College Counseling in the Classroom: Randomized Evaluation of a Teacher-Based Approach to College Advising

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Abstract

Guidance counselors provide the main source of college advising for low-income high school students, but are woefully understaffed in high-need schools. This paper evaluates an approach to school-based college advising that relies on teachers rather than counselors. Using a randomized control trial in sixty-two Michigan high schools, I estimate the effects of a college planning course for high school seniors on postsecondary enrollment, persistence, and degree receipt. The course teaches about postsecondary education opportunities, application processes, and strategies for persisting toward a degree. I find no effect of the course on the number of students entering college, but an increase in the number persisting and earning a degree, particularly among low-income students. This is due to a shift in the composition of enrollees toward higher-achieving students: the course increases enrollment among high-achieving, low-income students, who have relatively high persistence rates, and reduces enrollment among low-achieving students, who in the course's absence would have enrolled and then quickly dropped out. The program's main cost is potential learning loss from displaced time in other subjects, which is difficult to measure but appears small.

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I. Introduction

The decision of whether and where to enroll in college is complex, with uncertain costs and returns that vary substantially across students, institutions, time, and field of study (Oreopoulos & Petronijevic, 2013; Stange, 2015; Altonji & Zimmerman, 2019; Andrews et al., 2022). High-income parents can help their children with this decision and the application process, but children from economically disadvantaged families, whose parent(s) may not have attended college or even graduated high school, must rely on in-school support typically provided by guidance counselors. Guidance counselors can be highly effective (Mulhern, 2022), but are woefully understaffed in high-need schools, often with student-counselor ratios on the order of 1000-to-1 (Executive Office of the President, 2014). As a result, many high-achieving students from economically disadvantaged families either do not enroll in college, or enroll in a less-selective and under-resourced college at which they have a greater probability of dropping out (Hoxby & Avery, 2013). At the same time, many low-achieving high school graduates armed with limited information about whether they will enjoy and succeed in college enroll to learn whether college is right for them, only to quickly drop out after realizing that it is not (Stange, 2012; Stinebrickner & Stinebrickner, 2012). Both of these phenomena contribute to the high college dropout rate in the U.S., particularly among children from economically disadvantaged families (Bailey & Dynarski, 2011; Denning et al., 2022).

Economists and education researchers have devised and evaluated interventions to help students navigate the complex college enrollment decision and application process. These seminal studies show large increases in college enrollment and/or degree completion from policies ranging from FAFSA assistance at H&R Block (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012), to application assistance provided in-school by current undergraduates (Carrell & Sacerdote, 2017), to intensive college advising provided outside of school through philanthropically-funded programs like The Bottom Line (Barr & Castleman, 2021; Castleman & Goodman, 2017; Castleman, Deutschlander, & Lohner, 2020). These interventions represent creative work-around solutions to a systemic failure of school-provided college advising for low-income students. However, they may face challenges to implement at scale, because they are either offered outside of school, require partnering with an outside organization, rely on non-school personnel, and/or require substantial increases in school funding. While hiring many high-quality counselors at disadvantaged schools might fix the problem on a more systemic level (Mulhern, 2022), such a solution is unlikely given the necessary increases in school funding.

This paper evaluates an approach to school-based college advising that relies on existing high school teachers, as opposed to counselors, and requires very little additional school funding. Specifically, I conduct a randomized control trial (RCT) in 62 Michigan high schools to estimate the effects of a college planning course for high school seniors on postsecondary enrollment, persistence, and degree receipt. The course teaches about two- and four-year postsecondary opportunities, benefits of attending college, costs and challenges of enrolling and persisting, and strategies to apply to and persist through college. The course is built into seniors' class schedules either as a new, stand-alone course, as part of homeroom or a senior advisory period, or by incorporating the curriculum into an existing class such as Senior English. I partner with the non-profit Michigan College Access Network (MCAN) to develop the course curriculum and materials, and with the Michigan Department of Education (MDE) for data access and assistance with project implementation. Course instructors participate in a one-day training by MCAN staff, and then implement the curriculum with no further assistance from MCAN or any other outside entity. After conducting a pilot of the course in five high schools in 2015-16, I implemented the fully rolled-out RCT among a sample of 62 (non-pilot) schools enrolling 6,704 seniors during 2016-17, allowing an examination of postsecondary enrollment, persistence, field of study, grades earned, and degree receipt through several years after the intervention.

To preview the results, I find that the course has no effect on the overall number of students enrolling in college, but increases the number persisting through college. Students in treated high schools are 2.5 percentage points (9 percent), more likely to persist to their third year of college, the farthest out in time that I can measure. This effect is driven by economically disadvantaged students, who are 2.7 percentage points (10 percent) more likely to persist to year two, and 3.5 points (18 percent) more likely to persist to year three. The zero impact on enrollment, but increase in persistence, can be explained by a reduction in enrollment among low-achieving students, as measured by baseline GPA and scores on the (mandatory) SAT, and an increase in enrollment among high-achieving students. High-achieving students (those with above median GPA and SAT scores) are nearly 3 percentage points (4 percent) more likely to enroll, and similarly more likely to persist to year two and three. The course reduces enrollment among low-achieving students by 4.4 points (9.5 percent), yet there is no decline in the number of such students persisting past the first year of college, suggesting that the marginal enrollees prevented from enrolling would have quickly dropped out in the absence of the course.

Splitting students by both economic disadvantage and baseline achievement, I find that the increases in enrollment among high-achieving students are concentrated among economically disadvantaged students: High-achieving, disadvantaged students at treated schools are 4 percentage points (6 percent) more likely to enroll, 6.6 points (13 percent) more likely to persist to year two, and 5.1 points (12 percent) more likely to persist to year three. The enrollment reduction among low-achieving students is concentrated among non-economically disadvantaged students: low-achieving, disadvantaged students see no enrollment decline, and, in-fact, experience increases in persistence, driven by increased rates of transfer from community colleges to four-year institutions. Turning to enrollment intensity and college major, I find that the course increased the fraction of high-achieving, disadvantaged students enrolling in college full-time and majoring in high-earning fields, such as STEM, business, and economics.

Finally, I examine the effects of the course on degree receipt. The course increases the fraction of students earning an Associate's degree by 1.5 percentage points (21%). This effect is driven by high-achieving, disadvantaged students, who see a 3.7 percentage point (39%) increase and high-achieving, non-disadvantaged students, who see a 3.2 percentage point (27%) increase. Given the timing of my data, I only observe Bachelor's degree receipt for students who graduate high school with no delay, enroll immediately in college, and earn their Bachelor's degree within four years – a feat accomplished by less than 9% of the control group (and less than 4% among economically disadvantaged students). I perhaps unsurprisingly find no effect of the course on this measure of Bachelor's degree receipt accomplished by only the very highest achievers.

While it is too early to rigorously examine Bachelor's degree receipt, researchers have found substantial earnings returns to receiving an Associate's degree (e.g., Jepsen, Troske, & Coomes, 2014; Kane & Rouse, 1995). Thus, the benefits of the course in terms of increased earnings likely outweigh the minimal financial costs of the program, even with no increase in Bachelor's degree receipt. The course requires very little additional school funding, given that schools almost exclusively used existing teachers to staff the course. The course's main cost is displaced learning time in other subjects. Unfortunately, learning during twelfth grade is difficult to assess given that state tests are implemented during junior year. However, two facts suggest any such learning loss may be small. First, a concerning symptom of lost learning in other subjects would be if students have lower persistence rates or perform worse in their college classes. There is no evidence that this is the case: the course boosts persistence rates, and treated and control students have similar grades. Second, the teachers whose class time was displaced by the course would likely be the most vocal about this issue. But, in a final survey of course instructors – most often English teachers who had incorporated the course into Senior English – there was near-universal satisfaction with the course, and little concern about lost learning time in other subjects.[1] Ultimately, I cannot convincingly measure the cost of lost learning time, and so the benefits of the course in terms of postsecondary enrollment, persistence, and degree receipt can be thought of as "net" of any such learning loss.

This paper contributes to two related economics literatures. The first examines strategies to boost college enrollment and persistence by providing students with information and assistance. This literature tends to categorize interventions into the previously described "boots-on-the-ground" strategies versus extremely "light-touch" interventions, such as text-message campaigns and mailings. The appeal of these light-touch strategies is that they are easy to scale and very inexpensive. However, while some such interventions have found small, cost-effective increases in college entry and persistence (Hoxby & Turner, 2013; Castleman & Page, 2015; Barr & Turner, 2018; Page & Gelbach, 2017), many have not (Bettinger et al., 2012; Bergman, Denning, & Manoli, 2019; Bird, Castleman, Denning, Goodman, & Lamberton, and Rosinger, 2021; Phillips & Reber, 2022; Hyman, 2020). The college planning course combines the advantages of the two types of interventions by using a boots-on-the-ground, in-person approach, but with the scalability and small financial costs of the lightest-touch information interventions.

The closest paper to this one is Oreopoulos and Ford (2019) who implement a series of three workshops throughout senior year in which students in Canada learn about and receive assistance applying to college. They find promising impacts on enrollment, but due to data limitations the authors cannot examine effects on persistence. My paper extends Oreopoulos and Ford (2019) to examine a more intensive intervention that is set in the U.S, and for which I can evaluate effects on college persistence and degree receipt.

[1] For example, one survey question asked to what extent the instructor felt the course was displacing more valuable instruction in another course, or time spent on other learning or activities. On a scale from "1" to "5", where "1" was not at all and "5" was very much so, the majority of instructors responded a "1", and the mean was a 1.8.

The second literature studies the option value of schooling as a model of the college enrollment and dropout decision (Stange, 2012; Stinebrickner & Stinebrickner, 2012). Given limited information about whether they will enjoy and succeed in college, some high school graduates make the rational decision to enroll for the option value of continuing in college, but quickly drop out after learning more about college and their ability. These students are ex-ante better off enrolling, but ex-post better off having never enrolled. The college planning course reducing the number of low-achieving students enrolling in college, but not the number persisting past the first year, is consistent with this model, suggesting that the course helped alleviate information problems for these students prior to them entering college. This finding can also help interpret the results of recent studies showing a null effect of light-touch information interventions (Bettinger et al., 2012; Bergman et al, 2019; Bird et al., 2021; Phillips & Reber, 2022; Hyman, 2020). One explanation for the null result is that while the interventions may have boosted enrollment for some students, the interventions may also have reduced enrollment for others by helping them learn prior to college entry that they would be likely to drop out.

This study comes with several caveats and issues to consider when evaluating program scale-up. First, although the earnings benefits from the increases in Associate's degrees likely outweigh the minimal financial costs of the course, it is difficult to estimate earnings returns without observing effects on Bachelor's degree receipt. The increased persistence and transfer from community colleges to four-year institutions suggest there may be possible increases, but greater Associate's degree receipt could also crowd out future Bachelor's degrees. Second, while the financial cost of program scale-up is small, the one-day teacher training is a non-trivial cost, and a small share of the course curriculum that is Michigan-specific (e.g., the community college to four-year institution transfer process) would have to be adjusted. Third, when considering scale up and generalizability, it is possible the schools that volunteered to participate were those that anticipated the greatest benefit. Finally, on a more positive note, one additional benefit of the program could be that removing college advising from overburdened high school counselors would allow them to devote more time toward other important topics like mental health and current academic challenges. While caution is prudent in generalizing this paper's results to a widespread expansion of the policy, the college planning course represents a promising alternative for schools seeking greater postsecondary outcomes, but without the funds to hire additional counselors nor the capacity to partner with outside organizations.

II. The Intervention

I implement and evaluate a college planning course that takes place over the approximately eighteen weeks of a typical public high school fall semester (early September through mid-January). The 31 treatment schools in this project were randomly assigned to offer the course during the fall 2016 semester. In this section, I describe the structure and content of the course. In Section IV, I describe the randomized control trial design and implementation.

To encourage school participation and to increase scalability, schools were allowed substantial flexibility in how they structured the course. For example, the number and length of class sessions each week were left to each school's discretion, though schools were asked to have the course meet twice or more per week for a minimum of 90 total minutes per week. Over half of treated schools decided that the most feasible way to fit the course into the senior schedule was to incorporate the course curriculum into Senior English (43% of schools) or another course that was part of the existing twelfth grade schedule (11%), such as Senior Finance (see Figure Ia). Another 21% of the schools held the course during homeroom or a senior advisory period. The remaining 25% of schools created a new stand-alone course that they added to the senior schedule. Among these schools, the mean number of course contact hours per week was just over two and half hours, well over the suggested 90-minute minimum.[2]

Schools chose which students enroll in the course, but were told they must enroll at least half of their grade 12 students. In practice, 63 percent of seniors across all treated schools were enrolled in the course. However, there was substantial heterogeneity: seven of the 31 treated schools offered it to fewer than 50 percent of their seniors, while four schools offered it to greater than 90 percent of their seniors. Based on principal survey responses, schools' strategies for choosing who to enroll in the course were varied: many schools enrolled all students who were taking a particular course, such as Senior Honors English. One school invited students who considered themselves "college-bound," as well as by teacher and parent requests. Another school invited the top 100 seniors ranked by GPA. Many schools simply offered the course to all seniors and let those enroll who wanted to and who could fit it into their schedule. As explained further in Section IV, I focus on the Intent-to-Treat (ITT) effect of the course for all seniors in treated schools, regardless of whether a student enrolled in the course. I view the variation in

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[2] I do not know the contact hours for the other schools, because I do not observe what fraction of time in Senior English (for example) was spent covering English curriculum versus the college planning curriculum.

schools' decisions about who to enroll as a feature of this study, not a bug: allowing schools this flexibility should help with scalability, and the ITT estimate captures the effect of the course accounting for this wide array of schools' possible choices about who to enroll, which may help with external validity.

Schools were allowed to choose whether the course was graded or ungraded (e.g., pass/fail), though I encouraged schools to grade the course to maximize the chance that students would engage seriously with the course material. Essentially all but the 21% of schools that held the course during homeroom or a senior advisory period opted to offer the course as graded. The schools that embedded the course curriculum into their senior English class typically included the college planning material in the English course grade.

Schools were asked to cap class sizes at or as close to 25 as possible, though I recognized that this would not be feasible for some of the larger, more disadvantaged schools. Figure Ib shows a cumulative distribution function of class size across class sections, noting that most schools had multiple class sections of the course. About two-thirds of class sections kept at or near the 25-student limit, while about a third of the sections had larger enrollments in the upper-20s to mid-30s. One school had 44 students in their college planning course. In communications with school staff, it appeared that the larger class sizes were not due to a lack of prioritizing the college planning course, but rather reflected the grim reality of the student / staffing ratios at these schools.

Principals were instructed to choose instructors from existing teachers, counselors, or other staff at the school. In practice, English teachers were the most common choice of instructor (53%), followed by other types of teachers (28%), with Social Studies being the most common after English (see Figure Ic). Only seven percent of course instructors were counselors. Thirteen percent of instructors were other non-teacher, non-counselor staff and administrators, such as a "Dean of Students," "Special Services Coordinator," or "Intervention Officer." Based on principal survey responses, some factors that went into the decision of who to teach the course were who had good knowledge about college application issues (this was often the English teachers), who the principal felt was well-liked by students and could effectively teach the material, and who had an available slot in their schedule.

All instructors participated in one 8-hour training covering pedagogy and curriculum. The training was offered in person on a Saturday during June 2016. It was offered on three separate

Saturdays around the state to make it easier for instructors to attend. A make-up session was held in Lansing, which is centrally located in Michigan, during late August 2016 for any instructors that were unable to attend one of the June sessions. All treated schools that offered the course had at least one instructor attend a training. A sample training agenda is included as Appendix Figure I.

