The Causal Effect of General Education Requirements

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Executive Summary

At the average American university, General Education Requirements constitute around ⅓ of student graduation requirements. In 2014, the Texas Higher Education Coordinating Board changed its General Education Requirements at public four-year institutions. I analyze the relationship between courses being classified as General Education Requirements and enrollments in these courses at six public institutions in Texas (Lamar University, Midwestern State University, Sul Ross State University, Texas State University, Angelo State University, and Texas Tech University). Through my investigation, I discovered that when controlling for course code, around 33 more students are likely to enroll in a course if it is considered a General Education course. Further, introductory courses and courses considered easy for students to pass are likely to have an increase in enrollment when they are considered as General Education courses.

Policy Implications

- Removing courses from General Education requirements can reduce funding, and faculty members within those departments
- Courses considered General Education requirements can increase in student enrollment in those departments, and subsequently increase students majoring in those subject areas.
- This is important for policymakers because they can create effective curriculum structures that can guide undecided students to success.

Introduction/Background

9 Humanities credits. 12 Natural Science credits. 8 Communication credits. At the average American university, students are expected not only to complete required courses for their chosen major or course of study, but also to take certain required credit hours within different fields of study. On average, these required credit hours constitute approximately 40 credit hours – one-third of the required credits for the completion of a bachelor's degree (Lattuca & Stark, 2014). These courses are known as General Education requirements.

General Education is defined in the Texas Education Review as a part of a liberal education curriculum shared by all students, exposing them to a multitude of disciplines and creating a foundation for the development of intellectual, civic, and practical skills. This curriculum can exist in a variety of forms that encompasses "introductory, advanced, and integrative forms of learning" (Henschel et al, 2018). From 1975 to 2000, a study found that general education requirements encompassed a significant amount of undergraduate degree requirements (Brint et al, 2009), suggesting general education requirements may have significant impacts on resource allocation to different academic departments depending on how general education curriculum shape student course enrollments.

The Texas Core Curriculum of General Education requirements was first implemented in 1987. In October 2011, the Texas Higher Education Coordinating Board made changes to the rules of the Texas Core Curriculum for public higher education institutions within Texas that went into effect in Fall of 2014 (Henschel et al, 2018). This change included decreasing the maximum number of credit hours of the core curriculum from up to 48 to 42 hours. The 9 revised Core Component Areas consist of eight Foundational Component Areas, which are Communication, Mathematics, Life and Physical Science, Language, Philosophy and Culture, Creative Arts, American History, Government/Political Science, Social and Behavioral Sciences, and an added institutional Component Area Option (Henschel et al, 2018).

Table 1

Texas Core Curriculum Credit Hours Before and After 2014 Policy Change

Institution	Credits 2013-2014	Credits 2014-2015	Dosage
Lamar University	48	42	6
Midwestern State University	47	42	5
Sul Ross State University	46	42	4
Texas State University	46	42	4
Angelo State University	44	42	2
Texas Tech University	44	44	0[1]

[1] Texas Tech University was given an exception from the overall credit decrease.

Notes: Table displays Texas Core Curriculum Credit Requirements before and after the 2014 Policy Change. Data comes from institution course catalogs posted online.

Through several statistical analyses of course enrollment numbers against factors such as course subject, course number, and year at Lamar University, Midwestern State University, Sul Ross State University, Texas State University, Angelo State University, and Texas Tech University (all

four-year public institutions in Texas), we study the factors that impact student course taking and understand the effectiveness of general education courses at these institutions.

Literature Review

The goal of a General Education curriculum is to expose students to a "diversity of ideas, people, and learning experiences, inside and outside the classroom" (Keeling et al, p. 47). In a modern-day context, general education has implications in terms of departmental funding and resource allocation (Wells, 2016). However, the fundamental question remains regarding whether these requirements strengthen student course outcomes or hinder their university experience.

Scott-Clayton (2015) explores whether providing students with more structured paths to graduation at Community Colleges increases their chances of graduation. The study explains the difficulties of particularly students from lower-income backgrounds in terms of choosing courses and deciding course pathways. Many students entering a university environment, as Tinto (1993) explains, experience not only academic challenges but also the social challenges that accompany adult life. When students do not have any semblance of structure in course-taking, they succumb to "bounded rationality", or self-evaluating tradeoffs in decision-making that lead to unsound outcomes (Scott-Clayton, 2015). As such, it is imperative that students do not make regretful decisions by increasing access to resources like advising, and simplifying course choices through a more structured curriculum.

