THE ROLE OF DECISION-DRIVEN DATA COLLECTION ON NORTHWEST OHIO LOCAL EDUATION AGENCIES' INTERVENTION FOR FIRST-TIME-IN-COLLEGE STUDENTS' POST-SECONDARY OUTCOMES: A QUASI-EXPERIMENTAL EVALUATION OF THE PK-16 PATHWAYS OF PROMISE (P^3) PROJECT

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ABSTRACT

Judy Jackson May, Advisor

Research shows that the variance in lifetime earnings of Americans can often be forecast by their level of education. Americans with a bachelor's degree are more likely to live an economically sound life, as their lifetime earnings total US$1 million more than high school graduates (Blagg & Blom, 2018). However, earning a degree in higher education can be challenging for students attending college for the first time. Studies indicate that a substantial number of first-time-in-college (FTIC) students are underprepared to meet the demands of a college education (Carnevale, Smith, & Strohl, 2013; Conley, 2016).

The purpose of the study was to assess the effects of the PK-16 Pathways of Promise (P^3) Project on the post-secondary outcomes of full-time, FTIC students. The quasi-experimental research design included an intervention group and a comparison group. The two groups were compared for significant differences on several variables, including grade point average (GPA), proportion of credits lost in early-level courses, cumulative number of credit-bearing hours earned by the end of the academic year, and persistence and retention rates.

Students in both groups attended one of the three institutions of higher education (IHEs) in the study. However, the intervention group resided within a 20- to 25-mile radius of the IHEs in the study, whereas students in the comparison group resided in different regional areas within Ohio. Based on their home districts' geographical locations, students in the comparison group were assumed to be more likely to attend one of the IHEs as a residential student. Controlling for sex, ethnicity, high school GPA, and school typology, the analysis used multilevel modeling (MLM).

Overall, there were statistically significant differences between the intervention group and comparison group when assessing the cumulative number of credit-bearing hours earned by the end of the academic year, and the persistence and retention rates, after controlling for sex, ethnicity, high school GPA, and school typology. Although there were statistically significant differences between the two groups in the study, the differences in post-secondary achievement between the two groups—represented by the coefficient of the intervention variable and effect sizes—were minimal. A deeper examination of the results suggests that geographical location, course rigor, and a sense of belonging might offer possible explanations for the group differences.

To my beloved and cherished family.

To everyone that believed in me during this journey, even when I could not believe in myself –

This is for you.

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CHAPTER 1: INTRODUCTION

Educators in the United States (US) public school system from pre-school to grade 12 (PK-12) are expected to furnish students with the skills required for success beyond high school—most notably, a post-secondary education (Castellano, Richardson, Sundell, & Stone, 2016; Martinez, Baker, & Young, 2017). This includes approximately 2.3 million graduating high school seniors who enrolled for the first-time in a post-secondary institution in fall 2019 (Bustamante, 2019). However, statistics show that an estimated 48% of full-time, first-time-in-college (FTIC) students who started at a four-year institution in 2010 failed to earn a degree by 2016 (Hess, 2016). Researchers assert that students are not graduating from high school with the knowledge and skills needed to succeed in a credit-bearing college course (Barnes & Slate, 2013; Conley, 2016; Morgan, Zakhem, & Cooper, 2018).

Credit-bearing courses are college-level courses that count towards a bachelor's degree (Bettinger, Boatman, & Long, 2013). According to the US Department of Education, a typical bachelor's degree requires the completion of 120 credit hours or an average of 40 classes. The 120 credit hours are divided among general education courses, major-specific courses, and elective courses (Complete College America, 2017). Students matriculating to institutions of higher education (IHEs) and deemed underprepared for credit-bearing college courses are required to complete additional compensatory coursework in core academic courses, such as mathematics, reading, and writing. The compensatory courses are known as remedial or developmental courses. Further, remedial courses are lost credits, as they do not count towards a bachelor's degree, but hold the same tuition costs as credit-bearing courses (Lane, Schrynemakers, & Kim, 2020).

