enrolled. A list of majors by WUR Category can be found in the Appendix.
- Unmet Need is based on remaining financial need after merit and need based financial support has been disperesed. Financial aid values include merit and need based aid and exclude gift aid and loans.
- First Generation status, based on self-reported information from the student's application to the university.
- STEM major, which indicates whether a student has a STEM major in the term based on definitions from the Arizona Board of Regents, Department of Education (DOE), National Center for Education Statistics (NCES), and National Science Foundation (NSF). The list of majors by WUR Category in the Appendix includes a STEM designation by major.

Other variables in the data include:

- Graduated in Plan, which indicates whether a student graduated in the term.
- Number of credits attempted in the term, number of credits earned in the term, GPA in the term, and cumulative GPA in the term.

Variables that were evaluated and determined not to be statistically significant ($p > o.05$) in all analyses include:

- Pell Recipient, which indicates whether as student is a recipient of a Pell Grant at any point during their college career.

- Residency, based on the student's residency upon entry in their first term at the university.
- Age, which is split into two groups, above and below 25 years.

The data spans enrollment from Fall 2011 through Spring 2022. Each semester is counted as a term (t). When a student is enrolled in their first Fall semester, t = 1. Their first Spring semester is t = 1.5.

In the analysis a variable is used for graduation with 1 representing graduating in the term and 0 representing not graduating in the term. This variable is not a strict binary because non-graduations can be used as a placeholder until a student has graduated. For example, students who started at the University in Fall 2020 will most likely still be taking classes in Fall 2021 instead of graduating, these students are marked as 0. Overall, most graduations for first-time, full-time Female students occur in the Spring of the fourth academic year, t = 4.5.

Methodology

Survival analysis and Churn analysis were the primary methods used in this analysis.

Survival Analysis

Survival analysis is typically used to measure lifetimes of populations or products to predict subscription rates of customers. Here the survival analysis methods of Kaplan-Meier Analysis, Log-Rank Test, and Proportional Hazard Analysis are used to explore questions like, what is the probability that an individual will graduate at a certain point in time in their academic career, and do the identities and majors of women in STEM affect their retention levels? This initial exploratory analysis covers a snapshot of different points in a student's college career.

In the Kaplan-Meier Survival Analysis, censoring occurs if a student has not experienced the event of interest (graduation) by the end of the time period (Spring 2022). This could indicate that a student has dropped out, taken a semester off before returning, or is currently enrolled and has not yet reached a time period during which they could graduate. For example, if a student first enrolled in Fall 2021, they would most likely censor in the first year because there is no data for their progress past Spring 2022 (since the data ends after the Spring 2022 terms)

The Log-Rank Test is the sum of the differences between the observed and expected events for a particular term. It is similar to a chi-square test in that it shows if there is a significant difference between groups. It does not show the probability effect. To determine the probability effect, Proportional Hazard Analysis is used.

The Univariate Cox-Regression score shows the hazard ratio between groups at any particular point in time and is interpreted as the instantaneous rate of graduation for those who are still in school. The Proportional Hazard Analysis shows the group within the variable that most affects graduation. This analysis represents graduation effects in a negative or positive manner along with the amount they contribute to the likelihood of graduation. This is a time dependent

analysis, so the value at each term affects the overall output. In this model, censoring does not have an effect nor does it represent a probability of risk. As a continuation of survival analysis, the hazard ratio explains rates of graduation. In this report, a higher hazard rate means a higher likelihood of graduation.

Churn Analysis

Churn analysis is typically used to track when someone will stop being a customer or user of a product or service. For the purposes of this analysis, churn analysis explores student attrition. This analysis applies three binary classification models that predict student attrition. The three models used to analyze this binary classification prediction were a logistic regression, a decision tree model, and a random forest model. Logistic regression models attempt to predict the probability of belonging to a group. Decision tree models use characteristics of the variables to separate the groups in a tree like structure and understand how they are related. Random forest models are a combination of multiple decision trees analyzed together to find a more accurate relationship of group variables. Logistic regression was found to be the best fitting model for the analysis, so only its results will be presented in this report.

Results

Survival Analysis - Individual Characteristics

Analysis Review

The preliminary survival analysis examined graduation rates for each characteristic individually.

