

Learner Characteristics, Online Engagement, and Student Success Rates

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Abstract

This paper examines the relationship between students' backgrounds and engagement with online homework materials to discover who participates in online homework and whether such engagement impacts student success rates. This paper asks (1) Is there a positive correlation between specific demographic backgrounds and use of learning technology? and (2) Is there a positive correlation between specific demographic backgrounds, use of learning technology, and student success rates? We analyze quantitative data for almost 300 students from two introductory-level political science courses – U.S. Government and Politics and State and Local Government (Texas) – who utilized an online homework system as a learning tool. We find mixed results between the two courses and among different student backgrounds.

Keywords: learning, online, political science, technology

1. Introduction

Across the United States in higher education, there have been increased efforts to incorporate instructional technology into course designs, lesson plans, and assessments (Demp, Lincoln, and Cifuentes, 2011). Wilson, Pollock, and Hamann write, "The incentives and arguments for doing so are many, including facilitation of higher education for non-traditional students and changing student demographics, skill building to improve student preparation for workplaces that are likely to use computer technology, space restrictions in universities with growing enrollment, the opportunities that Internet classrooms provide for organizing and monitoring student work and assignments, and so on. However, little is known about how online instruction affects the learner" (2006, 335). We find that not only is there limited information about the learner in these educational endeavors, but frequently there are also automatic assumptions about why technology should be incorporated into teaching and learning, namely that students already use technology as evidenced by the prevalence of computers and cell phones and that students learn better from mixed media approaches. In particular, there is the notion that instructors should build on the existing skills set of tech-savvy students from the Millennial Generation or Generation Z as they are also known. We, along with other university faculty and students, are now finding, however, that these assumptions do not hold true in every setting. In other words, "technology" is not a one size fits all method for teaching and certain learning outcomes. The medium of technology matters, the identities of the students matter, and course and institutional contexts matter.

In order to maximize the potential of student learning opportunities through various means of engagement, many higher education institutions are currently encouraging faculty to incorporate specific technology in the form of supplementary online materials into their courses in conjunction with traditional classroom lectures. As political science instructors, we typically expect undergraduate students to grasp in a short period of time a large amount of information about how institutions construct the political system and how individual citizens operate within the political structure itself. However, among current freshmen at our regional university, there is often an observed skills gap and lack of preparation to efficiently and effectively understand and apply that material. As researchers, we want to uncover if exposure to online ancillary materials can help students bridge this gap to be academically successful.

Our two research questions are (1) Is there a positive correlation between specific demographic backgrounds and use of learning technology? and (2) Is there a positive correlation between specific demographic backgrounds, use of learning technology, and student success rates? In this paper, we analyze quantitative data for almost 300 students from two introductory-level political science courses – POLS 2305: U.S. Government and Politics and POLS 2306: State and Local Government (Texas) – who utilized an online homework system as a learning tool in an effort to see what factors influence success rates. This study aims to accurately differentiate between what we think or assume is happening and what we know is happening, thereby separating fact from fiction. Discovering whether or not students use educational technology in the first place and then secondly, locating when and for whom this technology makes a positive difference has implications for students, faculty, and administration alike in terms of time, energy, resource allocation, and potentially retention. As such, while we focus on two political science courses for data purposes, our analysis of the overall process and outcomes can apply to other disciplines as well.

2. Background

Much of the literature on the role and use of technology in classrooms, online learning, and distance education tends to focus on pedagogy, meaning how instructors can properly incorporate and implement digital methods and platforms into course designs, lesson plans, and assessments. Part of this is driven by a general demand for information about developing appropriate curriculum that adapts to the changing needs of each new generation of students. There is also a specific demand for how-to guidelines given the new and fast-paced nature of evolving technology these days. That said, we share Oh's concern about previous research on this subject: "Past studies thus pay little attention to real or potential users of distance education; rather, they focus on providers or managers (i.e., instructors or administrators). As a result, users' needs and demands have been often neglected in studying the designing and implementing of eLearning, while administrators' or instructors' demands or assumptions have been the major source of investigation" (2003, 136). Our research therefore aims to add to the growing body of literature that centers on learners' needs and the actual impact of technology on students' success rates. This is of particular importance because there may be pre-existing student skills gaps *prior* to a course for individual students and between student groups, which can be exacerbated or mediated *during* a course depending on the mode(s) of instruction.

