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PRICES THEY PAY: ACADEMIC ACHIEVEMENT AND PROGRESS TO GRADUATION BARRIERS EXPERIENCED BY COMMUNITY COLLEGE STUDENTS DUE TO THE COST OF COURSE MATERIALS

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Abstract

Affordability is considered a key predictor of college enrollment and academic success, yet higher education costs continue to rise. Over the past three decades, textbooks and course materials alone have increased almost three times the rate of inflation (U.S. Bureau of Labor Statistics, 2016). To identify the extent to which course material costs create barriers for community college students, and whether these costs foster inequities for students in traditionally underserved and underrepresented populations, a cross-sectional survey research study was conducted fall 2019 amongst students enrolled in community colleges across the Tennessee Board of Regents system (N = 88,946, n = 1,912). The survey covered course material purchase behaviors, decisions, and experiences related to academic achievement and progress to graduation. Results showed nearly two-thirds of students (68.6%) have delayed purchasing a textbook due to cost. Almost half (41.3%) reported not purchasing required materials, 15.8% reported earning poor grades, and 3.3% reported having failed a course because they could not afford the materials. Logistic regressions were employed to determine whether these extents were disproportionately experienced by non-White, low income, and/or Adult Learners over age 25. Statistically significant differences in academic achievement barriers were found for low income students, alongside significant progress to graduation barriers for non-Adult Learners, suggesting younger learners are more susceptible to consequences from course material costs. These findings inform policy efforts by helping educational leaders better understand the impacts of course material costs on the ability of community college students to achieve in coursework and progress to graduation.

Keywords: Textbook costs, course material costs, college textbooks, cost of higher education, higher education debt, equity in higher education

PRICES THEY PAY: ACADEMIC ACHIEVEMENT AND PROGRESS TO GRADUATION BARRIERS EXPERIENCED BY COMMUNITY COLLEGE STUDENTS DUE TO THE COST OF COURSE MATERIALS

While affordability is often considered key in predicting a student's enrollment and academic success in college, the cost of higher education continues to rise. The U.S. Bureau of Labor Statistics (2016) reported the Consumer Price Index for college textbooks and course materials to have increased 88% from 2006 to 2016, while tuition increased 63% and all other items only increased 21%. While the state of Tennessee has initiated programs to eliminate cost barriers associated with tuition, the cost of textbooks and course materials may continue to present barriers to student academic success and progress to graduation. Students who cannot afford the required materials make decisions to take fewer courses, drop courses, earn poor grades, and even avoid courses altogether (Florida Virtual Campus, 2019; Hendricks, et al., 2017; Jhangiani & Jhangiani, 2017; Martin, et al., 2017).

Issues related to the cost of course materials are an individual, state, and federal concern. On average, Tennessee community college students reported spending \$119.20 per course on required materials during the fall 2019 semester, which, for a typical 15-hour course load, would have resulted in an average of \$596 per semester of oftentimes unanticipated college-related expenses (Spica, 2020). When unable to pay out of pocket, students often turn to federal loans, which consequently now rank second behind mortgage debt at an estimated \$1.5 trillion, an increase of \$20 billion between the second and third quarters of 2019 alone (Perry, 2019).

The purpose of this study was to identify the extent to which community college students perceive the cost of course materials to be a barrier to their ability to succeed in coursework and progress to graduation, and whether that extent is significant for students in traditionally underserved and underrepresented populations (non-White, low-income, and Adult Learners over the age of 25). Less expensive options like Open Educational Resources (OER), *Inclusive Access* programs, etc. might present potential solutions, and knowing the extent to which these costs present barriers for community college students will provide the foundation needed to develop and justify policies that maximize the ability of students to earn post-secondary degrees and credentials.

Review of Literature

This study of community college cost barriers is situated within research on college affordability and points of impact related to the high cost of textbooks and course materials. Barriers to academic achievement and progress to graduation were explored and contextualized using a lens of equity in higher education. The following sections elaborate upon each of these aspects.

College Affordability

Higher education has been known to contribute to the capacity for individuals to earn a livelihood and improve financial and social well-being (U.S. Bureau of Labor Statistics, 2014). Issues related to higher education affordability and access are more important than ever for stakeholders across the board. In the state of Tennessee, for example, great energies have been invested to equip all citizens with a postsecondary degree or credential by 2025 through two-year community and technical college “tuition-free” programs like Tennessee Promise for high school graduates and Tennessee Reconnect for Adult Learners over age 25 (Drive to 55 Alliance, 2018). Despite these efforts, data have continued to reveal African American retention rates ten percent below that of peers, consistently lower graduation rates for low-income students, and declining adult enrollment (Complete Tennessee, 2017).

College affordability not only encompasses tuition costs, but also costs related to course materials that students are often required to purchase for each of their classes. Overall, college affordability has declined, especially for students from low- and lower-middle income families (Perna & Li, 2006). To combat these costs, students from low- and lower-middle income families often work while pursuing their studies, putting them at greater odds of experiencing the negative academic impacts shown to start around 15 hours a week of work outside school (Kuh & O’Donnell, 2013; Wenz & Yu, 2010). Anthony, et al.’s (2019) analysis of 2017 IPEDS data noted that, in the state of Tennessee, students would have to work more than 15 hours a week during the school year to even begin to pay the net price of tuition, fees, and living expenses associated with college. While this picture is less bleak than that of states like New Hampshire, where students would need to work almost 45 hours to break even, the conclusion remains instructive: many students across the nation must decide between focusing on schoolwork and risk

increased debt or working during the school year and risk not successfully completing the degree or credential they have deemed necessary to their future success.

