ASSOCIATION FOR INSTITUTIONAL RESEARCH
Data and Decisions for Higher Education

Dear Xueli,

Thank you for submitting your proposal. A printable summary is below. Your confirmation number is 15169. A confirmation email will be sent to you within 24 hours.

Applicants will be notified of the status of the proposed project on February 2, 2017.

If you have questions or need assistance regarding your application please contact the AIR Grant staff at 850-391-7109 or grants@airweb.org.

SUMMARY

Personal Information

Name	Dr. Xueli Wang
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Demographics

Highest degree	
Discipline of highest degree	
Position description	
Staff members in IR office	
Campus type	
Years of experience in IR	
IR Roles	
Year of birth	
Race/Ethnicity	
Gender	

Grant Type

I am applying for a:

Research Grant

Financial Representative

Name

Robert Andresen

Affiliation

The Board of Regents of the University of Wisconsin System

Department

Research and Sponsored Programs

Title

Associate Director Post-Award Services

Address

21 N. Park Streeet, Suite 6401

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Additional Contacts

Project Description

Project title:

The Role of Community College Attendance in Shaping Baccalaureate Recipients' Access to Graduate and Professional Education

Statement of the research problem and national importance (limit 750 words):

- What is the research problem this proposal intends to address?
- How does this topic relate to the research priorities areas of access, affordability, and value of legal or graduate/professional education?
- Why is this topic of national importance?
- Why is it timely to conduct this research at this time?

Broadening access to graduate and professional education has been a long-standing concern nationally (Council of Graduate Schools, 2016; English & Umbach, 2016; Griffin, Muñiz, & Espinosa, 2012; Perna, 2004). In this endeavor, community colleges play an essential role in supplying and assisting a diverse pool of aspiring graduate and professional students. In recent decades, community colleges came under remarkable spotlight as a key sector in shaping how students participate in and progress through postsecondary education (American Association of Community Colleges, 2015a; Bell, 2012; Mooney & Foley, 2011; National Science Foundation, 2010). Nationally, 1,108 community colleges enroll approximately 7.3 million students annually (American Association of Community Colleges, 2016), including 46% of all undergraduates (American Association of Community Colleges, 2015b). The community college contribution to postsecondary attendance extends well beyond the sub-baccalaureate level into the graduate and professional levels (National Science Foundation, 2010, 2015). Nearly half of all science and engineering bachelor's and master's degree recipients (Mooney & Foley, 2011; National Science Foundation, 2010) and approximately 13% of doctoral recipients across all fields of study (National Science Foundation, 2015) had attended a community college. Indeed, nearly 50% of students starting at community colleges aspire to earn a graduate or professional degree (National Center for Education Statistics, 2011).

These national descriptive data make a strong case for conducting rigorous research to further understand the community college impact on access to graduate and professional education. However, other than the broad descriptive accounts, the empirical base on this topic is virtually nonexistent. This is a critically important gap in the literature that this project intends to fill. Drawing upon the latest national longitudinal survey of students who completed a bachelor's degree during 2007-2008, this study investigates whether and how having attended a community college during their undergraduate years plays a role in baccalaureate recipients' access to graduate and professional education four years since their college completion.

This research topic is both timely and of significant national importance for several reasons. First, diversity in education, especially at the graduate and professional level, is critical for the U.S. to maintain a competitive edge in the global economy (Council of Graduate Schools & Educational Testing Service, 2010) and to make crucial advancements in technology, the environment, and other essential national and global needs (National Academy of Sciences, 2010). However, much remains to be done to improve diversity in graduate and professional education, and other countries are quickly

making gains on the United States (Council of Graduate Schools & Educational Testing Service, 2010). To address this concern, community colleges represent a unique opportunity to diversify graduate and professional education, as a disproportionately large number of first-generation students and underrepresented racial/ethnic minority students either start at or have attended community colleges (Cohen, Brawer, & Kisker, 2014).

Second, affordability of graduate and professional education remains a contested problem for both students and higher education policymakers and researchers (Council of Graduate Schools & Educational Testing Service, 2010; Malcom & Dowd, 2012). Offering much more affordable course and program options, community college attendance may appeal to students as it may lower the total costs of postsecondary attendance, including graduate and professional school. Historically, community colleges have sought to provide postsecondary studies with minimal financial consequences (Dowd & Coury, 2006) and transferability (Cohen et al., 2014), which in turn may influence the diverse student populations enrolling at these institutions to continue their education at the four-year level and beyond with fewer financial constraints.