Conley (2007) claimed that there is a disconnect between college readiness and college eligibility. College eligibility refers to a student's ability to meet IHE admission criteria, whereas

college readiness describes a student's ability to thrive in college and accomplish the goal of graduating with a college degree or credential (Conley, 2007; Duncheon, 2018). The operational definition of college readiness for the present study was the ability of full-time, FTIC students to enroll in college without the need for remedial education (Boatman & Long, 2018; Conley, 2007; Jimenez, Sargrad, Morales, & Thompson, 2016), whereby:

> Remediation, also known as developmental education, is a series of non-credit courses created for students who are considered as underprepared for credit-bearing college-level course work by university officials. Generally, remediation is concentrated in core academic skills, such as math, reading and writing. (Boatman & Long, 2018)

Scholars agree that a substantial percentage of high school graduates are ill-prepared to meet post-secondary education demands (Carnevale et al., 2013). Significant research indicates that, in 2016, on average, 57% of FTIC students at a public two-year institution and 63% of FTIC students at a public four-year institution were required to take at least one remedial course (Scott-Clayton, 2018). To this end, more than 50% of students enrolling in an IHE required compensatory education, which increased the financial burden on students and the time required for a student to complete degree requirements.

The graduation rate of FTIC students has improved over the years; however, the overall growth rate has not been significant. Boatman and Long (2018) used the completion rate for FTIC students from 2004 to 2016 to showcase the minor increase in completion rates at four-year and two-year public institutions. The completion rate for FTIC students for this period at public four-year institutions increased from approximately 54% to 61% and from roughly 25% to 28% in public two-year institutions (Boatman & Long, 2018). Moreover, educational practitioners assert there is substantial room to improve the college readiness of FTIC students, which in return would increase the overall completion rate of college (Castellano et al., 2016; Jackson &

Kurlaender, 2014; M. C. Long, Conger, & Iatarola, 2012; Martinez et al., 2017). Adelman (2006); Kendall, Pollack, Schwols, and Snyder (2007); and, more recently, Kurlaender, Reed, Cohen, and Ballis (2018) reported the lack of college readiness of high school graduates to be associated with academic performance in high school. In contrast, other researchers attributed the lack of college readiness of high school graduates to the misalignment between local education agencies (LEAs) and IHEs (Kirst & Usdan, 2009; Perna & Armijo, 2014). LEAs are public K-12 entities legally obligated to implement education policies established by the federal government. Typically, an LEA refers to school districts administered by one governing body. The governing body is known as the district's local school board.

In the US, a public school district and the attending student population are bound to a specific geographical location and area of land. While some geographical areas may contain only one school district, multiple school districts may exist within large cities. In rural areas, one school district may include several towns. Additionally, depending on size, some school districts may have only one K-12 school, while other school districts have multiple K-12 schools encompassed by the school district. This study used the term LEA in its most common form, as referring to a school district and not individual K-12 schools.

The purpose of the study was to examine how leaders from the two education sectors, secondary and post-secondary, could better collaborate to enhance full-time, FTIC students' post-secondary outcomes. Collaborative efforts between leaders from the two sectors of education have the potential to create a system for students to transition smoothly from one level of education to the next, thus removing some of the challenges associated with post-secondary degree attainment.

The urgency to prepare students for college success comes when a post-secondary degree has become increasingly necessary for the upcoming generation to earn a livable wage (Martinez

et al., 2017). Decades ago, attractive pathways to adult success beyond secondary school were plentiful and did not require post-secondary education; however, projections estimated that 63% of occupations in 2020 required post-secondary education credentials (Petcu, Frakes, Hoffman, & Young, 2016). Thus, finding ways in which LEA and IHE leaders can collaborate to increase the college readiness of secondary graduates by preparing students for success in college remains a worthy area of investigation.

Recently, the topic of college readiness began to gain scholarly interest, with a plethora of researchers linking a college education as the gateway to the "American Dream." Today, not only is a college credential perceived as the roadmap to the American Dream for wealth and prosperity, but scholars have also concluded that higher levels of education improve the overall quality of life of American citizens (Blagg & Blom, 2018; Nuckols, Bullington, & Gregory, 2020). Consequently, the issue of college completion rates has become a pertinent concern for leaders and educational practitioners. Shapiro et al. (2019) revealed that more than 40% of full-time, FTIC students who began their college career in 2011 had not yet graduated within six years of enrollment. Moreover, college completion rates are central for leaders and educational practitioners, as many project that employment opportunities require credentials beyond a high school diploma (Martinez et al., 2017). In response to the evolving changes in the labor market, IHE leaders are seeking innovative initiatives to improve secondary graduates' overall college readiness. The PK-16 Pathways of Promise (P^3) Project is one of the few innovative initiatives designed by IHE leaders to increase secondary graduates' college readiness through collaborative efforts between LEA and IHE leaders.

