

2016

An Evaluation of the Labor Market Impact of SB 155

A Report Prepared by

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A REPORT COMMISSIONED BY
THE KANSAS BOARD OF REGENTS



An Evaluation of the Labor Market Impact of SB 155 was funded under terms of an agreement with the State of Kansas, Department of Commerce. This workforce product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This product is copyrighted by the institution that created it. Internal use by an organization and/or personal use by an individual for non-commercial purposes is permissible. All other uses require the prior authorization of the copyright owner. The analysis reflects data sources from the Kansas Board of Regents, the National Student Clearinghouse, and the Kansas Department of Labor.

This report was prepared for the Kansas Board of Regents by the Center for Science, Technology & Economic Policy at the Institute for Policy & Social Research, the University of Kansas. The views expressed in this document are those of the authors and do not necessarily reflect the views of the Kansas Board of Regents or the University of Kansas.

We thank Genna Hurd and Xan Wedel for editorial assistance and graphic design.

Executive Summary

At the request of the Kansas Board of Regents, the Center for Science, Technology, & Economic Policy at the University of Kansas evaluated the labor market impact of Senate Bill 155 (SB 155). The SB155 program is intended to boost enrollment in college-level career and technical education (CTE) course and to prepare students for both post-high school employment and postsecondary education. The purpose of this study is to document early results of the SB155 program on employment, wages, and college achievement. We analyzed data on enrollment, credits, grades, certificates and degrees, and industry certifications provided by the Kansas Board of Regents. The data was linked to labor market outcomes provided by the Kansas Department of Labor.

We found that SB 155 had the following impact on labor market outcomes:

- The SB155 program substantially increased the number of college-level technical credits that Kansas high school students complete.
- About 30 percent of SB155 participants complete a college-level technical certificate or degree while in high school, while about 25 percent complete an industry-recognized credential.
- About 64 percent of SB155 participants enroll in college within two years of graduation.
- For students who do not move on to college, the number of SB155 technical credits completed in high school is positively related to employment and wages.
- In the two years following high school graduation, students who move directly into the labor market are less likely to be employed than students who move on to college. However their wage earnings are higher, probably because they work more hours.
- Academic outcomes of SB155 students exceed those of comparable traditional CTE college students in terms of degree completion and persistence (continuing to a second year of college).
- After two years, SB155 students remain ahead of traditional CTE college students in terms of certificates and degrees earned and higher-level certificates and degrees earned.
- SB155 students who attend college have higher employment rates than their traditional CTE college counterparts. Once employed, wages of the two groups are about the same.

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Introduction

For decades students have been earning college credits before they graduate from high school. An example is the Advanced Placement program, which has grown from 1,000 students in the mid-1950s to over 2.5 million students today (College Board, 2003, 2016). Advanced placement students can earn college credit in liberal arts and sciences fields such as history, languages, math, and physics. Other academic opportunities include dual enrollment (course counts for college and high school) and International Baccalaureate programs. Students get a running start on college work and may save tuition money by finishing college in fewer semesters.

But many students pursue career and technical education (CTE) rather than liberal arts and sciences or a four-year degree. In fact, many of the jobs expected to open up in the future will require post-secondary education, but not necessarily at the bachelor's degree level. A Georgetown University study (Carnevale, Jayasundera, and Hanson, 2012) discusses "middle jobs"—jobs that provide middle class wages but do not require a four-year degree. Of 29 million such middle jobs today, about two thirds require education beyond high school, primarily certificates and associates degrees. Can CTE students get a head start on this education while still in high school, just as Advanced Placement students get a head start on academic pathways?

National data on college-level CTE enrollment for high school students appear to be limited. A 2013 report (Thomas, et al., 2013) provides 2011 data on dual high school-college enrollments. Dual credit options are more common for traditional academic courses than for technical courses, but technical opportunities still are substantial. Nationally, about 76 percent of high schools offer academic options, while 49 percent offer CTE options. Technical course opportunities are more common in the central states, where they are offered in 54 percent of high schools, than in the northeast (36%). In 2011, high school CTE students enrolled in more than 600,000 technical courses for college credit.

