

# The Impact of the Step Up Scholars Program on College Readiness and Success

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# About Education Northwest

Founded as a nonprofit corporation in 1966, Education Northwest builds capacity in schools, families, and communities through applied research and development.

This study is the final report of a three-year external evaluation of the GEAR UP Hawai'i program Step Up Scholars.

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# Executive Summary

Spearheaded by GEAR UP Hawai'i, the Step Up Scholars program was a statewide campaign and program that encouraged Hawai'i public school students in the graduating Classes of 2013, 2014, and 2015 to earn a more-rigorous high school diploma—the Board of Education Recognition Diploma (BOERD). The BOERD was designed to better prepare high school students for college and careers. The goal of the program was to increase the number of students who took rigorous coursework, graduated with the BOERD, and as a result, successfully entered and completed postsecondary education.

From fall 2008 to spring 2012, 13,886 students pledged to be Step Up Scholars, representing a third of students in the Classes of 2013, 2014, and 2015 in the state. After the campaign, the program provided a breadth of information and resources to Scholars about meeting the requirements of the BOERD, applying for college and financial aid, and developing the skills needed to succeed in college and a career. The idea was that more-informed and better-prepared students were more likely to take the required coursework for the BOERD and apply for financial aid and college.

This evaluation presents the program's effects on high school graduation and earning the BOERD for Scholars, as well as their college enrollment and persistence, compared with a matched comparison group. Since Step Up's theory of change centered on encouraging students to take rigorous coursework to earn the BOERD, we also examined the program's impact on earning credit in rigorous high school coursework. Finally, we examined Step Up's impact on the college-performance outcomes of students who attended the University of Hawai'i (UH).

**We found Step Up improved Scholars' chances of earning credit in rigorous coursework, graduating from high school, earning the BOERD, and enrolling and persisting in college. Results were similar for low-income Scholars. For UH students, Step Up improved first-year college-level credit accumulation and grade point average (GPA).**

Today, the Step Up program and BOERD no longer exist. There is now one diploma for all high school students, which in some ways mirrors the rigor of the BOERD. Based on the positive impact of Step Up, however, continuing the program in some form may benefit Hawai'i students' college readiness and success. Prior research suggests low-touch, informational interventions related to postsecondary enrollment, such as well-timed messages and materials sent directly home, can be beneficial for students. GEAR UP Hawai'i may want to consider preserving these aspects of Step Up, which may support GEAR UP's goal of increasing the number of low-income students who are prepared to enter and succeed in postsecondary education.

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# Introduction

Designed and implemented by GEAR UP Hawai'i, Step Up Scholars (also called "Step Up") was a statewide campaign and program that encouraged students in the graduating Classes of 2013, 2014, and 2015 to earn a more-rigorous high school diploma—the Board of Education Recognition Diploma (BOERD)—which was designed to better prepare high school students for college and careers. The goal of the program was to increase the number of students who take rigorous coursework, graduate with the BOERD, and as a result, successfully enter and complete postsecondary education.

At the request of GEAR UP Hawai'i, researchers at Education Northwest conducted a multiyear external evaluation of the impact of Step Up on the educational outcomes of participants (referred to as "Step Up Scholars"). In the first year of the evaluation (2014), we gathered perspectives from key stakeholders—GEAR UP staff members, high school counselors and administrators, and students—about the program's impact. We also examined the program's effect on student performance on the Hawai'i State Assessment (HSA). That evaluation found that Step Up raised the scores of Step Up Scholars by about three percentile points on the reading HSA and six percentile points on the math HSA.<sup>1</sup>

In this final report, we present the program's impact on high school graduation, earning the BOERD, college enrollment, and college persistence. Since Step Up's theory of change centers on encouraging students to take rigorous coursework to earn the BOERD, we also examined its impact on high school course taking, specifically, earning course credit in an Advanced Placement (AP) course and in Algebra II or higher. Finally, we examined the program's impact on the college-performance outcomes of students who enrolled at the University of Hawai'i (UH) during their first year, including college credit accumulation and cumulative grade point average (GPA).

**We found that Step Up improved Scholars' chances of taking and completing rigorous coursework, graduating from high school, earning the BOERD, and enrolling and persisting in college. Results are similar for low-income Scholars. For UH students, the program increased first-year college-level credit accumulation and GPA.**

Below, we provide a description of the program, followed by a description of the data, descriptive outcomes, and methods used in the evaluation. More details about the methodology can be found in Appendix C. Next, we present the results. We conclude with a brief discussion and implications for GEAR UP Hawai'i program staff members in regard to sustaining components of Step Up that may be particularly impactful, such as sending well-timed information directly home to students' families.

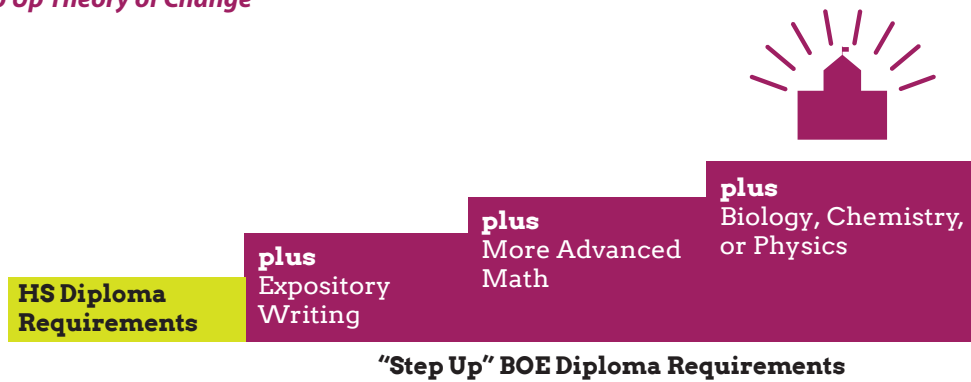
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<sup>1</sup> The full report is publicly available for download on the Education Northwest website:  
<http://educationnorthwest.org/resources/step-Scholars-program-perspectives-its-history-and-impact>

## Step Up theory of change

Step Up was a partnership among the Hawai'i State Board of Education, Hawai'i State Department of Education, and Hawai'i P–20 Partnerships for Education to help public high school students “step up” to the challenge of college and career readiness through earning the BOERD. The BOERD was more rigorous than the regular high school diploma because it required completing expository writing (e.g., an AP English course) to fulfill one of the four English credits; biology, chemistry, and/or physics to fulfill one of the three science credits; and an additional fourth year of mathematics. In addition, the BOERD required students to pass the Algebra II end-of-course exam and complete a senior project. Appendix A describes changes in the state's high school diploma requirements over the past 10 years.