There are a variety of variables that can contribute to a skills gap and lack of preparation to efficiently and effectively do homework, comprehend homework content, and demonstrate mastery of material. Anecdotally, Hauss states,

There is a lot of talk these days about the digital divide, or the gaps in web access and IT use between rich and poor, black and white, and even men and women. I fear I opened another gap, one between stronger and weaker students.

Because most of the students I teach work upwards of 30 hours a week while taking four or five courses, I always have a substantial number of students who fail simply because they are unable to keep with the workload. That proportion has grown in the last two years.

On the other hand, my top students are doing better work than ever. In particular, they use more sophisticated and detailed evidence and make more powerful arguments in large part because my IT use gives them more freedom to pursue their own interests than they would have had had they taken my course before the technology revolution and before I began following more flexible course outlines (2000, 826-827).

In the preceding excerpt, Hauss points to demographic backgrounds impacting not just individual student learning, but also influencing different outcomes between groups. The literature exploring learner characteristics and success rates has mixed results, however, about which backgrounds have positive or negative correlations with use of online materials and successful outcomes. Yukselturk and Bulut did not find gender or age to significantly contribute to variance in students' success in an online course (2007, 77-78). Wong and Hanafi's research did not find a gender disparity for prior computer experience before taking an Information Technology (IT) course or significant gender differences in attitudes towards IT, but did notice that females exhibited more confidence in IT at the end of the course (2007, 163-164). Riegler-Crumb and Moore's analyses show that gender differences in high school physics course-taking "varies in relation to the gendered context of the local community labor force" where the "male advantage in high school physics is significantly smaller or nonexistent in schools situated within communities where more women are employed in STEM professions" (2014, 266).

Their research has implications for the level of preparedness for male and female students going into college and taking courses that have technological components. In choosing to register for a face-to-face versus online format of an Introduction to American Government and Politics course, Dolan (2008) did not find any differences between the two sections with regard to sex, grade point average (GPA), or reason for taking the course (most took it to fulfill a major or general education requirement), but did notice significant differences for age and year in school in which the online sections tended to have students who were a bit older and farther along in school (388-389). As for graded performance, Dolan's research found students in the online class performed better overall (final course grade of B- versus a C). When controlling for mode of instruction, Dolan observed that GPA had a consistent influence on grades. Age, sex, or semester were occasionally influential for different graded components (e.g., select exams), but no consistent patterns for these variables emerged from Dolan's data (389). Yet another study by Clawson, Deen, and Oxley (2002) showed that student characteristics such as GPA, hours worked, and major were not significantly related to participation rates in an online newsgroup (discussion board), but found differences between African-American and White/Caucasian students (715).

3. Research Design & Methodology

Established in 1947, Texas A&M University-Corpus Christi (TAMU-CC) presently enrolls more than 10,000 students from 48 states and over 60 countries. It is formally designated as a Hispanic-Serving Institution. The five colleges include Business, Education, Liberal Arts, Nursing and Health Sciences, and Science and Engineering. More than 70% of students have some form of financial aid (<https://www.tamucc.edu/about/facts.html>). All Bachelor degree-seeking students regardless of major must take two core curriculum classes in Political Science. At TAMU-CC, incoming freshmen usually take the introductory POLS 2305: U.S. Government and Politics and POLS 2306: State and Local Government in their first year. The typical sequence is to take POLS 2305 during the first semester and then POLS 2306 during the second semester, but students sometimes take these classes out of order due to availability. For a select group of students, they do not have to take one or the other if they have previous credit transfers. These courses tend to be large lecture classes that are also tied to two other courses in a Learning Community Triad: First Year Seminar for all students and a sub-population of students may take English Composition as well.