Kansas has been a leader in promoting high school enrollment in college-level CTE courses. In 2012, Governor Brownback proposed the *Excel in Career Technical Education Initiative*, which was passed by the legislature as Senate Bill 155 (SB 155) and implemented for the 2013 academic year. The program is intended to boost enrollment in college-level CTE courses and to prepare students for both post-high school employment and postsecondary education. Key elements of the program include:

- Participants must be high school students who live in Kansas.
- Free tuition for students who enroll in qualified CTE courses offered by community colleges in Kansas. Most technical courses at community colleges qualify.
- Financial incentives paid to school districts for students who earn industry-recognized credentials in specified high-demand occupations such as carpentry, nursing assistants, and welders (see Table 1).

The number of high school students in college-level CTE courses has risen greatly since implementation—by 2015, enrollment in college-level CTE stood at over twice the pre-implementation (2012) level (Kansas Legislative Research, 2015).

Truck Drivers, Heavy and Tractor-Trailer	Plumbers, Pipefitters, and Steamfitters
Nursing Assistants	Heating, Air Conditioning, and Refrigeration Mechanics and Installers
Computer Support Specialists	Sheet Metal Workers
Automotive Service Technicians and Mechanics	Machinists
Welders, Cutters, Solderers, and Brazers	Farmers, Ranchers, and Other Agricultural Managers
Carpenters	Farm Equipment Mechanics
Truck Drivers, Light or Delivery Services,	Fire Fighter
Electricians	Structural Metal Fabricators and Fitters
Industrial Machinery Mechanics	Food Service Managers
Bus and Truck Mechanics and Diesel Engine Specialists	Dental Assistant
Computer-Controlled Machine Tool Operators, Metal and Plastic	Emergency Medical Technicians & Paramedics

Source: Kansas Board of Regents.

Concepts and Methods

The purpose of this study is to document early results of the SB155 program on employment, wages, and college achievement. We analyze data on enrollments, credits, grades, certificates and degrees, and industry certifications provided by the Kansas Board of Regents. The data have been linked to labor market outcomes provided by the Kansas Department of Labor.

We undertake four distinct analyses:

- Description of SB155 students and outcomes (Analysis 1).
- Comparison across SB155 students who do not continue on to college. We examine whether the number of SB155 credits passed in high school and the certificates and credentials earned affect wages and employment (Analysis 2).
- Comparison of students who do not continue on to college with those who enroll within two years after high school graduation (Analysis 3).
- Comparison of students who take SB155 technical credits in high school with community college students who start their technical educations when they are first time freshmen (Analysis 4). We refer to this last group of students as “traditional CTE college students.”

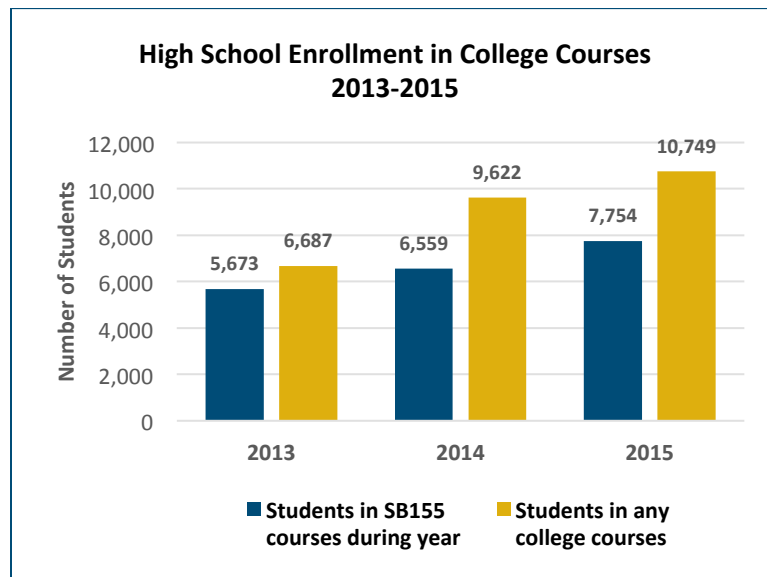
Description of SB155 Students and Outcomes (Analysis 1)

The number of students who enroll in SB155-qualified courses during high school has grown considerably since academic year 2013, the first year of operation (Table 2, Figure 1). The number of credits passed each year has expanded by about 50 percent since 2013 (Figure 2). An increasing number of students earn college certificates or industry credentials each year. Note that the students who take SB155 courses also enroll in a substantial number of other college credits.

