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High-Impact Learning Experiences and Post-Graduate Outcomes: Exploring the Influence on Employment, Continuing Education and Salary

With the cost of college on the rise, administrators are facing increasing pressure to demonstrate evidence of their effectiveness (Kuh & Ewell, 2010). At the same time, students are increasingly motivated to attend college in order to enhance their career opportunities (Eagon, Lozano, Hurtado, & Case, 2013). High-impact learning experiences, such as internships, service-learning, study abroad and research, are one promising strategy to enhance positive developmental outcomes for students; however, little research has examined the connection between high-impact learning and post-graduate outcomes. The literature indicates that high-impact learning experiences, which allow for deep learning, meaningful interactions with peers and faculty and application of learning (Kuh, 2008), are beneficial to all students (Brownell & Swaner, 2009; Kuh, 2009), but have an even greater positive impact on outcomes for underrepresented students (Kuh, Cruce, Shoup, Kinzie, & Gonyean, 2008; Pascarella & Terenzini, 2005). Most studies have focused on a narrow set of outcomes, most commonly student persistence and academic performance (Brownell & Swaner, 2009). Less is known about how high-impact learning experiences relate to post-graduate outcomes (Wolniak & Engberg, 2015) such as job placement rates, continuing education and starting salary. With the cost of college continuing to rise, these outcomes are increasingly important indicators of institutional and student success.

This study will address these problems by examining the relationship between participation in high-impact learning experiences and student outcomes at graduation. Specifically, this paper will address two research questions:

1. Does participation in high-impact learning experiences influence post-graduate placement rates in employment and continuing education?
2. Does participation in high-impact learning experiences influence starting salaries for students who have secured employment?

Literature Review

Student Involvement and High-Impact Learning Experiences

Astin's (1984) seminal theory of student involvement laid the foundation for our current understanding of the value of student engagement in the college experience. Through longitudinal studies, Astin found relationships between students' level of involvement and a wide range of positive developmental outcomes. Astin defined involvement as "the amount of physical and psychological energy that the student devotes to the academic experience" (p. 518) and incorporated both traditional classroom-based academic experiences and co-curricular experiences in his concept of involvement. Involvement has both

quantitative and qualitative features, and can be measured in terms of the number of hours students spent on a task, or on their depth of involvement and the level of mental attention dedicated to an experience. Astin argues that student learning and development is directly proportional to the quality and quantity of student involvement in the college experience.

More recently, literature and practice has focused attention on high-impact learning experiences as a differentiating factor in student outcomes. Kuh's (2008) foundational work identified 10 high-impact practices that create opportunities for deep learning and are linked to a range of positive student benefits. These practices include first-year seminars/experiences, common intellectual experiences, learning communities, writing-intensive courses, collaborative assignments and projects, undergraduate research, diversity/global learning, service-learning or community-based learning, internships and capstone projects. Recalling Astin's findings, high-impact learning experiences require a significant quantity and quality of effort from students, and Kuh argues that these experiences are beneficial for several reasons. First, high-impact learning experiences often demand purposeful time and effort on the part of the student. Second, these experiences typically require meaningful, intensive interaction with faculty and peers. Third, high-impact practices increase the likelihood that students will interact with diverse people. Fourth, these activities provide opportunities for students to apply their learning in different settings. Finally, these experiences provide opportunities for students to understand themselves in relation to others, explore their own values and beliefs, and gain the tools to participate in society in meaningful and positive ways.

Benefits of High-Impact Learning Experiences

The relationship between student participation in high-impact practices and positive developmental outcomes is strongly supported in the literature. For example, studies have found that students who participate in undergraduate research see greater rates of academic success, retention and persistence (Finley & McNair, 2013; Jones, Barlow, & Villarejo, 2010). Service-learning is tied to a range of positive academic, social, personal, civic and professional outcomes (Celio, Durlak, & Dymnicki, 2011; Eyler, Giles, Stenson, & Gray, 2001; Warren, 2012) including higher GPAs, stronger retention and higher graduation rates for underrepresented students, including lower-income, minority or first-generation students (Song, Furco, Lopez, & Maruyama, 2017). High-impact practices are also associated with higher levels of student engagement (Sweat, Jones, Hans, & Wolfgram, 2013) and greater sense of belonging on campus (Ribera, Miller, & Dumford, 2017). This is important, especially for underrepresented students who face additional barriers to succeeding in higher education (see, for example, Bridges, Kinzie, Laird, & Kuh, 2008; Engle & Tinto, 2008; Fischer, 2007; Terenzini et al., 2001; Yeh, 2002; Zalaquett, 1999). Underrepresented students

participate in high-impact learning experiences at lower rates (Brownell & Swaner, 2009; Harper, 2009; Kuh, 2008; Sweat et al., 2013), but experience greater benefits than other students when they do participate (Kuh, 2009).

High-Impact Learning and Post-Graduate Outcomes

Students are increasingly viewing college as a pathway to a successful career (Eagon et al, 2013), and receiving a college education has been linked to career outcomes in a variety of ways (Liu, Thomas, & Zhang, 2010). Despite this, relatively few studies have looked at the relationship between high-impact learning experiences and post-graduate indicators of success (Wolniak & Engberg, 2015). Researchers have found that undergraduate research can increase students' intentions to enroll in graduate school (Kilgo & Pascarella, 2016) and that women in STEM-focused women-only learning communities had higher intentions to pursue a STEM graduate program (Szelényi & Inkelas, 2011). High-impact practices have been found to support the development of transferable skills, such as communication and teamwork, that employers want to see in employees (Berger, 2012; Kinzie, 2013; Lopatto, 2007). These experiences provide students with engaging "stories" to tell potential employers about the development of new skills or the discovery of a new passion (Miller, Rocconi & Dumford, 2017). Internships, capstones and service-learning have been shown to be positively correlated with job attainment at graduation (Miller et al. 2017), and internships have been found to increase job placement (Callanan & Benzing, 2004; Saltikoff, 2017).

