Gender Differences in Dropout Rates Across Course Types in Higher Education

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Abstract
This study investigates the impact of gender and course type on dropout rates in higher education using data from the Polytechnic Institute of Portalegre in Portugal, spanning 2008 to 2019. Logistic regression analysis reveals that female students, especially in STEM and Design and Multimedia courses, have lower dropout rates than male students. Conversely, the highest dropout rates are observed in health and nursing courses, particularly among males. Students who are married, in a relationship, or have debt exhibit higher dropout rates. Mothers with higher education degrees reduce the likelihood of students dropping out. Further research is needed to determine if customized support is necessary to improve academic outcomes and ensure educational equity for at-risk students, particularly males in specific course categories.

Key Words: Gender, Dropout Rates, Higher Education, Course Types, Student Retention

Introduction
Entering college is a significant milestone for many students, but numerous challenges must be overcome to graduate and complete their education. These challenges vary depending on factors such as gender, course types, and racial background. This study investigates how gender and course type affect dropout rates in higher education, using ten years of data from the Polytechnic Institute of Portalegre in Portugal.

Literature Review
Research on how gender affects dropout rates across different types of courses in higher education has shown mixed results. Mastekaasa (2008) found that female students are more likely to stay in courses with many other female students. My study aims to extend this understanding by examining how the percentage of female students in various courses affects dropout rates. Severiens (2012) argued that the proportion of males and females in academic programs significantly influences retention rates and reasons for leaving. Almås (2016) highlighted that family and personal traits play a crucial role in dropout decisions, with different factors affecting male and female students. Lowes (2016) found that in online high school courses, female students participated more, but male students' participation was more closely linked to better academic performance. These studies show the importance of considering both gender and course type to better understand dropout rates.

Understanding the impact of different course types on dropout rates is essential for improving education quality. Niu (2018) and Lee (2011) emphasized the importance of identifying factors that influence dropout rates. Niu focused on online courses like MOOCs, while Lee categorized the causes into student-related, course/program-related, and environment-related factors. Pierrakeas (2004) and Parker (1999) looked into online and distance learning, finding that a student's control over their learning and financial support are significant factors in retention. This research highlights that understanding dropout rates requires looking at many different factors, including the type of course and the student's situation.

Studies on how gender influences experiences in higher education show varied results. Richardson (1991) did not find strong evidence that men and women learn in significantly different ways. However, Harrop (2007) noted that before starting their courses, men and women set different goals, chose different learning activities, and faced distinct challenges. Lörz (2011) suggested that fewer women enroll in higher education and choose technical fields because they perceive the job market differently, are more risk-averse, and have different motivations for selecting their study areas. These findings indicate that gender plays a crucial role in various educational decisions and experiences, underlining the importance of understanding these differences to address the gender gap in dropout rates from different types of courses in higher education.

Research examining how gender, the type of course, and dropout rates are connected has shown varied outcomes. Pittman (1991) concluded that social aspects, more than the type of course, played a pivotal role in students deciding to leave their studies. While the direct measurement of broad social interactions and their impacts on student dropout rates is beyond the scope of this study due to data limitations, this research aims to partially address these aspects through control variables such as marital status, attendance timing, socioeconomic background indicated by parents' educational levels and occupations, scholarship status, and age at enrollment. These variables offer a lens to understand some dimensions of students' social contexts and their potential effects on educational persistence, providing a nuanced analysis within the constraints of the available data.

Alspaugh (2000) observed that boys were more likely to drop out than girls, especially during the transition to high school. Xenos (2002) noted that female students had lower dropout rates in computer science courses, which was not due to the difficulty of the course. Patterson (2009) found that students taking online courses had a higher likelihood of dropping out, though this trend did not significantly differ by gender. These studies suggest that the reasons behind dropout rates are complex and influenced by a variety of factors beyond just gender and course type.

Research indicates that dropout rates in higher education result from the intricate interaction among socioeconomic factors, gender, and the type of course a student is enrolled in. Pittman (1991) discovered that social connections within the educational setting, rather than the nature of vocational or business courses, had a stronger link to dropout rates. Alspaugh (2000) pointed out that students from lower socioeconomic (SES) backgrounds tend to have higher dropout rates, underlining the impact of socioeconomic status. Mastekaasa (2008) further highlighted how gender plays a role, with female students showing a higher tendency to continue their studies in fields traditionally dominated by males like computer science, engineering, physics, and certain specializations within mathematics and technology. Patterson (2009) contributed to the discussion

by noting that students in online courses, who might encounter unique socioeconomic and gender challenges, are more likely to drop out than those attending courses on campus. Venegas-Muggli (2020) discovered that older college freshmen who have children and are working, enrolled in longer programs, and are more likely to drop out. Jorgensen (2009) identified being male, with lower high school results and who are male are more likely to drop out. Houseknecht (1980) showed that better-educated women, especially those who studied for more than five years, have more marital problems, with the main reasons connected to their job, their race, and their income. In addition, (Dwyer, 2013; 2012) identified that high student debt is associated with a higher likelihood of dropping out of college (Dwyer, 2013; 2012). These findings collectively show that dropout rates are affected by a variety of complex and interconnected factors.