Third, the ways in which students participate in postsecondary education are increasingly complex, diverse, and nonlinear, including the path to graduate and professional education. As illuminated by the national descriptive data presented earlier, it is clear that community colleges are contributing to the broader scheme of students' education beyond these institutions. A more robust empirical understanding of how community college attendance impacts access to graduate and professional education will yield key policy implications for how to more fairly and holistically evaluate the success of community colleges, when the common metrics solely revolve around graduation and transfer rates (Mullin, 2011). In addition, findings from this research will reveal ways in which different postsecondary sectors, including community colleges and graduate and professional schools, can work together to cultivate more seamless educational pathways, especially for students accessing graduate and professional education. Responding to these prominent and timely issues around access to graduate and professional education and by accounting for how community colleges may factor into a larger viable postsecondary pathway, this research will generate unprecedented empirical evidence on the multifaceted issue of access to graduate and professional education.

Review the literature and establish a theoretical grounding for the research (limit 1000 words):

- What has prior research found about this problem?
- What is the theoretical/conceptual grounding for this research?

Prior Literature

Except for a few national descriptive reports pointing to the sizable number of graduate and professional students who have attended a community college (Mooney & Foley, 2011; National Science Foundation, 2014, 2015), there exists no empirical investigation of the proposed research topic. Nonetheless, prior literature on graduate/professional school enrollment and the impact of community colleges on educational outcomes informs the current study.

For decades, community colleges have been viewed as a major sector that democratizes higher education through their transfer function. Accordingly, there is a long line of research that tests whether attending community colleges affects transfer students' success at receiving four-year institutions. While earlier studies claimed that community colleges "cool out" students' aspirations and the probability of earning a baccalaureate degree (e.g., Clark, 1960; Dougherty, 1992; Doyle, 2010; Pascarella, Edison, Nora, Hagedorn, & Terenzini, 1998; Rouse, 1995), more recent evidence suggests that, once students successfully transfer from community colleges to four-year institutions, they enjoy comparable educational attainment in comparison with their counterparts beginning at four-year institutions (e.g., Melguizo & Dowd, 2009; Melguizo, Kienzl, & Alfonso, 2011). In particular, departing from earlier studies, recent research leverages rigorous quasi-experimental designs to better account for the issue of self-selection in studying the impact of community college attendance. For example, Melguizo and Dowd (2009) controlled for self-selection by using an instrumental variable approach and estimated a fixed-effects model using two-stage regression techniques. Their study revealed that community college transfer students were as likely to succeed as beginning four-year students.

Community colleges have also been studied as a major contributor to students' larger postsecondary attendance patterns. For example, research on postsecondary co-enrollment by Crisp (2013), Wang and McCready (2013), and Wang and Wickersham (2014) points to the potentially positive influence of having attended a community college on students' progression toward their longer-term educational goals. Taken together, the body of research on the impact of community college attendance highlights these institutions' unique potential in helping students advance beyond a community college credential. However, how community college attendance affects students' access to graduate and professional education is not well understood.

There is a fair amount of literature that has uncovered a plethora of factors related to enrollment in graduate and professional programs. At the individual student level, background characteristics at play include socioeconomic status (e.g., Ethington & Smart, 1986; Millett, 2003; Walpole, 2003), gender (e.g., English & Umbach, 2016; Hearn, 1987; Perna, 2004), race/ethnicity (e.g., English & Umbach, 2016; Millett, 2003; Nettles, 1990; Perna, 2004; Zhang, 2005), parental education (e.g., Hearn, 1987; Pascarella, 1984), as well as the primary language spoken in students' homes (e.g., Perna, 2004). Also, academic preparation and performance through schooling is a consistently strong predictor of graduate or professional enrollment (e.g., English & Umbach, 2016; Heller, 2001; Zhang, 2005).