POLS 2305 and POLS 2306 require students to purchase, register for, and use LearnSmart as a part of their overall course grade. McGraw-Hill Connect is an online educational system that provides instructors and students with a variety of digital teaching and learning tools. McGraw-Hill Connect includes adaptive learning technology that can tailor assignments to individual students' needs. According to the company's website:

No two students are alike. McGraw-Hill LearnSmart™ is an intelligent learning system that uses a series of probing questions to pinpoint each student's knowledge gaps. LearnSmart then provides an optimal learning path for each student, so that less time is spent in areas the student already knows and more time in areas needed. The result: students retain more knowledge, learn faster, and study more efficiently. (<http://connect.customer.mcgraw-hill.com/features/instructors/#customizable>)

The online homework functions as a student learning tool and a formal assessment for grading purposes. During the Fall 2013 semester, LearnSmart counted for 15% of the final grade in POLS 2305 and was worth 35% of the final grade in POLS 2306. Students had to complete fifteen LearnSmart assignments in the U.S. Government class and twelve assignments in the State and Local Government class.

Because LearnSmart uses adaptive technology, completion times and scores varied among students. 100 points were possible provided students mastered the material before each deadline in their syllabus.

For each research question, we developed several hypotheses:

(1) Is there a positive correlation between specific demographic backgrounds and use of learning technology?

H1: Those individuals who are more affluent economically will have a higher interaction rate/engagement level than those students from less affluent backgrounds.

H2: Those individuals who are male will have a higher interaction rate/engagement level than those students who are female.

(2) Is there a positive correlation between specific demographic backgrounds, use of learning technology, and student success rates?

H3: Those individuals who are more affluent economically will have a higher success rate in their class and using the online technology than those students who are from less affluent economic situations.

H4: Those individuals who are male will have a higher success rate in their class and using the online technology than those students who are female.

H5: Those individuals who engage with the online material at a higher level will have a better final course grade than those students who do not.

In order to answer questions regarding the impact of student engagement with online material on final course performance, our research relied on data compiled in three ways: high school transcripts for students' GPAs, online homework engagement via LearnSmart, and self-reported student data from the College Student Inventory (CSI). The latter is a survey required of all first-year students who are a part of the university's Learning Communities Program. According to Dr. Dave Trites and SUNY-Cortland, The Noel-Levitz Retention Management System is an early-intervention, early-alert system based on students' self-reported information. The CSI is designed to allow institutions to:

- Assess students' individual academic and personal needs
- Recognize students' specific strengths, as well as coping mechanisms
- Identify students who are at risk for academic and/or personal difficulties and who may even drop out
- Recognize students' attitudes and motivational patterns, so that intervention is more successful
- Enable advisors to participate in effective and rewarding contact with students early in the first term

The CSI is designed especially for incoming first-year students to identify their needs, strengths, attitudes, motivational patterns, resources, coping mechanisms, and receptivity to intervention. The survey has 100 questions (SUNY-Cortland and Noel-Levitz, 2014).

We combined the aforementioned GPA, homework, and CSI data into one data set. Students provided their names and student identification numbers, which facilitated the matching process. Once combined, we omitted student names from the data set to reduce potential bias and maintain confidentiality. POLS 2305 had 155 participants and POLS 2306 had 123 participants for a total of 278 students analyzed in this study.

To test our hypotheses, we employed two statistical models. We ran a linear regression model (OLS) in both models. This is consistent with previous analysis regarding online homework conducted by Dillard-Eggers, Wooten, Childs, and Coker (2008). Their research found that the course grade was positively affected by the extent of work on online homework (12). We also ran the models separately for POLS 2305 and POLS 2306 since we anticipated that the POLS 2305 students in particular would have had more previous experience with course content given their prior experiences in the K-12 education system (e.g., history or civics courses), which might yield different results compared to the POLS 2306 students who likely focused on Texas government and politics for the first time in college. In addition, we ran the models separately because the number of online homework assignments varied between the classes, meaning that one class had more opportunities for engagement. Our models are outlined below:

Model 1: *Number of Engagements with Online Materials* = $\beta_0 + \beta_1$ (*race/ethnicity of student*) + β_2 (*level of preparedness/GPA*) + β_3 (*age of student*) + β_4 (*personal financial outlook of student*) + β_5 (*expectations of work while in college*) + β_6 (*gender of student*)

Dependent Variable: Total Number of LearnSmart Modules Attempted

- We compiled a count of the individual engagements that took place over the duration of the semester by using the number of online assignments that the student completed.