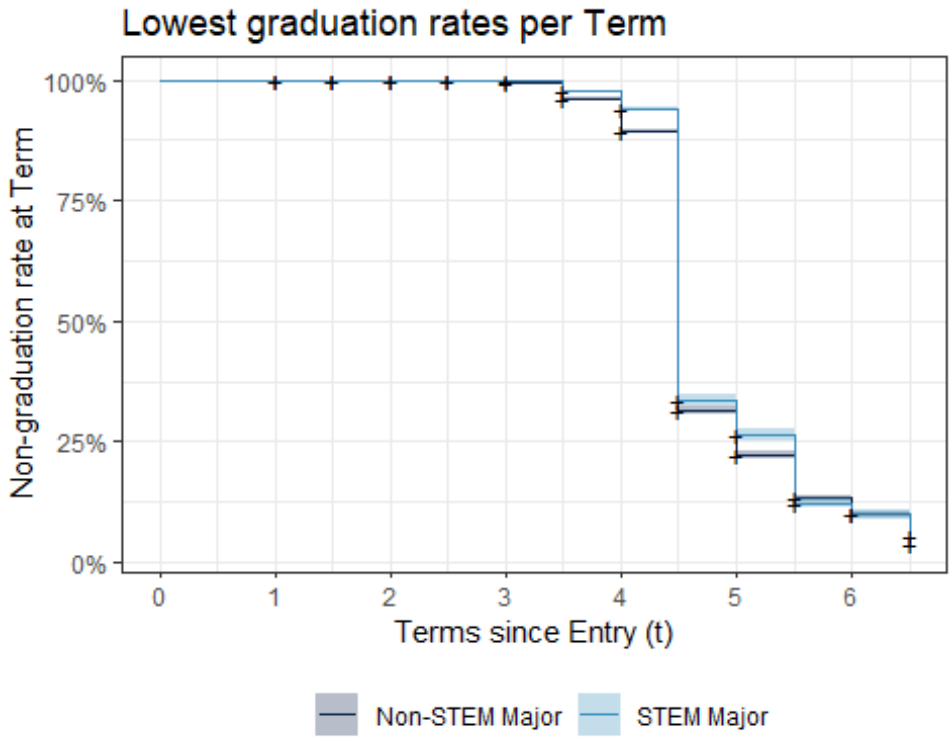
This analysis explores female students' experiences using financial, demographic, and academic characteristics and estimates the probability of graduating of student from a 10-year time period (Fall 2011 - Spring 2022). Each semester of a student's carrer is considered a single time period. For example, t=1, is the Fall semester of a student's first academic year, and t=1.5, is the Spring semester of the student's first academic year. This analysis is supported by the Kaplan-Meier, Log-Rank Test and the Cox Regression analysis methods.

STEM Major vs. Non-STEM Majors

Kaplan-Meier Analysis: Students in STEM Majors have a slightly lower probability of graduating than non-STEM majors. The Kaplan-Meier Model shows that at the Spring semester of their fourth year, non-STEM majors have a 68% graduation rate, whereas STEM majors have a 64% graduation rate.

Log-Rank Test and Univariate Cox Regression: The Log-Rank test and Proportional Hazard Analysis show that STEM majors have a different graduation experience, including a negative β coefficient, meaning the likelihood of graduation is lower for STEM majors throughout six academic years. The hazard ratio provides the effect size of the variable, here it shows that being a STEM major negatively affects graduation rates by 4%, meaning STEM majors have a 4% reduced chance of graduating by the Spring of their sixth academic year.

The graph below shows the probability of not graduating in each term for women in STEM and non-STEM majors. In the graph, starting in t = 4.5 (the Spring of a student's fourth year), the probability of not graduating begins to spread out with STEM major students having lower likelihood of graduating that term. The plus signs in the graph indicate students censoring, censor data points are the unavailable data for a given student. This includes students who have 0 units or 0 cumulative GPA, took time off, or have not yet reached that particular term in their college career.