As students transition through college, a number of other factors further underlie access to graduate and professional schools. Specifically, undergraduate experiences (e.g., Ethington & Smart, 1986; Hathaway, Nagda, & Gregerman, 2002), major fields of study (e.g., Heller, 2001; Mullen et al., 2003; Zhang, 2005), and educational expectations (e.g., Mullen et al., 2003) are important college factors to consider. In addition, students' financial support and barriers influence their pursuit of graduate and professional education, as debt burden (e.g., English & Umbach, 2016; Heller, 2001; Perna, 2004) and financial support received (e.g., Millet, 2003; Perna, 2004) both play a significant role. In regard to institutional characteristics, baccalaureate institutions' selectivity, size (e.g., Ethington & Smart, 1986; Millett, 2003), along with location, control, and Carnegie classification (e.g., English & Umbach, 2016; Perna, 2004), were found to influence graduate school enrollment.

Theoretical Grounding

This study is informed by the theoretical perspectives of human capital and rational choice, as well as extant literature on factors contributing to access to graduate and professional education. Human capital theory (Becker, 1975) represents an appropriate lens to examine the influence of specific types of postsecondary attendance on educational attainment and outcomes at both undergraduate and graduate levels (Dale & Krueger, 2002; Paulsen & Toutkoushian, 2008). Human capital theory suggests that students choose educational options and how they invest in these options in order to

maximize their utility. In this sense, a baccalaureate recipient's decision around whether to attend a community college during their undergraduate years as well as whether to pursue graduate or professional education can both be informed by expected monetary or nonmonetary costs and benefits (Becker, 1993; Elwood & Kane, 2000). In particular, the decision regarding whether to attend a community college can be viewed from a rational choice perspective. Rational choice theory posits that individuals form a conclusion about the outcomes of an action based on an assessment of available information, and when the perceived incentives are strong, will consistently choose the perceived best action (Kien-hong Yu, 2011; Tierney & Venegas, 2009). In the context this study, students may consider information related to the cost, academic rigor, availability, and scheduling options associated with community college program and course offerings when making decisions around whether to attend a community college. Similarly, the rationale choice process approaches graduate or professional school enrollment as a cost-benefit analysis.

Further, the ways in which community college attendance is related to access to graduate and professional education may play out in a highly nuanced fashion within the framework of human capital and rational choice. Students who choose to attend community colleges are likely to be sensitive to costs as well as economic returns to their education. For example, they may focus on the expediency of baccalaureate attainment in order to immediately enter the workforce, thus forgoing graduate and professional educational options following undergraduate completion. On the other hand, aspiring graduate or professional students, such as aspiring law students for example, are likely to perceive greater returns of an advanced degree, and therefore are willing to delay entrance into the workforce in order to pursue graduate or professional degrees. Consequently, the theoretical grounding for this study also calls for a nuanced investigation of the community college attendance impact based on specific disciplines within graduate and professional education.

Describe the research method that will be used (limit 1000 words):

- What are the research questions to be addressed?
- What is the proposed research methodology?
- What is the statistical model to be used?

Research Questions

Guided by the theoretical grounding and relevant prior literature, this study seeks to answer two research questions:

First, what is the impact of having attended a community college on baccalaureate recipients' access to graduate and professional schools in general? Since there is no previous research examining this topic, answering this question will offer an overall estimate of the community college impact on access to graduate and professional education in general.

Second, how does previous community college attendance influence student enrollment in different professional and graduate programs? This nuanced and discipline-specific approach will yield findings that provide contextualized insights into access to varying graduate and professional programs and the specific ways in which community college attendance helps or hinders such access.

Methods

This study is based on restricted-use data from the 2008-12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12), the third and latest administration of the national longitudinal survey of students' education and work experiences after completing a bachelor's degree. Conducted by the U.S. Department of Education's National Center for Education Statistics (NCES), B&B:08/12 follows a nationally representative sample of bachelor's degree recipients who completed their degree requirements during the 2007-08 academic year and who were first interviewed as part of the 2007-08 administration of the National Postsecondary Student Aid Study (NPSAS). Two follow-up studies have been conducted with this cohort, with the first follow-up administered one year after graduation that focused on undergraduate experiences and early post-baccalaureate outcomes, and the second completed in 2012 that closely examined students' enrollment in graduate and professional programs as well as labor market experiences through the 4th year since college graduation.

This research will include all three data waves of the B&B:08/12 sample of nearly 17,000 respondents. Of this sample, 36% had ever attended a community college (defined as a public 2-year institution) before completing baccalaureate degrees in 2007-08, and 20.3% of the total sample began postsecondary education at a community college. As of 2012, about 30.0% of the total sample enrolled in a master's degree program, 2.5% in a doctoral degree program, and 5.3% in a professional degree program. In particular, 3.4% of the total sample enrolled in programs categorized as legal professions and studies.