**Figure 1. Step Up Theory of Change**



The theory underlying Step Up was that taking the rigorous coursework required to earn the BOERD would prepare students to successfully enter and complete postsecondary education. Research has found that the number and rigor of high school courses are associated with college enrollment and completion (ACT, 2005; Adelman, 2006; Chen, Wu, & Tasoff, 2010). The rigor of students' high school curriculum is an even stronger predictor of bachelor's degree attainment rates than high school GPA and test scores (Adelman, 2006). In particular, earning credit in advanced math courses and AP courses is a key predictor of college readiness and success (Ackerman, Kanfer, & Calderwood, 2013; Dougherty, Mellor, & Jian, 2006; Geiser & Santelices, 2004; Mattern, Shaw, & Xiong, 2009; Scott, Tolson, & Lee, 2010). Therefore, to measure Step Up's impact on rigorous course taking, we specifically focused on the outcomes of earning credit in Algebra II or higher and in any AP course. Algebra II is the highest math course students had to complete to earn the BOERD, so earning credit in Algebra II and beyond represents meeting or exceeding the requirements of the rigorous diploma (see Appendix A).

## Step Up campaign

From fall 2008 through spring 2011, GEAR UP program staff members spread the word about the value of Step Up and the more-rigorous diploma through mailings, newspaper and magazine articles, announcements and features on radio stations and television morning shows, and outreach at community events. The target audience was eighth- and ninth-grade students enrolled in Hawai'i public schools, and the goal was to encourage them to sign a pledge to be a Step Up scholar and earn the BOERD. Schools received incentives for getting 50 percent or more of students in the graduating Classes of 2013, 2014, and 2015 to sign the pledge.

School administrators and counselors we interviewed for the 2014 case study said an enormous amount of information and energy went into getting students to pledge to be Step Up Scholars and learn about the BOERD. For example, according to one high school administrator:

**“ There was a push in ninth grade. The district got behind it. The counselors did presentations and passed out a pledge form. Initially, with the push to pledge, kids were made aware of what they needed to do to go for the BOERD. Our students also developed a commercial. It was aired on TV all over the state.**

The campaign was very successful; about a third of the students in the Classes of 2013, 2014, and 2015 pledged to be Step Up Scholars.

### **Step Up program**

After the campaign, Scholars received a significant amount of information and resources about how to meet the requirements of the BOERD, apply for college and financial aid, and develop the skills needed to succeed in college and a career. The idea was that more-informed and better-prepared students were more likely to take the required coursework for the BOERD and apply for financial aid and college. Scholars received the following:

- Monthly emails and postcards with tips and announcements
- Quarterly newsletters mailed to each scholar's home targeted to both the student and his or her family
- Yearly college exploration and application kits mailed to each scholar's home

See Appendix B for a list of materials and resources sent to Scholars.

Almost all counselors and administrators interviewed for the 2014 case study mentioned two reasons Step Up was a promising program with value: It was an additional source of information about college preparation for students, and it emphasized positive messages about postsecondary readiness and success, which are important for students to hear as much as possible, from as many sources as possible. According to one counselor:

**“ How Step Up has impacted me is that when Step Up mails things to students, they come to me to talk about it, and I can get students to do things I have been telling them over and over to do, but they never do. It is helpful for them to hear it from an outside source. It is better that they get the information right at home.**

The program also provided incentives for graduates who earned the BOERD, such as priority college admissions, special consideration for college Scholarships, and job application-advancement opportunities with local employers. However, a relatively small number of students who earned the BOERD took advantage of these incentives.

The program ended with the graduating class of 2015, when the state eliminated the BOERD and adopted a single high school diploma for all students. This diploma is similar to the BOERD but does not require four years of mathematics and a senior-year project (see Appendix A).

# Descriptive Outcomes and Methodology

## Research questions and data

The Hawai'i State Department of Education provided restricted-use, student-level administrative data to conduct this evaluation. The data included a flag for students who pledged to be a Step Up Scholar in eighth or ninth grade. The sample for this evaluation included students who were public school eighth-graders in 2008–2009, 2009–2010, and 2010–2011 and had HSA scores in eighth grade. See Table 1 for sample sizes of students in this study by graduating year, and the number of low-income students in the Step Up Scholar and Non-Scholar groups.

**Table 1. Number of students in study**

GRADUATION YEAR	STEP UP SCHOLARS		ALL OTHER STUDENTS (NON-SCHOLARS)	
	<i>Step Up Scholars</i>	<i>Low-income Scholars</i>	<i>Non-Scholars</i>	<i>Low-income Non-Scholars</i>
2013	3,305	1,454	6,434	3,603
2014	3,713	1,708	6,179	3,398
2015	3,788	1,705	5,780	3,006
Total sample in study	10,806	4,867	18,393	10,007

Data also included information from the National Student Clearinghouse, which verifies student enrollment for 96 percent of domestic colleges and universities, so we could examine the impact of Step Up on student enrollment and persistence at postsecondary institutions nationally. We also received data from UH so we could examine more-detailed college outcomes for students who attended UH.

The primary research questions for this study were:

1. For students in the graduating Classes of 2013, 2014, and 2015, what is the impact of the Step Up Scholars program on **high school graduation** with a regular diploma or BOERD?
2. For students in the graduating Classes of 2013, 2014, and 2015, what is the impact of the Step Up Scholars program on **college enrollment** at a four-year or two-year college?
3. For students in the graduating Classes of 2013 and 2014, what is the impact of the Step Up Scholars program on **first-to-second-year college persistence**?<sup>2</sup>

We also examined one potential mechanism underlying Step Up's impact by addressing the following questions about its influence on rigorous course taking:

4. For students in the graduating Classes of 2013, 2014, and 2015, what is the impact of the Step Up Scholars program on **earning credit in Algebra II or beyond**?
5. For students in the graduating Classes of 2013, 2014, and 2015, what is the impact of the Step Up Scholars program on **earning credit in any AP course**?

For all five questions, we identified Step Up's impact on low-income students (i.e., students who received free or reduced-price lunch in eighth grade) and higher-income students (i.e., students who did not receive free or reduced-price lunch in eighth grade) separately.

<sup>2</sup> At the time of data analysis, the college enrollees from the class of 2015 had just completed their first year, and therefore first-to-second-year college persistence data was not available.



