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Understanding Student Beliefs and Choices Related to Cross-Enrollment to Square Practice with Theory

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ABSTRACT

College students make repeated course enrollment decisions, which are informed by their beliefs and preferences about course and institutional characteristics. Cross-enrollment, an enrollment pattern in which community college students simultaneously take a class at a 4-year college or university while still enrolled in classes at their community college, poses unique considerations. This article examines community college students' beliefs and preferences related to enrollment on their home campus and at a nearby four-year college. We surveyed 671 transfer-intending students at three California community colleges about their beliefs around the costs and benefits of course-taking at their home community college and a neighboring university. We also conducted a choice-based conjoint experiment to understand how students weigh various factors related to selecting courses at both institutions. We find that community college students' course enrollment decisions at their home campus are driven by cost and anticipated workload, combined with concerns about academic preparation and access to support. However, concerns about administrative burdens associated with transferring credit between institutions drive students' decisions about course enrollment at a neighboring university. These findings are important for administrators planning course offerings and policymakers seeking to increase rates of cross-enrollment.

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Most students who enroll at community colleges intend to transfer to a four-year university and attain a bachelor's degree (Bailey et al., 2015). However, less than a third of all community college students successfully transfer to a four-year institution, and only 13% of all community college students complete a bachelor's degree within 6 years of initial enrollment (Shapiro et al., 2017). In an effort to improve degree completion, several states such as California, Arizona, Virginia, and Washington have enacted simultaneous

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enrollment policies that allow students to enroll in multiple institutions concurrently, both within and across postsecondary sectors (Crisp, 2013; Hindman & Russ-Eft, 2017). For example, students may take classes at multiple community colleges in one semester, often referred to as co-enrollment, or they may simultaneously take classes at a four-year university and a community college, which we refer to as cross-enrollment. Cross-enrollment policies, which generally allow students to enroll without formal admissions and at no additional cost, enable community college students to preview the experience of attending a four-year institution and make connections with faculty and students on four-year campus while completing course requirements for their community college (de Los Santos & Sutton, 2012; Fugate, 2001; Hindman & Russ-Eft, 2017; Mangan, 2018).

California's cross-enrollment policy was signed into law in 1994 to address a perceived need for greater intersegmental cooperation between the three higher education systems in California. Policymakers believed that by improving intersegmental cooperation to increase access to courses and streamline credit transfers, more community college students would transfer (Senate Education Committee, 1994). Indeed, research suggests that simultaneous enrollment opportunities similar to California's cross-enrollment policy have been associated with increased rates of transfer (de Los Santos & Sutton, 2012; Wang & McCready, 2013) and with increased bachelor's degree attainment for community college students (Crisp, 2013; Hindman & Russ-Eft, 2017; Wang & Wickersham, 2014).

In the first 4 years of California's cross-enrollment policy, a report from the University of California (UC) to the Senate Education Committee suggested that fewer than 150 community college students had cross-enrolled at any of the UC Campuses (Atkinson, 1999). However, despite low participation, there was sufficient support for reauthorization and the law remains part of California's education code. California's lawmakers and leaders of the California State University System and the Community College System stated that cross-enrollment showed potential for improving transfer and completion rates across the state (California State Senate, 1999). Locally available data suggest that the uptake has not changed substantially since statewide data were available. For example, at UC Irvine, one of the largest UC Campuses, about 150 students cross-enrolled during the period from Fall 2013 to Fall 2019, despite average annual enrollments of more than 150,000 students across the four nearest community colleges.[1] However, there is no statewide data tracking simultaneous enrollment, courses taken, or institutional patterns. What is clear is that now, more than 30 years after the initial cross-enrollment law was passed in California, students remain largely unaware of the opportunity to cross-enroll (Morales-Gracia et al., 2022).

Recent evidence shows that students express high levels of interest when they are made aware of opportunities to cross-enroll (Morales-Gracia et al., 2022), suggesting that more information could increase cross-enrollment rates. Yet, research also indicates that increased awareness may not necessarily

increase uptake as students report that the decision to register for a class at a four-year university is not straightforward (Morales-Gracia et al., 2022). Students must consider many factors including individual preferences, beliefs, and assumptions about classes and institutions, as well as institutional, structural, logistical, and financial concerns (Wickersham, 2020).

Past work looking at student course-taking and transfer provides some insight into student motivations for simultaneous enrollment. Surveys and interview data suggest that financial and process-driven factors, such as the ease with which students can transfer credits back to their home institution, heavily influence enrollment decisions (Fink & Jenkins, 2017; Kisker, 2007; Wickersham, 2020). Students have also emphasized that perceptions of belonging and feeling welcomed by the institution were key factors in their enrollment decisions, particularly when selecting programs and institutions (Morales-Gracia et al., 2022; Wickersham, 2020).

Though this prior literature has investigated the multiple factors that drive different course-taking decisions on students' home campuses and transfer decisions between schools (Fink & Jenkins, 2017; Kisker, 2007; Wickersham, 2020) we do not yet know which of these factors are important to students when deciding which classes to take at other institutions through simultaneous enrollment or about how students prioritize certain decision factors when picking a course. This lack of research makes it difficult for policymakers and institutional leaders to use existing cross-enrollment policies effectively to support student success.

In this study, we examine community college students' preferences related to course-taking on their home campus and at a nearby university to better understand why students might decide to cross-enroll. Our analysis is guided by the following research questions:

(1) What are students' beliefs related to taking a course (e.g., tuition and fees, available support, difficulty, etc.) on their home community college campus or at a nearby university?
(2) Which course characteristics are most important for students when deciding which courses to enroll in at their home campus and when cross-enrolling at a neighboring university?

We surveyed 671 transfer-intending students at three California community colleges about their transfer plans, their knowledge of cross-enrollment policies, and their beliefs about the experience of taking courses at their home community college and a neighboring university. To develop a better understanding of how the beliefs about course and institution characteristics drive the decision process. We then conducted a choice-based conjoint experiment to better understand specific course characteristics that matter to students when deciding to enroll in a course at their home campus or at a nearby

university. Conjoint experiments have long been used in business and marketing research to understand consumer preferences and predict behavior (see Green & Rao, 1971; Luce & Tukey, 1964). This method allows us to identify specific course characteristics that are appealing to students, as well as to understand how these characteristics are weighed in the decision-making process. In a higher education context, this approach allows us to see which characteristics more heavily influence course selection.