The key independent variable is whether respondents had attended a community college (1=yes and zero otherwise). To mirror the complex ways in which community colleges factor into the larger scheme of postsecondary attendance, two approaches will be used to construct this "treatment" variable, with one restricted to beginning college at a community college and the other broadened to having ever attended a community college during one's undergraduate years regardless of where students began postsecondary education. Both approaches will be adopted and tested throughout all phases of the analysis to generate nuanced findings.

The dependent variable for the first research question is a dichotomous indicator of whether or not respondents had enrolled in graduate or professional schools as of 2012. The dependent variable for the second research question is a multi-categorical variable indicating the following areas of graduate and professional school enrollment as of 2012, with no graduate or professional enrollment as the reference category: (a) humanities, (b) social sciences, (c) science, technology, engineering, and mathematics (STEM), and (d) professional fields such as law and business. A preliminary examination of the B&B:08/12 data indicates sufficient subsample sizes within each specified fields of study, with the potential for further breakdowns within professional fields such as law school enrollment.

The research design follows two main steps: (1) the propensity score matching to establish the "treatment" and "control" groups based on students' community college attendance and (2) multilevel modeling to answer the two main research questions. First, this project deals with students' self-selection in their decision to attend a community college by adopting propensity score matching (Rosenbaum & Rubin, 1983; Rubin, 1974, 1976) that balances the "treatment" and "control" groups (baccalaureate recipients who attended community colleges and those who did not) based on a host of observed student characteristics. See Appendix A for the statistical models and equations associated with propensity score matching.

Once the propensity score is obtained, this study adopts the individual case matching approach where each treated subject matches with at least one control subject who has the same or a very similar propensity score. This method helps yield more stable estimates in a relatively large sample, especially where the number of control cases is considerably larger than treatment cases, as in this study (Guo & Fraser, 2010). The propensity score analysis will be complemented by a sensitivity analysis using the Wilcoxon's signed-rank test in Stata (Gangl, 2004) that assesses the potential impact of unobserved confounders on the treatment effect.

In the next step, hierarchical generalized linear models (HGLMs) will be conducted to answer both research questions. HGLMs are an extension of generalized linear model (McCullagh & Nelder, 1989) to the context of hierarchical data and are appropriate for analyzing categorical, non-normally distributed outcomes including binary and categorical response variables (O'Connell, Goldstein, Rogers, & Peng, 2008), as is the case in this study. Refer to Appendix A for the statistical models and equations associated with HGLM. A complete list of variables to be used in the study is presented in Appendix B.

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Project Description - Appendix

- Appendices

Datasets

List the datasets that will be used and explain why they best serve this research (limit 500 words)

The proposed research will utilize the most recently available, nationally representative data from the 2008-12 Baccalaureate and Beyond Longitudinal Study (B&B:08/12). Conducted by the U.S. Department of Education's National Center for Education Statistics (NCES), B&B:08/12 follows a large national sample of bachelor's degree recipients who completed their degree requirements during the 2007–08 academic year. Three waves of data collection capture both baccalaureate recipients' educational experiences prior to completing undergraduate education and their post-baccalaureate enrollment behaviors, particularly in regard to access to graduate and professional education. In addition, detailed data of student background as well as postsecondary attendance and transcripts are available in B&B:08/12. Given its longitudinal design, national generalizability, and robust transcript and survey data collection that is of direct relevance to the study's focus on community college attendance in relation to graduate and professional school access, B&B:08/12 is best suited for addressing the proposed research questions. In particular, B&B:08/12 contains a holistic set of theoretically sound variables that will allow a well-informed investigation of this highly understudied topic. Further, the sizable number of respondents who enrolled in law school will make possible nuanced and specific analysis of this particular group along with individuals enrolled in specific professional and graduate programs.

Statement of use of restricted datasets (limit 250 words):

Applicants should provide a statement indicating whether the proposed research will require use of restricted datasets. If restricted datasets will be used, the plan for acquiring the appropriate license should be described.

If restricted datasets will not be used, leave this text box blank and click *Save and Continue*.

This study will employ restricted-use data from the B&B:08/12. I am currently authorized to use these restricted-use data through a site license at the School of Education of UW–Madison.