The course structure mirrors the college application timeline that unfolds from September through January of senior year. Weeks 1 through 4 focus on explaining about the costs and benefits of attending college, different types of colleges, the basic steps necessary for applying to college, career exploration, resume building, and identifying admissions requirements. Weeks 5 through 11 guide students through the college application process in time to meet typical priority/early consideration deadlines, providing support to complete essential components of the college application with the goal of submitting at least three college applications (one reach, one safety, and one match).[3] Weeks 12 through 18 cover budgeting and managing finances in college, searching and applying for financial aid, and final steps needed for enrollment and success during the first year and beyond, including accepting an offer of admission, registering for orientation and placement exams, choosing a smart first-year course schedule, and deciding on a college major. While much of the course curriculum focused on traditional application steps to four-year colleges, the curriculum emphasized community college enrollment as well, and taught about the process of transferring from community to four-year colleges in Michigan. To increase scalability, a goal of the course curriculum was for it to be portable across states, with only a few necessary changes to specific content areas (for example, the community college to four-year college transfer process). See Appendix Figure II for a more detailed course outline.

To develop the course curriculum, I partnered with the Michigan College Access Network (MCAN), a non-profit focusing on increasing postsecondary access and success in Michigan. MCAN took nearly full responsibility for developing the curriculum, with feedback from MDE staff and myself. Neither MCAN nor their national network had previously offered an intervention similar to this college planning course. Thus, MCAN staff essentially developed the course curriculum from scratch, though certainly a large part of the development process consisted of collecting existing content from their prior work and other sources, and assembling

[3] Teachers worked with qualifying students to apply for application fee waivers. Fee waivers were not provided as part of the course, so middle- and high-income students had to pay the application fees themselves.

it into a coherent curriculum for use during the 12th grade fall semester. MCAN staff provided course instructors with all components necessary for implementation of the course, such as curriculum, lesson plans, class handouts, and assignments. An example lesson plan for "Lesson 2: Match and Fit" is attached as Appendix Figure III. An example class handout on the FAFSA completion process is attached as Appendix Figure IV.[4]

III. Data

III.A Data Sources

This project's main data sources are administrative microdata owned by the Michigan Department of Education (MDE) and Michigan's Center for Educational Performance and Information (CEPI). Postsecondary enrollment and degree receipt data come from the National Student Clearinghouse (NSC), which contains information on almost all undergraduates nationwide.[5] The NSC provides information on when students are enrolled in college, and where students enroll, enabling a match to data from the Integrated Postsecondary Education Data System (IPEDS) to obtain information on college sector and selectivity. The NSC also provides information on whether students are enrolled full-time or part-time, and whether and when they earn a postsecondary degree.

The second source of postsecondary information is Michigan's Student Transcript and Academic Record Repository (STARR). STARR provides transcript data for all Michigan two- and four-year public colleges and universities. 83% of the students in my sample who attend postsecondary schooling do so at an in-state public institution.[6] For these students, STARR provides more detailed information than is available in the NSC, such as students' grades and declared major.

Information on student characteristics and enrollment during grade 12 come from the Michigan Student Data System (MSDS), which identifies the school in which a student is enrolled, as well as key demographics such as sex, race, and eligibility for free or reduced-price

[4] Note the prominent disclaimer at the bottom of course materials stating that the materials are the property of MCAN and cannot be used without their permission. We included this because I was concerned that control schools would get their hands on the materials and offer the curriculum during fall 2016 in spite of a being assigned to offer it during fall 2017. To my knowledge, no control school defied their assigned treatment status in this way.
[5] Please see Dynarski, Hemelt, and Hyman (2015) for a detailed description of the NSC, its matching process, and coverage rates.
[6] I examine whether treatment affects this percentage in section V.D.

lunch. It also contains students' cumulative high school grade point average (GPA), attendance rates, performance on state standardized tests, and performance on the SAT college entrance exam, which was mandatory and provided in-school for free for students in this cohort.

In addition to the administrative data, I implemented various surveys to gather qualitative data on the student, instructor, and principal experience with the course. While critical to understand and improve the fidelity of the project and course implementation throughout the life of this project, these data are less central to the evaluation of the effects of the course on postsecondary outcomes, and so I only briefly describe these survey data. Please see the online appendix for more details about these surveys.

Prior to implementing the randomized control trial (RCT) in 2016-17, I ran a pilot of the course during fall 2015 in five high schools. See Appendix Table 1 for characteristics of these schools. During the pilot, I implemented monthly student and instructor surveys to measure course usability, feasibility, and fidelity of implementation. Students and instructors were generally positive, but also provided helpful criticisms leading to improvements to the course curriculum and implementation process before rolling out the RCT in fall 2016. To assess the instructor, student, and principal experience with the course during the RCT, I conducted mid-semester and end-of-semester instructor surveys, as well as end-of-semester course evaluation to students, and a final survey of principals after the course had concluded. Overall, students, instructors, and principals were quite positive about all aspects of the course.

In addition to these surveys inquiring about the course experience, we also implemented brief student surveys to seniors in treatment and control schools during February and May 2017 (the spring after the course was offered in treated schools), asking about college knowledge, FAFSA submission, college applications, and college acceptances. Unfortunately, while we aimed for near universal take-up, we ended up with valid survey responses from only 76% of seniors. More troubling than the 76% response rate is that the response rate differed by treatment status: seniors from control group schools were 6.4 percentage points more likely to respond.[7] Given the response-rate issues with these student survey data, I only briefly mention some results from these data in Section V.D, and present a full table of results in Appendix Table 9.

[7] This differential response is likely because control group schools were required to participate in the survey in order to offer the course in fall 2017, while the treatment schools had already completed the course.

III.B Sample Summary Statistics

Table 1 shows sample means for pre-treatment characteristics of grade 12 students and their schools during 2016-17 in the entire state of Michigan (column 1) and the experimental sample (column 2). In the next section, I discuss columns 3, 4, and 5, which show means by treatment status, and test for balance. For a complete list of schools by treatment status, along with their baseline characteristics, see Appendix Tables 2 and 3.

The 6,704 students and 62 schools in the experimental sample are more economically disadvantaged, racially diverse, and lower-achieving than the Michigan population. 53% of the sample is economically disadvantaged (proxied for by eligibility for free or reduced-price lunch), compared to 39% of all Michigan 12th graders. The experimental sample is 56% white (non-Hispanic) and 36% black (non-Hispanic), compared to 71% and 18%, respectively among the population. Only 8 and 10% of the sample and Michigan population, respectively, are another race (e.g., Asian, American Indian) or identify as Hispanic. Students in the experimental sample are somewhat more likely to attend school in a city (23%), town (18%), or rural area (27%), and substantially less likely to attend school in a suburban area (33%) as compared to the Michigan population. To help illustrate the geographic dispersion of schools, Figure II shows a Michigan map with treatment and control schools represented by blue- and maize-colored markers, respectively. The sample schools are spread throughout the state, including several schools in the (rural) Upper Peninsula. Four percent of students in the sample attend a charter school, compared to 7% overall in Michigan. Finally, the sample schools are smaller than in the population, with the mean grade 12 enrollment for students in the experimental sample of 170 compared to 248 among the population.[8]

Among the entire Michigan population, 53% of grade 12 seniors during 2015-16 enrolled in college in fall 2016, while 33% did so at a four-year college.[9] These rates are lower for the experimental sample: only 43% enrolled in college, and 24% did so at four-year colleges. The experimental sample is also lower achieving in high school than the Michigan population, by SAT score (917 compared to 996), 8th grade test scores (25% of a standard deviation below the

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[8] All of the means in Table 1 and discussed here are student-weighted, including for the school characteristics. The school-weighted mean grade 12 enrollments in the RCT sample and Michigan school population are 108 and 141, respectively.

[9] While all the other pre-treatment information in Table 1 is for seniors during 2016-17, the baseline college enrollment information is for seniors during 2015-16 who enroll in college in fall 2016.

mean 8th grade score, compared to 5% of a standard deviation above the mean), and grade 10 GPA (2.49 compared to 2.59). Their grade 11 attendance rate is nearly identical (92% of school days attended compared to 93%).

IV. Methodology

I evaluate the impacts of the college planning course on students' postsecondary outcomes using a school-level randomized control trial (RCT). Half of the 62 participating high schools, the treated group, were randomly assigned to enroll a portion of their grade 12 students in the college planning course during Fall 2016. The other half of schools, the control group, did not offer the college application course in Fall 2016, but instead offered it in Fall 2017.[10] A comparison of the postsecondary outcomes of seniors during 2016-17 across treated and control schools provides the causal effect of a school offering the course. Specifically, I use the following specification to estimate the intent-to-treat (ITT) impact of the course on student outcomes:

$$Y_{is} = \beta_0 + \beta_1 COURSE_s + \beta_2 X_{is} + \delta_s + \epsilon_{is} \tag{1}$$

where Y_{is} is a postsecondary outcome of student *i* in school *s*, $COURSE_s$ is a binary variable that represents whether school *s* was assigned to offer the course in Fall 2016, X_{is} is a vector of student- and school-level characteristics included to increase statistical precision,[11] and ϵ_{is} is the error term, which I cluster at the school level. β_1 provides the causal effect on Y of being in a school that offers the college planning course.

To attain maximum statistical precision with the school-level randomization, I used a pairwise block design to randomly assign schools to treatment status (Raudenbush, et al. 2007; Bloom, 2005). I estimated a predicted college enrollment rate for each high school based on a quadratic trend in the fraction of seniors who enrolled in postsecondary education considering

[10] Randomly assigning *when* as opposed to *whether* schools were offered the course was more politically acceptable to the Michigan Department of Education, and helped with recruiting schools.

[11] The student-level covariates are: dummies for female, economically disadvantaged, Black, Hispanic, and other race, as well as 8th grade test score, 11th grade SAT score, cumulative GPA as of 10th grade, and 11th grade attendance rate. Note that students' GPA is as of 10th grade, because MDE stopped collecting transcript data used for the GPA calculation as of 2015-16, when these students were in grade 11. The school-level covariates are: dummies for suburban, town, rural, and charter, as well as the number of grade 12 students, fraction of 2015-16 seniors enrolled in any college in fall 2016, and fraction enrolled in a four-year college.

the five years prior to random assignment.[12] I sorted schools by this predicted enrollment rate, grouped schools into pairs, and assigned treatment status within each pair. This strategy minimizes the chance of differences across treatment and control in the pre-treatment outcome and maximizes statistical precision, so long as prior school-level college enrollment rates are highly predictive of current rates (which they are in my sample). The δ_s in Equation (1) is the randomization block (i.e., pair) fixed effect, which is necessary to include, given that randomization is conducted within block.

Although randomly assigning students to the intervention within schools would increase statistical precision, I chose a school-level design for two reasons. First, it would have been more logistically and politically challenging to implement student-level randomization. Second, with a student-level randomization, spillovers could occur in which treated students share their increased college knowledge with control students, attenuating the estimated effects of the course. These spillovers between participating and non-participating students within a school are a desired aspect of the treatment that I want to capture as part of the treatment effect.

These potential spillovers are also a main reason why I focus on the ITT estimate of the course. Because not all seniors in the treated schools will participate in the course, Equation (1) estimates an ITT estimate of the effect of being in a high school that is randomly assigned to offer the college planning course, rather than the effect of actually taking the course. This ITT effect combines the effect for students who take the course and the effect for students who do not. The ITT estimate is the ideal parameter in this context for two reasons. First, as mentioned above, any spillover effects experienced by non-enrolled students receiving assistance from enrolled students, or experiencing any general increases in college-going culture in the school due to the course, is an important part of the school-level treatment included in the ITT parameter. Second, the ITT estimate is the parameter of policy interest, as it arguably reflects the likely real-world situation where the course is made available to a high school, but not forced upon every student.

Randomization worked well and student and school characteristics are generally balanced across treated and control schools. Table 1, columns 3 and 4 show sample means by treatment status. Column 5 shows regression-adjusted differences, reporting the coefficient on *COURSE*,

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[12] For the small subset of schools in my sample that were established within the five years prior to randomization, I used the trend in postsecondary enrollment over the years that the school had been in operation.

and its standard error, from a regression of each characteristic on *COURSE* and the randomization block fixed effects, clustering the standard error at the school level. Looking to column 5, only two of the nineteen characteristics in Table 1 are statistically significant: students in treated schools are slightly less likely to be female, and are substantially more likely to live in a suburban area. There are no statistically significant differences in baseline college-going rates, SAT scores, 8th grade test scores, grade 11 GPA, and grade 11 attendance rates. If anything, the coefficients on all of these baseline achievement and college-going outcomes are negative, which is the opposite direction we would expect if we were concerned about the greater propensity for treated schools to be in suburban areas that tend to enroll higher-achieving students.

V. Results

V.A Effects on Enrollment and Persistence

I begin by examining whether the college planning course impacts students' enrollment and persistence through college. The postsecondary data extends through four academic years after the experiment (i.e., through 2020-21), allowing a relatively long window in which to observe whether students ever enroll in postsecondary schooling. Examining persistence through college, however, requires me to shorten the period over which I examine initial enrollment. For example, to examine whether a student persists to their second year of college, I create a dummy equal to one if a student initially enrolls in college during the first three academic years after the experiment, and is still enrolled during the academic year after they initially enroll. For persistence to year three, I create a dummy equal to one if a student enrolls within the first two years after the experiment, and is still enrolled as of two academic years after the initial college entry year. I restrict my examination of college persistence to through three years after initial college entry in order to allow students at least two years after the experiment to enter college.[13] Note that this analysis does not condition on enrolling, i.e., the sample is not restricted to those who enroll – rather I examine dependent variables that are dummies equal to one if the student enrolls and persists to the relevant year.

[13] Examining persistence beyond year three would require focusing on only those students who enroll immediately after the experiment, missing students who take an additional year to graduate high school or students who take a "gap-year" before enrolling.

I find a fairly precisely estimated zero effect of the course on college enrollment (Table 2, column 1, row 1). The coefficient is -0.007 (SE=0.014), allowing me to rule out an increase of about 2 percentage points with 95% confidence. Interestingly, the point estimate grows as I examine persistence through college. The (insignificant) point estimate is 1.4 for enrolling and persisting to year 2, and is a marginally significant 2.5 percentage points for enrolling and persisting to year 3 (SE=1.3). This represents an 8.5% increase in enrolling and persisting through three years of postsecondary schooling, given the control mean of 29.4%.

This pattern of results is driven by economically disadvantaged (ED) students, as measured using eligibility for free or reduced-price lunch (Table 2, column 2). These students see no enrollment effect, but a statistically significant 2.7 percentage point (SE=1.3), or 9.7%, increase in the probability of enrolling and persisting to year 2, and 3.5 percentage point (SE=1.1), or 17.7%, increase in enrolling and persisting to year 3. The point estimates for not economically disadvantaged students (Table 2, column 3) also grow somewhat from enrollment to persistence but are smaller in magnitude and statistically insignificant.

As another way to illustrate effects of the course on college enrollment and persistence, I plot in Figure IIIa enrollment and persistence rates for the control group and treatment groups by semester. For example, the first square marker plots the control group mean of enrolling in at least one semester of postsecondary schooling during the four years after the experiment (equivalent to the college enrollment measure used in Table 2, row 1). The subsequent square markers plot control group means for enrolling in at least two semesters, at least three semesters, through enrolling in at least six semesters of college. I then add the estimated treatment effect to the control mean to show the predicted outcome for the treatment group (circular markers), along with whiskers representing the 90% confidence interval.