The tuition, fees, and related college costs that students cannot pay from money earned from jobs or savings ultimately end up as student loan debt. Moreover, an estimated \$3 billion of federal student aid is devoted each year to paying for the costs of textbooks alone (Vitez, 2018). At least 30 states have responded to these concerns by introducing legislation to address course material affordability (Baek & Monaghan, 2013). The federal government has responded as well, most recently in renewing a multi-million-dollar appropriation to promote the creation of openly licensed textbooks to replace high cost, traditionally copyrighted course materials (SPARC, 2019).

Points of Impact Related to High-Cost Course Materials

Impact on Academic Achievement. Negative effects to academic achievement result when students do not have the required course materials. The consequences of not having required materials range from students dropping courses, earning poor grade, and/or avoiding courses and majors altogether (Florida Virtual Campus, 2019; Hendricks, et al., 2017; Jhangiani & Jhangiani, 2017; Martin, et al., 2017).

Jenkins, et al. (2020) found that nearly two-thirds of undergraduate students (65%) at a public, four-year Hispanic Serving Institution in Southern California reported not buying required materials due to cost. Of those who did not purchase the required materials, over half (56%) felt it hurt their academic performance in the course (Jenkins, et al., 2020). These decisions are made consciously – even knowing beforehand that their performance in the class would suffer, nearly half (44%) still made the choice not to purchase the required materials.

Impact on Progress to Graduation. Lack of affordability has also been cited as a barrier to post-secondary persistence and completion. For instance, a recent Complete Tennessee report (2017) reported average retention and graduation rates for two-year community colleges remaining below 60% and 20%, respectively, with retention of African Americans students for each falling at least 10 percentage points

below that of peers. Although studies indicate incremental improvements regarding textbook costs for students in some states (Florida Virtual Campus, 2019; NACS, 2020), the extent of textbook cost issues for Tennessee community college students – and whether they have improved—remains unknown. Studies regarding these effects on community college-specific populations are vital, as states heavily rely upon community colleges to provide programming capable of reaching all citizens across the state, regardless of income. Without knowing the extent to which course material costs present barriers for community college students, however, legislators and other educational leaders lack the foundation to support policy and initiatives to maximize the potential for students to achieve in academic coursework, progress to graduation, and ultimately attain the greater financial and social well-being promised to those who pursue higher education.

Conceptual Framework

Bensimon’s (2005, 2012) conceptual framework on equity in higher education guides this study. Whereas equality focuses on providing the same amount and type of resources to all students, equity focuses on providing the appropriate amount and type of resources needed to accommodate individual circumstances. According to the World Health Organization, equity produces “the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically” (World Health Organization, 2020, Equity section). Bensimon’s focus on *equity-mindedness* has resulted in five principles including the need for institutions and systems to establish clear goals, maintain an equity-minded approach, create practices and policies that accommodate differences, continue to learn, and enact equity as a pervasive principle (Bensimon, et al., 2016).

According to Bensimon (2005), inequities manifest when practices at the individual or institutional level fail to produce the expected results for students from traditionally underserved and underrepresented populations. These changeable failures of practice can stem from faculty, administrators, policymakers, or even an institution’s structural arrangements or cultural characteristics.

Regardless of origin, data-based inquiries provide the information needed to surface and address these inequities. By disaggregating data by populations of interest, institutions can frame conversations that resist the natural inclination to assume a problem is understood (Bensimon, 2012). As Bensimon recommends, “the way in which data are displayed and discussed can intensify learning, confirm or refute hypotheses, challenge preconceived ideas, motivate further inquiry, and provide the impetus for change” (Bensimon, 2005, p. 106).

To empower policymakers to examine course material cost issues through the lens of equity, the data for this study were disaggregated according to populations deemed at-risk under Tennessee’s Master Plan, including non-White students, low-income students, and non-traditional “Adult Learner” students over the age of 25 (THEC, 2020). In addition to disaggregating data, this study maintained a focus on equity by keeping institutional responsibility in the forefront by framing results through the lens of institutional practices, rather than through perceived student shortcomings or stereotypes associated with disadvantage and poverty (Bensimon, 2005).

Method

This quantitative study was conducted using a survey research design with students enrolled in community colleges throughout the Tennessee Board of Regents (TBR) system. TBR is the largest public higher education system in Tennessee, housing the state’s two-year public institutions, including colleges of applied technology and the 13 community colleges that served as the focus of this study ($N = 88,946$; TBR, 2020b). The following research questions guided this study:

1. What is the prevalence rate of community college students experiencing barriers to academic achievement (e.g., delaying the purchase of required course materials, not purchasing materials, earning poor grades or failing a course) due to cost of course materials?
2. What is the prevalence rate of community college students experiencing progress to graduation issues (e.g., taking fewer courses, not registering for a specific course, and/or dropping or withdrawing from a course) due to the cost of required materials?

3. Are either of these prevalence rates significantly higher for traditionally underserved and underrepresented populations (e.g., non-White, low income, Adult Learners)?