IPEDS Race/Ethnicity

Kaplan-Meier Analysis: The Survival analysis shows that students with lower graduation rates include Native American or Alaska Native students (35% graduation rate at t = 4.5), Native Hawaiian or Other Pacific Islander students (55% graduation rate at t = 4.5), and Black or African American students (58% graduation rate at t = 4.5). At the Spring semester of their fourth year, t = 4.5, the students with higher graduation probabilities are those with no reported racial identities (74% graduation rates), White students (73% graduation probability), and Asian students (69% graduation rates).

Log-Rank Test and Univariate Cox Regression: With White students as a baseline control group, the Cox Regression analysis shows Native American or Alaska Native students have a negative β coefficient meaning the likelihood of graduating is lower throughout the six academic years. The hazard ratio provides the effect size of the variable, and it shows that identifying as Native American or Alaska Native negatively effects graduation rates by 53%, meaning Native American or Alaska Native female students have reduced chances of graduating by 53%. The

Log-Rank test shows that Hispanic or Latina students have the most statistically significant difference in graduation experience aside from White students, meaning students in this group graduate at different rates compared with other race/ethnicity.

The Cox Regression analysis shows that Black or African American students, Hispanic or Latina students, and Multiracial students also have negative β coefficients with varying Hazard Ratio effects on graduation, meaning female students in these three race/ethnicities have lower likelihoods of graduating compared to White students. All other race/ethnicities were not significant in the Cox-Regression analysis (Asian International, Native Hawaiian or Other Pacific Islander students).

Because The University of Arizona is a Hispanic Serving Institution, it is noted that Hispanic or Latina students have a negative β coefficient meaning the likelihood of graduating is lower throughout the six academic years. The hazard ratio provides the effect size of the variable, and it shows that identifying as Hispanic or Latina negatively effects graduation rates by 22%, meaning Hispanic or Latina female students have reduced chances of graduating by 22%.

Remaining Financial Need (Unmet Need)

Kaplan-Meier Analysis: The survival analysis shows that students with remaining financial need (unmet need) have a graduation rate of 63% at term t = 4.5, which is lower than those without a remaining financial need (71% probability of graduating).

Log-Rank Test and Univariate Cox Regression: The Log-Rank test and proportional hazard analysis show that students with a unmet need have a different graduation experience. Particularly, they show a negative β coefficient meaning the likelihood of graduation is lower throughout the six academic years. The hazard ratio provides the effect size of the variable, and it shows that students with unmet need experience negative effects their graduation rates of 18%, meaning being a student with unmet need reduces chances of graduating by 18%.

First Generation Students

Kaplan-Meier Analysis: The Survival analysis shows that first generation students have a graduation rate of 60% at term t = 4.5, which is lower than those who are not first generation students (70% probability of graduating).

Log-Rank Test and Univariate Cox Regression: The Log-Rank test shows that First Generation students have a different graduation experience. Particularly, the proportional hazard analysis shows that they have a negative β coefficient meaning the likelihood of graduation is lower throughout the six academic years. The hazard ratio provides the effect size of the variable, and it shows that first generation students experience negative effects to their graduation rates 25%, meaning being a first-generation student reduces chances of graduating by 25%.

THE World University Rankings (WUR) Categories

Kaplan-Meier Analysis: Female students with lower graduation rates in THE WUR categories include Physical Science Majors (48% graduation rate at t = 4.5), Computer Science majors (54%

graduation rate at t = 4.5), and Arts and Humanities majors (59% graduation rate at t = 4.5). Female students with higher graduation rates in the Spring semester of their fourth year (t = 4.5), are Business and Economics majors, (82% graduation rate), Law majors (73% graduation rate), and Education and Social Science majors (72% graduation rates).

Log-Rank Test and Univariate Cox Regression: With a control group of Psychology, the Log-Rank test shows that Business and Economics majors and Physical Science majors have a different experience than other groups, meaning students in these majors graduate at different rates compared to other groups. Both groups maintain the highest and lowest hazard ratio effects, respectively. Specifically, the proportional hazard analysis shows that Physical Sciences, Computer Science, and Arts and Humanities majors have a negative β coefficients meaning the chance of graduating is lower throughout the six academic years. The hazard ratio provides the effect size of the variable, and it shows that being a Physical Science major reduces a student's chance of graduating by 39%; being a Computer Science major reduces a student's chance of graduating rates by 28%; and having an Arts and Humanities major reduces a student's chance of graduating by 19%. Business and Economics Majors also show a different graduation experience, but they have a positive β coefficient meaning the likelihood of graduation is higher throughout the six academic years and having this major increases graduation rates by 39%. All other majors were not statistically significant.

