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Supporting College Student Success through Applied Learning: Considering Associations with Average College Grades, Graduation in Four Years, and Degree Aspirations

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Abstract

While previous research has examined the association between various forms of applied learning and effects on student outcomes, the present study examines engagement in forms of applied learning and three distinct measures of student success. Using longitudinal data from the Wabash National Study, this analysis examined the relationship between undergraduate participation in forms of applied learning and students' graduation within four years, fourth-year college grades, and post-baccalaureate degree aspirations. Results suggested that certain applied learning experiences were associated with specific forms of student success. Specifically, the odds of graduation within four years increased for students who participated in internship, capstone, or study abroad experiences but decreased for students who participated in an independent study or volunteer experience. Applied learning experiences associated with higher college grades included faculty asking students to apply theories or concepts to practical problems or in new situations, completing an independent study, capstone, internship, research with a faculty member, or study abroad experience, but applying concepts to exams or assignments was associated with lower college grades. Finally, higher levels of students' educational aspirations were associated with participating in research with a faculty member and study abroad. Together, these findings emphasize the need for institutions of higher education, faculty, and student affairs practitioners to nuance applied learning opportunities in relation to student success goals.

Keywords: undergraduates, applied learning, student success

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Supporting College Student Success through Applied Learning: Considering Associations with Average College Grades, Graduation in Four Years, and Degree Aspirations

The challenges of the COVID-19 pandemic have reiterated the importance of engaging in practices that can help undergraduates to succeed. In a survey of students conducted by *Inside Higher Ed* and College Pulse, most undergraduates who responded reported learning less in 2021 than they had in academic years prior to the pandemic (Ezarik, 2021). The American Association for Colleges and Universities (AAC&U, 2018) defines applied learning as opportunities in which students apply classroom content to problems. Applied learning can benefit students by enhancing their experience and demonstrating real skills to employers (Hart Research Associates, 2015). Research on student outcomes has demonstrated that various forms of applied learning can be associated with numerous benefits for undergraduate students (Trolian & Jach, 2019), including academic motivation (Trolian & Jach, 2020), students' attitudes toward professional success (Jach & Trolian, 2022), and students' overall psychological well-being (Trolian & Jach, 2022). While previous research has considered how high-impact practices (HIPs) have been associated with student persistence and retention as measures of student success (Provencher & Kassel, 2019; Valentine & Price, 2021), the present study seeks to broaden this work by considering curricular and co-curricular forms of applied learning. Furthermore, this study responds to the call for future research on applied learning to use longitudinal approaches (Schwartzman & Bouas Henry, 2009).

This study examines undergraduate student engagement in several forms of applied learning and their association with three measures of college student success: graduation within four years, fourth-year college grades, and fourth-year educational aspirations using longitudinal data from the Wabash National Study of Liberal Arts Education (WNS). We include the following measures of applied learning: how often faculty asked students to apply theories or concepts to practical problems or in new situations; how often exams or assignments required use of course content to address a problem; and whether students engaged in the following experiences during college: independent study; senior capstone; an internship, co-op, or practicum; research with a faculty member; study abroad; service-learning as part of a course; community service or volunteer work; and engaging in out-of-class experiences that help to translate knowledge and understanding from the classroom into action.

Review of Literature

We briefly consider previous literature on applied learning, as well as the body of literature on undergraduate student success, with attention to time to degree completion, college grades, and degree aspirations.

Applied Learning in Higher Education

The AAC&U (2018) has defined applied learning as "an understanding and a disposition that a student builds across the curriculum and co-curriculum, from making simple connections among ideas and experiences to synthesizing and transferring learning to new, complex situations within and beyond the campus" (para. 2). Examples of curricular forms of applied learning include applying concepts to problems, independent study, research with faculty, internships, capstone experiences, and study abroad. Examples of co-curricular applied learning include volunteering, completing a community project, peer education, student leadership, and out-of-class experiences applying classroom learning. For many decades, theorists have posited that applying solutions to problems can enhance educational experiences (Dewey, 1938), with Kolb's (1984) theory of experiential learning emphasizing the importance of adults having opportunities to apply their learning. Kuh (2008) deemed specific forms of applied learning to be HIPs due to their engagement with deep learning. According to the AAC&U (2022), these experiences include: capstones, collaborative assignments, common intellectual experiences, diversity/global learning, ePortfolios, first-year seminars/experiences, internships, learning communities, service-learning/community-based learning, undergraduate research, and writing-intensive courses.

A variety of researchers have nuanced how HIPs might be more or less effective for Students of Color (Conefrey, 2017; Finley & McNair, 2013; Gipson & Mitchell Jr., 2017; Sweat et al., 2013). Specifically, research by Gipson and Mitchell Jr. (2017) demonstrated that African American students who were involved in four or more HIPs were more likely to have a grade point average (GPA) of 3.0 or higher, with different types of HIP experiences associating with the 3.0 GPA based on class level (first-year/sophomore vs. junior/senior). In a comparison of HIPs for White students and Students of Color, Sweat et al. (2013) showed that diversity-related course content was most beneficial for engaging Students of Color. Together, this evidence further suggests that implementing and delivering HIPs and applied learning experiences needs to go beyond general promotion and consider how to best tailor to specific students (Gipson & Mitchell Jr., 2017; Sweat et al., 2013), such as Awad and Brown's (2021) examination of how undergraduate research can engage Students of Color in ecology.

Our review of the literature on applied learning focuses on the forms of applied learning included in the present analysis. Experiences such as applying concepts to practical problems, engaging in exams or assignments that require use of course content to address a problem, engaging in research with a faculty member, and out-of-class experiences that help to translate knowledge from the classroom into action have been found to be associated with undergraduates' increased academic motivation (Trolian & Jach, 2020). Boyles (2012) suggested that student engagement in challenging problems can develop their ability to persuade others, work with a team, more readily adapt, and innovate new ideas. Furthermore, researchers have suggested that problem-based learning facilitates undergraduates' improved understanding of key ideas (Walker et al., 2015; Youngerman & Culver, 2019).