Survey research was selected for its ability to identify trends, attitudes, and opinions of a population, as well as for the capacity to test associations among variables. Each of these functions of survey research provides summary-based information upon which policymakers and educational leaders rely to make decisions (Creswell & Creswell, 2018). A survey research design also establishes baseline data for measuring longitudinal progress on future course material initiatives.

The 53-item, peer-reviewed, web-based survey covered topics related to student experiences with required course materials from spending and academic experiences to purchase behaviors, decisions, and preferences. Administered via QuestionPro for data security and FERPA-compliance, the instrument was adapted from peer-reviewed textbook affordability surveys including Florida Virtual Campus (2019) and Martin, et al. (2017), with additional questions related to Tennessee's *Inclusive Access* pilot (see Relevant Survey Items, Appendix 1C). To capture a richer perspective of students' attitudes and experiences, both closed- and open-ended items were included, with "Other; please specify" responses throughout so respondents felt less pressured to select responses that did not accurately represent their desired answer (Rea & Parker, 2014). Descriptive statistics for selected survey items were made available in a preliminary report published by the University of Tennessee, Knoxville, Postsecondary Education Research Center (Spica, 2020). This study contains an official, more extensive survey analysis of academic achievement and progress to graduation barriers.

Because the term "required course materials" invited a wide range of interpretation during the pilot phase, the survey explicitly defined required course materials as "textbooks, digital access codes, software, lab manuals, etc. that your instructor requires you to purchase for the course. These materials are listed under the "Required Textbooks" section of each course syllabus." The survey also made clear that required course materials did not concern supplementary or recommended materials that instructors did not require students to purchase. Participation in the survey was anonymous and voluntary, nor was it conducted in association with any class or assignment. To further minimize risk to participants and adhere

to IRB guidelines, respondents were able to skip any question, which resulted in sample size variation across responses. To protect student privacy, research directors at each community college administered the survey via email to their individual student populations; as a further measure of confidentiality, all data were de-identified prior to analysis.

Participants

The population for this study included all students enrolled for the fall 2019 semester at community colleges across the Tennessee Board of Regents system ($N = 88,946$). A total of 1,912 students comprised the sample population for this study. Table 1.1 compares frequencies and percentages for the sample to those of the TBR population.

Table 1.1 Participants by Community College Compared to Fall 2019 TBR Population

	Sample Frequency	Sample Percent	Population Frequency	Population Percent
Chattanooga State	97	5.1%	8,148	1.2%
Cleveland State	43	2.2%	3,383	1.3%
Columbia State	158	8.3%	6,455	2.4%
Dyersburg State	87	4.6%	2,849	3.1%
Jackson State	102	5.3%	4,946	2.1%
Motlow State	149	7.8%	7,023	2.1%
Nashville State	129	6.7%	8,019	1.6%
Northeast State	76	4.0%	6,100	1.2%
Pellissippi State	221	11.6%	10,800	2.0%
Roane State	136	7.1%	6,016	2.3%
Southwest	0	0%	9,653	0%
Volunteer State	171	8.9%	9,227	1.9%
Walters State	532	27.8%	6,327	8.4%
<i>Missing Responses</i>	11	.6%		
Total	1,912	100.0	88,946	2.1%

*11 of the 1,912 respondents (0.6%) elected not to identify their institution.

Demographic characteristics including race/ethnicity, income, and age were key to analysis, and except for age, most demographic characteristics were similar between the sample and population. The racial and ethnic characteristics of the fall 2019 TBR community college student population included 70.7% White, 15.9% Black or African American, 6.4% Hispanic or Latino, and 7.0% classified as Other (TBR, 2020a). Characteristics of the study sample included 83.3% White and 16.8% Non-White students

(5.6% Black, 6.2% Hispanic, and 5% Other (e.g., Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and multi-racial). Table 1.2 compares the racial/ethnic characteristics of the sample to the TBR population.

Table 1.2 Racial/Ethnic Category Comparison: Study Sample and TBR Population

Racial/Ethnic Category	Study Sample*	TBR Population
White / Caucasian	83.3%	70.7%
Hispanic / Latino	6.2%	6.4%
Black / African American	5.6%	15.9%
Other - Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, Multi-Racial (2 or more races)	5%	7.0%

*78 of the 1,912 respondents (4.1%) elected not to report race/ethnicity.

This study also focused on low-income students most likely eligible for federal Pell grants, determined by a self-reported annual household income of less than \$36,000. The income threshold of \$36,000 provided a sample percentage (36.4%, $n = 690$) that closely aligned with the 37% of the TBR student population receiving some amount of Pell award in the 2019-20 academic year (TBR, 2020a). The study also considered age vis-à-vis “Adult Learner” students older than 25 years of age (TBR, 2020a). The study sample contained a greater percentage of Adult Learners (47%, $n = 898$) as compared to the statewide student population (28%, $n = 24,905$).

In addition to the above characteristics, three-quarters of respondents were female (76.4%), as compared to 21.7% male, and 0.6% non-binary/third gender (1.8% of respondents elected not to report gender). Over three quarters worked in addition to their studies (78.6%, $n = 1,501$), with 47.3% ($n = 710$) of those working over 30 hours per week. Over half the respondents (53.6%, $n = 1,019$) intended to transfer to a four-year institution after completing their current program. In terms of spending on required

course materials, close to half (48.6%) reported spending over \$300 during the fall 2019 semester, with 20% spending more than \$500.

