

ACTION RESEARCH BRIEF



Equity in WTCS Dual Enrollment Participation

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To promote access and student success, two-year college administrators have collaborated with public high schools to develop dual enrollment programs (Cohen, Brawer, & Kisker, 2014). These programs allow high school students to earn credit toward high school graduation and enroll in postsecondary courses, earning college-level credit that may count towards a degree (Cohen et al., 2014).

Dual enrollment programs are increasingly prevalent, as 98 percent of two-year colleges nationally provide dual enrollment courses to area high school students (Marken, Gray & Lewis, 2013). According to the National Center for Education Statistics, more than 1 million high school students were enrolled in dual enrollment programs during the 2010-11 academic year (Marken et al., 2013). More recent analysis by the Community College Research Center using data from the Integrated Postsecondary Education Data System estimates that the majority of dual enrollment growth has occurred in the public two-year college sector (Fink, Jenkins, & Yanagiura, 2017). Specifically, public four-year enrollment grew from 72,000 to 220,000, while public two-year enrollment

grew from 163,000 to 745,000 between 1995 to 2015 (Fink et al., 2017). The striking growth in high school dual enrollment across the nation suggests that high school students are increasingly interested in completing college-level courses while in high school.

Compared to the extensive empirical evidence on dual enrollment programs in four-year institutions (e.g., An, 2013a; An, 2013b; Allen & Dadgar, 2012; An, 2013a, 2013b; Howell, 2011; Puyear, Thor, & Mills, 2001), a comparatively smaller body of research is devoted to studying the student benefits of two-year college dual enrollment participation. While limited in quantity, the two-year college research consistently suggests the benefits of participation in dual enrollment, such as a higher likelihood of college entry without delay after high school graduation (Wang, Chan, Phelps, & Washbon, 2015), as well as stronger postsecondary outcomes including GPA, persistence, credit accumulation, and completion (e.g., D'Amico, Morgan, Robertson, & Rivers, 2013; Karp, Calcagno, Hughes, Jeong, & Bailey, 2008; Kim & Bragg, 2008; Wang et al., 2015). While much of the existing two-year college literature promisingly explores the associations between dual enrollment programs and postsecondary outcomes, empirical evidence addressing variance in dual enrollment participation rates among underrepresented populations is strikingly limited.

Adding to the two-year college dual enrollment research literature, this study

explores equity in dual enrollment participation by race/ethnicity and gender. While the existing two-year college empirical research speaks to whether dual enrollment participation relates to student outcomes (e.g., D'Amico et al., 2013; Karp et al., 2008; Kim et al., 2008; Wang et al., 2015), less is known about the equitable representation of diverse populations participating in these potentially academic momentum building programs. Therefore, a detailed sub-group analysis of dual enrollment participation in the two-year college sector is needed.

This quantitative study aims to add to the two-year college research by exploring equity in dual enrollment participation using data from the Wisconsin Technical College System (WTCS) and the Wisconsin Department of Public Instruction (DPI). The analysis is limited to dual enrollment participation during the 2015-16 academic year within Wisconsin. This study includes a sub-group analysis by student gender and race/ethnicity. Specifically, this research attempts to answer the following question:

Research Question: *Are there significant disparities in high school dual enrollment participation rates across demographic groups including gender and race/ethnicity within the WTCS?*

Relevant Literature

A review of the two-year college literature for this study explored two lines of inquiry; the relationship between dual enrollment participation and student outcomes, and the relationship between student race/ethnicity and student outcomes. The existing empirical evidence on the two topics highlight their relationship with student outcomes separately and bring to light the need to explore equity in dual enrollment participation.

Dual Enrollment and Postsecondary Outcomes

A prominent benefit for offering dual enrollment programming is to provide high school students an opportunity to receive both high school credit and postsecondary credit with completion of a single course. Through coordinated efforts between high schools and postsecondary institutions, high school students can choose from a breadth of subject areas that may not have been available if a dual enrollment partnership did not exist. Beyond an increase in high school educational offerings, the empirical research suggests several benefits for participating in dual enrollment programs, including a higher likelihood to participate in postsecondary education after high school graduation and stronger postsecondary outcomes.

In general, the existing research on dual enrollment programming suggests that these offerings transmit positive benefits among participating high school students. Specifically, in a study investigating the associations between dual enrollment participation and postsecondary outcomes, D'Amico and colleagues (2013) conducted logistic regression analysis and concluded that dual enrollment participants performed better than non-participants in relation to first-to-second-year technical college retention. Similarly, Karp and colleagues (2008) found that dual enrollment participants in Florida and New York City had comparatively stronger postsecondary outcomes that included second year college retention, third year cumulative GPA, and more credits earned in the third year. Through path analysis of a sample of 15,000 first-time Wisconsin Technical College students, Wang and colleagues (2015) found that dual enrollment participation is related to early academic momentum indicators such as more attempted credits, a higher likelihood of college entry without delay, and summer college enrollment after high school

graduation. Wang and colleagues (2015) also found that the identified early academic momentum indicators were positively related to the students' completion of a credential and second year retention. Despite differing statistical approaches, these collective findings within the two-year landscape are consistent in suggesting that dual enrollment has a significant and positive association with postsecondary student success.

