

Through the Lens of Equity: Impacts of Required Course Material Costs for Tennessee
Community College Students

A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

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May 2021

DEDICATION

For Tennessee students,
the best and brightest,
and the great heights they will reach.

ABSTRACT

The goal of this nonexperimental, multi-part dissertation was to explore issues of course material affordability for students at Tennessee community colleges. Data were drawn from two sources: a 53-item student survey ($n = 1,912$) and three years of anonymized outcomes data provided by the Tennessee Board of Regents (TBR). Guided by Bensimon's conceptual framework on equity in higher education (Bensimon, 2005, 2012), data for each study were disaggregated to examine findings through the lens of equity, with attention to three populations of concern for Tennessee higher education (race/ethnicity, low-income, and Adult Learners over age 25).

The first article, *Prices they pay: Academic achievement and progress to graduation barriers experienced by community college students due to the cost of course materials*, establishes the issue. A binary logistic regression indicated that low-income students disproportionately experience barriers to academic achievement, and that students under the age of 25 disproportionately experience barriers to graduation. The second article, *Inclusive Access: A multi-institutional study of academic outcomes from a statewide community college automatic billing eTextbook pilot*, compared the academic outcomes of an *Inclusive Access* pilot with those of the two previous fall semesters. A four-level hierarchical generalized linear mixed modeling approach to analysis showed no significant benefits or detriments to academic achievement from participation in the *Inclusive Access* automatic billing program pilot, either for students overall or for any of the three populations examined through the lens of equity.

In the third article, *The influence of technological savviness and home internet access on student decisions to use print or digital course materials*, a multinomial logistic regression was employed to explore student format decisions and potential correlates including demographic

characteristics, technological savviness, and availability of home internet access. Most students preferred print format materials, perceiving them to better facilitate their learning. Those who preferred digital materials did so primarily for their portability and convenience. Preferences did not significantly differ by demographic characteristics (race/ethnicity, income, Adult Learner status), level of technological savviness, and/or availability of home internet access.

Findings overall provide insight useful for framing conversations around the role of institutional policies and practices in creating, perpetuating, and resolving issues related to course material costs. Recommendations for policymakers and educational leaders, along with directions for future research, are included.

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INTRODUCTION

The cost of attending college has seen alarming increases over the past three decades, with prices for textbooks and course materials increasing almost three times the rate of inflation (U.S. Bureau of Labor Statistics, 2016). While tuition is usually blamed for the rapidly rising costs of higher education, from 2006 to 2016, the cost of college textbooks increased by 88%, more than nearly any other college student expense. The consequences are far-reaching –almost two-thirds of students have attempted coursework without buying the required materials (Nagle & Vitez, 2020; Martin, 2017). Students also often pay for course materials using federal financial aid dollars, with an estimated \$3.15 billion of federal student aid devoted to textbooks each year (Senack & Donoghue, 2016).

These ever-rising expenses have impacts beyond contributing to long-term student loan debt. Course material costs cause students to drop and withdraw from courses, take fewer courses, avoid certain courses and majors, and even attempt coursework without having the required materials (Florida Virtual Campus, 2019; Martin et al., 2017; Nagle & Vitez, 2020). When students attempt coursework without the required materials, they risk failing or earning poor grades (Florida Virtual Campus, 2019; Martin et al, 2017; Jhangiani & Jhangiani, 2017; Hendricks, Reinsberg, & Rieger, 2017). Ultimately, these course-level consequences can impact a student's ability to progress to graduation.

Policies to help mitigate these issues include the Higher Education Opportunity Act (2008), which mandates that federally funded institutions provide required course material information to students in advance of course registration (Higher Education Opportunity Act, 2008). This allows students to factor in additional course material costs as they decide which courses to take. The use of digital textbooks, touted for being more affordable, portable, and

interactive than their print counterparts, has likewise increased. The proliferation of digital, subscription-based materials has also practically eliminated the third-party used market where students have traditionally sought more affordable materials (Jarvis, 2019; Knox, 2019; Millward, 2019; Vogel, 2012).

Faculty have responded to the increasing course material prices by adopting freely and openly available Open Educational Resources (OER), “high-quality teaching, learning, and research materials that are free for people everywhere to use and repurpose” (Hewlett Foundation, 2019). Institutional libraries have helped reduce costs by making textbook materials available on reserve, as well as by promoting the use of OER, library collections, and library subscription materials (Broadhurst, 2017; Chadwell & Fisher, 2016; Colson & Donaldson, 2017; Hendrix et al., 2016; Noe, 2018; Rokusek & Cooke, 2019; Thomas & Bernhardt, 2018). Even publishers and campus bookstores have positioned themselves as purveyors of more affordable options, offering textbook rentals programs, *Inclusive Access* automatic billing programs, and subscription services that provide individual-level access for a flat semester or annual fee (Graydon et al., 2011; Kronk, 2018). Despite these numerous efforts, reports have continued to indicate that students spend the same or very similar amounts on course materials (Nagle & Vitez, 2020). Students at Tennessee community colleges, for example, spent \$119.18 per course on average in the fall 2019 semester (Spica, 2020).

The state of Tennessee has introduced programs to eliminate barriers to higher education access associated with tuition costs (Davidson et al., 2020). However, the extent to whether course material costs present barriers for students enrolled in Tennessee community colleges remains largely unknown. Community colleges are the primary vehicle for state higher education access, and identifying the extent to which course material costs present barriers will help leaders

create and support policy that maximizes the ability of students to succeed in coursework, progress to graduation, and ultimately attain the better life assured to those who make the sacrifices required to pursue higher education.

This dissertation fills a gap by 1) uncovering the extent to which course material costs present barriers to academic achievement and progress to graduation for community college students, 2) examining the academic outcomes of a statewide *Inclusive Access* course material affordability pilot, and 3) exploring the influence of factors such as technological savviness and home internet access on students' decisions to use print or digital course materials. Large-scale research on the impacts of course material costs has never been conducted with the Tennessee-specific community college student population, nor has any large-scale research explored academic outcomes related to the increasingly prolific, *Inclusive Access* automatic billing model for digital course material distribution.

Purpose of the Study

The purpose of this dissertation is to better understand the dynamics of problems and solutions regarding the affordability of course materials for students enrolled in Tennessee community colleges. The first article establishes the problem by defining academic achievement and progress to graduation barriers experienced by community college students due to the high cost of course materials. The second and third articles explore facets of solutions to those issues: the second article examines the academic outcomes from a statewide community college *Inclusive Access* pilot. The third explores the dynamics of an increasingly digital world, bringing the student voice to the forefront in an exploration of decisions for print or digital materials and how those preferences relate to demographic characteristics, technological savviness, and the availability of home internet access.

Research Questions

The three articles of this dissertation together illuminate a more holistic picture of the problems, dynamics, and solutions related to course material affordability for community college students. The overarching research question guiding these studies was “How do course material costs impact Tennessee community college students?” The research questions guiding each article were as follows:

- To what extent do course material costs present barriers to academic achievement and progress to graduation?
- How do the academic outcomes of a statewide *Inclusive Access* program pilot compare to outcomes from previous semesters?
- Which format do students prefer for their course materials– print or digital – and can those be predicted based on demographic characteristics, technological savviness, and/or the availability of home internet access?

Each research question was explored through the lens of equity, with data disaggregated by race/ethnicity, income, and age to determine whether any findings were disproportionately experienced by populations deemed at-risk for Tennessee community colleges. Details on the theoretical framework are included in the following section.

Theoretical Framework

The guiding framework for this dissertation was Estela Mara Bensimon’s work on equity in higher education (Bensimon, 2005, 2012). Equity is a value and quality that 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 markedly differs from equality. Whereas equality centers around

providing access to the *same* rights and resources, equity focuses on providing the *right* or *appropriate* amount and type of resources to accommodate individual student circumstances.

Hallmark to Bensimon's (2005, 2012) perspective on equity in higher education is the positioning of institutional policies and practices as the primary lens of examination. According to Bensimon, inequities are not failures caused by perceived student shortcomings, or stereotypes associated with disadvantage and poverty, but rather changeable failures on the part of multiple levels of institutional actors, policies, and practices. This distinction is crucial to predicting whether an institution will approach an issue from a deficit- or equity-oriented standpoint. A deficit-oriented approach looks at inequities from the perspective of student shortcomings. Such an approach often results in compensatory educational programs or remedial courses geared toward "fixing the student" (Bensimon, 2005, p. 103). An equity-oriented approach, in contrast, focuses on empowering institutional stakeholders to address shortcomings that instead lie with individual instructors, administrators, policymakers, or even in an institution's structural arrangements and cultural characteristics (Bensimon, 2012).

Key to Bensimon's (2005) equity-minded approach is the framing of conversations around student outcome data that have been disaggregated by race and ethnicity: "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). A data-based approach can help institutional stakeholders examine and identify problems. By first collecting, analyzing, and disaggregating data, stakeholders better resist the natural inclination to assume that a problem is already understood. This more open-minded approach can, in turn, make leaders more likely to learn and approach problems in new ways that have the potential to result in more equitable experiences for all students.

Bensimon's (2005) perspective on equity in higher education is rooted in four theoretical strands. The first, sociocultural activity setting theory, emphasizes that learning and change occur when practitioners jointly engage in meaningful activities like examining disaggregated data to better illuminate points of inequity (Vygotsky, 1978). Secondary roots in Dewey's practice theory (1938) posit that disparities in student outcomes result from situations triggered by institutional malfunctions, which then require conversations framed around institutional change (as opposed to conversations on ways the institution can change the student; Bensimon, 2012). The third theoretical strand, stemming from the idea that individuals can become agents of organizational change, has roots in both organizational learning and practice theories, wherein "the knowledge production itself may become a form of mobilization" (Gaventa & Cornwall, 2008, p. 12). Finally, the close connections of race-consciousness and equity underscored throughout the framework stem from critical theories of race (Bensimon, 2012; Caldwell & Crenshaw, 1996; Delgado & Stefancic, 2012).

Bensimon's conceptual framework on equity in higher education is threaded throughout every aspect of this dissertation, from study design to analysis and discussion. "The lens of equity" refers to how each study design focuses on disaggregating and analyzing data to ensure effects were not disproportionately experienced by traditionally underserved and/or underrepresented populations as identified in Tennessee's Master Plan (THEC, 2020). Rather than assuming these issues are already understood, the first study takes time to establish the nature and extent of the problem. This foundation, alongside the framing of subsequent analyses and discussions, will empower stakeholders to facilitate proactive conversations surrounding the role of institutional policies and practices in creating, perpetuating, and – ultimately, hopefully – addressing issues related to course material affordability.

Research Design and Methods

The three articles comprising this nonexperimental dissertation study are based on two key data sources: a 53-item web-based survey administered to Tennessee community college students fall 2019, and a large data set of anonymized student-level academic outcomes from the 2017, 2018, and 2019 fall semesters. Survey research was selected for its ability to aid in understanding the characteristics of a population based on sample data (Johnson & Christensen, 2020). Policymakers and educators charged with finding solutions to college affordability require insight into the student populations they serve, and survey research provides quantitative data helpful for describing trends, attitudes, opinions, and data that allow for testing associations among variables (Creswell & Creswell, 2018). A survey research design was also deemed most appropriate given the pragmatic nature of this project, as the results establish baseline data useful for measuring the longitudinal progress of future initiatives.

To complement insight from the survey research, analysis in the second article incorporates a large data set of anonymized, student-level academic outcome data provided by the TBR Office of Policy and Strategy. This data set comprises three years of outcome data and demographic information for courses where all sections participated in a fall 2019 pilot of *Inclusive Access*, a relatively new and controversial digital materials distribution model that automatically adds the cost of an eTextbook to students' tuition bills at the time of course registration. These data were analyzed not only to compare pilot academic outcomes against those of the previous two years in which the courses were taught, but also to examine the extent to which those outcomes were realized for students in traditionally underserved and underrepresented populations.

Population and Sample

The population of this dissertation study included all students enrolled for the fall 2019 semester at community colleges across the Tennessee Board of Regents system ($N = 88,946$). The Tennessee Board of Regents (TBR) system is the largest system of public higher education in Tennessee, serving nearly 120,000 students enrolled at 40 community colleges and colleges of applied technology (TBR, 2020b). TBR houses all of Tennessee's two-year public institutions, including the 13 community colleges that served as the focus of this study. These institutions offer classes in almost all of Tennessee's 95 counties, and the state heavily relies on them to enable affordable, accessible higher education opportunities for all citizens across the state.

According to TBR data, the fall 2019 Tennessee community college student population consisted of 88,946 students (TBR, 2020a). A total of 61.1% of students were female, 38.9% were male, and 28% were classified as "Adult Learners" over the age of 25. In terms of income, 37% of all Tennessee community college students in the fall 2019 semester were awarded some amount of a federal Pell grant, and just slightly over half of students (50.5%) attended community college part-time.

The variables for race/ethnicity in each study followed recommendations in the Office of Management and Budget's Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity (OMB, 2016), with respondents able to self-identify as one or more of six categories (Black or African American, Hispanic or Latino, White or Caucasian, Prefer Not to Respond, Other). For the fall 2019 semester, the TBR community college population consisted of 70.7% White students, 15.9% Black, 6.4% Hispanic, and 7.0% of classified as Other (TBR Data, 2020). Table I-1 compares the racial/ethnic characteristics of the fall 2019 student survey sample with that of the state community college population:

Table I-1 Racial/Ethnic Characteristics of Survey Sample & Tennessee Community College Student Population

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

*78 of the 1,912 respondents (4.1%) elected not to respond to this question.

Data Collection

The web-based survey data analyzed for this dissertation encompassed 53 items developed in partnership with the TBR Office of Policy and Research and community college campus research offices (see Appendix IA for complete instrument). The survey covered student spending on required course materials; experiences related to not having required course materials; purchase behavior, decisions, and preferences related to course materials; and participant demographics. For the purposes of this study, required course materials were defined within the survey 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 explicitly stated within the same definition that required course materials did not concern supplementary or ‘recommended’ materials that students were not required to purchase.

Participation was totally voluntary and not associated with any class or assignment, and no incentives were offered for completing the survey. Respondents were also able to skip any question and stop participating at any time. Average time for survey completion was 13 minutes, and the instrument included both closed- and open-ended questions adapted from national, peer-reviewed surveys administered by Florida Virtual Campus (2019) and Martin et al. (2017). Florida Virtual Campus’s Office of Distance Learning and Student Services has conducted biannual textbook surveys since 2010 to identify ways to reduce the cost of educational materials, asking students about purchase behaviors, academic completion and success, study aids, and the use of financial aid (Florida Virtual Campus, 2019). The student survey from Martin et al. (2017) focused on points of impact due to course material costs, including purchases foregone to fund the purchase of those materials.

To maintain student privacy and information security, research directors at each community college facilitated the survey's electronic administration to all students enrolled on their individual campuses fall 2019. This census approach to administration likewise allowed all students an equal chance of participation, which, in turn, enabled the best chance to gather a representative sample (Johnson & Christensen, 2020). The survey was administered using the QuestionPro web-based survey tool, which was selected for its FERPA-compliant security measures and ability to adapt to desktop, laptop, and mobile devices.

The data gathered from this survey served as the primary data source for the first and third articles of this dissertation. The second article regarding the Tennessee Board of Regent's *Inclusive Access* pilot utilized the data set comprising three years of anonymized student-level academic outcome data provided by TBR's Office of Policy and Strategy. These two data sources together provided a more holistic view of dynamics regarding the affordability, dynamics, and issues of course material costs for students enrolled in Tennessee community colleges. Prior to data collection, the study was approved by the Tennessee Board of Regents and University of Tennessee, Knoxville, Institutional Review Boards.

Survey Procedure

The survey instrument utilized in the first and third articles of this dissertation was developed in partnership with the TBR Office of Policy and Research and peer-reviewed, with input from question construction experts including the dissertation committee chair. Prior to launch, face validity was established via a two-week pilot testing period with research directors at each community college, who provided feedback on the survey items and overall design. After this initial pilot test, the survey was piloted with individuals representing a range of ages and differing levels of college experience, with items streamlined and further adjusted for clarity and

concision (Johnson & Christenson, 2020). These pilot tests were conducted on desktop, laptop, and mobile devices.

Following the feedback and pilot testing phases, the survey was administered via email invitation sent by research directors to all students enrolled at each respective community college beginning October 17, 2019 (see Survey Communications, Appendix 1B). In addition to the email invitation, campuses were given the option to deploy a survey notice and link within their password-protected campus portal. Survey administration corresponded with the 8th week of the semester (one week after fall break), with the goal of pinpointing a time when students would have likely still been able to recall how much they spent on materials while also having enough of the semester behind them to comment on whether those materials were being used. Participants were able to access the survey link via phone, computer, tablet, or any internet-connected mobile device. The pre-screening and informed consent were presented on the first page of the survey (see Informed Consent, Appendix 1A). Upon completion of the pre-screening and informed consent, students were able to progress to the survey.

The survey remained open for two weeks, closing on October 31st, 2019, with a first reminder sent after nine days and a final reminder two days before the survey close. To increase awareness of the survey, an email was sent by research directors to instructors at the halfway point to notify them of the survey. In this email, instructors were asked to remind (but not incentivize) their students to read the email invitation and consider completing the survey (see Survey Communications, Appendix 1B). All participating institutions adhered to the above timeline except Chattanooga State Community College, which launched the survey earlier (September 19, 2019) in order to avoid a scheduling conflict with another major campus survey. The complete survey timeline is indicated below:

- Thursday, October 17, 2019 – Survey Launch / Student Invite Email
- Monday, October 21, 2019 – Email from Institutional Research Directors to Instructors
- Saturday, October 26, 2019 – First Student Reminder Email
- Tuesday, October 29, 2019 – Final Student Reminder Email
- Friday, November 1, 2019 – Survey Close

Three Article Format

The purpose of this three-article format dissertation is to empower policymakers and other educational leaders with the insight and understanding needed to address issues related to the cost of required course materials. The three articles within this dissertation 1) establish the extent to which the cost of materials presents barriers to academic achievement and progress to graduation for students enrolled in Tennessee community colleges, 2) examine outcomes and perceptions related to the increasingly prolific, digital-first *Inclusive Access* course material affordability initiative, and 3) explore the influence of key factors on student decisions for digital and print course material formats. These findings serve as a baseline for charting the progress of future course material initiatives. They also outline the impact of the *Inclusive Access* automatic eTextbook billing model, and, finally, deepen stakeholders’ understanding of the dynamics and implications of solutions that privilege the use of digital materials.