Data and Sources

This study employed univariate and multivariate analyses to investigate barriers experienced by community college students due to the cost of course materials. The univariate analysis explored prevalence rates of academic achievement barriers (delaying the purchase of required materials, not purchasing required materials, earning poor grades, and/or failing a course) and progress to graduation barriers (taking fewer courses, not registering for a specific course, and dropping or withdrawing from a course). Multivariate analyses then explored whether any academic achievement or progress to graduation barriers were disproportionately experienced by traditionally underserved and underrepresented populations of interest to TBR: student racial/ethnic origin (White and Non-White), low-income (annual household income of \$36,000 or less), and Adult Learners (over age 25).

To decrease the likelihood of Type I error, the experiences and decisions reported by students were categorized into two constructs: barriers to academic achievement and barriers to progress to graduation. The first construct, barriers to academic achievement, encompassed decisions and experiences related to course-level achievement, from delaying the purchase of required materials to not purchasing required materials, earning poor grades, and/or failing a course. The second construct, barriers to progress to graduation, encompassed decisions that hindered advancement toward degrees and credentials, including taking fewer courses, not registering for a specific course, and dropping or withdrawing from a course.

Construct reliability and internal consistency of the two constructs were checked using R (v4.0.1 Psych package). Cronbach's alpha scores for both were over the threshold of 0.70, indicating high internal consistency (academic achievement $\alpha = 0.85$, progress to graduation $\alpha = 0.82$). While 1,912 cases were available for the univariate analysis, due to missing values (stemming predominantly from the income question), the multivariate analysis for academic achievement barriers included 1,412 cases and the

progress to graduation barriers included 1,413 cases. A missing values analysis revealed data were missing completely at random.

Data Analysis

SPSS (Version 26) was used to compute the analyses. First, the univariate analysis provided descriptive means and proportions evidencing decisions made by students due to the cost of course materials. Next, binary logistic regression— selected for its ability to explain the relationship between one dependent dichotomous variable and one or more independent variables – determined whether those decisions might have been disproportionately experienced for non-White, low income, and/or Adult Learner students.

Results

Results of the univariate analysis indicated that course material costs can have a negative influence on course-level academic achievement. Nearly two-thirds of students (68.6%) reported delaying the purchase of required course materials due to their cost. Almost half (41.3%) have decided not to purchase required materials. Over 15% of students (15.8%) reported earning a poor grade, and 3.3% reported failing a course because they could not afford to buy the required materials.

Results also indicated that course material costs may present barriers to a student's ability to progress to graduation. Over a quarter of students (27.2%) reported taking fewer courses; 14.3% declined to register for a specific course, and 9.6% have dropped or withdrawn from a course altogether due to the cost of materials. Table 1.3 displays the univariate results.

Table 1.3 Student Experiences and Decisions from Course Material Costs ($n = 1,912$)

Barrier	Percentage of Students
Earned a poor grade	15.8%
Failed a course	3.3%
Dropped or withdrew from a course	9.6%
Avoided a class / Not register for a specific course	14.3%
Not purchased the required textbook	41.3%
Delayed purchasing required materials	68.6%
Decided to take fewer courses	27.2%

Following the univariate analysis, a binary logistic regression examined whether any of the three independent variables – race/ethnicity, low-income, or Adult Learner status – were significant predictors of academic achievement or progress to graduation barriers. The first logistic regression examined whether the cost of course materials presented significant barriers to academic achievement for non-White, Pell-eligible, or Adult Learner students. The Academic Achievement construct encompassed experiences of delaying or not purchasing required materials, earning poor grades, and/or failing a course. Table 1.4 provides a demographic breakdown of the sample for analysis ($n = 1,412$).

Table 1.4 Variable Demographics: Academic Achievement Barriers

Variable Type			<i>n</i>	Percent
Dependent Variable	Barriers Experienced	Barriers Experienced	1039	73.6%
		Barriers Not Experienced	373	26.4%
Independent Variables	Race/Ethnicity	White	1192	84.4%
		Non-White	220	15.6%
	Low Income (annual household income >\$36K)	Income above \$36,000	741	52.5%
		Income below \$36,000	671	47.5%
	Adult Learner Status	Non-Adult Learners (Under Age 25)	654	46.3%
Adult Learners (Over 25)		758	53.7%	

An Omnibus Test to determine the model's predictive value indicated significant differences in academic achievement barriers $\chi^2 (3, N = 1,412) = 9.42, p = 0.024$. A subsequent Wald Chi-Square Test of Model Effects confirmed no significant unique contributions based on racial/ethnic status $\chi^2 (1, N = 1,412) = 0.743, p = 0.39$ or Adult Learner status $\chi^2 (1, N = 1,412) = 0.027, p = 0.87$. Significant contributions to academic achievement barriers were found with income $\chi^2 (1, N = 1,412) = 7.91, p = 0.005$.