The PK-16 Pathways of Promise (P^3) Project

In the summer of 2016, leaders from an IHE (IHE1) piloted a project designed to bridge the gap between IHEs and LEAs by initiating a dialogue centered on increasing secondary

graduates' success in college. The pilot project provided six LEA administrators—otherwise referred to as partner LEAs—with data on their graduates enrolled at IHE1. The six LEA administrators received the data on their graduates at an Inaugural PK-12 Data Summit on College Readiness. Each LEA received the raw, de-identified data (all identifying student information was removed, and students were assigned a unique anonymous identification number) on their graduates' performance on numerous academic achievement indicators at IHE1. The data included scores on mathematics and English placement tests, final grades in benchmark courses, overall college grade point average (GPA), major, high school GPA, and American College Testing (ACT) or Scholastic Aptitude Test (SAT) scores. While LEAs regularly receive data on their students' performance on state test scores or standardized tests (Preliminary Scholastic Aptitude Test [PSAT], SAT, or ACT scores), they receive minimal to no data on their college performance. This is critical, as the data provided to LEAs in the pilot represented the first time any of these LEAs had received data related to their graduates' post-secondary performance.

In an effort to build and expand the pilot project, a team of faculty, staff, and researchers from IHE1 submitted a grant proposal to the Ohio Department of Higher Education (ODHE) to fund the continuation of the piloted project. IHE1 received a two-year grant to fund the continuation of the pilot. The PK-16 Pathway of Promise (P^3) Project is a continuation of the pilot project. The P^3 Project proposed to develop and field-test a scalable model for identifying key performance indicators of college readiness in university data systems, transmit these data back to partner LEAs, and establish a collaborative partnership between IHEs and LEAs for the continuous development of strategies to be implemented by LEA leaders to improve the college readiness of their secondary graduates.

The P³ Project expanded the number of partner LEAs from the initial six to 10 in the first year of the grant and added two more LEAs in the second year of funding. In the pilot year and first year of the grant, the partner LEAs encompassed only one K-12 school per district, whereas the two LEAs added in Year 2 of the grant encompassed multiple K-12 schools per district. The final sample included 13 LEAs and 20 K-12 schools. In addition to expanding the pilot project by adding LEAs, the P³ Project added another IHE (IHE2) in Year 1 of the grant and added a third IHE (IHE3) in Year 2 of the grant. The P³ Project was built on robust partnerships between IHEs that typically serve Northwest Ohio and their respective area LEAs. Table 1 provides the number of LEAs and the number of IHEs in each year of the P³ Project.

Table 1

Number of LEAs and IHEs in Each Year of the P³ Project

Project year	Number of P³ LEAs	Number of P³ IHEs
Pilot	6	1
Year 1	10	2
Year 2	13	3

District Typology

In 1996, the Ohio Department of Education (ODE) classified LEAs according to similar geographic (rural, small town, urban, and suburban) and demographic characteristics (poverty level and school population). These classifications are referred to as “district typologies” and were updated to include eight district typologies in 2013 (ODE, 2013). Moreover, the Ohio District typologies enable researchers to evaluate LEAs in Ohio on equivalent factors, including district size, school poverty (level), socioeconomic composite, location composite, race and ethnicity, and tax capacity. Table 2 identifies the eight district typologies in Ohio.

Table 2

School District Typologies as Categorized by the ODE

2013 typology code	Major grouping	Full descriptor	Districts in typology	Students in typology
1	Rural	Rural—high student poverty and small student population	124	170,000
2	Rural	Rural—average student poverty and very small student population	107	110,000
3	Small town	Small town—low student poverty and small student population	111	185,000
4	Small town	Small town—high student poverty and average student population size	89	200,000
5	Suburban	Suburban—low student poverty and average student population size	77	320,000
6	Suburban	Suburban—very low student poverty and large student population	46	240,000
7	Urban	Urban—high student poverty and average student population	47	210,000
8	Urban	Urban—very high student poverty and very large student population	8	200,000

As shown in Table 2, each typology classifies districts as being high student poverty, average student poverty, low student poverty, very low student poverty, and very high student poverty. In the US, free or reduced-price lunch (FRPL) student status is a determinant of the poverty level within a school (National Center for Education Statistics [NCES], 2020). The National School Lunch Program (NSLP) offers nutritionally balanced FRPL to children with household incomes under 185% of the poverty level each school day (NCES, 2020). FRPL student status was not collected as part of the P³ dataset, as the percentage of students eligible for FRPL under the NSLP is used as an indicator of student poverty levels in public K-12 schools and is already factored in the district typologies.