Studies consistently show a correlation between the college dropout rate and parents' occupations. Martinez (2009) observed that students whose parents had less education are more at risk of dropping out with the situation affected by college grades, test scores, scholarships, loans, and working full-time. Lundetræ (2011) and Foley (2014) both found that parental education significantly predicted dropout, with Foley further emphasizing the importance of a student's cognitive skills and how much parents value education. These findings highlight the importance of providing extra support to students from lower socioeconomic backgrounds in completing their college education.

The literature review on gender differences in dropout rates across course types in higher education highlights a complex landscape where gender interplays with various factors to influence student retention. Studies by Mastekaasa (2008), Severiens (2012), and Almås (2016) suggest that gender composition within courses, alongside family and personal characteristics, significantly affects dropout decisions. Investigations into online and distance learning by Pierrakeas (2004) and Parker (1999) further emphasize the multifactorial nature of dropout rates, affected by factors such as a student's autonomy and financial support. Additionally, studies by Harrop (2007) and Lörz (2011) reveal gender-specific goals, learning activities, and motivations, illustrating the nuanced role gender plays in educational experiences. This research intends to deepen the understanding of these dynamics by analyzing how course type specifically impacts dropout rates and how these impacts may differ between males and females, accounting for variables like marital status and socioeconomic background. The study will enhance the body of knowledge by explicating the nuanced ways gender and course type converge to affect higher education outcomes.

Research Objective

This study aims to investigate how the type of course affects dropout rates within higher education and to explore whether this effect differs between male and female students. By considering additional variables such as marital status, attendance patterns, and socioeconomic background, this research seeks to offer a detailed analysis of the factors influencing students’ decisions to complete their studies.

Research Methodology

This research analyzes a dataset from the Polytechnic Institute of Portalegre, covering academic years from 2008/09 to 2018/2019. The methodology involves quantitative analysis, categorizing courses into broader academic fields and employing logistic regression analysis, by using Stata Software, to assess the predictive power of course type on dropout rates. Special attention was paid to gender as a key variable, alongside controlling for factors like marital status and socioeconomic status to isolate the effects of course type on dropout rates accurately.

Research Significance

This study holds significance in enhancing understanding of the factors that influence student retention in higher education. By identifying key predictors of dropout rates, this study guides specific interventions designed to support at-risk students to improve their educational achievements. Additionally, the acquired insights may help policymakers and educators for better resource allocation and foster a more inclusive academic setting.

Research Questions:

1. Does the likelihood of dropout vary across types of courses?
2. Does the pattern of differences in dropouts by course type differ between male and female students?

Hypotheses:

1. Null Hypothesis (H0): There is no significant difference in dropout rates across different course types when comparing male and female students.
2. Alternative Hypothesis (H1): There is a significant difference in dropout rates across different course types when comparing male and female students.

About the dataset

This study draws on a detailed dataset from the Polytechnic Institute of Portalegre in Portugal, covering student records from academic years 2008/09 to 2018/2019. The dataset encompasses a diverse array of undergraduate programs, including but not limited to agronomy, design, education, and nursing, capturing information on 4,424 student records. Each record provides a wealth of information, including students' academic backgrounds, demographic details, socio-economic indicators, and academic achievements.

This dataset holds significant value as it has the potential to enhance our understanding of the factors that influence student retention and success in higher education. By providing insights into the dropout rates across various programs and student demographics, it serves as a valuable resource for educators, policymakers, and researchers striving to enhance educational outcomes. This study aims to contribute to the development of a more supportive and effective educational environment, lowering dropout rates and promoting student accomplishments in higher education.

Limitations of the dataset and Redefining or Reclassification of the variables

While the dataset provides extensive information, it is important to acknowledge certain limitations encountered during its analysis. My access to the dataset was through online platforms, specifically the www.kaggle.com and archive.ics.edu , which may not have housed the original, comprehensive data. In order to adapt with the limitations, I reclassify all the variables I plan to use into more manageable categories. This step helps me to simplify complex data for clear analysis and to handle any undefined or missing information.