Independent Variables:

Race/Ethnicity

- We include race/ethnicity as a variable because there is sometimes a belief that minority students will engage less than White/Caucasian students due to socialization factors (similar to gender), but we do not include race/ethnicity in our hypotheses as we do not have strong reasons to believe that this particular characteristic will have a significant impact for our student population.

High School GPA

- A Noel-Levitz Senior Consulting Analyst argues that when they build their retention model for college students, one of the most important predictors for an individual student's success is their past performance. We use high school GPA as a proxy for student level of preparedness and a potential predictor for success in college (Trites, 2014).

Age

- Increasingly as more students are exposed to and have experience with advanced technology compared to previous generations, there is an expectation of comfort and familiarity with online technology for this "younger" group. We include age as a variable to ensure all potential variables are tested and avoid omitted variable bias.

Personal Financial Outlook of Student

- This variable is measured by the self-reported assessment of the student's individual financial outlook, specifically the level of comfort and concern he/she feels as it pertains to his/her own financial stability for the current college year. This variable is one substitute for "economic affluence" as it pertains to our hypotheses. The CSI survey question wording for personal financial outlook was "I have the finances necessary to finish college" and "I don't have any financial problems that will interfere with my schoolwork."

Work Expectations

- This variable is based on a self-reported statement of finance measured as the amount of work hours (i.e., employment) that the individual will need to do while attending college. "Expected hours worked" functions as a second proxy for "economic affluence." Our rationale for using this particular measure as a proxy for personal finance is based on: First, individuals tend to overestimate their finances when asked the direct question of income. By using the number of hours that a student will work, the variable is less prone to respondent bias. Second, it was determined that the personal finances of the student were more accurate than disclosing the finances of the parents/guardians. Just as many individuals will overestimate their income, it is common for many families to avoid discussing finances with their children. As a result, any attempt to determine the familial or household income level would potentially be incomplete or inaccurate. The survey question wording for work expectations was "While enrolled in classes, the amount of time I expect to spend working at a job is approximately ____."

Gender

- Thinking about the gender of a student, there is a belief that female students will or do engage less with online materials than male students due to socialization factors. This belief is partially reinforced through the work of Wilson, Pollock and Hamann who observe that "women appear to be less likely than men to choose a section that is partially taught over the web, which might be related to their self-perceived lower computer literacy" (2006, 338).

Model 2: *Student Success (based on final course grade)* = $\beta_0 + \beta_1$ (number of online engagements) + β_2 (race/ethnicity of student) + β_3 (level of preparedness/GPA) + β_4 (age of student) + β_5 (personal financial outlook of student) + β_6 (expectations of work while in college) + β_7 (gender of student)

Dependent Variable: Final Course Grade

- The final course grade is what the student earned for the semester based on the combined required components of the class.

Independent Variables:

LearnSmart

- Using the number of engagements with the online homework, the ultimate goal is to determine how a student will perform in the class. The expectation is that by using the online assignments, a student will develop a better understanding of the material and therefore demonstrate this understanding via a higher-than-average final course grade.

All other Independent Variables are carried over from the previous model. In Model 2, the previous Dependent Variable (Online Engagements) is added as an independent variable to the right hand side of the equation in order to predict final grade outcomes.

4. Results & Discussion

In Table 1 below, the results show a negative relationship between online engagement and the gender of the student in the POLS 2305 class. For this paper, Males were coded as 2 and Females were coded as 1, thus giving the impression that Females are more likely to engage with the online material than Males (-0.1707) significant at the 0.05 level. This is contrary to the prevailing belief in many fields is that males will be more likely to engage or feel comfort with technology (Broos, 2005).

Table 1: Pairwise Correlation Coefficients for POLS 2305 – Number of Online Engagements

POLS 2305	Online Engagements	Race/Ethnicity	HS GPA	Age of Student	Work Expectations	Personal Finances	Gender of Student
Online Engagements	1.00						
Race/Ethnicity	-0.0281	1.00					
HS GPA	-0.0100	-0.0403	1.00				
Age of Student	0.1234	0.0279	0.0431	1.00			
Work Expectations	0.0442	0.0670	0.0211	0.1585*	1.00		
Personal Finances	-0.0017	-0.1841*	-0.0333	-0.0202	-0.2870*	1.00	
Gender of Student	-0.1707*	-0.0021	0.1816*	0.0701	0.0406	0.0069	1.00