Researchers have also identified beneficial outcomes associated with specific forms of curricular and co-curricular applied learning opportunities. In defining how institutions of higher education can engage students, Kuh (2009) named internships and independent study as "enriching educational experiences" (p. 18). Capstone courses are designed for fourth year undergraduates to demonstrate a synthesis of how they have developed vital skills such as critical thinking, communication, problem-solving, and team building (Young et al., 2017). Participation in undergraduate research has been associated with students' ability to clarify their career goals and positive academic outcomes such as development in critical thinking, problem solving, and both written and oral communication (Hensel, 2018; Seifert et al., 2019). While institutions of higher education have not made the study abroad experience affordable for all students, the AAC&U (2017) reported that students who did had significant gains on skills deemed desirable for employment, including problem-solving and communication skills. Participating in service-learning has been shown to improve college students' reported levels of self-esteem and their ability to address personal problems (Eppler et al., 2011). Longitudinal research by Astin and Sax (1998) has shown that undergraduates who participated in service activities, such as volunteering or completing a community project, have reported enhanced development on academic and life skills as well as an increased sense of civic responsibility. Finally, participation in out-of-class experiences, such as off-campus involvement and positional leadership roles, has been associated with undergraduate students' leadership development (Dugan & Komives, 2007). Together, the benefits of applied learning provide ample justification for their utility within undergraduate education.

Student Success

A significant body of research has focused on student success in higher education, and student success has been defined and measured in many ways throughout the literature (Kuh et al., 2007). Kuh et al. discuss varying definitions of student success within the higher education literature, which include sustained enrollment in postsecondary education (i.e., persistence), academic achievement (i.e., grades/GPA), student satisfaction, student learning and other college outcomes, college graduation (i.e., degree completion), successful transitions after college graduation, and sustained lifelong learning. Researchers have examined student success using these varying definitions, measuring overall rates of success, differences in student success outcomes by sub-groups/student populations, and contributors to student success in college.

Several contributors to student success in college have been identified by researchers. Student characteristics, such as being female, being a full-time student, and being an international student have been linked to measures of college student success (Kuh et al., 2006). Similarly, engagement in some activities and experiences during college have been associated with positive success outcomes, such as residing on-campus, having increased student-faculty interactions, involvement in co-curricular activities, engaging in a learning community during college, or engaging in diversity experiences during college (Kuh

et al., 2006). These and other experiences have all been found to contribute to various forms of college student success.

Of the numerous ways in which student success has been defined and measured (Hearn, 2006), our study measures student success in three ways: completing a bachelor's degree within four years, holding a higher GPA, and expressing aspirations for further study in graduate or professional school. Time to degree for undergraduates has been measured by the federal government over time (U.S. Department of Education, National Center for Education Statistics [NCES], 2021). GPA is widely used as a measure of success during and after completion of a bachelor's degree. Degree aspirations connect to student success because they suggest motivation to pursue higher level careers requiring graduate and professional school training (Cuellar & Gonzalez, 2021). The following subsections detail previous research on each of these components of student success.

Undergraduate Degree Completion in Four Years

Graduation in four years has been associated with a variety of factors for undergraduate students, including first-generation status, race/ethnicity, and socioeconomic standing (Conefrey, 2017; Finley & McNair, 2013; Provencher & Kassel, 2019). Students who are eligible for the federal Pell Grant, for instance, have been shown to take longer to graduate than their non-eligible peers (Bell & Glass, 2019), demonstrating how the rising cost of higher education can be harmful to students. However, HIPs are associated with improved student persistence and retention (Provencher & Kassel, 2019). Studies examining persistence and retention related to HIPs have demonstrated that these practices have conditional effects for underrepresented students, in that participation in HIPs can be particularly beneficial for first-generation students and Students of Color (Conefrey, 2017; Finley & McNair, 2013; Gipson & Mitchell Jr., 2017; Sweat et al., 2013).

Given that the average time to an undergraduate degree is five years, researchers who have analyzed data from the National Student Clearinghouse have called for the importance of considering how the model of four years to an undergraduate degree is an outdated model that can render non-traditional students as failures (Shapiro et al., 2016). As delineated by Torres and Lepeau (2022), time-to-degree metrics may benefit institutions which primarily enroll full-time students whose parents went to college and privilege the privileged, including White and higher income students. As authors, we acknowledge how our work reinforces normalizing four years to degree completion, which is not necessarily a normative timeline for all students. As such, we consider other measures of student success within our analysis, to more fully consider ways that student success might be measured beyond four-year graduation.

College Grades

College grades, or a student's GPA, are also a measure of student success that has been used by students, faculty, administrators, employers, and parents to assess

undergraduate students. Research has shown that certain experiences and factors can be associated with higher GPAs. For example, students who have had the experience of participating in an honors program have demonstrated a higher overall college GPA and four-year graduation rate (Bowman & Culver, 2018). Study abroad is another experience that has been shown to be beneficial for students, as it can relate to the high-impact practice of global and diverse learning (AAC&U, 2022). Recent research has shown that Pell Grant-eligible students who have studied abroad graduate with comparable GPAs to non-eligible peers, suggesting that study abroad did not impede college grades (Bell & Glass, 2019). The experience of student employment has also been associated with college grades, with some hours per week being associated with higher grades (Dundes & Marx, 2006; Salisbury et al., 2012) but too many hours per week being associated with negative impacts (Curl & Benner, 2017). Thus, while forms of curricular and co-curricular engagement can bolster college grades, too many hours or obligations can detract from students' GPAs.

Degree Aspirations

Research has also suggested that college students' degree aspirations are associated with outcomes including college choice, retention, and enrollment in graduate school (Astin, 1977; Carter, 2002; Tinto, 1993). Certain college experiences and student characteristics have been shown to be associated with undergraduates' degree aspirations. Recent work by Bradberry and De Maio (2019) suggested that degree aspirations were associated with undergraduate students' participation in experiential learning programs such as Model United Nationals and Judicial Internship programs. In addition, research using longitudinal data from the Cooperative Institutional Research program has shown that undergraduate students' graduate degree aspirations may change over time, since a higher GPA and levels of interactions with faculty can be associated with Latina/o students' graduate and professional degree aspirations (Cuellar & Gonzalez, 2021). As researchers, we acknowledge that there are disciplines that do not require a baccalaureate for employment and those which do not require a degree beyond a baccalaureate. Together, four-year degree completion, college grades, and post-baccalaureate degree aspirations provide a triangulated measure of student success in the present study.