Further, not only is decision-making complex, but the courses that students take critically inform their curricular outcomes. A paper by Richard Patterson explores whether taking an elective course during (control) or after (treatment) the semester students make decisions about their major changes the major pathway that students choose (Patterson et al, 2021). This was conducted with the aim of exploring whether the time between when a student is assigned a course and chooses a major increases the likelihood of choosing a corresponding major (Patterson et al, 2021). A linear regression analysis concluded that students are more influenced by courses from their first semester (control) rather than courses taken in their second semester (treatment) when choosing their major. The results of this study are impactful to policies that aim to steer students to specific majors (i.e. STEM) through course offerings because it depicts that the timing that students are assigned to courses influence their major choices to a greater extent if they take the course during the semester they choose their major as opposed to the semester after they choose their major. As such, policies that assign students to take courses in subject areas like STEM during the semester they make course decisions might steer more students towards STEM major choices.

Additionally, the study by NaLette Brodnax regarding the effects of providing students with information on the gender gap in technology experimented with the Nudge-Intervention Design, which is a form of intervention where institutions structure a decision-making context with the

intent of serving a decision-maker's interest without constraining their choices (Brodnax, 2021, p. 4). Essentially, students are more likely to make academic choices like taking courses in specific subject-areas (i.e. STEM, humanities) or choosing a particular major pathway when *nudged* by course advisors, administrators, or departments. In order to understand whether female students (who are traditionally underrepresented in STEM fields) are more likely to pursue a STEM major if shown female representation in the field, they gave students an informational brochure that either had only male students, only female students, or mixed-gender students. The outcome of the investigation depicted that there was the greatest increase in enrollment of female students who were only shown the female imagery (Brodnax, 2021, p. 10). As such, it becomes clear that student course-taking outcomes are influenced by the signals and information they receive about coursework from institutions through both visual and written means.

Hypothesis

Based on the results of previous studies, we postulate that adding (removing) a course to the general education requirement will increase (decrease) enrollment in that course, consequently increasing (decreasing) departmental funding and faculty members in that subject area.

Data

To conduct our investigation, we draw on general education requirements and course enrollments. We consulted course catalogs by academic year at Lamar University, Midwestern State University, Sul Ross State University, Texas State University, Angelo State University, and Texas Tech University to identify when courses occur. To measure course enrollment, we calculate the amount of students in a course based on administrative transcripts.

Methods

In order to measure student course-taking behavior, we collected and recorded all of the General Education courses from the years 2010 to 2023 from course catalogs cross-referenced with student administrative transcripts from public institutions in Texas. Using this data, we calculated the number of students enrolled in each course by academic year.