Finally, 45 percent of Step Up Scholars and 29 percent of non-Scholars attended UH. We identified the impact of Step Up on more-detailed postsecondary outcomes for students who attended UH:

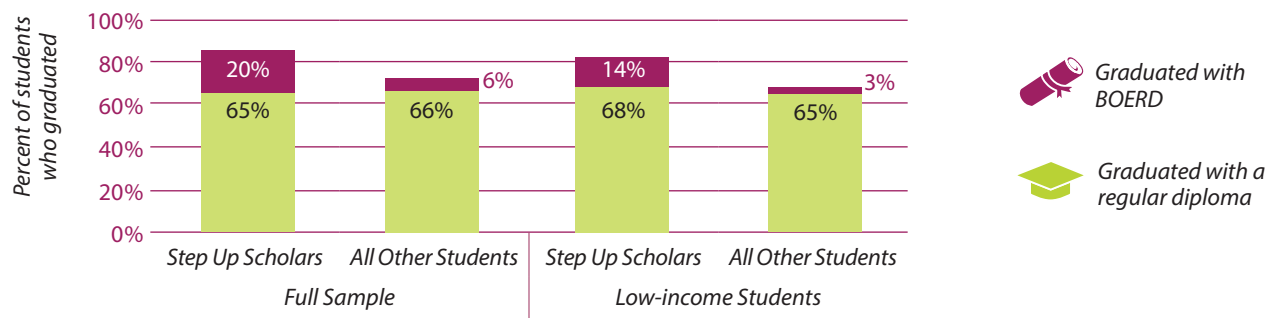
- For University of Hawai'i enrollees in the graduating Classes of 2013 and 2014, what is the impact of the Step Up Scholars program on **first-year college credit accumulation and first-year GPA?**

### Descriptive outcomes

Scholars took slightly more rigorous coursework than all other students. On average, Step Up Scholars earned 2.4 credits in Algebra II and other advanced math courses and nearly 1 credit in AP, while all other students earned 1.9 credits in Algebra II and/or higher math courses and close to zero (0.05) credits in AP.

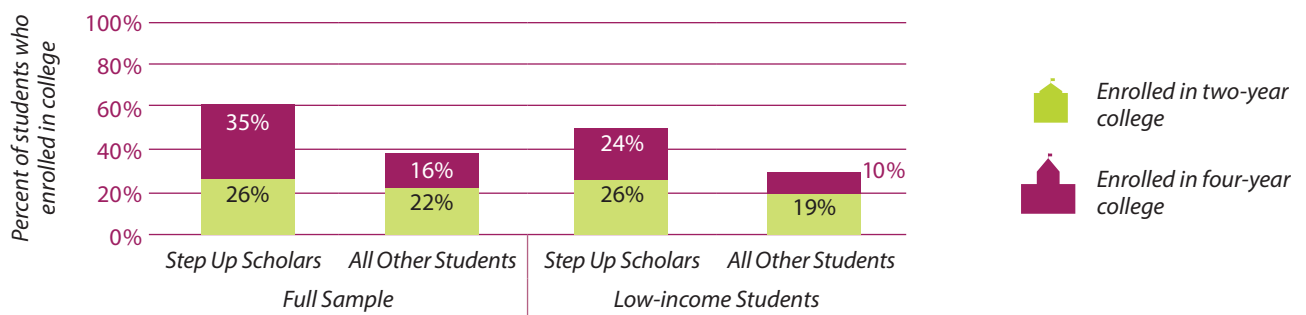
Descriptive outcomes also reveal Scholars had higher high school graduation, college enrollment, and college persistence rates than all other students. Eighty-five percent of Scholars graduated from high school, compared with 72 percent of all other students (Figure 1). Low-income Scholars also had higher graduation rates than low-income non-Scholars. Scholars' higher graduation rate was mostly the result of a higher percentage of Scholars earning the BOERD since a similar percentage of Scholars and non-Scholars earned the regular diploma.

**Figure 2. Step Up Scholars had higher graduation rates compared with all other students**



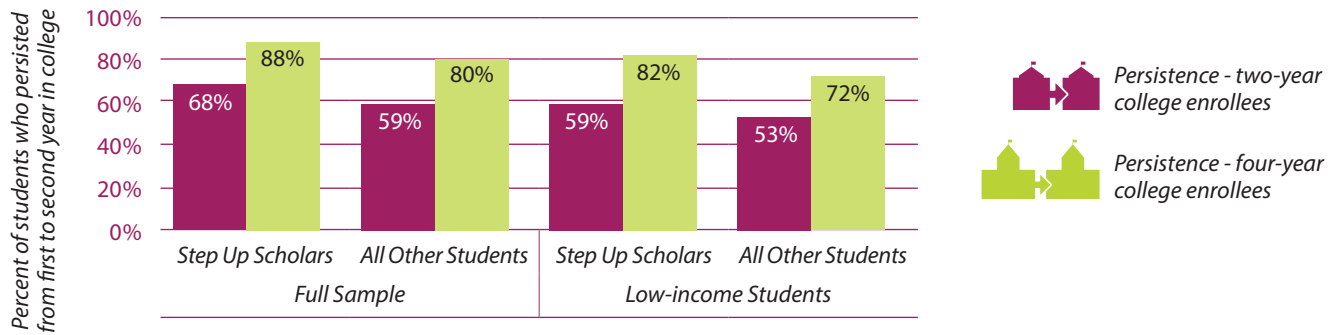
More Scholars also enrolled in college; 62 percent of Scholars enrolled in college compared with 38 percent of all other students (Figure 2). Low-income Scholars also had higher college-enrollment rates than all other low-income students (50 percent compared with 29 percent). Step Up Scholars enrolled in both two-year and four-year colleges at higher rates, although the differences in college enrollment were primarily driven by much higher rates of four-year college enrollment among Scholars.

**Figure 3. Step Up Scholars had higher rates of college enrollment compared with all other students**



More Scholars from the graduating Classes of 2013 and 2014 also persisted in college from the first year to the second year (Figure 3). Regardless of income level, all Scholars who attended a four-year college persisted to the second year at higher rates than their non-Scholar peers. Persistence rates for two-year college students were similar among Scholars and non-Scholars in the full sample, and they were slightly higher for low-income non-Scholars compared with low-income Scholars.

**Figure 4. Step Up Scholars had higher rates of college persistence compared with all other students**



Finally, Scholars who attended UH earned about 19.5 credits and a 2.9 GPA during their first year, while all other students who attended UH earned about 16 credits and a 2.7 GPA.