*p<.05

The POLS 2306 results in Table 2 also demonstrate a negative relationship between the gender of a student and online engagements. The coefficient of -0.3444, significant at the 0.05 level of analysis, lends additional support to the premise that there is more to the negative relationship than previous authors have found in their research (Levin and Gordon, 1989; Shashaani and Khalili, 2001; Schumacher and Morahan-Martin, 2001; Durndell and Haag, 2002; Broos, 2005). Some of those research findings are limited as they were studying different groups, especially in the case of Shashaani and Khalili (2001) and Durndell and Haag (2002) who studied individuals in Iran and Eastern Europe respectively. A second finding in Table 2 of interest is the negative relationship between the level of preparation of a student based on their high school GPA and use of online homework. The coefficient between GPA and Online Engagements is -0.5488 and is significant at the 0.05 level.

Table 2: Pairwise Correlation Coefficients for POLS 2306 – Number of Online Engagements

POLS 2306	Online Engagements	Race/Ethnicity	HS GPA	Age of Student	Work Expectations	Personal Finances	Gender of Student
Online Engagements	1.00						
Race/Ethnicity	0.1375	1.00					
HS GPA	-0.5488*	-0.0403	1.00				
Age of Student	0.0473	0.0279	0.0431	1.00			
Work Expectations	-0.1210	0.0670	0.0211	0.1585*	1.00		
Personal Finances	0.0901	-0.1841*	-0.0333	-0.0202	-0.2870*	1.00	
Gender of Student	-0.3444*	-0.0021	0.1816*	0.0701	0.0406	0.0069	1.00

*p<.05

When examined more closely in our formal statistical models, the variable that is most statistically significant (as indicated by an asterisk) for the number of online LearnSmart assignments completed in POLS 2305 is gender (Table 3).

Instead of gender being in the predicted direction of males completing more of the online engagements (Question 1, Hypothesis 2), females engage with the online material at a higher level than males.

Table 3: Model 1 for POLS 2305

	Number of Online Engagements
Race/Ethnicity of Student	-0.074 (0.388)
Age of Student	1.187 (0.695)
Expected Hours Worked	0.096 (0.475)
Gender of Student	-2.468 (1.054)*
High School GPA of Student	0.002 (0.047)
Financial Issues of Student	0.046 (0.288)
Constant	-14.295 (13.831)
R^2	0.05
N	155

* $p < 0.05$; ** $p < 0.01$

The data results show that females will typically complete two more online assignments than their male counterparts. This finding is interesting given that Wilson, Pollock, and Hamann (2006) observed in their study that female students are less likely to select classes that are partially taught online. They also find, though, that “partial online instruction has overall positive effects on learner outcomes for both men and women compared with the traditional format. In particular, it can increase both computer literacy and political attentiveness for female students and can help narrow the gender gap in higher education” (338). In this way, even if our own female students were initially reluctant in taking our courses, it could be that once they were in the system, they learned the process and content and overcame any potential prior negative socialization factors. No other variables were shown to be significant including personal finance. The expectation that economic affluence will lead to a higher level of engagement based on previous experience and access to materials (Question 1, Hypothesis 1) is found to be non-existent in the POLS 2305 course.

Table 4 shows data for the POLS 2306 course. Here we find that the variable of gender is statistically significant and the personal finances of a student also have an impact on engagement with the online homework material. Previous success in high school as measured by GPA will increase the level of engagement as well.

Table 4: Model 1 for POLS 2306

	Number of Online Engagements
Race/Ethnicity of Student	0.173 (0.204)
Age of Student	0.305 (0.257)
Expected Hours Worked	-0.167 (0.204)
Gender of Student	-1.860 (0.516)**
High School GPA of Student	0.045 (0.020)*
Financial Issues of Student	-0.369 (0.129)**
Constant	4.121 (5.272)
R^2	0.22
N	123

* $p < 0.05$; ** $p < 0.01$

For the first hypothesis, we find that in the POLS 2306 course, unlike the POLS 2305 course, the level of student affluence will play a significant factor in terms of the number of engagements a student will undertake with the online assignments. The greater the level of financial difficulty a student experiences, the fewer the number of online engagements that will occur. This variable is shown to be significant at the 0.01 level of analysis. Furthermore, while the students of POLS 2305 do not demonstrate a decreased level of engagement based on their level of affluence, the students in POLS 2306 are negatively impacted by their level of affluence and engagements with the online materials as they become more personally concerned about their financial situations. In specific, as the level of “fear” regarding finances increases, the attention to and engagement with the online material decreases by almost a half of one assignment.