Survival Analysis - Multivariate Cox Regression Analysis

Multivariate analysis is used to explore how the characteristics jointly impact graduation. Each group characteristic is analyzed against the rest. Because most of the characteristics are categorical, a reference or baseline group is selected based on their high graduation rates. Continuous variable groups use 0 as a baseline. Overall, the reference group does not change the statistical significance, but it does slightly alter the hazard ratio values meaning it slightly changes the likelihoods of graduation in comparison to the baseline group.

An explanation of the statistically significant variables and findings from this multivariate analysis follows.

- Some IPEDS Race/Ethnicity groups show significant differences in graduation rates. Comparing all ethnicities to White students as a baseline control group: Black or African American students have a negative β coefficient, meaning the likelihood of graduation is lower throughout the six academic years. The hazard ratio provides the effect size of the variable, meaning identifying as a Black or African American student negatively reduces a student's graduation rate by 28%; Native American or Alaska Native students have a negative β coefficient, meaning the likelihood of graduation is lower throughout the six academic years with a hazard ratio of 52%, meaning identifying as a Native American or Alaska Native student negatively reduces a student's graduation rate by 52%; Hispanic or Latina students have a negative β coefficient, with a hazard ratio of 21%, meaning identifying as a Hispanic or Latina student negatively reduces a student's graduation rate by 21%; and Multiracial students have a negative β coefficient with a hazard ratio

of 17%, meaning identifying as a Multiracial student negatively reduces a student's graduation rate by 17%

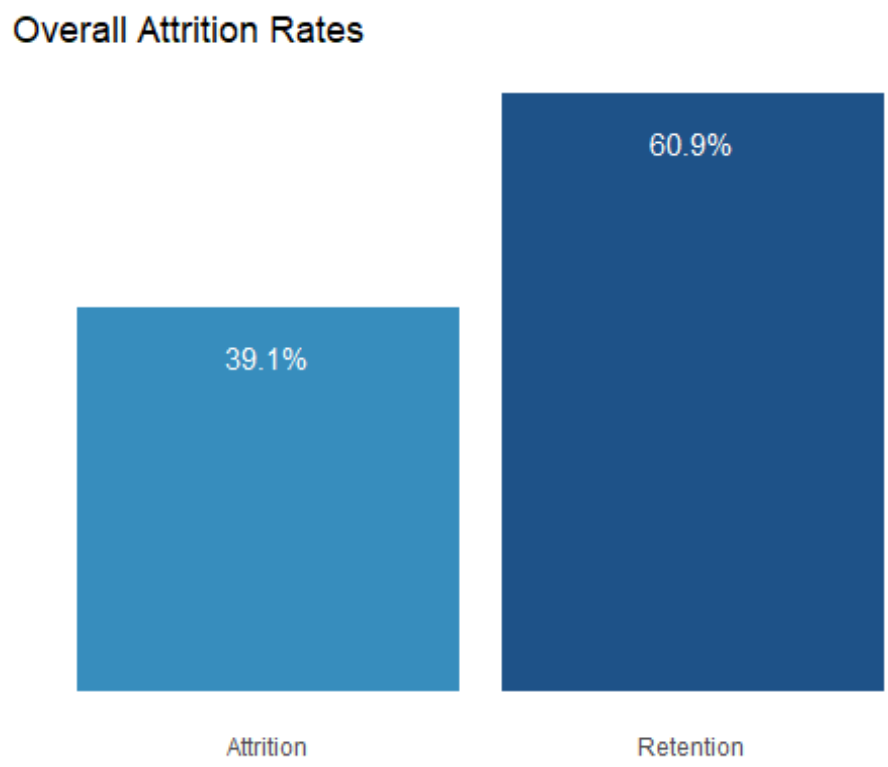
- Remaining Financial Need (unmet need) ($p<.05$) has a negative β coefficient, meaning the likelihood of graduation is lower throughout the six academic years when compared with students who do not have unmet financial need. The hazard ratio shows that being a student with unmet need negatively reduces graduation rates by 5%.
- First Generation ($p<.001$) has a negative β coefficient, meaning the likelihood of graduation for first generation students is lower throughout the six academic years compared with non-first generation students. The hazard ratio shows that being a first-generation student reduces graduation rates by 25%.
- Receiving a Pell Grant at any point ($p<.001$) has a positive β coefficient, meaning the likelihood of graduation is higher throughout the six academic years compared with students who did not receive a Pell Grant. The hazard ratio shows that receiving a Pell Grant at any point in a student's academic career increases graduation rates by 15%.
- Some World University Rankings (WUR) Categories show significant differences in graduations rates. Comparing all majors to Psychology as a baseline control group: Physical Sciences ($p<.001$) has a negative β coefficient, meaning the likelihood of graduation is lower throughout the six academic years, and has a hazard ratio of 41%; Computer Science ($p<.001$) has a negative β coefficient, and has a hazard ratio of 37%; Arts and Humanities ($p<.001$) has a negative β coefficient, and has a hazard ratio of 20%. Business and Economics ($p<.001$) has a positive β coefficient, and has a hazard ratio of 32%.