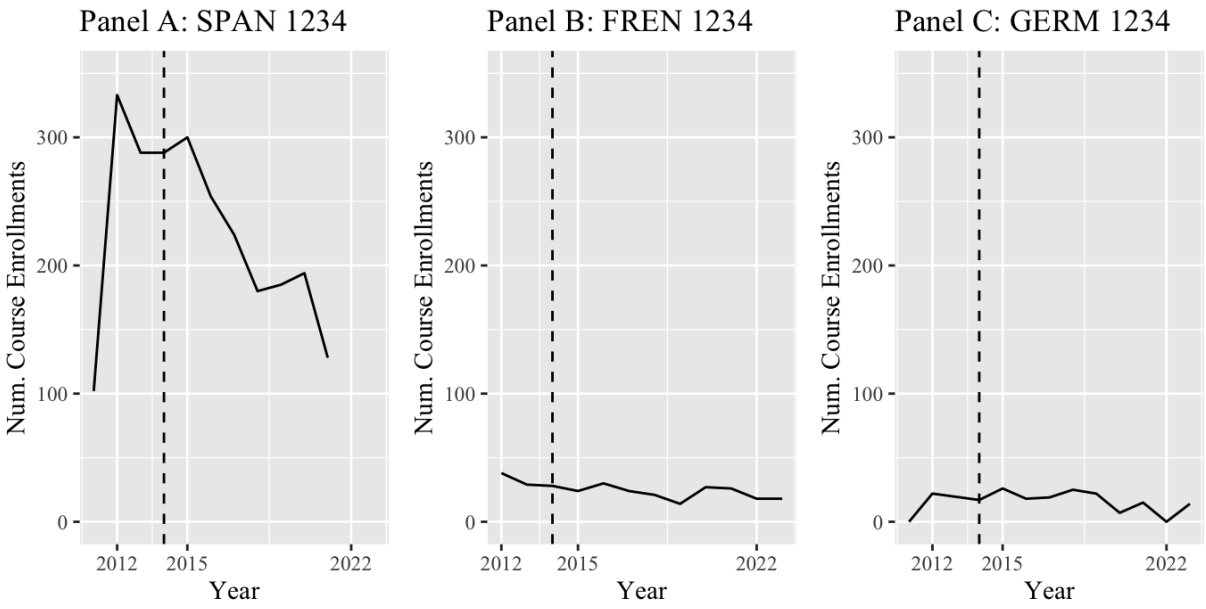
Results

In our analysis of 6 four-year institutions in Texas, we explored the change in course enrollments as general education requirements changed, particularly before and after the year 2014 in which, as stated above, the Texas Higher Education Coordinating Board made changes to the Texas Core Curriculum. For example, at Midwestern State University, we observed course enrollments in Spanish 1234 (Figure 1 - Panel A), French 1234 (Figure 1 - Panel B), and German 1234 (Figure 1 - Panel C), all of which were removed from General Education requirements in 2014. We observed that Spanish enrollments clearly drop, while French and German enrollments do not show the same decreasing trend. This suggests that removing Spanish from the general

education curriculum decreases enrollment in Spanish courses because students might be more likely to take it as a general education requirement since it is a commonly spoken language in Texas – and students may find it more useful to learn – while they are likely to take French and German out of interest independent of General Education requirements.

Figure 1

Course Enrollments in Select Courses at Midwestern State University Over Time

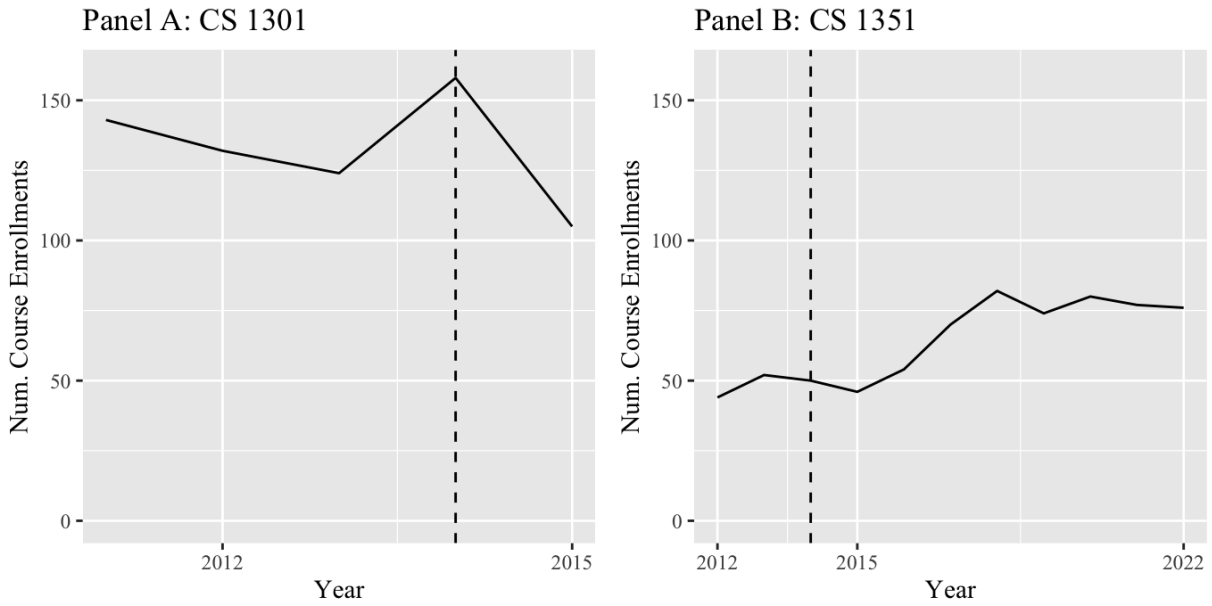


Notes: Figure displays course enrollments in SPAN 1234, FREN 1234, and GERM 1234 at Midwestern State University from the 2011 to 2022 academic years. Data comes from administrative student transcripts housed at the University of Texas at Dallas.

Also, when comparing an introductory Computer Science course (CS 1301) (Figure 2 - Panel A) to an advanced Computer Science course (CS 1351) (Figure 2 - Panel B) at Angelo State University, there is a clear drop in enrollment after the introductory course is removed as a General Education requirement in 2014, while there is a marked increase in enrollment in the advanced level course after it was removed as a General Education requirement. Essentially, students who enroll in the introductory course are more likely to take this course if it is listed as a general education requirement rather than seek out the course. This supports the notion that students are more likely to take certain courses or subjects if they are included in the general education requirement.

Figure 2

Course Enrollments in Select Courses at Angelo State University Over Time



Notes: Figure displays course enrollments in CS 1301 and CS 1351 at Angelo State University from the 2011 to 2022 academic years. Data comes from administrative student transcripts housed at the University of Texas at Dallas.