	Academic Year		
	2013	2014	2015
Students in SB155 courses during year	5,673	6,559	7,754
SB155 credits passed during year	41,043	50,151	60,801
Students in any college courses	6,687	9,622	10,749
College credits passed (technical and non-technical)	63,991	93,996	112,333
Students earning college certificate or degree	1,460	2,521	3,041
Students earning industry credentials	1,148	1,892	2,126

Source: Kansas Board of Regents.

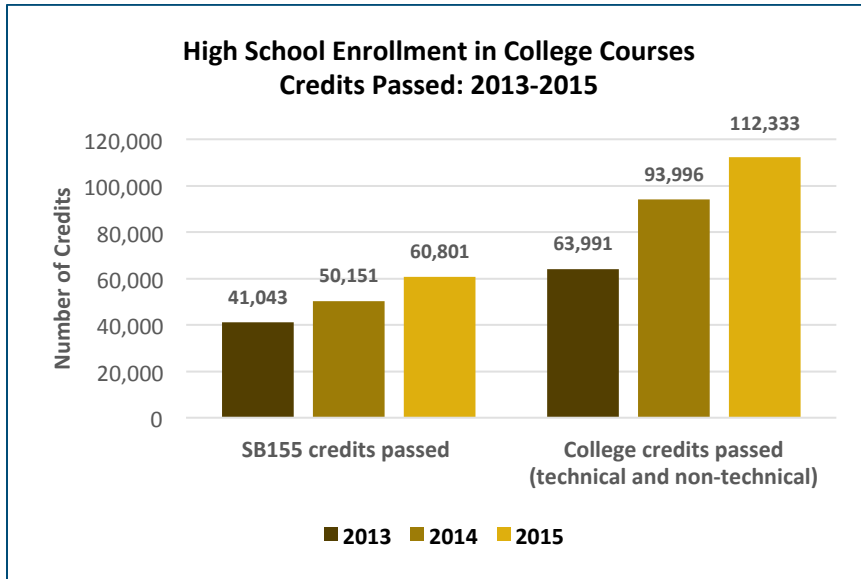
While Table 2 presents a snapshot of enrollments and degrees by year, Table 3 presents the characteristics of high school *graduates* who have participated in the SB155 program. The students are a little more than 50 percent female. Students of color comprise over 20 percent of graduates with SB155 credits. For comparison, 50.5 percent of Kansas high school graduates are female and 31.2 percent are students of color (Kansas State Department of Education, 2015). Students of color appear to be under-represented in the SB155 program.



Source: Kansas Board of Regents.

Figure 1

On average, the students pass about 7.5 SB155-qualifying credits while in high school, with a B average in these courses. While the number of SB155-qualifying credits per student has remained constant, the total number of college credits (SB155 and others) has risen over time to almost 15 in 2015. Thus it is safe to say that SB155 has *not* crowded out or substituted for other college-level work.



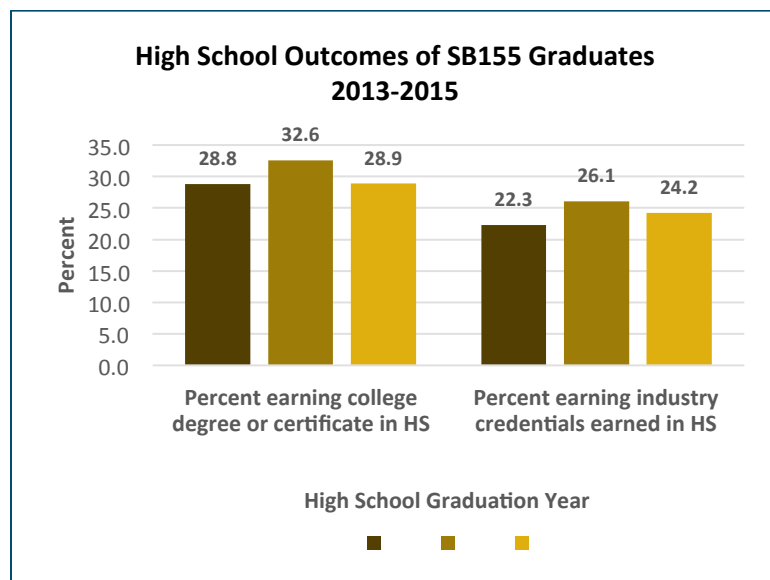
Source: Kansas Board of Regents.