### Quasi-experimental methodology

Although impressive, sociodemographic and academic differences may drive the outcome differences between Scholars and non-Scholars. Compared with all other students, Scholars had higher average HSA math and reading scores in eighth grade. Scholars also had a significantly higher proportion of female students and lower proportions of students who were eligible for free or reduced-price lunch, had an English language learner status, and had an individualized education program in eighth grade (before the intervention began). There were also racial/ethnic differences between the two groups. The largest differences were that Step Up Scholars had lower proportions of Part-Hawaiian students and higher proportions of Filipino and Japanese students. The characteristics of students are included in Table 2 under “Unweighted sample.”

**Table 2. Characteristics of Step Up Scholars and all other students**

	Unweighted sample		Weighted sample	
	Step Up Scholars	All other students	Step Up Scholars	All other students
<b>Hawai'i State Assessment score</b>				
Eighth-grade reading	320.99	308.63	313.93	313.08
Eighth-grade math	313.60	297.57	304.45	303.35
<b>Gender</b>				
Female	57%	43%	49%	48%
Male	43%	57%	51%	52%
<b>Program participation</b>				
Eligible for free or reduced-price lunch (eighth grade)	45%	52%	49%	50%
Had an English language learner status (eighth grade)	11%	11%	11%	11%
Had an individualized education program (eighth grade)	6%	12%	9%	9%
<b>Race/ethnicity</b>				
American Indian	0%	1%	1%	1%
Black	1%	1%	1%	1%
Chinese	5%	2%	3%	3%
Filipino	29%	22%	25%	25%
Native Hawaiian	5%	6%	5%	5%
Part-Hawaiian	19%	26%	24%	24%
Japanese	14%	9%	11%	11%
Korean	2%	1%	1%	1%
Portuguese	1%	2%	2%	2%
Hispanic	2%	3%	3%	3%
Samoan	2%	4%	3%	4%
White	6%	10%	8%	8%
Indo-Chinese	12%	12%	12%	12%
Other	1%	1%	1%	1%

Sociodemographic and academic differences suggest Scholars would have better educational outcomes, regardless of their pledge to be a Step Up scholar. Therefore, we used propensity score analysis to calculate each student’s likelihood of pledging to be a scholar, based on his or her background characteristics and eighth-grade HSA scores.<sup>3</sup> Students who had the same likelihood as actual Scholars of pledging to be a Step Up scholar based on their background characteristics received a greater weight in the sample.

The “Weighted sample,” in which similar students in both the scholar and non-Scholar groups were weighted more heavily, is very similar across all background characteristics (see Table 2). For example, in the unweighted sample, Scholars have much higher HSA reading and math scores and a lower rate of free or reduced-price lunch eligibility, while in the weighted sample, Scholars and non-Scholars have nearly the same average scores and the same percentage of students eligible for free or reduced-price lunch. In general, the analysis weights less-advantaged Step Up Scholars and more-advantaged non-Scholars more heavily in the analysis.

<sup>3</sup> We also matched on third- and fifth-grade HSA scores, but the results were similar, so in the final analysis, we just matched on eighth-grade scores.

After weighting students based on their propensity score, we used regression analysis to estimate the relationship between pledging to be a scholar and the outcomes of interest.<sup>4</sup> For more details on the methodology, see Appendix C. Overall, this method allowed us to compare apples to apples; our population of Scholars matched our population of non-Scholars. Thus, we can be more confident outcome differences are the result of participating in Step Up rather than differences in student academic and sociodemographic characteristics.

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<sup>4</sup>We also ran the analysis for each cohort (the class of 2013, the class of 2014, and the class 2015) separately, and the results were all the same, so we presented the findings for students across all combined cohorts.

# Impact Study Findings

## Step Up had a positive impact on high school graduation, college enrollment, and college persistence

Overall, Step Up positively influenced high school graduation, college enrollment and college persistence. Nearly all findings are statistically significant, meaning they could not have occurred by chance. We discuss the findings below, and detailed results are presented in Table C2 in Appendix C.

The likelihood of a Step Up scholar graduating from high school was two times greater than that of a non-Scholar. A Step Up scholar's likelihood of earning the BOERD was about 2.3 times greater than that of a non-Scholar. Step Up's impact on earning a regular diploma was slightly less for low-income Scholars than higher-income Scholars, but the program's impact on earning the BOERD was **greater** for low-income Scholars than higher-income Scholars. Specifically, **low-income Scholars were 1.8 times more likely to graduate from high school and 2.5 times more likely to earn the BOERD than their peers who were not Scholars.** Scholars not eligible for free or reduced-price lunch were 2.3 times more likely to graduate from high school and earn the BOERD than their peers who were not Scholars.

Step Up Scholars were also 1.8 times more likely to enroll in a two-year college and about 2.6 times more likely to enroll in a four-year college than non-Scholars. These results were nearly identical for low-income Scholars. Specifically, **low-income Scholars were 2.5 times more likely to enroll in college than their low-income peers who were not Scholars.**

Finally, the program had a slightly greater influence on first-to-second-year college persistence for Scholars who enrolled in a four-year college than those who enrolled in a two-year college. Scholars who attended a four-year college were 1.5 times more likely to persist to the second year, and Scholars who attended a two-year college were 1.3 times more likely to persist. Results for low-income Scholars who attended a four-year college are the same as those for the full sample; **low-income Scholars who attended a four-year college were about 1.4 times more likely to persist from the first to second year than their low-income peers who were not Scholars.** Results for low-income Scholars who attended a two-year college are positive but statistically insignificant, meaning **the program may have had no impact on the persistence of low-income students who attended a two-year college.** This is the only statistically insignificant effect of the program.

## Step Up had a positive impact on rigorous high school course taking

A primary feature of the Step Up program was to provide students with well-timed information about the courses they needed to take to earn the BOERD and thus encourage them to take more rigorous coursework. Step Up Scholars did, in fact, take more rigorous coursework than the matched comparison group. Specifically, Step Up led to a 0.25 increase in earning credit in advanced math courses (Algebra II or higher) and a 0.7 increase in earning credit in AP coursework. Step Up had the same influence on low-income students' math credits but a slightly lower influence on AP (see Table C2).

## For University of Hawai'i students, Step Up had a positive impact on college progression and performance

A useful measure of college progression toward graduation is the total number of credits earned, and a measure of college performance is cumulative GPA. The impact study findings reveal Step Up led to an increase of 1.8 credits over one year and a 0.06 increase in first-year GPA for Scholars who attended UH.

