

# Benefits of Dual Enrollment to Diverse Middle-Achieving California Students

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# Key Research Findings

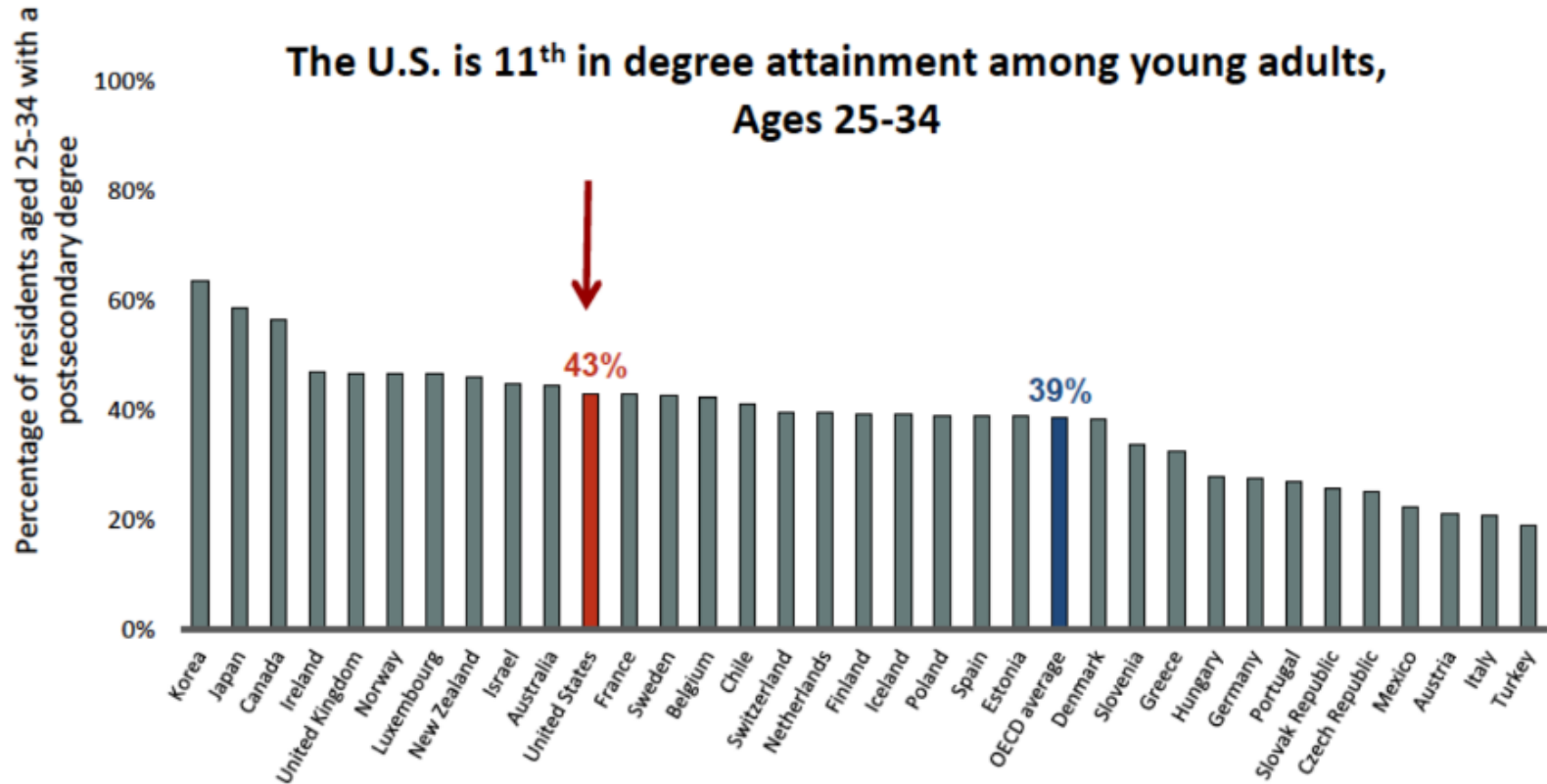
- California Middle-Achieving Students (2.0-3.5 GPA, Swanson, 2008)
- 6 yr period 2008-09 AY through 2014-15 AY
- 1<sup>st</sup> year college GPA better than their peers
  - DE/CE regression models explained 21%-27% of the aggregate variance (11-30% by site)
  - Explained more for Non-White students (34.4% vs 31.8%) than for White students (25.3% vs 21.7%)
- Middle-achieving students of color benefitted generally more than their peers