Figure IIIa shows a declining rate of enrollment across semesters among the control group, from nearly 57% enrolling in at least one semester to just below 30% in at least six semesters. The treatment group experiences a slightly smaller rate of descent, with an approximately two percentage point greater fraction enrolling and persisting through at least five or six semesters. Figure IIIb shows the effects among economically disadvantaged students. The control group drops from 50% ever enrolling to less than 20% enrolling in at least six semesters. The treatment group, while seeing no difference in initial enrollment, sees a statistically significant difference of more than three percentage points emerge by semester three. This effect remains between 2 and 3 points for at least four through six semesters. Similar to the effects shown in Table 2, there is no effect on enrollment or persistence for not economically disadvantaged students.

In the following sections, I explore several possible explanations for why the college planning course has no effects on the number of students enrolling in college, but increases the number persisting through college. First, the course may shift the composition of who enrolls toward higher-achieving students who are more likely to persist. Second, the course may change where students enroll, shifting students toward institutions where they are more likely to persist. Third, the course might increase the intensity with which students enroll (i.e., from part-time to full-time). Fourth, the course teaches about strategies to succeed in college, which may translate into students earning higher grades. Finally, the course might increase "college knowledge", which could help students navigate the logistical and administrative hurdles that prevent some students from persisting.

V.B Effects by Baseline College-Readiness

The first explanation that I explore is that by teaching students about the benefits of college, but also about the costs and challenges associated with enrolling and persisting, the course may have increased enrollment among some groups and decreased enrollment among others. Specifically, I examine whether the course increases the enrollment of more academically prepared students, who have a higher likelihood of persisting through college, but may previously have been unaware of the benefits of college or otherwise faced some information barrier dismantled by the course. I also examine whether the course decreases enrollment among less academically prepared students. These students have a higher likelihood of dropping out, but in the absence of the course may have been unaware of the high level of college dropout rates and their likelihood of success. Given incomplete information, the optimal decision for many marginal college students is to enroll to obtain the option value of continuing in college, i.e., to learn about whether college is right for them, even though many will quickly drop-out after learning that it is not (Stange, 2012; Stinebrickner & Stinebrickner, 2012). By increasing information for these students prior to enrolling, the course may prevent some of them from enrolling and quickly dropping out.

I test this explanation using students' baseline high school GPA and SAT scores. I measure GPA prior to grade 12 to avoid any possible effects of the course on contemporaneous GPA during senior year. The SAT was required for all students as part of the 11th grade test students take for accountability purposes. I categorize students as high-achieving if they have an above median GPA and SAT score, estimated among all Michigan twelfth-graders. Students are considered low-achieving if they have either a below median GPA or below median SAT score. Column 4 in Table 2 shows that low-achieving students were 4.4 percentage points (SE=1.9), or 9.5%, less likely to enroll in college. High-achieving students were 2.9 percentage points (SE=1.3), or 4% more likely to enroll (Table 2, column 5). These results suggest that the college planning course caused an upward shift in the achievement level of college enrollees by reducing the number of low-achieving students and increasing the number of high-achieving students.

Turning to effects on persistence by baseline achievement, there is zero effect on enrollment and persistence to year two (-0.4 percentage points, SE=1.6) or year three (1.2 percentage points, SE=1.3) among low-achieving students, in spite of the large reduction in enrollment. This suggests that, consistent with the aforementioned hypothesis about incomplete information and the option value of enrolling in college, the marginal low-achieving students who the course prevented from enrolling, would have quickly dropped out in the absence of the course. On the other hand, the marginal high-achieving students induced into college by the course persisted through college: the course caused a 3.8 percentage point (SE=1.9), or 6.7%, increase in enrolling and persisting to year two among high-achieving students, and marginally significant 3.6 percentage point (SE=2.1), or 7.3%, increase in enrolling and persisting to year three. This pattern of results for enrollment and persistence by baseline student achievement helps explain the null enrollment effect, but positive persistence effect, observed for the entire sample.

Figures IIId and IIIe visually illustrates these results. Low-achieving students in treated schools are less likely than their control group counterparts to enroll, but have a lower dropout rate into semesters two and three, leading to an identical rate of enrolling in at least three or more semesters. High-achieving students in the treatment group are more likely to enroll than control group students, and this effect persists and even grows across semesters, with treatment group students seeing significant effects across every semester.

Given sheepskin effects in higher education (Jaeger & Page, 1996), an important concern is whether the course increases postsecondary degree receipt in addition to persistence through college. Given the timing of my data, I can observe Bachelor's degree receipt only for those students who: a) graduate high school on time, b) immediately enroll in college, and c) earn a Bachelor's degree within four years. Only 9 percent of the control group accomplish this feat. I find no statistically significant effect of the course on this highly-selective measure of Bachelor's degree receipt (Table 2, column 1, bottom row), which is perhaps unsurprising, and suggests that the course is not affecting students operating at this highest margin of postsecondary success.

Four years after the experiment, however, provides ample time to examine whether the course affects students' likelihood of earning an Associate's degree – the terminal degree at community colleges, which are the most common postsecondary choice for economically disadvantaged students and low-achieving students in my sample. In Panel B of Table 2, I find that the college planning course increases the likelihood that students earn an Associate's degree by 1.5 percentage points (SE=0.7 points), or 21 percent. This effect is driven by a 3.7 percentage point increase in Associate's degree receipt among high-achieving students (SE=1.0), representing a dramatic 39% increase. Economically disadvantaged students, in spite of the significant increase in persisting through college, see no significant increase in Associate's degree receipt.

Given that the effect of the course on college persistence is driven by economically disadvantaged students, I next explore whether we see the same pattern of effects by baseline achievement among economically disadvantaged students. Put another way, it would be helpful to know whether the differential effects by achievement are experienced equally by student economic advantage. Table 3 splits the sample by the interaction of achievement and economic disadvantage. While splitting the sample into four groups – low-achieving, disadvantaged; high-achieving, disadvantaged; low-achieving, not disadvantaged; and high-achieving, not disadvantaged – reduces statistical power, doing so is particularly important given the importance of boosting the postsecondary attainment rates of high-achieving, economically disadvantaged students (Hoxby and Turner, 2013).

With the caveat that these results are less precise than in the prior analysis, I find a marginally significant 4.0 percentage point (SE=2.3), or 5.7%, increase in enrollment among high-achieving, economically disadvantaged students (Table 3, column 3). I find a smaller and statistically insignificant increase (2.1 percentage points; SE=1.6) among high-achieving, non-disadvantaged students (column 5). There is a large enrollment reduction (6 percentage points; SE=2.5) among low-achieving, non-disadvantaged students (column 4), and a statistically insignificant 3 percentage point decline (SE=2.2) among low-achieving, disadvantaged students. In summary, the results split by these four subgroups support the hypothesis that the increase in persistence among economically disadvantaged students can be explained by the upward shift in enrollee achievement, with lower enrollment among low-achieving, disadvantaged students, and greater enrollment among high-achieving, disadvantaged students. At the same time, the increased enrollment among high-achieving students seems to be concentrated among disadvantaged students, while the reduced enrollment among low-achieving students appears to be concentrated among non-disadvantaged students.

Turning to persistence, the positive enrollment effect among high-achieving, disadvantaged students does not attenuate, and, if anything, appears to grow over time. For example, while these students are 4.0 percentage point (SE=2.3), or 5.7%, more likely to enroll, they are 6.6 percentage points (SE=2.3), or 13%, more likely to enroll and persist to year two, and 5.1 points (SE=2.5), or 12.1%, more likely to enroll and persist to year three. These students also experience a large (39%) increase in Associate's degree receipt (3.7 percentage points, SE=1.2). As seen with the effects on persistence for low-achieving students in Table 2, any low-achieving, disadvantaged students choosing not to enroll due to the course would have likely dropped out quickly in the absence of the course: the 3 percentage point enrollment decline turns positive for persistence to year 2, and positive and statistically significant for year 3 (3.1 points, SE=1.2). Not only do the marginal enrollees persist at a higher rate, but the course also appears to increase the persistence rate of the inframarginal low-achieving, disadvantaged student. However, they do not see an increase in Associate's degree receipt; the zero effect on Associate's degree receipt for disadvantaged students observed in Table 2, column 2, in spite of the large increase in persistence to year three, is driven by the low-achieving, disadvantaged students.

The pattern of results for low-achieving, non-disadvantaged students is similar to the low-achieving, disadvantaged students, in that the large 6 percentage point drop in enrollment among this group becomes attenuated and statistically insignificant for persistence. While it remains negative, the insignificant effects on persistence and Associate's degree receipt suggest that the course reduces the number of these students enrolling in college, but not the number of students persisting through college.

Figure IV shows the results by these four subgroups visually. Low-achieving, disadvantaged students (Figure IVa) are 3 percentage points less likely to enroll than control group students, but are 2.8 and 1.5 percentage points more likely to enroll in at least five semesters and at least six semesters, respectively. High-achieving, disadvantaged students (Figure IVb) are consistently more likely to enroll and persist, relative to control group students, with all but one of the point estimates (semester two) statistically significant at the 10% level. The same pattern emerges for the high-achieving, not disadvantaged students, though the differences are smaller and less precise. Finally, among low-achieving, non-disadvantaged students, there are large declines in initial enrollment and enrolling in at least two semesters, but the declines dissipate in semesters 3 and 4, and becomes near zero by semesters 5 and 6.

V.C Effects on College Choice and Match

Another channel through which the college planning course could increase persistence is by affecting where students enroll. Persistence rates vary dramatically across institutions, with the increased college drop-out rate and slowing time-to-degree in the U.S. over the last few decades due in part to differences across colleges in characteristics such as instructor quality, resources for student support, and peer effects (Bound, Lovenheim, & Turner, 2013).

I report effects on enrollment by college type in Table 4. The three mutually exclusive and collectively exhaustive dependent variables reported here are indicators for: 1) whether a student enrolls *only* in a four-year institution or institutions during the four years after the experiment, 2) whether a student enrolls *only* in a two-year institution or institutions during that period, and, 3) whether a student enrolls in both, which typically represents students transferring from a community college to a four-year institution. The college planning course increases the fraction of students enrolling in both a two-year and four-year institution by 2.1 percentage points (SE=0.5), or 27%. Drilling into the four subgroups by prior achievement and economic disadvantage, we see that this effect is concentrated among low-achieving, economically disadvantaged students who experience a 3.2 percentage point (SE=0.9) increase.[14] This

[14] From here on I present results for the whole sample and by the four subgroups of economic disadvantage interacted with achievement (e.g., high achieving, economically disadvantaged students). See Appendix Tables 4

represents a near doubling of the enrollment rate in both a two- and four-year college among this group (CM=3.4). These students also see a large reduction in the fraction of students enrolling only in a two-year college (4.3 points, SE=1.5). Thus, it appears that the college planning course causes a substantial fraction of low-achieving, disadvantaged students who in the absence of the course would have enrolled only in community college to instead successfully transition from a community college to a four-year institution.

Recall from Table 3 that this group saw a 3.1 percentage point (SE=1.2) increase in enrollment and persistence to year three, but no increase in Associate's degree receipt. The increase in the rate of transfer from community college to a four-year institution may explain the null effect on Associate's degree receipt, because while transferring to a four-year college will appear as increased persistence through college, students typically forego earning their Associate's degree when they transfer to a four-year institution (NSC Research Center, 2015).

In addition to heterogeneity by college type, the match between student and college is also important: low-income students who "undermatch" to colleges that are less selective than the students' are qualified to attend are more likely to dropout than students who enroll in a "match" or "reach" college, which will typically have more resources and student support (Hoxby & Avery, 2013; Hoxby & Turner, 2013). I next examine the effect of the college planning course on the match between student academic preparation and college quality. I consider a "safety" college for a student to be either a two-year college, regardless of a student's SAT score, or a four-year college where the student's SAT score is above the 75th percentile of enrolled students at that school (taken from IPEDS). I consider a "match" college to be a four-year institution where the students' SAT score is between the 25th and 75th percentile at the college. Finally, I consider a "reach" school one where the student's SAT score is below the 25th percentile at the school.

The college planning course increases the fraction of students who during the four years after the experiment enroll in *both* a safety and non-safety (either a match or reach) college by 2.8 percentage points (SE=0.9). There is a similar-sized, though imprecise decrease in the fraction of student who enroll *only* in a a safety college (2.4 points, SE=1.5). As seen with college choice, this suggests that students who in the absence of the course would have only

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and 5 for effects on college choice, student-college match, enrollment intensity, major, and GPA, separately by economic disadvantage (ED vs non-ED) and by achievement (low vs high baseline achievement).

enrolled in a community college or a low-quality four-year institution, instead successfully transfer to a better-fit college. Looking by student achievement and economic disadvantage, this pattern is concentrated among low-achieving, disadvantaged students, who experience a 2.5 point (SE=1.2) increase in enrollment at both a safety and non-safety college, and 5.0 point decrease (SE=2.1) in enrollment only at a safety college. The increase in college enrollment among high-achieving, disadvantaged students is driven by a 6.4 point (SE=2.8) increase in ever enrolling at a safety college (evenly split between students enrolling only in a safety and enrolling in both a safety and non-safety). The reduction in enrollment among low-achieving, not disadvantaged students is driven by a large reduction in enrollment only at a safety college (-5.4 points, SE=2.5).[15]

V.D Effects on Enrollment Intensity, Major, GPA, and College Knowledge

Yet another channel through which the course might increase postsecondary persistence is by shifting enrollees away from part-time enrollment and toward full-time enrollment. For every enrolled semester, the NSC data reports whether the student was enrolled full-time or part-time. I report in Table 6 whether the effects of the course on college enrollment are driven by changes in full-time enrollment, part-time enrollment, or both. High-achieving, economically disadvantaged students experience a 4.9 percentage point (SE=1.8), or almost 9%, increase in the likelihood of ever enrolling full-time during the sample period. This is driven entirely by an increase in enrolling both full- and part-time during the four years after the experiment, with no increase in enrolling only full-time. This result is consistent with two possible explanations. First, the course might be inducing marginal high-achieving, disadvantaged students from no enrollment into enrolling both part- and full-time. Second, the course may be inducing the marginal enrollee into enrolling only part-time, and inducing the inframarginal part-time enrollee into enrolling both part-time and full-time. Either way, the substantial increase in the likelihood of ever enrolling full-time could help to explain the increased persistence rates for this group.

[15] In a separate analysis, I estimate results on enrollment by college selectivity measured using the Barron's College Selectivity Index (see Appendix Table 6), finding a very similar pattern of results: for the entire sample, there is a reduction in enrolling only at a non-selective college, and increase in enrolling both at a non-selective and at a selective college. As with the effects on college type (Table 4) and student-college match (Table 5), this pattern is driven by low-achieving, disadvantaged students. There are increases in non-selective enrollment among high-achieving, disadvantaged students, and reductions in non-selective enrollment among low-achieving, non-disadvantaged students.