Theoretical Framework

This study relies on Kuh et al.'s (2007) student success framework. Kuh et al.'s framework specifically considers six key student success outcomes, including: "academic achievement; engagement in educationally purposeful activities; satisfaction; acquisition of desired knowledge, skills, and competencies; persistence; and attainment of educational objectives" (p. 10). The authors suggest that these student success outcomes are influenced by students' precollege experiences, student behaviors, student engagement in college experiences, institutional conditions, and external influences. Students' precollege experiences include educational experiences and background/

cultural experiences; student behaviors include factors such as motivation and how students spend their time; student engagement in college experiences refers to the type of and degree of engagement in college experiences and activities; institutional conditions include characteristics such as institutional type and selectivity, as well as environmental and institutional climate factors; and external influences include the social and policy environments in which students engage in higher education. Taken together, their framework suggests that student engagement in college experiences and interactions often leads to positive student success outcomes. The present study aligns particularly well with the Kuh et al. student success framework because the framework posits that "students who find something or someone worthwhile to connect within the postsecondary environment are more likely to engage in educationally purposeful activities during college, persist, and achieve their educational objectives" (p. ix). Since applied learning offers students with both curricular and co-curricular opportunities to engage with their campus environment, the Kuh et al. model offers a framework for understanding how applied learning can potentially serve as a facilitator of student success.

To date, limited work has examined the connection between many of the applied learning experiences that students encounter in higher education and measures of student success. This study considers three measures of student success—graduation within four years, fourth-year college grades, and fourth-year educational aspirations—to evaluate the relationship between engagement in several applied learning experiences in college and these three student success outcomes. Specifically, our dependent variables in this study align with Kuh et al.'s. (2007) model in that graduation within four years and average college grades are specific measures of academic achievement while degree aspirations are a way to examine engagement and attitudes toward educational objectives. This study focuses on three primary research questions:

1. Does engagement in applied learning experiences predict college graduation within four years?
2. Is engagement in applied learning experiences associated with higher fourth-year college grades?
3. Is engagement in applied learning experiences associated with higher fourth-year educational aspirations?

As outlined in the methods section below, our study uses the Kuh et al. model to incorporate student background characteristics, precollege student behaviors, student experiences, and measures of student success.

Methods

Data and Sample

Data are from the Wabash National Study of Liberal Arts Education (WNS), which examined liberal arts experiences and outcomes among undergraduate students at

more than 50 colleges and universities in the United States. Institutions selected to participate in the WNS were chosen to represent the diversity of college and university institutional types in the United States, and therefore included liberal arts colleges, research universities, regional colleges and universities, and community colleges. Institutions in the WNS sample also represented a range of institutional characteristics, including varying student population sizes, patterns of student residence, and geographic locations. The sample used in this study was limited to the four-year colleges and universities in the WNS, and included seven research universities, nine regional colleges and universities, and 30 liberal arts colleges.

The WNS was a longitudinal study that assessed student experiences and outcomes at three separate time points—at the beginning of students' first year of college, at the end of students' first year of college, and at the end of students' fourth year of college. At the first time point (Time 1), participants completed a demographic survey and a survey instrument that inquired about their pre-college (high school) educational experiences. Participants also completed a series of assessment instruments designed to measure their precollege knowledge, skills, and attitudes, including measures of critical thinking skills, moral reasoning skills, leadership attitudes, attitudes toward diversity, attitudes toward social and political involvement, and others. These measures were designed to serve as a pre-college pre-test of several important college outcomes. At the second time point (Time 2), participants completed two survey instruments designed to assess their college experiences and again completed the same set of assessment instruments, measuring college outcomes at the end of students' first year of college (end-of-first-year post-test). At the third and final time point (Time 3), participants again completed the two survey instruments assessing their college experiences and once again completed the same set of assessment instruments, measuring college outcomes at the end of students' fourth year of college (end-of-fourth-year post-test).

The WNS had three cohorts of undergraduate student participants who attended college from 2006–2010 (2010 Cohort), 2007–2011 (2011 Cohort), or 2008–2012 (2012 Cohort). All student participants were first-time, full-time undergraduate students at the time of the first data collection. The student sample used in this study is made up of study participants from all three WNS cohorts. After narrowing the sample to students who attended one of the four-year WNS colleges and universities and using listwise deletion to account for missing data, useable data was available for 4,028 participants. The sample for this study was 61% female and 39% male. Of the participants included in the sample, 6% were Asian/Pacific Islander, 6% were Black/African American, 5% were Hispanic/Latinx, and 83% were White. Of the participants, 61% attended a liberal arts college, 22% attended a regional college or university, and 17% attended a research university.

Variables

Table 1 presents descriptive statistics for all variables included in this study. The dependent variables included three measures of student success: graduation within four years,

fourth-year college grades, and fourth-year educational aspirations (as measured at Time 3 by the WNS). College graduation within four years was measured using a WNS item that measured students' graduation at the end of their fourth year of college. This item was provided by each student's institution to the WNS research team and included 0 = did not graduate at the end of their fourth year and 1 = graduated at the end of their fourth year. Students' fourth-year college grades were measured using an item from the WNS that asked students to indicate their average college grades at the end of their fourth year of college. Response options included: 1 = C– or lower, 2 = C, 3 = C+, 4 = B–, 5 = B, 6 = B+, 7 = A–, 8 = A. This item was standardized prior to analysis. Students' fourth-year educational aspirations were measured using an item from the WNS that asked students to indicate their highest intended academic degree at the end of their fourth year of college. Response options were: 1 = Vocational/technical certificate or diploma, 2 = Associate's degree, 3 = Bachelor's degree, 4 = Master's degree, 5 = Law degree, 6 = Doctoral degree. This item was also standardized prior to analysis.