In attempts to decipher which factor(s) related to General Education courses were the most significant, we regress course enrollments on whether a course meets a general education requirement, controlling for course code, academic year, and subject area. This analysis depicted that course code has the most significant influence on predicting the difference between general education course enrollment and regular course enrollment. When controlling for the academic year, it was predicted that about 573 more students would enroll in a course if it was a general education course with only about 16.6% of the variation in data accounted for (R-Squared value of 0.166067). However, factoring enrollments by course code predicted that around 33 more students were likely to enroll in a course if it was classified as a general education course with about 93.8% of the variation in data accounted for (R-Squared value of 0.938131). As such, course code is strongly associated both with whether a course is a gen ed and course enrollments.

It is important to consider the impact of removing introductory courses from the General Education curriculum on student enrollment. Based on this analysis, students are less likely to take introductory courses if they are not considered general education requirements. This can be an incentive for policy makers to promote certain course pathways for students by increasing courses in specific subject areas in the General Education curriculum.

Further, to explore the longer term impacts of gen eds, we conducted a regression on student majors and general education requirements, but found that students are pursuing 1.52 less majors

in an area if it is a general education course, disproving our initial hypothesis that general education courses have a clear influence on student major choices.

Table 2

Regressing Course Enrollments on General Education Requirements

Factors	(1)	(2)	(3)
Is Gen Ed	573.562***	33.6654***	36.2244***
	(17.2475)	(7.43123)	(7.41919)
R-squared	0.166	0.938	0.938
Observations	206,946	206,946	206,946
Controls for Academic Year	X		X
Controls for Course		X	X

Notes: Standard errors in parenthesis. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$. Table displays results of linear regression tests conducted on several factors related to courses being classified as General Education courses, which are Academic Year and Subject Number. Data comes from administrative student transcripts housed at the University of Texas at Dallas.

Discussion and Limitations

Our study is limited in a number of important ways including the inability to observe decision-making processes and the lack of clear causal inference. Because we draw primarily on quantitative data, we can observe the courses in which students enroll but do not observe the student decision-making process. This is because our analysis does not contain qualitative methods of analysis like interviews and surveys of students experiencing these curricular changes. As such, we can say that students make different course-taking decisions based on our data, but can only theorize about their course decision-making process.

While we control for information related to general education courses like course codes, academic year, and subject area, we cannot establish a clear causal relationship between general education requirements and course enrollments. Further, we cannot establish a causal relationship in our data because when departments experience declines in course enrollments, they modify multiple factors in addition to adding General Education courses. This can confound the conclusion that making courses General Education courses increases enrollments. As an example, the study by Brodnax (2021) attempted to increase female student enrollment in STEM courses by advertising these courses in a brochure featuring female students. These particular

courses could have seen increases in enrollments due to similar advertising techniques as opposed to increasing solely because they are considered General Education requirements. As such, there are many factors that contribute to student course enrollment, and this study cannot determine causality of course enrollments increasing due to classification as a General Education requirement.

Theoretical Importance

Through the investigation of the 2014 change in General Education requirements at 6 four-year public institutions in Texas, we have preliminary gathered that students are less likely to take certain courses when they are removed from the general education curriculum – these courses being introductory and "easier" courses for students.

In our investigation, we found that general education requirements do not have a clear influence on student major choices. This can be explained because students at these institutions in Texas take general education courses anytime during their college career, so they can take certain courses after choosing a major. This results in a fluctuation of course enrollments, but a maintenance of the same major.

However, for incoming and first-year students, the strategic adding/removal of certain introductory courses can likely shift student majors in a certain field. For example, adding more STEM courses can increase students pursuing STEM majors. This can directly impact the amount of funding that departments receive based on student enrollment, which increases when courses are part of the General Education Curriculum. Because courses are funded by the number of seats that departments enroll, money can be subsidized (or shifted) to certain departments. For example, Brint (1989) mentions that certain departments that have a greater number of enrollments (i.e. English 101) require more funding to sustain themselves.

Policy Implications

This can also have implications for curriculum restrictions. In Florida, the STOP WOKE Act imposed restrictions on Sociology courses, banning them from general education curricula, and in effect, removing essential funding from these departments. This resulted in fears from sociologists of the subsequent eradication of this subject area from universities in Florida (Hartocollis, 2024).

Consistent with these fears of sociologists in Florida, our results suggest that policies enforcing or removing particular courses from general education requirements can impact student course-taking and career decisions. Based on our findings, removing sociology courses from general education requirements will likely lead to a reduction in the size and resources of sociology in Florida.

As such, it becomes clear that policies enforcing or removing particular courses from general education requirements can impact student course-taking, and career decisions. Using this information, policymakers can hopefully create effective curriculum structures that can guide undecided students to success.

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