Our findings have implications for colleges and universities promoting participation in cross-enrollment policies at their institutions. We extend prior work that examines student preferences at individual institutions by examining student perceptions of challenges and benefits when selecting courses across institutions and sectors using a conjoint experiment. This novel methodological approach provides a clear understanding of students' preferences about course-taking at their home community college as well as at nearby universities. This could support efforts to provide better information to students.

Literature review

Simultaneous enrollment policies

So-called "non-traditional" paths through higher educations, such as officially transferring between colleges, swirling between multiple institutions over time without officially transferring, stopping out for one semester or more, or enrolling simultaneously in courses at more than one college, are increasingly common, particularly for students who start at community colleges (Adelman, 2005; Borden, 2004; Crawley & LeGore, 2009; McCormick, 2003). The patterns of simultaneous enrollment are varied and complex (Cooper, 2024; Dorman, 2024). In this article, we focus on cross-enrollment, a form of simultaneous enrollment in which a community college student takes a course at 4-year institutions while still enrolled in their home's 2-year campus.[2]

Policies to facilitate cross-enrollment can occur at the state level (e.g., California's statewide cross-enrollment policy, Virginia's Combined Cooperative Degree Program), cooperative programs at a 4-year college with several local community colleges, or programs between individual pairs of colleges. Examples of programs at specific colleges include a program between Indiana's Ivy Tech Community College and Purdue University's College of Agriculture (https://pathwaytopurdue.purdue.edu/), cross-enrollment agreements between Central Virginia Community College and four local colleges (https://centralvirginia.edu/Student-Services/Transfer-Information/Co-Enrollment), and a degree partnership program between Oregon State University and all of Oregon's community colleges (https://catalog.oregonstate.edu/admission/dpp/). California, the setting for this study, has

a legislated statewide cross-enrollment policy encompassing all three public systems of higher education.

Cross-enrollment policies can be designed to address the barriers to persistence and transfer for community college students that have been found in the past empirical work. First, by increasing students' access to variety of course schedules and the geographic locations of courses, cross-enrollment policies can ease the logistical burden of access (Crisp, 2013; Sturtz, 2006). Second, cross-enrollment can allow students to strategically access courses or resources that may improve their chances of successful transfer or decrease their time to completion, such as courses that are only offered on the four-year campus (e.g., upper division courses and laboratory courses) (Morales-Gracia et al., 2022). Finally, cross-enrollment policies may improve students' sense of self-efficacy in several ways such as by providing opportunities for success beyond the community college setting, by providing access to peers and professors at 4-year universities, and by giving students the opportunity to become familiar with a four-year university campus. Evidence suggests that such simultaneous enrollment patterns are associated with greater persistence, increased probability of transfer, and higher degree attainment rates for students who begin at community colleges (Crisp, 2013; Wang & McCready, 2013). Practically, these policies aim to reduce the administrative and financial costs of taking a course on a four-year campus for community college students by allowing enrollment without formal admission and by charging student community college tuition rates, rather than the tuition rates charged to 4-year students or to other visiting students.

Student enrollment decisions

A relatively small body of research has examined how college students make enrollment decisions (e.g., whether to enroll simultaneously in two colleges, which course to enroll in), and even less work has explicitly explored how community college students make decisions. Extant work that has examined course choice in the context of four-year colleges has broadly found that various factors are reliably related to students' reports of why they enrolled in specific courses. Situational constraints such as the day and time a course is offered and major course requirements often top the list (Galotti & Umscheid, 2019; Lee et al., 2021) and career goals and success expectations are also commonly cited factors (Renninger & Hidi, 2016; von Keyserlingk et al., 2019) Our work extends this prior work by examining course choice across campuses and higher education sectors.

Taking courses at multiple colleges adds a layer of complexity for students and thus requires additional considerations. Bahr (2012) examines patterns of co-enrollment among California Community College students. He finds that such simultaneous enrollment is generally a purposeful decision (e.g., taking

advantage of differences in days or times course sections are offered or differences in pre-requisite courses) and that it occurs most often during periods of academic exploration and experimentation. Only one study (Morales-Gracia et al., 2022) has specifically examined how community college students make decisions related to taking classes at a four-year college. Their study, based on focus groups with 102 students, found that students' decision-making process around cross-enrollment was influenced by perceptions of their sense of belonging on a four-year campus, based on beliefs related to institutional prestige and perceived abilities. Specifically, students expressed concerns about a potential lack of professor and counselor availability and fear that the workload and pace may be too intense at four-year institutions. In addition to negotiating perceived fit, students also raised concerns related to additional costs and logistical difficulties such as having to navigate the complex process of transferring credits back to their home campus. Generally, low take-up rates of cross-enrollment policies, combined with this evidence on students' perceptions of these opportunities, motivate the need to better examine students' beliefs about the potential costs and benefits of different enrollment opportunities as well as the specific factors that affect decision-making.

Theoretical framework

Our analytic approach is inspired by Wickersham's (2020) college pathway (re)selection model among beginning 2-year college students. Wickersham's model provides a framework for understanding factors that influence community colleges students' repeated enrollment decisions, such as whether to enroll in the next semester and at which college or which classes to take in each semester. The model builds on prior literature that has examined factors students value when making postsecondary enrollment decisions (e.g., Hossler & Gallagher, 1987) and how these differences vary across contexts and across student groups (e.g., Somers et al., 2006; Wood & Harrison, 2014). Like most of this previous work, Wickersham implicitly draws on classic rational choice models and more recent cognitive models of decision-making that assume that students aim to maximize their personal benefit and make decisions based on available knowledge (Schwartz et al., 2011; Scott, 2000; Ulen, 1999), but that these decisions are affected by socially distributed imperfect information. Therefore, decision-making can be temporally inconsistent and dependent on the situation and context (Hossler & Gallagher, 1987; Wickersham, 2020).

Relative to past work on enrollment decision-making in higher education, and relevant to this study, Wickersham (2020) provides important departures in two ways. First, her model explicitly focuses on students in community colleges and accounts for the factors and contexts specific to this group, such

as employment, age, and the variety of pathways available. Second, Wickersham's model is designed to examine choices that are longitudinal, repeated, and temporally dependent (e.g., whether to re-enroll each term, which major to select, and where to take courses); the model highlights that enrollment is an iterative process for most students in community colleges. By looking past initial enrollment and examining different decision-making points, the model explicitly acknowledges that students weigh short-term (e.g., parking, cost, and workload) and long-term (e.g., alignment with career goals, related to transfer goals) factors when making each decision. Importantly, the model acknowledges that the factors are interconnected and intersectional.