Compiled Dataset

The data compiled as part of the P³ Project included student demographic data, high school academic preparedness indicators, college outcomes at the end of students' first academic

year, and students' cumulative college performance. Although Pell Grant eligibility is collected as part of the college admissions process, the Financial Aid Office at IHE1 did not release the data to P³ Project personnel because of student confidentiality concerns expressed by the Financial Aid Office. Table 3 highlights the data delivered to partner LEAs. In the first year of the project, data were compiled for 5,042 secondary graduates from one of the 10 LEAs who subsequently enrolled as FTIC students at IHE1 or IHE2 from 2010 until 2018. In the second year of the project, data were compiled for 16,250 college students who graduated from one of the 20 secondary schools from one of the 13 partner LEAs and enrolled as FTIC students at IHE1, IHE2, or IHE3 from 2010 until 2018.

Table 3

Data Compiled by the P³ Project and Delivered to Partner LEAs

Indicators of high school academic preparation	First-year post-secondary outcomes	Cumulative post-secondary outcomes	Grades earned in entry course
High school GPA	Major	Cumulative GPA	Writing
ACT and/or SAT scores	First-year GPA	Total credits earned	Mathematics
College credits completed in high school	Credit hours earned	Graduation pace	Science
	Persistence status		Social science
	Retention status		Remedial education

Data Summits

The P³ data were delivered to partner LEAs at annual "data summits." IHE leaders designed the annual data summits to foster ongoing support and collaboration with LEA partners to promote college readiness, successful transition to college, and success as FTIC students. The data summits were used to build LEA capacity in data literacy and support LEAs for developing continuous program improvement plans grounded in the data. The data summits' objective was to improve LEA participants' knowledge of data, program evaluation, best practices in professional development, and FTIC student success barriers. The data summits were part of the P³ Project initiative to foster collaboration between leaders from both educational sectors.

Additionally, the data summits presented an opportunity for LEA partners to provide IHE leaders feedback on how useful the data were and request additional data for their secondary graduates to help inform their efforts to improve graduates' college readiness from their respective districts. LEA partners participated in three data summits as part of the P³ Project. Table 4 provides a detailed summary of the data summits facilitated by IHE leaders for LEA partners as part of the P³ Project to enhance secondary graduates' college readiness.

Table 4

Summary of the P³ Data Summits

Data summit	Year	Full descriptor	Number of P³ LEAs	Number of P³ IHEs
I	Summer 2016	Inaugural data summit as part of the pilot project. This data summit represented the first time any of the six LEAs had received data related to their graduates' performance at an IHE.	6	1
II	Fall 2017	LEAs received summaries of the P³ data, professional development on data literacy and program evaluation, and the procedures for the use of sub-awards. LEAs expressed interest in professional development sessions led by IHE faculty in specific content areas.	10	2
III	Summer 2018	IHE faculty specialized in English, mathematics, and natural sciences facilitated sessions on first-year college student expectations in early-level content courses. LEAs requested a data dashboard.	13	3
IV	Summer 2019	The final data summit was used to orient LEA partners to the data dashboard. The data dashboard included data for students from all LEAs in Ohio entering one of the three P³ IHEs. Data included average ACT and GPAs of secondary graduates, persistence and retention rates, and first-year course pass rate for each typology.	13	3

P³ Project Subawards

To further support the college-readiness initiatives of partner LEAs, sub-awards were provided to LEA partners in Year 1 of the grant. Participating LEAs submitted a proposal for US$10,000 in sub-awarded grant funds to support programs, professional development, and instructional initiatives to increase their graduates' college readiness, based on the analyses of the

data provided to LEA administrators during Data Summit II. While partner LEAs held considerable latitude in proposing plans to use the sub-award to improve their students' college readiness, the proposal for the sub-award required a rationale for fund use based on the P^3 data specific to each district.

Conceptual Framework

The conceptual framework guiding this study to improve college readiness and enhance student success in college was grounded in the perspectives relative to data-driven decision making (D3M) and decision-driven data collection (D3C). Researchers have identified D3M as the systematic collection and analysis of myriad data sources to enhance students' academic performance (J. A. Marsh, Pane, & Hamilton, 2006; Schifter, Natarajan, Ketelhut, & Kirchgessner, 2014). In contrast to D3M, Wiliam (2014) defined D3C as gathering only the data needed to target the specific problem being investigated. This differentiation between D3M and D3C is essential because:

> a focus on D3M emphasized the collection of data first without any particular view about the claims they might support, so the claims are therefore accorded secondary importance. By starting with the decisions that need to be made, only data that support the particular inferences that are sought need to be collected. (Wiliam, 2014, p. 6)

Over the years, educators have attempted to improve student performance by collecting numerous sources of data. The wealth of data collected by educational practitioners over the years as a strategy to help raise student achievement includes, yet is not limited to, annual achievement test scores, classroom assessments, homework assignments, classroom performance, and standardized test scores. However, when data are made available to educators, even when unsuitable for the problem being investigated, educators use the available data for convenience (Wiliam, 2014). To this end, in this data-rich environment, the focus should be on

D3C, instead of D3M, as it pertains to improving the college readiness of students. In the current study, the emphasis needed to be on D3C because educators were collecting data associated with the specific claim that high school graduates are entering IHEs underprepared for college-level coursework.