Others have found a more complex relationship between early career outcomes and high-impact learning experiences. In one study, researchers found that high-impact practices exert a small and inconsistent influence on career outcomes, and that field of study and the alignment between a students' major and their job had the greatest impact (Wolniak & Engberg, 2015). The authors suggest caution when using high-impact learning experiences as a practice to enhance career outcomes for all students. Other researchers have also found field of study to be a significant predictor of salary, with students in STEM and some healthcare fields out-earning peers in other fields (Melguizo & Wolniak, 2012). The overall quality of institution has also been linked to earnings, with graduates of more selective, higher quality institutions earning more than students who graduated from less selective institutions (Zhang, 2008). Higher levels of social engagement, including participation in residential life, student organizations and community service activities, during college has also been linked to stronger salaries (Hu & Wolniak, 2010). While evidence supports the positive association between high-impact practices and a variety of student development outcomes, the relationship between these learning experiences and post-graduate outcomes remains an underexplored area.

Hypotheses and Conceptual Model

Based on Astin's (1984) theory of student involvement, Kuh's (2008) foundational work on high-impact practices and the literature on the benefits of high-impact learning experiences, this paper proposes the following hypotheses:

Hypothesis 1: Students who participate in a greater number of high-impact learning experiences will have more positive outcomes as measured by post-graduate placement and starting salaries.

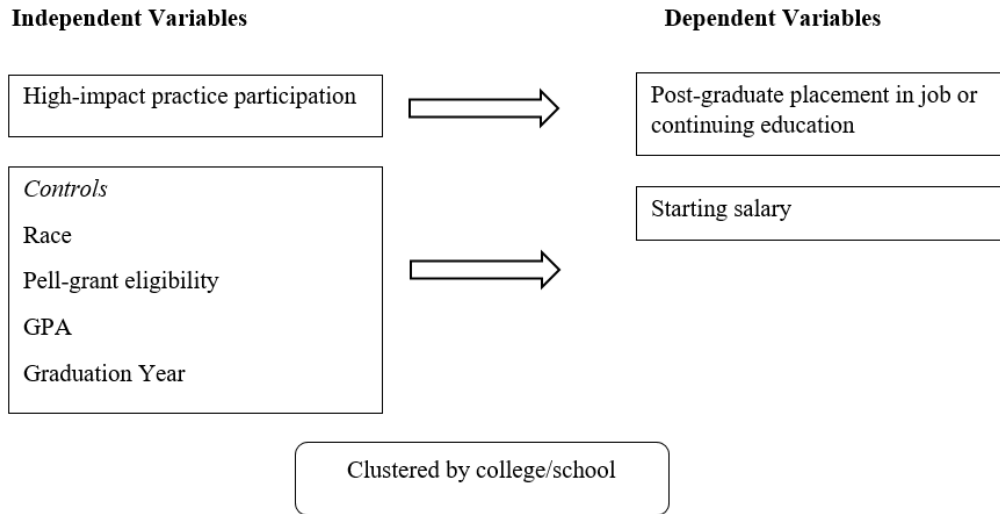
Hypothesis 2: Students from racial minority groups or who are Pell-grant eligible will have less positive outcomes as measured by post-graduate placement and starting salaries relative to white students and non-Pell eligible students.

Hypothesis 3: Students with higher GPAs will have more positive outcomes as measured by post-graduate placement and starting salaries.

Hypothesis 4: The student's college/school will be related to post-graduate placement and starting salaries.

A significant body of work demonstrates that high-impact practices are beneficial to college students (Kuh, 2008); however, less evidence exists on the relationship between high-impact practices and post-graduate outcomes (Wolniak & Engberg, 2015). This research addresses a critical gap in our understanding of the relationship between high-impact practices and student success. This study will examine the relationship between high-impact learning participation and post-graduate outcomes, as shown in Figure 1, accounting for GPA, field of study, race, Pell-grant eligibility and graduation year.

Figure 1: Conceptual Model



Methods

Data Collection

The dataset used for this study is composed of 8,746 undergraduate students at a mid-sized public research university in the Northeast. All undergraduate students who graduated in May of the years 2015, 2016, 2017 and 2018 are included in the dataset. Data from multiple sources were compiled into this new dataset by an institutional assessment office. Data was sourced from institutional records, a survey of graduating seniors and with secondary source information for non-respondents from internet search by institutional assessment staff using NACE standards for first-destination data, which defines knowledge rate as “the percent of graduates for which the institution has reasonable and verifiable information concerning the graduates’ postgraduation career activities” (NACE, 2019, p.5). These combined data sources resulted in an average knowledge rate of 88.75%. The senior survey was distributed via email to all undergraduate students graduating in May. The survey was administered by an assessment office located within the division of student affairs and was promoted by other offices, in particular campus career centers. Student participation was encouraged through a variety of incentives including gift cards and tickets to popular commencement activities. Survey promotion begins in April and continues through commencement. There is no existing literature published using this dataset.