Figure 2

Close to 30 percent of the SB155 students finish high school with a community college certificate or degree, usually a SAPP certificate requiring less than 16 hours of study (Table 3, Figure 3). Around 25 percent of the students earn an industry-recognized credential while in high school. Emerging national research suggests that students who pass industry-recognized exams achieve a boost in wages compared with students without certifications (Association for Career and Technical Education, 2016). Most of the SB155 students (about 65%) go on to college, enrolling in both 4-year and 2-year institutions. In comparison, 75 percent of Kansas high school grads *plan* to attend college right after high school (Kansas State Department of Education, 2015).

	High School Graduation Year		
	2013	2014	2015
	Number of HS grads in SB155 program	3,092	5,452
Percent graduates of color in SB155 program	21.4%	21.2%	21.5%
Percent female graduates in SB155 program	53.2%	52.4%	50.7%
Average SB155 credits passed in HS	7.6	7.5	7.6
GPA in SB155 courses taken in HS	3.01	3.06	3.03
Average total college credits passed in HS	11.5	13.9	14.6
GPA in all college courses taken in HS	2.98	3.02	2.98
Percent earning college degree or certificate in HS	28.8%	32.6%	28.9%
Percent earning industry credentials earned in HS	22.3%	26.1%	24.2%
Percent enrolling in college after HS	64.3%	63.7%	N/A
Percent enrolling in 2-yr institution	41.1%	37.8%	N/A
Percent enrolling in 4-year institution	23.2%	25.8%	N/A

Source: Kansas Board of Regents.



Source: Kansas Board of Regents.

Figure 3

We also examined the post-high school behavior of students who did and did not earn a post-secondary credential while in high school (Table 4). Students who earn a certificate or degree in high school are more likely to be employed in the following year than those who do not—almost 10 percent more for 2014 graduates. Rates of college attendance are similar between the two groups.

Grad Year	Certificate Status	# Students	Employment Status (Year after HS)			College Attendance	
			Employed	Not Employed	Unknown	Attend	Not Attend
2013	Earned certificate or degree in HS	688	82.3%	15.1%	2.6%	65.7%	34.3%
	Did not earn certificate or degree	2,404	75.3%	19.4%	5.3%	63.9%	36.1%
	Total	3,092	76.8%	18.5%	4.7%	64.3%	35.7%
2014	Earned certificate or degree in HS	1,421	83.0%	14.0%	3.0%	64.7%	35.3%
	Did not earn certificate or degree	4,031	73.4%	20.7%	5.9%	63.3%	36.7%
	Total	5,452	75.9%	18.9%	5.2%	63.7%	36.3%

Source: Kansas Board of Regents and Kansas Department of Labor. Note: Employment status is unknown if a student did not have a social security number in KBOR's records.

High School Graduates Who Do Not Attend College: The Impact of SB155 Credits (Analysis 2)

One way of assessing the impact of the SB155 program is to compare two groups of high school students who do not attend college during the first few years after high school graduation. Some students participate in the SB155 program intensely, earning a large number of college-level technical credits and completing college certificates and industry certifications. Others enroll in only a few SB155 credits. Does the intensity of technical education affect wages and employment for students who stop at high school?

We estimate the graduates' wages and employment by matching the students against the Kansas Department of Labor's Unemployment Insurance database (the matching was done by KDOL and identities of all graduates were masked). The database includes the earnings of most employed Kansans, but excludes those who:

- are self-employed,
- are military and other federal employees,
- live in Kansas but work in another state, and
- move away entirely.

Furthermore, the database contains no information on hours, so it is not possible to distinguish between full time and part time employment. Nevertheless, no other database allows us to merge individual labor market outcomes with individual education information.

We divide the SB155 high school graduates (who do not go to college) into two groups: those with 9 or more technical credits and those with fewer than 9¹. 2013 high school graduates can be tracked forward for two years—2014 and 2015. 2014 graduates can only be tracked for one year. We use simple linear regressions to estimate differences in employment and average wages between the two groups. We use quantile regression techniques to estimate median wage differences. Average wages are highly sensitive to outliers—one person who does phenomenally well in the labor market can skew the entire average. Median wages simply show the wages of the person in the middle of the distribution and are quite insensitive to outliers. In the tables below, significance levels less than 0.05 generally are considered to be “statistically significant.”