The NSC data is limited to information on where, when, and at what intensity students enroll. However, for students who enroll at an in-state, public institution (i.e., Michigan community colleges and public four-year universities), I observe data from their college transcripts through the STARR database. Among the students in my sample who enroll in college during the sample period, 83% of them ever enroll in an in-state community college or public four-year university, allowing me to observe them in STARR. I examine whether treatment status affects this percentage, presenting results in Appendix Table 7. There is no effect of the course among the whole sample on either the likelihood that a student ever enrolls at an in-state, public institution, or alternatively, only enrolls in an out-of-state or private institution – thus, no difference by treatment status in the percentage of all college enrollees who are observed in STARR. However, looking by student achievement and economic disadvantage, some interesting patterns emerge. The reductions in enrollment among low-achieving students, both economically disadvantaged and non-disadvantaged, are driven by reductions in students enrolling only at out-of-state or private institutions. The increased enrollment among high-achieving, disadvantaged students is driven by enrollment at in-state, public institutions. On the other hand, the increases among high-achieving, non-disadvantaged students are driven by enrollment at out-of-state or private institutions. While interesting in their own right, these patterns lead to differences by treatment status in the percentages of college enrollees who ever enroll in a public, in-state institution (i.e., who I can observe in STARR). Thus, effects estimated using the STARR data, at least among the four subgroups by student achievement and economic disadvantage, may be biased and should be interpreted as merely suggestive.

Acknowledging the suggestive nature of this analysis, I examine the effect of the course on students' declared major or program of study, and their GPA in college. The college planning course teaches students strategies for choosing a major, and about differential earnings by major. It is possible that the course could affect the fields in which students study. Following Dynarski, Hyman, and Schanzenbach (2013), I categorize science, technology, engineering, mathematics (STEM), economics, and business fields as high-earning, and all others as low-earning.[16] I consider two mutually exclusive and collectively exhaustive categories of enrollment: ever enrolling in a high-earning field of study, and only enrolling in a low-earning field.

[16] Specifically, I use two-digit Classification of Instructional Programs (CIP) codes. See Appendix Table 8 for a description of the codes and whether I classify each as high- vs low-earning.

The college planning course increased the fraction of high-achieving, disadvantaged high school seniors enrolling in a high-earning field of study by 4.6 percentage points (SE=1.9), or 11.5%. There was no change in the fraction enrolling in a low-earning field (-0.6 points, SE=2.4). This suggests either that the course induced the marginal high-achieving, disadvantaged student to enroll in college and do so in a high-earning field, or that the course induced the inframarginal student to shift from a low-earning to high-earning field. Regardless, the fact that the course increased the fraction of high-achieving, economically disadvantaged students enrolling in college, majoring in a high-earning field, and persisting through to degree receipt, is promising that these students will see increased earnings due to the course.

The final aspect of postsecondary enrollment that I examine is students' academic performance in college. While the course shifts college enrollees toward higher baseline academic achievement, the sign of any effect on students' GPA in college is ambiguous. For example, the marginal students induced into college may face barriers to academic performance in college not faced by the inframarginal student, and thus may underperform relative to their inframarginal peers. Similarly, if the course displaces learning in other subjects during senior year, this could manifest as students earning lower grades in college. On the other hand, it is also possible that the course could improve the academic performance of inframarginal enrollees by teaching students strategies to succeed in college, ultimately raising college GPA.

I consider two mutually exclusive, collectively exhaustive dependent variables: whether a student enrolls in college and earns a cumulative GPA above the sample median, and whether the student enrolls and earns a cumulative GPA below the median. Using these definitions, I do not find any notable pattern of effects on enrollment by GPA in college. The increase in enrollment among high-achieving, disadvantaged students is split quite evenly across those enrolling and earning a high GPA (3.2 points, SE=2.3) and those enrolling and earning a low GPA (4.2 points, SE=2.5). Similarly, the decreased enrollment among low-achieving, not disadvantaged students is split evenly by GPA (a coefficient of -0.029 for each).

One additional mechanism through which the course may have boosted persistence rates is through increased knowledge about strategies for success during college and how to persist toward earning a degree. While I prefer not to put much weight on the results of the student surveys given incomplete and differential response rates by treatment status, one of the only survey outcomes for which there appears to be an effect of the course is students being comfortable and knowledgeable about postsecondary opportunities and the college application process. Students are asked to rank their level of comfort and knowledge level on a scale from one to five. The course increases the likelihood of students choosing a four or five (i.e., comfortable or very comfortable) by 7.5 percentage points (SE=2.6), or 52%, among high-achieving, economically disadvantaged students (see Appendix Table 9). This is the student group that sees the largest increases in college entry and persistence, suggesting that some of these effects may be due to increased college knowledge.

VI. Conclusion

Guidance counselors provide the main source of college advising for low-income high school students, but are woefully understaffed in high-need schools (Executive Office of the President, 2014). Using a randomized control trial in 62 Michigan high schools, I design and evaluate a college planning course for high school seniors taught by teachers, as opposed to counselors, and that requires almost no additional school funding. While the course had no impact on the overall number of students enrolling in college, it increased the number of students persisting through college. This effect was driven by economically disadvantaged students, who saw large increases in enrolling and persisting to their third year in college. I find evidence that this increase in persistence was driven by a shift in the composition of enrollment toward students who were more college-ready, as measured by high school GPA and SAT scores. High-achieving, disadvantaged students were more likely to enroll in college, persist through year three of college, earn an Associate's degree, and major in a high-earning field. I also find that low-achieving, disadvantaged students attending community colleges were more likely to successfully transfer to a four-year school.

My analysis suggests that that the increases in persistence and degree receipt were driven by a combination of: 1) shifting college enrollment toward higher-achieving high school graduates, 2) increased transfer from two- to four-year institutions, 3) increased full-time enrollment, and 4) increased "college knowledge". While my study design does not allow me to pin down the precise contribution of each of these explanations, I show that the college planning course produces substantial improvements in college outcomes using a "boots-on-the-ground" in-person approach, but with the near zero financial costs of the lightest-touch information interventions. While I cannot measure the amount of learning loss due to displaced class time in other subjects, the improvements in college outcomes suggest that there are important benefits of the course net of any learning loss. While acknowledging the importance of that potential learning loss, it's worth reemphasizing that the near zero financial cost is an important strength of the intervention. Schools serving large numbers of economically disadvantaged students are rarely in the financial position to hire additional counselors or implement a new college-going intervention, even if it is relatively inexpensive on a per-pupil basis. While potential lost learning in other subjects may represent an important cost, the college planning course represents a promising alternative to schools seeking greater postsecondary outcomes, but without the funds to hire additional counselors nor the capacity to partner with outside organizations.

References

Altonji, Joseph & Zimmerman, Seth (2019). The costs of and net returns to college major. In *Productivity in Higher Education*. Edited by Caroline Hoxby and Kevin Stange. National Bureau of Economic Research, 133-176.

Andrews, Rodney J., Imberman, Scott A., Lovenheim, Michael F., & Stange, Kevin M. (2022). The returns to college major choice: Average and distributional effects, career trajectories, and earnings variability. *National Bureau of Economic Research Working Paper* 30331.

Barr, Andrew, & Turner, Sarah (2018). A letter of encouragement: Does information increase post-secondary enrollment of UI recipients? *American Economic Journal: Economic Policy*, 10(3): 42-68.

Barr, Andrew C. & Castleman, Benjamin L. (2021). The bottom line on college advising: Large increases in degree attainment. *EdWorkingPaper,* 21-481.

Bettinger, Eric P., Long, Bridget T., Oreopoulos, Philip, & Sanbonmatsu, Lisa (2012). The role of application assistance in college decisions: Results from the H&R Block FAFSA experiment. *The Quarterly Journal of Economics*, 127(3): 1205-1242.

Bergman, Peter, Denning, Jeffrey T., & Manoli, Dayanand, (2019) Is information enough? The effect of information about education tax benefits on student outcomes. *Journal of Policy Analysis and Management*, 38(3): 706-731.

Bird, Kelli A., Castleman, Benjamin L., Denning, Jeffery T., Goodman, Joshua, Lamberton, Cait, & Rosinger, Kelly O. (2021). Nudging at scale: Experimental evidence from FAFSA completion campaigns. *Journal of Economic Behavior & Organization*, 183: 105-128.

Bloom, Howard S. (2005). Randomizing groups to evaluate place-based programs." In H. S. Bloom (Ed.), *Learning more from social experiments: Evolving analytic approaches* (pp. 115–172). New York: Russell Sage.

Bound, John, Lovenheim, Michael F., & Turner, Sarah (2010). Why have college completion rates declined? An analysis of changing student preparation and collegiate resources. *American Economic Journal: Applied Economics,* 2(3): 129-57.

Carrell, Scott & Sacerdote, Bruce (2017). Why do college-going interventions work? *American Economic Journal: Applied Economics*, 9(3): 124-151.

Castleman, Benjamin L., Deutschlander, Denise & Lohner, Gabrielle (2020). Pushing college advising forward: Experimental evidence on intensive advising and college success. *EdWorking Paper,* 20-326.

Castleman, Benjamin L. & Goodman, Joshua (2018). Intensive college counseling and the enrollment and persistence of low-income students. *Education Finance and Policy,* 13(1): 19-41.

Castleman, Benjamin L. & Page, Lindsay C. (2015). Summer nudging: Can personalized text messages and peer mentor outreach increase college going among low-income high school graduates? *Journal of Economic Behavior and Organization*, 115: 144-160.

Denning, Jeffrey, Eide, Eric, Mumford, Kevin, Patterson, Richard, & Warnick, Merrill (2022). Why have college completion rates increased?" *American Economic Journal: Applied Economics*, 14(3): 1-29.

Dynarski, Susan, Hemelt, Steven, & Hyman, Joshua (2015). The missing manual: Using national student clearinghouse data to track postsecondary outcomes. *Educational Evaluation and Policy Analysis*, 37(1): 53S-79S.

Executive Office of the President (2014) "Increasing College Opportunity for Low-Income Students – Promising Models and a Call to Action." Washington D.C.

Hemelt, Steven W., Stange, Kevin M., Furquim, Fernando, Simon, Andrew, & Sawyer, John E. (2021). Why is math cheaper than English? Understanding cost differences in higher education. *Journal of Labor Economics,* 39(2): 397-435.

Hoxby, Caroline & Avery, Christopher (2013). The missing "one-offs": The hidden supply of high-achieving, low income students. *Brookings Papers on Economic Activity*, 1-65.

Hoxby, Caroline & Turner, Sarah (2013). Expanding college opportunities for high-achieving, low income students. *Stanford Institute for Economic Policy Research*.

Hyman, Joshua (2020). Can light-touch college-going interventions make a difference? Evidence from a statewide experiment in Michigan. *Journal of Policy Analysis and Management,* 39(1): 159-90.

Jaeger, David & Page, Marianne (1996). Degrees matter: New evidence on sheepskin effects in the returns to schooling. *The Review of Economics and Statistics*, 78(4): 733-740.

Jepsen, Christopher, Troske, Kenneth & Coomes, Paul (2014). The labor-market returns to community college degrees, diplomas, and certificates. *Journal of Labor Economics,* 32(1): 95-121.

Kane, Thomas, & Rouse, Cecilia (1995). Labor market returns to two-year and four-year schools. *American Economic Review*, 85(3): 600-614.

Mulhern, Christine (2022). Beyond teachers: Estimating individual guidance counselors' effects on educational attainment. Working paper.

National Student Clearinghouse Research Center (2015). *Snapshot Report: Degree Attainment – Outcome of Students who Transferred From Two-Year to Four-Year Institutions*, https://nscresearchcenter.org/wp-content/uploads/SnapshotReport8-GradRates2-4Transfers.pdf

Oreopoulos, Philip & Ford, Reuben (2019). Keeping college options open: A field experiment to help all high school seniors through the college application process. *Journal of Policy Analysis and Management*, 38(2): 426-454.

Oreopoulos, Philip & Petronijevic, Uros (2013). Making college worth it: A review of returns to higher education. *The Future of Children*, 23(1): 41-65.

Page, Lindsay C. & Gehlbach, Hunter (2017). How an artificially intelligent virtual assistant helps students navigate the road to college. *AERA Open*, 3: 1-12.

Phillips, Meredith & Reber, Sarah (2022). Does virtual advising increase college enrollment? Evidence from a random-assignment college access field experiment. *American Economic Journal: Economic Policy*. 14(3): 198-234.

Raudenbush, Stephen W., Martinez, Andres, & Spybrook, Jessica (2007). Strategies for improving precision in group-randomized experiments. *Educational Evaluation and Policy Analysis*, 29(1): 5-29.

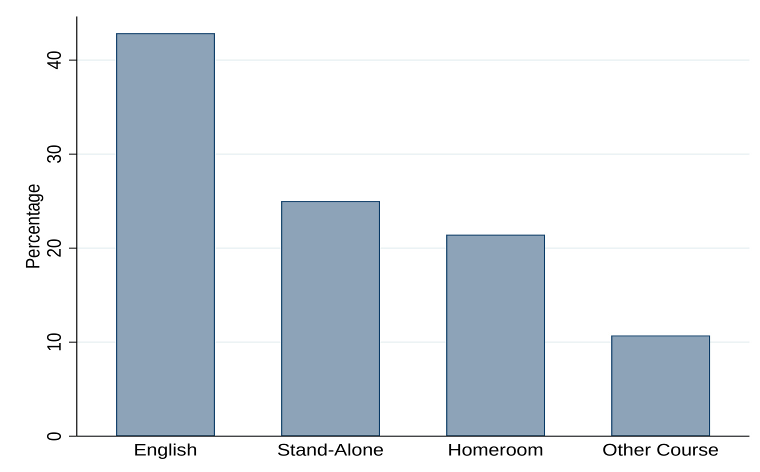
Stange, Kevin (2012). An empirical investigation of the option value of college enrollment. *American Economic Journal: Applied Economics*, 4 (1).

Stange, Kevin (2015). Differential pricing in undergraduate education: Effects on degree production by field. *Journal of Policy Analysis and Management*, 34(1): 107-135.

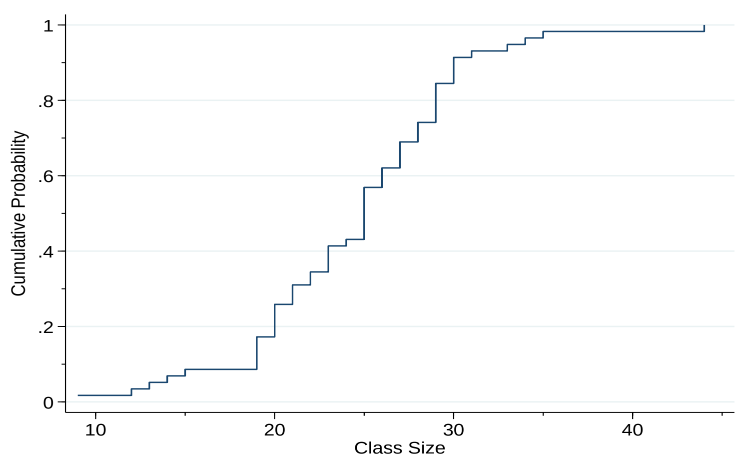
Stinebrickner, Todd & Ralph Stinebrickner (2012). Learning about academic ability and the college dropout decision. *Journal of Labor Economics*, 30(4): 707-748.