Timeline and Deliverables

Timeline:

Provide a timeline of key project activities.

March 1 – May 31, 2017

- Perform a thorough review of B&B:08/12 data elements
- Refine variable list as needed
- Conduct data quality check including distributions and missing data
- Refine data analysis plans as needed

June 1 – September 30, 2017

- Finalize data cleaning
- Conduct missing data analysis
- Perform propensity score matching analysis
- Perform multilevel analysis
- Prepare and submit mid-year report

October 1, 2017 – February 28, 2018

- Finalize data analysis
- Quality check of all data analyses
- Write up results and prepare statistical tables
- Refine literature review and research methods sections as needed
- Prepare final report
- Present findings at the Access Group Legal Education Research Symposium
- Submit one or more research articles for peer-reviewed publications

Deliverables:

List deliverables such as research reports, books, and presentations that will be developed from this research initiative.

The following deliverables will result from this project:

- Research reports to AIR, including mid-year progress report and final report;
- Presentation of findings at the Access Group Legal Education Research Symposium
- Presentation at the 2017 annual conference of the Association for the Study of Higher Education;
- Research article(s) to be submitted for publication in Research in Higher Education, and/or Journal of Higher Education.

Disseminate results:

Describe how you will disseminate the results of this research.
(Note: Costs of travel to meetings should be calculated on the budget page.)

Manuscripts based on this study will be submitted for publication in Research in Higher Education and/or Journal of Higher Education. In addition, the research papers will be disseminated as working papers through the Wisconsin Center for Education Research (WCER) where I serve as a researcher and principal investigator. A policy brief that focuses on the policy implications of the study will be published through the Wisconsin Center for the Advancement of Postsecondary Education (WISCAPE) where I serve as a faculty scholar. Both WCER and WISCAPE publications are distributed via the centers' websites, e-newsletters, targeted e-mail announcements, and limited print production. As previously described, results of this research will also be presented at the Access Group Legal Education Research Symposium and the 2017 annual conference of the Association for the Study of Higher Education.

IRB Statement

Statement of Institutional Review Board approval or exemption (limit 250 words):

As part of the proposal, a statement outlining a plan for Institutional Review Board (IRB) approval is required. The statement should outline the applicant's timeline and plan for submitting the proposal to an IRB or explain why IRB approval is not necessary. Final IRB action is not necessary prior to submitting the application.

The Institutional Review Board (IRB) at the University of Wisconsin-Madison specifies that research projects involving analysis of secondary data from NCES do not require prior IRB approval.

Biographical Sketch(es)

Biographical sketch (limit 750 words):

Dr. Xueli Wang is an associate professor in the Department of Educational Leadership and Policy Analysis at the University of Wisconsin–Madison. She holds a Ph.D. in Higher Education and a graduate minor in quantitative research methods from The Ohio State University. Wang's research centers on the educational pathways and success of students who have attended community colleges as well as students' access to and participation in STEM fields of study. Wang's work appears in numerous academic journals, such as American Educational Research Journal, Educational Evaluation and Policy Analysis, Educational Researcher, Teachers College Record, Journal of Higher Education, Research in Higher Education, Review of Higher Education, and Community College Review. In 2015, she received the Barbara K. Townsend Emerging Scholar Award by the Council for the Study of Community Colleges.

Wang has extensive training and experience in advanced quantitative methods involving large-scale national and state longitudinal databases. She has rich experience using NCES databases such as BPS:04/09, ELS:2002, and NELS:1988/2000, often drawing upon sophisticated statistical modeling approaches and quasi-experimental designs. Her content and methodological expertise, along with her experiences working with national datasets as a principal investigator, well qualifies her to complete the proposed study.

Budget

- AIR Grant Budget Wang Updated

Funding History

Funding history (limit 250 words):

A statement of prior, current, and pending funding for the proposed research from all sources is required. The statement should also include a history of all prior funding from AIR to any of the PIs for any activity. Funding from other sources will not disqualify the application but may be considered in the funding decision.

I have not received prior or current funding for the proposed research. I have been awarded funding from AIR for projects unrelated to this study, all resulting in peer-reviewed publications, including a 2015 Charles F. Elton Best Paper Award from AIR. As a doctoral candidate, I received a 2007–2008 AIR dissertation grant, and as faculty, I received an AIR research grant in 2011 and 2013 respectively. For each of these funded projects, I fulfilled all obligations required of the funding in a timely fashion. Below is the complete listing of the publications as a result of AIR funding.