A limited body of two-year and four-year college research has explored how dual enrollment programs transmit their positive effects among students most at risk of falling through the cracks towards college completion. Using sensitivity analysis with data from the National Education Longitudinal Study, An (2013a) found that dual enrollment has significant benefits in heightening college degree completion for low-income students while generating weaker positive effects for students from more affluent backgrounds. Similarly, An (2013b) found that dual enrollment participation benefits low-income students as much as non-low-income students in relation to first-year college GPA and the likelihood of enrolling in college remediation. In a study conducted by Karp and colleagues (2007), regression analysis was used to assess the associations between dual enrollment and postsecondary outcomes for sub-groups that included gender, high school achievement, and socioeconomic status.

Results revealed that students from low-income backgrounds who participated in dual enrollment had a cumulative third year college GPA that was .27 points higher than low-income students who did not participate in dual enrollment. High-income students who participated in dual enrollment had a cumulative third year college GPA that was .17 points higher than high-income non-dual enrollment students. Karp and colleagues (2007) found that the difference (.27 versus .17) is statistically significant and suggest that

dual enrollment more positively effects low-income students in relation to college GPA. Collectively, research on the positive effects of dual enrollment across varying student populations suggests dual enrollment as a lever for helping underrepresented students attain postsecondary success.

To fully capitalize on the positive effects of dual enrollment offerings, an understanding of who is most likely to participate in these programs is needed. Specifically, there is a need to expand upon the knowledge of dual enrollment participation rates across varying populations to identify if inequities exist.

Equity in Postsecondary Outcomes within the Two-Year College Sector

With an open access mission, two-year college enrollments in the U.S. have skyrocketed as brick-and-mortar two-year institutions have nearly doubled in count since the early 1960s (Cohen et al., 2014). Government officials and community leaders look to these institutions to provide a wide range of academic opportunities, which has allowed more diverse populations with multifaceted barriers to academic success the ability to enroll (Cohen et al., 2014). While two-year college access has supported a student enrollment increase from 5.7 to 7.2 million between 2000 and 2010, roughly 70 percent of two-year college students never graduate with a postsecondary degree (National Center of Education Statistics, 2014).

Two-year college degree completion rates and other public education student success statistics are strikingly disparate when analyzed by student race/ethnicity. According to the Penn Graduate School of Education's Institute for Research on Higher Education (2018), Wisconsin ranks 49th in the nation for educational equity due to sizeable variance in student outcomes. Within the Wisconsin postsecondary system, white students' on-

time degree completion rate is 14.3 percentage points higher compared to students from all other race/ethnicities. Further, there is roughly a ten-percentage point difference between minority race/ethnicity students enrolled in a degree and the percentage of this group in the overall state population. This finding demonstrates postsecondary participation equity gaps and is supported by national research conducted by Ashkenas and colleagues (2017) citing that both black and Hispanic students are currently more underrepresented at colleges than over 35 years ago despite the enactment of affirmative action educational policy. Collectively, these equity gaps in postsecondary enrollment and outcomes bring to light the importance of engaging all students in momentum building opportunities, such as high school dual enrollment, that fuel their educational aspirations and success.

Data Sample

This study includes 33,642 Wisconsin public high school students who participated in a WTCS dual enrollment course during the

2015-16 academic year. Dual enrollment data was drawn from the WTCS Client Reporting System and is reported to the WTCS System Office on an annual basis by each of the 16 Wisconsin Technical Colleges. Of the dual enrollment sample, 4,405 (13.1%) of students had an unknown race/ethnicity, and 781 (2.3%) had an unknown gender. A total of 25,011 (74.3%) dual enrollment students identified as white, and 17,398 (51.7%) identified as female.

Dual enrollment participants were then compared to the 253,006 Wisconsin public high school students enrolled in the 2015-16 academic year to better understand dual enrollment participation rates. Wisconsin public high school data was drawn from DPI's WISEdash data system and is reported to DPI by each Wisconsin public high school on an annual basis. Of the 2015-16 Wisconsin public high school enrollees, 193,251 (76.4%) identified as white, and 122,835 (48.6%) identified as female. Descriptive statistics for both samples are summarized in Table 1.