## **Limitations and sensitivity analysis**

For those students who pledged to be Scholars, having done so may signal stronger motivation and family support compared with students who did not take the pledge. These characteristics are difficult to capture and measure, and we cannot account for them in the statistical models. Differences in high school and postsecondary outcomes may be due to these unmeasured differences in Scholars and non-Scholars rather than the Step Up program itself.

To address this concern, we conducted additional “sensitivity” analyses to determine how much of the analytic sample has to be replaced with cases with no effect to change the statistically significant findings. We found the bias from unmeasured differences in students, such as motivation or family support, would have to be extremely large to invalidate the study results. Specifically, to invalidate the study’s inference, more than 70 percent of the cases would have to be replaced with cases for which there is an effect of zero. Therefore, despite the limitations, the study provides defensible quantitative estimates of the program’s impact.

# Implications of the Findings

Even though Step Up has ended, it is worthwhile to think about the features of the program that are worth sustaining or adapting. For example, stakeholders may want to consider whether it is feasible or worthwhile to continue the following aspects:

- A statewide media campaign to encourage taking rigorous coursework in high school and preparing for college and a career
- Materials mailed to students' homes about college and career preparation and the college/financial aid application process
- Emails to students about college and career preparation and the college/financial aid application process
- Events for students focused on college and career preparation and the college/financial aid application process
- Incentives for schools to encourage students to take rigorous coursework (e.g., offering free PSATs and providing free transportation to college-preparation events)
- Incentives for students to take rigorous coursework (e.g., priority college admissions, college Scholarships, and internships)

Prior rigorous research suggests two aspects of Step Up are particularly impactful. First, **the timing and content of materials sent to Scholars may have provided the information and motivation they needed to stay on track to earn the BOERD and graduate from high school.** Step Up's approach is similar to interventions such as "low touch information and nudges" that have been found to improve college enrollment (Page & Scott-Clayton, 2016, p. 12). These interventions include automated text message reminders from counselors and peers about important dates for Free Application for Federal Student Aid filing, completing college application paperwork, and other deadlines. Similarly, Step Up provided frequent communication through emails and newsletters sent home about requirements and deadlines for the Algebra II end-of-course exam, the SAT and ACT, financial aid, Scholarships, and college applications. According to Page and Scott-Clayton:

**“ Nudges can help students overcome their attentional failure by providing reminders that are well-timed to correspond to the windows of opportunity during which students would optimally focus on particular tasks. Well-timed nudges may actually serve to capitalize on students' relative impulsivity, encouraging them to make progress with a particular task in the moment rather than putting it off to an unspecified future time. Thus, there may be promise in low-touch nudges and reminders to support students both to and through postsecondary education. (p. 13)**

Second, **sending information directly to students' homes may have been the most direct and influential way to provide guidance to students on earning the BOERD and applying for college and financial aid.** Presumably, parents and other caregivers also received this information, sparking conversations and further guidance about course taking, college, and careers. Some of the information was specifically targeted for families (see Appendix B for more details), which further involved parents and caregivers in the discussion of college and career preparation.

Two prior studies suggest sending information directly home about college costs and quality is related to improving college access among low-income students. For example, the Expanding College Opportunities (ECO) intervention seeks to give low-income, high-achieving students the information an expert college counselor might provide by sending materials directly to students' homes, so both students and parents can access useful information about college and make decisions together (Hoxby & Turner, 2013). These materials include reminders about deadlines and requirements of the nearest colleges, the state's flagship college, selective in-state colleges, and a small number of randomly chosen, highly selective out-of-state colleges. The materials also include the colleges' graduation rates and the average cost for students with annual family incomes of \$20,000, \$40,000, and \$60,000. The authors found large impacts of ECO on college application, admissions, and enrollment outcomes for students in the treatment groups.

In another informational intervention, the College Foundation of North Carolina and the College Board created a "College Is Affordable" brochure that was distributed to low-income families with middle school students in North Carolina (College Foundation of

North Carolina & College Board, 2012). On a survey, families that received the brochure were more likely to understand the cost of attending college in North Carolina and that students from low-income families could attend college at little to no cost.

Overall, Step Up seemed to have large effects on Scholars' graduation, college enrollment, and college persistence. Compared with their non-Scholar peers, Scholars were two times more likely to earn a regular diploma, 2.5 times more likely to earn the BOERD, 1.8 times more likely to enroll in a two-year college, 2.6 times more likely to enroll in a four-year college, 1.3 times more likely to persist at a two-year college, and 1.5 times more likely to persist at a four-year college. These results are similar for low-income Scholars.

Results also indicate Scholars took more advanced math and AP coursework than non-Scholars, which may be one mechanism underlying the positive high school graduation and postsecondary outcomes. In other words, Step Up may have successfully induced students to take rigorous coursework to earn the BOERD and thus become more prepared to enter and succeed in college.

Finally, Scholars who attended UH also had better outcomes than their non-Scholar peers. They earned more college credits in their first year, and higher GPAs than their counterparts who did not pledge to be a scholar in eighth grade.

The positive effects justify a consideration of how to preserve aspects of Step Up. Well-timed materials about college preparation, financial aid, and college admissions sent to students' home or provided to students and their families could contribute to GEAR UP's goal of increasing the number of low-income students who are prepared to enter and succeed in postsecondary education.



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## Appendix A. Hawai'i High School Diploma Requirements