These data, therefore, indicated that the academic achievement barriers reported by the univariate analysis were not disproportionately experienced by the non-White or Adult Learner populations of concern. Significance was indicated based on income, with students reporting an annual household income of less than \$36,000 being 1.4 times more likely to delay the purchase of required materials, earn

poor grades, and/or fail a course due to the cost of materials as compared to peers with incomes above \$36,000, $OR = 1.41$, 95% CI [.105, .587], $p < .05$. Table 1.5 relates parameter estimates for academic achievement barriers.

Table 1.5 Logistic Regression Results: Academic Achievement Barriers

Parameter	<i>B</i>	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	.856	.105	.651	1.061	66.901	1	.000
Non-White	.150	.174	-.191	.491	1.047	1	.389
White	0 ^a	.	.	.	.	.	.
Low-Income (Income below \$36K)	.346	.123	.105	.587	7.907	1	.005*
Not Low-Income (Income above \$36K)	0 ^a	.	.	.	.	.	.
Adult Learners (Over Age 25)	-.020	.122	-.258	.218	.027	1	.871
Non-Adult Learner (Under Age 25)	0 ^a	.	.	.	.	.	.
(Scale)	1 ^b						

Dependent Variable: Experienced an Academic Achievement Issue

Model: (Intercept), Race White=0, Non-White=1; Low-Income (annual household income less than \$36K) 0=Not Low-Income, 1= Low-Income; Adult Learners Under 25=0, Over 25=1

a. Set to zero because parameter is redundant.

b. Fixed at the displayed value.

The second logistic regression determined whether course material costs presented significant barriers to progress to graduation. Progress to graduation barriers encompassed experiences and decisions related to taking fewer courses, not registering for a specific course, and dropping or withdrawing from a course. Table 1.6 provides a demographic breakdown of the sample ($n = 1,413$).

Table 1.6 Variable Demographics: Progress to Graduation Barriers

	N	Percent
Barrier(s) Experienced	509	36.0%

Dependent Variable	Progress to Graduation Barrier Experienced	Barrier Not Experienced	904	64.0%
Independent Variables	Race/Ethnicity	White	1,192	84.4%
		Non-White	221	15.6%
	Low-Income (income below \$36K)	Income above \$36,000	742	52.5%
		Income below \$36,000	671	47.5%
	Adult Learner Status	Non-Adult Learners (Under 25)	654	46.3%
Adult Learners (Over 25)		759	53.7%	

An Omnibus Test prior to the regression indicated significant differences in the model $\chi^2 (3, N = 1,413) = 30.347, p = 0.00$. The Wald Chi-Square Test of Model Effects then determined which of the independent variables – non-White, low-income, and/or Adult Learners – exhibited significant differences in experiences of progress to graduation barriers. Results indicated no significant unique contributions based on racial/ethnic status $\chi^2 (1, N = 1,413) = 1.28, p = 0.26$, or income $\chi^2 (1, N = 1,413) = 1.07, p = 0.30$. Significant unique contributions were indicated by Adult Learner status $\chi^2 (1, N = 1,413) = 27.49, p = 0.00$. Table 1.7 displays the results of the logistic regression.

Table 1.7 Logistic Regression Results: Progress to Graduation Barriers

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	-.935	.103	-1.137	-.734	82.71	1	.000
Non-White	-.179	.158	-.488	.130	1.28	1	.257
White	0 ^a	.	.	.	.	.	.
Low-Income (Income below \$36K)	.117	.113	-.104	.338	1.07	1	.301
Not Low-Income (Income above \$36K)	0 ^a	.	.	.	.	.	.
Adult Learners (Over Age 25)	.595	.114	.373	.818	27.49	1	.000*
Non-Adult Learner (Under Age 25)	0 ^a	.	.	.	.	.	.
(Scale)	1 ^b						

Dependent Variable: Experienced a Progress to Graduation Issue

Model: (Intercept), Race White=0, Non-White=1; Low-Income (annual household income less than \$36K) 0=Not Low-Income, 1= Low-Income; Adult Learners Under 25=0, Over 25=1

a. Set to zero because parameter is redundant.

b. Fixed at the displayed value.

The logistic regression showed Adult Learner status to be a significant predictor of progress to graduation barriers. As compared to Adult Learners over the age of 25, students under the age of 25 were more likely to experience progress to graduation issues due to the cost of course materials. Specifically, students under the age of 25 were 1.8 times more likely to take fewer courses, not register for a specific course, and drop or withdraw from a course because of costs related to required course materials.

In summary, logistic regression analyses of academic achievement and progress to graduation barriers suggested significant differences in the experiences of low-income students and non-Adult Learners. Due to the cost of course materials, low-income students were significantly more likely to experience academic achievement barriers. Students under the age of 25 were significantly more likely to experience barriers to graduation.

Discussion

This study examined barriers for Tennessee community college students due to the cost of required course materials. Results of the univariate analysis demonstrated barriers experienced by Tennessee students to be comparable to those of students in other states. For example, the findings of this study were consistent with findings of Martin, et al., (2017), which noted that 66% of students have decided not to purchase course materials due to their cost. A lesser percentage of Tennessee community college students (41.3%) have decided not to purchase course materials as compared to other studies (65% from Jenkins, et al. (2020), 64.2% from Florida Virtual Campus (2019), and 66% from Martin, et al. (2017)). The fact that Tennessee students more often acquire course materials seems promising. Upon closer consideration, however, Tennessee students also leave postsecondary institutions with more student debt than students in California, Florida, and Utah (TICAS, 2021). The extent to which these disparities are caused by course material costs remains unknown, a prime opportunity for future research.