In the dataset, the 'Course' variable initially included 17 distinct types. To streamline the analysis, these have been consolidated into five broad academic categories as shown in Table 1. In 'STEM' category, courses related to engineering, mathematics, science and technology are encompassed. Courses that focus on creative design and multimedia are grouped together under the 'Design and Multimedia' category. 'Health and Nursing Courses' include all programs centered on health care and medical training. 'Management and Business Courses' cover subjects related to business theory and practice. Finally, the 'Education and Communication Courses' category combines courses oriented towards education, communication, and social services. These redefined categories allow for a more efficient analysis of the relationship between course type and student outcomes.

Course Code	Course Type	Course Label
1	STEM	Biofuel Production Technologies
		Agronomy
		Informatics Engineering
		Equiniculture
2	Design and Multimedia	Animation and Multimedia Design
		Communication Design
3	Health and Nursing Courses	Veterinary Nursing
		Nursing
		Oral Hygiene
4	Management and Business Courses	Management
		Tourism
		Advertising and Marketing Management
		Management (evening)
5	Education and Communication Courses	Social Service
		Social Service (evening)
		Journalism and Communication
		Basic Education

Table 1: Course Categories

The primary outcome variable, 'Academic Outcome,' originally had three categories: 'dropout,' 'enrolled,' and 'graduated.' I simplified this into a binary variable, 'Education Status,' where 'Non-Dropout' (enrolled and graduated) is coded as '0' and 'dropout' as '1.' For 'Marital Status,' I reduced six categories to four: 'single' and 'married' remained unchanged, 'divorced' included widowers and the legally separated, and 'other' included de facto unions. Parents' educational qualifications were condensed into three categories: 'Lower Education' (primary and secondary), 'Higher Education' (bachelor's, master's, and doctorate), and 'Unknown or Other' (unclear or missing information). The 'debtor' variable was redefined into 'with debt' and 'without debt.' These reclassifications simplify

the dataset, enabling a more focused analysis of how course type, gender, and other factors influence student dropout rates.

Descriptive Statistics Table of Different variables

Variable Category	Variable	Frequency	Percent	Cumulative Percent
Marital Status	Single	3,919	88.58%	88.58%
	Married/Partnered	414	9.36 %	97.94%
	Divorced/Separated	91	2.06%	100%
Course Type	Health and Nursing Courses	1,189	26.88%	26.88%
	Design and Multimedia	441	9.97%	36.85%
	STEM	533	12.05%	48.90%
	Management and Business Courses	1,168	26.40%	75.30%
	Education and Communication Courses	1,093	24.71%	100%
Attendance	Daytime	3,941	89.08%	89.08%
	Evening	483	10.92%	100%
Mother's Qualification	Lower Education (Primary/Secondary)	1,125	25.43%	25.43%
	Higher Education (Bachelor/Master's/Doc	591	13.36%	38.79%
	Unknown or Other	2,708	61.21%	100.00%
Father's Qualification	Lower Education (Primary/Secondary)	3,181	71.90%	71.90%
	Higher Education (Bachelor/Master's/Doc	407	9.20%	81.10%
	Unknown or Other	836	18.90%	100.00%
Mother's Occupation	Professional/Administrative	915	20.68%	20.68%
	Service/Skilled	1,438	32.50%	53.19%
	Unskilled/Other	2,071	46.81%	100.00%
Father's Occupation	Professional/Administrative	843	19.06%	19.06%
	Service/Skilled	1,144	25.86%	44.91%
	Unskilled/Other	2,437	55.09%	100.00%
Living Status	Out of state student or Int'l Student	2,426	54.84%	54.84%

	Local Student	1,998	45.16%	100%
Debt Status	Without Debt	3,921	88.63%	88.63%
	With Debt	503	11.37%	100%
Gender	Male	1,556	35.17%	35.17%
	Female	2,868	64.83%	100%
Scholarship Status	No Scholarship	3,325	75.16%	75.16%
	Scholarship Holder	1,099	24.84%	100%
Age at Enrollment	Young Adults: 17-24 years old	3,287	74.3	74.30%
	Middle-Aged Adults: 25-44 years old	1,003	22.67	96.97%
	Older Adults: 45-64 years old	134	3.03	100%
Educational Status	Non-Dropout	3,003	67.88%	67.88%
	Dropout	1,421	32.12%	100%f
Total Observation		4,424		

Table 2: Descriptive Statistics Table of Different variables

Findings

Analyzing the Impact of Socio-Demographic Factors and Course Type on Dropout Rates: A Logistic Regression Approach