The dataset includes information on student participation in five high-impact learning experiences, which were identified as priorities by institutional leadership. The institution tracks student participation primarily through designations of credit-bearing experiences. These experiences are internships, undergraduate research, study abroad, service-learning and capstones/theses. Data on student participation was gathered both from the survey of graduating seniors and from institutional data, including program participation records and course rosters for credit-bearing experiences. The dataset also includes demographic information gathered from institutional records, including race, Pell-grant eligibility, field of study and GPA. Student post-graduate outcomes, including employment, continuing education and starting salaries were gathered from student survey responses.

Participants

The majority of students included in this study were white (62%) and non-Pell eligible (66%), with an average GPA of 3.37. The vast majority of students included in the sample were “traditional” college students, with 88% enrolled full-time and 96% between the ages of 18-24. Over half the students (56%) were enrolled in a liberal arts college, followed by 16% in an engineering school and 15% in business management. A significant majority of students (88%) had at least one high-impact learning experience during college, with an average of four experiences per student. Most students self-selected into these high-impact experiences, with few majors requiring internship or other high-impact experience participation to graduate. Three-quarters of students had secured employment or were enrolled in a program of continuing education at graduation. Of students who had secured employment, the average reported starting salary was \$57,422. Overall, this dataset represents a high-performing student population with strong post-graduate outcomes. The average knowledge rate for the survey of graduating seniors was 88.75% (7,762 students). Additional descriptive statistics are available in Table 1.

Table 1*Descriptive Statistics*

	Frequency	Percentage
Race/Ethnicity		
White	5,424	62.02%
Asian	1,230	14.06%
Hispanic	800	9.15%
Non-resident Alien	482	5.51%
Black/African American	376	4.30%
Two or More Races	294	3.36%
Unknown	127	1.45%
Pacific Islander	7	0.08%
American Indian/Alaska Native	6	0.07%
Pell-Grant Eligibility		
Not Pell Eligible	5,786	66.16%
Pell Eligible	2,960	33.84%
College/School		
Liberal Arts	4,938	56.46%
Engineering	1,399	16%
Business	1,338	15.3%
Nursing	683	7.81%
Human Services	388	4.44%
Post-Graduate Destinations		
Employed	3,801	44.07%
Continuing Education	2,694	30.87%
Not Employed or Enrolled in Continuing Education	2,131	25.57%

n = 8,746

Measures

Data for this research project came from a survey of graduating seniors and from existing institutional sources, including student records and program data.

Dependent variables. Three dependent variables were explored in this study: post-graduate placement, post-graduate destination and starting salary. Placement was coded as binary outcome, with students who had secured a job or enrolled in continuing education coded as “placed” and all other students coded as “unplaced.” Specific destinations were explored as a separate dependent variable, with employment, continuing education and no placement as separate categorical variables. Students with no placement were set as the base/reference category. Finally, starting salary, a continuous variable, was analyzed only for students who had a job at graduation. All dependent variables were self-reported by students in a graduating senior survey administered shortly before graduation.

Independent variables. The predictor variable, total number of high-impact learning experiences, was a continuous measure of a student's total number of internship, service-learning, study abroad, research or capstone experiences during college. This variable was derived from both institutional records of university-sponsored experiences and self-reported by students in the senior survey. Procedures were in place to prevent duplication of experience counts. Control variables were all pulled from institutional records and included GPA (continuous variable on a 4.0 scale), race/ethnicity (categorical), Pell-grant eligibility (binary) and graduation year (categorical). College or school of study (categorical) was used as a grouping variable to account for dependence of the data.

Analysis

Multilevel multivariate logistic regression was used to examine the relationship between post-graduate placement rates and high-impact learning experience participation. To further examine the relationship between high-impact learning experiences and post-graduate outcomes, a multilevel multinomial logistic regression was used to explore each possible placement outcome (job, continuing education, or no placement). Students with no placement were assigned as the base category for comparison. Next, multilevel multivariate linear regression was used to examine the relationship between starting salaries and high-impact learning participation for students who reported having secured a job. For each analytical model race, Pell-grant eligibility, GPA and graduation year were included as control variables. White students and non-Pell eligible students were used as the base categories for comparison purposes. Data was clustered by the five colleges or schools of study to account for the dependence of the data and expected differences in placement rates and salaries between various fields of study ($M = 1,749$, $SD = 1640.11$).

Model fit. The analytical models used in this study met almost all appropriate model assumptions, indicating that the data was a good fit for the selected models. Kurtosis values for continuous variables (total number of high-impact learning experiences, GPA and salary) were below the absolute value of 10, which has been found to be an acceptable level (Kline, 2011). For all analytical models, because the data can be grouped by a student's college or school of study, the model violates the assumption of independence of the data. To address this, multilevel models were used to cluster the data by college or school. While most indicators suggest the models are a good fit for the data, the McFadden R-squared for the multinomial logistic regression model predicting post-graduate destination was only .048, indicating that the model does not explain much of the variance in post-graduate placement outcomes.

Missing data. Because salary data was only gathered for students who had secured a job at the time of the survey, missingness for this variable was analyzed only for students who reported having a job. This resulted in about 23% of data missing for this variable. Missing data in the salary variable was significantly related to the total number of high-impact experiences ($\beta = -.004$, $SE = .001$, $t = -3.31$, $p < .001$, 95% CI = $-.01, -.002$), graduation year ($\beta = .02$, $SE = .004$, $t = 5.77$, $p < .001$, 95% CI = $.01, .03$), the college or school ($\beta = -.03$, $SE = .004$, $t = -5.88$, $p < .001$, 95% CI = $-.03, -.02$), destination ($\beta = -.13$, $SE = .003$, $t = -49$, $p < .001$, 95% CI = $-.14, -.13$) and GPA ($\beta = -.15$, $SE = .01$, $t = -13.18$, $p < .001$, 95% CI = $-.18, -.13$). Possible explanations for omitted data may be related to the survey year due to differences in survey administration and students with lower starting salaries choosing not to report this information.