Article 1. Prices they pay: Academic achievement and progress to graduation barriers experienced by community college students due to the cost of course materials

The purpose of the first study was to identify the extent to which Tennessee community college students perceive the cost of course materials to present barriers to their academic achievement and ability to progress toward graduation. Less expensive options like OER, *Inclusive Access* programs, etc. present potential solutions, but hearkening back to Bensimon

(2005), an equitable solution requires that stakeholders first gather data and not assume a problem is understood. Educational leaders will be better able to justify policy and resources toward affordability initiatives once the extent to which course material cost barriers has been established.

With an emphasis on equity and fostering “the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically” (WHO, 2020, Equity section), the first article of this dissertation explores not only whether academic achievement or progress to graduation barriers are experienced by Tennessee community college students, but also whether those issues are disproportionately experienced by traditionally underserved and underrepresented populations based on race/ethnicity, income, and/or Adult Learner status. The overarching research question guiding this article was “To what extent do course material costs present barriers to academic achievement and progress to graduation?” The research sub-questions were as follows:

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

A logistic regression was conducted to analyze the data and provide insight to help policymakers and other educational stakeholders identify issues and frame proactive conversations around the institution's role in potentially fostering inequitable outcomes. The results of this study may also serve as a baseline toward charting the progress of course material initiatives.

Article 2. Inclusive Access: A multi-institutional study of academic outcomes from a statewide community college automatic billing eTextbook pilot

The purpose of the second study was to examine the academic outcomes of a statewide community college *Inclusive Access* automatic billing pilot. *Inclusive Access* programs are partnerships between publishers, course material providers, and institutions that automatically add the cost of an eTextbook or other digital materials to the student's tuition bill at the time of course registration (McKenzie, 2017). Despite their rapid gain in popularity as a method to save students money and provide Day One Access to course materials, *Inclusive Access* has yet to be extensively studied beyond measures of relative cost-savings.

In maintaining the emphasis on equity, analysis also disaggregated outcomes according to populations that serve as key foci for THEC's access and completion efforts: traditionally underrepresented, Pell-eligible, and Adult Learners over the age of 25. The research questions guiding this second study are as follows:

- (1) How do the academic outcomes of the *Inclusive Access* pilot semester compare to the two previous fall semesters in which each course was taught?
- (2) How do these outcomes differ for traditionally underserved and underrepresented populations (non-White, federal Pell grant recipients, and Adult Learners over the age of 25)?

By examining academic outcomes, this study will help inform policy efforts and other decisions by educational leaders on how and whether to support the continued expansion of *Inclusive Access* automatic billing initiatives.

Article 3. The influence of technological savviness and home internet access on student decisions to use print or digital course materials

The purpose of the third article was to identify course material format preferences and the extent to which those preferences can be predicted based on demographic characteristics and factors like technological savviness and home internet access. Required course materials remain standard practice for institutions of higher education, and most solutions proposed to mitigate issues related to high course material costs center around the use of digital technologies. Digital courseware and eTextbooks, marketed for their lower prices and convenience, have been increasingly promoted by publishers; at the same time, digital subscriptions and courseware inhibit consumer choice by virtually eliminating the third-party, lower cost, used materials market (Jarvis, 2019; Knox, 2019; Millward, 2019; Vogel, 2012). Understanding Tennessee community college student format preferences, and which factors influence those preferences, will empower educational stakeholders to make informed decisions on programs and initiatives.

Utilizing the fall 2019 survey data, the format decisions of students across multiple Tennessee community college institutions, programs, and ages will be explored. The student voice, illuminated by analysis of open-ended questions, will further complement and add contextual richness to the quantitative data. The research questions guiding the third study were as follows:

- (1) Which course material format – print or digital – do students prefer?
 - a. What are the reasons for those preferences?

- b. Are there significant differences in preferences for traditionally underrepresented student populations (race/ethnicity, low income, and/or Adult Learners)?
- (2) Is there a relationship between format preference and technological savviness and/or home internet access?

In addition to Bensimon's (2005) work on equity in higher education, Narver and Slater's (1990) market orientation framework also served to contextualize this study. A market orientation connects knowledge of customer preferences with the ability of firms to create superior value that eventually positively impacts firm performance. This framework acknowledges that, while higher education policy focuses on what is best for the student, decisions must also be made based on potential impacts to an institution's fiscal health. Students comprise the largest target market of higher education, and in the case of course material preferences, a market orientation acknowledges that the attempt to accommodate student format preferences remains in the best interest of the institution.

Summary

The three articles of this dissertation together illuminate a more holistic picture of how course material cost impact students at Tennessee community colleges. Results reveal the complexities of the issues, namely that cost is only one aspect to consider when approaching issues of course material affordability. For instance, initiatives based solely around the use of digital materials may have unintended consequences for the student learning experience, and the preferences of the student consumer should perhaps also be considered in the decision-making process. Each of the three articles also present results from data disaggregated to determine whether findings are disproportionately experienced by populations deemed at-risk for

Tennessee community colleges, an equity-based approach to help empower leaders wishing to frame proactive conversations on the role of institutional actors, practices, and policies in potentially hindering and/or precipitating the ability of students to access and complete postsecondary degrees and credentials.

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Appendix IA. Complete Survey Instrument

Part I. Your Spending on Required Course Materials

This first section concerns the cost of required materials for your community college courses. For the purposes of this study, required materials are 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. This survey does not concern supplementary or "recommended" materials that you are not required to purchase. Do not include the cost of supplementary/recommended materials in any of your answers.

How many courses are you taking this semester?

- 1
- 2
- 3
- 4
- 5
- 6+

I am not taking any courses this semester.

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

What was the primary source of funding for your required course materials this semester?

Cash and/or personal savings

Credit card(s)

Help from parents, family members, employers, friends, etc. that you DO NOT have to pay back.

Loans (money you must pay back, like federal student loans or personal loans from family, friends, employers)

Grants/Scholarships (Pell grants, TN Promise, Lottery, Private Scholarships, GI Bill, SEOG, Post 911, TN Reconnect, TN Strong, etc)

Other (please write in below) _____

Did you use any additional funding sources to purchase required materials this semester (outside of the one you indicated in the previous question)?

Yes

No

This semester, approximately what percentage of your required material costs were covered by

financial aid (grants, scholarships, loans)?

I do not receive financial aid.

None of it covered my course materials.

25% or less

26% - 50%

51% - 75%

76% - 99%

All my required material costs were covered by financial aid.

Not sure

Part II. Your Experience Having (and Not Having) Course Materials

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 any point in your academic career, have you decided to forego or skip certain purchases so that you could afford to purchase your required course materials?

Yes

No

Which goods and/or services have you NOT purchased in order to afford to pay for required course materials? Select all that apply.

Housing (rent, room, housing costs)

Food (groceries, board, meals)

Savings and Debt Reduction (savings, investments, paying off debt or student loans)

Transportation (gas, car repairs, transportation needs)

Health (doctor bills, prescriptions, insurance)

Childcare

Other Education Expenses (upgrade computer, supplies)

Clothes, Shoes, or other apparel

Recreation (travel, dates, social activities)

Self-care (gym memberships, hair or nail services)

Other (please specify) _____

If you like, share a brief example/story related to purchases you've foregone in order to pay for your required course materials. Otherwise, click the "Next" button to continue the survey.

Part III. Required Materials for your Courses

How many courses did you have this semester where you spent \$0 on required materials?

None - I have purchased materials for each of my courses.

One

Two

Three

Four or more

For courses where you spent \$0 on materials, why did you spend \$0? Select all options that apply:

No materials were required.

The required materials were all free. There was nothing for me to purchase.

Materials were required, but I did not buy them because I could not afford them.

Materials were required, but the instructor doesn't actually use them so I didn't buy them.

I had already purchased the required materials for a previous course.

I borrowed or am sharing the materials with someone.

I got access to the materials through the library.

I am a student with a disability, so I did not purchase the materials because they are not accessible to me.

Other (please explain) _____

This semester, have you purchased required course materials that your instructor is NOT using in the course?

Yes, I have purchased required materials that my instructor isn't even using.

No, my instructors are using everything they've asked me to purchase.

Throughout your time at this community college, approximately how many times have you purchased required materials that the instructor did not use?

Once

Twice

Three times

Four times

Five or more times

Inclusive Access & Discounted eTextbooks

Some courses provide automatic access and a discounted eTextbook if the cost of that eTextbook

can be added to your bill at the time you register for the course. This set of questions asks about your experiences with this type of program, sometimes referred to as "inclusive access."

Are you taking a class right now where the cost of an eTextbook was automatically added to your bill?

- Yes
- No
- Not sure

Were you given a chance to opt out / not participate in having the cost of the eTextbook be automatically added to your bill? If so, what did you decide to do?

- I was not given a chance to opt out, but would have if I had known it was an option.
- I was not given a chance to opt out, but would have paid for the eTextbook anyway.
- I was given a chance but chose not to opt out.
- I was given a chance and wanted to opt out, but the process was confusing. I ended up paying for the eTextbook that was added to my bill.
- I was given a chance to opt out and did. I purchased a print textbook instead.
- I was given a chance to opt out and did. I purchased another digital version of the eTextbook instead.
- Other (please explain) _____

How did you feel about the opt-out process?

- The process mostly made sense. I had no questions about it.
- The process was confusing, and I had to ask questions to successfully opt out.
- The opt-out process was confusing, so I gave up.

Feel free to share any thoughts you have about having the cost of a discounted eTextbook automatically added to your bill when you register for a course. Otherwise, click "Next" to continue the survey.

Part IV. Your Course Decisions & Preferences -- Almost finished!

When you register for courses, does the price of the required materials influence which courses you select?

- Yes
- No

What dollar amount do you consider reasonable to pay for the required materials in a 3-credit hour course?

If you like, feel free to explain why this amount is reasonable / how you arrived at this number.

When registering for courses, if you saw a section with a free online textbook, would you prioritize registering for that section over a section that did not have a free online textbook?

Yes

No

Similarly, how likely would you be to choose an electronic textbook over a hard copy textbook if the cost was significantly reduced?

Very Likely

Likely

Somewhat Likely

Unlikely

Very Unlikely

At what price would you not register for a course because of the required material cost? Write in the dollar amount that would make you look for a different course instead.

During your time at the community college in which you're enrolled, how many classes total have you taken where the textbook was free and available online? Enter that number below.

Do you prefer your course materials to be in digital or print format?

I prefer digital course materials.

I prefer print course materials.

I have no preference -- I feel the same way about digital and print.

Please state your level of agreement with this statement: I consider myself technology savvy. ("Technology savvy" means you know how to navigate and use technology, and that when the technology is new, it's not hard for you to learn how to use it.)

Strongly Disagree

Disagree

Somewhat Disagree

Neither Agree nor Disagree

Somewhat Agree

Agree

Strongly Agree

Is your internet access at home sufficient to complete homework and other course-related assignments?

Yes

No

Feel free to share any additional thoughts regarding any of the questions above, or related to the cost or use of required course materials in general. Otherwise, click "Next" to be taken to the last page of the survey.

Part IV. General Info. This is the last page! Thanks for hanging in there.

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 _____

Are you studying full-time or part-time this semester?

Full Time (9+ credit hours)

Part Time (fewer than 9 credit hours)

In which semester did you first enroll in your current community college?

Fall 2019

Spring 2019

Fall 2018

Spring 2018

Fall 2017

Other _____

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

Yes

No
Not Sure

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.

Are you participating in any of the following programs? Select all that apply:

TN Reconnect (for returning adult non-veteran students)
Hope Scholarship (lottery funded scholarship for freshmen entering from high school)
Promise (scholarship & mentoring program with community service for freshmen entering from high school)
Veteran Reconnect (for returning veteran students)
I am not part of any of these programs
Not Sure

Which best describes your gender identity?

Woman
Man
Non-binary/third gender
I prefer not to respond

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) _____

How many people are in your household? Indicate the number of adults (18+), children (under 18), and seniors (65+) below. Household = the people living in the same housing unit as yourself

	Number of People
Adults (18+)	☐
Children (under 18 years old)	☐
Seniors (65+)	☐

Please estimate your annual household income. Household income = the combined amount all the adult members of your household (that you've identified above) earn each year.

Less than \$13,000	\$47,000-\$55,000
\$13,001-\$16,999	\$55,000-\$64,999
\$17,000-\$19,999	\$65,000-\$74,999
\$20,000-\$24,999	\$75,000-\$99,999
\$25,000-\$31,999	\$100,000 or more
\$32,000-\$35,999	Not sure
\$36,000-\$46,999	Prefer not to answer

How much money does your household usually have left each month after paying for necessary goods? Necessary goods = transportation, housing, electricity, food, medication, and required payments toward credit cards and other debt

- Not sure
- Below \$0 (we go further in debt)
- Nothing, we just break even
- \$0-\$100
- Prefer not to answer
- More than \$100 (write in the amount below) _____

Where do you usually get your course materials? Select up to three.

- Campus Bookstore Purchase New
- Campus Bookstore Purchase Used
- Campus Bookstore Rental
- Off-Campus Bookstore Purchase New
- Off-Campus Bookstore Purchase Used
- Off-Campus Bookstore Rental
- Directly from the Publisher (digital access or print)
- Amazon / Chegg Online Purchase
- Amazon / Chegg Online Rental
- eBay Online
- From other students
- Illegally download the textbook
- Scan the library copy
- Another way (please explain) _____

Did either of your parents graduate from a four-year college/university?

- Yes
- No
- Not sure

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

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, the cost of textbooks and course materials alone has 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 Learner students. Statistically significant differences in academic achievement barriers were found for low-income students, alongside significant progress to graduation barriers for non-Adult Learners under the age of 25, suggesting younger learners to be more susceptible to consequences stemming 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.

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.

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.

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

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.

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.

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.

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 1.3 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%

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	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.

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 ($n = 1,413$).

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 $\chi^2 (1, N = 1,413) = 1.28, p = 0.26$,

Table 1.5 Logistic Regression Results: Academic Achievement Barriers

Parameter	B	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.

Table 1.6 Variable Demographics: Progress to Graduation Barriers

			N	Percent
Dependent Variable	Progress to Graduation	Barrier(s) Experienced	509	36.0%
		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%

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.

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

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.

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.

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

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

Barrier Type	Spica and Biddix (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%

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.

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.

Acknowledgements

Acknowledgements and appreciation to the Tennessee Board of Regents Office of Policy and Strategy, especially Amy Moreland for championing this study, to Robert Denn and Lauren Collier of the THEC Textbook Affordability Working Group, and for feedback and mentorship from faculty in the UT Department of Educational Leadership & Policy Studies (Lisa Driscoll, Jimmy Cheek) and UT Libraries (Teresa Berry). Thanks also to community college research directors who provided feedback and facilitated survey communications: Traci Williams (Chattanooga State); David Knopp (Cleveland State); Harry Djunaidi (Columbia State); Mary Ricks (Dyersburg State); Sara Vonderheide (Jackson State); Amanda Bowers (Motlow State); Charles Clark (Nashville State); Josh Whitlock (Northeast State); Nancy Ramsey (Pellissippi State); Karen Brunner (Roane State); Colette Catania (Volunteer State); Debbie McCarter (Walters State).

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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

CHAPTER II***INCLUSIVE ACCESS: A MULTI-INSTITUTIONAL STUDY OF ACADEMIC
OUTCOMES FROM A STATEWIDE COMMUNITY COLLEGE AUTOMATIC
BILLING ETEXTBOOK PILOT***

Abstract

In response to issues related to the high cost of textbooks and other course materials, *Inclusive Access* programs allow the cost of a discounted eTextbook and/or courseware to be automatically added to a student's tuition bill at the time of course registration (McKenzie, 2017). Touted for their ability to lower costs and provide students with access to materials on or before the first day of class, automatic billing programs have become increasingly prolific across the higher education landscape. At the same time, research into many aspects of the program's impact and efficacy remains lacking. This study examined academic outcomes from an *Inclusive Access* pilot launched fall 2019 by Tennessee's largest system of public higher education. Results from across 13 community colleges, 41 course areas, and 141 courses indicated no significant differences in either overall or population-specific academic outcomes between the *Inclusive Access* pilot semester and the two prior falls in which the courses were taught. The findings demonstrate that benefits accrued from relative cost-savings and/or Day One Access were insufficient to produce significant improvements in academic outcomes, with no significant differences in outcomes also evidenced for non-White, federal Pell grant award recipients, and/or non-traditional students over the age of 25. These results suggest that measures beyond cost-savings and Day One access, such as hidden costs, the need for perpetual access, and the ultimate repercussions of deferred costs to student debt, should also be considered when evaluating ways to provide students with affordable course materials that enable high-quality, equitable learning experiences.

Inclusive Access: A multi-institutional study of academic outcomes from a statewide community college automatic billing eTextbook pilot

Course material costs have increased exponentially over the past two decades. From 2006 to 2016, compared to an overall inflation rate of 20%, the cost of textbooks increased by 88%, more than nearly any other college student expense (U.S. Bureau of Labor Statistics, 2016). As a result of these ever-rising costs, students have reported not purchasing required materials, earning poor grades, dropping and withdrawing from courses, and avoiding majors altogether (Martin et al., 2017). Vitez (2018) reports that “sixty-five percent of students have skipped buying a textbook at some point because of cost, and each year, \$3 billion of federal student aid goes to pay for textbooks.”