Table 1. Descriptive Statistics (n = 4,028)

Variable	Mean	Standard Deviation	Range
Sex: Male	0.39	0.49	0.00–1.00
Sex: Female	0.61	0.49	0.00–1.00
Race/Ethnicity: Black/African American	0.06	0.24	0.00–1.00
Race/Ethnicity: White	0.83	0.37	0.00–1.00
Race/Ethnicity: Hispanic/Latinx	0.05	0.22	0.00–1.00
Race/Ethnicity: Asian/Pacific Islander	0.06	0.23	0.00–1.00
Parent Education: 4-Year Degree or Higher	0.74	0.44	0.00–1.00
Precollege Academic Ability	0.00	1.00	–4.23–2.08
Precollege Educational Aspirations	0.00	1.00	–3.08–1.33
High School GPA	0.00	1.00	–7.16–0.65
Institution Type: Research University	0.17	0.38	0.00–1.00
Institution Type: Regional University	0.22	0.42	0.00–1.00
Institutional Selectivity	0.00	1.00	–1.99–1.35
Institutional Size	0.00	1.00	–0.77–3.39
Institution Emphasis on Academic Work	0.00	1.00	–3.40–0.88
Hours Spent Socializing and Relaxing	0.00	1.00	–1.86–2.48
Hours Spent in On- and Off-Campus Work	0.00	1.00	–1.02–6.34

Table 1. Descriptive Statistics (n = 4,028) (*continued*)

Variable	Mean	Standard Deviation	Range
Hours Spent in Co-curricular Activities	0.00	1.00	–1.13–3.26
Hours Spent Preparing for Class	0.00	1.00	–2.12–1.83
Major: STEM	0.27	0.45	0.00–1.00
Major: Arts, Humanities, or Social Science	0.50	0.50	0.00–1.00
Major: Professional	0.23	0.42	0.00–1.00
Frequency of Faculty Contact	0.00	1.00	–2.41–2.24
Time Spent Applying Concepts to Problems	0.00	1.00	–3.15–0.78
Frequency of Faculty Assigning Application of a Concept to a Problem	0.00	1.00	–3.14–1.27
Frequency of Applying Concepts on Exams/Assignments	0.00	1.00	–2.45–1.42
Independent Study Completed (vs. Did Not Complete)	0.32	0.47	0.00–1.00
Capstone Completed (vs. Did Not Complete)	0.59	0.49	0.00–1.00
Internship Completed (vs. Did Not Complete)	0.72	0.44	0.00–1.00
Research with Faculty (vs. Did Not Complete)	0.35	0.48	0.00–1.00
Study Abroad (vs. Did Not Complete)	0.43	0.50	0.00–1.00
Community Project (vs. Did Not Complete)	0.57	0.50	0.00–1.00
Volunteer (vs. Did Not Complete)	0.81	0.40	0.00–1.00
Out-of-Class Experiences / Applied Classroom Learning	0.00	1.00	–3.43–1.14
Fourth-Year Educational Aspirations	0.00	1.00	–3.32–1.32
Fourth-Year College Grades	0.00	1.00	–4.08–1.25
Graduation in Four Years	0.89	0.32	0.00–1.00

Note. All continuous variables are standardized.

Several measures of applied learning in higher education served as the independent variables of interest, including: how often faculty asked students to apply theories or concepts to practical problems or in new situations (Likert-scale item ranging from *very often* to *never*; standardized); how often exams or assignments required use of course

content to address a problem (Likert-scale item ranging from *very often* to *never*; standardized); student engaged in an independent study during college (1 = yes; 0 = no); student engaged in a culminating senior capstone experience during college (1 = yes; 0 = no); student engaged in an internship, co-op, or practicum experience during college (1 = yes; 0 = no); student engaged in research with a faculty member during college (1 = yes; 0 = no); student engaged in a study abroad experience during college (1 = yes; 0 = no); student engaged in service-learning as part of a course during college (1 = yes; 0 = no); student engaged in community service or volunteer work during college (1 = yes; 0 = no); and engaging in out-of-class experiences that help to translate knowledge and understanding from the classroom into action (Likert-scale item ranging from *strongly agree* to *strongly disagree*; standardized). All applied learning variables were measured at Time 3 by the WNS. We included a variety of applied learning experiences since not all experiences may be available depending on a student's major.

This study also used several control variables, in order to isolate the relationships examined. Pascarella's (1985) college impact framework for assessing change during college suggests sets of variables that should be included in research that attempts to assess change or development in college. These include students' background/precollege characteristics, the institutional structure and environment, interactions with agents of socialization (such as faculty, staff, or peers), and the quality of student effort. Selection of variables for models in this study was based on Pascarella's framework, in order to isolate the extent to which applied learning experiences contribute to student success in college.

Background characteristics (measured at Time 1 by the WNS) included students' sex (male or female), race/ethnicity (Asian/Pacific Islander, Black/African American, Hispanic/Latinx, or White), parents' highest level of education (first-generation or continuing-generation), and involvement in high school activities (7-item scale measuring engagement in high school extracurricular activities, $\alpha = 0.58$). Institutional characteristics (measured at Time 3 by the WNS) included institution type (liberal arts college, regional university, or research university), institutional selectivity (Barron's score), institutional size, and student perceptions of institutional emphasis on academic work. Other college experiences (measured at Time 3 by the WNS) included major field of study, hours spent engaged in employment on- or off-campus, hours spent engaged in cocurricular activities, hours spent socializing and relaxing, hours spent preparing for class, and frequency of student-faculty interactions. Finally, the longitudinal design of the WNS also permitted the researchers to control for several measures of students' precollege student success (measured at Time 1 by the WNS), including precollege academic ability (ACT or equivalent entrance exam score), precollege/high school GPA, and precollege educational aspirations, allowing the researchers to better isolate changes to the four years of college examined. Furthermore, incorporating background characteristics and precollege student behaviors aligns with Kuh et al.'s (2007) student success framework, which includes a consideration of students' precollege experiences.