# Basic & Applied Skills Deficits

Society for Human Resource Management (**SHRM**)  
2016 survey of 3300 HR professionals reported:

- Industries with the greatest recruiting difficulty
  - Health & Social Assistance
  - Manufacturing
- Most commonly reported **basic and applied skills deficits**:
  - writing in English,
  - computer skills,
  - critical thinking and problem solving
  - Professionalism and work ethic
- Source: <https://shrm.org/hr-today/news/hr-news/Pages/Recruiting-Gets-Harder-in-2016.aspx>

# The U.S. Lags in Degree Completion



Source: Organisation for Economic Co-operation and Development, Education at a Glance 2013 (2011 data)

# U.S. Lags in Skills & Training Completion

- **US lags in literacy, math and technical skills**
  - Below the international average
  - Far below top performing countries: Japan & Finland
- **US also has a high level of skill disparity**
  - US is more unequal in its distribution of skills

More jobs require advanced skills and low skill adults are left behind

Source:

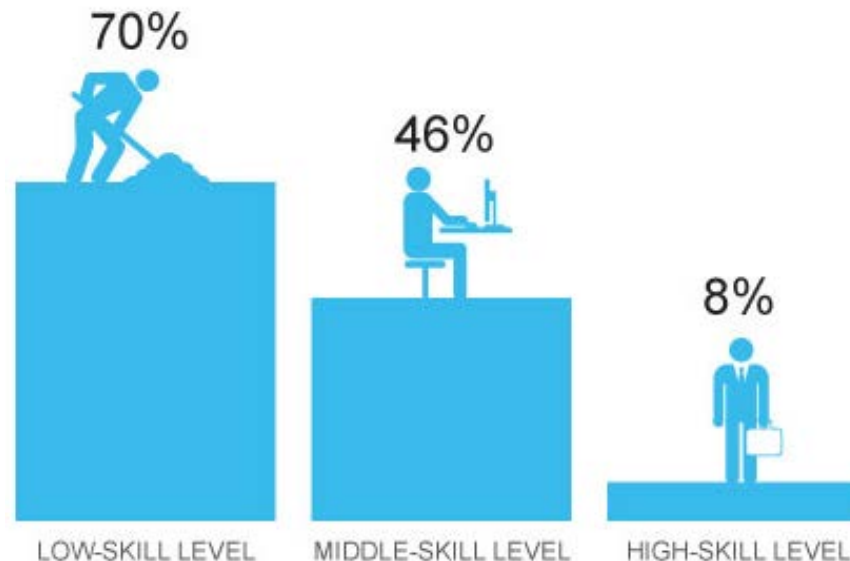
OECD Skills Outlook (2013)

<https://www.nationalskillscoalition.org/news/blog/u-s-lags-in-basic-skills>

# Low-skill jobs are at greatest risk of automation

## Low-skill jobs at greatest risk

Percentage of jobs, by skill level, at a high risk of being automated in 20 years.



Note: Low skill requires no post-secondary education; middle skill requires some college or training; high skill requires a bachelor's degree or higher.

Source USA TODAY analysis of data from Carl Benedikt Frey and Michael A. Osborne, authors of "Future of Employment" and EMSI/CareerBuilder.

Frank Pompa and MaryJo Webster, USA TODAY

Source: [https://medium.com/@nath\\_leigh/low-skilled-humans-need-not-apply-the-employment-future-for-a-child-born-today-98af1ea391a9](https://medium.com/@nath_leigh/low-skilled-humans-need-not-apply-the-employment-future-for-a-child-born-today-98af1ea391a9)

# Economic Context

## **Globalization and technology is restructuring the U.S. economy**

(Brynjolfson & McAfee, 2011; Goldin & Katz, 2008)

### **The result:**

#### **Unprecedented loss of low skill jobs**

Great Recession (2008) resulted in the loss of 7.2 million low skill jobs requiring a high school diploma or less (Carnevale, Jayasundera et al., 2010).