The Wickersham (2020) model identifies six key factors affecting student enrollment decision-making: payoff, fit, place, transferability, mobility, and flexibility. The primary factor, payoff, refers to students' efforts to minimize costs and to maximize educational qualifications through the (re)selection of college pathways. Fit refers to how well a student feels they match with the institutional environment including the size, program, and academic preparation. Place refers to students' preferences in terms of an institutions' location (for personal, professional, or academic reasons). Transferability describes the level of effort it takes community college students to transfer their credits to other institutions. Mobility describes how a specific pathway might enable students to advance their long-term personal and professional goals. The final factor, flexibility, refers to community college students' desire to choose pathways that allow them to manage other responsibilities and choose their desired mode of learning. Each of these factors can have both short- and long-term components. For example, the primary factor, payoff, refers to students' efforts to minimize costs such as effort, travel time, and tuition/fees (short-term) and to maximize educational qualifications (long-term) through the (re)selection of college pathways. Wickersham (2020) notes that these factors are interconnected and interact with each other and that students reengage with the decision-making process each time they select into (or out of) pathways.

This framework guides the data collection and analysis of this study in two ways. First, our study focuses on a specific repeated decision (course enrollment) that is made multiple times after initial enrollment. Second, the factors related to this decision that we examined were inspired by Wickersham's model, both in their focus (e.g., cost, fit, and transferability) and in the fact that we included both short- and long- term considerations.

Data and methods

To better understand the beliefs and preferences about different institution types and the courses that influence student enrollment choices, we deployed a survey in Fall 2020 to a random sample of 1,500 transfer-

intending[3] students at each of three community colleges in one region of Southern California (a total of 4,500 students across three colleges). A total of 671 students (14.8%) responded across the three colleges. As shown in Table 1, 51% of the respondents were female, and a just over a quarter (26%) of respondents identified as Spanish, Hispanic, or Latino/a/e/x while more than a third (35%) were Asian. Roughly 6% of the respondents were currently taking courses at a 4-year institution while enrolled at their current community college, while 21% had been previously enrolled at a 4-year university. The overwhelming majority (75%) of students intended to transfer.

As shown in Table 2, most students in the sample were unaware of cross-enrollment (62%) or were not sure if they had heard of cross-enrollment before (17%). Students who had heard of the policy were asked how closely the definition we provided was to what they understood or assumed cross-enrollment to be. Nearly one-third of students reported they understood cross-enrollment to be different from the definition provided. Despite the lack of awareness, two-thirds of the students were either interested in cross-enrolling in the future (22%) or would have cross-enrolled had they known about it earlier (42%).

Table 1. Sample descriptive characteristics.

	N	%	*M* (*SD*)
Age			23.58 (7.03)
Gender			
Female	345	51.5	
Male	299	44.6	
Neither Female nor Male	26	3.9	
Race and Ethnicity			
Asian	233	34.8	
Black	4	0.6	
Native Hawaiian or Other Pacific Islander	2	0.3	
Spanish, Hispanic, or Latino/a/e/x	175	26.1	
White	204	33.5	
Mixed race	29	4.3	
Declined to state	23	3.4	
Currently Enrolled At			
California Community College	651	97.2	
California State University	14	2.1	
University of California	17	2.5	
Private 4-year university	7	1.0	
Other	7	1.0	
Academic Goal			
Earn an associate degree	95	14.8	
Earn a career/technical certificate	10	1.4	
Transfer without an associate degree	127	19.0	
Transfer with an associate degree	375	55.8	
None of the above	43	6.4	
Not sure yet	20	2.9	
Observations	670		

Standard deviation in parentheses. The current enrollment and academic goal categories exceed 100% as some respondents selected more than one category.

Table 2. Knowledge of cross-enrollment policies.

	N	%
Heard of cross-enrollment		
Yes	145	21.6
No	413	61.6
Not Sure	112	16.7
Does the definition match your understanding[a]		
Totally different	18	12.5
Somewhat different	36	25
Mostly the same	63	43.8
Exactly what I understood	27	18.8
Interest in cross-enrollment		
Interested in cross-enrolling in the future	149	22.3
Not interested in cross-enrolling in the future	236	35.3
Would have cross-enrolled if I had been aware earlier	283	42.4
Observations		

[a]Asked only of students who were aware of the policy.

Survey design

The survey was constructed and administered using QuestionPro, an online survey platform. The survey focused on three areas. The first section asked about students' academic goals and experiences, their awareness and understanding of the cross-enrollment policy, and their intent to cross-enroll. In the next section, we sought to better understand students' beliefs about course-taking at their home campus and at a neighboring university. We presented a series of statements focused on six course attributes identified by prior literature to be important to student enrollment decisions (Table 3). The first two categories, related to the fit of the course for the student's academic

Table 3. Belief statements related to each category.

Category	Asked about	
Belief Statement	Home Campus	Neighboring University
Ability to succeed		
The class will be a lot of work	X	X
I will learn a lot in the class	X	X
Access to support		
Professor will have a good reputation	X	X
It will not be difficult to get help from the professor	X	X
Financial constraints		
There will be a lot of additional costs		X
Administrative barriers		
The process of transferring credit will be easy		X
Course characteristics		
I'll be able to get a face-to-face class		X
Campus characteristics		
The process for registering for class will be easy		X
It will be easy to find parking		X
I'll have a longer drive		X
The college has a good reputation		X
The college offers classes not offered by my college		X
Help my chances of transferring		X
N		

Standard deviation in parentheses.

needs are *ability to succeed* and *access to support*. The third category relates to the economic costs and payoffs related to taking a course, or *financial considerations*. The fourth category relates to the administrative processes involved in credit transfer, or *administrative barriers*. A fifth category focuses on in-person course availability. Finally, a sixth category comprises two of Wickersham's factors and includes place-related constraints such as parking and transportation time, as well as mobility-related factors such as the impact of course-taking on future transfer goals (Galotti & Umscheid, 2019; Wickersham, 2020).

Each of these six categories captures students' beliefs related to course-taking at either their home campus or course-taking at a neighboring university campus (Table 3). Students were asked to report the extent to which they believed each statement. Respondents rated each statement on a 5-point scale ranging from a belief that the statement is *Almost never true* to a belief that the statement is *Almost always true*.