In efforts to lower the cost of course materials, campuses have explored the use of *Inclusive Access* programs, “e-text-based programs developed by for-profit textbook publishers that are bundled within the course and offered at a reduced price over their traditional textbook bookstore sales” (Hurley & Hallmark, 2020, p. 4). In essence, *Inclusive Access* programs automatically bill the cost of a presumably discounted eTextbook or other digital materials directly to a student’s tuition bill at the time they register for a course (McKenzie, 2017). Title 34 of the Code of Federal Regulations paved the way for this automatic billing model, enabling institutions to include the cost of textbooks in tuition and fees provided they are priced “below competitive market rates” (34 e-C.F.R. §668.164 2016).

Distribution via *Inclusive Access* also provides a more sustainable model for publishers, whose profits have substantially declined since 2016 in the face of rental programs, used printed copies available on the third-party market, and innovations such as freely available Open Educational Resources (Carbaugh, 2020; NACS, 2020; Vitez, 2020). The model has likewise provided growth opportunities for companies that specialize in aggregating and distributing

digital content, their promotion key in paving the way for publisher, industry expert, and campus bookstore buy-in (RedShelf, 2017; see Appendix 2A for summary of marketing descriptions).

Despite the rapid gain in popularity of *Inclusive Access*, however, many aspects remain to be studied. To address this gap in research, this study examines the academic outcomes from a statewide community college *Inclusive Access* pilot of 141 courses in 41 course areas across 13 institutions. The evidence produced by this study helps inform the decisions of policymakers and educational leaders on how and whether to support program expansion.

Review of Literature

This review first outlines the underlying dynamics that generated and made the *Inclusive Access* digital distribution model possible for institutions of higher education. Next, the model's two most consistently marketed benefits – cost savings and Day One access— are reviewed. Finally, advertised program benefits are balanced with related program criticisms, i.e., the program opt-out process, digital material usage and students' need to retain materials, and the hidden costs of program facilitation.

Inclusive Access: Marketed Benefits

Cost Savings. The affordability of textbooks and course materials remains of particular concern for students at community colleges, where those costs can account for 80% of total college attendance expenditures (Jaggars et al., 2019). Cost-savings are one of the most widely reported benefits of *Inclusive Access* programs (Hurley 2020; McClendon and McMillan, 2020). Discounts are realized via “bulk purchase” where entire classes (or a set percentage of students in a class) must opt in to purchase digital materials at a lower rate negotiated between the institution and publisher. These discounts are subject to regular prices increases, and in most

cases can be reduced or eliminated if contractual enrollment quotas are missed (Vitez, 2020). *Inclusive Access* programs have also been criticized for a lack of transparency in pricing. In a study of 52 contracts across 31 colleges, researchers found that nearly half of the contracts did not disclose the discount structure (Vitez, 2020).

By adding the cost of materials to a student's tuition bill, expenses can be paid with Title IV federal student aid funds. This effectively allows economically disadvantaged students, who might have otherwise delayed or avoided purchasing materials, to have access to digital materials at the same time as their peers. This immediate access on the first day of class has been thought to help create a more equitable environment by allowing all students access to the same materials at the beginning of the semester (Anaya & Yankelewicz, 2020). Nonetheless, the digital format of the materials also predicates the possession of an electronic device and, in most cases, internet access.

Another consequence to the bulk purchase approach is that students lose the ability to purchase from options available via the third-party market unless they opt out of the program. Similarly, the costs included in tuition that are not immediately paid eventually roll into overall student loan or credit card debt. Therefore, the immediate cost-savings and equity of access offered by the *Inclusive Access* model can be illusory in that paying with student loans can result in higher prices as tuition costs are deferred and interest added. In this respect, these costs ultimately contribute to ever-rising student debt, which as of 2019 totaled over \$1.5 trillion, second only to mortgage debt (Perry, 2019). According to Perry (2019), student loan debt increased \$20 billion between the second and third quarters of 2019 alone.

Day One Access. Alongside the potential for significant student cost-savings, another suggested benefit of the *Inclusive Access* delivery model is the convenience of having materials

already set up and available within the instructor's course section of the institution's Learning Management System (LMS) when classes begin. The potential benefits of "Day One" or "First Day of Class" access are described by the access hypothesis, or the assumption that simply having course materials is generally more beneficial for student learning than not having them (Grimaldi et al., 2019). While first day access is generally deemed important, actual usage on the first day is debatable, as researchers have also reported students' being unaware of their ability to access materials on the first day (McClendon & McMillan, 2020),

Some researchers have suggested associations between Day One access and higher course completion rates (Colvard et al., 2018; Fischer et al., 2015). Fischer et al. (2015) suggested Day One access to freely accessible Open Educational Resources (OER) may have influenced moderate differences in course completion and academic achievement between the OER treatment group and a control group using traditionally copyrighted textbooks. In another study involving OER, Colvard et al., (2018) found that the improved end of course grades and decreased DFW rates of the OER treatment group could have been attributed to all students having access on the first day of class. While both Colvard et al., (2018) and Fischer et al., (2015) evidenced significantly improved course grades for groups using Day One access materials, these studies also examined materials based on OER. Given that OER materials possess inherently different qualities than traditionally copyrighted materials, it is unknown whether the grade improvements seen in these two studies can be attributed to Day One access or to the unique nature of OER in being freely available, sharable, printable, editable, retainable, etc.

Inclusive Access: Criticisms

Opt-In / Opt-Out. To enable features like Day One access for all students, most *Inclusive Access* programs are “Opt-Out” in nature, with all students automatically enrolled to participate unless they opt-out of the program (Vitez, 2020). In general, discounts on eTextbooks are offered only when institutions enter a bulk-purchase agreement with publishers, the nature of which is typically based on course enrollment. For the best chances of achieving enrollment quotas, all students are usually automatically enrolled unless they manually opt-out within a specified timeframe at the beginning of the semester (Jaggars et al., 2019). Most *Inclusive Access* programs operate on this opt-out basis (there are few exceptions, most notably the state of Florida, whose legislative “opt-in/opt out” provision allows students choose whether or not to participate; Textbook and instructional materials affordability, 2017).

The process for opting out differs in transparency and complexity, sometimes occurring on the registrar’s side, sometimes with the bookstore (Vitez, 2020). Regardless of process, when students elect to opt out, access to the online textbook and other digital course materials within the LMS are revoked (Jarvis, 2019). The National Association of College Stores reported that preference for a print version was the top reason students opted out of *Inclusive Access*, followed second by their already having a copy of the materials and then, thirdly, that they had found a cheaper version elsewhere (NACS, 2020).

Retention and Usage of Materials. Day One access notwithstanding, the subscription-based nature of *Inclusive Access* programs typically means that students lose access to their digital materials at the end of the semester. With this revocation of access, students also often lose access to the highlights, notes, homework assignments, practice problems, supplementary resources, etc. (Wiley, 2017). While institutions like Indiana University have negotiated

exceptions to allow students to maintain their access until they leave the institution, the most common scenario is a loss of access after the semester end (Abaci & Quick, 2020).

Leadership hesitancy and/or opposition to *Inclusive Access*, often stemming from the publishing industry's poor affordability record, presents another system-level barrier (Hurley & Hallmark, 2020). Students have also reported mixed levels of satisfaction with the model. For instance, researchers showed that 51% of students participating in at least one *Inclusive Access* course reported being satisfied with the digital delivery model, while 21% indicated dissatisfaction, mostly due to dislike of the digital format (NACS, 2020). Not all digital materials allow students to copy/paste text, which can present difficulties when creating notes and study guides. Some institutions have even gone so far as to negotiate copyright clearance so students can print portions of the eTextbook (Hurley & Carter, 2020).

Hidden Costs. The intricacies mentioned reflect the hidden costs of *Inclusive Access* automatic billing models. By changing the traditional methods by which students acquire course materials, *Inclusive Access* has also transformed the nature of interactions between institutions, bookstores, and publishers. Under the traditional distribution model, campus bookstores facilitate the collection of course material “adoption” information from instructors. They then make that information available to students (ideally by the time of registration, as stipulated by the Higher Education Opportunity Act; HEOA, 2008) so students can budget and shop for new, used, or rental materials through any purchase channel. A 2019 survey of Tennessee community college students indicated students frequently acquire materials from their campus bookstore, commonly purchasing used (50.9%), new (40.7%), and rental materials (33.9%; Spica, 2020). The next most common purchase sources were Amazon/Chegg online purchases (35.6%) and Amazon/Chegg online rentals (36.1%; Spica, 2020).

The *Inclusive Access* digital distribution model, in contrast, removes the student consumer from the equation. The campus bookstore continues to collect course material information, then prices are negotiated and provided to the registrar and/or bursar to post the fees within the course registration system. While the workflow varies, information is commonly communicated using a shared spreadsheet operated by central institutional employees (Anaya & Yankelewitz, 2020). Publisher representatives, working alongside the bookstore, campus IT, and faculty ensure the correct content is activated in the LMS (Hurley, 2020). After the semester begins, the registrar/bursar is responsible for keeping accounts current for students who opt-out, which usually also entails fielding communications, answering questions, and manually adding and subtracting charges from individual student accounts (Conole et al., 2020). This process is repeated repeated with each semester – spring, summer, and fall, impacting resources that institutions may not be able to effectively support. Human error like typos, errors in transmission of enrollment data, or even faculty missing enrollment deadlines, can create additional, oftentimes manual steps for resources previously uninvolved in the course material process (Anaya & Yankelewitz, 2020).

Because the *Inclusive Access* distribution model remains relatively new, continued research is warranted to inform how and whether to further support program expansion. While several researchers have examined cost data, no studies to date have focused on academic outcomes for community college students, a population with a more diverse demographic in terms of age, socio-economic status, and geographical location. To fill this gap, this study explored academic outcomes of *Inclusive Access* programs across multiple community college institutions, programs, and courses. By measuring course completion (passing with a grade of A-

C) and withdrawal rates, this study will help quantify the potential impact of Day One access and other marketed aspects of *Inclusive Access*.

Conceptual Framework

This study gauges the value of marketed program benefits by comparing the academic outcomes of an *Inclusive Access* pilot semester with those of two previous fall semesters. The conceptual framework guiding this exploration is Bensimon's (2005, 2012) work on equity in higher education, which posits institutional practices and policies as responsible for creating equitable conditions for learning and student outcomes. Equity is a value and quality that attempts to provide the right and appropriate amount of resources to accommodate individual student circumstances (as opposed to equality, which centers around providing access to the *same* rights and resources). *Inclusive Access* programs are geared toward saving students money and providing Day One access, which presumably helps eliminate inequities that allow underserved populations to realize outcomes similar to the dominant populations. Incorporating a lens of equity, this study not only examines academic outcomes, but also the extent to which those outcomes were achieved for traditionally underserved and underrepresented populations (non-White, federal Pell grant recipients, and non-traditional Adult Learners over the age of 25).

Bensimon's inquiry-based framework and guidelines for equity in higher education have helped guide studies and initiatives ranging from racial equity in student affairs (LePeau et al, 2019; Pendakur, 2020) to inclusion in STEM education (Bensimon et al., 2019; MacDonald et al., 2020) and professional development and faculty workload concerns (O'Meara et al., 2019; Sidman-Taveau & Hoffman, 2019). The central approach to Bensimon's framework is data-based inquiry. By disaggregating data on academic outcomes based on populations of concern, this study will produce information to help policymakers and other educational leaders focus

conversations on how the institution can contribute to improving inequities (Bensimon, 2012). Such contributions could lie in unexamined policies, practices, institutional structural arrangements, or even institutional cultural characteristics. Finally, given the role of the Tennessee Higher Education Commission to “protect students and consumers from substandard, transient, deceptive or fraudulent institutions and practices” (THEC, 2020), examining outcomes through the lens of equity will help ensure that programs are supported that deliver on their intended benefits.

Purpose of the Study and Research Questions

The purpose of this study was to explore the academic outcomes of a fall 2019 statewide community college *Inclusive Access* pilot, with particular focus on whether and how the use of *Inclusive Access* materials impacted academic outcomes for traditionally underserved and/or underrepresented populations (non-White, federal Pell grant recipients, and Adult Learners over the age of 25). Academic outcomes were measured by DFW rates, an aggregate measure of D grades, F grades, I grades, and W (course withdrawal). DFW rates were compared between the pilot semester and the two previous falls in which the courses were taught (fall 2018, fall 2017). With Bensimon’s (2005) equity framework in mind, the following research questions guided the study:

1. How do the academic outcomes for the *Inclusive Access* pilot semester compare to the two previous fall semesters in which each course was taught?
2. How do these outcomes differ for traditionally underserved and underrepresented populations (non-White, federal Pell grant recipients, and Adult Learners over the age of 25)?

Method

Study Design

This study on the fall 2019 Tennessee community college *Inclusive Access* pilot analyzed an anonymized student-level demographic and course outcomes data set provided by the Tennessee Board of Regents (TBR) Student Information System. TBR is the largest system of public higher education in Tennessee, serving nearly 120,000 students at 40 community colleges and colleges of applied technology (TBR, 2020). TBR also houses all of Tennessee's two-year public institutions, including the 13 community colleges that served as the focus of this study. The study was approved by the Institutional Review Board for The University of Tennessee, Knoxville, as well as that of the Tennessee Board of Regents.

Participants

The population for this study consisted of students enrolled for the fall 2019 semester at community colleges across the TBR system (N=88,946). The racial/ethnic characteristics of the fall 2019 community college student population consisted of 70.7% White, 15.9% Black, 6.4% Hispanic, and 7.0% of classified as Other (TBR, 2020). Over half (61.1%) of students were female, 38.9% male, with 28% over the age of 25. Over a quarter (37%) of all students received a federal Pell grant, and 50.5% attended part-time. Over a quarter (28%) were also over the age of 25. High school students participating in dual-enrollment programs were not included in analysis. Basic demographic characteristics of the sample are presented in Table 2.1.

Data Collection and Procedure

For inclusion in the study, all sections of a course had to have been included in the fall 2019 *Inclusive Access* pilot, i.e., courses with participation from only selected sections were

Table 2.1 Sample Demographic Characteristics

Demographic Characteristics	Semester (Cases, % of Total Cases)		
	2019 IA Pilot	2018 Pre-Pilot	2017 Pre-Pilot
Gender			
Male	20,275 (39.2%)	21,110 (40.5%)	17,921 (41.4%)
Female	31,361 (60.7%)	30,950 (59.4%)	25,356 (58.6%)
Non-binary/Third Gender	23 (0.0004%)	2 (0.00004%)	0 (0.0%)
Total Cases	51,659	52,062	43,277
Race/Ethnicity			
White	36,008 (69.7%)	36,776 (70.6%)	31,947 (73.8%)
Black	8,355 (16.2%)	8,621 (16.6%)	6,400 (14.8%)
Hispanic	3,738 (7.2%)	3,267 (6.3%)	2,268 (5.2%)
Asian	899 (1.7%)	945 (1.8%)	670 (1.5%)
Other	2,681 (5.2%)	2,453 (4.7%)	1,992 (4.6%)
Total Cases	51,681	52,062	43,277
Pell Award Recipients			
Pell Recipient	26,056 (50.4%)	25,395 (48.8%)	22,230 (51.4%)
Not a Pell Recipient	25,625 (49.6%)	26,667 (51.2%)	21,047 (48.6%)
Total Cases	51,681	52,062	43,277
Adult Learner Status			
Adult Learners Over 25	12,905 (25.0%)	13,025 (25.0%)	8,369 (19.3%)
Learners Under 25	38,776 (75.0%)	39,037 (75.0%)	34,908 (80.7%)
Total Cases	51,681	52,062	43,277

eliminated from inclusion. Learning Support courses (e.g., non-credit bearing remediation courses in English and math that utilize a different grading system) were also not included in the analysis. Based on these criteria, 241 courses in 47 course areas across 13 institutions were selected for inclusion (see Appendix 2B for a list of courses included in the study).

The comparison groups included outcome data for those same courses in the previous fall 2018 and fall 2017 semesters. The two previous fall terms were selected in efforts to maintain consistency between terms, as well as because many courses were taught only in fall. For the regression analyses, a weighted average from the two previous falls was used to better control for potential anomalies from either of the previous semesters.

Analysis of academic outcomes utilized DFW rates, or the aggregate proportion of students who received a grade of D, F, I, or W (Withdrawal). Course grades of D, F, and I indicate a lack of academic achievement which can ultimately influence a student's progress toward graduation. A grade of W is given when a student drops a course after the deadline or leaves the institution (TBR, 2018). In counting as though no hours had been attempted, course withdrawals likewise indicate a lack of progress to graduation. One study of withdrawal rates at a large community college district in Texas, for instance, indicated excessive course dropping to be a “‘cooling out’ mechanism” reducing students’ ambitions to complete degrees (McKinney et al., 2019).

Researchers have found that both underprepared and underserved students may more frequently fail or withdraw from courses, with students from weaker academic backgrounds more likely to withdraw later in the semester (Bosshardt, 2004; Hagedorn et al., 2007).

Additional factors of influence include findings that African Americans drop courses at higher

rates than their peers, and that STEM-related courses have been found to experience higher drop rates (see McKinney et al., 2019, for an overview of characteristics influencing course withdrawal rates). To control for this as well as other environmental factors, institution, course, and semester were included as random effects.

The second step in evaluating academic outcomes from the fall 2019 *Inclusive Access* pilot semester was an analysis through the lens of equity. This step featured data disaggregated based on populations of concern for equitable access and completion for Tennessee community colleges (non-White, federal Pell grant recipients, and Adult Learners over the age of 25). Table 2.2 displays research variables by category.

Data Analysis

Analysis of DFW rates utilized a four-level hierarchical generalized linear mixed modeling approach to investigate the influence of the fall 2019 *Inclusive Access* pilot on student academic outcomes. Multilevel modeling was selected for its ability to provide a more confident estimate of variability in student performance, as the hierarchical introduction of levels can reduce uncertainty from contextual factors and account for co-variables that might have otherwise been causally attributed (Raudenbush & Bryk, 2002). Hierarchical linear modeling is likewise appropriate for nested data in which observations are theoretically dependent, allowing for a more precise estimation that accounts for independence in random effects.