Examining the factors influencing dropout rates in logistic regression analysis revealed significant predictors across demographic and educational variables. Students enrolled in Design and Multimedia and STEM courses exhibit significantly lower odds of dropping out (ORs = 0.58 and 0.442, respectively, both $p < 0.001$) as described in table 3, indicating that these fields may offer more engaging curricula or better support structures. Specifically, students in Design and Multimedia courses have 42% lower odds, and those in STEM courses have 55.8% lower odds of dropping out compared to students in Health and Nursing courses. In contrast, Management and Business Courses do not show a statistically significant difference in dropout rates compared to Health and Nursing courses (OR = 0.845, $p = 0.140$), suggesting that the impact of these courses on dropout rates may require further investigation. Education and Communication Courses also positively impact retention, with a noticeable decrease in dropout odds (OR = 0.61, $p < 0.001$), representing a 39% reduction in the odds of dropping out compared to Health and Nursing courses. Gender also plays an important role, with female students showing significantly lower dropout rates compared to males (OR = 0.478, $p < 0.001$), pointing to potential gender-specific differences in academic engagement or support. This equates to females having approximately 52.2% lower odds of dropping out. Additionally, marital status significantly affects educational persistence, with married or partnered students, as well as those divorced or separated, showing higher odds of

dropping out (ORs = 1.78 and 2.02, respectively, both p < 0.002). Married or partnered students are 1.78 times more likely, and divorced or separated students are 2.02 times more likely to drop out than their single counterparts. This suggests that personal and familial commitments might influence students' ability to continue their education. The educational level of mothers also influences dropout rates, with students whose mothers have higher education being less likely to drop out (OR = 0.756, p = 0.044), which translates to a 24.4% reduction in dropout odds compared to students whose mothers have no higher education.

Financial burdens significantly affect dropout rates, with students who have debt being much more likely to leave their courses (OR = 3.93, p < 0.001). This underscores the critical role of financial factors in student retention and suggests that addressing student debt could be crucial for improving dropout rates. Students with debt are 3.93 times more likely to drop out than those without debt, emphasizing the substantial impact of financial strain on educational continuity.

Variable	Odds Ratio	Std. err.	t	P>|t|	95% conf. interval
Course Type					
Design and Multimedia	0.58	0.083	-3.81	<0.001	0.438 - 0.767
STEM	0.442	0.055	-6.57	<0.001	0.347 - 0.564
Management and Business Courses	0.845	0.096	-1.48	0.140	0.676 - 1.057
Education and Communication Courses	0.61	0.075	-4.04	<0.001	0.480 - 0.775
Gender					
Female	0.478	0.036	-9.82	<0.001	0.413 - 0.554
Marital status					
Married/Partnered	1.78	0.202	5.07	<0.001	1.424 - 2.224
Divorced/Separated	2.02	0.456	3.11	0.002	1.298 - 3.145
Mothers' qualification					
Higher Education (Bachelor/Master's/Doctorate)	0.756	0.105	-2.01	0.044	0.576 - 0.993
Unknown or Other	1.318	0.117	3.11	0.002	1.108 - 1.569
Fathers' qualification					
Higher Education (Bachelor/Master's/Doctorate)	0.937	0.132	-0.46	0.644	0.711 - 1.235
Unknown or Other	0.932	0.085	-0.78	0.437	0.779 - 1.114
Mothers' occupation					
Service/Skilled	0.677	0.077	-3.44	0.001	0.541 - 0.845
Unskilled/Other	0.597	0.07	-4.42	<0.001	0.475 - 0.751

Fathers' occupation					
Service/Skilled	0.813	0.093	-1.8	0.071	0.649 - 1.018
Unskilled/Other	0.832	0.09	-1.7	0.089	0.674 - 1.028
Debt Status					
With Debt	3.93	0.407	13.21	<0.001	3.208 - 4.814
Constant	1.317	0.2	1.81	0.07	0.978 - 1.775f

Table 3: Impact of Socio-Demographic Factors and Course Type on Dropout Rates: A Logistic Regression Approach

Marginal Effects

The analysis of average marginal effects from a logistic regression model sheds light on the factors affecting students' dropout rates. Table 4 shows that students enrolled in STEM and Design and Multimedia courses are significantly less likely to drop out, showing reductions in dropout rates by 16.07 and 11.22 percentage points, respectively, suggesting these fields may provide engaging curricula that enhance student retention. Female students experience a 14.94 percentage point lower dropout rate compared to males, indicating gender-specific resilience in educational persistence. Marital status also influences dropout rates; married or partnered students have an 11.78 percentage point higher likelihood of dropping out, and divorced or separated students see a 14.55 percentage point increase, possibly due to the added life stresses associated with such personal circumstances. Additionally, having a mother with higher education decreases a student's likelihood of dropping out by 4.86 percentage points, reflecting the positive impact of an educationally supportive family environment. In stark contrast, financial burdens increase dropout risks substantially, with students in debt 29.94 percentage points more likely to drop out, underscoring the profound impact of financial stress on educational continuance. These results highlight the multifaceted nature of factors that contribute to dropout rates in educational settings.