While general questions related to students' beliefs around enrollment choices provide insight into what students believe about specific course enrollment choices, these questions do not take competing priorities or the importance of various factors into account as students make their final decision. For example, while students might state that they believe professors will be more available on their home campus than at the neighboring four-year college, these questions do not allow us to determine how these factors play into course choice or if one factor might dominate all others or be non-negotiable in making an actual course enrollment decision. To account for the importance of various courses and institutional characteristics in the decision process, in the final sections of the survey we conducted a choice-based conjoint experiment, discussed in detail below, to identify student preferences related to the five previously identified course characteristics.

Design of the choice-based conjoint experiment

Conjoint experiments were originally developed for marketing research to understand buyer preference for specific characteristics, referred to as attributes, of multi-attribute products (Green & Rao, 1971). Common examples of this include examining which features (attributes) of a new car (e.g., premium sound, power seats, and extended warranty) or a vacation package (e.g., location, price, accommodations, and activities) are most important to consumers when making a purchase. Within the family of conjoint methods, choice-based conjoint experiments allow researchers to investigate the impact-specific item attributes have on individual choice to predict real marketplace behavior (Rao, 2014).

In a choice-based conjoint experimental design, researchers identify important research-based attributes and use these attributes to create profiles of

a given product (e.g., course difficulty, when and where the course is offered, monetary cost to taking a course) (Green & Rao, 1971; Hainmueller et al., 2014; Rao, 2014; Viano et al., 2021). Product profiles are randomly paired to create head-to-head choice sets, which are then presented to respondents who are asked to choose between the presented options. This approach allows researchers to identify the importance of an individual attribute relative to the other presented attributes (Bansak et al., 2021; Green & Rao, 1971) and draw causal conclusions about the relationship between attribute and choice (see Hainmueller et al., 2014, for a full discussion of causal estimation in conjoint experiments). For example, Viano et al. (2021) used a choice experiment to understand the importance of school attributes that affect teachers' willingness to work in low-performing schools, and the preferred value of those attributes (e.g., consistent administrative support vs. inconsistent support).

To conduct the conjoint experiment, we developed a list of course- and institution-related attributes based on several sources. First, we developed broad categories of attributes based on Wickersham's (2020) model and findings from student focus group interviews related to student perceptions of cross-enrollment by Morales-Gracia et al. (2022). Many of the attributes, particularly those around transferability, mobility, and flexibility — discussed in the pathway (re)selection model (Wickersham, 2020) and identified by students — were reflected in the extant literature (e.g., Bailey et al., 2015; Dowd & Coury, 2006; Galotti & Umscheid, 2019; Goldrick-Rab, 2010; Jaggars, 2014; Morales-Gracia et al., 2022). Prior work stressed the importance of anticipated course workloads and instructor reputations as reported by past students through word of mouth or, more recently, platforms such as RateMyProfessor.com (Galotti & Umscheid, 2019). Additionally, prior literature suggested that community college students express the importance of flexibility, convenience, and time efficiency when selecting courses online versus face-to-face courses (Jaggars, 2014).

Our final list of attributes (Table 4) included a total of six course-level characteristics, five of which are malleable course-level characteristics, and one of which is a location-related characteristic. The first five attributes (course modality, additional cost to taking the course, process for transfer, instructor reputation, and workload of the course) represent malleable course-level characteristics that are within the control of administrators or faculty and thus could be adjusted to increase uptake of cross-enrollment. Each attribute could apply to any course in any discipline and potentially influence a student's decision to enroll. A sixth course-level attribute, course location, was included in a head-to-head comparison between community college courses and courses offered at a neighboring university campus. While there are other factors that may influence a student's decision to enroll in a particular class, such as degree

Table 4. Course attributes by belief category.

Attribute	Values	Rationale
Ability to succeed		
Perceived Workload	Other students say the class requires an average amount of work. Other students say the class requires a lot of work.	Students carefully consider the expected workload of classes before making the decision to enroll(Galotti & Umscheid, 2019). This falls under Wickersham's (2020) *fit* factor in which students consider their academic preparation in the institutional environment.
Access to support		
Past student perceptions	60% of students say they would take a class with the professor again. 90% of students who say they would take a class with this professor again.	Prior work has found that students obtained information about courses from peers and through out-of-class interactions (Morales-Gracia et al., 2022). The percent rating is intended to be similar to Ratemyprofessor.com, a commonly used website that crowdsources student perceptions of faculty. This also falls under Wickersham's (2020) *fit* factor in which students consider the fit of the chosen pathway.
Financial constraints		
Cost	The additional cost of taking this class: no additional cost. $60 additional costs for books. $150 additional costs for books and fees.	Studies indicate that community college students' educational decisions are influenced by costs associated with education (Goldrick-Rab, 2010). For example, having financial aid is found as a key factor in facilitating consistent educational progress while attending community college (Dowd & Coury, 2006). Additionally, costs tie to the perceived payoff, or benefit, in relation to the costs involved in taking the class (Wickersham, 2020).
Administrative barriers		
Process for Transfer	The process to transfer credits back to my home campus is easy. The process to transfer credits back to my home campus is time-consuming.	Studies indicate that the complexity of transferring credits is a barrier to transferring itself (e.g., Bailey et al., 2015; Wickersham, 2020). Prior work suggests that students have a difficult time navigating whether certain courses count toward their degree/transfer (Morales-Gracia et al., 2022).
Course characteristics		
Modality	The course is offered online. The course is offered face-to-face.	Jaggars (2014) found that "most students preferred to take only 'easy' academic subjects online; they preferred to take 'difficult' or 'important' subjects face-to-face" indicating that modality is a contributing factor to course decision-making. The flexibility inherent in online course-taking is also a key factor (Wickersham, 2020).

We primed students to think of two courses that are identical along the following dimensions: 1) Both classes are offered at the same time; 2) Both classes fulfill the same requirements; 3) Students have met the prerequisites for both classes.

applicability, schedule considerations, and pre-requisites, these factors are personal to each student and beyond the control of faculty or administrators.