The Multivariate Cox Regression Analysis shows that in combination with multiple characteristics, female students who identify as First Generation, Black or African American, Native American or Alaska Native, or Hispanic or Latina, have remaining financial need after financial aid and other loans are dispersed, and who are in Arts and Humanities Majors, Physical Sciences, or Computer sciences majors have a have a lower likelihood of graduating in six academic years.

Churn (Attrition) Analysis

This analysis uses churn to track student attrition rates. Here, churners are students who have left the University of Arizona without graduating, designated as Attrition (1), Non-churners, are students who have graduated or are still in school, designated as Retention (0). There is a 39.1% attrition rate throughout the observed time period.

An important distinction between this analysis and the previous one is that these results show attrition rates, they do not show graduation rates. *A table of Attrition/Retention Rates by group characteristics can be found in the Appendix.*



Logistic Regression Model

The Logistic Regression model output had the highest precision and AUC scores, meaning it was the best at predicting attrition. The model's top significant variables that reduce attrition rates, are some IPEDS race/ethnicity groups including Asian, Hispanic or Latina, Not Reported, and White; students with unmet financial need; and World University Rankings (WUR) groups including Business and Economics, Clinical, Pre-clinical and Health, Education, Engineering and Technology, Law, Psychology, and Social Sciences. Variables that increase attrition rates, are non-resident students, first generation students, and having a STEM Major.

When other variables are included, such as cumulative GPAand the time since a student entered school ($p<.001$), they also show a significant reduction on attrition rates.This means that as a student progresses in their degree or has a higher GPA, they are more likely to retain or graduate.

Discussion

In this report, survival analysis and churn analysis were used to evaluate graduation rates per term and attrition indicators based on different demographic characteristics and majors for first-time full-time women at the University of Arizona who entered in a Fall term on the main campus.

In survival analysis, when academic measures such as time since entry, cumulative GPA, and units taken and passed are excluded, demographic characteristics and type of major become

significant indicators of undergraduate female students' likelihood to graduate. In particular, pursuing a major in Arts and Humanities, Physical Sciences, and Computer Science result in lower likelihoods of graduation within six years. Female students who have remaining financial need, are the first in their family to attend college, or identify as Black or African American, Native American or Alaska Native, Hispanic or Latina, or Multiracial also have lower likelihoods of graduation within six years. Female students who identify as White have higher likelihoods of graduating within six years. Female students studying Business and Economics are also more likely to graduate in six years.

The churn analysis shows that female students are most at risk of attrition early in their academic career as well as when their cumulative GPA is below 2.1. Without considering academic progress, characteristics such as the WUR Major Categories (including Arts and Humanities and Physical Sciences), First Generation status, Residency, and Race/Ethnicity are top variables that contribute to female student attrition.