Wang, X. (2016). Course-taking patterns of community college students beginning in STEM: Using data mining techniques to reveal viable STEM transfer pathways. Research in Higher Education, 57(5), 544-569. (Charles F. Elton Best Paper Award)

Wang, X. (2013). Why students choose STEM majors: Motivation, high school learning, and postsecondary context of support. American Educational Research Journal, 50(5), 1081-1121.

Wang, X. (2013). Modeling entrance into STEM fields of study among students beginning at community colleges and four-year institutions. Research in Higher Education, 54(6), 664-692.

Wang, X. (2012). Factors contributing to the upward transfer of baccalaureate aspirants beginning at community colleges. The Journal of Higher Education, 83(6), 851-875.

Wang, X. (2012). Academic performance of community college transfers: psychological, sociodemographic, and educational correlates. Community College Journal of Research and Practice, 36(11), 872-883.

Wang, X. (2009). Baccalaureate attainment and college persistence of community college transfer students at four-year institutions. Research in Higher Education, 50(6), 570-588.

Dissertation Advisor Letter of Support

There are no files attached.

Appendix A. Statistical Models and Equations

Propensity Score Matching

In this study, let $z_i = 1$, or 0 where z_i is respectively denoted to having attended a community college or not for student *i*, given a vector of observed covariates, x_i. That is, the propensity score (PS) of student *i* attending a community college can be expressed as,

$$PS_i = Pr(z_i = 1 \mid x_i) = p(z_i).$$

Express PS in a logistic function,

$$p(z_i) = e^{zi} / (e^{zi} + 1) = 1 / (1 + e^{-zi})$$

Then, the linear propensity score, $logit(PS_i)$, can be assessed using a logit model written as,

$$logit(PS_i) = ln\,(PS_i/(1\text{-}PS_i)) = ln(1/e^{-zi}) = z_i$$
$$z_i = \beta' x_i$$

where β' is a row vector of regression coefficients and x_i is a column vector of the covariates of student *i*.

Hierarchical Generalized Linear Modeling

To illustrate, for individual student *i*, nested in baccalaureate institution *j*, the log odds of the student's enrollment in graduate or professional schools relative to no enrollment can be expressed by the following function, the within-college model:

$$\log\left[\frac{\varphi_{ij(k)}}{\varphi_{ij(r)}}\right] = \beta_{0j(k)} + \beta_{1j(k)} \times (community\ college\ attendance)_{ij}$$
$$+ \boldsymbol{B}'_{2j(k)} \times [background\ characteristics]_{ij} + \boldsymbol{B}'_{3j(k)} \times [academic\ preparation]_{ij}$$
$$+ \boldsymbol{B}'_{4j(k)} \times [college\ experiences]_{ij}$$
$$+ \boldsymbol{B}'_{5j(k)} \times [educational\ expectations]_{ij}$$
$$+ \boldsymbol{B}'_{6j(k)} \times [finances]_{ij}$$

In addition, the between-college model is expressed as follows:

$$\beta_{0j(k)} = \gamma_{00(k)} + \boldsymbol{\Gamma}'_{0(k)} \times [institutional\ characteristics]_j$$

where (k) indicates the outcome category *k* and (r) is the reference category—no graduate or professional enrollment.

A complete list of variables to be used in the study is presented in Appendix B.