Figure I. College Planning Course Schedule, Class Size, and Staffing

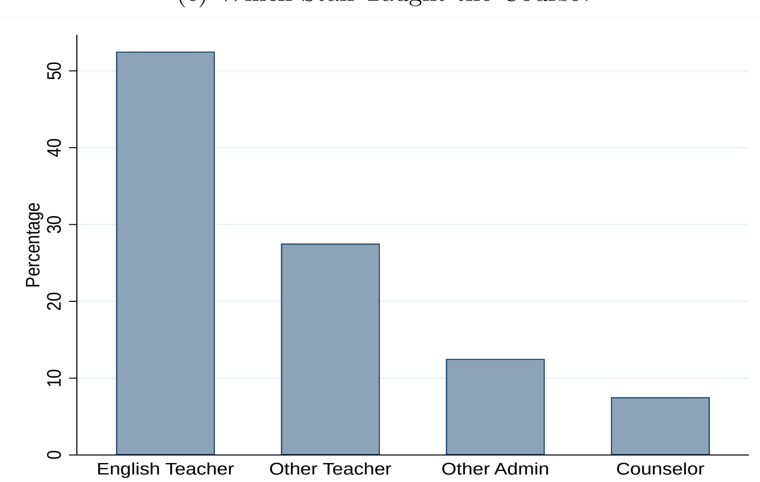
(a) How Was Course Fit Into Seniors' Schedule?



(b) Class Size



(c) Which Staff Taught the Course?



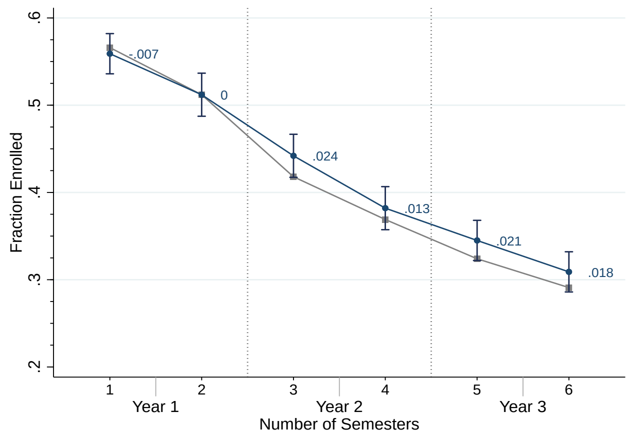
Notes: These figures describe various aspects of the college planning course implementation. Figure (a) describes whether the course was combined with Senior English, scheduled as a stand-alone elective course, combined with homeroom or a senior advisory period, or combined with a another class other than English. Figure (b) shows the distribution of class sizes for the course. And Figure (c) shows whether the course was taught by an English teacher, other type of teacher, other staff / administrator, or a guidance counselor.

Figure II. The 62 Participating Schools

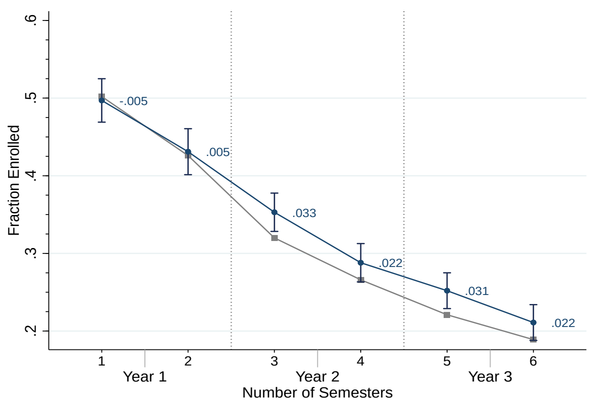
Notes: This figure shows a Michigan map with treatment and control schools represented by blue- and maize-colored markers, respectively.

Figure III. Number of Semesters Enrolled, By Economic Disadvantage and Achievement

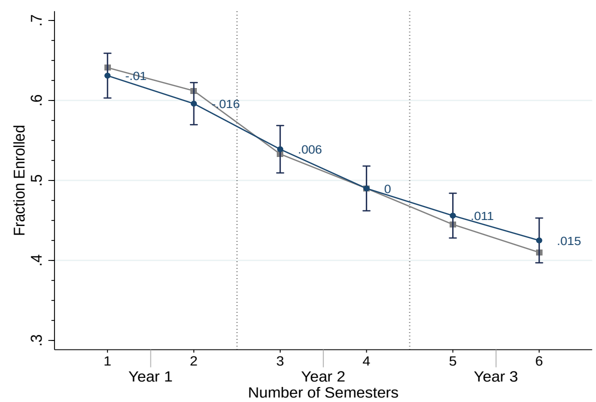
(a) All



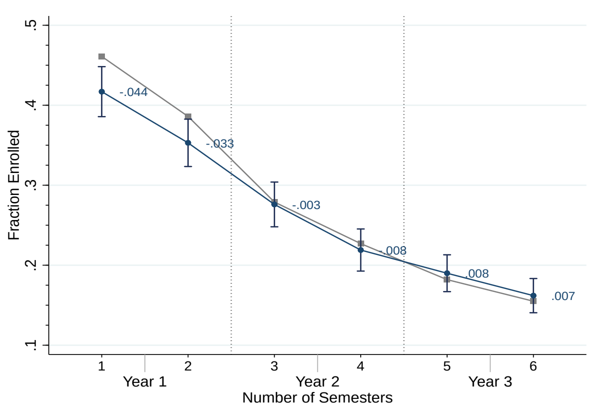
(b) Economically Disadvantaged (ED)



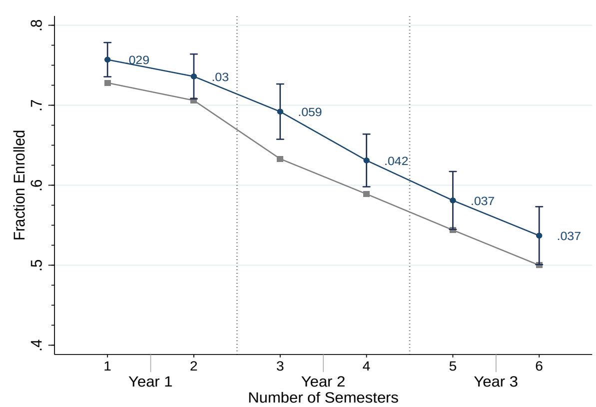
(c) Non-ED



(d) Low-Achieving

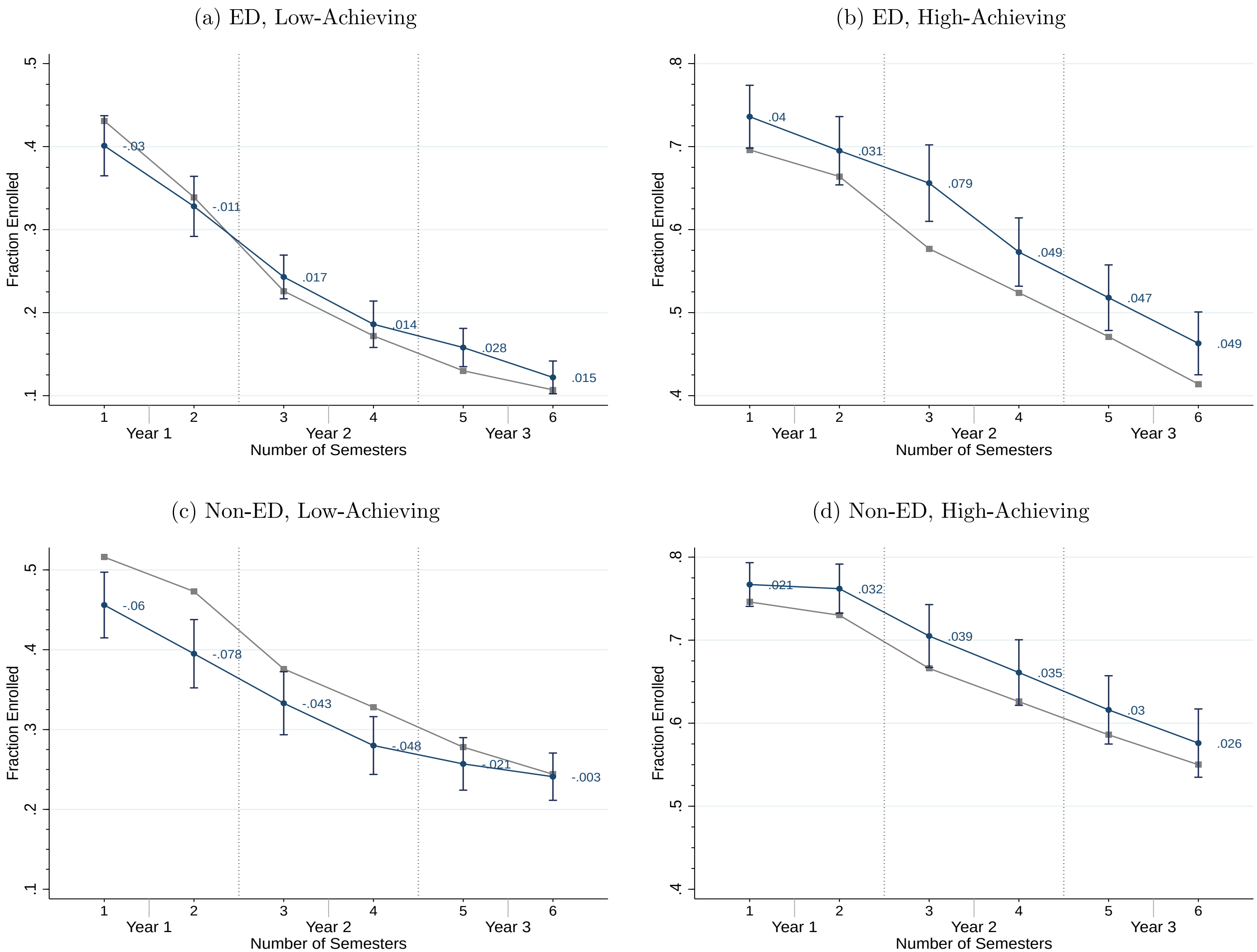


(e) High-Achieving



Notes: The control group is the gray line with square markers. Each point plots the fraction of control group students enrolled for at least the given number of semesters. For example, for semester two, each point plots the fraction of control group students enrolled for at least two semesters. The treatment group (blue line, circular markers) points add the estimated coefficient to the control group point, with the whiskers denoting the 90% confidence interval.

Figure IV. Number of Semesters Enrolled, By Economic Disadvantage-Achievement Interaction



Notes: The control group is the gray line with square markers. Each point plots the fraction of control group students enrolled for at least the given number of semesters. For example, for semester two, each point plots the fraction of control group students enrolled for at least two semesters. The treatment group (blue line, circular markers) points add the estimated coefficient to the control group point, with the whiskers denoting the 90% confidence interval.

Table 1. Sample Means and Balance

	All Michigan	RCT Sample	Treatment	Control	Regression-Adjusted Difference	
	(1)	(2)	(3)	(4)	(5)	
Student Demographics						
Female	0.495	0.499	0.490	0.509	-0.026**	(0.010)
Economically Disadvantaged (ED)	0.389	0.530	0.523	0.539	0.039	(0.042)
White	0.714	0.564	0.601	0.518	0.003	(0.083)
Black	0.181	0.356	0.314	0.406	-0.005	(0.083)
Hispanic	0.059	0.052	0.052	0.052	0.003	(0.012)
Other Race/Ethnicity	0.046	0.028	0.032	0.024	0.000	(0.006)
School Characteristics						
City	0.200	0.225	0.198	0.258	0.029	(0.083)
Suburb	0.453	0.327	0.425	0.208	0.182**	(0.080)
Town	0.121	0.181	0.159	0.207	-0.127	(0.084)
Rural	0.226	0.267	0.218	0.328	-0.084	(0.092)
Charter	0.065	0.041	0.023	0.062	-0.000	(0.025)
Grade 12 Enrollment	248	170	183	154	21.939	(22.937)
School College-Going (Baseline)						
Fraction Attend Any College	0.532	0.431	0.434	0.426	-0.022	(0.026)
Fraction Attend 4-Year College	0.334	0.241	0.238	0.245	-0.025	(0.025)
Student Achievement						
Grade 11 SAT Score	996	917	918	916	-18.490	(17.517)
Grade 8 State Test Score	0.049	-0.253	-0.262	-0.243	-0.098	(0.068)
Has Grade 8 Test Score	0.841	0.857	0.862	0.851	0.008	(0.012)
Grade 10 GPA	2.587	2.490	2.492	2.487	-0.087	(0.068)
Grade 11 Attendance Rate	0.930	0.918	0.924	0.912	-0.007	(0.011)
Number of Students	117,717	6,704	3,663	3,041		
Number of Schools	835	62	31	31		

Notes: The sample for column 1 is all Michigan grade 12 students during 2016-17. The sample for columns 2-5 is the experimental sample including 6,704 seniors during 2016-17 in 62 Michigan high schools. All of the means in this table are student-weighted, including the school characteristics. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. All students in this cohort in Michigan take the SAT exam in school during grade 11. College enrollment information is for seniors during 2015-16 who attend college during fall 2016. Grade 8 state test score is average math and reading scores standardardized for the entire Michigan 8th grade cohort to mean zero and standard deviation one. Column 5 reports the coefficient and standard error from a regression of the characteristic on an indicator for treatment, as well as randomization block fixed effects (discussed in Section IV of the paper), clustering the standard error at the school level.

*** = significiant at 99% level; ** = 95% level; * = 90% level

Table 2. Effects of College Planning Course on College Enrollment, Persistence, and Degree Receipt

	All Students	ED	Non-ED	Low-Achieving	High-Achieving
	(1)	(2)	(3)	(4)	(5)
Panel A. Enrollment and Persistence					
Enroll	-0.007	-0.005	-0.010	-0.044**	0.029**
	(0.014)	(0.017)	(0.017)	(0.019)	(0.013)
	0.566	*0.502*	*0.641*	*0.461*	*0.728*
Enroll and Persist to Year 2	0.014	0.027**	-0.003	-0.004	0.038**
	(0.015)	(0.013)	(0.020)	(0.016)	(0.019)
	0.372	*0.277*	*0.483*	*0.242*	*0.571*
Enroll and Persist to Year 3	0.025*	0.035***	0.010	0.012	0.036*
	(0.013)	(0.011)	(0.018)	(0.013)	(0.021)
	0.294	*0.198*	*0.406*	*0.164*	*0.494*
Panel B. Degree Receipt					
Earn Associate's Degree	0.015**	0.009	0.017	-0.005	0.037***
	(0.007)	(0.008)	(0.010)	(0.010)	(0.010)
	0.071	*0.051*	*0.096*	*0.046*	*0.111*
Enroll Immediately and Earn Bachelor's Degree Within 4 Years	-0.003	-0.004	-0.003	-0.004	0.010
	(0.007)	(0.006)	(0.011)	(0.003)	(0.012)
	0.087	*0.037*	*0.145*	*0.017*	*0.194*
Observations	6,704	3,552	3,152	4,041	2,663

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment in row 1 is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). The dependent variable for rows "Enroll and Persist to Year 2 (3)" is a dummy equal to one if the student enrolls within the first three (two) years after the experiment and is still observed in college one (two) year(s) after college entry. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.