The missing data from the total number of high impact learning experiences is significantly related to the graduation year ($\beta = -.03$, $SE = .003$, $t = -12.13$, $p < .001$, 95% CI = $-.05, -.03$), destination ($\beta = .01$, $SE = .002$, $t = 4.60$, $p < .001$, 95% CI = $.01, .01$), GPA ($\beta = -.063$, $SE = .01$, $t = -8.09$, $p < .001$, 95% CI = $-.08, -.05$) and Pell eligibility ($\beta = .02$, $SE = .01$, $t = 2.83$, $p < .01$, 95% CI = $.01, .03$). Students with lower GPAs or who were Pell eligible may have been less likely to have a record of high-impact learning experience participation and may have been more likely to not respond to the survey request. All other missing data were not statistically related to any other variables in the dataset.

To address these missing data patterns, I added all significant predictors of missingness to the final analytical model and used Full Information Maximum Likelihood (FIML) to impute the missing salary data, as recommended by other researchers (McArdle, 2013; Schafer & Graham, 2002; Scheffer, 2002). All other missing data represented less than 6% of the dataset, which is an acceptable percentage of missing data and is unlikely to bias results (Bennett, 2001). Therefore, I ran the analysis with this missing data removed.

Results

Post-graduate placement. As displayed in Table 2, the total number of high-impact learning experiences, GPA, graduation year, college or school of study and some race or ethnicity categories were significantly related to having a placement in a job or continuing education at the time of graduation, after controlling for all variables in the model. Students had 4% higher odds of having a placement at graduation for each additional high-impact learning experience ($OR = 1.04$, $SE = .01$, $z = 3.23$, $p < .001$, 95% CI = $1.02, 1.06$). For each one point increase in GPA, students had a 177% increase in odds of having a placement ($OR = 2.77$, $SE = .209$, $z = 13.52$, $p < .001$, 95% CI = $2.39, 3.21$). Graduation year was also a significant predictor of post-graduate placement ($OR = 1.28$, $SE = .031$, $z =$

10.10, $p < .001$, 95% CI = 1.22, 1.34). Data was clustered by college or school, accounting for 8.6% of the variance in placement outcomes (ICC = .09, $SE = .05$, $p < .001$, CI = .03, .25), indicating the appropriateness of modeling this as a multilevel model. Relative to white students, the odds of Asian students having secured a job or enrolled in continuing education were 34.7% lower ($OR = .65$, $SE = .05$, $z = -5.32$, $p < .001$, 95% CI = .56, .76), the odds of non-resident aliens having secured a placement were 49.7% lower ($OR = .50$, $SE = .058$, $z = -5.94$, $p < .001$, 95% CI = .40, .63) and the odds for Black students were 10.2% lower ($OR = .90$, $SE = .12$, $z = -.81$, $p < .05$, 95% CI = .69, 1.2). No other racial groups were significant predictors of post-graduate placement rates relative to white students. Pell eligibility was also not a significant predictor.

Table 2
Post-Graduate Placements

Variable	OR	SE	z	p <	95% CI	
Total high-impact learning experience	1.04***	0.013	3.23	.001	1.02	1.06
Race (Relative to White Students)						
American	0.59	0.55	-0.57	.570	0.10	3.60
Indian/Alaska Native						
Asian	0.65***	0.05	-5.32	.000	0.56	0.76
Black/African American	0.9*	0.12	-0.81	.417	0.69	1.16
Hispanic	1.03	0.10	0.03	.750	0.85	1.25
Non-resident alien	0.50***	0.06	-5.94	.000	0.40	0.63
Two or more races	1.17	0.19	0.99	.323	0.85	1.61
Unknown	0.72	0.15	-1.56	.120	0.47	1.09
Pacific Islander	2.80	3.18	0.91	.363	0.31	25.80
GPA	2.77***	0.21	13.52	.000	2.39	3.21
Pell Eligible (Relative to Non-Pell Eligible)	0.89	0.06	-1.86	.062	0.79	1.01
Graduation Year	1.28***	0.03	10.10	.000	1.22	1.34

Note. OR = Odds Ratio. SE = Standard Error. CI = Confidence Interval.

* $p < .05$ ** $p < .01$ *** $p < .001$

Data clustered by college/school

Employment. Analysis was also performed to explore specific statistics for employment and continuing education relative to students with no placement, as displayed in Table 3. High-impact learning experiences, GPA, graduation year and some race categories were significant predictors of employment rates. For each

additional high-impact learning experience, a student's odds of having secured a job by graduation increased by 9% ($OR = 1.08$, $SE = .010$, $z = 8.27$, $p < .001$, 95% $CI = 1.06, 1.10$). For every one point increase in GPA, a student's odds of having a job increase by 82% ($OR = 1.82$, $SE = .15$, $z = 7.5$, $p < .001$, 95% $CI = 1.55, 2.12$). Relative to white students, the odds of Asian students having secured a placement decreased by 33% ($OR = .67$, $SE = .06$, $z = -4.73$, $p < .001$, 95% $CI = .57, .79$), the odds for non-resident aliens were 68.5% lower ($OR = .32$, $SE = .05$, $z = -8.15$, $p < .001$, 95% $CI = .24, .42$) and the odds for Black students were 34.9% lower ($OR = 0.65$, $SE = 0.10$, $z = -2.91$, $p < .01$, 95% $CI = .488, .870$). Graduation year ($OR = 1.29$, $SE = .034$, $z = 9.65$, $p < .001$, 95% $CI = 1.22, 1.36$) also significantly predicted employment outcomes. A small but significant amount of the variance (2.5%) in post-graduate destination outcomes was attributed to the college or school of study ($ICC = .025$, $SE = .017$, $p < .001$, $CI = .01, .09$). Pell eligibility and most race/ethnicity categories were not significant.