Data were cleaned prior to analysis, with cases lacking complete data eliminated from the regression, leaving 92% of the dataset intact (135,315 of 147,020 cases). The race/ethnicity variable, which followed federal recommendations, allowed respondents to self-identify as one or more of six categories (Black or African American, Hispanic or Latino, White or Caucasian, Prefer Not to Respond, Other; OMB, 2016). Race/Ethnicity was recoded White or Non-White to

Table 2.2 Research Variables by Category

Category	Variables
Dependent Variable	DFW Rate (Grade of D, F, I, or W)
Independent Variable	Semester (Fall 2019 <i>Inclusive Access</i> pilot, Fall 2018, Fall 2017)
Covariates	• Race/Ethnicity (1=Non-White, 0=White) • Pell-Recipients (1=Received Pell Award, 0=No Pell Award) • Adult Learner Status (1= Age 25 or above, 0=Under Age 25)
Random Effects	• Institution • Course • Semester

align with TBR's annual reporting format. For example, in the fall 2019 semester, TBR community college students consisted of 70.7% White, 15.9% Black, 6.4% Hispanic, and 7.0% Other (TBR Data, 2020). Federal Pell grant recipient status was provided in the original dataset, and age was recoded into Adult Learners (age 25 or older) and Non-Adult Learners (under age 25). Prior to analysis, multicollinearity was assessed using a basic linear model, with Variance Inflation Factors (VIFs) slightly greater than 1 indicating no multicollinearity concerns for independent variables race/ethnicity (1.023), Pell-recipients (1.023), and Adult Learners (1.001).

Results

A total of 135,315 cases were included in the analysis. Of the 47,462 cases in *Inclusive Access* courses for the fall 2019 semester, 13,086 earned a grade of D, F, I, or W (DFW rate 27.6%). For the previous fall in which the same courses were taught under a non-*Inclusive Access* model, 13,322 of 48,035 cases were a D, F, I, or W (DFW rate 27.7%). For the second previous fall in which the courses were taught under a non-*Inclusive Access* model, 11,536 of 39,818 cases were a D, F, I, or W (DFW rate 29.0%). Table 2.3 displays overall grade distribution and course withdrawals by semester.

To compare DFW rates for the fall 2019 *Inclusive Access* pilot semester against the two previous falls in which the courses were taught, a four-level random intercept model was fit using SAS 9.4 PROC GLIMMIX, with logit link function and variance components. Model 1 determined random variability in the odds of passing courses with an A-C grade at the course and/or institution levels. Model 1 displayed significant variation between courses within institutions, ($OR = 1.41, p < .0001$) and significant variation between courses within semester ($OR = 1.43, p < .0001$).

Table 2.3 Grade Distribution & Course Withdrawals by Semester

Semester	Passed (A-C)	D or F Grade	Withdrawals	Total Cases
Fall 2019 IA Pilot	34,376 (72.4%)	9,343 (19.7%)	3,743 (7.9%)	47,462
Fall 2018 Pre-Pilot	34,713 (72.3%)	9,415 (19.6%)	3,907 (8.1%)	48,035
Fall 2017 Pre-Pilot	28,282 (71.0%)	8,184 (20.6%)	3,352 (8.4%)	39,818

Model 2 introduced semester as a fixed effect. The Type III Test of Fixed Effects indicated no significant differences in DFW rates between semesters, $F(2, 411) = 1.29, p = 0.277$. In further examination, DFW rates for the fall 2019 *Inclusive Access* pilot semester were compared with a weighted average of DFW rates for the two previous fall semesters in which the courses were taught (fall 2018, fall 2017). This estimation indicated students in the *Inclusive Access* fall 2019 pilot semester were on average 7% more likely to pass with an A-C grade as compared to students in the fall 2018 and fall 2017 semesters ($OR = 1.067, SE = 0.0496$). This difference, however, was not statistically significant, $t(411) = 1.32, p = 0.188$.

Model 3 displayed differences in DFW rates between semesters after controlling for three demographic characteristics: 1) Race/ethnicity (0=White, 1= Non-White, i.e. Black, Hispanic, Asian, Multi-racial, Other); 2) Pell grant recipients (0=Non-Pell Recipient, 1=Pell Recipient); and 3) Adult Learner status (0=Under 25, 1=Over 25). This model revealed significant differences for all three categories, Race/ethnicity $F(1, 134,661) = 794.20, p < 0.0001$; Pell recipients $F(1, 134,551) = 105.11, p < 0.0001$; and Adult Learners $F(1, 134,661) = 695.28, p < 0.0001$. Specifically, after controlling for semester, as compared to White students, non-White students were on average 34% less likely to pass with a grade of A-C, $OR = 0.66, 95\% CI [0.64, 0.68]$. Adult Learners over age 25 were 52% more likely to pass than learners under age 25, $OR = 1.52, CI [1.47, 1.56]$. Pell recipients were 12% less likely to pass than non-Pell recipients, $OR = 0.877, CI [0.86, 0.90]$. In spite of these pockets of difference, when comparing DFW rates from the 2019 *Inclusive Access* pilot semester against those from the 2017 and 2018 semesters, no significant differences were detected, $OR = 1.06, t(411) = 1.21, p = 0.228$. Table 2.4 displays results of the first three of four regression models.

Table 2.4 Hierarchical Linear Regression Models: DFW Rates

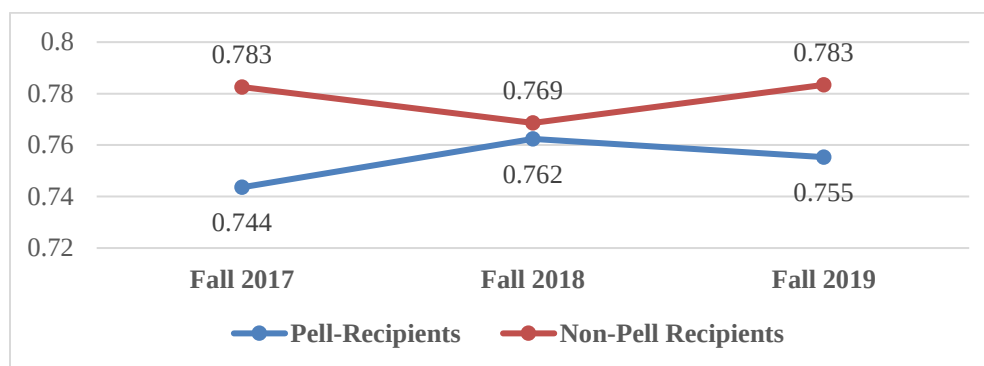
	Model 1		Model 2		Model 3	
Fixed Effect	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>	<i>Coefficient</i>	<i>SE</i>
Intercept	1.179	0.064	1.199	0.066	1.269	0.064
Pre-IA 2017			-0.047	0.030	-0.035	0.030
Pre-IA 2018			-0.018	0.028	-0.025	0.028
IA Pilot 2019			-		-	
Pre-Pilot vs. Pilot			0.065	0.050	0.060	0.050
Race/Ethnicity (0=White)					-0.412	0.015
Pell Recipients (0=Non-Pell)					-0.132	0.013
Adult Learner (0=<25)					0.417	0.016
Random effects	<i>Parameter</i>	<i>SE</i>	<i>Parameter</i>	<i>SE</i>	<i>Parameter</i>	<i>SE</i>
Level 4: Institution	0.020	0.016	0.020	0.016	0.018	0.014
Level 3: Course	0.344	0.042	0.343	0.042	0.325	0.040
Level 2: Semester	0.036	0.006	0.035	0.006	0.035	0.006
Deviance	154932.6		154930.1		153238.0	

Models 4-6. Level 4 Moderated Effects: Race/Ethnicity, Pell Recipients, and Adult Learners

A fourth level in the hierarchical linear regression probed for potential inequities across DFW rates for three different populations of concern to creating an equitable learning environment in community colleges. Models 4-6 explored differences in outcomes based on demographic characteristics race/ethnicity (White/Non-White), whether students had been awarded a federal Pell Grant award, and whether students were Adult Learners, or over age 25.

Model 4 Race/Ethnicity. Model 4 explored DFW rate differences based on race/ethnicity (White or Non-White, i.e., Black, Hispanic, Asian, Multi-racial, Other). Results indicated DFW rates did not significantly vary based on whether students were White or Non-White, $F(2, 134,659) = 1.25$ $p = 0.286$. Therefore, as compared to the two previous fall semesters in which the courses were taught, the fall 2019 Inclusive Access pilot semester did not produce significantly different outcomes for students based on whether they were classified as White or Non-White. Since no significant variability in outcomes across semesters was detected, no further computations were performed.

Model 5 Pell-Recipients. Model 5 more closely examined differences in DFW rates between non-Pell and Pell grant recipients. Moderated effects displayed significant differences in DFW rates from the *Inclusive Access* intervention semester based on whether a student had received a federal Pell grant, $F(2, 134,659) = 17.86$, $p < 0.0001$. Further comparison of fall 2019 *Inclusive Access* semester DFW rates against a weighted average of fall 2017 and 2018 semester DFW rates showed significant variability between and within Pell- and Non-Pell populations at various points. See Table 2.5 for least squares means variation in DFW rates over time for both Pell- and Non-Pell populations.

Table 2.5 Least Squares Means: DFW Rates Over Time

Despite variation at points both within and between Pell and non-Pell recipients, a comparison of average fall 2017 and 2018 DFW rates with fall 2019 *Inclusive Access* pilot semester DFW rates displayed no significant differences for either Pell recipients, $OR = 1.012$, $t(411) = 0.42$, $p = 0.671$, or non-Pell recipients $OR = 1.047$, $t(411) = 1.61$, $p = 0.106$. Pell recipients were 1% more likely to pass in fall 2019 as compared to falls 2017 and 2018, and non-Pell recipients were almost 5% more likely to pass as compared to falls 2017 and 2018. These differences, however, did not prove overall to be statistically significant.

Model 6 Adult Learners. Model 6 examined differences in DFW rates for Adult Learners over the age of 25 as compared to students under the age of 25. No significant moderating effect was shown by the comparison of DFW rates for Adult Learners between the *Inclusive Access* pilot semester and two previous semesters, $F(2, 134,659) = 0.99$, $p = 0.3711$. The data therefore showed no statistically significant differences in the *Inclusive Access* intervention as compared to the two previous semesters in which the courses were taught.

In summary, no significant differences were found in either overall DFW rates or population specific DFW rates between the *Inclusive Access* fall 2019 semester and the two prior fall semesters. These results demonstrate that the *Inclusive Access* pilot neither significantly improved nor worsened student DFW rates. Similarly, DFW rates in the fall 2019 *Inclusive Access* pilot semester neither significantly improved nor worsened for students in any of the three populations included to examine differences in outcomes through the lens of equity (Non-White, Pell Grant Recipients, Adult Learners). Table 2.6 summarizes results of the hierarchical linear regression for each of the three populations examined in Models 4-6.

Table 2.6 Hierarchical Linear Regression Models 4-6: DFW Rates by Demographic

	Model 4			Model 5			Model 6		
	Race/Ethnicity			Pell Recipient			Adult Learners		
	1=Non-White 0=White			1=Pell 0=Non-Pell			1=Over 25 0=Under 25		
Fixed Effect	Coefficient	SE	OR	Coefficient	SE	OR	Coefficient	SE	OR
Intercept	1.259	0.064	3.523	1.283	0.065	3.606	1.265	0.065	3.104
Pre-IA 2017	-0.023	0.031	0.977	-0.006	0.034	0.994	-0.023	0.031	0.977
Pre-IA 2018	-0.008	0.030	0.992	-0.085	0.032	0.918	-0.020	0.029	0.980
IA Pilot 2019	-			-			-		
Race (0=White)	-0.383	0.024	0.682	-0.411	0.015	0.663	-0.412	0.015	0.663
Income (0=Non-Pell)	-0.132	0.013	0.877	-0.159	0.022	0.853	-0.131	0.013	0.877
Adult Learner (0=>25)	0.417	0.016	1.517	0.418	0.016	1.518	0.440	0.026	1.553
Pre-IA 2017 * 1 ^a	-0.038	0.036	.963	-0.057	0.032	0.945	-0.056	0.040	0.945
Pre-IA 2017 * 0 ^b	-			-			-		
Pre-IA 2018 * 1	-0.052	0.034	.949	0.124	0.030	1.132	-0.022	0.037	0.978
Pre-IA 2018 * 0	-			-			-		
IA Pilot 2019 * 1	-			-			-		
IA Pilot 2019 * 0	-			-			-		
Random Effects	Parameter	SE		Parameter	SE		Parameter	SE	
Level Four: Institution	0.018	0.014		0.018	0.014		0.018	0.015	
Level Three: Course	0.325	0.040		0.325	0.040		0.325	0.040	
Level Two: Semester	0.035	0.006		0.035	0.006		0.035	0.006	
Deviance	153235.5			153202.3			153236.2		

^a 1 = Comparison Categories (Non-White, Pell Recipient, Adult Learner)^b 0 = Reference Categories (White, Non-Pell, non-Adult Learner)* $p > .001$.

Discussion

This study examined DFW rates for a statewide community college *Inclusive Access* pilot. Following Bensimon's (2005) conceptual framework for examining inequities in higher education, specific attention was given to possible differences in outcomes experienced by three traditionally underrepresented populations: non-White, federal Pell grant recipients, and/or Adult Learners over the age of 25. Results indicated no statistically significant improvements or declines in either overall or disaggregated DFW rates between the *Inclusive Access* pilot semester and the two previous falls in which the courses were taught. As such, this study produced no evidence to support statistically significant benefits or detriments to academic achievement from participating in an *Inclusive Access* automatic billing program. Through the lens of equity, these findings indicate that the disadvantaged populations the program purports to serve are no better or worse off (from an academic outcomes standpoint) with an *Inclusive Access* automatic billing program. Considering these findings, the following section connects the discussion with the perceived program benefits from the review of literature: Day One Access and cost-savings.

Day One Access. One of the main advertised benefits of *Inclusive Access* is the ability to provide students with Day One access to course materials. The results of this study suggest that Day One access itself may not be sufficient to erase inequities for traditionally underrepresented populations. The data in this study detailed that certain populations experience statistically significant lower odds of passing courses with an A-C. For example, Model 3 showed that, after controlling for semester, compared to White students, non-White students are on average 34% less likely to pass with a grade of A-C. Learners over age 25 are 52% more likely to pass than learners under age 25, and Non-Pell recipients are 14% more likely to pass than Pell recipients.

While there was no evidence to support improved academic outcomes as a benefit of participating in *Inclusive Access*, Day One access may provide indirect benefits for general course administration. Instructors are known to grapple with issues, complaints, and excuses from students related to not having the access needed to complete homework and other course assignments (Abaci & Quick, 2020, p. 42; Anaya & Yankelewitz, 2020; Williams et al., 2020). Day One access relieves the logistical burden of instructors having to negotiate extended trial access with publishers. *Inclusive Access* alleviates the need to request PDF copies of first chapters from publishers, as well as the extra step of extending deadlines, shifting assignments, and other workarounds to accommodate students waiting on financial aid to purchase needed materials. In these situations, *Inclusive Access* programs may provide relief by making materials immediately available for use on the first day of class.

Conversely, the results of this study suggest that significant academic benefits cannot be attributed to the Day One access feature of *Inclusive Access* automatic billing programs. These findings suggest that Day One access alone is insufficient to produce significant gains in DFW rates, even for at-risk populations deemed most likely to benefit. Other methods of Day One access, for instance the use of Open Educational Resources (OER), have shown to produce significant improvements in Drop, Withdrawal, and Passing with a C or better rates (Hilton, 2016). In this respect, usage, rather than access, may be key (Grimaldi et al., 2019). Kinskey et al. (2018) indicated the most frequently reported reason that students did not buy a textbook was because they could adequately complete assignments without one. Students not being asked to engage with the materials they are required to purchase makes any emphasis on access irrelevant.

Cost-Savings. In absence of significant benefits to academic outcomes, evaluations of *Inclusive Access* programs become more a question of value vis-à-vis explicit and implicit costs—

costs to the publishers, the bookstore, the institution, the faculty, and most importantly, to the student consumer. The past decade has witnessed a transition for most publishers from print materials to digital subscription-based, limited access duration products that have effectively reduced the number of used textbooks available on the third-party market (Academic Senate for California Community Colleges, 2019; Vitez, 2020). For publishers, *Inclusive Access* provides an avenue for direct purchases that maintain and allow for continued profit growth. For institutions, hidden costs accrue as units invest energies to set up and facilitate automatic billing, whereas the perceived benefits of cost-savings and Day One access could be had independently of the *Inclusive Access* distribution model. Furthermore, the use of digital materials may require faculty to take additional steps to transfer annotations, notes, highlights, etc. from semester to semester (Abaci & Quick, 2020). Further investigations into these hidden costs may provide a more holistic picture of actual program costs. If an institution shoulders most of the burden, those costs could at least be leveraged in pricing negotiation (or institutions may simply choose to invest those costs in the exploration of alternative solutions).

Costs to the student consumer must also be considered, including weighing the loss of student consumer choice against the convenience of automatic billing and Day One access. Prior to the introduction of *Inclusive Access*, student consumers were encouraged to shop and select from several options, from digital or print and new or used to renting or purchasing and even borrowing from friends or accessing from library course reserves (Florida Virtual Campus, 2019). Unless students understand and follow through with the opt-out process, *Inclusive Access* digital distribution models eliminate the opportunity to compare and select from multiple options. In an ideal situation where the price is truly discounted, the materials actually used, and

the consumer in favor of a digital product, *Inclusive Access* could save students the 2+ hours they would have otherwise spent shopping around and comparing options (Katz, 2019).