The number of SB155 credits taken in high school appears to affect employment in the first year after high school. The graduates who take more SB155 credits are significantly more likely to be employed than are those graduates with fewer credits (Table 5). However by the second year after graduation, employment rates show no significant difference.

Graduates with more SB155 credits earn significantly higher wages than those with fewer credits—between \$3,000 and \$4,000 more. Wage differences between the two groups persist over time, whether measured by average or median wages (Table 6, Figure 4). Wages rise over time as the high school graduates gain experience.

Table 5. Employment Outcomes for SB155 Participants High School Graduates Who Do Not Attend College			
	Percent Employed	Number of Observations	Significance Level of Difference
<i>Year after graduation</i>			
Grads with < 9 SB155 Credits	72.4%	2,738	<.0001***
Grads with >= 9 SB155 Credits	79.1%		
<i>Two years after graduation</i>			
Grads with < 9 SB155 Credits	75.2%	981	0.7486
Grads with >= 9 SB155 Credits	76.1%		

Source: Kansas Board of Regents and Kansas Department of Labor.

*** Indicates that the difference in employment is significant at the 1 percent level.

¹ We experimented with an 8 credit cutoff and a 10 credit cutoff. Results were similar. We chose 9 credits because that often corresponded to taking 3 college level courses.

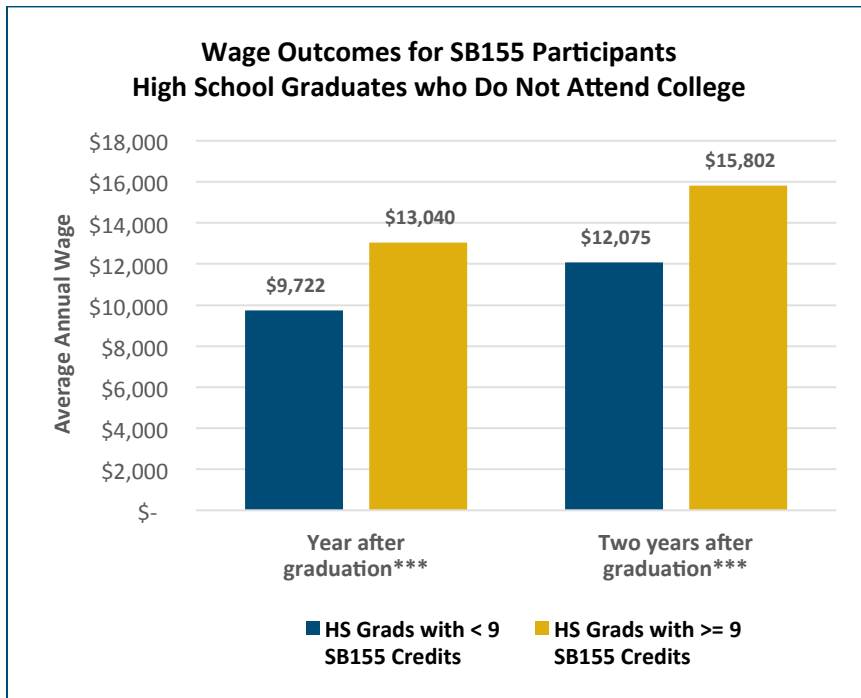
We also estimated the effects of community college certificates and industry credentials on wages (no table). Both showed positive and significant effects on wages in the first year after graduation but not in the second. The number of technical credits appears to be a stronger predictor of wage gains due to education than these other measures considered.

For those who are not college bound, a strong technical background earned in high school accrues substantial labor market rewards. It is easier for graduates with a strong background to find a job straight out of high school, and the wages that they earn are higher than those of their counterparts. It is not necessarily the case that these differences are due solely to the SB155 program. Those students who complete a large number of technical credits may have other personal characteristics such as persistence that contribute to labor market success. Most evaluation work confronts the same problem—we can find effects but it is difficult to attribute them to a single cause.