**Table A1. Changes in Hawai'i high school diploma requirements, 2005–2016**

	Requirements apply to graduating Classes of:					
	2005–2009	2010–2012		2013–2015		2016 onward
	HS DIPLOMA	HS DIPLOMA	BOE DIPLOMA	HS DIPLOMA	BOE DIPLOMA ("STEP UP" DIPLOMA)	HS DIPLOMA <sup>b</sup>
English	4 credits	4 credits *must include ELA 1, ELA 2	4 credits *must include ELA 1, ELA 2	4 credits *must include ELA 1, ELA 2	4 credits *must include ELA 1, ELA 2, and expository writing <sup>a</sup>	4 credits *must include ELA 1, ELA 2, and expository writing
Math	3 credits	3 credits	3 credits	3 credits	4 credits *must include Algebra I, Geometry, and Algebra II	3 credits *must include Algebra I, geometry, or two-year Common Core sequence <sup>c</sup>
Science	3 credits	3 credits	3 credits	3 credits	3 credits *must include biology, chemistry, and/or physics	3 credits *must include biology and laboratory sciences
Social studies	4 credits	4 credits	4 credits	4 credits	4 credits	4 credits
World language, fine arts, & CTE	0 credits	2 credits	2 credits	2 credits	2 credits	2 credits
Physical education	1 credit	1 credit	1 credit	1 credit	1 credit	1 credit
Health	0.5 credit	0.5 credit	0.5 credit	0.5 credit	0.5 credit	0.5 credit
Personal transition plan	0.5 credit	0.5 credit	0.5 credit	0.5 credit	0.5 credit	0.5 credit
Electives	6 credits	6 credits	6 credits	6 credits	5 credits	6 credits
Other			<ul style="list-style-type: none"> <li>Senior project (1 credit)</li> </ul>		<ul style="list-style-type: none"> <li>Senior project (1 credit)</li> <li>Pass the Algebra II end-of-course exam</li> </ul>	<ul style="list-style-type: none"> <li>Senior project optional—counts as 1 elective credit</li> </ul>
Total	22 credits	24 credits	25 credits	24 credits	25 credits	24 credits

a Expository writing requirement may be met by completing an Advanced Placement or International Baccalaureate English course.

b Credits may also be earned with newly developed Common Core State Standards (CCSS) proficiency-based equivalents.

c Math requirements may be fulfilled by a series of courses that satisfy the minimum learning expectations of the CCSS for mathematics.

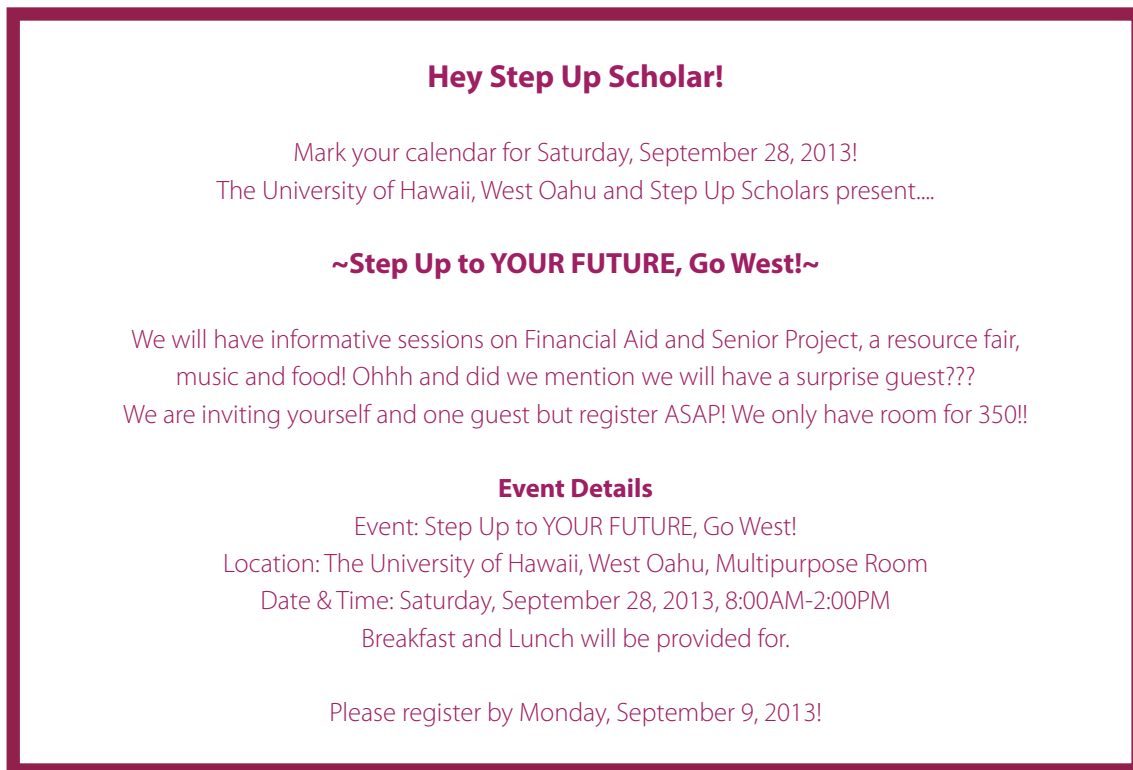
Note: Graduation requirements retrieved from the Hawai'i State Board of Education site: <http://www.hawaii.boe.net/policies/4500series/Pages/4540.aspx>.

## Appendix B. Step Up Scholars Program Materials

### Monthly emails and postcards with tips and announcements

- Upcoming events and opportunities for the month (specific for each island and/or high school)
- Career-related opportunities for Scholars (e.g., internships and summer jobs)
- Algebra II end-of-course exam dates
- College-preparation information and events (e.g., GEAR UP for College Fair, College Week Live)
- SAT and ACT registration deadlines and test dates
- Information about making the most of winter break
- Scholarship opportunities (specific Scholarships and dates)
- Free financial aid workshops at various sites statewide to learn more about how to pay for college
- Other important announcements

**Table B1. Sample postcard Scholars received about a Step Up event**



### Quarterly newsletters mailed to the scholar's home targeted to both the student and his or her family

Topics covered in scholar newsletters included:

- Finding the best-fit college
- College application advice from experts
- Should I stay, or should I go?
  - Benefits of staying in Hawai'i
  - Benefits of going to the mainland

- Being the first in the family to go to college (advice from *First in the Family: Advice About College From First-Generation Students – Your High School Years* by Kathleen Cushman)
  - You are college material
  - You can do better
  - Making your map
  - Create support networks
  - Taking care of business
- University of Hawai'i application video tutorial
- Running Start (program that allows high school students to enroll in college Classes and earn credit toward high school graduation and a college degree)
- Financial aid:
  - Free Application for Federal Student Aid (FAFSA)
  - Don't pay to complete the FAFSA
  - College Goal Sunday (free community workshops to help with completing the FAFSA)
  - IRS data-retrieval tool
  - Scholarship 'Aha (community workshops for those interested in finding out more about sources of financial aid available for Native Hawai'ians, including criteria and qualification requirements)
- Step Up business partners' advice on why they think it is important to stay on track to earn the BOERD and how Classes like math, science, and English will help prepare Scholars for a successful future
- Why math and English are important
- Algebra II end-of-course exam updates
- Useful college terms
- Hawai'i Scholarship information and deadlines

Topics covered in family newsletters included:

- Helping their child apply for financial aid
- Tips on preparing their child for college (useful sites that provide everything from college application checklists to financial aid and grade-level tip sheets)
- How parents can help children who struggle in school
- Helping their child research Scholarship opportunities
- Scholarship 'Aha event (for Native Hawai'ian students)

## **Yearly college exploration and application kits mailed to the scholar's home**

The college application and exploration season kit included:

- Grade-specific tip sheets
- College application puzzle sheet
- College application poster
- College comparison chart
- Letters of recommendation form
- College essay do's and don'ts
- Financial aid tip sheet
- Scholarship matrix
- University of Hawai'i campus comparison chart
- University of Hawai'i application and residency FAQ

# Appendix C. Technical Report

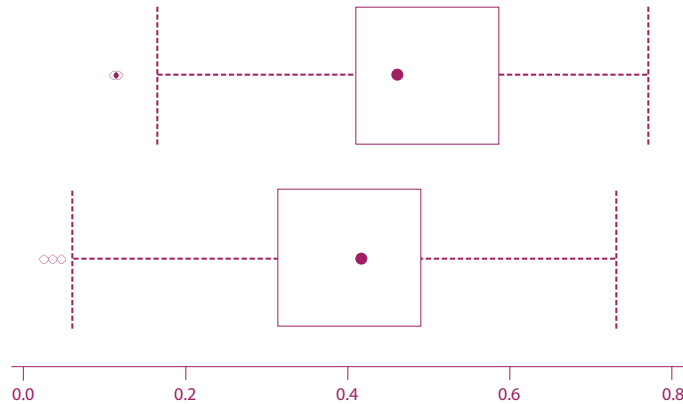
## Propensity score analysis

Because Step Up could not deny services to students who met the requirements to enroll in the program, random assignment to a treatment was neither feasible nor practical. To conduct the impact study, we employed propensity score weighting because research has shown propensity score analysis (PSA), combined with covariate adjustment, is more effective in removing selection bias than either method used alone (Rubin, 1973; Rubin, 1979; Rubin & Thomas, 2000). PSA ensures both groups are at least comparable on the observed covariates, and covariate adjustment may then be able to reduce remaining differences on the observed covariates between the two samples and improve the precision of the impact estimation.

First, for each student, we calculated a propensity score—a statistical estimate of a student’s likelihood of participating in Step Up based on a set of observed covariates. The observable characteristics included socioeconomic status (as measured to be free or reduced-price lunch status), race/ethnicity, gender, special education status, English language learner status, and Hawai’i state assessment (HSA) scores, all of which predict receipt of the treatment condition and subsequent education outcomes. The propensity score for each student was calculated using the General Boosted Method (GBM) and its associated weights derived separately for estimating the average treatment effect on the treated (ATT) and the average treatment effect (ATE) (McCaffrey, Ridgeway, & Morral, 2004).<sup>5</sup> GBM was particularly useful in this study, as it reduced the pretreatment group differences to almost zero.

Second, before conducting the outcome analysis, we first determined there was sufficient overlap of the distribution of the propensity scores in the two groups and that assigning weights to each student would lead to successful balancing of the covariates in the two groups (Figure C1).

**Figure C1. Overlap of propensity scores for treatment and comparison groups**



Note: The boxplot shows there was sufficient overlap of the propensity scores in the two groups, demonstrating that weighting led to successful balancing of the covariates in the two groups.

After weighting, we inspected the standardized effect size of the mean differences in pretreatment covariates from the two groups and confirmed the magnitude of the differences in effect sizes on each pretreatment covariate was reduced almost to zero (Table C1). More importantly, a statistically significant difference occurred for many of the pretreatment variables before weighting and for none of the pretreatment variables after weighting.

<sup>5</sup> GBM specifies both the predictor variables and the functional form of the model. More specifically, GBM is an automated and data-adaptive algorithm that fits several models by way of a regression tree and then merges the prediction each model produces. GBM also handles continuous, nominal, ordinal, and missing independent variables and captures both nonlinear and interaction effects. In addition, the different regression models are invariant to one-to-one transformations of the independent variables.

**Table C1. Characteristics of Step Up Scholars and comparison students in the 2013, 2014, and 2015 graduating Classes**

	Unweighted means			Weighted means		
	Treatment	Control	Effect size	Treatment	Control	Effect size
Eighth-grade reading	320.99	308.63	0.40	313.93	313.08	0.03
Eighth-grade math	313.60	297.57	0.46	304.45	303.35	0.03
Male	0.43	0.57	-0.27	0.51	0.52	-0.02
Eligible for free or reduced-price lunch (eighth grade)	0.45	0.52	-0.15	0.49	0.50	-0.02
Had an English language learner status (eighth grade)	0.11	0.11	0.00	0.11	0.11	0.00
Had an individualized education program (eighth grade)	0.06	0.12	-0.23	0.09	0.09	-0.01
American Indian	0.00	0.01	-0.04	0.01	0.01	0.00
Black	0.01	0.01	-0.05	0.01	0.01	0.00
Chinese	0.05	0.02	0.13	0.03	0.03	0.01
Filipino	0.29	0.22	0.17	0.25	0.25	0.00
Native Hawaiian	0.05	0.06	-0.06	0.05	0.05	0.00
Part-Hawaiian	0.19	0.26	-0.19	0.24	0.24	0.00
Japanese	0.14	0.09	0.16	0.11	0.11	0.01
Korean	0.02	0.01	0.03	0.01	0.01	0.00
Portuguese	0.01	0.02	-0.04	0.02	0.02	-0.01
Hispanic	0.02	0.03	-0.07	0.03	0.03	0.00
Samoan	0.02	0.04	-0.14	0.03	0.04	-0.01
White	0.06	0.10	-0.15	0.08	0.08	-0.01
Indo-Chinese	0.12	0.12	-0.01	0.12	0.12	0.00
Other	0.01	0.01	0.03	0.01	0.01	-0.01

Note: The |Effect size| represents the absolute value of the standardized effect size, defined as the treatment group mean divided by the treatment group standard deviation minus the control group mean divided by the treatment group standard deviation.

Source: Authors' analysis of data.