Limitations and Directions for Future Research

A few limitations of this study warrant mention. Only one year of academic outcome data was available from one institution type (community colleges) across a single state (Tennessee). While these data still provided a large data set for comparative purposes, additional years and representation across a broader geographic reach would have proven even more beneficial to analysis. Using federal Pell Award recipients as a proxy for socio-economic status likewise only provided an approximation, with low-income students often undercounted and middle-income students included as part of the proxy (Delisle, 2017). Future studies may consider balancing student cost savings against the hidden costs of implementation incurred by program partners. Since *Inclusive Access* programs have been viable for several years, it may also be prudent to explore if, and the extent to which, prices have increased from year to year. This study likewise did not account for the ability or importance of perpetual access, yet another factor separating subscription-based programs like *Inclusive Access* from other initiatives that provide Day One access like Open Educational Resources, which allow students to retain materials after the conclusion of the semester. Features like highlighting, note-taking, and other annotation functionalities of digital, subscription-based materials certainly add to their value; however, this value may prove moot when students lose access as they progress to more advanced courses without the ability to reference prior work. Future studies may also consider exploring the extent to which students want or need to retain course materials.

The impact of automatic billing programs on future student debt likewise remains unknown. This study elected not to examine explicit costs, but further research is needed as to

students' levels of awareness on how *Inclusive Access* charges may increase student loan debt: “Interestingly, many students believe that IM Direct [Instructional Materials Direct] course materials are free because it is included in the tuition and fees paid upon course registration. Because the course materials are not paid for separately, students are not as concerned about the cost” (Anaya & Yankelewitz, 2020, p. 54). Future studies may consider charting trends in student loan debt attributable to *Inclusive Access* programs, as currently \$3 billion of federal student aid is devoted toward paying for textbooks each year (Vitez, 2018). Deferring the costs of course materials does not alter their fundamental lack of affordability, an important point of consideration for policymakers and educational leaders looking “to learn what is not working and what changes need to be made” regarding course material programs and initiatives (Bensimon, 2012, p.28).

Implications

If equity in higher education is the end game, these findings raise questions regarding the long-institutionalized practice of requiring students to purchase additional materials when they register and pay the tuition to enroll in a course. Evidence suggests that there are many cases in which course materials are required but not used. For example, a 2019 survey of 1,912 Tennessee community college students surfaced that more than forty percent (44.4%) of students purchased required materials in the fall 2019 semester that went unused (Spica, 2020). Furthermore, over ten percent of student respondents (11.8%) reported purchasing required course materials that went unused at least three or more times throughout their college career. The absence of significant improvements in academic outcomes, especially when weighed against the potentially detrimental impacts to long-term financial security from increased student loan debt, make practices like *Inclusive Access* deserving of further scrutiny. Are instructors

being forced to adopt materials simply for the sake of appearing consistent across multiple sections of a course? If required textbooks are simply used as a reference, is it vital that everyone have the newest, most expensive edition? When tuition must be paid prior to the first day of class to avoid the purging of a schedule, how do students find out whether and how an instructor plans to use the textbook so they can make an informed decision to opt-out? The findings of this study surface a need for these discussions, lest institutions fall prey to forcing students into exactly the “substandard, transient, deceptive or fraudulent” practices they seek to avoid (THEC, 2020).

Cost-savings certainly provide an important metric for evaluating the effectiveness of course material initiatives, and *Inclusive Access* programs claim to provide subscription-based digital materials at relatively lower prices. Similarly, thanks to integrations between publishers/vendors and the institutional LMS, *Inclusive Access* programs enable access to materials on or before the first day of class (whether and how those materials are used is another matter). Cost-savings or access aside, this study found the *Inclusive Access* digital distribution model as piloted in community colleges across Tennessee to be insufficient in producing significant improvements in academic outcomes, even for the at-risk populations the program deemed to benefit.

This study emphasized the importance of examining academic outcomes when evaluating programmatic interventions like *Inclusive Access*. Through the lens of equity, the importance of disaggregating data to examine outcome disparities for underserved and underrepresented populations was also emphasized. For this study, the convenience of Day One access and potential cost-savings may offer reasons to pursue *Inclusive Access* automatic billing programs, but the hidden costs, possible needs for perpetual access, and repercussions for student loan debt should also be considered, especially if the model produces no significant benefits to academic

outcomes. In the end, paraphrasing Tennessee's iconic philanthropist Dolly Parton, the cost of looking so cheap may actually be surprisingly high.

Acknowledgements

Acknowledgements and appreciation to the Tennessee Board of Regents, especially Amy Moreland in the Office of Policy and Strategy for championing this study, as well as to Robert Denn for the continuous work in pursuing more equitable course material solutions for students throughout the state. Special thanks also to Patrick Biddix, Lisa Driscoll, Jimmy Cheek, and Teresa Berry at The University of Tennessee for their feedback and help in shaping this project.

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APPENDICES

Appendix 2A. Marketing Inclusive Access: Program Descriptions from Company Websites

Company	<i>Inclusive Access Program Description</i>
Pearson Education	“ <i>Inclusive Access</i> offers all students access to required course materials on the first day of class at a discount of up to 70% off the cost of print course materials.”
McGraw-Hill Education	“ <i>Inclusive Access</i> is a partnership between an institution, bookstore, and publisher to deliver digital course materials to students, below market rates, on or before the first day of class.” ... “50-80% lower cost, Day One Access, and course materials are integrated into your Learning Management System providing easy, and the simplicity of single sign-on access and grade-book integration.”
Cengage Learning	“ <i>Inclusive Access</i> is a business model that integrates the cost of course materials directly through the campus bookstore or other preferred transactions. The <i>Inclusive Access</i> model at Cengage does this PLUS delivers content directly, and seamlessly, to an institution’s Learning Management System (LMS) or other preferred channel so students are ready from day one.”
Wiley	“Wiley <i>Inclusive Access</i> provides students and faculty with instant digital access to required materials on or before the first day of class at substantial savings—so that every student can come to class prepared and ready to learn.”
Follett	“Follett ACCESS is a powerful program that enables colleges and universities to deliver all course materials (textbooks, courseware, lab kits, supplies, etc.) as part of tuition or course charges. ... With Follett ACCESS, all students have what they need on the first day of class, stress-free, affordably and effortlessly — which levels the playing field for all students and empowers them for academic success, regardless of economic background or social status.
	Follett ACCESS is the perfect union of publishers, institutions, faculty and Follett — coming together to enhance access to course materials, engagement and learning outcomes, help make course materials more affordable and ultimately foster student outcomes.”
Barnes & Noble	“Students enjoy access to significantly discounted course materials with a tuition-based delivery model to ensure everyone is prepared for the first day.”
RedShelf	“ <i>Inclusive Access</i> is a course materials delivery program. It packages digital content with your course so you can access the right materials at the most affordable price on the first day of class.”
VitalSource	“‘ <i>Inclusive Access</i> ’ is the course content solution that is driving down costs for students and giving them Day One access to the materials they need to persist.”

Appendix 2B. Courses Included in Study

ACCT (Accounting)	• BUSN 2320	• CULA 2331
• ACCT 1010	• BUSN 2330	ECON (Economics)
• ACCT 1020	• BUSN 2350	• ECON 2100
• ACCT 2341	• BUSN 2360	• ECON 2200
ADMN (Administration)	• BUSN 2370	EDU (Education)
• ADMN 1302	• BUSN 2380	• EDU 1120
• ADMN 1309	CHEM (Chemistry)	• EDU 201
• ADMN 1311	• CHEM 1010	• EDU 2100
• ADMN 1313	• CHEM 1030	• EDU 2230
AHSC/ALHS (Allied Health Science)	• CHEM 1110	EETC (Electrical Engineering Tech)
• AHSC 1310	• CHEM 2010	• EETC 1311
• AHSC 1320	CITC (Computer Info Technology)	ENGL (English)
• ALHS 2311	• CITC 1300	• ENGL 1010
• ALHS 2312	• CITC 1302	• ENGL 1020
• ALHS 2314	• CITC 1303	• ENGL 2120
ART (Art)	• CITC 1308	ENST (Engineering Systems Tech)
• ART 1035	• CITC 1310	• ENST 1300
• ART 2000	• CITC 1326	• ENST 1350
• ART 2020	• CITC 2320	• ENST 1370
ASTR (Astronomy)	• CITC 2326	ET (Engineering Technology)
• ASTR 1010	• CITC 2344	• ET 112
BIOL (Biology)	COL/GEN/ORN/VSCC (College Success)	GEOG (Geography)
• BIOL 1010	• COL 1010	• GEOG 2010
• BIOL 1110	• COL 1030	HEC/HED (Health Education)
• BIOL 1120	• GEN 1010	• HEC 231
• BIOL 1230	• ORN 1010	• HED 120
• BIOL 1430	• VSCC 1000	• HED 220
• BIOL 2010	COMM (Communication)	HIST (History)
• BIOL 2020	• COMM 2025	• HIST 2010
• BIOL 2230	• COMM 2045	• HIST 2020
BUSN (Business)	CRMJ (Criminal Justice)	• HIST 2310
• BUSN 1300	• CRMJ 1010	• HIST 2320
• BUSN 1302	• CRMJ 1020	HMGT (Hospitality Management)
• BUSN 1305	• CRMJ 1340	• HMGT 1030
• BUSN 1310	• CRMJ 2010	HSC (Human Pathophysiology)
• BUSN 1320	• CRMJ 2020	• HSC 111
• BUSN 1350	CULA (Culinary Arts)	• HSC 190
• BUSN 1360	• CULA 1310	
• BUSN 1370	• CULA 1320	
• BUSN 1380	• CULA 1330	
• BUSN 2300		

HUM (Humanities)

- HUM 1010

INFS (Information Systems)

- INFS 1010

LOGI/LGM

(Logistics/Logistics Management)

- LGM 130
- LGM 140
- LGM 180
- LOGI 1000

MATH (Math)

- MATH 1000
- MATH 1010
- MATH 1030
- MATH 1050
- MATH 1100
- MATH 1130
- MATH 1410
- MATH 1420
- MATH 1530
- MATH 1630
- MATH 1710
- MATH 1730
- MATH 1830
- MATH 1910
- MATH 2010

MUS (Music)

- MUS 1030

OTAP (Occupational Therapy Assistant)

- OTAP 1130
- OTAP 1210
- OTAP 1310

PHIL (Philosophy)

- PHIL 1030

PHYS (Physics)

- PHYS 2010
- PHYS 2110

PLBT (Phlebotomy)

- PLBT 1300

POLS (Political Science)

- POLS 1030
- POLS 2025

PSCI (Physical Science)

- PSCI 1030

PSYC (Psychology)

- PSYC 1030
- PSYC 2110
- PSYC 2130
- PSYC 2220

PTAT (Physical Therapy)

- PTAT 2200

SOCI (Sociology)

- SOCI 1010
- SOCI 1011
- SOCI 1020
- SOCI 1040
- SOCI 2010

SPAN (Spanish)

- SPAN 1010
- SPAN 1020

SWRK (Social Work)

- SWRK 2010
- SWRK 2020

THEA (Theatre)

- THEA 1030

CHAPTER III
THE INFLUENCE OF TECHNOLOGICAL SAVVINESS AND HOME INTERNET
ACCESS ON STUDENT DECISIONS TO USE PRINT OR DIGITAL COURSE
MATERIALS

Abstract

The purpose of this survey research study was to examine Tennessee community college student decisions and experiences with print and digital course material formats. Analysis considered which format students prefer between print or digital, the reasons behind those preferences, and whether those preferences significantly differed based upon demographic characteristics, perceived levels of technological savviness, and/or the availability of home internet access. Students enrolled for the fall 2019 semester at community colleges across the Tennessee Board of Regents system were surveyed using both open- and closed-ended questions ($n = 1,912$). Results showed that most students (63.6%) preferred to use print materials, with no significant connections based on demographic characteristics (non-White, low income, age) or home internet access. Student voices woven throughout provided an additional layer of insight for educational leaders seeking to establish policies and practices that optimize the student experience.

The influence of technological savviness and home internet access on student decisions to use print or digital course materials

Affordability is often considered a key to college success, yet the cost of textbooks and course materials continues to rise at an alarming rate. From 2006 to 2016, textbook costs increased 88%, even outpacing the rapid 63% increase in tuition and fees during that same time (BLS, 2016). Students unable to afford the ever-rising cost of course materials make decisions to drop and withdraw from courses, avoid courses and majors, and sometimes even attempt coursework without the required materials, leading to poor grades and delays to graduation (Florida Virtual Campus, 2019; Martin et al., 2017; Nagle & Vitez, 2020).

Most solutions intended to mitigate issues related to the high cost of course materials center around the use of digital technologies. Digital courseware and eTextbooks, marketed for their price and convenience, have increasingly eliminated the third-party, lower cost, used materials market (Jarvis, 2019; Knox, 2019; Millward, 2019; Vogel, 2012). Publishers and digital delivery companies have also partnered to introduce *Inclusive Access* programs that automatically add course material costs to tuition, allowing students to pay with qualifying financial aid (however also effectively deferring those expenses to student loan debt). Faculty interested in eliminating course material costs altogether have turned to freely available Open Educational Resources (OER). While OER allow for unlimited printing and distribution, they are typically provided in digital form, leaving students responsible for print costs as needed.

Textbooks and course materials remain central to the academic experience, and despite the increasing proliferation of digital options, more information is needed on how students select and engage with the materials they are required to purchase. Just as institutions display interest and willingness to respond to student preferences in areas like campus infrastructure and ancillary services, understanding decisions related to course material formats will better assist institutions in promoting options that accommodate the student consumer. To fill this gap, this study examined students' course material format preferences, with attention to underlying correlates and reasons why students prefer print or digital. By weaving student voices throughout the qualitative analysis and discussion, the student consumer was also given a platform from which to share their perspectives and experiences.

To examine student format choices through the lens of equity, data were also disaggregated by demographic characteristics to illuminate potential disparities based on race/ethnicity, income, and/or age. Format preferences were likewise examined based on

students' perceived levels of technological savviness and the availability of sufficient home internet access to complete homework and other course assignments. Results are designed to empower policymakers and educational leaders to frame conversations around how course material policies and practices may perpetuate equity-related issues. These findings may also influence policies and programs that restrict format availability to either digital or print. Finally, because the customer experience plays a central role in the intelligence gathering process of market orientation – arguably even moreso in the increasingly competitive higher education landscape– the insight provided by this study will help stakeholders make decisions that optimize the customer experience and, ultimately, positively impact the performance of the institution.

College Student Attitudes and Preferences toward Print and Digital Materials

Research concerning student attitudes and preferences toward print and digital course materials has offered mixed results. Most findings, stemming from cross-sectional survey designs, have reported a majority preference for print course materials (Medley-Rath, 2018; Millar & Schrier, 2015; Mizrachi et al., 2018; Morris & Lambe, 2017; Sharma, 2019; Woody et al., 2010). Kazanci (2015) examined preferences over a six-year period and found no changes in the preference for print materials for reading activities.

Other researchers, however, found that students prefer digital materials (Adeyinka et al., 2018; Al-Qatawneh et al., 2019). In a cross-sectional survey of undergraduate Library Information Science students across five universities, Adeyinka et al (2018) identified a student preference for eTextbooks, with students perceiving eTextbooks to be easy to use and to enhance their learning. Another study of 880 undergraduates from Al-Qatawneh et al. (2019) showed a high degree of usage and preference for eTextbooks. While clear preferences were expressed in

these studies, other cross-sectional survey research studies evidenced no preference for print or digital either way (Al Saadi et al., 2017; Makwanya & Oni, 2019). For example, Makwanya & Oni's (2019) survey of 200 students showed a preference for both print and digital, with students perceiving digital to be as good as print, easy to use, and sufficient for academic purposes.

Content and genre also appear to influence format preferences. One survey of 170 students at Chattanooga State Community College revealed that students more often preferred the use of eTextbooks for courses in the humanities and social sciences (management, marketing, history, English literature, sociology, etc.) and then print for STEM-oriented areas (statistics, engineering, accounting, finance, etc.; Williams et al., 2020). Foasberg (2014) also identified contextual differences in preferences, with print preferred for academic and long-form reading and digital for shorter, non-academic reading. These findings have been reinforced by those of Mizrachi et al. (2018), wherein 72.8% of participants demonstrated a preference for print format with readings seven pages or more in length.

Findings related to the reasons behind format preferences provide deeper context into student course material format decisions. For example, students reported preferring digital materials for cost-savings, portability, convenience, and functionalities like the ability to search, copy-paste, and quickly navigate contents (Baek & Monaghan, 2013; Broadhurst, 2017; Grissett & Huffman, 2019; Huang, 2013; Slocum-Schaffer, 2020; Soules, 2017). Other students reported preferring print materials for consistency in formatting, print's ability to help them focus and retain information, as well as for ease of reading, highlighting and notetaking (Baglione & Sullivan, 2016; Mizrachi, 2015; Sharma, 2019; Slocum-Schaffer, 2020). Students also seemed to prefer reading from printed pages due to experiences of eye strain from the use of eTextbooks (Adeyinka et al., 2018; Al-Qatawneh et al., 2019; Baglione & Sullivan, 2016; Jeong, 2012).

Another cross-sectional survey study from Millar & Schreier (2015) evidenced that digital materials were primarily preferred because “All required course materials are in one place at all times.” The primary reason for preferring print was a rather circular “I simply prefer print to digital” (Millar & Schreier, 2015, p. 176).

The format of course materials may also impact academic performance. In a systematic review and meta-analysis, Clinton (2019) compared reading between paper and screens in terms of performance, times, and/or metacognition. Using random effects models to analyze 33 experimental design, random assignment studies across 29 reports, Clinton’s results indicated that reading expository texts (as opposed to narrative texts) on a screen negatively affected performance as compared to reading from paper (Clinton, 2019). No differences in performance were found for narrative texts, nor were there any significant differences for reading time. Readers also displayed better metacognition (referred to as calibration or awareness of performance) when reading from paper (Clinton, 2019). Thayer et al., (2011) found that some students feel print materials better facilitate their learning by providing the ability to read, conceptually map, and interact with physical materials.

Other researchers comparing outcomes have indicated no significant role for format in academic outcomes. Morris & Lambe (2017) found no statistical differences in formative assessment performance between eBooks and print. Similarly, Murray and Pérez (2011) found no significant differences in test scores between undergraduates using printed versus digital materials.