QuestionPro generated course profiles (Figure 1) with randomly selected values for each attribute and presented 18 random pairs of profiles, or choice sets, split into three different parts. In the first part of the conjoint experiment, respondents were presented with six choice sets of two courses offered at their home campus described using the five malleable attributes. Within each

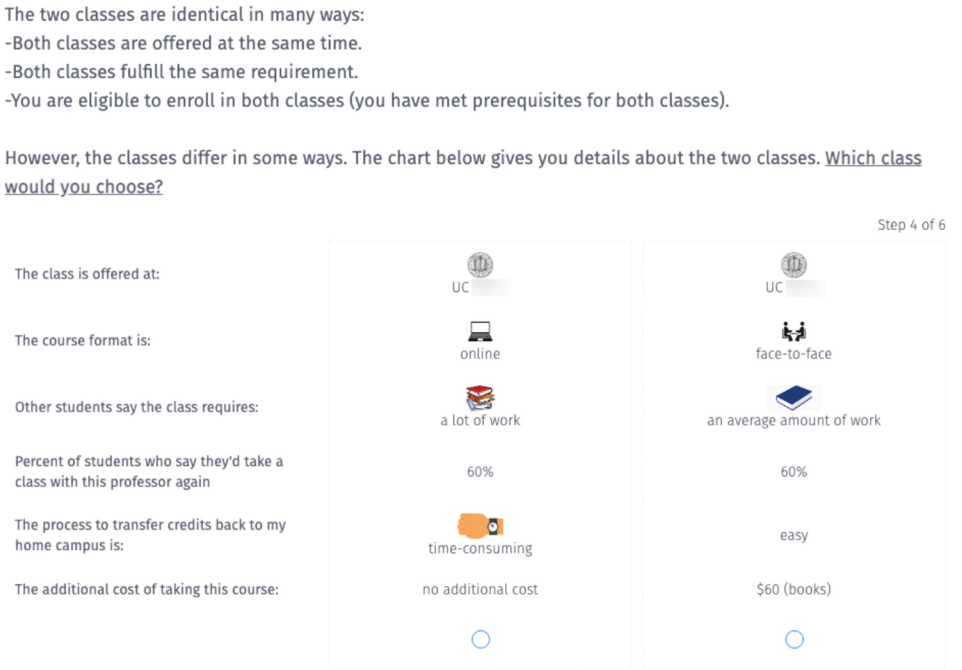

Figure 1. Experimental design: examples of choice profiles. Students were presented with random head-to-head profile comparisons and asked to pick the class they would choose given the two options.

attribute, we presented one value from either two or three possible values, as listed in Table 4. In some cases, these values represented known and well-understood dichotomies such as *online* and *face-to-face* for the course modality. In other cases, we presented logical comparisons such as *an average amount of work* and *a lot of work* for course workload. In each instance, the respondents were asked to consider the choice sets to be identical in the non-malleable, student-specific attributes (e.g., schedule, major requirements fulfilled, and prerequisites) but differing on the presented attributes, as shown in Figure 1. Respondents were then asked to select the course they would prefer to take based on the values of each attribute.

In the second part of the experiment, we probed students' willingness to enroll in courses at a neighboring university campus by asking students to select from six sets of courses with different attribute values all being offered at a neighboring university campus. In the final section, respondents were presented with six randomly paired choice sets, each of which included both home campus courses and courses at the neighboring university campus. Again, respondents were asked to consider all other course characteristics to be identical between the choices.

In instances where an attribute would not realistically be paired with another attribute (e.g., courses at the home campus would not require

a transfer process), we restricted listed attributes to prevent students from being presented with unrealistic choices. Responses to these head-to-head choices allow us to determine the importance students place on a particular course attribute (e.g., additional cost) relative to other attributes (e.g., perceived workload) and which course attributes are most important when making the overall decision to take a course (Viano et al., 2021).

Analysis of choice-based conjoint experiment

Within-campus comparisons

To analyze the results of the conjoint experiment, we use two modeling approaches suggested by prior literature: multinomial mixed logistic regression for within-campus comparisons and ordinary least-squares regression for the between-campus comparisons. The first approach, often used in business and marketing, uses multinomial mixed logits to analyze responses and estimate an ordinal ranking, referred to as a utility rank, of each level of the selected course attributes (Rao, 2014). In conjoint experiments, coefficient estimates of the mixed logit models are referred to as *partworth utilities*, interpreted as an ordinal rank of each level within the attribute (Rao, 2014; Viano et al., 2020). Higher Partworth estimates represent a greater order of preference within the attribute in terms of simple order, not magnitude. For example, an attribute with a partworth utility of 2 is preferred over an attribute with a partworth utility of 1 but not necessarily twice as much. This approach allows us to identify the importance of each attribute as well as preferences for values within each attribute for our within-campus comparisons.

The attribute importance values are calculated for each attribute using the partworth utility values. The attribute importance is the ratio of the within-attribute utility range to the sum of all utility ranges for all attributes:

$$Attribute\ Importance = \frac{Range\ of\ partworth\ utilities\ of\ attribute}{Sum\ of\ all\ ranges\ of\ allattributes'\ partworth\ utilitites} \times 100$$

For example, we would estimate a partworth utility for each value within the Perceived Workload attribute (Table 3) and derive the attribute importance by dividing the range of the value utilities by the sum of all value ranges for all attributes. The resulting importance score is interpreted as the relative weight placed by the students on the attribute when deciding which course to take. While attribute importance can be used to compare the importance of the overall attribute, these scores do not indicate a level preference within the attribute. For example, a high attribute importance for instructor reputation would not indicate whether the preference is for an instructor with a strong reputation or an average reputation, just that reputation matters overall.

Between-campus comparisons

A limitation of this traditional approach is that it is not possible to estimate the interaction between attributes to detect the moderating effect of one attribute on another. We are specifically interested in examining the moderating effects of course location. For example, having a professor with a good reputation may matter more at a community college campus than the neighboring university campus. To account for the moderating impact of course location (home community college vs. neighboring university campus) we use a second approach and estimate an additional set of models providing a between-campus comparison of attribute values.[4] Specifically, we estimate the probability of course selection using a linear probability model (1)[5] following a method similar to Hainmueller et al. (2014).

$$\begin{aligned} Y_{cs} = {} & \alpha + \beta_1 ALotOfWork_{cs} + \beta_2 GoodReputation_{cs} + \beta_3 Mediumcost_{cs} \\ & + \beta_4 HigherCost_{cs} + \beta_5 Online_{cs} + \beta_6 FourYear_{cs} \\ & + \beta_7 ALotOfWork_{cs} \times FourYear_s + \beta_8 GoodReputation_{cs} \times FourYear_s \\ & + \beta_9 Mediumcost_{cs} \times FourYear_s + \beta_{10} HigherCost_{cs} \times FourYear_s \\ & + \beta_{11} EasyTransfer_{cs} \times FourYear_s + \beta_{12} HardTransfer_{cs} \times FourYear_s \\ & + \beta_{13} Online_{cs} \times FourYear_s \times FourYear_s + \varepsilon_{cs} \end{aligned}$$

In a standard linear probability model, we predict the probability Y that course c at institution s is chosen for enrollment. Coefficients in the linear model would represent the average treatment effect (ATE) of each course attribute level in the model. However, in the analysis of a conjoint experiment, the coefficients estimated by the specified model are interpreted as the average marginal component effect (AMCE) of the attribute value and the average component interaction effect (ACIE) of the interaction of attribute values (Hainmueller et al., 2014) on the probability of course selection.