#### **An inadequate supply of US & CA high skill workers and college graduates**

(Carnevale & Rose, 2011; Johnson, 2014)

# Employment Projections: 2020

## California

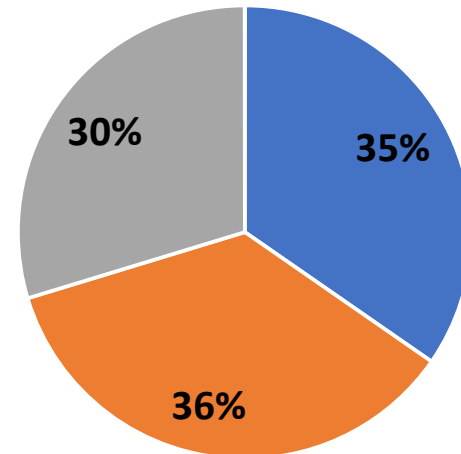
**67%** of jobs in 2020 will require a career certificate or college degree

**36%** of California adults have an associates degree or higher

**31% skills gap**

Carnevale, Smith & Strohl (2013) and Johnson (2014)

## Nationwide



■ HS Diploma or less

■ BA Degree or higher

Carnevale, Smith, & Strohl (2013)



# Research

## **Findings: student benefits**

**Enter college immediately** (Swanson, 2008)

**Higher 1<sup>st</sup> year college GPAs** (An, 2012)

**Higher college GPAs** (Ganzert, 2004; Jones, 2014; Wang, et al., 2015)

**Persist to the second year** (Swanson, 2008)

**Complete college degrees** (An, 2013; Swanson 2008)

**Higher college graduation** (Ganzert 2004, Taylor, 2015)

**Positive outcomes for students with HS GPAs of < 3.0** (Karp, et al., 2007)

## **Findings: mixed or little effect**

dual credit effectiveness: mixed results (Kim & Bragg, 2008; Smith 2007)

Positive CE outcomes, no participation effects for marginally eligible CE students (Speroni, 2011a)

# Research Findings

- **1.27 million** high school students enrolled in 2010-11 college credit courses; **71%** were coordinated with **2 year colleges** (Marken, Gray, Lewis & Ralph, 2013).
- **Opportunity varies** by location and high school (Bragg, Kim & Barnett, 2006; Pretlow & Wathington, 2013).
- **Schools with high minority enrollment are least likely to offer dual credit courses** (Waits, 2005)
- **African American and Hispanic students are underrepresented in dual credit courses** (Ulate, 2011)
- **California AB288** (2016) dual credit (CE) is permitted as part of seamless high school to college pathways. Legislation built on 2005 legal guidance and additional legal guidance was issued after its passage

# Objectives & Purpose

## Objective:

Identify and examine a scalable statewide intervention for which there was existing data.

## Concurrent Enrollment

Early adopters in California  
State and institutional data available

## Social Cognitive Career Theory (Lent, et al., 1994)

Investigate Concurrent Enrollment for its potential to be part of the solution

## Purpose of the Study:

To better understand the impact of dual credit on the college readiness and completion outcomes of diverse middle-achieving students

## Concurrent Enrollment

NACEP (2015) definition  
High school students taking college credit courses. Taught by qualified and college-approved high school teachers on the high school campus. Students earn college credit at the time they pass the course.

# Research Questions

1. How is CA middle-achieving HS students' college readiness explained by CE participation as measured in terms of:

- **High school graduation**
- **High school GPA**
- **First year college GPA**
- **Award of college certificates and degrees**

2. For CA middle-achieving non-white HS students' that participated in CE, how does this participation explain their college readiness?

3. How does the college readiness of non-white middle-achieving CA HS students compare to their white peers?

# Site Selection

Step  
1

Review dual  
enrollment  
headcounts

CCI Colleges

Non-CCI  
Colleges

Other colleges  
with high  
Special Admit  
student  
numbers

Step  
2

Determine &  
validate the  
type(s) of  
offerings

Check with  
SB1070 / K14  
TAPs &  
Review  
College  
websites

Step  
3

Identify  
partner K12  
feeder high  
schools

Review  
stated  
concurrent  
enrollment  
partnerships

Step  
4

Obtain  
descriptive  
data for the  
selected  
colleges and  
high schools

# Selected Study Sites

25 of the 118 California colleges were considered and reviewed

Evidence of concurrent enrollment program:

2011/2012 special admit counts x college and college websites

SB1070 / K14 TAPs and college program staff

Three (3) colleges and their dual credit high schools partners were selected

	<b>Geographic area</b>	<b>Fall 2015 Students</b>	<b># High Schools</b>	<b># HSDs</b>
<b>Shasta College</b>	Northern CA	8,858	4	2
<b>Santa Barbara City College</b>	Central Coast	17,613	4	2
<b>Mt. San Jacinto College</b>	Inland Empire (Southern CA)	16,632	16	4