The results in Table 4 for POLS 2306 also show that the better a student performed previously in high school, the higher the level of engagement with the online material. While the high school GPA is not as strong as either gender or financial concerns of the student in terms of impact, as the GPA increases from a “B” to an “A” we can expect to see an increase of 50% of one assignment. While this result on its face may seem without value, it might allow for a slight increase in the student’s preparation or participation to round up to the next letter grade.

For the second hypothesis, the results show that female students will engage with the online materials more than male students in POLS 2306. On average, male students will complete two fewer assignments than their female counterparts. The result of gender, like financial issues as a variable, is significant at the 0.01 level of analysis. This result is again counter to the hypothesized direction where we might expect males to engage with the online material at a higher rate than females.

Turning now to our second research question, the coefficients in Table 5 run counter to the beliefs of Moore and Kearsley (1996) who find “the more formal education a person has, the more likely he or she is to complete a distance education course or program” (161). While not a perfect correlation in terms of definition, we can assume that the more education one has, the better the performance.

Converse to the Moore and Kearsley (1996) contention, we find that a student's previous level of success indicates a negative relationship with their final grade performance (-0.4168) shown to be significant at the 0.05 level. Our results likely follow the logic of Yukselturk and Bulut (2007) where students find that the growth of their "responsibility" for learning shifts from the faculty member to the student, thus leading to a negative relationship.

Table 5: Pairwise Correlation Coefficients for POLS 2305 – Final Grade Performance

POLS 2305	Final Grade	Online Engagements	Race/Ethnicity	HS GPA	Age of Student	Work Expectations	Personal Finances	Gender of Student
Final Grade	1.00							
Online Engagements	0.0624	1.00						
Race/Ethnicity	-0.1177	-0.0281	1.00					
HS GPA	-0.4168*	-0.0100	-0.0403	1.00				
Age of Student	-0.0553	0.1234	0.0279	0.0431	1.00			
Work Expectations	-0.2339*	0.0442	0.0670	0.0211	0.1585*	1.00		
Personal Finances	-0.0308	-0.0017	-0.1841*	-0.0333	-0.0202	-0.2870*	1.00	
Gender of Student	-0.0986	-0.1707*	-0.0021	0.1816*	0.0701	0.0406	0.0069	1.00

*p<.05

Table 6 indicates that high school GPA is also found to have a negative relationship with the variable of final course grade in POLS 2306. The coefficient is found to be stronger in the POLS 2306 course (-0.4872) than what was found in POLS 2305. This result is significant at the 0.05 level. In addition, gender as a variable returns a negative relationship with the final grade for the course (-0.3201 and significant at the 0.05 level). The most intriguing finding in Table 6 is the strong and positive relationship observed between online engagements and final grade in the course. Significant at the 0.05 level, the coefficient of 0.8130 for the online engagements provides an interesting positive interaction that was not found in the POLS 2305 course.

Table 6: Pairwise Correlation Coefficients for POLS 2306 – Final Grade Performance

POLS 2306	Final Grade	Online Engagements	Race/Ethnicity	HS GPA	Age of Student	Work Expectations	Personal Finances	Gender of Student
Final Grade	1.00							
Online Engagements	0.8130*	1.00						
Race/Ethnicity	0.0806	0.1375	1.00					
HS GPA	-0.4872*	-0.5488*	-0.0403	1.00				
Age of Student	0.1019	0.0473	0.0279	0.0431	1.00			
Work Expectations	-0.1761	-0.1210	0.0670	0.0211	0.1585*	1.00		
Personal Finances	0.0971	0.0901	-0.1841*	-0.0333	-0.0202	-0.2870*	1.00	
Gender of Student	-0.3201*	-0.3444*	-0.0021	0.1861*	0.0701	0.0406	0.0069	1.00