*** = significiant at 99% level; ** = 95% level; * = 90% level

Table 3. Effects of Course on Postsecondary Outcomes, by Student Poverty-Achievement Interaction

	All Students	ED Low-Achieving	ED High-Achieving	Non-ED Low-Achieving	Non-ED High-Achieving
	(1)	(2)	(3)	(4)	(5)
Panel A. Enrollment and Persistence					
Enroll	-0.007	-0.030	0.040*	-0.060**	0.021
	(0.014)	(0.022)	(0.023)	(0.025)	(0.016)
	0.566	*0.431*	*0.696*	*0.516*	*0.746*
Enroll and Persist to Year 2	0.014	0.011	0.066***	-0.038	0.022
	(0.015)	(0.013)	(0.023)	(0.026)	(0.023)
	0.372	*0.194*	*0.503*	*0.333*	*0.611*
Enroll and Persist to Year 3	0.025*	0.031**	0.051**	-0.020	0.025
	(0.013)	(0.012)	(0.025)	(0.021)	(0.025)
	0.294	*0.117*	*0.423*	*0.253*	*0.534*
Panel B. Degree Receipt					
Earn Associate's Degree	0.015**	-0.006	0.037***	-0.009	0.032**
	(0.007)	(0.010)	(0.012)	(0.014)	(0.016)
	0.071	0.034	0.096	0.067	0.120
Enroll Immediately and Earn Bachelor's Degree Within 4 Years	-0.003	-0.004*	0.009	-0.004	0.002
	(0.007)	(0.002)	(0.017)	(0.007)	(0.014)
	0.087	*0.007*	*0.117*	*0.036*	*0.238*
Observations	6,704	2,546	1,006	1,495	1,657

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment in row 1 is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). The dependent variable for rows "Enroll and Persist to Year 2 (3)" is a dummy equal to one if the student enrolls within the first three (two) years after the experiment and is still observed in college one (two) year(s) after college entry. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.

*** = significiant at 99% level; ** = 95% level; * = 90% level

Table 4. Effects of College Planning Course on College Choice

		ED		Non-ED	
	All Students	Low-Achieving	High-Achieving	Low-Achieving	High-Achieving
	(1)	(2)	(3)	(4)	(5)
Enroll in Any College	-0.007	-0.030	0.040*	-0.060**	0.021
	(0.014)	(0.022)	(0.023)	(0.025)	(0.016)
	0.566	*0.431*	*0.696*	*0.516*	*0.746*
Enroll Only in 4-Year College	-0.022	-0.018	0.009	-0.033**	-0.013
	(0.016)	(0.019)	(0.031)	(0.015)	(0.022)
	0.276	*0.133*	*0.407*	*0.188*	*0.501*
Enroll Only in 2-Year College	-0.006	-0.043***	0.022	-0.028	0.019
	(0.011)	(0.015)	(0.024)	(0.024)	(0.018)
	0.212	*0.264*	*0.149*	*0.261*	*0.126*
Enroll in 2-Year and 4-Year College	0.021***	0.032***	0.009	0.001	0.014
	(0.005)	(0.009)	(0.019)	(0.010)	(0.014)
	0.077	*0.034*	*0.140*	*0.067*	*0.118*
Observations	6,704	2,546	1,006	1,495	1,657

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). Enrollment in only a 4-year college, only a 2-year college, and both a 2-year and 4-year college are mutually exclusive and collectively exhaustive groups. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.
*** = significiant at 99% level; ** = 95% level; * = 90% level

Table 5. Effects of College Planning Course on Student-College Match

		ED		Non-ED	
	All Students	Low-Achieving	High-Achieving	Low-Achieving	High-Achieving
	(1)	(2)	(3)	(4)	(5)
Ever Enroll in Safety College	0.004	-0.024	0.064**	-0.037	0.056*
	(0.017)	(0.022)	(0.028)	(0.024)	(0.029)
	0.504	*0.424*	*0.545*	*0.485*	*0.624*
Ever Enroll in Match or Reach College	0.012	0.009	0.005	-0.006	-0.007
	(0.010)	(0.015)	(0.025)	(0.016)	(0.022)
	0.231	*0.112*	*0.389*	*0.180*	*0.371*
Enroll in Safety College Only	-0.024	-0.050**	0.032	-0.054**	0.040
	(0.015)	(0.021)	(0.033)	(0.025)	(0.027)
	0.383	*0.376*	*0.352*	*0.383*	*0.412*
Enroll in Safety and Match / Reach College	0.028***	0.025**	0.032	0.017	0.016
	(0.009)	(0.012)	(0.024)	(0.011)	(0.012)
	0.121	*0.047*	*0.192*	*0.103*	*0.212*
Observations	6,704	2,546	1,006	1,495	1,657

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). Safety colleges are either a 2-year college or a 4-year college where the student's SAT score is above the 75th percentile of enrolled students at that school. Match colleges are a 4-year institution where the student's SAT score is between the 25th and 75th percentile. Reach colleges are where the student's SAT score is below the 25th percentile. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.

*** = significiant at 99% level; ** = 95% level; * = 90% level

Table 6. Effects of College Planning Course on College Enrollment Intensity

	All Students	ED Low-Achieving	ED High-Achieving	Non-ED Low-Achieving	Non-ED High-Achieving
	(1)	(2)	(3)	(4)	(5)
Ever Enroll Full-Time	0.015	-0.001	0.049***	-0.024	0.025
	(0.013)	(0.013)	(0.018)	(0.021)	(0.020)
	0.391	*0.210*	*0.568*	*0.313*	*0.642*
Enroll Part-Time and Full-Time	0.025*	0.023*	0.055**	-0.022	0.013
	(0.015)	(0.012)	(0.024)	(0.016)	(0.033)
	0.293	*0.143*	*0.400*	*0.252*	*0.503*
Enroll Part-Time Only	-0.003	-0.019	-0.011	0.019	0.020
	(0.013)	(0.018)	(0.018)	(0.018)	(0.018)
	0.154	*0.206*	*0.128*	*0.156*	*0.086*
Enroll Full-Time Only	-0.011	-0.024***	-0.006	-0.002	0.012
	(0.008)	(0.009)	(0.021)	(0.012)	(0.019)
	0.098	*0.067*	*0.167*	*0.061*	*0.139*
Observations	6,704	2,546	1,006	1,495	1,657

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). Full-time and part-time enrollment status comes from the National Student Clearinghouse (NSC) designation. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.

*** = significiant at 99% level; ** = 95% level; * = 90% level

Table 7. Effects of College Planning Course on College Major and GPA

	All Students	ED Low-Achieving	ED High-Achieving	Non-ED Low-Achieving	Non-ED High-Achieving
	(1)	(2)	(3)	(4)	(5)
Panel A. College Major					
Enroll and Major in High-Earning Field	-0.002	-0.005	0.046**	-0.029	-0.011
	(0.010)	(0.014)	(0.019)	(0.019)	(0.023)
	0.320	*0.205*	*0.400*	*0.283*	*0.488*
Enroll and Major in Low-Earning Field	-0.005	-0.025	-0.006	-0.031	0.032
	(0.010)	(0.017)	(0.024)	(0.018)	(0.021)
	0.246	*0.226*	*0.295*	*0.233*	*0.258*
Panel B. GPA					
Enroll in College and Earn High GPA	-0.011	-0.003	0.032	-0.029	-0.002
	(0.012)	(0.011)	(0.023)	(0.018)	(0.020)
	0.251	0.089	0.350	0.165	0.521
Enroll in College and Earn Low GPA	0.008	-0.010	0.042*	-0.029	0.004
	(0.013)	(0.017)	(0.025)	(0.022)	(0.019)
	0.251	*0.267*	*0.279*	*0.289*	*0.175*
Observations	6,704	2,546	1,006	1,495	1,657

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). High-earning fields include STEM, business, and economics (see text for more detail). High and low (college) GPA are above and below median, respectively. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.
*** = significiant at 99% level; ** = 95% level; * = 90% level

Online Appendix: Survey Descriptions

In this appendix, I provide more details about the various surveys fielded as part of this project.

Prior to implementing the randomized control trial (RCT) in 2016-17, I ran a pilot of the course during fall 2015 in five high schools. See Appendix Table 1 for characteristics of these schools, which included two rural high schools, two larger urban high schools, both in Detroit, and one charter high school also in Detroit. During the pilot, I implemented monthly student and instructor surveys to measure course usability (e.g, whether instructors struggled to teach any particular course content, or felt ethically or otherwise uncertain, unwilling, or uncomfortable teaching any particular course content), feasibility (e.g., whether instructors felt that the time requirements of the course, including class preparation, instruction, and grading were manageable, or whether students felt that the course could successfully fit into their schedules, and that homework assignments requiring information from parents/guardians, such as FAFSA completion, were successfully completed), and fidelity of implementation (e.g., whether the instructor covered and spent the expected amount of time on all components, objectives, and course activities). Students and instructors were generally positive, but also provided helpful criticisms leading to improvements to the course curriculum and implementation process before rolling out the RCT in fall 2016.

Mid-semester and final instructor surveys were implemented during the RCT roll-out when treatment schools were offering the course. These surveys asked instructors questions about how valuable they felt each lesson was, how difficult it was to teach, whether it required an appropriate amount of outside time for students, and whether students had difficulty completing their assignments. We also implemented an end-of-semester course evaluation to students, asking, for example, how valuable each of the topics covered in the course were. Finally, we conducted a principal survey after the course had concluded, asking about how students were selected to enroll in the course, how instructors were chosen to teach the course, whether the principal was happy with the decision to offer this course, and any advice on implementing the course in the future. Overall, students, instructors, and principals were quite positive about all aspects of the course.

In addition to these surveys inquiring about the course experience, we also implemented brief student surveys to seniors in all schools (treatment and control) during February and May 2017 (the spring after the course was offered in treated schools), asking about college knowledge, FAFSA submission, college applications, and college acceptances. Unfortunately, while we aimed for near universal take-up, we ended up with valid survey responses from only 76% of seniors, due to a mix of not reaching 10% of seniors, 10% of seniors opting out (which we had to allow to meet IRB protocols), and 4% of students entering nicknames and dates-of-birth on their survey that we could not match to our administrative records. More troubling than the 76% response rate for evaluating the effects of the course on student outcomes from the survey data is that the response rate differed by treatment status: seniors from control group schools were 6.4 percentage points more likely to respond. This differential response is likely because control group schools were required to participate in the survey in order to offer the course in fall 2017. While the survey was also required for the treatment schools, there was little binding incentive left for them to rigorously implement it, given that they were finished with the course that year and had already gained access to the course materials for possible use in future years. Given the response-rate issues with these student survey data, I only briefly mention some results from these data in Section V.D, and present a full table of results in Appendix Table 9.

Online Appendix:
Additional Tables

Appendix Table 1: Pilot School Sample Summary Statistics

School Name	District	Grade 12 Enrollment	ED	Black	Attend Any College	Attend 4-Year College	Urbanicity	Charter
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Pilot Schools								
Holton High School	Holton Public Schools	66	0.394	0.000	0.477	0.123	Rural	No
Pinconning High School	Pinconning Area Schools	111	0.324	0.009	0.516	0.280	Rural	No
King High School	Detroit Public Schools	314	0.736	0.990	0.388	0.235	City	No
Western International High School	Detroit Public Schools	490	0.616	0.215	0.239	0.136	City	No
Detroit Edison Public School Academy High School	Detroit Edison PSA	92	0.717	1.000	0.782	0.628	City	Yes
Pilot School Sample Mean	-	339	0.616	0.475	0.374	0.374	-	0.086
RCT Sample Mean	-	170	0.530	0.356	0.431	0.241	-	0.041

Notes: Grade 12 enrollment, fraction economically disadvantaged, and fraction black are calculated for seniors during 2016-17. The fraction attending any and 4-year college are calcuated for seniors during 2015-16 who attend college during fall 2016.

Appendix Table 2. Treatment School List

	School	District	Grade 12 Enrollment	ED	Black	Attend Any College	Attend 4-Year College	Urbanicity	Charter
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Carman Ainsworth High School	Carman-Ainsworth Community Schools	363	0.634	0.661	0.647	0.385	Suburb	No
2	Lake Shore High School	Lake Shore Public Schools (Macomb)	302	0.358	0.169	0.541	0.262	Suburb	No
3	Port Huron High School	Port Huron Area School District	264	0.522	0.165	0.516	0.248	Suburb	No
4	East Detroit High School	East Detroit Public Schools	228	0.687	0.822	0.397	0.206	Suburb	No
5	Owosso High School	Owosso Public Schools	211	0.465	0.014	0.487	0.350	Town	No
6	Truman High School	Taylor School District	206	0.723	0.407	0.355	0.232	City	No
7	Battle Creek Central High School	Battle Creek Public Schools	205	0.673	0.491	0.466	0.188	City	No
8	Hazel Park High School	Hazel Park School District	182	0.579	0.435	0.333	0.175	Suburb	No
9	Three Rivers High School	Three Rivers Community Schools	173	0.474	0.112	0.422	0.227	Town	No
10	Eastern High School	Lansing Public School District	172	0.700	0.424	0.506	0.185	City	No
11	Ecorse High School	Ecorse Public Schools	113	0.850	0.796	0.071	0.047	Suburb	No
12	Hillsdale High School	Hillsdale Community Schools	108	0.481	0.036	0.556	0.400	Town	No
13	Detroit Collegiate Prep	Detroit Public Schools	107	0.883	0.986	0.201	0.067	City	No
14	Morley Stanwood High School	Morley Stanwood Community Schools	98	0.539	0.024	0.533	0.467	Rural	No
15	Union City HIgh School	Union City Community Schools	87	0.462	0.021	0.480	0.213	Rural	No
16	Oscoda High School	Oscoda Area Schools	85	0.668	0.035	0.471	0.276	Rural	No
17	Lawton High School	Lawton Community School District	81	0.467	0.032	0.453	0.093	Rural	No
18	Pine River High School	Pine River Area Schools	79	0.486	0.024	0.525	0.495	Rural	No
19	Whitmore Lake High school	Whitmore Lake Public School District	70	0.359	0.020	0.500	0.318	Rural	No
20	Dryden High School	Dryden Community Schools	56	0.327	0.004	0.354	0.229	Rural	No
21	Mount Clemens High School	Mount Clemens Community School District	55	0.715	0.727	0.348	0.152	Suburb	No
22	Montabella Jr/Sr High School	Montabella Community Schools	55	0.593	0.010	0.418	0.239	Rural	No
23	Renaissance High School	Plainwell Community Schools	53	0.688	0.055	0.042	0.000	Town	No
24	Genesee High School	Genesee School District	50	0.650	0.088	0.415	0.151	Suburb	No
25	Pittsford High School	Pittsford Area Schools	50	0.465	0.022	0.537	0.244	Rural	No
26	da Vinci High School	Da Vinci Institute	49	0.700	0.233	0.229	0.057	Rural	Yes
27	WAY Academy Southwest	W-A-Y Academy	38	0.864	0.207	0.063	0.016	City	Yes
28	Newberry High School	Tahquamenon Area Schools	38	0.498	0.018	0.561	0.463	Town	No
29	Quest High School	North Branch Area Schools	33	0.681	0.014	0.098	0.073	Rural	No
30	A.D. Johnston Jr/Sr High School	Bessemer Area School District	27	0.449	0.031	0.448	0.034	Rural	No
31	Hale High School	Hale Area Schools	27	0.685	0.063	0.448	0.241	Rural	No

Notes: Grade 12 enrollment, fraction economically disadvantaged, and fraction black calculated are calculated for seniors during 2016-17. The fraction attending any and 4-year college are calculated for seniors during 2015-16 who attend college during fall 2016. Schools sorted in descending order of grade 12 enrollment. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch.