Recommendations

To better assist female students in completing degrees at the university, we recommend greater support for early interventions aimed at students in STEM majors, specifically those who are enrolled in Computer Science or Physical Science disciplines. Similarly, providing additional assistance to students with low GPAs (<2.0) can serve to prevent both academic probation and university attrition. This type of support could take the form of coursework assistance, supplemental college readiness skill-building, as well as greater faculty and advisor mentorship. Many programs already exist on campus, but newer students sometimes remain unaware of these opportunities until they are already struggling. Greater effort could be made to strengthen departmental relationships with cross-campus services like the A Center, Think Tank, the SALT Center, and the Advising Resource Center. Increasing student awareness about existing programs would likely increase their accessibility and utilization.

We recommend special attention to students experiencing financial need. Financial stress is a leading contributor to university attrition. Therefore, an increase of financial support where possible is also suggested since students with no unmet financial need and students who receive Pell grant support are more successful in their pursuit of graduation. More targeted early outreach about existing scholarships, grants, and paid internship opportunities, collaborative student advising efforts between academic advising staff and financial aid staff, and an overall increase in direct, non-merit based, financial assistance could all serve to mitigate attrition risks.

Students who are the first in their family to attend college (first generation) and students from historically underrepresented racial/ethnic groups (students who identify as Black or African American, Native American or Alaska Native, Hispanic or Latina) often experience cultural

challenges related to institutional norms independent of their academic preparedness. Support programs exist for specific student groups (i.e. Thrive Center, Guerrero Student Center, Native American Student Affairs, African American Student Affairs, ASEMS Program). Students who utilize these resources report great benefits from their participation and these in-demand programs could be further expanded to serve the growing population of historically underrepresented students on campus. Additionally, more substantial effort could be made to increase the overall cultural competency of more generalized student service units and academic units on campus. This type of cultural approach that addresses campus climate would be a crucial complement to more academically focused retention efforts. Lastly, this report focuses on the experience of female students at our university. Given the differences in student outcomes that are observable along the axes of racial/ethnic, socioeconomic status, and first-generation status, we recommend that all gender-focused interventions related to student success take an intersectional approach. We suggest that remaining mindful of the differential experiences of 1)BIPOC students, 2) first-generational students, and 3) transgender and non-binary students will only serve to improve any gender-focused interventions to increase institutional diversity, equity, and inclusion.

Appendix

Full Report

A copy of the full analysis report can be provided upon request. Please contact uair@arizona.edu for the document.

Attrition/Retention Rates by Group Characteristics

This table provides the rates of attrition and retention by student characteristics.

Characteristic	Group	Attrition/Retention	Student %
STEM Distinction	STEM Major	Attrition	35%
		Retention	65%
	Non-STEM Major	Attrition	41%
		Retention	59%
	Asian	Attrition	31%

Characteristic	Group	Attrition/Retention	Student %
IPEDS Race/Ethnicity		Retention	69%
	Black or African American	Attrition	54%
		Retention	46%
	Hispanic or Latina	Attrition	44%
		Retention	56%
	International	Attrition	36%
		Retention	64%
	Multiracial	Attrition	43%
		Retention	57%
	Native American or Alaskan Native	Attrition	64%
		Retention	36%
	Native Hawaiian or Other Pacific Islander	Attrition	42%
		Retention	58%
	Not Reported	Attrition	32%
		Retention	68%
	White	Attrition	36%

Characteristic	Group	Attrition/Retention	Student %
		Retention	64%
The WUR Academic Majors	Arts and Humanities	Attrition	57%
		Retention	43%
	Business and Economics	Attrition	29%
		Retention	71%
	Clinical, Pre-clinical and Health	Attrition	35%
		Retention	65%
	Computer Science	Attrition	39%
		Retention	61%
	Education	Attrition	31%
		Retention	69%
	Engineering and Technology	Attrition	18%
		Retention	82%
	Law	Attrition	35%
		Retention	65%
	Life Sciences	Attrition	40%

Characteristic	Group	Attrition/Retention	Student %
		Retention	60%
	Physical Sciences	Attrition	49%
		Retention	51%
	Psychology	Attrition	41%
		Retention	59%
	Social Sciences	Attrition	35%
		Retention	65%
Remaining (Unmet) Financial Need	No Unmet Financial Need	Attrition	39%
		Retention	61%
	Unmet Financial Need	Attrition	32%
		Retention	68%
Residency	Arizona Resident	Attrition	36%
		Retention	64%
	Domestic Resident	Attrition	46%
		Retention	54%
	International	Attrition	36%