*p<.05

When we examine the results of the full statistical models, which uses the final course grade as the dependent variable, we observe in Table 7 that for students in the POLS 2305 course external working hours will have a significant and negative impact on the individual student's final grade. For many college students, the need to work is important as they are attempting to potentially earn money for books, entertainment, or to pay their living expenses while in college. What we see in Table 7 is that the more hours a student is expecting to work on average will have an overall detrimental impact on their final course grade. The coefficient is small, but it should not be completely dismissed. Using a grading scale from zero to 100, for every ten hours a student is expecting to work, their grade will be adversely affected by roughly -2.08 points. If a student is working full-time and attempting to maintain a full-time schedule of classes, the expected decrease is roughly equivalent to one full letter grade drop (-8.32).

Table 7: Model 2 for POLS 2305

	Final Grade for the Course
Number of Online Engagements	0.011 (0.015)
Race/Ethnicity of Student	-0.076 (0.072)
Age of Student	0.052 (0.131)
Expected Hours Worked	-0.208 (0.089)*
Gender of Student	-0.085 (0.200)
High School GPA of Student	0.020 (0.009)*
Financial Issues of Student	-0.021 (0.054)
Constant	-0.076 (2.593)
R^2	0.11
N	155

* $p < 0.05$; ** $p < 0.01$

While the expectation of working has a negative impact on the final course grade of the student, Table 7 indicates that the high school GPA plays a somewhat minimal and positive role. As shown in Tables 1 and 3, this finding of a positive and significant impact for the high school GPA was not initially anticipated for any of the students in POLS 2305. However, it is this variable that a Senior Consulting Analyst for Noel-Levitz uses to determine the rate of successful retention of a college student. Arguably, the coefficients are “small,” which may or may not have a substantive impact for the students’ success rates. Those students who performed at a higher level (again based on GPA) will see a positive return on their final course grade. A student who was a “C” student in high school will realize roughly 0.20 grade points more than a “D” student. For some students, these few tenths of a point could potentially mean the difference between passing or failing the course.

For our second research question and Hypothesis 5, the expected outcome was that the higher the level of engagements with the online material, the better the final course grade. Results in Table 7 indicate that the number of online engagements played no role in the final course grade outcome for the semester in POLS 2305. Additionally, while financial concerns of the student do not play a role in this model, as described in Hypothesis 3, students who have to work more may be less affluent than those students who do not have to work, which influences their course performance.

Turning to the second model in Table 8 for POLS 2306, only the number of online engagements provides any impact on the dependent variable.

Table 8: Model 2 for POLS 2306

	Final Grade for the Course
Number of Online Engagements	0.333 (0.026)**
Race/Ethnicity of Student	-0.048 (0.057)
Age of Student	0.102 (0.072)
Expected Hours Worked	-0.085 (0.057)
Gender of Student	-0.136 (0.151)
High School GPA of Student	0.002 (0.006)
Financial Issues of Student	-0.018 (0.037)
Constant	-2.542 (1.469)
R^2	0.68
N	123

* $p < 0.05$; ** $p < 0.01$

Significant at the 0.01 level, the number of online engagements positively affects the final grade in the course. This result is in the expected direction as described in Hypothesis 5. However, unlike in the POLS 2305 class where it is observed that high school GPA and expected hours worked have an impact on the dependent variable, only the online engagements matter in the POLS 2306 course. These results would seemingly provide an argument that students in the POLS 2306 course have become more adept at learning or in the understanding of a college course given that it is usually the second political science class taken in the second semester, but because this course was attempted in the Fall semester of the students' freshman year, such an argument cannot be applied in this case.

It is also recognized that both Hypotheses 3 and 4 are not supported with the results for POLS 2306. While students in the POLS 2305 did have a proxy (Expected Hours Worked) for finances/level of affluence that will impact their final grade, students in POLS 2306 do not. In addition, the results fail to provide support for the hypothesis dealing with the final course grade for gender or males versus females. The expectation was that males would outperform females in the final grade as a result of their level of interaction and engagement with the online material. Referring back to the first model (Tables 3 and 4), it was observed that females exhibit more online engagement than their male colleagues. Knowing this fact, it would be easy to assume that females would then outperform their male counterparts in the final grade calculations. In both observations of Model 2 (Tables 7 and 8), this has proven to not be the case.