Appendix Table 3. Control School List

	School	District	Grade 12 Enrollment	ED	Black	Attend Any College	Attend 4-Year College	Urbanicity	Charter
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Oak Park High School	Oak Park School District	338	0.830	0.979	0.354	0.193	Suburb	No
2	East Engilsh Village Preparatory Academy	Detroit Public Schools	332	0.845	0.986	0.190	0.093	City	No
3	Calumet High School	Calumet, Laurium & Keweenaw Public Schools	166	0.505	0.009	0.362	0.210	Town	No
4	Lincoln High School	Van Dyke Public Schools	158	0.646	0.755	0.293	0.127	City	No
5	Ferndale High School	Ferndale Public Schools	157	0.618	0.642	0.576	0.377	Suburb	No
6	Old Redford Academy	Old Redford Academy	153	0.733	0.995	0.494	0.201	City	Yes
7	Perry High School	Perry Public Schools	131	0.367	0.016	0.503	0.268	Town	No
8	Bridgeport High School	Bridgeport-Spaulding Community Schools	118	0.576	0.649	0.373	0.209	Suburb	No
9	Fennville High School	Fennville Public Schools	116	0.710	0.035	0.557	0.258	Rural	No
10	Bad Axe High School	Bad Axe Public Schools	103	0.380	0.010	0.621	0.485	Town	No
11	Delton Kellogg High School	Delton Kellogg Schools	101	0.411	0.015	0.392	0.196	Rural	No
12	Medicine and Community Health at Cody	Detroit Public Schools Community District	96	0.836	0.984	0.320	0.173	City	No
13	Jonesville High School	Jonesville Community Schools	93	0.366	0.007	0.495	0.218	Rural	No
14	Brandywine High School	Brandywine Community Schools	85	0.550	0.097	0.667	0.308	Rural	No
15	Clinton High School	Clinton Community Schools	77	0.250	0.009	0.591	0.500	Town	No
16	Vassar High School	Vassar Public Schools	76	0.445	0.040	0.532	0.342	Town	No
17	Sandusky Jr/Sr High School	Sandusky Community School District	75	0.489	0.016	0.587	0.440	Town	No
18	Maple Valley High School	Maple Valley Schools	73	0.478	0.021	0.341	0.198	Rural	No
19	Dansville High School	Dansville Schools	73	0.264	0.007	0.629	0.258	Rural	No
20	Ross Beatty Jr/Sr High School	Cassopolis Public Schools	70	0.621	0.261	0.473	0.243	Rural	No
21	Concord High School	Concord Community Schools	60	0.470	0.119	0.597	0.433	Rural	No
22	Britton-Deerfield Schools- Britton Building	Britton Deerfield Schools	56	0.431	0.013	0.576	0.364	Rural	No
23	Harbor Beach High School	Harbor Beach Community Schools	54	0.343	0.000	0.556	0.413	Rural	No
24	Jeffers High School	Adams Township School District	52	0.519	0.004	0.439	0.293	Rural	No
25	Marcellus High School	Marcellus Community Schools	51	0.547	0.027	0.365	0.115	Rural	No
26	East Lee Campus - Godfrey Lee High School	Godfrey-Lee Public Schools	45	0.909	0.202	0.018	0.000	City	No
27	Lawrence Jr/Sr High School	Lawrence Public Schools	42	0.509	0.031	0.432	0.295	Rural	No
28	Pickford High School	Pickford Public Schools	31	0.435	0.013	0.619	0.476	Rural	No
29	North Dickinson High School	North Dickinson County Schools	24	0.460	0.004	0.722	0.444	Rural	No
30	Lighthouse Academy School	Lighthouse Academy	20	0.933	0.404	0.091	0.000	Suburb	Yes
31	North Star Academy	North Star Academy	15	0.583	0.036	0.400	0.360	Rural	Yes

Notes: Grade 12 enrollment, fraction economically disadvantaged, and fraction black calculated are calculated for seniors during 2016-17. The fraction attending any and 4-year college are calculated for seniors during 2015-16 who attend college during fall 2016. Schools sorted in descending order of grade 12 enrollment. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch.

Appendix Table 4. Effects on College Choice and Match by Student Poverty and by Achievement (Separately)

	All Students	ED	Non-ED	Low-Achieving	High-Achieving
	(1)	(2)	(3)	(4)	(5)
Panel A: College Choice					
Enroll in Any College	-0.007	-0.005	-0.010	-0.044**	0.029**
	(0.014)	(0.017)	(0.017)	(0.019)	(0.013)
	0.566	*0.502*	*0.641*	*0.461*	*0.728*
Enroll Only in 4-Year College	-0.022	-0.010	-0.023	-0.031**	-0.002
	(0.016)	(0.020)	(0.016)	(0.015)	(0.021)
	0.276	*0.206*	*0.358*	*0.152*	*0.467*
Enroll Only in 2-Year College	-0.006	-0.021*	0.004	-0.036***	0.023
	(0.011)	(0.012)	(0.016)	(0.014)	(0.015)
	0.212	*0.233*	*0.188*	*0.263*	*0.135*
Enroll in 2-Year and 4-Year College	0.021***	0.025**	0.010	0.023***	0.009
	(0.005)	(0.010)	(0.008)	(0.006)	(0.009)
	0.077	*0.062*	*0.095*	*0.046*	*0.126*
Panel B: College Match					
Ever Enroll in Safety College	0.004	0.001	0.000	-0.027	0.055**
	(0.017)	(0.019)	(0.021)	(0.019)	(0.022)
	0.504	*0.456*	*0.560*	*0.445*	*0.595*
Ever Enroll in Match or Reach College	0.012	0.010	0.015	0.000	0.006
	(0.010)	(0.015)	(0.014)	(0.012)	(0.013)
	0.231	*0.186*	*0.284*	*0.136*	*0.378*
Enroll in Safety College Only	-0.024	-0.024	-0.024	-0.050***	0.026
	(0.015)	(0.019)	(0.018)	(0.016)	(0.020)
	0.383	*0.370*	*0.398*	*0.379*	*0.390*
Enroll in Safety and (Match or Reach) College	0.028***	0.025*	0.024**	0.023***	0.029**
	(0.009)	(0.014)	(0.010)	(0.008)	(0.011)
	0.121	*0.086*	*0.162*	*0.067*	*0.205*
Observations	6,704	3,552	3,152	4,041	2,663

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). Enrollment in only a 4-year college, only a 2-year college, and both a 2-year and 4-year college are mutually exclusive and collectively exhaustive groups. Safety colleges are either a 2-year college or a 4-year college where the student's SAT score is above the 75th percentile of enrolled students at that school. Match colleges are a 4-year institution where the students' SAT score is between the 25th and 75th percentile. Reach colleges are where the student's SAT score is below the 25th percentile. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.
*** = significiant at 99% level; ** = 95% level; * = 90% level

Appendix Table 5. Effects on Enrollment Intensity, Major, and GPA, by Poverty and Achievement (Separately)

	All Students	ED	Non-ED	Low-Achieving	High-Achieving
	(1)	(2)	(3)	(4)	(5)
Panel A: Enrollment Intensity					
Ever Enroll Full-Time	0.015	0.019	0.007	-0.004	0.031*
	(0.013)	(0.012)	(0.017)	(0.015)	(0.015)
	0.391	*0.305*	*0.491*	*0.246*	*0.615*
Enroll Part-Time and Full-Time	0.025*	0.039***	0.007	0.009	0.032
	(0.015)	(0.013)	(0.020)	(0.013)	(0.024)
	0.293	*0.212*	*0.388*	*0.181*	*0.465*
Enroll Part-Time Only	-0.003	-0.022	0.016	-0.007	0.010
	(0.013)	(0.016)	(0.014)	(0.016)	(0.014)
	0.154	*0.185*	*0.118*	*0.188*	*0.101*
Enroll Full-Time Only	-0.011	-0.020*	0.001	-0.013*	-0.002
	(0.008)	(0.011)	(0.011)	(0.007)	(0.015)
	0.098	*0.093*	*0.103*	*0.065*	*0.150*
Panel B. College Major					
Enroll and Major in High-Earning Field	-0.002	0.010	-0.016	-0.014	0.008
	(0.010)	(0.012)	(0.016)	(0.012)	(0.017)
	0.320	*0.257*	*0.394*	*0.232*	*0.456*
Enroll and Major in Low-Earning Field	-0.005	-0.015	0.006	-0.030**	0.021
	(0.010)	(0.013)	(0.015)	(0.014)	(0.014)
	0.246	*0.245*	*0.247*	*0.229*	*0.272*
Panel C. GPA					
Enroll in College and Earn High GPA	-0.011	0.004	-0.023	-0.014	0.007
	(0.012)	(0.014)	(0.016)	(0.011)	(0.017)
	0.251	0.159	0.358	0.116	0.459
Enroll in College and Earn Low GPA	0.008	0.011	0.004	-0.023	0.023*
	(0.013)	(0.016)	(0.015)	(0.017)	(0.013)
	0.251	*0.270*	*0.227*	*0.275*	*0.213*
Observations	6,704	3,552	3,152	4,041	2,663

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). Full-time and part-time enrollment status comes from the National Student Clearinghouse (NSC) designation. High-earning fields include STEM, business, and economics (see text for more detail). High and low (college) GPA are above and below median, respectively. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.
*** = significiant at 99% level; ** = 95% level; * = 90% level

Appendix Table 6. Effects of College Planning Course on College Selectivity Using Barrons Selectivity Index

		ED		Non-ED	
	All Students	Low-Achieving	High-Achieving	Low-Achieving	High-Achieving
	(1)	(2)	(3)	(4)	(5)
Ever Enroll in Non-Selective College	0.006	-0.021	0.075**	-0.052**	0.035
	(0.016)	(0.021)	(0.029)	(0.023)	(0.036)
	0.434	*0.374*	*0.465*	*0.449*	*0.497*
Ever Enroll in Selective College	0.016	0.014	0.003	0.011	0.024
	(0.011)	(0.015)	(0.022)	(0.017)	(0.024)
	0.275	*0.105*	*0.462*	*0.162*	*0.532*
Enroll in Non-Selective College Only	-0.023*	-0.044**	0.037	-0.070***	-0.003
	(0.012)	(0.018)	(0.027)	(0.026)	(0.022)
	0.291	*0.326*	*0.233*	*0.355*	*0.214*
Enroll in Both a Non-Selective and Selective College	0.030***	0.023**	0.038	0.019	0.039
	(0.011)	(0.011)	(0.023)	(0.013)	(0.027)
	0.143	*0.047*	*0.231*	*0.095*	*0.283*
Observations	6,704	2,546	1,006	1,495	1,657

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment is measured as ever enrolling during the four years after the experiment (i.e., through 2020-21). Selectivity determined according to the Barron's College Selectivity Index. "Selective" colleges are those in any of the top four categories (i.e., most competitive, highly competitive, very competitive, and competitive). "Non-Selective" colleges are those listed as less competitive or non-competitive, the latter includes community colleges and unranked four-year colleges. Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score.
*** = significiant at 99% level; ** = 95% level; * = 90% level

Appendix Table 7. Effect of College Planning Course on Being Observed in STARR Dataset

		ED		Non-ED	
	All Students	Low-Achieving	High-Achieving	Low-Achieving	High-Achieving
	(1)	(2)	(3)	(4)	(5)
Ever Enroll in Any Institution	-0.007	-0.030	0.040*	-0.060**	0.021
	(0.014)	(0.022)	(0.023)	(0.025)	(0.016)
	0.566	*0.431*	*0.696*	*0.516*	*0.746*
Ever Enroll in In-State Public Institution	0.005	-0.005	0.056*	-0.018	-0.019
	(0.014)	(0.021)	(0.029)	(0.028)	(0.024)
	0.459	*0.349*	*0.577*	*0.404*	*0.612*
Only Enroll in Out-of-State or Private Institution	-0.012	-0.025**	-0.015	-0.042***	0.040**
	(0.009)	(0.011)	(0.019)	(0.010)	(0.017)
	0.107	*0.082*	*0.119*	*0.112*	*0.134*
Percent of College Enrollees Observed in STARR					
Control Group	81.1%	80.0%	82.9%	78.3%	82.0%
Treatment Group	81.2%	85.8%	86.0%	84.6%	77.3%
Observations	6,704	2,546	1,006	1,495	1,657

Notes: The sample is 6,704 seniors during 2016-17 in 62 Michigan high schools. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. College enrollment is measured within the four years after the experiment (i.e., through 2020-21). For the percent of college enrollees observed in STARR, the control group is simply the control mean of the fraction ever enrolled in an in-state public divided by the fraction ever enrolled in any insitution. The treatment group percentage is calculated by adding or subtracting the treatment effect for each of those two outcomes from each of the two control means, and then dividing (e.g., 81.2% = 100 * [(0.459 + 0.005) / (0.566-0.007)]). Student economic disadvantage (ED) is proxied by eligibility for free or reduced-price lunch. Low-achieving students have below median high school GPA or SAT score. High-achieving students have above median GPA and SAT score. *** = significiant at 99% level; ** = 95% level; * = 90% level

Appendix Table 8: Classification of Instructional Programs (CIP) Codes

CIP Code Description	High-Earning
AGRICULTURAL SCIENCES	Yes
AGRICULTURAL/ANIMAL/PLANT/VETERINARY SCIENCES	Yes
AGRICULTURE, AGRICULTURE OPERATIONS	Yes
ARCHITECTURE AND RELATED SERVICES	No
AREA, ETHNIC, CULTURAL, GENDER	No
BASIC SKILLS AND DEVELOPMENTAL/REMEDIAL	No
BIOLOGICAL AND BIOMEDICAL SCIENCES	Yes
BUSINESS, MANAGEMENT, MARKETING	Yes
CITIZENSHIP ACTIVITIES	No
COMMUNICATION, JOURNALISM, AND RELATED	No
COMMUNICATIONS TECHNOLOGIES/TECHNICIANS	Yes
COMPUTER AND INFORMATION SCIENCES	Yes
CONSERVATION AND RENEWABLE NATURAL RESOURCES	No
CONSTRUCTION TRADES	No
CULINARY, ENTERTAINMENT	No
EDUCATION	No
ENGINEERING TECHNOLOGIES AND ENGINEERING	Yes
ENGINEERING TECHNOLOGIES/TECHNICIANS	Yes
ENGINEERING	Yes
ENGINEERING/ENGINEERING-RELATED TECHNOLOGIES	Yes
ENGLISH LANGUAGE AND LITERATURE/LETTERS	No
FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES	No
FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS	No
HEALTH PROFESSIONS AND RELATED CLINICAL	Yes
HEALTH PROFESSIONS AND RELATED PROGRAMS	Yes
HEALTH PROFESSIONS AND RELATED SCIENCES	Yes
HEALTH PROFESSIONS RESIDENCY/FELLOWSHIP	Yes
HEALTH-RELATED KNOWLEDGE AND SKILLS	Yes
HISTORY	No
HOMELAND SECURITY, LAW ENFORCEMENT	No
LEGAL PROFESSIONS AND STUDIES	No
LEISURE AND RECREATIONAL ACTIVITIES	No
LIBERAL ARTS AND SCIENCES, GENERAL STUDIES	No
LIBRARY SCIENCE	No
MARKETING OPERATIONS/MARKETING	No
MATHEMATICS AND STATISTICS	Yes
MECHANIC AND REPAIR TECHNOLOGIES/TECHNICIANS	Yes
MILITARY SCIENCE, LEADERSHIP AND OPERAT	Yes
MILITARY TECHNOLOGIES AND APPLIED SCIENCES	Yes
MULTI/INTERDISCIPLINARY STUDIES	No
NATURAL RESOURCES AND CONSERVATION	No
PARKS, RECREATION, LEISURE, AND FITNESS	No
PARKS, RECREATION, LEISURE, FITNESS	No
PERSONAL AND CULINARY SERVICES	No
PERSONAL AWARENESS AND SELF-IMPROVEMENT	No
PHILOSOPHY AND RELIGIOUS STUDIES	No
PHYSICAL SCIENCES	Yes
PRECISION PRODUCTION	Yes
PSYCHOLOGY	No
PUBLIC ADMINISTRATION AND SOCIAL SERVICES	No
RESIDENCY PROGRAMS	No
SCIENCE TECHNOLOGIES/TECHNICIANS	Yes
SOCIAL SCIENCES	No
THEOLOGY AND RELIGIOUS VOCATIONS	No
TRANSPORTATION AND MATERIALS MOVING	No
VISUAL AND PERFORMING ARTS	No
VOCATIONAL HOME ECONOMICS	No

Notes: This table provides a list of all of the 2-Digit (broadest) CIP codes in the STARR data, and which ones I assign as high- vs low-earning. For Social Sciences, I code the more detailed code for Economics as high-earning, and the rest of social sciences as low-earning.