# Student Population

## Middle-Achieving Students:

- **Academically capable; appear to be unmotivated, disengaged or bored** (Matteson, 2014)
- **GPA's of between 2.0-3.5** (Swanson, 2008)
- **Very little research on these students** (Allen & Dadgar, 2012)
- **78% of college students fit this category** (Adelman, 2006)

# Methodology

**Study Period:** 2008-2009 through 2014-2015

**Data Sets:** Cal PADS records were matched to Cal PASS Plus records; MSJC institutional data set

**Data Sample:** The complete records of students attending selected schools were pulled

## **Data Limitations**

- Cal PASS Plus is a voluntary system

- Incomplete students records were eliminated

- Special admit status conflates varied types of concurrent enrollment

- Data matching was incompatible with non-special admit CE coding methodology

## **Efforts to ensure the validity and generalizability of the study**

- Sample Restrictions: to colleges and high schools engaged in CE in the study period

- Site level analyses in recognition of site-based policy and practice differences



# Descriptive Statistics: Student Study Samples

Sample Size	Study Sample	Percent of Total
29,634	High school students (full student sample)	100%
21,275	Middle-achieving high school students	72%
12,373	College-going middle-achieving high school students who completed 1 <sup>st</sup> year of college	42%
8,098	College-going middle-achievers (1 <sup>st</sup> yr college) by bivariate race category	27%

# College Going Middle Achiever Sample

<b>Tables 17-21</b>	<b>Shasta</b>	<b>Santa Barbara</b>	<b>MSJC Riverside</b>	<b>Average/Total</b>
Number Matriculating	<b>1,881</b>	<b>3,706</b>	<b>6,785</b>	<b>12,373</b>
Percent Matriculating	<b>15.2%</b>	<b>30.0%</b>	<b>54.8%</b>	100%
Female : Male Ratio Matric.	1:1.0175	1:1.0944	1:0.9604	
<b>Race / Ethnicity Part 1</b>				
Percent Latina/o	0.4%	46.9%	12.9%	25.0%
<b>Race / Ethnicity Part 2</b>				
Percent White	66.7%	14.9%	18.4%	
[Discontinued - Latina/o]	4.3%	14.0%	11.5%	
No response	19.8%	68.9%	63.1%	
Remaining Ethnicities	9.2%	2.2%	7.0%	
<b>Percent Low SES</b>	<b>34.3%</b>	<b>49.9%</b>	<b>39.5%</b>	<b>42.2%</b>

# College-Going Middle-Achievers' Concurrent Enrollment Course Taking by Site

<b>Table 22</b>	<b>Shasta</b>	<b>Santa Barbara</b>	<b>MSJC Riverside</b>	<b>Total / Average</b>
# NOT Dual / Concurrent Enrolled	6,167	780	1,198	8,145 students
# Dual / Concurrent Enrolled	<b>618</b>	<b>2,926</b>	<b>684</b>	<b>4,228 students</b>
Ave. # Classes / person	<b>2.76</b>	<b>3.20</b>	<b>3.30</b>	<b>3.15 classes</b>
Ave. # units attempted / person	9.33	9.48	9.73	9.50 units
Ave. # units completed by those who completed > 0 units	8.57	9.18	9.42	9.13 units
# people completing > 0 units	544	2,802	648	3,994 students
# people earned > 0 grade points	<b>534</b>	<b>2,525</b>	<b>643</b>	<b>3,702 students</b>
Ave. # grade points / person by those who earned > 0 grade points	25.86	27.94	28.75	27.78 grade points / person
# units > 0 / Ave. # DE/CE grade points	3.02	3.04	3.05	<b>3.04</b>

# Bivariate Race Subsample by Site

Tables 26-28	Shasta		Santa Barbara		MSJC Riverside		Average/Total
Dual Enrollment							
All other races	90	18%	1,490	79%	287	58%	1,867 students
White	404	82%	400	21%	205	42%	1,009 students
Ave. # DE / CE courses							Courses/person
All other races	3.37		2.75		3.18		<b>2.85</b>
White	3.67		4.08		2.67		<b>3.63</b>
Ave. # DE / CE units / person completing > 0							Units/person
All other races	9.40		7.71		9.91		8.11
White	10.49		10.95		8.29		10.26
Ave. # DE / CE Grade Points (GP) earned / person > 0							GP/ person (Ave. grade/person)
All other races	28.63		23.14		29.83		24.51 ( <b>3.02</b> )
White	31.96		33.48		24.99		31.24 ( <b>3.05</b> )