Influences on Print and Digital Preferences

Demographic Factors. Age, a characteristic often correlated with factors like time at an institution and/or previous experience with digital course materials, has been shown to influence students' preferences for print or digital course material formats (Al-Qatawneh et al., 2019; Baek & Monaghan, 2013; Mizrachi et al., 2018; Weisberg, 2018; Zhao et al., 2020). Baek and Monaghan (2013) found that students over the age of 22 had more positive eTextbook experiences than younger students. Al-Qatawneh et al., (2019) found statistically significant differences in fifth-year students' usage of eTextbooks, similar to Mizrachi et al.'s (2018) who noted increasing percentages of students preferring eTextbooks with each year at the institution. While this increased preference for digital could have been due to the added exposure to and experience with eTextbooks, another study by Woody et al., (2010) found no correlation between preferences for eTextbooks and number of eTextbooks previously used.

Technological Savvy. Researchers have also suggested familiarity with technology may impact student course material format preferences. Using a quantitative, experimental design, Ngafeeson and Sun (2015) surmised that a willingness to try new technology and frequency of technology use and training influenced students' acceptance of eTextbooks. Sun and Flores (2013) found that level of technological savvy directly affected students' experiences with eTextbooks, with technology veterans utilizing more features and finding eTextbooks more helpful. Woody et al. (2010), however, found no associations with students' comfort with computers and their use and preference for eTextbooks. Similarly, Kurata et al., (2017) found a general preference for printed media in their cross-sectional survey of 1,755 participants across a variety of ages, even despite that respondents spent 70% of their time reading digital media.

Home Internet Access. Another issue potentially impacting material format preference and the ability to maximize the benefits of digital is the availability of home internet access (Hurley & Carter, 2020). Despite an overall 11% increase in home internet use over the past decade, a persistent digital divide still exists based on income levels, age groups, and race (Remaley, 2020). The gaps between Whites and historically underrepresented groups have remained statistically significant. For example, Remaley (2020) found that African Americans and Hispanics are 7% less likely to use the internet in general. Subsequently, while internet use among households with incomes less than \$25,000 experienced a 3% growth to 65% between 2017 and 2019, usage still lags far behind the 87% seen in households with incomes of \$100,000 or more (Remaley, 2020).

Overall, differing and varied results from course material format preference studies present an opportunity for additional research. While students may appreciate the functionalities of digital, they may still benefit academically from the functionalities afforded by print. The extent to which student format preferences are associated with factors like race/ethnicity, income, age, technological savviness, and the availability of home internet access likewise remain unknown. This study focuses on the Tennessee community college population, which offers a diverse demographic in terms of age, socioeconomic status, and geographical location. Exploring the influence of home internet access and technological savviness will help policymakers and higher education leaders understand the experiences and needs of students. This deeper understanding will empower them to lead conversations and approach course material policies and initiatives through the lens of equity.

Conceptual Framework

Two frameworks, equity and market orientation, served as theoretical guides for this study (Bensimon, 2005, 2012; Narver & Slater, 1990). According to the World Health Organization (WHO), equity reflects “the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically” (WHO, 2020). In the higher education context, Bensimon’s work in equity has emphasized the need for stakeholders to focus on the ability of all students to achieve (Bensimon, 2005, 2012). In doing so, before solutions to equity problems can be constructed, data-based inquiries must first be conducted to demonstrate that a problem is worthy of investigation. Data-based inquiries likewise help stakeholders resist the natural inclination to assume that a problem is understood (Bensimon, 2005, 2012). Following this framework, to identify any underlying inequities, the data analyzed for this study were disaggregated by race/ethnicity, income, age, tech-savviness, and availability of home internet access.

A second framework centered around market orientation also guided this study (Narver & Slater, 1990). This complementary framework acknowledged that, while higher education policy decisions do usually focus on the best interest of the student, decisions are also made based on potential impacts to the fiscal health and performance of the institution or organization. Students comprise the largest target market of higher education, an organization that depends on profitability (or, at the very least, continued funding) for survival. The market orientation framework from Narver and Slater (1990) connected an organization’s use of customer preferences to the creation of superior value that ultimately impacts that organization’s performance. The creation of a customer-supportive internal environment among all employees has been linked to organization profit (Jaworski & Kohli, 1993; Narver & Slater, 1990). A

market orientation in higher education would entail the creation of superior value vis-à-vis policies and practices that consider and reflect student course material format preferences.

Purpose and Significance of the Study

The purpose of this cross-sectional survey research study was to examine the course material format preferences of Tennessee community college students, with attention to demographic characteristics and potential influences like technological savviness and home internet access. College affordability could be improved by addressing course material costs, which themselves have outpaced even the alarming increases in tuition that catalyzed state-funded tuition programs like Tennessee Promise and Tennessee Hope (BLS, 2016). Finding an equitable solution to address those costs, however, requires that stakeholders understand the dynamics of the student experience. This study provides both policymakers and educational leaders with a richer understanding of students' preferences and experiences regarding print and digital material formats.

Despite the increasingly common role played by digital course materials, little evidence exists as to which format students prefer for learning. This study filled this gap in two ways: firstly, with a quantitative examination of student preferences that disaggregated results to examine differences based on race/ethnicity, income, age, technological savviness, and home internet access. Secondly, this study provided a deeper understanding of dynamics and experiences by weaving the student voice throughout. Taken together, the results of this study offer context to benefit practical and policy-level decisions, as well as empower policymakers and educational leaders with information to make decisions that promote equitable learning environments for the students and communities they serve.

Method

This study examined students' course material format preferences and the relationship of those preferences to demographic factors such as race/ethnicity, income, age, technological savviness, and the availability of home internet access. The following research questions guided the study:

1. Which course material format – print or digital – do students prefer?
 - a. What are the reasons for those preferences?
 - b. Are there significant differences in preferences for traditionally underrepresented student populations (race/ethnicity, low-income, and/or non-traditional Adult Learners)?
2. Is there a relationship between format preference and technological savviness and/or home internet access?

Study Design

A nonexperimental survey research design was selected for this study, as survey research methods are useful for understanding the characteristics of a population based on sample data (Johnson & Christensen, 2020). In the case of this study, a better understanding of course material format preferences was sought, as well as of the factors influencing those preferences. Survey research provides insight about trends, attitudes, and opinions, as well as provides data in a manner that allows for testing associations among variables (Creswell & Creswell, 2018). Prior to undertaking any steps in the research, study approval was secured through the Institutional Review Board (IRB) of both the University of Tennessee and Tennessee Board of Regents (TBR). Ethical considerations included voluntary participation not associated with any class or

assignment, an informed consent prior to beginning the survey, the ability for participants to skip any question, and the data being anonymized prior to analysis (Rea & Parker, 2014).

Instrument

The survey instrument from which the questions for analysis were drawn was adapted from nationally known, peer-reviewed course material affordability surveys, namely Florida Virtual Campus (2019) and Martin et al. (2017). Florida Virtual Campus (2019) has conducted biannual textbook surveys since 2010 and is the commonly referenced course material survey model. Similarly, Martin et al. (2017) focused on points of impact for textbook costs, including purchases foregone in order to pay for course materials. The 53-item survey was administered fall 2019 to community college students across the Tennessee Board of Regents (TBR) system. TBR is the largest system of public higher education in Tennessee, serving nearly 120,000 students enrolled at 40 community colleges and colleges of applied technology (TBR, 2020). The survey covered student spending on required course materials; experiences related to not having required course materials; purchase behavior, decisions, and preferences related to course materials. Open-ended follow-up questions were included throughout to capture an enriched student perspective.

Because “course materials” invited a wide range of interpretation, the survey 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 explicit that “required course materials” did not concern supplementary or “recommended” materials that students were not required to purchase.

Measures

The dependent variable for the quantitative analysis was student format preference (print, digital, or no preference between the two). While several subtypes of digital course materials exist (eTextbooks, interactive e-texts, digital courseware, etc.), for the purposes of this study, digital materials referred generally to electronically based materials (as opposed to materials based on paper/print).

Independent variables included demographic characteristics (race/ethnicity, income/Pell-eligibility, Adult Learner status), perceived technological savviness, and home internet access. The construction of race/ethnicity followed recommendations of the U.S. Office of Management and Budget's Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity (2016), with respondents self-identifying into one or more of six categories (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). For the analysis, these categories were collapsed into two categories (White and Non-White).

The independent variable of income (referred to also as "Pell-eligibility") focused on low-income students most likely to be eligible for federal Pell grants as determined by a self-reported annual household income of less than \$36,000. The twelve survey options for reporting annual household income were collapsed into two categories: Pell-Eligible (>\$36K annual household income) and Non-Pell-Eligible. Age responses were also collapsed into two categories: Adult Learners and non-Adult Learners. The Tennessee Board of Regents (TBR) system classifies "Adult Learners" as those over 25 years of age (TBR, 2020).

The independent variable of technological savviness (technology savvy, or tech-savviness) related to being "well informed about or proficient in the use of modern technology,

especially computers” (Oxford Dictionary, n.d.). On the survey (see Appendix 3A for relevant survey items), students self-reported their level of agreement with the statement “I consider myself technology savvy.” The statement was followed by the definition, “You know how to navigate and use technology, and when the technology is new, it's not hard for you to learn how to use it.” Response options were measured on a 7-point unanchored scale (strongly disagree, disagree, somewhat disagree, neither agree or disagree, somewhat agree, agree, strongly agree). A seven-point unanchored scale was chosen for its greater level of reliability over a scale with four or fewer points, along with its ability to allow respondents to express a neutral response (Johnson & Christensen, 2020).

Since the use of digital technologies for homework and course assignments requires internet access beyond that which is available on-campus, availability of internet access was also included as an independent variable. The availability of internet access was measured by a Yes/No response to the question “Is your internet access at home sufficient to complete homework and other course-related assignments?” Finally, open-ended responses were included to complement the quantitative data and capture a richer perspective of the student experience. Table 3.1 displays variables, research questions, and corresponding survey item(s) for this study.

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 ($N = 88,946$). TBR houses Tennessee’s two-year public institutions, including 13 community colleges offering classes in almost all 95 counties within the state. The fall 2019 student population consisted of 70.7% White, 15.9% Black, 6.4% Hispanic, and 7.0% Other (TBR Data, 2020). Over half were female

Table 3.1 Variables, Research Questions, and Survey Item(s)

Variable	Research Question	Survey Item(s)
Dependent Variable: Format Preference	Which course material format – print or digital – do students prefer?	Do you prefer your course materials to be in digital or print format? 1. I prefer digital course materials. 2. I prefer print course materials. 3. I have no preference -- I feel the same way about digital and print.
Independent Variable 1: Technological Savviness	Is there a relationship between format preference and technological savviness and/or home internet access?	Please state your level of agreement with this statement: I consider myself technology savvy. ("Technology savvy" means you know how to navigate and use technology, and that when the technology is new, it's not hard for you to learn how to use it.) Strongly Disagree Disagree Somewhat Disagree Neither Agree nor Disagree Somewhat Agree Agree Strongly Agree
Independent Variable 2: Home Internet Access	Is there a relationship between format preference and technological savviness and/or home internet access?	Is your internet access at home sufficient to complete homework and other course-related assignments? Yes No

(61.1%), 38.9% were male, and 28% were over the age of 25. Over a quarter (37%) received some form of Pell grant assistance, and approximately half (50.5%) attended part-time. High school students participating in dual-enrollment programs were not included in the study.

Data Collection

This study employed a census survey approach to data collection. To maintain the security of student contact information, surveys were distributed via email by institutional research directors on each campus to all enrolled students.

Procedure

After securing approval from both The University of Tennessee, Knoxville, and Tennessee Board of Regents Institutional Review Boards, research directors at each community college were given two weeks to provide feedback on the survey design. After this feedback period, the survey was pilot tested on desktop, laptop, and mobile devices with both research directors and individuals representing a range of ages and college experience (Johnson & Christenson, 2020).

The survey was administered via email invitation sent by research directors at each participating community college campus beginning the 8th week of the fall 2019 semester (see Survey Communications, Appendix 3B). The 8th week of the semester was selected as a time when students would still have been likely to recall how much they spent on materials while also having enough of the semester underway to determine whether faculty were incorporating those materials into the course. Campuses were also given the choice to deploy an additional survey notice within their password-protected campus portal. The pre-screening and informed consent

comprised the first page of the survey, and once completed, students were able to progress to the survey.

The survey remained open for two weeks, with a first reminder sent after nine days and a final reminder two days before the survey close. To encourage participation, research directors sent an email to instructors at the halfway point requesting they remind (but not incentivize) students to read the email invitation and consider completing the survey. The complete survey timeline is indicated below:

- Day 1 – Survey Launch / Email Invitation to Students
- Day 7 – Email from Research Directors to Instructors
- Day 9 – Email Reminder 1
- Day 12 – Email Final Reminder
- Day 14 – Survey Close

Analyses

Both quantitative and qualitative data were analyzed for this study, using SPSS (Version 26) and nVivo (Version 12), respectively. For the quantitative analysis, data were first cleaned using Morrow's (2017) twelve-step process. Data were then imported into SPSS (Version 26) and prepared by correcting coding errors, assessing for normality, dealing with outliers and missing data, and modifying variables for analysis. For example, the Likert scale reporting technological savviness was recoded to better compare the preferences of those who consider themselves savvy vs. not, with respondents reporting somewhat to strong disagreement with the statement categorized as "Not Tech Savvy" ($n = 294$) and respondents somewhat to strongly disagreeing with the statement classified as "Tech Savvy" ($n = 1,462$). Respondents who neither agreed nor disagreed with the statement ($n = 152$) were excluded from analysis.

The next step of analysis, descriptive statistics, showcased the sample characteristics (Morrow, 2017). The final step of analysis, a multinomial logistic regression, determined the extent to which format preferences could be predicted by students' self-reported level of technological savviness and home internet access. Multinomial logistic regression was selected for its ability to predict the values of a nominal dependent variable with three categories based on the value of one or more independent variables (Johnson & Christensen, 2020). In this study, the dependent variable was format preference (preference for digital or preference for print, with no preference as the reference category). The three independent variables were 1) demographic characteristics (race/ethnicity, income, age), 2) technological savviness and 3) availability of home internet access.

Qualitative data were analyzed in two steps. First, the open-ended survey responses were uploaded into nVivo coding software (Version 12). The individual responses were then analyzed using a thematic coding process, beginning with open coding in which segments of meaningful data were identified (Merriam & Tisdell, 2016). Since a single case could have received multiple coding references, the number of codes exceeded the total number of cases. After open coding, axial coding was conducted to group the open codes into categories based upon the identification of collections of similar codes; then, from those categories, key themes were assigned (Morse, 2010). To ensure validity and reliability of the findings, an external expert in qualitative methods confirmed the coding and analysis procedures.

Results

This study examined community college student course material format preferences and whether race/ethnicity, income, age, level of technological savvy, and availability of home

internet access could serve as predictors of those preferences. Prior to analysis, assumptions were checked to confirm 1) the dependent variable was measured at the nominal level, 2) one or more independent dichotomous variables were included, 3) no outliers were present; 4) categories were independent, and finally 5) the coefficient's output for all variables returned VIF values slightly greater than 1, indicating no multicollinearity issues (race/ethnicity, Tolerance = 0.985, VIF = 1.015; income/Pell-eligibility, Tolerance = 0.969, VIF = 1.032; age/Adult Learner status, Tolerance = 0.996, VIF = 1.004; tech-savviness, Tolerance = 0.988, VIF = 1.012; home internet access, Tolerance = 0.982, VIF = 1.019; Laerd Statistics, 2020).

Univariate Analyses

A univariate analysis was first performed to showcase the demographic characteristics of the 1,912 responses included in the study. Table 3.2 displays the basic descriptive statistics of the sample population.

Research Question 1. Which course material format – print or digital – do students prefer?

Students were asked to report their preferred course material format: print, digital, or no preference between the two. Of the 1,908 who responded to the question, over half (63.6%) preferred course materials in print format and 10.1% preferred digital format materials. Slightly over a quarter of students (26.3%) expressed no preference between print or digital.

Research Question 1, Sub-Question A. What are the reasons for those preferences?

Students who reported preferring either print or digital were then asked to share the reason(s) for their preference. Of the 1,304 (92.7%) respondents to this follow-up question, 1,127 (86.4%) had expressed a preference for print and 177 (13.6%) had expressed a preference for digital. See

Table 3.2 Sample Demographic Characteristics (n = 1,912)

Demographic Characteristic	N	% of Total
Gender		
Female	1,455	76.4%
Male	413	21.7%
Non-binary/Third Gender	11	0.6%
Total	1,905	
Race/Ethnicity		
White	1,528	83.3%
Black	103	5.6%
Hispanic	113	6.2%
Asian	27	1.5%
Other	63	3.4%
Total	1,834	
Income / Pell-Eligibility		
Annual Income below \$36K	690	47.4%
Annual Income above \$36K	765	52.6%
Total	1,455	
Adult Learner Status		
Adult Learners Over Age 25	898	47.7%
Learners Under Age 25	985	52.3%
Total	1,883	

Note: Number of responses differ, as participants could skip questions.

Table 3.3 for overall themes and categories that emerged from the data.

Why Students Prefer Print Course Materials

To better understand each format preference, responses for those who preferred print ($n = 1,127$) were then coded separately from responses for those who preferred digital ($n = 177$).

Table 3.4 illustrates the most prominent themes emerging from the reasons for preferring print.

Print Theme 1: Learning. Learning, or the advantages afforded by print for activities like reading, studying, focusing, and retaining information, was the most prominent theme for students who preferred print materials. Students reported that print helps them more easily learn and retain information. As one student related, “I learn best when I can physically interact with things. Manually turning the pages and highlighting parts of the book are much more effective for me.” Others mentioned how print’s relative lack of distraction helps them focus. For example, one student noted, “I cannot concentrate when reading online books. I always get distracted by other things online.” Also frequently mentioned was the helpfulness of having print materials available while working on a computer to complete homework and other assignments.