Continuing education. Analysis was also run to examine predictors of enrolling in continuing education, relative to students who had no placement at the time of graduation, as shown in Table 3. For each additional high-impact learning experience, the odds of enrolling in continuing education increased by 7% ($OR = 1.07$, $SE = .01$, $z = 5.79$, $p < .001$, 95% $CI = 1.05, 1.1$). For every one point increase in GPA, a student's odds of enrolling in continuing education increase by 443% ($OR = 5.43$, $SE = .51$, $z = 18.20$, $p < .001$, 95% $CI = 4.53, 6.52$). Relative to white students, Asian students odds of being enrolled in continuing education were 24.2% lower ($OR = .76$, $SE = .071$, $z = -2.96$, $p < .01$, 95% $CI = .631, .911$). Students in the unknown race/ethnicity category were 49.4% less likely to be enrolled in continuing education relative to white students ($OR = .51$, $SE = .15$, $z = -2.33$, $p < .05$, 95% $CI = .29, .90$). Graduation year ($OR = 1.21$, $SE = .034$, $z = 6.60$, $p < .001$, 95% $CI = 1.14, 1.28$) was also a significant predictor of continuing education. Again, a statistically significant, but small, amount of the variance (2.5%) in post-graduate destination was attributed to the college or school of study ($ICC = .025$, $SE = .017$, $p < .001$, $CI = .01, .09$). Pell eligibility and most race categories were not significant predictors.

Table 3

Post-Graduate Destinations Relative to Students with No Placement

Variable	OR	SE	z	p <	95% CI	
Employment						
Total high-impact learning experience	1.08***	0.010	8.27	.000	1.06	1.10
Race (Relative to White Students)						
American	.86	.795	-0.17	.868	.14	5.28
Indian/Alaska Native						
Asian	0.67***	0.06	-4.73	.000	0.57	0.79
Black/African American	0.65**	0.10	-2.91	.004	.49	0.87
Hispanic	0.92	.10	-0.78	.438	0.75	1.13
Non-resident alien	0.32***	0.05	-8.15	.000	0.24	0.42
Two or more races	1.06	.018	0.32	.752	0.75	1.48
Unknown	0.82	0.18	-0.89	.371	0.53	1.27
Pacific Islander	2.36	2.76	0.73	.463	0.24	23.35
GPA	1.82***	0.15	7.50	.000	1.55	2.12
Pell Eligible (Relative to Non-Pell Eligible)	0.88	0.06	-1.91	.056	.78	1.00
Graduation Year	1.29***	.03	9.65	.000	1.22	1.36
Continuing Education						
Total high-impact learning experience	1.07***	0.013	5.79	.000	1.05	1.1
Race (Relative to White Students)						
American	0.60	0.76	-0.40	.687	0.05	6.99
Indian/Alaska Native						
Asian	0.76**	0.07	-2.96	.003	0.63	0.91
Black/African American	1.17	0.18	1.02	.307	0.86	1.59
Hispanic	1.08	0.12	0.65	.516	0.86	1.35
Non-resident alien	1.00	0.13	0.01	.990	0.78	1.28
Two or more races	1.40	0.26	1.83	.068	0.98	2.00
Unknown	0.51*	0.15	-2.33	.020	0.29	0.90
Pacific Islander	3.75	4.75	1.04	.297	0.31	45.00
GPA	5.43***	0.51	18.20	.000	4.53	6.52
Pell Eligible (Relative to Non-Pell Eligible)	0.89	0.06	-1.59	.111	0.78	1.03
Graduation Year	1.21***	0.03	6.60	.000	1.14	1.28

Note. OR = Odds Ratio SE = Standard Error. CI = Confidence Interval.

*p < .05 **p < .01 ***p < .001

Reference group: Students with no placement

Data clustered by college/school

Starting salary. As shown in Table 4, the total number of high-impact learning experiences, GPA, graduation year, some race categories, and the college

or school of study were all significant predictors of starting salary after controlling for all other variables in the model. With each additional high-impact learning experience, starting salary increased by \$965.75 ($\beta = 965.75$, $SE = 219.25$, $z = 4.40$, $p < .001$, 95% CI = 536.03, 1395.48). A significant amount (31%) of the variance in starting salary was attributed to the students' college or school of study (ICC = .305, $SE = .137$, $p < .001$, CI = .11, .61). Starting salary increased by \$7,062.66 for each one point increase in GPA ($\beta = 7062.66$, $SE = 1750.68$, $z = 4.03$, $p < .001$, 95% CI = 3631.39, 10493.93). Graduation year was also a significant predictor of starting salary ($\beta = 1953.40$, $SE = 533.11$, $z = 3.66$, $p < .001$, 95% CI = 908.52, 2998.29). Relative to white students, Pacific Islander students ($\beta = -61298.97$, $SE = 23116.23$, $z = -2.65$, $p < .01$, 95% CI = -106606.70, -15991.21) and students who identified as two or more races ($\beta = -7256.08$, $SE = 3446.44$, $z = -2.11$, $p < 0.05$, 95% CI = -14010.99, -501.18) had significantly lower starting salaries. All other race/ethnicity categories, as well as Pell eligibility, were not significant predictors of salary.