Analyses

The researchers used logistic regression to determine whether each applied learning experience predicted graduation in four years, and the researchers used ordinary least squares (OLS) regression to estimate the relationship between each applied learning experience and students' fourth-year college grades and fourth-year educational aspirations. All models included all ten measures of applied learning and all control variables. All models used a clustering command to account for the nested nature of the data (SVY in Stata), where students were nested within institutions. All models also accounted for which WNS cohort participants were members of by including dummy variables for cohort membership. Finally, models were evaluated for potential issues of collinearity by calculating the variance inflation factor (VIF) for each variable included in all analytical models, and statistics ranged from 1.06–2.01, below recommended VIF limits.

Limitations

This study and its results are limited in several important ways. First, the use of an existing dataset (the Wabash National Study of Liberal Arts Education) to examine this study's research questions required the use of existing survey items and measures. These measures are limited in terms of what questions and how questions were asked, as well as response options that were made available to participants. As a result, there may be other ways of measuring the constructs considered in this study (e.g., applied learning experiences and measures of student success). Additionally, these existing items are limited in terms of ways that demographic items (such as sex or race/ethnicity) were measured. Future research should consider ways to measure these constructs that are more inclusive of research participants. Second, the use of survey research methods presents several potential threats to validity, some of which may confound the results of this study. Threats to validity include issues of maturation, selection bias, regression to the mean, and attrition. The longitudinal nature of the WNS, while an asset in assessing pre-test/post-test outcomes, does present issues in terms of maturation and attrition in particular. Additionally, voluntary participation in the WNS presents an issue in terms of potential selection bias (despite the use of whole population sampling and/or random sampling within each WNS institution). Future research should consider ways to address these limitations by using other research designs and methods that specifically address these issues.

Results

This study examined the relationship between several applied learning experiences and three measures of student success at the end of the fourth year of college. Table 2 presents odds ratios (OR) predicting four-year graduation (1 = yes, 0 = no) for each

applied learning experience. Results indicated that three applied learning experiences positively predicted students' graduation in four years: completing a capstone experience (OR = 3.96, $p < .001$); completing an internship, co-op, or practicum (OR = 2.13, $p < .001$); and completing a study abroad experience (OR = 1.53, $p < .05$). Two other applied learning experiences negatively predicted students' graduation in four years: completing an independent study (OR = 0.65, $p < .05$); and engaging in community service or volunteer work (OR = 0.69, $p < .05$). All other applied learning experiences were not significant predictors of four-year graduation.

Table 3 presents OLS regression estimates for the association between each measure of applied learning and students' fourth-year college grades and fourth-year educational aspirations. Results indicated that seven applied learning experiences were positively associated with higher fourth-year grades: how often faculty asked students to apply theories or concepts to practical problems or in new situations (B = 0.05, $p < .01$); completing an independent study (B = 0.12, $p < .01$); completing a capstone experience (B = 0.12, $p < .01$); completing an internship, co-op, or practicum experience (B = 0.30, $p < .001$); completing research with a faculty member (B = 0.15, $p < .001$); completing a study abroad experience (B = 0.15, $p < .001$); and engaging in out-of-class experiences that help to translate knowledge and understanding from the classroom into action (B = 0.11, $p < .01$). Additionally, one applied learning experience was negatively associated with higher fourth-year grades: how often exams or assignments required use of course content to address a problem (B = −0.04, $p < .05$). All other applied learning experiences were not statistically associated with higher fourth-year grades. Results also indicated that three applied learning experiences were positively associated with higher fourth-year educational aspirations: completing an independent study (B = 0.09, $p < .01$); completing research with a faculty member (B = 0.27, $p < .001$); and completing a study abroad experience (B = 0.08, $p < .01$). All other applied learning experiences were not statistically associated with higher fourth-year educational aspirations.

Discussion

The present study considered applied learning and measures of fourth-year student success in college: graduation within four years, fourth-year average college grades, and fourth-year educational aspirations. Findings suggest that the odds of graduation within four years increases for students who participated in internship, capstone, or study abroad experiences. To be sure, these types of formal experiences may be more likely to occur in the junior or senior year. Yet this study suggests that these experiences, perhaps by design, formally address student learning in a way that applies to students' academic disciplines or future career trajectories, which may lead to students' graduation in four years. Kuh (2008) notes that these three types of experiences are considered HIPs, whereby students are more likely to be academically engaged and derive benefits from these experiences in terms of increased learning and improved college outcomes. This study offers further support for these experiences in contributing

Table 2. Odds Ratios Predicting Student Graduation in Four Years at the End of the Fourth Year of College (n = 4,028)

Variable	Odds Ratio (S.E.)	
Sex: Male	0.77	
	(0.12)	
Race/Ethnicity: Black/African American	0.51	**
	(0.13)	
Race/Ethnicity: Hispanic/Latinx	0.49	**
	(0.13)	
Race/Ethnicity: Asian/Pacific Islander	0.57	*
	(0.16)	
Parent Education: 4-Year Degree or Higher	0.90	
	(0.13)	
Precollege Academic Ability	0.69	***
	(0.06)	
Involvement in High School Activities	0.93	
	(0.06)	
Average College Grades	1.86	***
	(0.13)	
Institution Type: Regional University	0.20	***
	(0.04)	
Institution Type: Research University	0.43	**
	(0.13)	
Institutional Selectivity	2.90	***
	(0.30)	
Institutional Size	0.82	*
	(0.08)	
Institution Emphasis on Academic Work	0.97	
	(0.07)	
Hours Spent Socializing and Relaxing	1.03	
	(0.07)	
Hours Spent in On- and Off-Campus Work	0.96	
	(0.06)	
Hours Spent in Co-curricular Activities	1.03	
	(0.08)	