The AMCE is an estimate of the average effect of a given attribute when respondents have information on other attributes.[6] Interaction terms in the model are interpreted as the average component interaction effect (ACIE). The ACIE is the difference in the AMCEs of a given attribute on the interacted attributes. For example, the ACIE captured by β_8 is an estimate of the difference in AMCE of a professor's reputation between the home community college course and a course at the neighboring university. The overall change in probability of a course being chosen (AMCE) based on a professor's reputation at the neighboring campus is calculated as the linear combination of $\beta_6 + \beta_8$.

To avoid impossible choice sets (i.e., a home campus course that requires credit be transferred back to the home campus), certain combinations of attributes are restricted from being randomized into choice profiles, creating what is known as a limited set. In a limited set, the attributes in the

choice profile are not purely random (i.e., transfer would only apply at the neighboring university). In attributes with limited sets, the AMCE is calculated as a weighted average of the marginal difference between the attribute value specified in the model and the reference attribute level. In the case of transfer process, the AMCE of marginal difference between easy transfer and harder transfer at the neighboring university is calculated as $\beta_{11} + .5 \times \beta_{12}$.7 Given that individual preferences are key to the course selection process and therefore not independent, standard errors are clustered by respondents.

Conjoint experiments are dependent on several assumptions related to the choice sets and the overall design of the experiment (Hainmueller et al., 2014; Rao, 2014). First, choice tasks must be *stable*. This means that all choice sets must present the same set of attributes that do not change over the course of the experiment. Second, choice tasks must have *no carryover effects* on other tasks, meaning that a given choice set does not influence the respondent's future choices. Similarly, there must be *no profile-order effects*, meaning that the order in which choice sets are displayed is not intended to make a difference in the choice process. Profiles in each choice set presented by QuestionPro had the same attributes and were presented separately from other choice sets, meeting the first and second assumptions. Finally, the assumption of *randomized design* requires that the attributes of each choice profile are randomly generated. QuestionPro randomly generated choice profiles for each set displayed to every user, meeting the third assumption.

It is important to note that the survey was implemented in Fall, 2020, 9 months into the pandemic-induced transition to fully online education at the three campuses. Given the changes in course delivery during the pandemic, we had to address the potential shift in student thinking about course-taking. It is also important to note that during the pandemic community colleges were losing enrollment while universities in California remained relatively stable. We therefore asked students to answer as if they were "living in a world without the Coronavirus in which it is safe to take classes in person, on-campus" when online learning was not the only option. This instruction was repeated throughout the survey.

Results

Beliefs related to cross-enrollment courses

We first investigate student beliefs about course characteristics. We focus on the five course attributes we manipulate in the choice experiment as well as fixed institutional characteristics of the neighboring university that might influence a decision to take a course on the four-year campus. Table 5 summarizes

Table 5. Average student beliefs about course-taking and campus experience at their home campus and a neighboring university campus.

	Home College	Nearby University
Ability to succeed		
The class will be a lot of work	0.44***	1.12***
	(0.87)	(0.90)
I will learn a lot in the class	0.84***	1.06***
	(0.92)	(0.91)
Access to support		
Professor will have a good reputation	0.67***	0.84***
	(0.90)	(0.93)
It will not be difficult to get help from the professor	0.62***	0.00
	(1.07)	(1.04)
Financial constraints		
There will be a lot of additional costs		1.01***
		(1.06)
Administrative barriers		
The process of transferring credit will be easy		0.44***
		(0.99)
Course characteristics		
I'll be able to get a face-to-face class		0.30***
		(1.10)
Campus characteristics		
The process for registering for class will be easy		0.08*
		(1.04)
It will be easy to find parking		−0.47***
		(1.11)
I'll have a longer drive		0.64***
		(1.32)
The college has a good reputation		1.24***
		(0.94)
The college offers classes not offered by my college		1.06***
		(0.99)
Help my chances of transferring		0.87***
		(1.04)
N	667	644

Standard deviation in parentheses.

students' beliefs about costs and benefits related to course and institutional characteristics that may influence their decision to enroll in courses. Each rating is recentered from the initial 1–5 scale as −2 to 2. On this scale, negative ratings represent an average belief that the statement is untrue while positive ratings represent an average belief that the statement is true; 0 represents the midpoint between "almost never true" and "almost always true." Higher standard deviations indicate greater variance, or less agreement, among students responding to the survey. Each average response was tested against a hypothetical population mean of 0 in a single sample t-test.

Questions related to ability to succeed and access to support were asked about both the home college and the neighboring university. In questions related to perceptions of their ability to succeed in courses, students had a stronger belief that courses at the neighboring university would be a lot of work compared to courses at their home community college. However, they were confident that they would learn a lot at both colleges. In terms of access to course support, students believed

that professors at both colleges would have a good reputation but were uncertain about their ability to get help at the neighboring four-year college.

The remaining questions related to financial constraints, administrative barriers, course characteristics, and campus characteristics were asked only about the neighboring university. Students believed that there would be a lot of additional monetary costs when taking courses at the neighboring university. They also believed that the process of transferring credits earned at the university back to their home community college would be easy. Students were sure they would be able to take a course face-to-face at the neighboring university but were unsure of how difficult the process for registering for classes would be. Students believed parking at the university campus would be difficult and that attending courses at the neighboring campus would result in a longer commute. Students were confident that the neighboring university had a good reputation and believed they could take courses not offered by their community college at the university and that doing so would help their chances of transferring later.

Within-campus importance of course attributes

Next, we explore specific course attributes that influence a student's decision to enroll in a course at their home institution and at a university via cross-enrollment. Table 6 presents conjoint utility estimates and importance scores for each of the presented course attributes for the within-campus comparisons. Larger utilities indicate a higher within-attribute rank in terms of preference. For example, an attribute level with a utility of 0.09 is preferred over

Table 6. Conjoint partworth utilities and attribute importance for within-campus comparisons.