	High School Enrollment		WTCS Dual Enrollment	
	Count	%	Count	%
Total Sample	253,006		33,642	
Race/Ethnicity				
American Indian/Alaskan Native	3,037	1.2%	253	0.8%
Asian	8,490	3.4%	818	2.4%
Black	18,761	7.4%	799	2.4%
Hispanic	23,747	9.4%	1,781	5.3%
Pacific Islander	207	0.1%	39	0.1%
White	193,251	76.4%	25,011	74.3%
Multiple	5,513	2.2%	536	1.6%
Unknown	-		4,405	13.1%
Gender				
Male	130,171	51.4%	15,463	46.0%
Female	122,835	48.6%	17,398	51.7%
Unknown	-		781	2.3%

Statistical Methods

To address this study's research question, Chi-square tests were conducted to better understand the relationship between dual enrollment participation rates and student demographics. In the first Chi-square test, dual enrollment participation was analyzed with student gender. In the second Chi-square test, dual enrollment participation was analyzed with student race/ethnicity.

Missing data within this study's sample were nonexistent in the DPI high school enrollment data. However, roughly 13 percent of the WTCS dual enrollment student records did not include race/ethnicity, and roughly 2 percent did not include gender. Due to missing demographic records in the WTCS data, this study utilized list-wise deletion when conducting data analysis by removing all cases with missing demographic data from the final analysis

Results

Dual Enrollment Participation Rates

Dual enrollment participation rates were calculated by dividing the count of students reported in WTCS dual enrollment by the count of students reported in the DPI high school enrollment data. A summary of dual enrollment participation rates by race/ethnicity and gender are presented in Table 2.

As shown in Table 2, 13.3 percent of the 2015-16 Wisconsin public high school student population participated in a WTCS dual enrollment course during the 2015-16 academic year. Dual enrollment participation rates in this study vary by student race/ethnicity and gender. Roughly 12 percent of male high school students participated in dual enrollment courses while 14.2 percent of females participated in dual enrollment courses.

	High School Enrollment	WTCS Dual Enrollment	Dual Enrollment Participation Rate
	Count	Count	%
Total Sample	253,006	33,642	13.3%
Race/Ethnicity			
American Indian/Alaskan Native	3,037	253	8.3%
Asian	8,490	818	9.6%
Black	18,761	799	4.3%
Hispanic	23,747	1,781	7.5%
Pacific Islander	207	39	18.8%
White	193,251	25,011	12.9%
Multiple	5,513	536	9.7%
Unknown	-	4,405	N/A
Gender			
Male	130,171	15,463	11.9%
Female	122,835	17,398	14.2%
Unknown	-	781	N/A

Nearly 13 percent of white high school students participated in a dual enrollment course while 7.5 percent of Hispanic and 4.3 percent of black students participated in a dual enrollment course. As referenced in Table 2, the Hispanic and black student populations represented the second and third largest population within Wisconsin public high schools. The Pacific Islander population had the highest dual enrollment participation rate of 18.8 percent and had the smallest high school population size of 207 students.

Chi-square Tests

Within the first Chi-square test, gender was revealed to not be a significant variable in this study. The Chi-square test p-value was .674 signifying there is not a significant difference in dual enrollment participation rates when comparing male and female students at the state-wide level.

Within the second Chi-square test, race/ethnicity was identified as a significant variable. The Chi-square test p-value was .019 suggesting there is a significant difference in dual enrollment participation rates among the seven race/ethnicities analyzed in this research at the state-wide level. This is evidenced by the participation rates presented in Table 2. Specifically, the black and Hispanic high school populations are significantly underrepresented in dual enrollment participation compared to the white high school student population. It is also important to note that the Hispanic and black populations are the second and third largest high school student population.

Turning Research into Professional Learning

Given this study's research question, Career Prep/K-12 Relations college leaders were invited to participate in a professional learning opportunity embedded within the WTCS Career Prep System Called Meeting held in November 2018. Roughly 30 WTCS college staff were in attendance.

During the session, the implications of this study were reviewed; attendees received college-level dual enrollment participation rates disaggregated by district high school and student gender and race/ethnicity; and college attendees were asked to participate in facilitated discussions to build their data literacy and explore their college results to support student success. Attendees noted that high school student interest in course offerings, family awareness of high school dual enrollment, and transportation to a college to participate in a college offered dual enrollment course could be related to *why* certain student populations participate in dual enrollment while others do not. This prompted attendees to want to reconvene at their college and further explore dual enrollment course offerings to better understand dual enrollment access and existing high school student participation. Attendees also noted that their area high schools would be interested in better understanding equity in dual enrollment participation rates and that the provided data could serve as a point of discussion in future partnership building. A sample of the college-level dual enrollment participation rates by high school given to each attendee is provided in Table 3.

High School	High School Enrollment Count				WTCS Dual Enrollment Count				Dual Enrollment Participation Rate			
	Minority	White	Female	Male	Minority	White	Female	Male	Minority	White	Female	Male
High School A	364	983	654	693	84	196	121	176	23.1%	19.9%	18.5%	25.4%
High School B	344	1255	754	845	56	168	155	109	16.3%	13.4%	20.6%	12.9%
High School C	316	694	468	542	49	147	119	125	15.5%	21.2%	25.4%	23.1%

Dual Enrollment includes students with a course record tied to a recognized credit code of 8A, 8B, 1A, 1B, 9C, 9H, 9B, or 9K

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