Appendix B. List of Variables in the Proposed Study

Variable name	Description	B&B:08/12 label
Key dependent variables		
Enrollment in graduate or professional school as of 2012	Research Question 1: Whether respondent had enrolled in master's, doctoral, or professional degree program Research Question 2: Enrollment in specific fields of graduate or professional study	B2MSTR12 B2DCTR12 B2PROEV B2HIEMAJ
Key independent variable		
Community college attendance	Definition 1: Whether respondent's first postsecondary institution was a public 2-year college Definition 2: Whether respondent ever attended a public 2-year institution before 2007-08 bachelor's degree completion	I1PUB2 ATT2PUB
Covariates in propensity score matching and multilevel modeling		
Background characteristics		
Respondent's age	Respondent's age (in years) at first enrollment in postsecondary education	AGEPSE
Respondent's gender	Dummy variable (1=female, 0=male)	GENDER
Respondent's race/ethnicity	A series of dummies with White as the reference category	RACE
Respondent's parental education	Whether respondent is a first-generation student, recoded from parents' highest level of education (1=yes, 0=no)	PAREDUC
Citizenship	Whether respondent was born in the U.S.	USBORN
Socioeconomic status	Whether respondent met eligibility criteria for the federal TRIO Programs, based on combinations of income and parent education levels	TRIO
Respondent's primary language	Whether English was the primary language respondent spoke at home while growing up (1=yes, 0=no)	PRIMLANG
Distance from high school	Whether respondent was living more than 50 miles from the high school where last attended	B1HRELOC
Academic preparation		
High school performance	High school grade point average (GPA)	HSGPA
Advanced placement	Earned Advanced Placement credit in high school	HSCRDAP
College credits	Earned any college credits in high school	HSCRDANY
Type of high school	High school type attended (1=private, 0=public)	HSTYPE
Level of high school math	Highest level of math completed in high school	HCMATHHI
Years of high school math	Number of years of high school math	HCYSMATH
Years of high school science	Number of years of high school science	HCYSSCIE
Years of high school English	Number of years of high school English	HCYSENGL
1st year college performance	Transcript GPA in year 1 of attendance	QEYR1GPA

Variable name	Description	B&B:08/12 label
Additional covariates to be added in multilevel modeling		
Individual level variables		
College experiences		
Satisfaction with major	Satisfaction with undergraduate major choice	B1MAJCHO
Satisfaction with undergraduate education	Satisfaction with quality of education at bachelor's degree institution	B2INCHO
Work-study	Respondent's 2007-08 work-study job was related to undergraduate coursework or major/field of study	SJMAJOR
Undergraduate employment	Respondent's undergraduate job was related to major or field of study	JOBMAJOR
Perceived value of undergraduate education	Whether respondent thought their undergraduate education was worth its financial cost	B1COBEN
Study abroad	Ever studied abroad as of 2007-08	NUSABEVR
Choice of major	Ever formally changed major at bachelor's degree institution as of 2009	B1NPMJCH
Remediation	Remedial courses: # taken	QETOTR
Overall college academic performance	Undergraduate GPA as of 2007-08	GPA
Educational expectations	Whether respondent expects to earn a graduate degree (1=yes, 0=baccalaureate only)	HIGHLVEX
Finances		
Pell grant amount	Federal Pell grant in 2007-08	PELLAMT
Merit-based aid	Total merit-only grants in 2007-08	MERITAID
Need-based aid	Total need-based grants in 2007-08	NEEDAID
Debt burden	Cumulative federal amount owed for undergraduate as of 2008-09	B1FDOWE1
Institutional level variables		
Selectivity	Selectivity of 2007-08 bachelor's degree institution	SELECTV2
Highest degrees offered	Highest level of offering at 2007-08 bachelor's degree institution	HLOFFER
Institutional control	Control or affiliation of the respondent's 2007-08 bachelor's degree-granting institution	CNTLAFFI
Carnegie classification	Carnegie classification of the respondent's 2007-08 bachelor's degree-granting institution	CC2005B
Institutional size	Indicates the enrollment count for Fall 2006 at the respondent's 2007-08 bachelor's degree-granting institution	ENRLSIZE
Intuitional location	Degree of urbanization of 2007-08 institution	LOCALE

Research Grant Proposal Budget Form

Name Xueli Wang

Personnel - Salary

Principal Investigator	$	40,511.95
Second Principal Investigator	$	
Third Principal Investigator	$	
Graduate Research Assistant	$	7,488.00

Travel

2017 Access Group Legal Education Research symposium:	$	1,000.00
Other research related travel:	$	

(***Note***: Other planned travel should be listed in the "Timelines and Deliverables" section)

Other research expenses

Please provide a breakdown of expenses below and add the total value in the box to the right. Allowable expenses include: materials, such as software, books, supplies, etc.; consultant services, such as transcription, analysis, external researchers, etc.; and costs for publishing articles in journals. The purchase of computer hardware, overhead or indirect costs, and living expenses are not allowable. If you have questions about specific expenditures, please contact AIR.	$	1,000.00

Funds are allocated in the amount of $1000 to support the travel and attendance at the Access Group Legal Education Research Symposium for one doctoral research assistant to be involved in this project.

TOTAL REQUESTED – Maximum Allowable is $50,000	$	49,999.95