As compared to students in the Florida Virtual Campus survey (35.6%), a lesser percentage of Tennessee community college students reported earning poor grades because they could not afford the required materials (15.8%). A relatively lower percentage of Tennessee community college students

reported failing a course because they could not afford the materials (3.3%, as compared to 17.2% of students across 40 institutions in Florida, 9% at one institution in California, and 4% at one institution in Utah). Florida's percentage has dropped since the 2016 survey (from 19.8%), perhaps testament to House Bill 7019 (2017) mandating that institutions adopt affordability policies, procedures, and guidelines.

The findings of this study likewise align with Jenkins, et al. (2020), who found that 12% of students reported dropping a class due to the cost of textbooks. On the other hand, there appear to be fewer Tennessee community college students dropping courses due to the cost of materials than what occurs in Florida, whose survey reported 22.9% of students dropping a course (again an improvement over 26.1% in 2016 before legislation was introduced). Table 1.8 compares percentages reported by the univariate analysis with those relevant from similar surveys.

Table 1.8 Barriers Due to Course Material Costs: Comparison of Findings

Barrier Type	<i>The Authors</i> (2020) <i>n</i> = 1,912	Jenkins (2020) <i>n</i> = 705	FLVC (2019) <i>n</i> = 24,189	Martin (2017) <i>n</i> = 676
Earned a poor grade	15.8%	N/A	35.6%	N/A
Failed a course	3.3%	9%	17.2%	4%
Dropped or withdrew from a course	9.6%	12%	22.9%	N/A
Avoided a class / Not register for a specific course	14.3%	27%	40.6%	33.28%.
Not purchased the required textbook	41.3%	65%	64.3%	66%
Delayed or avoided purchasing required materials	68.6%	N/A	N/A	86%
Decided to take fewer courses	27.2%	N/A	42.8%	20.6%

The multivariate analyses discerned whether academic achievement or progress to graduation barriers were disproportionately experienced based on race/ethnicity, income, and/or Adult Learner status. Though the logistic regression for academic achievement signaled no disparities in racial/ethnic origin or Adult Learner status, significant effects were seen for students with annual household incomes under \$36,000. These findings indicate that, while academic achievement barriers can be experienced by students regardless of race/ethnicity or age, the significant susceptibility of students from lower incomes serves to underscore course material costs as an equity concern.

Viewed through the lens of institutional policies and practices, faculty who have control over course material decisions should be encouraged to select the most cost-effective materials possible. Low- and no-cost alternatives like Open Educational Resources exist for most major course areas, and the use of library collections and subscription materials provide additional opportunities to save students money while also making more efficient use of existing institutional resources. Institutions can incentivize faculty by recognizing those who actively reduce the cost of materials, as well as by acknowledging the adaptation and creation of OER as service or teaching contributions in annual performance reviews, promotion, and tenure.

Statistically significant findings were also discovered with respect to Tennessee's non-Adult Learner population and progress to graduation barriers. Adult Learners were less likely to experience progress to graduation barriers, indicating students over age 25 are faring better than students under the age of 25 in not avoiding specific courses, taking fewer courses, and/or dropping courses due to the cost of course materials. These findings may be due to the relative financial stability of most Adult Learners, or perhaps that Adult Learners have more experience planning and budgeting expenses.

Despite overall advances in college affordability, these results reinforce that course material costs continue to negatively influence both academic achievement and progress to graduation. These negative influences ultimately affect the ability of community colleges to offer equitable experiences for all students. As Bensimon's (2005) conceptual framework on equity in higher education reinforces, viewing these results through the lens of institutional policies and practices could help catalyze lasting change.

Course material decisions may primarily lie with faculty, but the influence and overall responsibility lies with an institution's culture and incentive system. Faculty are driven by incentives, and their time is valuable. In the community college environment, it is not uncommon for faculty to teach 4-5 courses in addition to holding office hours and orchestrating other institutional responsibilities. The time left for curriculum development or searching for freely available resources is scarce. Luckily, lower division and General Education courses are the easiest to impact, with low- or zero-cost materials and ancillaries readily available on the internet. Those materials that have an open license can also be easily

adapted and tailored (OpenStax and Lumen Learning are two such companies offering freely available, outcomes-aligned materials).

In following Bensimon, et al.'s (2016) call to maintain an equity-minded approach and create practices and policies that accommodate differences, institutions could incentive faculty to consider low- and no-cost materials where available. Where not, incentives could encourage faculty to report course material decisions to the bookstore in advance of registration, so the student consumer can plan, budget and make more informed decisions as they select and register for courses. Transparency in providing students course material cost information at the time of registration – as stipulated by the Higher Education Opportunity Act— would allow students to select courses that fit their budget and better anticipate additional expenses.

Another factor potentially hindering the transition away from high-cost course materials is that faculty, while experts in their content field, are not necessarily experts in curriculum design or pedagogy. This gap between theory and practice presents an opportunity for institutions to incentivize and assist faculty, for instance in providing resources that help faculty select and adapt low- and/or no-cost course material options. Another incentive would be to recognize the creation of OER as a contribution toward promotion and tenure (Thoms, et al., 2018). The recognition associated with the promotion and tenure process generally serves to energize behavior (Petri & Govern, 2013). Formalizing curriculum development as part of promotion and tenure, as well as promoting the use of more affordable course materials at the institution and state levels, may facilitate momentum toward more equitable opportunities.