Table 6. Wage Outcomes for SB155 Participants High School Graduates Who Do Not Attend College					
	Average Annual Wage	Significance Level of Difference	Median Annual Wage	Significance Level of Difference	Number of Observations
Year after graduation					
Grads with < 9 SB155 Credits	9,722	<.0001***	7,831	<.0001***	2,047
Grads with >= 9 SB155 Credits	13,040		11,631		
Two years after graduation					
Grads with < 9 SB155 Credits	12,075	<.0001***	10,263	0.0011***	741
Grads with >= 9 SB155 Credits	15,802		13,724		

Source: Kansas Board of Regents and Kansas Department of Labor.

*** Indicates that the difference in wages is significant at the 1 percent level.



Source: Kansas Board of Regents and Kansas Department of Labor.

*** Indicates that the difference in wages is significant at the 1 percent level.

Figure 4

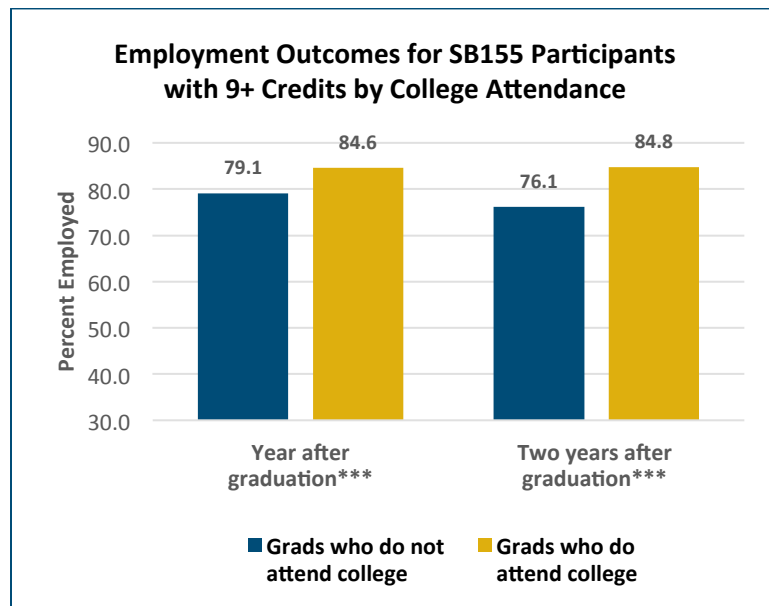
Graduates Who Do versus Do Not Enroll in College: Wage and Employment Differences (Analysis 3)

College attendance provides another distinction among high school graduates who enrolled in SB155 courses. For our third section of the analysis, we divide those students who earn 9+ technical credits in high school into college attendees versus those who move directly into the labor market. In general, we find that college attendees have higher employment rates compared with non-attendees but lower wages—probably due to part time employment while in school (Tables 7 and 8, Figure 5). Again, we point out that some of the students who do not attend college in Kansas may be in the military or may have left the state for other reasons, in part explaining their lower employment rate.

Table 7. Employment Outcomes for SB155 Participants with 9+ Credits Comparison of High School Graduates Who Do and Do Not Attend College			
	Percent Employed	Number of Observations	Significance Level of Diff.
<i>Year after HS graduation</i>			
Grads who do not attend college	79.1%	2,464	0.0006***
Grads who attend college	84.6%		
<i>Two years after HS graduation</i>			
Grads who do not attend college	76.1%	970	0.0013***
Grads who attend college	84.8%		

Source: Kansas Board of Regents and Kansas Department of Labor.

*** Indicates that the difference in employment is significant at the 1 percent level.



Source: Kansas Board of Regents and Kansas Department of Labor.

*** Indicates that the difference in employment is significant at the 1 percent level.

Figure 5

Table 8. Wage Outcomes for SB155 Participants with 9+ Credits Comparison of High School Graduates Who Do and Do Not Attend College					
	Average Annual Wage	Significance Level of Difference	Median Annual Wage	Significance Level of Difference	Number of Observations
<i>Year after HS graduation</i>					
Grads who do not attend college	13,040	<.0001***	11,631	<.0001***	2,031
Grads who attend college	9,356		8,358		
<i>Two years after HS graduation</i>					
Grads who do not attend college	15,802	0.0021***	13,724	0.0482**	791
Grads who attend college	13,329		11,630		

Source: Kansas Board of Regents and Kansas Department of Labor.