Variable	Odds Ratio (S.E.)	
Hours Spent Preparing for Class	0.83	
	(0.06)	
Major: STEM	0.94	
	(0.18)	
Major: Professional	0.58	**
	(0.10)	
Frequency of Faculty Contact	1.17	
	(0.09)	
Time Spent Applying Concepts to Problems	0.91	
	(0.07)	
Frequency of Faculty Assigning Application of a Concept to a Problem	0.96	
	(0.07)	
Frequency of Applying Concepts on Exams/Assignments	1.12	
	(0.08)	
Independent Study Completed (vs. Did Not Complete)	0.65	*
	(0.11)	
Capstone Completed (vs. Did Not Complete)	3.96	***
	(0.62)	
Internship Completed (vs. Did Not Complete)	2.13	***
	(0.32)	
Research with Faculty (vs. Did Not Complete)	1.38	
	(0.25)	
Study Abroad (vs. Did Not Complete)	1.53	*
	(0.26)	
Community Project (vs. Did Not Complete)	1.00	
	(0.15)	
Volunteer (vs. Did Not Complete)	0.69	*
	(0.12)	
Out-of-Class Experiences / Applied Classroom Learning	0.95	
	(0.07)	
Pseudo R-squared	0.43	

Note. ***$p < .001$, **$p < .01$, *$p < .05$. All continuous variables were standardized prior to analysis. Reference group for sex is female; reference group for race/ethnicity is White; reference group for major is arts, humanities, or social science.

Table 3. Regression Estimates for the Association Between Applied Learning and Students' Fourth-Year Grades and Fourth-Year Educational Aspirations (n = 4,028)

	I		II	
	College Grades		**Educational Aspirations**	
	Coef. (S.E.)		Coef. (S.E.)	
Sex: Male	−0.11	**	−0.01	
	(0.04)		(0.03)	
Race/Ethnicity: Black/African American	−0.36	***	0.26	**
	(0.08)		(0.07)	
Race/Ethnicity: Hispanic/Latinx	−0.22	**	0.07	
	(0.06)		(0.06)	
Race/Ethnicity: Asian/Pacific Islander	−0.12		0.02	
	(0.07)		(0.06)	
Parent Education: 4-Year Degree or Higher	0.10	***	0.02	
	(0.03)		(0.03)	
Precollege Academic Ability	0.32	***	0.14	***
	(0.02)		(0.02)	
Involvement in High School Activities	0.02		0.01	
	(0.02)		(0.01)	
High School Grades	0.23	***		
	(0.02)			
Precollege Educational Aspirations			0.36	***
			(0.02)	
Institutional Type: Research Institution	0.02		−0.19	*
	(0.07)		(0.09)	
Institutional Type: Regional Institution	0.21		0.18	***
	(0.09)		(0.05)	
Institutional Selectivity	−0.15	***	−0.05	*
	(0.04)		(0.02)	
Institutional Size	−0.02		0.08	*
	(0.03)		(0.03)	
Institution Emphasis on Academic Work	−0.06	***	0.00	
	(0.01)		(0.01)	
Hours Spent Socializing and Relaxing	−0.05	**	−0.05	**
	(0.01)		(0.02)	

Table 3. Regression Estimates for the Association Between Applied Learning and Students' Fourth-Year Grades and Fourth-Year Educational Aspirations (n = 4,028) (*continued*)

	I		II	
	College Grades		**Educational Aspirations**	
	Coef. (S.E.)		Coef. (S.E.)	
Hours Spent in On- and Off-Campus Work	−0.02		−0.02	
	(0.02)		(0.02)	
Hours Spent in Co-curricular Activities	−0.05	*	−0.01	
	(0.02)		(0.02)	
Hours Spent Preparing for Class	−0.03	**	0.05	**
	(0.01)		(0.01)	
Major: STEM	−0.24	***	0.18	***
	(0.04)		(0.04)	
Major: Professional	−0.05		−0.12	*
	(0.05)		(0.06)	
Frequency of Faculty Contact	0.09	***	0.06	**
	(0.02)		(0.02)	
Time Spent Applying Concepts to Problems	−0.02		0.02	
	(0.02)		(0.02)	
Frequency of Assigning Application of a Concept to a Problem	0.05	**	0.03	
	(0.01)		(0.01)	
Frequency of Applying Concepts on Exams/ Assignments	−0.04	*	0.01	
	(0.01)		(0.01)	
Independent Study Completed (vs. Did Not Complete)	0.12	**	0.09	**
	(0.03)		(0.03)	
Capstone Completed (vs. Did Not Complete)	0.11	*	−0.03	
	(0.04)		(0.01)	
Internship Completed (vs. Did Not Complete)	0.30	***	0.03	
	(0.04)		(0.03)	
Research with Faculty (vs. Did Not Complete)	0.15	***	0.27	***
	(0.03)		(0.04)	

Table 3. Regression Estimates for the Association Between Applied Learning and Students' Fourth-Year Grades and Fourth-Year Educational Aspirations (n = 4,028) (*continued*)

	I College Grades		II Educational Aspirations	
	Coef. (S.E.)		Coef. (S.E.)	
Study Abroad (vs. Did Not Complete)	0.15	***	0.08	**
	(0.03)		(0.03)	
Community Project (vs. Did Not Complete)	0.04		0.01	
	(0.03)		(0.03)	
Volunteer (vs. Did Not Complete)	–0.06		0.08	
	(0.05)		(0.05)	
Out-of-Class Experiences / Applied Classroom Learning	0.11	**	0.01	
	(0.02)		(0.02)	
R-squared	0.34		0.28	

Note. ***p < .001, **p < .01, *p < .05. All continuous variables are standardized. Model I: Fourth-Year Grades; Model II: Fourth-Year Educational Aspirations. Reference group for sex is female; reference group for race/ethnicity is White; reference group for major is arts, humanities, or social sciences.

to student success, particularly in terms of time to student graduation from a four-year college. Notably, participating in an independent study or a volunteer experience decreased students' odds of graduation within four years. These findings build on previous research nuancing what types of experiences matter for which students (Gipson & Mitchell Jr., 2017; Sweat et al., 2013). Higher education leaders should ensure that these types of experiences have the resources to be designed to facilitate student learning, and future research should examine how these types of experiences might better facilitate student success.