The P³ Project involved gathering data on student performance from university data systems, with continued involvement in the project allowing leaders from partner LEAs to request additional data on their graduates. Leaders from participating LEAs requested additional data based on the specific decisions they needed to make to improve their graduates' overall college readiness. The ultimate goal was to improve the college readiness of all secondary graduates. Therefore, by focusing on the decisions that needed to be made to enhance FTIC students' post-secondary outcomes, leaders were more likely to collect the appropriate amount of data for the current problem at hand. The data provided to LEA partners needed to be specifically related to college readiness and students' success in IHEs. By providing LEAs with data relevant to student success in college, leaders from both education sectors reduced the risk of making misinformed decisions related to enhancing FTIC students' post-secondary outcomes. Figure 1 illustrates the D3C process as part of the P³ Project.

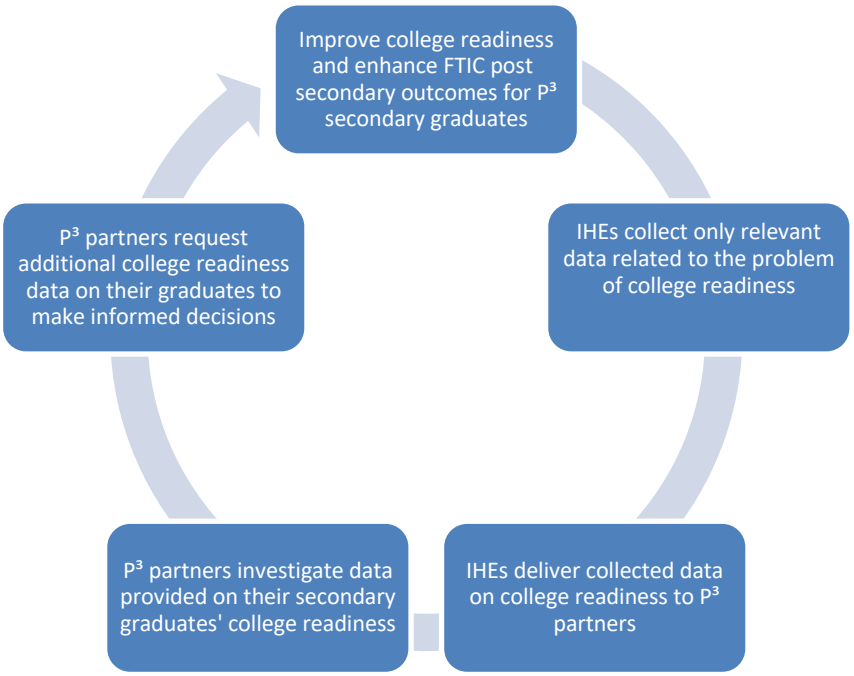


Figure 1. The D3C process.

Purpose of the Study

The purpose of this quasi-experimental research design study was to evaluate the intervention partner LEAs received as part of the P³ Project. Partner LEAs received data on their graduates' performance at an IHE. Then, LEA administrators were invited to participate in annual data summits to support LEAs' continuous college-readiness efforts, and participating LEAs received US$10,000 in sub-awards to use the data to support college-readiness initiatives at their respective schools.

The present study examined the post-secondary outcomes of full-time, FTIC students graduating from partner LEAs and receiving the intervention of the P³ Project when compared with the post-secondary outcomes of full-time, FTIC students graduating from all other LEAs in Ohio. The study was fundamental, as leaders from the two sectors of education, secondary and post-secondary, would subsequently have increased understanding of the collaborative efforts

required between IHEs and LEAs to support FTIC students' college readiness and success in college.

Research Questions

The extant literature has examined the effect of various student characteristics, such as gender, race and ethnicity, and high school rigor on the academic performance of FTIC students (Morgan et al., 2018). Statistics have revealed that 72% of females graduate with a bachelor's degree within six years, compared with 64% of males (Ross et al., 2012). In a more recent study by DesLauriers (2015), the researcher found males to have a retention rate 3.7% lower than their female counterparts.