Variable	Category	Marginal Effect	Std. Error	z-Value	P-Value	95% Confidence Interval
Course Type	Design and Multimedia	-0.112	0.029	-3.85	<0.001	-0.169 to -0.055
	STEM	-0.161	0.025	-6.33	<0.001	-0.210 to -0.111
	Management and Business	-0.036	0.025	-1.46	0.143	-0.085 to 0.012
	Education and Communication	-0.102	0.026	-3.96	<0.001	-0.153 to -0.052
Gender	Female	-0.149	0.016	-9.59	<0.001	-0.180 to -0.119
Marital Status	Married/Partnered	0.118	0.024	4.83	<0.001	0.070 to 0.166
	Divorced/Separated	0.146	0.05	2.94	0.003	0.048 to 0.243
Mother's Qualification	Higher Education	-0.049	0.024	-2.07	0.039	-0.095 to -0.002
	Unknown or Other	0.053	0.017	3.17	0.002	0.020 to 0.086
Father's Qualification	Higher Education	-0.012	0.027	-0.47	0.641	-0.065 to 0.040

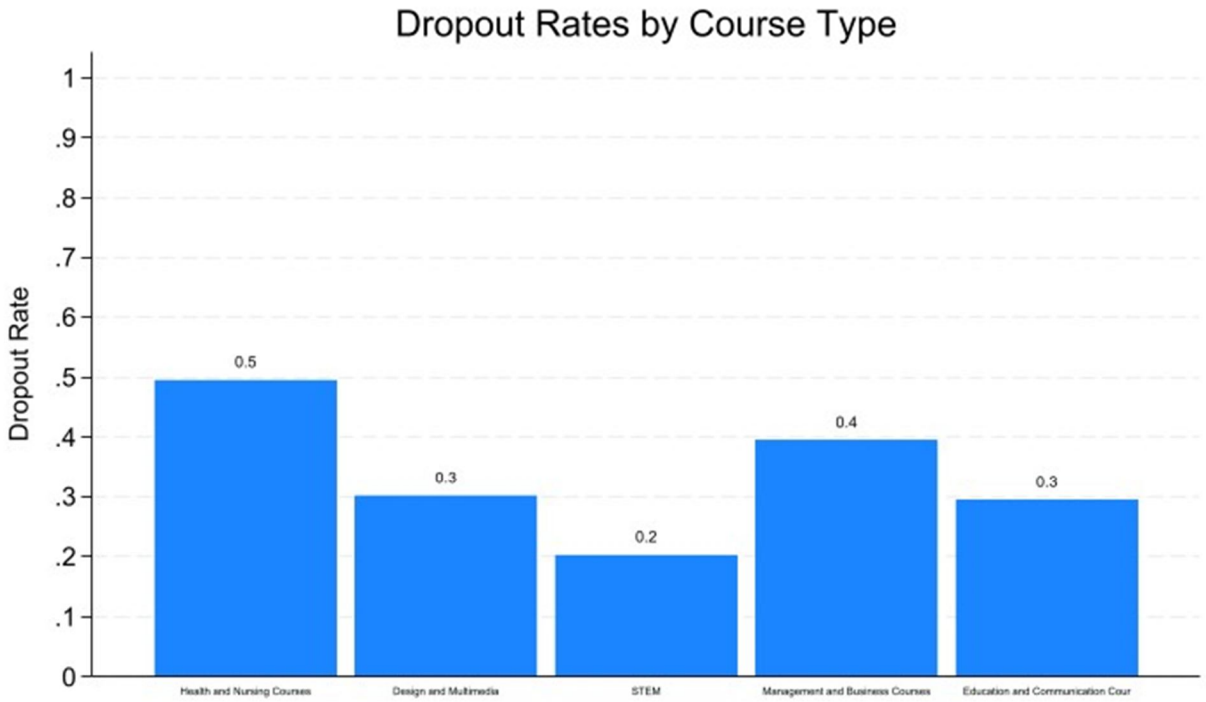
	Unknown or Other	-0.013	0.017	-0.78	0.434	-0.047 to 0.020
Mother's Occupation	Service/Skilled	-0.078	0.023	-3.4	0.001	-0.124 to -0.033
	Unskilled/Other	-0.102	0.023	-4.35	<0.001	-0.147 to -0.056
Father's Occupation	Service/Skilled	-0.04	0.023	-1.79	0.073	-0.084 to 0.004
	Unskilled/Other	-0.036	0.021	-1.68	0.093	-0.078 to 0.006
Debt Status	With Debt	0.299	0.023	13.1	<0.001	0.255 to 0.344