	Home Campus		Neighboring University	
	Utility (1)	Importance (2)	Utility (3)	Importance (4)
Course Format		3.0%		2.3%
Online	−0.09		−0.08	
On-campus	0.09		0.08	
Workload		26.7%		16.5%
A lot of work	−0.78		−0.58	
An average amount of work	0.78		0.58	
Portion would take again		34.8%		22.8%
90%	1.01		0.81	
60%	−1.01		−0.81	
Cost of Materials		35.5%		24.0%
$60 books	0.10		0.07	
$150 Books and Fees	−1.08		−0.88	
No additional Cost	0.98		0.81	
Transfer Process				34.5%
Easy			1.22	
Time Consuming			−1.22	

an attribute level with a utility of −0.09. When choosing between courses at their home community college campus (column 1), students preferred on-campus offerings (as compared to online), courses with an average amount of work (as compared to courses with a lot of work), courses with higher portions of students reporting they would take another class from the professor (as compared to courses that fewer students said they would take another class with the professor), and courses with no additional cost (as compared to courses with an additional cost).

Attribute importance ranks the relative importance of each attribute in the choice set. If all attributes were of equal importance within the home campus choice set, we would expect each to have an importance score of 25% (100/4 = 25). For home college courses (column 2), the cost of course materials was overall the most important attribute (35.5%) in determining whether respondents would select a particular profile in the choice set, with a student preference for lower cost courses. Instructor rating was nearly as important as cost (34.8%), while the workload was slightly lower (26.7%). Interestingly, the instructional modality (online vs. face-to-face) had relatively low importance (3.0%) which may be attributable to student's increased comfort with online classes because of the shift to online courses in response to the COVID-19 pandemic. The low-ranked importance of the online modality should be interpreted with caution as the survey was administered 9 months into the COVID-19 pandemic when all campuses were fully online.

When choosing between two courses at the neighboring university campus (column 3), student preferences for attribute values within course format (online versus on-campus), workload (a lot of work versus an average amount of work), portion who would take a course from the professor again (60% would take the course from the professor versus 90%), and cost ($60 versus $150 versus no additional cost) remained the same as for home-campus classes. Students prefer an easier transfer process for courses taken at the neighboring university campus. With the addition of the transfer process, the overall attribute importance (column 4) shifts with the transfer process becoming the most important (34.5%). The pattern of preferences then parallels home campus preferences: cost of materials (24%) and instructor rating (22.8%) are of similar importance, followed by workload (16.5%) and instructional modality (3%).

Between-campus importance of course attributes

Finally, we extend our analysis to examine choice sets that include courses offered at both the home college campus and the neighboring university campus, allowing us to estimate the effect of the offering institution on the probability of course choice and on the importance of the course attributes. Table 7 presents the between-campus comparisons (average component

Table 7. Average component interaction effects between campuses.

Course Attributes	ACIE
A lot of work	−0.062*
	(0.028)
90% of students would take class again	−0.058*
	(0.028)
$60 in books and fees	0.557***
	(0.031)
$150 books fees	0.580***
	(0.034)
Course is Online	−0.109***
	(0.029)
Profiles	7,938

Estimates presented as average component interaction effects (ACIE) with within-respondent robust standard errors in parenthesis. The analysis included 7,938 choice tasks across 671 respondents. The ACIE is the within-attribute difference of the average marginal component effect (AMCE).
*$p < .05$, **$p < .01$, ***$p < .001$.

interaction effects) of the marginal change in probability by course characteristics and campus.[8] Again, the ACIE represents the average within-attribute change in probability for each component by campus. If a course is a lot of work, considering all other possibilities of other components, the average probability a student will select that course is 6.2% points lower if the course is offered at the neighboring university campus. The average probability that a student will select a course that has an instructor with a good reputation (90% of the students would take the class again) is 5.8% points lower if that course is offered at the neighboring university. Students are 10.9% points less likely to pick an online class if it is offered at a neighboring university. Conversely, if costs of a course are higher, the average probability that course will be chosen is 55% points (a $60 increased cost) higher and 58% points ($150 increased cost) higher compared to a course with the same costs offered by the home campus.

Our full model also estimated the average marginal component effect (AMCE) of the transfer process for neighboring campuses. While not presented in Table 7 with the between-campus comparisons, the within-campus estimates for the easy transfer process and the harder transfer process were similar in relative importance and direction to estimates from the multinomial logit used in the primary within-campus analysis.[9] At neighboring campuses, the likelihood of course selection decreases by 30.2% points with an easy transfer process and 36.4% points with a harder transfer process.

Discussion

One of the most frequent decisions community college students make is which courses to enroll in each semester. For many students, these decisions include

whether to take courses at multiple campuses, which necessitates weighing interrelated beliefs about course and institutional characteristics (Galotti & Umscheid, 2019; Wickersham, 2020). However, despite a large body of academic work focusing on transfer, degree attainment, and academic performance, we know little about how students make these fundamental choices that make up their academic careers.

In this study, we find that students hold generally positive beliefs about taking courses at their neighboring university, particularly those beliefs related to fit (learning a lot in classes), flexibility (classes will be available that are not offered on their home campus), and transferability. Emphasizing these course characteristics could encourage cross-enrollment. However, students also expressed negative beliefs about taking classes at a nearby four-year college, particularly related to place (longer drive times and difficulty with parking), and flexibility (the ability to get a face-to-face class). If administrators wish to increase rates of cross-enrollment, they should consider addressing these concerns.

The results of our conjoint experiment shed light on the course attributes that are most important for students when making enrollment decisions. Our within-campus conjoint models demonstrate that when selecting courses at their home campus, cost, and access to support (payoff and fit) dominate the decision process. However, when students were asked to select between classes at their neighboring university campus, the added administrative burden of transferring earned credits back to their home campus became the most critical component of the choice. Credit must transfer in order for students to see payoffs from their perceived benefits (learning a lot and taking classes that are not available on their home campus) (Wickersham, 2020). Interestingly, students indicated they believed the transfer process would be easy, though arguably in reality it is not. We also highlight potential equity concerns, as administrative burdens often disproportionally affect those with fewer resources (Herd & Moynihan, 2018).

The between-campus conjoint model consistently shows students are overall more likely to select a class at their home community college than at the neighboring university. With one exception, manipulating malleable course characteristics does not change this preference. In most cases, manipulating the characteristics toward the more favorable option (e.g., a more highly rated professor) increases the probability of selecting a community college course. Cost is the only manipulation that sways students toward the university course; students prefer the university course when faced with higher costs. The reasons behind this preference are unclear. It may be that students see taking a class at a university as having a greater payoff (Wickersham, 2020). If the perceived payoff is greater, students may have a greater willingness to pay for the more expensive

university class. In California, more than half of community college students participate in the California Promise Grant program which waives all fees. Given that the community college baseline cost is "free" for most students, it may be that students are more willing to pay additional fees outside of their home campus.