*** Indicates that the difference in wages is significant at the 1 percent level.

** Indicates that the difference is significant at the 5 percent level.

Comparison of SB155 College Attendees with Traditional CTE Community College Enrollees (Analysis 4)

Our fourth section of the analysis looks at the outcomes of two groups of college attendees: 1) SB155 high school graduates who leave high school with at least 9 credits and 2) a comparison group of traditional college students who pursue a career and technical education program. We limit our comparison group to students completing 9 technical credits at community colleges in their first college year in courses that are eligible for SB155. We look at outcomes of the SB155 group versus the comparison group to examine whether high school enrollment in SB155 leads to a higher completion rate of degrees and certificates, better persistence in attending college for a second year (after completing the first year), and better labor market outcomes. We use statistical weighting techniques to account for any demographic differences between SB155 college attendees and the traditional group. The analysis is intended to isolate the effects of starting technical education in high school rather than college.

SB155 participants show a different pattern of academic outcomes than do traditional freshmen. In the first year of college, they earn about four fewer credits than their counterparts (Table 9). However, they start to catch up to the traditional CTE students in year 2. Including their work in high school, they are more likely to have to hold any certificate or degree, and they are more likely to hold a CERTC (45-60 credits) or higher than traditional students. It appears that SB 155 has given these students a head start on degree completion. Cumulative GPAs for SB155 students are slightly lower than for the traditional group. The pattern of fewer credits and lower grades can in part be explained by higher workforce participations among SB155 students (Table 11). Finally, the SB155 students are significantly more likely to move beyond the first year of college and enroll in a second year—their persistence rate is 62.4 percent versus 56.4 percent for traditional CTE students (Table 9). Unfortunately, data limitations prevent us from tracking students beyond the second year after college enrollment, and only those students who start college in 2014 can even be followed for two years.

	Traditional CTE Students	SB155 Participants	Number of Observations	Significance Level of Difference
<i>First year of College</i>				
Cumulative credits earned in college (per student)	30.6	26.9	2,875	<.0001***
Cumulative number of degrees and certificates	0.45	0.80	2,875	<.0001***
Percent of students with CERTC or higher	6.3%	13.5%	2,875	<.0001***
Percent of students with Associates or higher	1.8%	2.3%	2,875	0.3901
Cumulative College GPA	2.82	2.61	2,875	<.0001***
Persistence to second year of college (%)	56.4%	62.4%	1,294	0.0367**
<i>Second year after starting college</i>				
Cumulative credits earned in college (per student)	43.5	41.9	1,294	0.2227
Cumulative number of degrees and certificates	0.74	0.99	1,294	<.0001***
Percent of students with CERTC or higher	26.2%	32.0%	1,294	0.0281**
Percent of students with Associates or higher	13.7%	14.2%	1,294	0.8109
Cumulative College GPA	2.79	2.60	1,294	0.0006***

Source: Kansas Board of Regents.

*** Indicates that the difference between traditional students and SB155 participants is significant at the 1 percent level.

** Indicates that the difference is significant at the 5 percent level.

It appears that SB155 students do get a head start on college. Table 10 shows the highest degree earned for students who enroll in college starting in 2014. At the end of two years, the SB155 students remain ahead of the traditional CTE college students in terms of the percentage of students earning a degree or certificate and the percentage of students earning higher-level degrees and certificates.

Degree or Certificate: Highest Earned						
	None	SAPP <16 credits	CERTA 16-29 credits	CERTB 30-44 credits	CERTC 45-59 credits	ASSOC 60+ credits
<i>Before Freshman Year</i>						
Traditional CTE	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SB155	66.5%	22.6%	4.5%	2.1%	3.9%	0.4%
<i>First Year enrolling in college</i>						
Traditional CTE	56.4%	22.0%	3.3%	10.5%	5.5%	2.4%
SB155	43.7%	24.4%	3.9%	10.3%	14.8%	2.9%
<i>Second year after enrolling</i>						
Traditional CTE	39.4%	21.7%	3.3%	9.5%	12.4%	13.7%
SB155	32.7%	21.4%	3.9%	9.9%	17.7%	14.2%

Source: Kansas Board of Regents.

Employment rates of SB155 students exceed those of traditional students, particularly during the first year of college (Table 11, Figure 6). They may be able to leverage the technical training they earn in high school into jobs. By the second year after enrollment, employment of traditional CTE students rises as they gain technical skills and (in some cases) finish their educations. However, the SB155 students continue to surpass them in employment rates, perhaps because of financial need.