Findings from the present study also suggest that several applied learning experiences were associated with higher college grades, including faculty asking students to apply theories or concepts to practical problems or in new situations, and completing an independent study, capstone, internship, research with a faculty member, or study abroad experience. These findings suggest that opportunities to apply learning in the classroom and opportunities to engage in some applied learning experiences, both inside and outside of the classroom, may improve student achievement in college. These findings provide further support for some types of applied learning experiences, suggesting that these experiences can contribute to students' success in college. Notably, applying concepts on exams and assignments was negatively associated with students' average college grades at the end of the fourth year. This finding connects to previous research

that suggests that students who set goals, rather than focus on a specific grade, may earn higher grades (Roll, 2017). That is, the use of exams may shortcut students' concern about grades, rather than exhibiting a demonstration of understanding through a written paper. Future research should continue to examine how college grades measure student success.

Finally, research with a faculty member and study abroad experiences were associated with higher levels of students' educational aspirations. Both study abroad experiences (AAC&U, 2017) and research with a faculty member (Ovenden-Hope & Blandford, 2018; Seifert et al., 2019) have been associated with valuable beneficial student outcomes. The findings from this study indicate that these important applied learning experiences may also contribute to students' educational aspirations beyond their undergraduate degrees, potentially contributing to students' pursuit of graduate and professional degrees and encouraging lifelong learning orientations. Future research needs to continue to examine how to ensure access of these types of opportunities for specific types of students, including Students of Color and first-generation students.

Overall, these findings suggest that engaging in several forms of applied learning during college may potentially improve student outcomes on three key measures of student success, including degree completion in four years, average college grades, and educational aspirations. These findings can help provide practical and feasible way for faculty, student affairs professionals, and institutions of higher education to justify the importance of engaging in these practices for real results. College and university leaders should consider ways to expand opportunities for students to engage in these various types of applied learning experiences, providing funding and resources to bolster these important experiences for students. Institutional leaders should prioritize student engagement in these experiences and ensure that these types of applied learning are supported with time and resources so that faculty and staff have the bandwidth to engage undergraduates in these meaningful experiences.

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References

Association of American Colleges & Universities. (2017, November). Study abroad and beyond: Effects of global learning on career outcomes and skill development. *AAC&U News*.

Association of American Colleges and Universities. (2018). *Integrative and applied learning VALUE rubric*. https://www.aacu.org/value/rubrics/integrative-learning

Association of American Colleges and Universities. (2022). *High impact practices*. https://www.aacu.org/trending-topics/high-impact

Astin, A. W. (1977). *Four critical years*. Jossey-Bass.

Astin, A. W., & Sax, L. J. (1998). How undergraduates are affected by service participation. *Journal of College Student Development*, *39*(3), 251–263.

Awad, M. M., & Brown, M. A. (2021). Undergraduate research as a high-impact practice for engaging Students of Color in ecology. *Bulletin: Ecological Society of America*, *102*(2). https://doi.org/10.1002/bes2.1816

Bell, S. D., & Glass, C. R. (2019). Taking longer, but finishing just as strong: A comparison of Pell and Non-Pell study abroad participants' GPA and time-to graduation. *Frontiers: The Interdisciplinary Journal of Study Abroad*, *31*(2), 180–191. https://doi.org/10.36366/frontiers.v31i2.461

Bowman, N. A., & Culver, KC. (2018). When do honors programs make the grade? Conditional effects on college satisfaction, achievement, retention, and graduation. *Research in Higher Education*, *59*, 249–272. https://doi.org/10.1007/s11162-017-9466-y

Boyles, T. (2012). 21st century knowledge, skills, and abilities and entrepreneurial competencies: A model for undergraduate entrepreneurship education. *Journal of Entrepreneurship Education*, *15*(1), 41–55.

Bradberry, L. A., & De Maio, J. (2019). Learning by doing: The long-term impact of experiential learning programs on student success. *Political Science Instruction*, *15*(1), 94–111. https://doi.org/10.1080/15512169.2018.1485571

Carter, D. F. (2002). College students' degree aspirations: A theoretical model and literature review with a focus on African American and Latino students. In J. C. Smart & W. G. Tierney (Eds.), *Higher education: Handbook of theory and research* (Vol. 17, pp. 129–171). Springer. https://doi.org/10.1007/978-94-010-0245-5_3

Conefrey, T. (2017). LEADing the way with ePortfolios in a first-generation learning community. *International Journal of ePortfolio*, *7*(2), 161–173.

Cuellar, M. G., & Gonzalez, A. M. (2021). Beyond the baccalaureate: Factors shaping Latina/o graduate degree aspirations. *Journal of Hispanic Higher Education*, *20*(1), 59–74. https://doi.org/10.1177/1538192719830082

Curl, A., L., & Benner, K. (2017). The influence of employment on college students' academic experiences. *Journal on Excellence in College Teaching*, *28*(3), 183–200.

Dewey J. (1938). *Logic: The theory of inquiry*. Holt, Rinehart, and Winston, Inc.

Dugan, J. P., & Komives, S. R. (2007). Developing leadership capacity in college students: Findings from a national study. *The multi-institutional study of leadership: A project of the National Clearinghouse for Leadership Programs*. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.462.9299&rep=rep1&type=pdf

Dundes, L., & Marx, J. (2006). Balancing work and academics in college: Why do students working 10 to 10 hours per week excel. *Journal of College Student Retention: Research, Theory & Practice*, *8*(1), 107–120. https://doi.org/10.2190/7UCU-8F9M-94QG-5WWQ

Eppler, M. A., Ironsmith, M., Dingle, S. H., & Errickson, M. A. (2011). Benefits of service-learning for freshmen college students and elementary school children. *Journal of the Scholarship of Teaching and Learning*, *11*(4), 102–115.