# Mt. San Jacinto College

## Institutional Dual Enrollment Data Set

- Student Demographics
  - 40% Latina/o; 35% White; 25% other race/ethnicities (including unknown)
- Student CE course taking
  - 3,935 students
  - Averaged **2.42** courses attempted / student
  - Majority **82% took at least 1 course / year**
- Student College Degrees & Awards
  - 42 Students: 34 A.A. degrees; 7 A.S. degrees; 1 AJ certificate
- Cal PASS Plus matching
  - **3,899** (99%) matched by student ID alone
  - **734** (18.6%) matched on student ID and course sections
  - Of which **108** (24.6%) were college-going middle-achievers
  - Of which **14** (13.0%) could be matched to college course sections  
*most likely concurrent enrollment students*

# Methodology

**Research Design:** Causal comparative

**Methodology & Procedures:** Descriptive & inferential statistical analyses

**Independent variables:** participation in dual credit courses

Course enrollment (yes/no);

Units attempted, completed & grade points earned (dosage)

## **Dependent variables**

High school graduation

High school GPA

First year college GPA

Completion of a college certificate or degree

## **Control Variables**

Students' age, race / ethnicity, sex / gender, and low SES status

As appropriate, measure of prior academic achievement, high school GPA

# **FINDINGS: High School Graduation**

## **1a: High School Graduation:**

Statistically related but of little practice significance

## **2a & 3a: HS Graduation by Bivariate Race Category:**

Statistically related but of little practical significance for some Non-White students  
Not significantly related for White students

# FINDINGS:

High School Graduation		Significance	Variance Explained	Effect size	
Aggregate					
	Model 2	CE alone	p < .05	0.30%	r = .07 Smaller than typical
	Model 1	CE & HS GPA	p < .001	2.10%	r = .15 Small to Medium
	<b>Model 3</b>	<b>CE, HS GPA &amp; Student demographics</b>	<b>p &lt; .001</b>	<b>61.90%</b>	<b>r = .81</b> <b>Larger than typical</b>
Site Level					
	Model 3	Shasta	p < .001	29.60%	r = .33 Small to Medium
		Santa Barbara	p < .001	56.70%	r = .58 Larger than typical
		Riverside	p < .001	24.90%	r = .32 Small to Medium



# FINDINGS: High School GPA

## 1b: High School GPA:

- DE/CE participants had GPAs that were 0.20 higher than non-participants
- **DE/CE alone** explained **15.2%** of the variance in high school GPA
- **DE/CE & Student demographics** explained **28.8%** of the variance

## 2b & 3b: HS GPA by Bivariate Race Category:

- DE/CE participants had GPAs that were **0.20** higher than non-participants
- **DE/CE alone** explained **14.1%** of the variance in high school GPA among **Non-White students** and **16.4%** of the variance in high school GPA among **White students** at the aggregate level.

Directionality could not be inferred because of the participants' significantly higher GPAs than non-participants.

Additionally, dual credit course grades or grades earned on a 5.0 scale influenced cumulative high school GPAs used in the analysis

## FINDINGS: High School GPA MA 0.2 GPA pt gap

<b>Achiever Status</b>			Shasta	Santa Barbara	Riverside	Total
High	DE / CE		3.69	3.71	3.73	3.71
	Non-DE / CE		3.65	3.72	3.71	3.71
Middle	DE / CE		2.91	2.90	2.97	2.91
	Non-DE / CE		2.70	2.70	2.78	2.76

Middle-achieving CE participants' GPAs were roughly 0.2 points higher than non-participants

# FINDINGS: High School GPA

High School GPA					
Aggregate		Significance	Variance Explained	Effect size	
Model 1	DE / CE alone	$p < .001$	15.20%	$r = .391$	medium to large
Model 2	DE / CE & Student demographics	$p < .001$	28.80%	$r = .542$	Large to Larger than typical