Also of note is that students were less willing to take an online class at the university compared to relative indifference to course modality at their home college. This may reflect a belief that it is more difficult to succeed in classes online (Jaggars, 2014) and that taking an online class at a four-year college would exacerbate existing concerns about their own ability to succeed. It may also suggest that when students do decide to cross-enroll in classes at a university, they do so for the on-campus experience (Morales-Gracia et al., 2022).

These findings are limited in three key ways. First, the three colleges included in our sample are from the same general geographic area and responses could be shaped by prevailing beliefs in the area about nearby universities. Second, the malleable course characteristics identified in the conjoint experiment cannot encompass all possible factors that are salient to students. As with prior research on course and college choice, we are limited in our ability to consider unobservable perceptions, fears, and motivations that are unique to each individual student that may strongly influence their perceptions of payoff, fit, mobility, and place. Finally, the choice-based conjoint method studies decision-making in a controlled experimental environment (Hainmueller et al., 2014; Rao, 2014). External validity is difficult to measure as, in a real-world setting, factors outside the scope of the experiment may dominate student choices and the results should be interpreted with this in mind.

This article contributes to the literature in two major areas. First, we present student beliefs about the costs and benefits of cross-enrollment from a community college to a university. Though cross-enrollment participation is currently low, removing some of the administrative and cost-related barriers could expand cross-enrollment opportunities and subsequently improve student outcomes. Increased understanding of these beliefs can inform policymakers at the state and institutional levels, providing insight into areas where information, administrative processes, and students support may positively influence cross-enrollment uptake.

Second, findings from the choice-based conjoint experiment provide detailed information about the malleable course attributes that influence student decisions to enroll in a specific course. If colleges and universities seek to increase rates of cross-enrollment by improving awareness, it stands to reason that marketing courses that meet student preferences along these characteristics will increase student participation. Additionally, an understanding of how students make choices between institution types can be

used in developing community college–university partnerships, improving articulation and transfer processes, and targeting specific programs of study for cross-enrollment.

Further research should seek to better understand the low prevalence of cross-enrollment. Although our findings provide an empirical examination of a number of course-related factors that may influence a students' decisions to take a specific course, future research should seek to understand individual considerations beyond malleable course characteristics, as well as how specific cross-enrollment opportunities are perceived. Additionally, future research that examines interventions designed to improve cross-enrollment uptake and the subsequent impact on student-level outcomes would contribute to our understanding of this enrollment pattern.

Notes

1. Reported enrollment excludes Coastline College as a very high portion of enrollments are fully online due to partnerships with the Department of Defense.
2. A variety of terms are used in research and in practice for this pattern including concurrent enrollment, vertical simultaneous enrollment, cross-registration, and intersegmental swirling.
3. Transfer intent was identified using the student's reported intention at the time of application or by patterns of course-taking consistent with transfer to the University of California or California State University systems.
4. We test our earlier within campus comparisons using the same approach as a robustness check. We obtain similar results in terms of both magnitude and direction. Results are available upon request.
5. Main effect terms for $EasyTransfer_{cs}$ and $HarderTransfer_{cs}$ are omitted as these are restricted choices in the conjoint experiment — neither can occur at the home campus resulting in a main effect that is colinear with the interaction.
6. It is useful to note that in this sense the choice is multidimensional, taking into consideration the possible effects of the other attributes, averaging over the resulting effect distribution (Hainmueller et al., 2014).
7. More specifically, the weighted average of the coefficients would be calculated as $\frac{1}{2} \times \beta_{11} + \frac{1}{2} \times (\beta_{11} + \beta_{12}) = \beta_{11} + \frac{1}{2} \times \beta_{12}$, where β_{11} is an estimate of the AMCE of $EasyTransfer_{cs}$ and β_{12} is an estimate of the AMCE of $HarderTransfer_{cs}$.
8. Full coefficient estimates from equation 1 can be found in Appendix A, Table A1.
9. These estimates can be found in Appendix A, Table A2.

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Appendix A. Additional tables

Table A1. Linear probability models predicting course selection between-campuses.

	Model 1	Model 2
A lot of work (v. an average amount of work)	0.086***	0.135***
	(0.013)	(0.024)
90% of students would take class again (vs. 60%)	0.168***	0.219***
	(0.012)	(0.023)
$60 in books and fees (vs. no cost)	0.092***	−0.060*
	(0.016)	(0.027)
$150 books fees (vs. no cost)	−0.037*	−0.215***
	(0.018)	(0.031)
Course is Online (vs. on campus)	−0.079***	−0.018
	(0.014)	(0.024)
Easy transfer of credit (vs. no transfer process or hard)	−0.682***	
	(0.014)	
Time consuming transfer of credit (vs. easy or no)	−0.801***	
	(0.013)	
The course is offered at the neighboring university	0.436***	−0.603***
	(0.009)	(0.033)
A lot of work x neighboring university		−0.062*
		(0.028)
90% would take again x neighboring university		−0.058*
		(0.028)
$60 in books and fees x neighboring university		0.557***
		(0.031)
$150 in books and fees x neighboring university		0.580***
		(0.034)
Time consuming transfer process x neighboring university		−0.125***
		(0.017)
Online x neighboring university		−0.109***
		(0.029)
Constant	0.633***	0.610***
	(0.018)	(0.028)
Profiles	7938	7938

Standard errors in parentheses.
*$p < .05$, ** $p < .01$, *** $p < .001$.

Table A1 presents the raw coefficient estimates from the linear probability model specified in Equation 1. These estimates were used to calculate the relevant average marginal component effect (AMCE) and average component interaction effects (AMIE) reported in Table 7.

Table A2. Average marginal component effects for within-campus model.

Course Attributes	CC	UNI
A lot of work	0.135***	0.073***
	(0.024)	(0.017)
90% of students would take class again	0.219***	0.162***
	(0.023)	(0.017)
$60 in books and fees	−0.060*	0.497***
	(0.027)	(0.014)
$150 books fees	−0.215***	0.365***
	(0.031)	(0.013)
Course is Online	−0.018	−0.127***
	(0.024)	(0.019)
Easy transfer process (vs. no process at the home campus)		−0.302***
		(0.016)
Time consuming transfer of credit (vs. no process at the home campus)		−0.364***
		(0.016)
Profiles		7938

Table A2 presents the average marginal component effects (AMCE) for within-campus models. These results serve as a robustness check for the multinomial logit results presented in the primary within-campus analysis.