Table 4*Starting Salary Clustered by College or School*

Variable	Coef.	SE	z	p <	95% CI	
Total high-impact learning experience	965.75***	219.25	4.40	.000	536.03	1395.48
Race (Relative to White Students)						
American Indian/Alaska Native	-4371.54	23062.82	-0.19	.850	-49573.84	40830.77
Asian	-284.10	1844.64	-0.15	.877	-3900.43	3330.44
Black/African American	1533.16	3704.64	0.41	.679	-5727.81	8794.12
Hispanic	-751.01	2301.74	-0.33	.744	-5262.34	3760.31
Non-resident alien	-3164.67	4529.39	-0.70	.485	-12042.10	5712.76
Two or more races	-7256.08*	3446.44	-2.11	.035	-14010.99	-501.18
Unknown	2528.31	5646.53	0.45	.654	-8538.68	13595.30
Pacific Islander	-	23116.63	-2.65	.008	-106606.70	-15991.21
	61298.97**					
GPA	7062.66***	1750.68	4.03	.000	3631.39	10493.93
Pell Eligible (Relative to Non-Pell Eligible)	-52.20	1320.90	-0.04	.968	-2641.11	2536.72
Graduation Year	1953.40***	533.11	3.66	.000	908.52	2998.29

Note. SE = Standard Error. CI = Confidence Interval.

* $p < .05$ ** $p < .01$ *** $p < .001$

Discussion

A robust body of research has demonstrated the positive benefits of high-impact learning experiences on student development outcomes (Kuh, 2008). This study expands on this work by examining the influence of high-impact learning experiences on post-graduate outcomes. The findings indicate that high-impact learning experiences have a positive, statistically significant influence on whether or not students have secured a job or are enrolled in continuing education at the time of graduation and on starting salaries. These results are found even when accounting for GPA, college or school of study, race, graduation year and Pell eligibility. The results also indicate the complicated nature of these outcomes, and suggest that factors such as GPA and field of study exert a strong influence on post-graduate outcomes. Overall, these findings suggest that high-impact practices are not only beneficial to students during their college experience, but may have longer-term benefits. This study adds to the evidence high-impact learning experience are an important part of the college experience and that these experiences prepare students for future success.

The findings demonstrate that students have increased odds of a placement in a job or continuing education, and increased salary, for each additional high-impact practice. These findings are largely consistent with previous research. Previous studies have found that some high-impact learning experiences can have a positive influence on plans for continuing education (e.g. Kilgo & Pascarella, 2016; Szelényi & Inkelas, 2011), but these studies are limited to students' intentions to pursue graduate studies. The present study adds to our knowledge by demonstrating that high-impact learning contributes to actual graduate enrollment rates. Consistent with prior research, high-impact learning experiences were found to have a positive influence on early career outcomes (Callanan & Benzing, 2004; Miller et al. 2017; Saltikoff, 2017). Research indicates that high-impact learning helps students develop transferrable skills desired by employers (Berger, 2012; Kinzie, 2013; Lopatto, 2007) and provide students with engaging "stories" to convey to potential employers (Miller et al. 2017). As in other studies, field of study was a significant predictor of career outcomes (e.g. Wolniak & Engberg, 2015), in particular on salary (Melguizo & Wolniak, 2012). However, these findings suggest that despite factors such as field of study, which exert a strong influence on career outcomes, high-impact learning experiences are still a significant predictor of post-graduate success.

The findings for underrepresented students, operationalized in this study as Pell-grant eligible or from a racial minority group, were mixed. Pell-grant eligibility was not a significant predictor of any outcome. Relative to white students, some students from racial minority groups were less likely to have positive post-graduate outcomes, but the findings were inconsistent. Previous

research has found that underrepresented students face additional barriers to success during college (e.g. Astin & Osegura, 2005; Brownell & Swaner, 2009; Engle & Tinto, 2008), but that high-impact learning experiences have an especially strong influence on positive outcomes for these students (Kuh, 2008). It may be the case that the high rate of high-impact practice participation in the study population served to reduce some of the inequitable outcomes among student groups. This study did not compare outcomes across groups of students, however, and additional analysis is needed to further explore these findings.

Graduation year was also a significant predictor of each post-graduate outcome. The relationship between graduation year and outcomes is not clear; however it may be the case that data collection was stronger in some years or that campus practices related to career development have strengthened over time. Economic factors may also have played a role in students' career and continuing education opportunities.

Limitations

This study contributes to an underexplored area of research; however, it does present limitations that should be considered. First, the study examines student outcomes from only one institution. The findings, therefore, may not be widely transferrable to different institution types or student populations. For example, the institution prioritized high-impact learning participation and had a high rate of participation in these experiences. Second, the data used in the study only includes placements and starting salaries at the time of graduation. This operationalization of the dependent variables may be an unfair measure of "success," in particular for students in majors that do not lend themselves to employment in large firms that make early job offers to students. Finally, this exploratory study did not analyze the effect of specific high-impact practices or compare outcomes between groups of students, such as field of study or underrepresented students. The overall findings indicate that more work is needed to understand the effect of high-impact learning in more detailed and nuanced ways.