Characteristic	Group	Attrition/Retention	Student %
		Retention	64%
First Generation Student	First Generation	Attrition	50%
		Retention	50%
	Not First Generation	Attrition	34%
		Retention	66%

Integrated Postsecondary Education Data System (IPEDS) Race/Ethnicity:

IPEDS race/ethnicity is based on data from self-reported race and ethnicity prompts. Students are first asked if they are Hispanic or Latina, then they are asked to select from one of the following races: Native American or Alaska Native or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and White. If a student does not respond, they are counted as Not Reported. Students are marked as Nonresident alien according to the visa and citizenship information on record at the institution, recorded here as International. Students are then categorized into a single race/ethnicity. If a student identifies as Hispanic or Latina, they are categorized as Hispanic or Latina. If a student identifies as more than one race and not Hispanic or Latina, they are categorized as Multiracial. Otherwise, if a student identifies as one race and not Hispanic or Latina, they are categorized into the single race they selected.

Times Higher Education World University Rankings (WUR) Category Majors by STEM Flag

STEM majors are classified by combining definitions from the Arizona Board of Regents, the National Center for Education Statistics, the Department of Education, and the National Science Foundation. The Times Higher Education World University Rankings (WUR) provides a major category that was used to group majors together into common themes. The table below shows the breakdown of majors by WUR category and by STEM flag.

THE WUR Category	STEM Flag	Majors
Arts and Humanities	Non-STEM Major	No Major Selected A-Center, French 2, Spanish, French, Spanish 2, Studio Art, Creative Writing, English, Film and Television, Classics, German Studies, Art History, Performance, Linguistics, Classics 2, English 2, History, Media Arts, Italian, No Major Selected Arts & Sci, Theatre Production, German Studies 2, Philosophy, Religious Studies, Dance, Russian, No Major Selected Fine Arts, Creative Writing 2, Philosophy 2, Pre-Architecture, Theatre Arts, Regional Development, Music, Performance (Voice), Performance (Harp), Judaic Studies, Performance (Violin), Musical Theatre, History 2, Music 2, Performance (Flute), Performance 2, Studio Art 2, Performance (Trumpet), Linguistics 2, Performance (Viola), Italian 2, No Major Selected Humanities, Russian 2, Film and Television 2, Urban and Regional Development, Religious Studies 2, Arabic2, Judaic Studies 2, Arabic, Theatre Arts 2, Applied Humanities, Art History 2, Prof & Technical Writing, Design Arts & Practice, Game Design & Development, Live & Immersive Arts, World Literature
Arts and Humanities	STEM Major	Architecture
Business and Economics	Non-STEM Major	Finance, Business Economics, Accounting, Business Management, Business Administration, Marketing 2, Retailing & Consumer Science, Pre-Business, Operations Management 2, Operations Management, Marketing, Economics, Entrepreneurship 2, Finance 2, Pre-Retailing & Consumer Sci, Environ & Water Resource Econ, Business Management 2, Economics 2, Personal & Family Fin Planning, Accounting 2, Business Economics 2, Operations & Supply Chain Mgmt, Pre-Economics, Org Leadership & Reg Commerce, Retailing & Consumer Science 2, Pre-Economics 2
Business and Economics	STEM Major	Management Information Systems
Clinical, Pre-clinical and Health	Non-STEM Major	Pre-Nursing, Public Health, Pre-Pharmacy, Pre-Public Health, Care, Health and Society, Nursing, Speech, Language & Hearing Sci, Speech, Lang & Hearing Sci 2, Rehabilitation Studies Service, Public Health 2, Wellness & Health Promo Prac, Medicine