In addition to gender, scholars have reported that race and ethnicity affect post-secondary outcomes (Kena et al., 2016). Researchers have found that Hispanic and African American students have lower post-secondary graduation rates than do their Caucasian counterparts (Fry & Lopez, 2012). A report from the National Center for Education Statistics (NCES, 2020) found the post-secondary graduation rates of African American students to be 43.5%, which was 26% less than the post-secondary graduation rate of Caucasian students. Finally, better resourced high schools are also associated with lower remediation rates and higher post-secondary graduation rates (Morgan et al., 2018).

Anyon (2014) claimed that students graduating from urban LEAs are less likely to succeed in IHEs. In a study conducted by Lippman, Burns, and McArthur (1996), the researchers found that students graduating from urban, suburban, and rural LEAs performed equally after controlling for poverty. In a more recent study, researchers O'Day and Smith (2016) indicated that students from urban districts face additional challenges related to academic success and post-secondary attainment compared with their counterparts emerging from suburban or rural areas. Across the nation, post-secondary institutions use students' prior coursework and grades in

high school courses to determine whether applicants have the knowledge base for entry-level college courses (Lippman et al., 2008). Researchers frequently use high school GPAs to forecast student performance in college (Noble & Sawyer, 2004). Although scholars have debated the validity of these academic markers as accurate indicators of college readiness, studies continue to research the validity of pre-college academic preparation as a predictor of college success, retention, and persistence (Komarraju, Ramsey, & Rinella, 2013; Pascarella & Terenzini, 2005).

The research questions addressed by this study were as follows:

1. Is there a statistically significant difference in first-year college GPA for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?
2. Is there a statistically significant difference in the proportion of credits lost in early-level courses for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?
3. Is there a statistically significant difference in accumulated credit-bearing hours earned for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?
4. Is there a statistically significant difference in persistence for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?
5. Is there a statistically significant difference in retention for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?

Significance of the Study

Educational leaders have referenced the high rate of remediation required by FTIC students once they arrived at IHEs as evidence of students being ill-prepared for college (Conley, 2007; M. C. Long et al., 2012; Martinez et al., 2017). As aforementioned, the operational definition of college readiness for this study was the ability of FTIC students to enroll in college without the need for remediation or developmental course work (Boatman & Long, 2018; Conley, 2007; Jimenez et al., 2016). The most comprehensive recent numbers for remediation are from a study conducted by Butrymowicz (2017). The results of Butrymowicz's study revealed that 96% of FTIC students were required to take at least one remedial course in the 2014 to 2015 academic year. Butrymowicz's study revealed that a majority of secondary graduates were underprepared for entry-level college coursework. Many scholars have argued that FTIC students should be ready for college-level course content by being proficient in reading, writing, and arithmetic skills upon graduating high school (A. M. Cohen, Brawer, & Kisker, 2014; B. T. Long & Ansel, 2007).

The P³ Project established a platform for LEAs and IHEs to collaborate and use data on LEAs' secondary graduates' performance at an IHE to increase their students' college readiness. While the present study was constructed based on the platform established by the P³ Project, the nature of interventions implemented at the secondary or post-secondary level are such that their real effect may not be known for several years (Renbarger & Long, 2019). Nevertheless, this study offers substantial implications for educational leaders to make significant strides in better preparing students for post-secondary education. This study promotes increasing student success through ongoing, collaborative dialogue between IHEs and LEAs and disseminating relevant student data from IHEs to LEAs.

Delimitations

The participants in this study were limited to those graduating from LEAs in the state of Ohio. Additionally, the dataset used in this study only included FTIC students enrolling in IHE1, IHE2, or IHE3. Another limitation of the study was that college readiness is identified in the literature to include academic and non-academic indicators. Scholars have identified non-academic indicators as non-cognitive factors of college readiness. Examples of non-cognitive elements of college readiness include, yet are not limited to, student motivation levels, critical thinking skills, students' ability to navigate their campus community, and feeling a sense of belonging to their campus community (Tierney & Duncheon, 2015). However, this study strictly focused on the academic indicators of college readiness.

Definition of Key-Terms

Academic year: In the US, an academic year is the annual start of classes in August and ending in May (Integrated Postsecondary Education Data System [IPEDS], 2017).

Bachelor's degree: An award by the Secretary of the United States Department of Education that typically requires at least four years of college-level work (IPEDS, 2017).

Cohort: A specific group of students who entered an IHE at the same time and were tracked for their progress (IPEDS, 2017).

College readiness: The ability for high school graduates to succeed in an IHE by meeting the demands for a post-secondary credential without the need for remediation (Conley, 2007).

Community college: A two-year post-secondary institution that awards associate degrees.