Print Theme 2: Tech Issues. The second most prominent reason reported for preferring print almost solely related to an aversion to digital because of technical issues experienced. Tech issues ranged from the need for internet connectivity and additional equipment (laptops, electronic devices, etc.), to health issues due to time “staring at a screen.” One response captured the general sentiment: “... something other than being on a computer at work all day, just to come home and total a day of being on a screen for 14 hours. It gives me terrible headaches and makes my eyes feel irritated.” The reliability of print relative to digital was also commonly

Table 3.3 Overall Themes: Course Material Preferences (1,304 cases)

Theme	Categories	# Codes	% Total Codes
Tech Issues	internet access, health risks, reliability, power required, load times, tech not allowed in class, logins and access, compatibility, ads, general tech issues	621	22.8%
Learning	reading, retaining, studying, focus, learning styles, disability, homework	594	21.8%
Physicality	hands-on, physical copies, physical interaction, paper, real book, hard copy	354	14.4%
Navigation	reference, pages, flip, searching, navigate, format	332	13.0%
Annotation	notes, highlight	302	11.1%
Convenience	General convenience, print convenience, availability, anytime, homework, less chance of losing, forgetting, or damaging, efficiency, time management	171	6.3%
Portability	anywhere, easier to carry, bulky, heavy	135	5.0%
Costs	explicit costs, hidden costs (additional tech and equipment required, environment, specific tech to learn)	71	2.6%
Inertia	age, “used to”, old-fashioned	68	2.5%
Retain	want or need to keep, resale	51	1.9%
Unspecified	<i>(restated preference with no further justification)</i>	20	0.7%

Table 3.4 Top Themes: Preferences for Print (1,127 cases, 2,210 total references)

Theme	Categories	# (%) Coding References
Learning	reading, retaining, studying, focus, learning styles, disability, homework	480 (21.7%)
Tech Issues	internet access, health risks, reliability, power required, load times, tech not allowed in class, logins and access, compatibility, ads, general tech issues	472 (21.4%)
Physicality	haptics, spatial relations, paper, “real book”, hard copy	332 (15.0%)
Navigation	reference, pages, flip, searching, navigate, format	301 (13.6%)
Annotation	notes, highlight	286 (12.9%)

indicated, as print materials do not rely on having power, a charged device, internet access, or functioning websites.

Print Theme 3: Physicality. A third theme was physicality, or print's ability to provide interaction with the physical environment. This category included references to print as "real" or "actual" books and suggested benefits from "hands-on" haptic and other sensory interactions from having materials "in front of me." Typical responses for this category included the following: "I can focus better when I can touch and hold the text." Also: "I prefer to hold my textbook as to having it digitally, because I feel it helps me to be able to keep up and understand it."

Additional Print Themes. Additional themes included navigation (how one maneuvers through) and annotation (the ways in which one interacts). These comments, while closely related to those of the physicality theme, spoke more directly to the functions available with the materials themselves:

"With textbooks, I need to be able to easily flip back and forth to look at definitions, images, and flowcharts related to the chapter. Each chapter refers to multiple images that are far easier to view in a print textbook as I read to understand the materials. Electronic book readers don't have a large enough viewing window to do this."

Several respondents referred to the inconvenience of having to learn multiple new systems for highlighting and note-taking. For example, one student remarked, "Print textbooks are also easier to mark up with highlighting and post it notes, eTextbooks require strange highlighting methods that are annoying to try and figure out."

Why Students Prefer Digital Course Materials

Students' open-ended responses for preferring digital materials were also coded ($n = 177$). See Table 3.5 for the most prominent themes that emerged from analysis.

Digital Theme 1: Portability. Portability was the most prevalent theme for over a quarter of students (31.5%) who expressed a preference for digital materials. Portability encompassed dealing with the weight and bulk associated with physical textbooks, and the relief from not having to “lug around a computer and a textbook to classes.” As one student remarked, digital materials are “easier and less stress on the body than carrying a backpack loaded with books.” The portability of digital materials also more easily allows for impromptu studying, as one student noted, “If I find I have time at work or while I’m out and about, I can whip out my phone or tablet and study a little on the go without lugging bulky books.”

Digital Theme 2: Convenience. Convenience was the second major theme for students who preferred digital materials. Digital materials enable multiple resources to be housed on a single electronic device. Furthermore, because devices like smartphones are usually always with the student, they are less likely to lose or “forget them at home.” The “anytime, anywhere” ability of digital also enables access from any public or private electronic device. As one student noted, “My saved notes and assignments on my laptop can be opened on a public computer, my own desktop, and my phone.” A few students commented how features like calendars and push notifications have enabled them to better manage their time and maintain oversight of class activities.

Digital Theme 3: Learning. Learning also appeared as a prominent theme for students preferring digital. Students with disabilities remarked on the benefits of technology to magnify, annotate, and read the text aloud. One respondent remarked, “Since I’m legally blind I have a lot

Table 3.5 Top Themes: Preferences for Digital (177 cases, 251 coding references)

Theme	Categories	# (%) Coding References
Portability	anywhere, bulky, easier to carry, heavy	79 (31.5%)
Convenience	anytime, availability, general convenience, homework, less chance of losing, forgetting, or damaging, print convenience, time management	47 (18.7%)
Learning	disability, focus, homework, learning styles, reading, retaining, studying	28 (11.2%)
Navigation	flip, format, navigate, pages, reference, searching	24 (9.6%)
Costs	explicit costs, hidden costs	22 (8.8%)

more ways to navigate the material (magnification, screen readers, etc.).” Others noted that digital materials provide a more efficient study experience than print, citing additional study aids and/or digital materials that allowed for easy copy/pasting of text into study guides.

Additional Digital Themes. Navigation and cost were the fourth and fifth most prominent themes. For students preferring digital, navigation comments primarily centered on the relative ease of searching for information: “I find that digital course materials allow you to search faster and easier.” Cost comments related to digital materials’ being “usually cheaper.” They also encompassed remarks of the relative environmental friendliness of digital materials, such as “saves resources, trees, energy, etc.”

Research Question 1, Sub-Question B. *Are there significant differences in preferences for traditionally underrepresented student populations (race/ethnicity, low income, and/or non-traditional Adult Learners)?*

A multinomial logistic regression was performed to see whether student format preferences could be predicted based on demographic characteristics race/ethnicity (White or non-White), income (above or below \$36K annual household income), or non-traditional Adult Learner status (under or over the age of 25). After confirming model fit as indicated by the Goodness-of-Fit Test $\chi^2(6) = 4.263, p = 0.641$, the multinomial regression was conducted.

Results of the multinomial regression found no significant differences in preference for print or digital based on non-White racial/ethnic status $\chi^2(1, N = 1,410) = 0.641, p = 0.726$, income $\chi^2(1, N = 1,410) = 2.464, p = 0.292$, or Adult Learner status $\chi^2(1, N = 1,410) = 1.356, p = 0.508$. Results of the regression are exhibited in Table 3.6.

Table 3.6 Multinomial Regression Results: Preferences by Demographic Characteristic

Parameter ^a	<i>B</i>	Exp (<i>B</i>)	Std. Error	95% Confidence Interval for Exp(<i>B</i>)		Hypothesis Test		
				Lower	Upper	Wald Chi-Square	df	Sig.
Print Preference (Intercept)	.987		.110			79.767	1	.000
Non-White	.106	1.112	.173	.793	1.559	.376	1	.540
White	0 ^b						0	
Pell-Eligible (>\$36K Income)	-.150	.861	.123	.676	1.097	1.470	1	.225
Not Eligible (<\$36K Income)	0 ^b						0	
Adult Learners (Age 25+)	-.139	.870	.123	.683	1.108	1.273	1	.259
Non-Adult Learner (Under 25)	0 ^b						0	
Digital Preference (Intercept)	-.891		.176			25.480	1	.000
Non-White	.200	1.222	.273	.716	2.085	.541	1	.462
White	0 ^b						0	
Pell-Eligible (>\$36K Income)	-.286	.751	.202	.505	1.116	2.011	1	.156
Not Eligible (<\$36K Income)	0 ^b						0	
Adult Learners (Age 25+)	-.047	.954	.201	.644	1.414	.054	1	.816
Non-Adult Learner (Under 25)	0 ^b							

Dependent Variable: Format Preference: Print, Digital, or No Preference

Reference Categories: White, Annual Household Income <\$36K, Under Age 25

a. Reference Category = No Format Preference

b. Set to zero because parameter is redundant.

Research Question 2. *Is there a relationship between format preference and technological savviness and/or home internet access?*

A second multinomial regression was conducted to explore whether format preferences could be predicted based on whether students considered themselves to be technologically savvy. The chi-square likelihood ratio indicated a good model fit $\chi^2(2) = 3.82, p = 0.148$. Results of the regression indicated no significant associations in preferences for print based on level of technological savviness $\chi^2(1, N = 1,752) = 0.97, p = 0.325$. A significant association in preference for digital was found, with students who did not consider themselves technologically savvy to be 1.6 times more likely to prefer digital materials $\chi^2(1, N = 1,752) = 3.93, p = 0.047$. No significant associations were found between technological savviness and preference for print. Closer examination revealed close percentages of non-tech savvy and tech-savvy within each preference group. Of those 167 who preferred digital, 22% ($n = 36$) considered themselves non-tech savvy; of the 1,108 students preferring print, 17% ($n = 187$) considered themselves non-tech savvy. Table 3.7 displays results of the multinomial regression analysis.

A third multinomial regression was used to determine whether student format preferences could be predicted based on the availability of home internet access. Results demonstrated no significant differences in preference based on home internet access $\chi^2(2, N = 1,899) = 4.160, p = 0.125$. Table 3.8 displays the multinomial regression results.

Discussion

Educational leaders seeking to increase college affordability through policies that help lower the cost of course materials will benefit from a richer understanding of student experiences with print and digital formats. This study sought not only to uncover student preferences and

Table 3.7 Multinomial Regression Results: Preferences by Technological Savviness

Parameter ^a	B	Exp (B)	Std. Error	95% Confidence Interval for Exp(B)		Hypothesis Test		
				Lower	Upper	Wald Chi- Square	df	Sig.
Print Preference (Intercept)	.968		.139			48.263	1	.000
Not Tech Savvy	-.149	.861	.152	.640	1.159	0.970	1	.325
Tech Savvy	0 ^b						0	
Digital Preference (Intercept)	-.679		.205			11.018	1	.001
Not Tech Savvy	-.452	.636	.228	.407	.995	3.932	1	.047*
Tech Savvy	0 ^b						0	

Dependent Variable: Format Preference: Print, Digital, or No Preference
a. Reference Category = No Format Preference for either Print or Digital
b. Set to zero because parameter is redundant.

Table 3.8 Multinomial Regression Results: Preferences by Home Internet Access

Parameter ^a	B	Exp (B)	Std. Error	95% Confidence Interval for Exp(B)		Hypothesis Test		
				Lower	Upper	Wald Chi- Square	df	Sig.
Print Preference (Intercept)	.850		.056			232.38 6	1	.000
Insufficient Home Internet	.303	1.353	.186	.941	1.947	2.659	1	.103
Sufficient Home Internet	0 ^b						0	
Digital Preference (Intercept)	-1.017		.091			126.106	1	.000
Insufficient Home Internet	.498	1.646	.268	.973	2.785	3.448	1	.063
Sufficient Home Internet	0 ^b						0	

Dependent Variable: Format Preference: Print, Digital, or No Preference
a. Reference Category = No Format Preference
b. Set to zero because parameter is redundant.

experiences, but also how they connect with demographic characteristics and factors like internet access and technological savviness. Disparities in any of these factors have the potential to impact the ability of community colleges to provide equitable learning environments for the citizens and communities they serve.

Format Preferences and Influences. The univariate analysis first investigated the course material format choices of Tennessee community college students, with results indicating a clear preference for print course materials (63.6% print, 10.1% digital, and 26.3% no preference). These findings are largely consistent with those of several studies indicating that students prefer print materials (Millar & Schrier, 2015; Mizrachi et al., 2018; Morris & Lambe, 2017; Sharma, 2019; Woody et al., 2010). In the present study, the primary reasons students reported preferring print were related to perceived benefits to learning and tech issues related to digital materials. Issues reported, ranging from a lack of internet access to difficulties navigating eTextbooks and the additional costs of e-readers, were also echoed in Adeyinka et al., (2018). For students who preferred digital materials, portability and convenience were the most frequently reported reasons.

Following the univariate analysis, multivariate analyses explored correlates to students' preferences in order to uncover disparities that might impact equitable learning. Results indicated that student format preferences could not be predicted by race/ethnicity, income, age, or the availability of home internet access. While preferences for print could not be predicted based on technological savviness, preferences for digital were significantly associated with students who did not consider themselves to be technologically savvy (albeit barely so, $p = 0.047$). These findings reinforce those of Kurata et al. (2017), which indicated a mismatch between preferences

and actual behavior, as well as those of Woody et al. (2010), which found no significant correlation between number of e-books previously used and overall format preference.

Reasons for Student Preferences. Hallmark to this study were the open-ended data, which offered student voices to provide educational leaders with a richer understanding of the student experience with print and digital formats. Perceived benefits to learning, tech issues, and physicality were students' primary reasons for preferring print. These findings substantiate perceptions that printed materials better facilitate learning, focus, and retention of information (Mizrachi et al., 2018), especially for the expository nature of academic textbook content (Clinton, 2019). Clinton (2019) suggested that readers may be better aware of their performance when reading from paper, with the physical aspects of print potentially cueing deeper processing and learning. This deeper processing stands in contrast to the more leisure-oriented, superficial processing approach associated with reading from a screen (van den Broek et al., 2001).

In contrast to perceived learning benefits, this study found students preferring digital materials for their convenience and portability more so than their price. This was a surprise given the emphasis of cost-savings as a reason to opt for digital, and a divergence from the findings of Baglione & Tapia (2016) who noted price as the most important attribute for students selecting between traditional print and eTextbooks. This discrepancy may be explained by an examination of relative price differences between digital and printed materials. For example, Amazon's Chegg service shows pricing for the most recent edition of a principles of marketing textbook to differ from a \$59.99 6-month digital rental to a \$91.99 5-month print rental (Chegg, 2021). A used printed copy could be purchased for only \$10 more than the print rental (\$101.99), or a new printed copy acquired for \$268.49. The purchase of a digital option was unavailable at the time of investigation (via Chegg or any other purchase channel, including the publisher). When

examined from this cost perspective, it is understandable that “cost savings” may play a lesser role in student preferences over attributes like convenience and portability.

Despite the prominence of convenience as a reason for preferring digital, comments suggested that the actual convenience occurs mostly outside the classroom, at least for students in the study population. Several comments related instances where instructors required digital materials but then restricted or prohibited the use of technology in the classroom. One student summarized the issue:

“I also had classes where classmates bought digital copies of required textbooks and the professor would not allow that student to have their phone, tablet, laptop or any other form of technology out, which prevented the student from using this copy and receiving low grades on their course work. As a result of all of these situations, I decided that a digital copy causes too many problems for me to think about buying them.”

This “no electronic devices in class” policy may have stemmed from a time where electronic devices did not play such a prominent role in learning. This policy is a prime example of an institutional practice worthy of examination for its potential impacts on equitable learning. If eTextbooks are increasingly the norm, in some cases made the sole format available for accessing content through digital distribution models like *Inclusive Access*, these types of classroom-level restrictions are certainly in need of revisiting.

Function. Function also seems to influence preference, especially the extent to which students need to retain materials beyond the duration of the course. As one student in the present study remarked, “It actually depends... some courses I like to have a textbook to keep for reference in my job, but most I prefer the digital copy for convenience.” One way to easily resolve this

conflict would be through the use of openly-licensed, freely and permanently available OER.

Aside from being free to the student, these materials (usually digital in form and freely available on the internet) would easily accommodate the 61.7% of students who prefer to keep a printed copy of course readings (Medley-Rath, 2018). With OER, students decide which materials they wish to retain (in PDF format, on a hard drive, or printed and bound), and OER's adaptable nature means instructors are able tailor those contents to suit their specific learning outcomes.

Policy Recommendations. In an ideal, market-oriented environment, students would be able to enjoy the convenience and portability of digital alongside the learning advantages they identify with print. To this effect, publishers and programmers alike may invest in development that further tends to the physical and environmental cues that assist memory and retrieval (see Nichols, 2020, and Spencer et al., 2020 for recommendations). For example, most devices and apps include progress bars, but shifting pixels on a screen may not provide the physical magnitude of change required for the totality of senses to maneuver information into long-term storage.

In the meantime, faculty may benefit student learning by assessing the function of their course content and tailoring formats as per that content's intended purpose. Where retention is vital but only digital materials available, faculty could distill important information into study guides suitable for printing and studying. In cases where time is limited, faculty could facilitate a collaborative activity to promote exposure to important content wherein students draft guides, then exchange and improve them with peers. Making key course content available in printed form may promote better learning by eliminating the mind-wandering and other distractions associated with reading from screens (Clinton, 2019). As one student in this study related, "On a

computer there are many things I would rather do than complete my reading, so I normally don't finish the chapter.”

This study has demonstrated that students perceive print materials to be important to learning. Aspects like cost may be considered key in furthering the expansion of digital textbook use (Hancock et al., 2016), but relative savings may be negligible if students need to purchase an additional print copy for the benefit of their learning. Where digital materials are the only option, faculty may suggest ways to maximize the use of navigation signals like progress bars that most closely approximate the physical cues of print. When introducing required materials on the first day of class, instructors can orient students to the highlighting and note-taking features of digital texts, while also encouraging focused reading by making students aware of strategies to circumvent potential issues caused by electronic distractions (Brun-Mercer (2019) and Nichols (2020) provide suggestions to improve performance with on-screen readers).

Beyond classroom usage, educational leaders seeking to protect the student consumer should consider the cost of electronic devices and print add-ons as part of the bottom-line price when evaluating course material initiatives. If initiatives are pursued solely on account of cost-savings, the cost of the electronic devices required to access digital materials, as well as the printed add-ons that students regard so necessary to their learning, should each be factored in. Savings that do not add up may necessitate a new approach.