These findings also raise questions about another institutionalized practice wherein students are typically expected to make additional material purchases for a course beyond the tuition paid to enroll in that course. Such a standard practice underscores the current separation of course access, course content, and oftentimes course assessment. Addressing this divide, the University of British Columbia Faculty Senate recently approved a \$65 per 3-credit hour cost threshold for any courses that utilize third-party vendor assessments that account for 20% or more of the final course grade (Hendricks, 2019). The

foundation of this policy is the assumption that the cost of tuition should also support the cost of course assessment (Hendricks, 2019). With course material costs so often unanticipated, and especially given their ability to negatively impact academic achievement and progress to graduation, this practice certainly bears further examination under the need to continue to learn and enact equity as a pervasive principle (Bensimon, et al., 2016).

Limitations & Directions for Future Research

Regardless of instructive findings, limitations existed with the current study design. The web-based survey might have limited participation to those with internet access (Rea & Parker, 2014). While students have access to campus Wi-Fi and received the survey invite through their institutional email addresses, those uncomfortable with web-based technology may have been less likely to participate. Survey research also relies upon self-reported data, which may not necessarily present an accurate representation of actual conditions. Because survey questions were optional as per IRB requirements, the 1,912 responses available for the univariate analysis, were reduced for the multivariate analysis, albeit with still adequate sample sizes over 1,400 cases for each (to doublecheck, separate regressions run for each independent variable; significance remained unchanged). Another limitation lay in the data's not being disaggregated by program type, as STEM fields are typically associated with higher material costs. As such, one opportunity for future research would be to examine whether these impacts disproportionately affected students pursuing specific fields. Given that

Conclusion

This study examined the extent to which course material costs present barriers to academic achievement and progress to graduation for students at Tennessee community colleges. Results indicated low-income students disproportionately experience academic achievement barriers and that students under the age of 25 disproportionately experience barriers to graduation. In maintaining a focus on equity,

these findings inform and empower policymakers and institutional stakeholders with a better understanding of how course material costs affect students attempting to navigate higher education.

These findings also represent a double-edged sword for those crafting solutions to the high cost of course materials. One edge produces a sense of relief in that the barriers to academic achievement and progress to graduation were not found to be disproportionately experienced based on race/ethnicity. The other edge, however, shows that students experience these barriers regardless of their racial/ethnic background, a discovery that brings little solace. Furthermore, low-income students and students under the age of 25 were found significantly more likely to experience academic achievement and progress to graduation barriers, respectively. In this regard, work remains. In a truly equitable environment, students are not only allowed access to higher education, but they are also provided the appropriate amount and type of resources to succeed – course materials included.

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APPENDICES

Appendix 1A. Informed consent

Informed Consent

Research Study Title: Affordability of Required Course Materials for Students at Tennessee Community Colleges

Researchers: *Researcher Contacts Here*

We are asking you to be in this research study because you are currently attending community college in Tennessee. You must be age 18 or older to participate in the study. The information in this consent form is to help you decide if you want to be in this research study. Please take your time reading this form and contact the researchers to ask questions if there is anything you do not understand.

Why is the research being done? The purpose of the research study is to explore costs and experiences with required course materials for Tennessee community college students. The results will inform decisions to help improve college affordability.

What will I do in this study? If you agree to be in this study, you will complete an online survey. The survey includes questions about your experiences purchasing and using required textbooks and materials in your college courses. The survey should take you 7-10 minutes to complete. You can skip questions that you do not want to answer.

Can I say “No”? Being in this study is up to you. You can stop at any point up until you submit the survey. After you submit the survey, we cannot remove your responses because we will not know which responses came from you. Either way, your decision to participate will not affect your grades or any relationships at your community college.

Are there any risks to me? We don’t know of any risks to you from being in the study.

Are there any benefits to me? There is a possibility that you may benefit from being in the study, but there is no guarantee that will happen. Possible benefits include your community college taking steps to make course materials more affordable. Even if you don’t benefit, your participation may help us learn more about how course material costs affect students at Tennessee community colleges. We hope the knowledge gained from this study will benefit you and others in the future.

What will happen with the information collected for this study? The survey is anonymous, and no one will be able to link your responses back to you. Your responses to the survey will not be linked to your computer, email address or other electronic identifiers. Please do not include your name or other information that could be used to identify you in your survey responses. Information provided in this survey can only be kept as secure as any other online communication.

Information collected for this study will be published and possibly presented at scientific meetings.

Who can answer my questions about this research study? If you have questions or concerns about this study, or have experienced a research related problem or injury, contact the researchers: *Researcher Contact Info Here*

For questions or concerns about your rights or to speak with someone other than the research team about the study, please contact: *Institutional Review Board Contact Here*

Statement of Consent: I have read this form and been given the chance to ask questions and have my questions answered. If I have more questions, I have been told who to contact.

By clicking the “I Agree” button below, I am agreeing to be in this study.

I can print or save a copy of this consent information for future reference.

If I do not want to be in this study, I can close my internet browser.