Commuter campus: An IHE where the majority of students do not typically live on a premise considered part of the institution; rather, many students live in close driving proximity to the institution (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008).

Credit-bearing course: A college course that, if completed successfully, counts towards a bachelor's degree (IPEDS, 2017).

Data-driven decision making (D3M): The process in which educators methodically collect different types of data, such as annual achievement test scores, to guide their decision-making process to improve the success of their students (J. A. Marsh et al., 2006).

Data summit: Meetings organized by researchers from the IHEs involved in the P^3 Project to provide personnel from the partner LEAs support on their graduates' performance on college-readiness indicators.

Decision-driven data collection (D3C): The process in which researchers gather only the data they need to target specific instructional decisions (Wiliam, 2014).

District typology: The ODE (2013) groups public schools located within the state of Ohio based on descriptors such as geography, size, median family income, poverty level, and minority enrollment.

Fall semester: Denotes the length of time students enroll in classes starting from late August or early September and ending in early or mid-December (IPEDS, 2017).

First-time-in-college (FTIC) student: Students entering any higher education institution for the first time. These students may enter the institution with prior college credits earned while attending high school (IPEDS, 2017).

Full-time (FT) student: A student enrolled for at least 12 credit-bearing courses (IPEDS, 2017).

Institutions of higher education (IHEs): An educational establishment beyond secondary school offering instruction leading to an associate, bachelor's, master's, or doctoral degree.

Intervention: An academic strategy to enhance the post-secondary outcomes of FTIC students.

Local education agency (LEA): Any public institution having the authority to perform a service for public secondary schools, including a public charter school, that is established as an LEA, under state law in a city, county, township, or school district, or a combination of school districts or counties.

Lost credits: A course that does not count toward a student's graduation requirements (Schrynemakers, Lane, Beckford, & Kim, 2019).

Major: The academic program or specialization chosen by a student to pursue while enrolled in an IHE (IPEDS, 2017).

Non-P³ local education agencies: LEAs not involved in the PK-16 Pathways of Promise (P³) Project, and thus not receiving the intervention of the P³ Project.

P³ local education agencies: LEAs directly involved in the PK-16 Pathways of Promise (P³) Project, and thus receiving the intervention of the P³ Project.

PK-16 partnership: The creation of a collaborative initiative between K-12 and post-secondary institutions to promote student success from one level to the next (Davis & Hoffman, 2008).

PK-16 Pathways to Promise (P³) Project: A project funded by a grant from the ODHE to bridge the gap between IHEs and LEAs by opening a dialogue and sharing data on the academic achievement of high school graduates from partner LEAs enrolling in the IHEs involved in the P³ Project.

Persistence: A measure of student success that refers to students' reenrolling in classes after their first-semester enrollment (Seidman, 2012).

Remediation: A series of non-credit-bearing courses concentrated on core academic skills, such as mathematics, reading, and writing (Conley, 2007).

Residential campus: An IHE where most students typically live on a premise considered part of the institution (Kuh et al., 2008).

Retention: A metric used to measure institutional success. The retention rate is the percentage of first-year college students returning to their chosen higher education institution after completing their first academic year (Seidman, 2012).

Spring semester: Denotes the length of time students enroll in classes starting from late or early January and ending in late May or early June (IPEDS, 2017).

Outline of Dissertation

This first chapter has introduced the research problem statement and provided a description of the PK-16 Pathways of Promise (P^3) Project, the purpose of the study, the research questions guiding this study, and the significance of the study. The study's delimitations and a definition of the terms used in the study were also included in this chapter. Chapter 2 provides a review of the literature, while Chapter 3 details the research methodology of the study. Chapter 4 outlines the results of the research questions guiding the study. Finally, Chapter 5 discusses the results and implications of the study, and offers recommendations regarding practice.

CHAPTER 2: REVIEW OF THE LITERATURE

In the 1960s, an estimated 45% of American high school graduates opted to enroll in a post-secondary institution, while the majority of graduates entered the workforce immediately after graduation (Autor, 2011; Barrow & Malamud, 2015). Most Americans strived to live the American Dream. For this reason, directly obtaining a job was considered a natural step for the majority of Americans, as factories were thriving, unions were strong, and a stable job following high school provided Americans with the ability to live this Dream (Altonji & Zimmerman, 2017; Goldin & Katz, 2008; Santana, 2016). For many, the American Dream is to own a home, own a vehicle, and financially support their immediate family. Stable jobs for secondary graduates were the gateway to the American Dream, as they provided many Americans with the means to purchase a home and a vehicle, and financially support a family (Carnevale, Rose, & Cheah, 2011).