We merged the associated weights as a variable to the data sets and then exported the file to the STATA software package to conduct regression on the outcomes of interest. The main variable of interest in the regression is a dichotomous variable that is a "1" for students who pledged to be Step Up Scholars in eighth grade and a "0" for all other students. We used proportion ordinal regression to estimate the impact on graduation with a regular diploma or graduation with the BOERD. We used logistic regression to estimate the impact on college enrollment in a two-year college, college enrollment in a four-year college, and college persistence. We used linear

regression for the course credit and UH outcomes. We included all confounders (HSA scores, race/ethnicity, gender, English language learner status, socioeconomic status, special education status) that were originally used in the estimation of the propensity scores in the outcome analysis to obtain “doubly robust” estimates of the ATTs and ATEs (Hullsieck & Louis, 2002; Bang & Robins, 2005). To account for the effect of clustering of students on estimation of standard errors, we employed robust standard error estimation for statistical significance tests of the ATT and ATE.

## Results

We estimated both the ATT and the ATE. The ATE is an estimate of the effect on the whole sample, which explains how outcomes would have differed if everyone in the sample were Step Up Scholars as compared with if they were not Step Up Scholars (Wooldridge, 2002). ATT, on the other hand, is the effect that is averaged over only the students in Step Up. ATT helps reveal the extent to which students who had pledged to become Step Up Scholars had benefited more than if they had not pledged. A positive finding of the ATT will show the program was successful. A positive finding of the ATE will allow policymakers to decide whether it would have benefited students if all of them had participated in the program, thus helping with future decision making. Table C2 presents the coefficient estimate on the variable of pledging to be a Step Up scholar in eighth grade. Both the ATE and ATT show similar estimates and are statistically significant, except for the outcome of college persistence for low-income students who attended a two-year college.

**Table C2. Analysis finds Step Up had a positive effect on high school graduation, college enrollment, college persistence and earning AP and Algebra II or higher credits**

	Odds ratios for high school graduation		Odds ratios for college enrollment		Odds ratios for college persistence		Linear regression estimates for earning course credit	
	Earned regular diploma	Earned BOERD	Enrolled at two-year college	Enrolled at four-year college	Two-year enrollees	Four-year enrollees	Algebra II or higher credit	AP course credit
<b>ATE</b>								
Step Up scholar	2.03*	2.31*	1.85*	2.55*	1.25*	1.46*	0.25*	0.70*
95 percent CL	(1.90, 2.16)	(2.12, 2.52)	(1.74, 1.96)	2.38, 2.73)	(1.11, 1.42)	(1.26, 1.70)	(0.23, 0.27)	(0.68, 0.72)
<b>ATT</b>								
Step Up scholar	2.07*	2.29*	1.84*	2.57*	1.27*	1.44*	0.25*	0.76*
95 percent CL	(1.94, 2.20)	(2.10, 2.49)	(1.73, 1.96)	(2.40, 2.75)	(1.12, 1.44)	(1.24, 1.67)	(0.22, 0.27)	(0.74, 0.79)
Students eligible for free or reduced-price lunch								
<b>ATE</b>								
Step Up scholar	1.86*	2.55*	1.80*	2.49*	1.10	1.47*	0.27*	0.45*
95 percent CL	(1.70, 2.03)	(2.19, 2.97)	(1.65, 1.96)	(2.24, 2.77)	(0.92, 1.31)	(1.15, 1.87)	(0.24, 0.30)	(0.42, 0.48)
<b>ATT</b>								
Step Up scholar	1.88*	2.50*	1.78*	2.50	1.11	1.38*	0.27*	0.50*
95 percent CL	(1.72, 2.04)	(2.15, 2.91)	(1.63, 1.94)	(2.24, 2.78)	(0.93, 1.33)	(1.07, 1.79)	(0.24, 0.30)	(0.47, 0.53)
Students not eligible for free or reduced-price lunch								
<b>ATE</b>								
Step Up scholar	2.25*	2.22*	1.88*	2.57*	1.43*	1.60*	0.22*	0.96*
95 percent CL	(2.05, 2.47)	(2.00, 2.47)	(1.72, 2.05)	(2.35, 2.81)	(1.19, 1.72)	(1.27, 2.02)	(0.19, 0.25)	(0.92, 0.99)
<b>ATT</b>								
Step Up scholar	2.29*	2.21*	1.89*	2.60*	1.45*	1.61*	0.22*	1.02*
95 percent CL	(2.09, 2.52)	(1.99, 2.46)	(1.73, 2.06)	(2.38, 2.84)	(1.21, 1.74)	(1.28, 2.03)	(0.19, 0.25)	(0.98, 1.06)

\*Result is statistically significant at the 99 percent significance level.

Note: ATT = average treatment effect on the treated; ATE = average treatment effect; 95 percent CL = The 95 percent confidence limits (CL) represents the lower and upper confidence limits of the estimates.

Source: Authors' analysis of data.



## Sensitivity analysis

The sensitivity analysis directs attention to the bias related to nonrandom assignment to treatments. The sensitivity to bias can be reported in two ways (Frank, Maroulis, Duong, & Kelcey, 2013). The first is to answer how much bias there must be in the estimates to invalidate the inferences, and the second is to answer how much of the analytic sample has to be replaced with cases with no effect to change the statistical significance of the findings.

A threshold value corresponding to  $p = 0.05$  is used as the limiting condition representing no effect. We use the logistic regression estimates from Table C2 for calculation of the threshold values. The formula for calculating the threshold is as follows:

$$\delta^{\#} = \text{standard error (se)} \times t_{\text{critical},df}$$

The relative robustness of an inference can now be explicitly quantified in terms of the difference between an estimate and a threshold, expressed relative to the size of the estimate:

$$(\text{estimate} - \text{threshold}) / \text{estimate} = 1 - \text{threshold}/\text{estimate}.$$

Using these formulas, the estimates would need to be at least 88–93 percent biased to invalidate the inferences for all the major statistically significant effects in this study. Using ATE and obtaining a diploma as an example, we found that  $\delta^{\#} = \text{standard error (se)} \times t_{\text{critical},df} = 0.08 \times 1.96 = 0.16$ . Consequently, the difference between the estimate and threshold was  $2.03 - 0.16 = 1.87$ , which means 92 percent ( $1.87/2.03$ ) of the estimate would need to be biased to alter our inference for this statistically significant effect (Figure 2). Similarly, we calculated the values for all other estimates in the study. For ATEs, the percentage of bias needed to invalidate the findings for all outcomes is about 88–93 percent, and for ATTs, it is similarly about 88–93 percent. In other words, to invalidate the study's inference, more than 88 percent of the cases would have to be replaced with cases for which there is an effect of zero. Therefore, despite the limitations, the study provides defensible quantitative estimates of the program's impact.