Findings from this study suggest that print materials play a continued role in learning, while also revealing that students' preferences for print seem to be largely driven by issues with technology. Specifically, students reported that the use of digital materials require the additional purchase of suitable electronic devices, internet access, and more time “staring at a screen.” While increased screen time may be an unavoidable consequence of an increasingly digital

world, issues related to electronic devices and internet access could be addressed through policy. Adeyinka et al., (2018) suggested that institutions make eBook readers more readily available to students, and electronic device loan programs are becoming increasingly commonplace to serve students who may be negatively affected by not owning a laptop (Riesdorf, 2020). The lack of internet access and greater need for online learning give institutions of higher education a powerful argument to advocate for state and federal broadband initiatives that would close the “homework gap” while also expanding the ability to serve citizens in rural areas (Rachfal, 2020). With these impediments resolved, students may be more accepting of and likely to gravitate toward digital materials.

Limitations

While all Tennessee community college students have access to campus Wi-Fi and institutional email, the web-based survey research method utilized in this study limited participation to populations with access to e-mail and a computer. Those uncomfortable with web-based technology may have been more likely to exclude themselves from participation (Rea & Parker, 2014). Since survey research also relies upon self-reported data, results may not have completely represented an accurate reality. Similarly, because participants could skip questions, data were missing that could have impacted analysis. For instance, only 75% responded to the income question, revealing that many students – younger ones especially—may be unaware of their annual household income. Future studies may consider designs that collect income data outside of that which is self-reported. Despite these limitations, a survey research design was most appropriate for the pragmatic approach of this project to capture student perspectives and enable a deeper understanding for those making decisions related to course material costs. This survey’s

cross-sectional design, while immediately limited in scope, will nonetheless prove helpful as a baseline toward longitudinal measures of progress and changes in student attitudes over time.

Conclusion

As digital course materials become increasingly the norm in higher education classrooms (NACS, 2020), this study offers a more complex understanding of student format preferences and experiences. The majority preference for printed course materials uncovered by this study (63.6%), along with the learning benefits students perceived printed materials to provide, offer evidence that print retains an important place in student learning. As higher education systems seek to retain and grow enrollments, the question is not necessarily “Digital or print?” but rather “When digital? When print?” Function, context, and use matter, each of which can be enhanced to improve the student experience— faculty can consider which use cases necessitate print, institutions and states can pursue partnerships that resolve tech issues hindering digital usage, and publishers can continue improving digital products to realize the same benefits that students currently associate with print.

Acknowledgements

Acknowledgements and appreciation to the Tennessee Board of Regents Office of Policy and Strategy, especially Amy Moreland for championing this study. Feedback from Patrick Biddix, Lisa Driscoll, and Jimmy Cheek in UT’s Department of Educational Leadership & Policy Studies, as well as Teresa Berry from UT Libraries has likewise proven invaluable. A special thanks also goes to campus research directors who provided feedback and facilitated survey communications: Traci Williams (Chattanooga State); David Knopp (Cleveland State); Harry Djunaidi (Columbia State); Mary Ricks (Dyersburg State); Sara Vonderheide (Jackson State);

Amanda Bowers (Motlow State); Charles Clark (Nashville State); Josh Whitlock (Northeast State); Nancy Ramsey (Pellissippi State); Karen Brunner (Roane State); Colette Catania (Volunteer State); Debbie McCarter (Walters State). Together we make education better.

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APPENDICES

Appendix 3A. Relevant Survey Items

Do you prefer your course materials to be in digital or print format?

I prefer digital course materials.

I prefer print course materials.

I have no preference -- I feel the same way about digital and print.

(Responses “I prefer digital course materials” and “I prefer print course materials” receive the follow-up question: “Please briefly share why you feel this way:”)

Please state your level of agreement with this statement: I consider myself technology savvy. ("Technology savvy" means you know how to navigate and use technology, and that when the technology is new, it's not hard for you to learn how to use it.)

Strongly Disagree

Disagree

Somewhat Disagree

Neither Agree nor Disagree

Somewhat Agree

Agree

Strongly Agree

Is your internet access at home sufficient to complete homework and other course-related assignments?

Yes

No

Are you studying full-time or part-time this semester?

Full Time (9+ credit hours)

Part Time (fewer than 9 credit hours)

Which best describes your gender identity?

Woman

Man

Non-binary/third gender

I prefer not to respond

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) _____

Please estimate your annual household income. Household income = the combined amount all the adult members of your household (that you've identified above) 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

Appendix 3B. 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 – Day 1

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 at The University of Tennessee 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 me at spica@vols.utk.edu or my advisor, Dr. Patrick Biddix, at pbiddix@utk.edu.

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

Instructor Email – Day 7

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 the University of Tennessee, 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 – Day 9

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 **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 me at spica@vols.utk.edu or my advisor, Dr. Patrick Biddix, at pbiddix@utk.edu.

Thanks ahead of time for sharing your thoughts and experiences.

Final Reminder Email – Day 12

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 HERE “CLICK HERE TO BEGIN THE SURVEY”

The decision to participate is complete yours. If you have any questions, please contact me at spica@vols.utk.edu or my advisor, Dr. Patrick Biddix, at pbiddix@utk.edu.

Thanks ahead of time for sharing your thoughts and experiences.

CONCLUSION

College affordability has been a pressing issue for over half a century, mostly surrounding how tuition costs have rapidly outpaced the rate of inflation (Kirchstein, 2020). More recently, the attention of policymakers and educational leaders has also turned to the high and ever-rising cost of textbooks and course materials, recognizing that \$3 billion of federal funding is devoted each year to the cost of course materials (Vitez, 2018). In Tennessee alone, community college students reported spending an average of \$119.18 per course on required materials in the fall 2019 semester (Spica, 2020). For community college students paying \$168 per credit hour in tuition, course material costs can represent a substantial 24% increase on top of tuition for the average 12-credit hour semester (CSCC, 2021). Not only do these costs hinder efforts to improve college affordability, but they also present barriers that cause students to drop and withdraw from courses, take fewer courses, avoid certain courses and majors, and even attempt coursework without having the required materials (Florida Virtual Campus, 2019; Martin et al., 2017; Nagle & Vitez, 2020; Spica, 2020).

Issues related to course material costs have shown to be complex, with stakeholders spanning public and private industries. From publishers, federal and state governments to higher education systems, institutions, and the faculty they employ, each stakeholder maintains vested interests and obligations. It is likewise vital that these stakeholders find a solution, however, as their own sustainability hinges on the success of the customers, students, and communities they serve.

This dissertation utilized survey data collected fall 2019 to illuminate several facets of consideration when examining solutions to the high cost of required course materials. The first article established the extent of the issue by defining and quantifying barriers to academic

achievement and progress to graduation experienced by Tennessee community college students. The second article examined the impact of a statewide, digitally based *Inclusive Access* automatic billing pilot. The third article offered a richer perspective through the student voice and experience, stepping back to explore reasons why students decide for digital and print materials. The key findings of each article are summarized below:

- **Article 1.** In a fall 2019 survey of Tennessee community college students ($N = 1,912$), almost three quarters (68.5%) reported delaying or avoiding the purchase of required materials due to cost, and over a quarter (27.2%) reported taking fewer courses because of those additional costs. Course material costs presented significant barriers to academic achievement for low-income students $\chi^2 (1, N = 1,412) = 7.91, p = 0.005$. These costs also presented significant barriers in progress to graduation for students under the age of 25 $\chi^2 (1, N = 1,413) = 27.49, p = 0.00$.
- **Article 2.** Despite benefits to cost-savings and Day One access touted for *Inclusive Access* automatic billing models, no significant benefits or detriments to academic achievement were detected from participation in a fall 2019 Tennessee statewide community college *Inclusive Access* automatic billing program pilot.
- **Article 3.** Most students (63.6%) reported a preference for print course materials. This preference did not significantly differ by demographic characteristics (race/ethnicity, income, Adult Learner status), level of technological savviness, or availability of home internet access. Student voices evidenced perceptions that print materials better facilitate their learning: “Having a hard copy makes it easier for me to remember where in the book things are, so I retain better. Plus, electronic books hurt my eyes to read, and they're more difficult to flip through if I'm having to go between two sections of the book for an

assignment.” For others, print was preferred simply due to an aversion to the technical issues often associated with digital: “I feel this way because not everyone can afford internet at home and the Wi-Fi on campus doesn't always work. This semester I use three different sites that were assigned to me and two don't work on my phone.” Of the 10.1% of students who reported a preference for digital, the primary reasons related to portability and convenience.

The Lens of Equity

Each article of this dissertation followed Bensimon’s (2005, 2012) conceptual framework on equity in higher education. Research questions were examined through the lens of equity by disaggregating data by race/ethnicity, income, and age to uncover points of impact that might have been disproportionately experienced by traditionally underserved populations across the Tennessee community college landscape.

- **Race/Ethnicity (White/Non-White).** Each of the three articles in this dissertation examined whether non-White populations disproportionately experienced any points of impact due to the cost of course materials. No significant differences were detected with respect to 1) barriers to academic achievement and progress to graduation; 2) academic outcomes from the fall 2019 *Inclusive Access* pilot; and/or 3) preferences for print or digital course materials. This lack of significant differentiation represents a moment of celebration quickly overshadowed by the realization that the cost barriers uncovered in the first article still affect most students regardless of race/ethnicity. The second article introduced another reality – while non-White populations did not see significant improvements in academic outcomes from participation in *Inclusive Access*, in deferring

course material costs they may be inadvertently adding to their overall student debt, which itself presents a host of future repercussions (Kim & Chatterjee, 2019).

- **Low-Income (Annual household income under \$36K).** Gone are the days of simply getting a summer job or “making smarter decisions with money” to pay for college. In 2016-17, the average cost for tuition, fees, room and board for public institutions was \$19,488, a skyrocketing increase of 505% over a 30-year period (Snyder et al., 2019). In contrast, the median wage only increased 9.2%, from \$54,042 in 1989 to \$59,039 in 2016 (Maldonado, 2018). These continually increasing costs make higher education perpetually less affordable, particularly for students from low-income families. The findings from the first article of this dissertation suggest that students from families with an annual household income of less than \$36,000 disproportionately experience barriers to academic achievement because of course material costs.
- **Adult Learners (Over Age 25).** The most surprising findings from this dissertation came in comparing the decisions, experiences, performance, and preferences of community college student Adult Learners over age 25 with those of their counterparts under age 25. Despite the challenges faced by adults returning to the classroom (Grabowski et al., 2016), these studies produced evidence that students under age 25 – the ones most encouraged by state-funded tuition programs to engage in higher education – are even more vulnerable. For example, Article 1 showed learners under age 25 to be significantly more likely to experience barriers to graduation due to the cost of course materials. As compared to learners over age 25, students under age 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 course material costs. The hierarchical linear regression of Article 2 showed

that, after controlling for semester, learners over age 25 were 52% more likely to pass with a grade of A-C than learners under age 25. These findings are of particular importance for community colleges and other public institutions who bear the responsibility to equip the next generation with the knowledge and skills to be competitive in the world economy (TBR, 2020).

Recommendations and Future Directions

Using the findings of this multi-part dissertation, educational leaders are encouraged to facilitate conversations framed around how institutional policies and practices might perpetuate and/or improve inequities in higher education attributable to the high cost of course materials. In viewing results through the lens of equity, the following three recommendations are set forth for those seeking to positively impact course material cost issues:

RECOMMENDATION 1. Focus policy efforts on the regulation of cost, rather than the regulation of format, distribution, or payment model. Models that regulate format, distribution, and payment models appear largely driven by private industry, potentially restricting both faculty and student consumer freedom. As Adam Smith advised in *Wealth of Nations*, “To widen the market and to narrow the competition, is always the interest of the dealers” (Smith, 1776/2000, p. 348). Models that focus on the regulation of cost better protect student consumers by at least helping students better anticipate expenses.

One example of such an institution-level policy is that of the University of British Columbia (UBC), whose faculty senate established that 1) the cost of tuition should also support the cost of course assessment, 2) an expectation that faculty should develop learning materials

within UBC-supported technologies like the Learning Management System, and 3) courses with required textbooks require the content of the textbook and not the specific textbook edition, enabling more access options for students (Hendricks, 2019). This model introduced a \$65 cost cap per 3-credit hour course where third-party vendors are utilized for the portion of the course assessment (with that portion not to exceed 20% regardless; Hendricks, 2019).

Another policy focusing on cost over format or distribution model would be one centered around the use of Open Educational Resources (OER). OER may be freely shared – in any format – and save students on average \$116.94 per course over traditional textbooks (Nyamweya, 2018). Faculty have reported OER to be the same or better quality than traditional textbooks (Hendricks et al., 2017; Stovall et al., 2019). Educators who employ openly licensed resources also enjoy the flexibility allowed by OER to retain, reuse, revise, remix, and redistribute the material (Wiley, n.d.). A focus on OER would allow for multiple formats and distribution models, while also providing low- to no-cost high quality alternatives for high-enrollment, General Education course areas.

RECOMMENDATION 2. Focus policy efforts on establishing guidelines and resources that assist faculty in the selection of low- and/or no-cost course materials. Guidelines may help faculty justify requiring students – or not requiring students – to purchase additional course materials. Guidelines may also relieve institutional or cultural pressure on faculty to require purchases for the sake of appearing consistent across multiple courses, only to have those materials go unused. Guidelines may also help faculty weigh the benefits of discounted, subscription-based digital materials against the need for students to retain materials as they progress through programs and beyond graduation. Subject librarians, instructional designers,

and teaching/learning centers can typically assist faculty in discovering and selecting materials that are either 1) freely available or 2) readily available via existing institutional collections and subscriptions (for which students already pay in part through tuition and fees). Below are three examples of alternatives to traditional, higher-cost course materials:

1. **Open Educational Resources (OER).** Openly-licensed, freely available OER are easily discoverable for lower-level, General Education courses. Usually in digital form, OER allow for unlimited printing and distribution, and students may retain contents in any form after the conclusion of a course. As subject matter experts, faculty come well-equipped to review, align, and adapt OER to their specific course learning outcomes.
2. **Learning Management System (LMS) functionalities.** Auto-graded quizzes, discussion boards, group assignments, links to external resources, peer review functionalities, etc. within an LMS can offer a replacement for proprietary publisher homework systems. Institutional and/or system resources may help faculty consider their goals for using existing publisher homework systems and how/whether those goals might be replicated using functionalities of the Learning Management System already provided by the institution.
3. **Library collections and subscriptions,** including articles, online scholarly journals, e-books, and videos, may be capable of fully replacing materials that students would otherwise have to purchase at an additional fee. Subject librarians can assist faculty in discovering materials that align with their course learning outcomes, and policy at the institution, system, and state levels can further encourage faculty to utilize such content where available.

RECOMMENDATION 3. Refine approach to *Inclusive Access* automatic billing programs.

When digital materials are truly discounted, meaningfully incorporated into a course, and not needed for reference after the duration of the semester, *Inclusive Access* has the potential to provide an efficient, Day One access option. Nonetheless, the program's current opt-in, automatic billing approach is unlikely to solve the fundamental lack of affordability that causes 68.5% of Tennessee community college students to delay or avoid purchasing course materials. Especially in cases where materials are "required" but then not used in a course, these additional costs needlessly contribute to the student debt that eventually affects life satisfaction and psychological well-being (Kim & Chatterjee, 2019). Given that only 10.1% of students in this study expressed a preference for digital materials, policymakers may consider ways to relegate *Inclusive Access* as but one of many options available to the student consumer:

1. Require automatic billing programs to be opt-in (rather than opt-out) in nature.

If materials are truly discounted – and those materials deemed worthy of purchase because they are meaningfully incorporated as part of the course– students will opt in. Vitez (2020) recommends that the opt-in mechanism be listed as one of many payment options available alongside credit cards, cash, etc., so that students maintain the choice as to how and whether they would like to pay for materials.

2. Increase transparency to the student consumer by providing faculty with model syllabus language that clearly outlines opt-out steps and whether/how opting out may impact the student's grade. Improved program communication between administration, faculty, and the students ultimately responsible for purchasing materials will help increase consumer transparency. Information regarding the *Inclusive Access* program, the program opt-out process, and ways to approach savvy

course material purchases can also be discussed during orientation, on the first day of class, and made available on institutional bookstore sites.

3. **Consider – and account for – hidden costs, and institute contractual price increase caps not to exceed the rate of inflation.** Prior to entering an automatic billing program agreement, decision-makers at institutions and/or systems should determine the additional workload involved for institutional stakeholders to facilitate the program and ensure that compensation for those hidden costs are incorporated as additional discounts or publisher/vendor services.

CONCLUSION

American educator Horace Mann once referred to education as “a great equalizer” and “the balance wheel of the social machinery.” The benefits of attending community college have shown to be especially pronounced for females, underserved populations, and younger generations entering the workforce (Belfield & Bailey, 2011). This dissertation has shown that, unfortunately, some of these same populations also experience the greatest risk when making the sacrifices required to pursue higher education. Because of the cost of course materials, students under 25 are at significantly higher risk of experiencing barriers to graduation. Similarly, low-income students have a significantly greater risk of delaying or not purchasing required course materials, earning poor grades, and failing or withdrawing from courses altogether.

The three articles comprising this dissertation have likewise revealed evidence toward an ideal solution, establishing that students are negatively impacted by course material costs, that automatic billing does not provide significantly improved outcomes, and that students are especially in need of printed materials in cases where retention of information is paramount.

Most promising is that the solutions to these barriers lie within the control of educational leaders willing to examine institutional practices, policies, and cultures. From faculty designing courses to those responsible for determining faculty incentives, each stakeholder has the potential to make adjustments that foster more equitable learning environments. The communities and taxpayers deserve as much, the continued success of the higher education enterprise itself hinges upon it, and this examination of problems, dynamics, and solutions will hopefully take us one step closer to accomplishing it.

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VITA

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