Implications for Practice

The findings of this study indicate that high-impact learning experiences are an important contributor to student success after graduation, even when accounting for factors such as GPA or field of study. As other research suggests, colleges should continue to support the development and promotion of quality high-impact practices and integrate them into the college experience. Scholars have noted that carefully designed experiences may lead to even greater outcomes and that practitioners should consider the unique culture and needs of their student population when designing programs (Brownell & Swaner, 2009). While findings

indicate that high-impact practices are not the sole predictor of post-graduate success, these practices are an important part of the overall student experience and support students in making the most of their college experience. Moreover, the findings suggest that high-impact practices may be especially influential for students in fields that lead less directly to employment and a high salary. When making decisions about resource allocation, institutions and students may be well served by directing additional resources and support to the promotion of high-impact learning in these areas.

Future Research Directions

Researchers should continue to explore the influence of high-impact practices on post-graduate student outcomes. Future research could examine outcomes from a variety of institution types, including with student populations who may face additional barriers to success. The field would also benefit from an exploration of the influence of high-impact learning on post-graduate outcomes of underrepresented students, including students of color, first-generation students and low-income students. Research indicates that these students experience an even greater benefit from high-impact learning in terms of developmental outcomes during college, but researchers have not extended this line of inquiry to post-graduate outcomes, such as employment. Because field of study was an important predictor of post-graduate outcomes, future research should analyze outcomes for students in particular degree fields for a more nuanced understanding of the influence of high-impact learning. Finally, an expanded operationalization of post-graduate indicators of success would allow for analysis that better reflects the reality of many students' experiences after graduation. For example, including employment outcomes at 3-months or 6-months after graduation would better capture the meaningful outcomes for many students.

References

- Astin, A. W. (1984). Student involvement: A development theory for higher education. *Journal of College Student Personnel*, 25 (4), 297–308. Retrieved from <https://www.press.jhu.edu/journals/journal-college-student-development>
- Astin, A.W., & Oseguera, L. (2005). Degree attainment rates at American colleges and universities. *Higher Education research Institute*. Retrieved from <https://www.heri.ucla.edu/PDFs/pubs/TFS/Special/Monographs/DegreeAttainmentRatesAtAmericanCollegesAndUniversities.pdf>
- Bridges, B.K., Kinzie, J., Laird, T.F.N., Kuh, G.D. (2008). Student engagement and student success at historically black and Hispanic-serving institutions. In M. Gasman, B. Baez, C.S.V. Turner (Eds.), *Understanding Minority-Serving Institutions* (pp. 217-235). Albany, NY: State University of New York Press.
- Bennett, D.A. (2001). How can I deal with missing data in my study? *Australia and New Zealand Journal of Public Health*, 25(5), 464–469. Retrieved from <https://onlinelibrary.wiley.com/journal/17536405>
- Berger, L. (2012). *All work, no pay: Finding an internship, building your résumé, making connections, and gaining job experience*. New York: Random House.
- Brownell, J.E., & Swaner, L.E. (2009). High-impact practices: Applying the learning outcomes literature to the development of successful campus programs. *Peer Review*, 26-30. Retrieved from <https://www.aacu.org/peerreview/2019/winter-spring>
- Callanan, G. & Benzing, C. (2004). Assessing the role of internships in the career-oriented employment of graduating college students. *Education + Training*, 46(2), 82-89. doi:10.1108/00400910410525261
- Celio, C.I., Durlak, J., Dymnicki, A. (2011). A meta-analysis of the impact of service-learning on students. *Journal of Experiential Education*, 34(2), 164-181. doi:10.5193/JEE34.2.164
- Eagan, K., Lozano, J.B., Hurtado, S., & Case, M.H. (2013). *The American freshman: National norms fall 2013*. Los Angeles: Higher Education Research Institute, UCLA. Available at <http://www.heri.ucla.edu/monographs/theamericanfreshman2013.pdf>.

- Engle, J., & Tinto, V. (2008). Moving beyond access: College success for low-income, first generation students. *The Pell Institute*. Retrieved from <https://files.eric.ed.gov/fulltext/ED504448.pdf>
- Eyler, J.S., Giles, D.E., Stenson, C.M., & Gray, C.J. (2001). At a glance: What we know about the effects of service-learning on college students, faculty, institutions, 1993-2000. *Corporation for National Service*. Retrieved from <http://www.compact.org/wp-content/uploads/resources/downloads/aag.pdf>
- Finley, A., & McNair, T. (2013). Assessing Underserved Students' Engagement in High-Impact Practices. *Association of American Colleges and Universities*. Retrieved from <http://www.aacu.org/assessinghips>
- Fischer, M. J. (2007). Settling into campus life: Differences by race/ethnicity in college involvement and outcomes. *Journal of Higher Education*, 78(2), 125-161. <https://doi.org/10.1080/00221546.2007.11780871>
- Harper, S.R. (2009). Race-conscious student engagement practices and the equitable distribution of enriching educational experiences. *Liberal Education*. Retrieved from <https://www.aacu.org/liberaleducation/2009/fall>
- Hu, S., & Wolniak, G.C. (2010). Initial evidence on the influence of college student engagement on early career earnings. *Research in Higher Education*, 52, 750-766. <https://doiorg.proxy.binghamton.edu/10.1007/s11162-010-9176-1>
- Jones, M.T., Barlow, A.E., & Villarejo, M. (2010). Importance of undergraduate research for minority persistence and achievement in biology. *The Journal of Higher Education*, 81(1), 82-115. doi:10.1353/jhe.0.0082
- Kilgo, C.A., & Pascarella, E.T. (2016). Does independent research with a faculty member enhance four-year graduation and graduate/professional degree plans? Convergent results with different analytical methods. *Higher Education*, 71(4), 575-592. <https://doi.org/10.1007/s10734-015-9925-3>
- Kinzie, J. (2013). Taking stock of capstones and integrative learning. *Peer Review*, 15(4), 27-30. Retrieved from <https://www.aacu.org/publications-research/periodicals/taking-stock-capstones-and-integrative-learning>
- Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling* (5th ed., pp. 3-427). New York: The Guilford Press.