## FINDINGS: High School GPA by Bivariate Race

High School GPA		Significance	Variance Explained	Effect size	
Aggregate	Model 1 DE / CE				
	Non-White Students	$p < .001$	14.1%	$r = .38$	Medium to large
	White Students	$p < .001$	16.4%	$r = .42$	Medium to Large

## FINDINGS: 1<sup>st</sup> Yr College GPA

1c: DE/CE is significantly related to first year college GPA at the aggregate and site levels

- DE/CE regression models explain **21.9% to 27.0%** of the variance in first year college GPA at the aggregate level.
- DE/CE regression models vary in the proportion of variance explained:  
**Shasta: 11.9% to 12.8%**  
**SBCC: 26.8% to 32.1%**  
**MSJC: 26.2% to 38.9%**

2c & 3c: DE/CE is significantly related to first year college GPA for Non-White and White students at the aggregate and site levels

- DE/CE units attempted adds explanatory power to the model
- A greater proportion of the variance in the first year college GPA of Non-White students is explained by their participation in DE/CE courses (**34.4% vs 31.8%**) than is explained for White students (**25.3% vs 21.7%**) at the aggregate level

# FINDINGS: 1<sup>st</sup> Yr College GPA

First Year College GPA		Significance	Variance Explained	Effect size	
Aggregate					
Model 1	CE & HS GPA	p < .001	21.90%	r = .47	Medium to large
Model 2	CE, HS GPA & Student demographics	p < .001	24.20%	r = .495	Medium to large
Model 3*	CE units & GP earned & HS GPA	p < .001	27.00%	r = .52	Large to Larger than typical
* Added explanatory power for Santa Barbara; others saw reduced explanatory power					

## FINDINGS: 1<sup>st</sup> Yr College GPA by Bivariate Race

Aggregate Level Model 1	HS GPA, CE units attempted, completed & GP earned	Significance	Variance Explained	Effect size	
	Among Non-White Students	p < .001	34.40%	r = .588	Larger than typical
	Among White Students	p < .001	25.30%	r = .51	Large
Aggregate Level Model 3	HS GPA, CE units completed & GP earned	Significance	Variance Explained	Effect size	
	Among Non-White Students	p < .001	31.80%	r = .565	Larger than typical
	Among White Students	p < .001	21.70%	r = .472	Medium to large

A greater proportion of variance in first year college GPA is explained for non-white than white students

## FINDINGS: College certificates / degrees

RQ 1d, 2d & 3d: No statistically significant relationship at the aggregate or site levels.

### Supplemental examination of SBCC college degree completers

- Examination of the Cal PASS Plus data set found only SBCC middle-achieving students who had earned college awards within the study period
- SBCC regression found no causal relationship between DE/CE course units attempted, units completed, or grade points earned with award of college degrees or certificates for students in the aggregate or by bivariate race categories Non-White or White middle-achieving college-going students



# Summary of Findings

- Diverse middle-achieving dual credit participants' college readiness resulted in statistically significant college readiness measures:
  - **high school graduation** –
    - statistically related but not of practical significance
    - until student demographics is added to the model
  - **high school GPA** –
    - statistically related; directionality cannot be inferred
    - Explained **15%** of the aggregate variance (**7.9% - 27.6%** at site level)  
Student demographics added explanatory power to the model
    - Directionality cannot be inferred (cumulative HS GPA and grade scale)
  - ★ **first year college GPAs**
    - Explained **21%-27%** of the aggregate variance (**11-30% by site**)
    - Explaining more for Non-White (**34.4% vs 31.8%**) than White students (25.3% vs 21.7%)
  - **College completions** - Not statistically related

# Impact of the Study on the Problem Statement

Improve the education & career trajectory of middle achieving students

Increase the proportion of high skill workers and college graduates

Increased numbers of workers employed in living wage jobs and increased protection from job loss

Improved individual and family stability (even as low skill jobs continue to be shed by the restructuring US economy)

Mitigate the shortage of high skill workers and college graduates

Mitigate loss / relocation of businesses due to inadequately skilled workforce

Improve the odds that the next generation will have better education and career information and will be more adept at surviving economic restructuring

***Thus suggesting that concurrent enrollment is an effective access & equity strategy with large scale application potential***

*For more information*

## Fostering College Readiness Among Diverse Middle-Achieving High School Students

A Quantitative Analysis of the  
Effectiveness of California Dual  
Credit Course Offerings

Bonita Steele © 2016  
Available on ProQuest or on request