Table 4: Marginal Effects

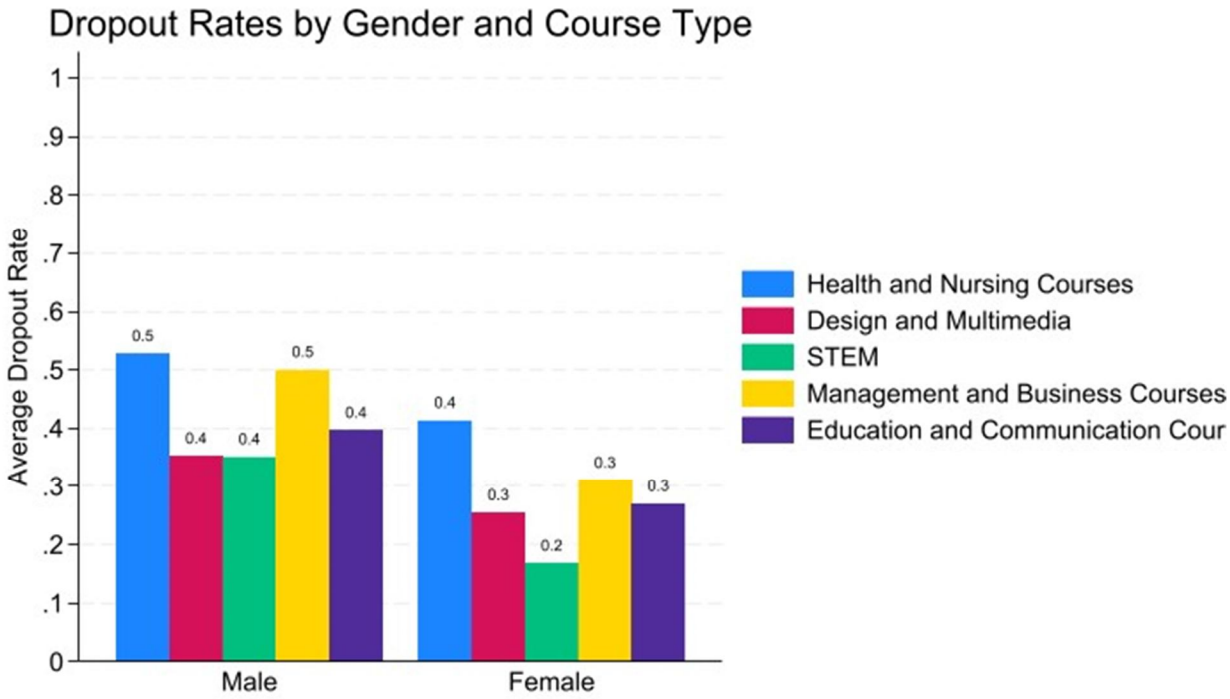
Visualization

Dropout Rates by Course Type

The bar chart of Dropout Rates by Course Type displays the dropout rates for various types of courses, indicating that Health and Nursing courses have the highest dropout rate at 50%, followed by Management and Business courses at 40%. Courses in STEM fields show a lower dropout rate of 20%, which is the least among the categories. Both Design and Multimedia, and Education and Communication courses have a dropout rate of 30%. This data suggests that students in Health and Nursing and Management and Business face more challenges leading to dropouts, whereas STEM courses seem to retain students better.