- 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*. Retrieved from <https://www.aacu.org/leap/hips>
- Kuh, G.D. (2009). What student affairs professionals need to know about student engagement. *Journal of College Student Development*, 50(6), 683-706. <https://doi.org/10.1353/csd.0.0099>
- Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J., & Gonyea, R. M. (2008). Unmasking the effects of student engagement on first-year college grades and persistence. *Journal of Higher Education*, 79(5), 540-563. <https://doi.org/10.1353/jhe.0.0019>
- Kuh, G.D., & Ewell, P.T. (2010). The state of learning outcomes assessment in the United States. *Higher Education Management and Policy*, 22(1), 9-28. Retrieved from <https://www.tandfonline.com/loi/cjhe20>
- Liu, X., Thomas, S. & Zhang, L. (2010). College Quality, Earnings, and Job Satisfaction: Evidence from Recent College Graduates. *Journal of Labor Research*, 31, 183-201. <https://doi.org/10.1007/s12122-010-9086-1>
- Lopatto, D. (2007). Undergraduate research experiences support science career decisions and active learning. *Cell Biology Education: Life Sciences Education*, 6(4), 297-306. doi:10.1187/cbe.07-06-0039
- McArdle, J. J. (2013). *Dealing with longitudinal attrition using logistic regression and decision tree analyses*. In J. J. McArdle & G. Ritschard (Eds.), *Contemporary issues in exploratory data mining in the behavioral sciences* (pp. 282– 311). New York, NY: Taylor & Francis.
- Melguizo, T. & Wolniak, G.C. (2012). The earnings benefits of majoring in STEM fields among high achieving minority students. *Research in Higher Education*, 53(4), 383-405. <http://dx.doi.org/10.1007/s11162-011-9238-z>
- Miller, A.L., Rocconi, L.M., Dumford, A.D. (2018). Focus on the finish line: does high-impact practice participation influence career plans and early job attainment? *Higher Education*, 75, 489-506. doi:10.1007/s10734-017-0151-z
- NACE. (2019). Standards and protocols for the collection and dissemination of graduating students initial career outcomes information for undergraduates. Retrieved from <https://www.nacweb.org/uploadedfiles/files/2020/publication/first-destination/first-destination-survey-standards-and-protocols.pdf>

- Pascarella, E.T., & Terenzini, P.T. (2005). *How college affects students: A third decade of research, volume 2*. San Francisco, CA: Jossey-Bass.
- Ribera, A.K., Miller, A.L., & Dumford, A.D. (2017). Sense of peer belonging and institutional acceptance in the first year: The role of high-impact practices. *Journal of College Student Development*, 58(4), 545-563. <https://doi.org/10.1353/csd.2017.0042>
- Saltikoff, N. (2017). The positive implications of internships on early career outcomes. *NACE Journal*. Retrieved from <https://www.nacweb.org/tag/journal/>
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7, 147–177. doi:10.1037/1082-989X.7.2.147
- Scheffer, J. (2002). Dealing with missing data. *Research Letters in the Information and Mathematical Sciences*, 3, 153–160. Retrieved from <https://mro.massey.ac.nz/handle/10179/4332>
- Song, W., Furco, A., Lopez, I., & Maruyama, G. (2017). Examining the relationship between service-learning participation and the educational success of underrepresented students. *Michigan Journal of Community Service Learning*, 24(1), 23-37. Retrieved from <https://quod.lib.umich.edu/m/mjcs/>
- Sweat, J., Hones, 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), 1-24. <https://doi.org/10.20429/ijstl.2013.070217>
- Szelényi, K., & Inkelas, K.K. (2011). The role of living–learning programs in women’s plans to attend graduate school in STEM fields. *Research in Higher Education*, 52(4), 349-369. <https://doi.org/10.1007/s11162-010-9197-9>
- Terenzini, P.T., Cabrera, A.F., & Bernal, E.M. (2001). *Swimming against the tide: The poor in American higher education*. New York: College Board.
- Warren, J.L. (2012). Does service-learning increase student learning?: A meta-analysis. *Michigan Journal of Community Service Learning*, 18(2), 56-61. Retrieved from <https://quod.lib.umich.edu/m/mjcs/>
- Wolniak, G. C. & Engberg, M. E. (2015, April). The influence of “high-impact” college experiences on early career outcomes. *AERA Annual Meeting*. Paper presented at AERA Annual Meeting, Chicago, IL.

- Yeh, T. L. (2002). Asian Americans college students who are educationally at risk. *New Directions for Student Services*, 97, 61-71. <https://doi.org/10.1002/ss.39>
- Zalaquett, C. P. (1999). Do students of noncollege-educated parents achieve less academically than students of college-educated parents? *Psychological Reports*, 85(2), 417-421. <https://doi.org/10.2466/pr0.1999.85.2.417>
- Zhang, L (2008). The way to wealth and the way to leisure: The impact of college education on graduates' earnings and hours of work. *Research in Higher Education*, 49, 199-213. <https://doi.org/10.1007/s11162-007-9080-5>