THE WUR Category	STEM Flag	Majors
Clinical, Pre-clinical and Health	STEM Major	Neuroscience & Cognitive Sci, Pharmaceutical Sciences, Neuroscience & Cognitive Sci 2, Pre-Neurosci & Cognitive Sci, Pre-Pharmaceutical Sciences
Computer Science	STEM Major	Computer Science, Information Science & Tech, Pre-Computer Science, Information Science & Arts, Information Science & eSociety, Computer Science 2, Information Science & Arts 2, Pre-Computer Science, BS, Information Science, Pre-Computer Science, BA, Information Science & Tech 2
Education	Non-STEM Major	Elementary Education, Art and Visual Culture Educ, Literacy Learning & Leadership, Pre-Early Childhood Education, Early Childhood Education, Art Education, Special Educ & Rehabilitation, Pre-Education, Music Education, Science Education, Music Education 2, Mild Moderate Disabilities, Pre-Elementary Education, Deaf Studies, Pre-Deaf Studies, Pre-Mild Moderate Disabilities
Engineering and Technology	STEM Major	Biosystems Engineering, Biomedical Engineering, Chemical Engineering, Materials Science & Engr, Electrical & Computer Engineer, Aerospace Engineering, Engineering Management, Civil Engineering, Mining Engineering, Mechanical Engineering, Systems Engineering, No Major Selected Engineering, Industrial Engineering, Applied Science, Environmental Engineering, Cyber Operations, Applied Physics, Architectural Engineering, Intelligence & Info Ops, Biosystems Analytics & Tech, Software Engineering
Law	Non-STEM Major	Law
Life Sciences	Non-STEM Major	Agribusiness Economics & Mgmt, No Major Selected Ag Life Sci, Agricultural Tech Mgmt & Educ, Agricultural Tech Mgmt & Ed 2, Agribusiness Econ & Mgmt 2
Life Sciences	STEM Major	Biochemistry, Nutritional Sciences, Physiology, Molecular & Cellular Biology, Animal Sciences, Biology, Natural Resources, Sustainable Built Environments, Pre-Physiology, Physiology & Medical Sciences, Microbiology, Molecular & Cellular Biology 2, Ecology & Evolutionary Biology, Environmental Science, Sustainable Plant Systems, Environmental Studies, Crop Production, Plant Sciences, Environmental Studies 2, Biology 2, Nutritional Sciences 2, Biochemistry 2, Microbiology 2, Pre-Nutritional Sciences, Bioinformatics, Natural Resources 2, Landscape Architecture, Ecology & Evolutionary Biol 2, Animal Sciences 2, Precision Nutrition & Wellness, Applied Biotechnology, Food Safety

THE WUR Category	STEM Flag	Majors
Physical Sciences	Non-STEM Major	No Major Selected Science, General Studies, Interdisciplinary Studies, Nutrition and Food Systems
Physical Sciences	STEM Major	Mathematics, Statistics and Data Science, Chemistry, Astronomy, Environ Hydrology & Water Res, Geosciences, Optical Sciences & Engineering, Mathematics 2, Physics, Astronomy 2, Physics 2, Chemistry 2, Hydrology and Atmospheric Sci, Statistics and Data Science 2, Geosciences 2
Psychology	Non-STEM Major	Psychology, Psychology 2
Psychology	STEM Major	Psychological Science, Pre-Psychological Science
Social Sciences	Non-STEM Major	Latin American Studies, Global Studies, Sociology, Journalism, Pre-Family Studies & Hum Dev, Communication, Family Studies & Human Dev, Political Science, Pre-Journalism, Anthropology, Public Management & Policy, Geography, No Major Selected Soc Beh Sci, Political Science 2, Middle East & N African St 2, East Asian Studies, Middle East & N African St, Africana Studies, Gender & Women's Studies, Family Studies & Human Dev 2, Gender & Women's Studies 2, Latin American Studies 2, Communication 2, Anthropology 2, Journalism 2, Sociology 2, Public Management & Policy 2, Mexican American Studies, East Asian Studies 2, Geography 2, Africana Studies 2, Mexican American Studies 2, Government and Public Service, American Indian Studies, American Indian Studies 2, Human Services, Fashion Industry Sci & Tech, Studies of Global Media
Social Sciences	STEM Major	eSociety, Geographic Info Sys Tech, Food Studies
Missing	Non-STEM Major	Veterinary Science, Criminal Justice Studies, Philosophy,Politics,Econ & Law, Veterinary Science 2, Phil, Politics, Econ & Law 2

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