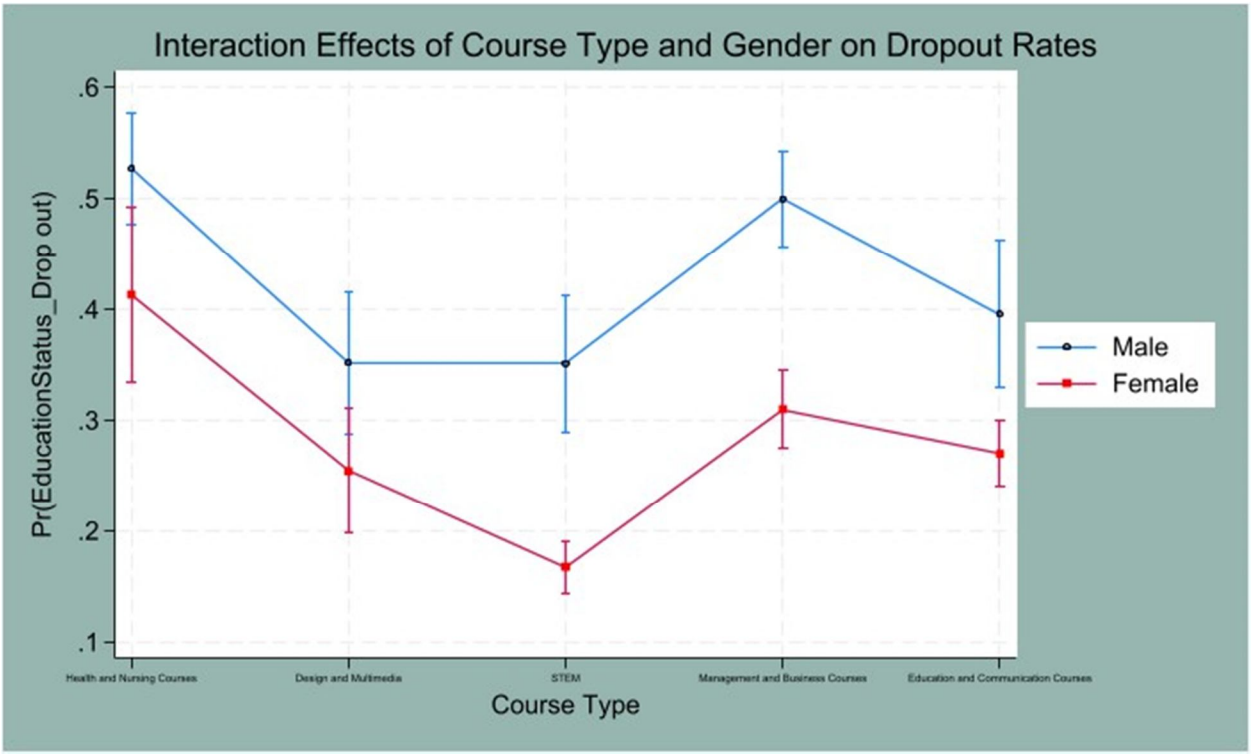


Predicted Probabilities of Dropout by Course Type and Gender



The bar chart depicts average dropout rates categorized by gender and course type. Notably, female students have lower dropout rates across all disciplines compared to male students. For example, in Health and Nursing Courses, the average dropout rate is the high for both genders at 0.5 for male and 0.4 for female students, while in STEM fields, female students have a notably lower rate of 0.2, half of the male rate at 0.4.

Interaction Effects of Course Type and Gender on Dropout Rates



The graph presented here shows the interaction between course type and gender on dropout rates among students. It appears that male students generally have a higher chance of dropping out compared to female students, especially in Health and Nursing courses. The trend continues in Design and Multimedia courses, although the gap narrows in STEM fields, suggesting that the dropout rates for men and women are more similar in these disciplines. Interestingly, in Management and Business courses, male dropout rates peak, then align more closely with female rates in Education and Communication courses. The error bars indicate some variability in the data, but overall, this pattern suggests that gender influences dropout rates differently across various fields of study.

Discussion

This study's findings illuminate the multifaceted relationship between gender and course type regarding dropout rates in higher education. Female students consistently show higher retention rates across most course types, aligning with literature suggesting female students tend to persevere more in their educational pursuits (Mastekaasa, 2008). This is particularly noteworthy in traditionally male-dominated fields such as STEM, challenging assumptions about female engagement in these areas. Conversely, male students exhibit higher dropout rates, especially in Health and Nursing courses, potentially due to challenges in predominantly female environments or other social factors (Severiens, 2012).

Moreover, the logistic regression model demonstrated that beyond gender, other socio-demographic factors play a crucial role in predicting dropout rates. For example, students whose mothers attained

a higher education level were less likely to drop out, reflecting the influence of parental education on student aspirations and attitudes towards education (Martinez, 2009; Lundetræ, 2011). Financial burdens also significantly affect dropout rates, with students in debt being much more likely to leave their courses.

These findings suggest that interventions should consider both gender and specific course challenges, with programs supporting male students in Health and Nursing and female students in STEM fields. This study contributes to the academic dialogue on dropout rates, advocating for policies aimed at reducing dropout rates by addressing the varied needs of students.

References

Almås, I., Cappelen, A. W., Salvanes, K. G., Sørensen, E., & Tungodden, B. (2016, May 1). What Explains the Gender Gap in College Track Dropout? Experimental and Administrative Evidence. *American Economic Review*, *106*(5), 296–302. https://doi.org/10.1257/aer.p20161075

Alspaugh, J.W. (2000). The Effect of Transition Grade to High School, Gender, and Grade Level upon Dropout Rates. *American Secondary Education*, *29*, 2-9.