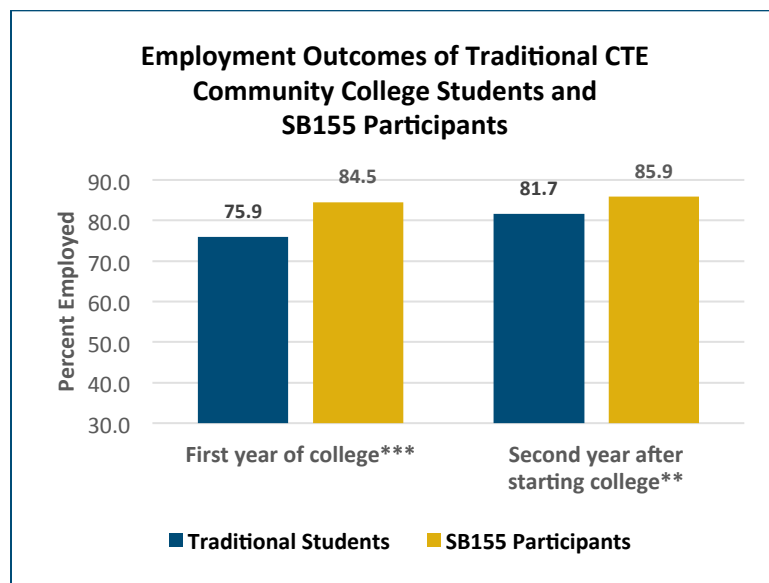
Once employed, the average and median wages of the two groups show no statistical difference. Wages for both groups rise by the second year when students gain experience and finish their educations.

Table 11. Labor Market Outcomes of Traditional CTE Community College Students and SB155 Participants				
	Traditional CTE Students	SB155 Participants	Number of Observations	Significance Level of Diff.
<i>First year of College</i>				
Employment (%)	75.9%	84.5%	2,834	<.0001***
Average annual wage earnings	9,534	9,167	2,834	0.2353
Median annual wage earnings	8,094	8,190	2,834	0.7978
<i>Second year after starting college</i>				
Employment (%)	81.7%	85.9%	1,272	0.0489**
Average annual wage earnings	14,332	13,612	1,272	0.2583
Median annual wage earnings	12,689	11,801	1,272	0.2968

Source: Kansas Board of Regents and Kansas Department of Labor.

*** Indicates that the difference between traditional students and SB155 participants is significant at the 1 percent level.

** Indicates that the difference is significant at the 5 percent level.



Source: Kansas Board of Regents and Kansas Department of Labor.

*** Indicates that the difference between students is significant at the 1 percent level.

** Indicates that the difference is significant at the 5 percent level.

Figure 6

Summary

We examined the education and workforce outcomes of SB155 program. We found that SB155 did provide a “head start” for high school students in terms of credits and employment. In particular, the SB155 program substantially increased the number of college-level technical credits that Kansas high school students complete. This increase in technical credits does not appear to come at the cost of other college credits in which high school students might enroll. Furthermore, about 30 percent of SB155 participants complete a college-level technical certificate or degree while in high school and nearly 25 percent complete an industry-recognized credential. These additional credits do not prevent students from enrolling in college. About 64 percent of SB155 participants enroll in college within two years of graduation.

For those SB155 students who do not move on to college, the number of SB155 technical credits completed in high school is positively related to employment and wages. During the two years immediately after high school, students with a technical concentration of more than 9 credits hours earn \$3000-\$4000 more per year than students with weaker technical backgrounds. When we compared SB155 students who did not enroll in college to those who did enroll, we found that students who move directly into the labor market are less likely to be employed than students who move on to college. However their wage earnings are higher, probably because they work more hours.

In addition, the academic outcomes of SB155 students exceed those of comparable traditional CTE college students in terms of degree completion and persistence (continuing to a second year of college). However they appear to take slightly fewer college credits per year and to have slightly lower GPAs. After two years, SB155 students remain ahead of traditional CTE college students in terms of certificates and degrees earned and higher-level certificates and degrees earned. SB155 gives students a head start on college. Finally, SB155 students who attend college have higher employment rates than their traditional CTE college counterparts. Once employed, wages of the two groups are about the same.

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