Ezarik, M. (2021, June 21). How COVID-19 damaged student success. *Inside Higher Ed*. https://www.insidehighered.com/news/2021/06/21/what-worked-and-what-didn%E2%80%99t-college-students-learning-through-covid-19

Finley, A., & McNair, T. (2013). Assessing underserved students' engagement in high-impact practices. *Association for American Colleges and Universities (AAC&U)*. https://leapconnections.aacu.org/system/files/assessinghipsmcna

Gipson, J., & Mitchell Jr., D. (2017). How high-impact practices influence academic achievement for African American college students. *Journal Committed to Social Change on Race and Ethnicity*, *3*(2), 124–144. https://doi.org/10.15763/issn.2642-2387.2017.3.2.123-144

Hart Research Associates. (2015). *Falling short? College learning and career success*. https://dgmg81phhvh63.cloudfront.net/content/user-photos/Research/PDFs/2015employerstudentsurvey.pdf

Hearn, J. C. (2006). Student success: what research suggests for policy and practice. *National Postsecondary Education Cooperative*. https://nces.ed.gov/npec/pdf/synth_Hearn.pdf

Hensel, N. H. (2018). *Course-based undergraduate research: Educational equity and high impact practice*. Stylus.

Jach, E. A., & Trolian, T. L. (2022). Applied learning experiences in higher education and students' attitudes toward professional success. *Journal of Student Affairs Research and Practice*, *59*(4), 401–418. https://doi.org/10.1080/19496591.2021.1967758

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.

Kuh, G. D. (2008). *High-impact educational practices: What they are, who has access to them, and why they matter*. Association of American Colleges and Universities.

Kuh, G. D. (2009). The National Survey of Student Engagement: Conceptual and empirical foundations [Special issue]. *New Directions for Institutional Research*, *141*, 5–20. https://doi.org/10.1002/ir.283

Kuh, G. D., Kinzie, J., Buckley, J. A., Bridges, B. K., & Hayek, J. C. (2006). What matters to student success: A review of the literature. *National Symposium on Postsecondary Student Success*. https://nces.ed.gov/npec/pdf/Kuh_Team_Report.pdf

Kuh, G. D., Kinzie, J., Buckley, J. A., Bridges, B. K., & Hayek, J. C. (2007). Piecing together the student success puzzle. *ASHE Higher Education Report*, *32*(5). Jossey-Bass.

Ovenden-Hope, T., & Blandford, S. (2018). *Understanding applied learning: Developing effective practice to support all learners*. Routledge.

Pascarella, E. T. (1985). College environmental influences on learning and cognitive development: A critical review and synthesis. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 1). Agathon.

Provencher, A., & Kassel, R. (2019). High-impact practices and sophomore retention: Examining the effects of selection bias. *Journal of College Student Retention: Research, Theory & Practice*, *21*(2), 221–241. https://doi.org/10.1177/1521025117697728

Roll, N. (2017). Help your students earn A's by not focusing on grades. *Inside Higher Ed*. https://www.insidehighered.com/news/2017/08/01/research-suggests-students-may-make-more-academic-progress-focusing-task-oriented

Salisbury, M. H., Pascarella, E. T., Padgett, R. D., & Blaich, C. (2012). The effects of work on leadership development among first-year college students. *Journal of College Student Development*, *53*(2), 300–324. https://doi.org/10.1353/csd.2012.0021

Schwartzman, R., & Bouas Henry, K. (2009). From celebration to critical reflection: Charting the course of scholarship in applied learning. *Journal of Applied Learning in Higher Education*, *1*(Fall), 3–25.

Seifert T. A., Oliveri, C., & Shaw, C. A. (2019). First year research experience (FYRE): Bringing research to new undergraduates. *New Directions for Higher Education*, *188*, 71–80.

Shapiro, D., Dundar, A., Wakhungu, P. K., Yuan, X., Nathan, A., & Hwang, Y. (2016, September). Time to degree: A national view of the time enrolled and elapsed for associate and bachelor's degree earners (signature report no. 11). *National Student Clearinghouse Research Center*.

Sweat, J., Jones, G., Han, S., & Wolfgram, S. M. (2013). How does high impact practice predict student engagement? A comparison of White and Minority students. *International Journal for the Scholarship of Teaching and Learning*, *7*(2), 1–17. https://doi.org/10.20429/ijsotl.2013.070217

Tinto, V. (1993). *Leaving college*. University of Chicago Press.

Torres, V., & LePeau, L. (2022). Understanding the synergistic relationship between student retention and student development theories. *Journal of Postsecondary Student Success*, *1*(3), 1–12. https://doi.org/10.33009/fsop_jpss130760

Trolian, T. L., & Jach, E. A. (Eds.) (2019). Applied learning in higher education: Curricular and co-curricular experiences that improve student learning. *New Directions for Higher Education*, *188*.

Trolian, T. L., & Jach, E. A. (2020). Engagement in college/university applied learning experiences and students' academic motivation. *Journal of Experiential Education*, *43*(3), 317–335. https://doi.org/10.1177/1053825920925100

Trolian, T. L., & Jach, E. A. (2022). Applied learning and students' well-being in higher education. *Applied Research in Quality of Life, 17,* 1269–1286. https://doi.org/10.1007/s11482-021-09961-3

U.S. Department of Education, National Center for Education Statistics. (2021). *The condition of education 2021 (NCES 2021–144), undergraduate retention and graduation rates*. https://nces.ed.gov/programs/coe/indicator/ctr

Valentine, J., & Price, D. (2021, February). Scaling high-impact practices to improve community college student outcomes: Evidence from the Tennessee Board of Regents. *Lumina Foundation*. https://www.luminafoundation.org/wp-content/uploads/2021/02/scaling-high-impact-practices-to-improve-community-college-student-outcomes.pdf

Walker, A., Leary, H., & Lefler, M. (2015). A meta-analysis of problem-based learning: Examination of education levels, disciplines, assessment levels, problem types, implementation types, and reasoning strategies. In A. Walker, H. Leary, C. Hmelo-Silver, & P. Ertmer (Eds). *Essential readings in problem-based learning: Exploring and extending the legacy of Howard S. Barrows*. Purdue University Press.

Young, D. G., Chung, J. K., Hoffman, D. E., & Bronkema, R. (2017). *2016 National Survey of Senior Capstone Experiences: Expanding our understanding of culminating experiences* (Research Report No. 8). National Resource Center for The First-Year Experience & Students in Transition.

Youngerman, E., & Culver, K. C. (2019). Problem-based learning (PBL): Real-world applications to foster (inter)disciplinary learning and integration. *New Directions for Higher Education*, *188*, 23–32.