5. Conclusion

Contrary to common assumptions and some previous research, our models do not show that males will engage at higher levels than their female colleagues with online materials. As shown in Model 1 (Tables 3 and 4), females tend to engage at greater levels with the online material than males.

This result was significant across both classes, which leads to the conclusion that while Wilson, Pollock and Hamann (2006) may have observed hesitancy in females to take certain classes, there could have been other factors at work that supersede the “fear” of online materials.

Secondly, the impact that financial concerns or work commitments have on a student can be a partial determinant in the success or amount of work a student will engage in. For those students in the POLS 2306 class who experience financial “insecurity,” it is observed that they will engage less with the online materials. This is not the case for those students in the POLS 2305 course, though. When moving from Model 1 into Model 2 (Tables 7 and 8), it is shown that the level of engagements for the POLS 2306 is much more impactful than for students in the POLS 2305 course. Furthermore, because of the importance (meaning higher portion) for the final grade, students in POLS 2306 course recognize or will experience more of a hardship as it pertains to their final course grade.

When comparing the two different introductory courses, it becomes apparent that there is a major disparity between the outcomes. Specifically, the results in the POLS 2306 course for the online assignment engagement shows a larger impact on the students’ final course grades when contrasted with POLS 2305. Looking at the two courses’ final grade outcomes, the online engagement in the POLS 2306 explains roughly 68% of the variance in the dependent variable. The online engagements alone do not provide insight for the dependent variable of final grade for the students in the POLS 2305 course. We believe that the underlying issue that has not yet been addressed is that of the weight or value of the online assignments. Students, like all cost/benefit actors, pay attention to the requirements for the course. They will essentially do what instructors make them do and when a specific component is weighted more heavily, they tend to spend more time, energy, and resources on the assignments or assessments that have a bigger impact on their final course grade. In the case of POLS 2305, the LearnSmart assignments were only worth 15% of the overall course grade, while in POLS 2306, the online homework was worth 35% of the final grade. Future research could therefore explore the differences between multiple types of assignments (online work and other types) and the different weights assigned to them. It may not be whether or not an assignment uses technology that matters so much as how much the assignment is worth to the student and instructor. This then goes beyond the realm of a specific content course like political science since that type of finding would apply to all kinds of courses and disciplines.

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9. Appendix 1. Supplemental Data

A. POLS 2305: U.S. Government and Politics.

Total number of registered students in course	Originally 173 registered; 159 with final grades
Number of students who stopped attending or dropped	14 (Stopped attending, dropped/withdrew, or not gradable)
Number of students registered in LearnSmart	170
Number of student not registered in LearnSmart	1 student on class roster, but not in LearnSmart; 5 students in LearnSmart but not on class roster
Number of students who completed less than half of the assignments (=7 or less)	18
Number of students who completed more than half of the assignments (=8 or more)	152
Average grade for LearnSmart assignments for whole class (include numerical score & letter)	79% (C+)
Number of students in each grade scale category (A, B, C, D, and F) for LearnSmart	A: 88 students B: 24 students C: 15 students D: 10 students F: 33 students
Final average course grade for whole class at end of semester (include numerical score & letter)	65% (D)
Number of students in each grade scale category (A, B, C, D, and F) for final course grade	A: 6 B: 40 C: 44 D: 32 F: 48 (includes not gradable or dropped students)

B. POLS 2306: State and Local Government.

Total number of registered students in course	Originally 175 registered; 150 with final grades
Number of students who stopped attending or dropped	25 (Stopped attending or not gradable)
Number of students registered in LearnSmart	163
Number of student not registered in LearnSmart	12
Number of students who completed less than half of the assignments	32
Number of students who completed more than half of the assignments	132
Average grade for LearnSmart assignments for whole class (include numerical score & letter)	79.9% (C+)
Number of students in each grade scale category (A, B, C, D, and F) for LearnSmart	A: 105 B: 15 C: 5 D: 4 F: 36
Final average course grade for whole class at end of semester (include numerical score & letter)	73.5% (C)
Number of students in each grade scale category (A, B, C, D, and F) for final course grade	A: 10 B: 46 C: 39 D: 13 F: 17