Dwyer, R. E., Hodson, R., & McCloud, L. (2012, November 19). Gender, Debt, and Dropping Out of College. *Gender & Society*, *27*(1), 30–55. https://doi.org/10.1177/0891243212464906

Harrop, A., Tattersall, A., & Goody, A. (2007, December). Gender matters in higher education. *Educational Studies*, *33*(4), 385–396. https://doi.org/10.1080/03055690701423531

Houseknecht, S. K., & Spanier, G. B. (1980, June). Marital Disruption and Higher Education Among Women in the United States. *The Sociological Quarterly*, *21*(3), 375–389. https://doi.org/10.1111/j.1533-8525.1980.tb00619.x

Jorgensen, S., Ferraro, V., Fichten, C.S., & Havel, A. (2009). Predicting College Retention and Dropout: Sex and Disability.

Lee, Y., & Choi, J. (2010, November 25). A review of online course dropout research: implications for practice and future research. *Educational Technology Research and Development*, *59*(5), 593–618. https://doi.org/10.1007/s11423-010-9177-y

Lörz, M., Schindler, S., & Walter, J. G. (2011, June). Gender inequalities in higher education: extent, development and mechanisms of gender differences in enrolment and field of study choice. *Irish Educational Studies*, *30*(2), 179–198. https://doi.org/10.1080/03323315.2011.569139

Lowes, S., Lin, P., & Kinghorn, B. R. (2016, December 16). Gender Differences in Online High School Courses. *Online Learning*, *20*(4). https://doi.org/10.24059/olj.v20i4.1049

Martinez, J. A., Sher, K. J., Krull, J. L., & Wood, P. K. (2009, January). Blue-Collar Scholars?: Mediators and Moderators of University Attrition in First-Generation College Students. *Journal of College Student Development*, *50*(1), 87–103. https://doi.org/10.1353/csd.0.0053

Mastekaasa, A., & Smeby, J. C. (2006, November 9). Educational choice and persistence in male- and female-dominated fields. *Higher Education*, *55*(2), 189–202. https://doi.org/10.1007/s10734-006-9042-4

Mastekaasa, A., & Smeby, J. C. (2006, November 9). Educational choice and persistence in male- and female-dominated fields. *Higher Education*, *55*(2), 189–202. https://doi.org/10.1007/s10734-006-9042-4

Niu, Z., Li, W., Yan, X., & Wu, N. (2018, May 18). Exploring causes for the dropout on massive open online courses. *Proceedings of ACM Turing Celebration Conference - China*. https://doi.org/10.1145/3210713.3210727

Parker, A. (1999). A Study of Variables that Predict Dropout from Distance Education. *Journal on Educational Technology, 1*, 1-10.

Patterson, B., & McFadden, C. (2009). Attrition in Online and Campus Degree Programs. *Online Journal of Distance Learning Administration, 12*.

Patterson, B., & McFadden, C. (2009). Attrition in Online and Campus Degree Programs. *Online Journal of Distance Learning Administration, 12*.

Pierrakeas, C., Xeno, M., Panagiotakopoulos, C., & Vergidis, D. (2004, August 1). A Comparative Study of Dropout Rates and Causes for Two Different Distance Education Courses. *The International Review of Research in Open and Distributed Learning*, *5*(2). https://doi.org/10.19173/irrodl.v5i2.183

Pittman, R. B. (1991, May). Social Factors, Enrollment in Vocational/Technical Courses, and High School Dropout Rates. *The Journal of Educational Research*, *84*(5), 288–295. https://doi.org/10.1080/00220671.1991.10886029

Pittman, R. B. (1991, May). Social Factors, Enrollment in Vocational/Technical Courses, and High School Dropout Rates. *The Journal of Educational Research*, *84*(5), 288–295. https://doi.org/10.1080/00220671.1991.10886029

Richardson, J. T. E., & King, E. (1991, January). Gender Differences in the Experience of Higher Education: quantitative and qualitative approaches. *Educational Psychology*, *11*(3–4), 363–382. https://doi.org/10.1080/0144341910110311

Severiens, S., & ten Dam, G. (2011, August 24). Leaving College: A Gender Comparison in Male and Female-Dominated Programs. *Research in Higher Education*, *53*(4), 453–470. https://doi.org/10.1007/s11162-011-9237-0

Venegas-Muggli, J. I. (2019, August 7). Higher education dropout of non-traditional mature freshmen: the role of sociodemographic characteristics. *Studies in Continuing Education*, *42*(3), 316–332. https://doi.org/10.1080/0158037x.2019.1652157

Xenos, M., Pierrakeas, C., & Pintelas, P. (2002, December). A survey on student dropout rates and dropout causes concerning the students in the Course of Informatics of the Hellenic Open University. *Computers & Education*, *39*(4), 361–377. https://doi.org/10.1016/s0360-1315(02)00072-6