Appendix 1B. Survey communications

Suggested Banner/Campus Portal Notification (Optional): “*Have you shared your experiences in the course material affordability survey? Click here now—survey closes Oct 31st!*”

Invitation Email – October 17, 2019

Dear student, you are invited to participate in a research study about the cost of textbooks and course materials. Participation is optional and the survey is anonymous. If you would like to participate, read the email below.

Hello!

I am writing you as a PhD student in Educational Leadership conducting research on college affordability. You are invited to participate in my research study on student costs and experiences with textbooks and other required materials. The results will help your college and others across the state make decisions to improve the affordability of college for you and future students.

You are being invited because you are a student at a Tennessee community college. To participate, you will complete an anonymous survey. The survey will only take 7-10 minutes to complete.

Click the link below for more info and to begin the survey:

SURVEY LINK HERE “CLICK HERE TO BEGIN THE SURVEY”

The decision to participate is completely yours. If you have any questions, please contact: *Insert Researcher Contact*

Your thoughts and feedback are very important. Please complete this survey by **Wednesday, October 31st**.

Instructor Email – October 21, 2019

Hello instructors,

Last week students received an email inviting them to complete a survey on the cost of required textbooks and course materials. This research is part of a dissertation project at <*Institution*>, and the results will help inform policy and other decisions to improve college affordability. TBR is helping the Principal Investigator facilitate this research, as campus-level results will be shared with our institution. The more students we can get to participate, the richer the information we will receive.

If you are able, please remind students at some point during your classes this week that the survey is available. Their experiences and feedback are very important.

Please do not offer any incentive to students for completing this survey, as we want to avoid any coercion or undue influence. Simply remind them in a neutral way that it is available, anonymous, and optional if they would like to participate.

Please let me know if you have questions and thanks for your help.

Reminder Email – October 26, 2019

Dear student, below is a reminder about the research study on the cost of textbooks and course materials. Your participation is optional and the survey is anonymous. If you would like to participate, read the email below.

Hello,

This is a quick reminder that my research survey on student experiences with the cost and use of required textbooks and other course materials is still open!

The 7-10 minute survey is anonymous, and the results will help inform decisions to improve college affordability for students throughout Tennessee.

Please take a moment to complete this survey by **Wednesday, October 31st**:

SURVEY LINK HERE “CLICK HERE TO BEGIN THE SURVEY”

The decision to participate is complete yours. If you have any questions, please contact: *Insert Researcher Contact Info*

Thanks ahead of time for sharing your thoughts and experiences.

Final Reminder Email – October 29, 2019

Dear student, below is a final reminder about the anonymous research study on the cost of textbooks and course materials. Your participation is optional; read more in the email below.

Hello,

Only two days remain to complete the anonymous survey on course material affordability. We hope you'll take a moment to share your thoughts and experiences – the survey will take less than 10 minutes.

SURVEY LINK - “CLICK HERE TO BEGIN THE SURVEY”

The decision to participate is complete yours. If you have any questions, please contact: *Insert Researcher Contact Info*

Thanks ahead of time for sharing your thoughts and experiences.

Appendix 1C. Relevant Survey Items

At any point in your academic career, have you delayed or avoided purchasing required course materials because of their cost?

- Yes
- No

At any point in your academic career, has the cost of required course materials caused you to... (select all that apply)

- Take fewer courses?
- Not register for a specific course?
- Drop or withdraw from a course?
- Not purchase the required materials?
- Earn a poor grade because you could not afford the required materials?
- Avoid a certain major because of higher course material costs?
- Fail a course because you could not afford to buy the required materials?
- None of these
- Other (please specify) _____

At which community college do you study?

- Chattanooga State Community College
- Cleveland State Community College
- Columbia State Community College
- Dyersburg State Community College
- Jackson State Community College
- Motlow State Community College
- Nashville State Community College
- Northeast State Community College
- Pellissippi State Community College
- Roane State Community College
- Southwest Tennessee Community College
- Volunteer State Community College
- Walters State Community College
- Other _____

What is your age?

- Less than 18 years old
- 18-24 years old
- 25-34 years old
- 35-44 years old
- 45+ years old
- Prefer Not to Respond

Which of the following categories best describes your race and/or ethnicity? Select one or more:

- Black or African American
- Hispanic or Latino
- Asian
- American Indian or Alaska Native
- Native Hawaiian or other Pacific Islander
- White or Caucasian
- Prefer Not to Respond

Other (please specify) _____

Do you work at a job in addition to your studies?

No.

Yes, I work 1-15 hours a week.

Yes, I work 15-30 hours a week.

Yes, I work 30+ hours a week.

Approximately how much did you spend on required course materials this semester? Enter the dollar amount below:

After finishing the program in which you are currently enrolled, do you plan to transfer to a four-year institution?

Yes

No

Not Sure

Please estimate your annual household income. Household income = the combined amount all the adult members of your household earn each year.

Less than \$13,000

\$13,001-\$16,999

\$17,000-\$19,999

\$20,000-\$24,999

\$25,000-\$31,999

\$32,000-\$35,999

\$36,000-\$46,999

\$47,000-\$55,000

\$55,000-\$64,999

\$65,000-\$74,999

\$75,000-\$99,999

\$100,000 or more

Not sure

Prefer not to answer