Appendix Table 9. Effects of College Planning Course on Student Survey Responses

						ED		Non-ED	
	All Students	ED	Non-ED	Low-Achieving	High-Achieving	Low-Achieving	High-Achieving	Low-Achieving	High-Achieving
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Responded to Survey	-0.064*	-0.058*	-0.071*	-0.066**	-0.054	-0.073**	-0.023	-0.062*	-0.069
	(0.034)	(0.032)	(0.039)	(0.030)	(0.041)	(0.034)	(0.029)	(0.032)	(0.052)
	0.774	*0.759*	*0.790*	*0.755*	*0.803*	*0.748*	*0.792*	*0.768*	*0.809*
Was Taught About College In School	-0.000	-0.012	0.012	0.005	-0.002	*-0.014*	*-0.016*	*0.021*	*0.004*
	(0.012)	(0.013)	(0.016)	(0.013)	(0.018)	(0.014)	(0.027)	(0.018)	(0.024)
	0.827	*0.822*	*0.833*	*0.810*	*0.851*	*0.808*	*0.858*	*0.814*	*0.847*
College Application Comfort/Knowledge (1-5 Likert Scale)	0.040	0.043	0.028	0.063	-0.001	-0.003	0.100	0.122*	-0.033
	(0.034)	(0.042)	(0.039)	(0.047)	(0.053)	(0.052)	(0.070)	(0.065)	(0.063)
	3.3	*3.3*	*3.3*	*3.2*	*3.4*	3.266	3.433	3.169	3.356
Comfortable / Knowledgable About College Applications (= 4 or 5 on Likert Scale)	0.014	0.032**	-0.005	0.015	0.015	0.010	0.075***	0.031*	-0.020
	(0.008)	(0.013)	(0.012)	(0.012)	(0.016)	(0.011)	(0.026)	(0.018)	(0.021)
	0.130	*0.138*	*0.121*	*0.126*	*0.135*	*0.135*	*0.145*	*0.109*	*0.130*
Complete the FAFSA	-0.005	-0.017	0.013	-0.012	-0.001	*0.008*	*-0.027*	*0.005*	*0.023*
	(0.015)	(0.019)	(0.019)	(0.022)	(0.020)	(0.023)	(0.019)	(0.036)	(0.019)
	0.709	*0.688*	*0.731*	*0.632*	*0.820*	*0.752*	*0.889*	*0.723*	*0.859*
Applied to Four-Year College or Planning to Attend Two-Year College	0.004	-0.010	0.020	0.008	0.009	-0.010	-0.019	0.025	0.027**
	(0.011)	(0.016)	(0.013)	(0.013)	(0.011)	(0.017)	(0.018)	(0.021)	(0.013)
	0.886	0.884	0.888	0.859	0.925	0.864	0.936	0.850	0.919
Applied to Four-Year College	-0.020	-0.035**	0.011	-0.009	-0.027	-0.007	-0.095***	-0.004	0.028
	(0.014)	(0.017)	(0.019)	(0.018)	(0.021)	(0.022)	(0.022)	(0.027)	(0.028)
	0.701	*0.686*	*0.718*	*0.623*	*0.814*	*0.629*	*0.832*	*0.611*	*0.803*
Num. Four-Year College Applications	-0.024	-0.097	0.148	0.012	-0.127	-0.001	-0.383**	0.111	0.199
	(0.070)	(0.072)	(0.094)	(0.061)	(0.133)	(0.050)	(0.151)	(0.101)	(0.147)
	2.1	*2.1*	*2.0*	*1.7*	*2.7*	*1.791*	*3.066*	*1.593*	*2.415*
Admitted to Four-Year College	0.001	0.012	0.010	-0.005	0.003	*0.030*	*-0.033*	*-0.042*	*0.042*
	(0.019)	(0.023)	(0.024)	(0.017)	(0.029)	*(0.026)*	*(0.041)*	*(0.031)*	*(0.036)*
	0.521	*0.455*	*0.593*	*0.360*	*0.744*	*0.348*	*0.721*	*0.382*	*0.757*
Plan to Enroll in Four-Year College	0.008	0.002	0.022	-0.003	0.003	*-0.005*	*-0.030*	*0.006*	*0.031*
	(0.016)	(0.021)	(0.022)	(0.018)	(0.020)	(0.027)	(0.032)	(0.032)	(0.025)
	0.370	*0.292*	*0.456*	*0.209*	*0.594*	*0.196*	*0.530*	*0.232*	*0.630*
Observations	5,078	2,640	2,438	2,965	2,113	1,846	794	1,119	1,319

Notes: The sample for all but the top row is the 5,078 (76%) of the sample who responded to the survey. Each point estimate is from a separate regression. Standard errors, in parentheses, are clustered at the high school level. Control means are in italics below standard errors. The dependent variables (listed as row titles) are from students' responses to survey taken during spring of senior year.
*** = significiant at 99% level; ** = 95% level; * = 90% level

Online Appendix:

Sample College Planning Course Materials

Appendix Figure I. Sample Training Agenda

MICHIGAN
COLLEGE ACCESS NETWORK

Teaching Students to Apply – College Planning Course
Training Agenda

Brighton, MI – June 2, 2016

9:00 - Breakfast, Welcome, and Introductions

9:15 - MCAN Overview/How We Define College
Christi Taylor, Michigan College Access Network

10:00 - Career Pathways
Joan Helwig, Huron and Tuscola College Access Networks

11:30 – Match and Fit
Patrick Cooney, Michigan Future Schools

12:30 – Lunch/Curriculum Overview

2:00 – College Admissions
Andrew Zellers, Eastern Michigan University

3:00 – Financial Aid and the FAFSA
Kristen Hooper, Washtenaw Community College

4:45 - Wrap Up and Next Steps

Appendix Figure II. College Planning Course Outline

College Process Timeline	Course Schedule	Topic(s)	Objectives	Assignments/Student Products
Pre-application Planning	Week 1	Welcome and Introduction / Course Overview (College 101)	• Students will become familiar with the structure and expectations of the course • Students will learn key postsecondary education terminology • Students will learn the benefits of attending college	• Begin filling out "Application Readiness Document" to identify the family and background information that students will need in order to submit a college application.
	Week 2	Career Exploration Part 1	• Students will explore careers of interest and high growth occupations in Michigan. • Students will identify the postsecondary educational steps needed to enter their career of interest.	• Completed "Pure Michigan Talent Connect" and "My High School and Beyond Plan" handouts listing postsecondary goals, career interests, and five identified colleges and majors. • Update "Application Readiness Document" to identify the high school and academic information that students will need in order to submit a college application.
	Week 3	Career Exploration Part 2	• Customize a goal statement to align with the requirements of a job posting. • Write concise and effective descriptions of personal and academic credentials. • Use action words to create effective descriptions of personal experiences. • Create a written resume that effectively presents top assets to another person.	• Completed Resume Worksheet • Update "Application Readiness Document" with academic and extracurricular information. • Finish creating a resume.
	Week 4	Match and Fit Part 1	• Students will be familiar with the concept of a college match. • Students will identify their own academic credentials and personal preferences and determine how they compare to colleges of their choice.	• Completed Preference Statement • Match Maker Handout. Students should work through classifying all the colleges in which they have expressed interest, and doing additional research to fill any categories (match, reach, or safety) that did not get filled with the student's initial list.
	Week 5	Match and Fit Part 2	• Evaluate individuals' initial thoughts on future work-life balance • Students will develop a Career/Life Plan • Students will think more deeply about match and fit	• Completed "12th Grade Career/Life Plan" handout

				• Completed "Fit Finder" handout and revised college list (if necessary) based on their research into Match and Fit • List of five colleges (including at least one match, reach, and safety) to which they are interested in applying
	Week 6	Application Process	• Students will describe the key components of a college application. • Students will review sample applications. • Students will identify how prepared they are to submit college applications.	• College Application Steps. Each student should receive College Application Steps handouts and begin to fill one out for each college they will apply to.
	Week 7	Letters of Recommendation	• Understand the importance of having a good recommender. • Understand the process of selecting individuals to make their recommendations. • Understand the process of making a recommendation request.	• List of potential recommenders • Request for recommendation letters
	Week 8	Admissions Essays Part 1	• Learn to identify topic/requirements of personal statements/admissions essays • Begin to write admissions essays	• Freewrite paper • As a take home assignment, students should turn their freewrite exercise into polished essay drafts
	Week 9	Admissions Essays Part 2	• Edit and finalize personal statements/essays	• Peer review worksheets • Revise essay drafts
Application Period	Week 10	Apply	• Begin completing college applications with the intention of applying to at least three colleges by the end of Week 11.	• Online application(s) in progress. • Confirmation page for completed application(s).
	Week 11	Apply	• Successfully complete at least three college applications. o Send off additional information (transcripts, letters of recommendation, etc.) o Application fees	• College application(s) in progress/complete. Confirmation page for completed application(s).
Budgeting, Scholarships, and Aid	Week 12	Budgeting in College	• Identify multiple sources of money • Rate different uses of money as 'need to have' or 'want to have' • Outline several benefits of saving money. • Have students practice creating a budget in preparation for college.	• Summer Financial Budget • Semester Financial Budget
	Week 13	Financial Aid Overview	• Financial aid terms and procedures. • How to complete the FSA ID	• Create an FSA ID

		• Resources for securing financial aid • Materials needed to complete the FAFSA • Official FAFSA site exploration • Describe the FAFSA process	• List of items and information they will need in order to file the FAFSA
	Week 14	The FAFSA Process	• Description of the FAFSA (what is it?) • Importance of FAFSA to financial aid options • Steps to completing FAFSA and financial aid process • Explain what the FAFSA does and its importance to paying for higher education • Describe the steps in the FAFSA completion process through the acceptance of an awardletter	• FAFSA Process Game
	Week 15	Scholarships Part 1	• Students will identify scholarship sources and search websites • Students will become familiar with searching for scholarships • Students will begin to apply for scholarship funds	• Scholarship Tracker. Each student should identify a list of potential scholarship opportunities.
	Week 16	Scholarships Part 2	• Students will continue searching and applying for scholarships.	• Completed scholarship applications
Enrollment and Matriculation	Week 17	Accepting Admission and Financial Aid	• How to think through the final decision on a school • Components of a financial aid package • Student choices and responsibilities in regards to a financial aid package	• College Enrollment Checklist
	Week 18	Final Steps	• Identify important summer steps toward college. • Identify their top ten educational achievements of 9th – 12th grade. • Predict their top ten educational and/or career accomplishments that they will achieve in the next ten years.	• Summer Steps worksheet • Achievements list

Appendix Figure III. Sample Lesson Plan

Pre-Application Planning

Lesson 2 – Match and Fit

LEARNING GOALS/OUTCOMES

- Students will be familiar with the concept of college match and fit
- Students will identify their own academic credentials and personal preferences and determine how they compare to colleges of their choice

MATERIALS NEEDED

- **Student Handouts:**
  - Application Readiness Handout
  - Match Maker Handout
  - Fit Finder Handout
- **Computer with internet access and projector to show video**

CLASSROOM ACTIVITIES

1. **View Big Future Video on How to Choose Colleges to Apply To** (Scroll down to the bottom right) https://bigfuture.collegeboard.org/find-colleges/how-find-your-college-fit

2. **Define Match and Fit.** Write the following definitions on the board. Have students brainstorm some things they should be looking for when determining match and fit. Some examples are also included for you to contribute if they don't get mentioned.

    a. Match: How does selectivity align with your academic achievements?
        i. You should apply to at least one reach school (your GPA/test scores fall below the average), match school, and safety school (your GPA/test scores fall well above the average)
        ii. Example: What is the institution's average admitted ACT score or GPA and how does that compare to yours?

    b. Fit: How does an institution align with your social, academic, and financial needs? Examples include:
        i. Academics and scores: How large a role do academics play in campus life? What is the academic rigor?
        ii. Size and environment: Do you prefer large lecture halls or small classes? What physical campus size are you looking for?
        iii. Sports and activities: Are athletics part your desired college experience?
        iv. Cost of attendance: Factoring in financial aid (both grants and loans), is cost of attendance reasonable for you?
        v. Majors: While you student may not have decided on a major yet, you might have a broad idea of their intended field of study (especially from filling out your "My Initial High School and Beyond Plan.") Are relevant majors offered?

3. **Introduce Students to Match.** Distribute the "Match Maker" handout and have students reference their "Application Readiness Document." Explain to students the various categories of match (reach, safety, match). Using the list of colleges they identified on their "My High School and Beyond Plan" worksheet and their academic credentials recorded on the "Application Readiness Document," students should begin to classify each school on their list, using the "Match Maker"

handout. In order to determine this, students should be referred to various institutions' incoming student web pages or College Scorecard (see activity 6). As a best practice, students should apply to at least one of each type of college – match, reach, and safety. If students do not have each category filled from their list of colleges, they should research additional colleges that fall into their missing categories.

4. **Introduce students to Fit.** Distribute the "Fit Finder" worksheet and give students time to think about the social and recreational opportunities they want in a college. Students should think about their values and what type of college they would like to attend.

5. **Introduce Priority Deadlines.** Some colleges (especially selective ones) have a priority application deadline, typically around November 1, that gives greater consideration to students who apply by this date, but will still accept applications after the date. Very few colleges in Michigan have these deadlines, but students should identify whether their colleges of interest have early deadlines when doing their research and keep this deadline in mind.

6. **Introduce College Scorecard.** The US Department of Education has created a great tool to help students research colleges to determine the best match and fit. Have students visit the College Scorecard website at https://collegescorecard.ed.gov/ and research some colleges of interest.

7. **Review the NACAC guide to determining the right college fit.** It can be found here: http://www.nacacnet.org/studentinfo/articles/pages/determining-the-right-college-fit.aspx

8. **Students identify what they are looking for in a college.** Students should break into groups and begin discussing what they are looking for in a college using the values they identified on their "Fit Finder" handout. They should do additional research on components of college fit and fill out worksheet specifics at home. Students may need to revise their list of colleges based on their findings.

STUDENT PRODUCTS

- **Completed Match Maker and Fit Finder handouts.**

HOMEWORK ACTIVITIES

- **Match Maker handout.** Students should work through classifying all the colleges in which they have expressed interest, and doing additional research to fill any categories (match, reach, or safety) that did not get filled with the student's initial list.
- **Complete Fit Finder handout if it doesn't get completed in class.**

ADJUSTING FOR TIME

- **If you have time left over:** Complete the Lesson 2 Supplemental Activity found in the Course Materials folder. Complete the Fit Finder research in class.
- **If you are short on time:** Cut activity #8 – "Students identify what they are looking for in a college," and have them do this research individually at home. Students can also explore College Scorecard on their own at home.

Appendix Figure IV. Example Class Handout

Budgeting, Scholarships, and Aid

Week 14 – The FAFSA Process – Handout

THE FAFSA PROCESS