Almost half a century later, circumstances shifted, as the number of available manufacturing jobs decreased by roughly five million. The perception of men being the sole breadwinners began to fade, and significant changes occurred in the workforce (Houseman, 2018). Technological advancements and globalization induced a shift in labor market demands. In response to the evolution of the labor market, an increasing number of employers sought post-secondary graduates to fill open positions (Castellano et al., 2016; Lippman et al., 2008; Martinez et al., 2017). Subsequently, the number of students enrolling in a post-secondary program after graduation increased from about four million in 1960 to an estimated 17.5 million in 2017 (Cahalan et al., 2020).

As high school graduates aspired to obtain a post-secondary degree, educational leaders recognized the challenges faced by many first-time-in-college (FTIC) students enrolling in institutions of higher education (IHEs). One of the many challenges students encountered while

matriculating into IHEs directly from secondary school was a lack of college readiness (Adelman, 2006; Conley, 2016; M. C. Long et al., 2012; Tierney & Duncheon, 2015). While many secondary educators perceived graduates to be prepared for college-level coursework, a number of scholars found FTIC students to be underprepared for collegiate coursework (Adelman, 2006; Castellano et al., 2016; Jackson & Kurlaender, 2014; Martinez et al., 2017). This chapter will focus on the relevant literature surrounding the American Dream, the construct of college readiness, and PK-16 partnerships.

The American Dream

To many Americans, the American Dream is the ideology that all Americans can achieve their economic prosperity and financial security goals. The term "American Dream" dates back to historian James Truslow Adams (1931) and his book, *The Epic of America*. Adams (1931) defined the American Dream as:

> The dream of a land in which life should be better and richer and fuller for every man with opportunity for each according to his ability or achievement … It is not a dream of motor cars and high wages merely, but a dream of a social order in which each man and each woman shall be able to attain to the fullest statute of which they are innately capable, and be recognized by others for what they are, regardless of the fortuitous circumstances of birth or position. (p. 404)

Adams's (1931) perception of the Dream is still accepted by many Americans today as an accessible path to prosperity, with effort being a determining factor in attaining the Dream. Likewise, Jim Cullen (2003), author of *American Dream: A Short History of an Idea that Shaped a Nation*, contended that, although there are multiple definitions of the Dream, a fundamental component of the Dream is effort. According to Adams (1931) and Cullen (2003), Americans can gain financial security and wellbeing simply by working hard and possessing the necessary skills

to achieve. However, many Americans concur that attaining the American Dream is becoming more difficult for reasons such as wealth and income inequalities, disparities within the school systems, and a lack of equal opportunities for all Americans (Kearney & Levine, 2014). Despite these recognizable disparities, researchers have argued that the gateway to living the Dream in the twenty-first century is post-secondary education. Americans can live a financially secure and sound life by persevering in college and persisting until degree attainment.

Education and the American Dream

In the United States (US), the variance in lifetime earnings of Americans is examined by their level of education. An individual's lifetime earnings are the amount of money they accrue from when they enter the workforce until they retire. Researchers have proclaimed that Americans with a bachelor's degree are more likely to live an economically sound life, as their lifetime earnings total US$1 million more than that of high school graduates (Blagg & Blom, 2018). More specifically, researchers Carnevale et al. (2013) broke down individuals' average lifetime earnings by their education level. Their report indicated that, on average, high school graduates earned US$1.3 million during their lifetime, associate degree holders earned US$1.7 million during their lifetime, and bachelor's degree holders earned US$2.3 million dollars during their lifetime (Carnevale, Jayasundera, & Gulish, 2016). Thus, individuals with a bachelor's degree earned US$1 million more during their lifetime than their counterparts with only a high school diploma.

To further highlight the differences in wages for Americans by level of education, a study by Abel, Deitz, and Su (2014) calculated the average income of those with a high school diploma, those with an associate degree, and those with a bachelor's degree. Abel et al. (2014) found those wages to be approximately US$41,000, $50,000, and $64,000, respectively. Even with wage fluctuation over time, the researchers found that those with a bachelor's degree earned

56% more than high school graduates, while those with an associate degree earned 21% more than high school graduates. In addition to individuals' lifetime earnings differing significantly by their level of education, individuals with a bachelor's degree were more likely to find employment opportunities as a result of the evolving economic landscape.

The Georgetown Public Policy Institute (2013) projected that 65% of all jobs in 2020 would require more than a high school diploma. More specifically, for Ohio, job openings that required a high school diploma were forecast to decrease to 36% by 2020, in contrast to the 1970s, when 72% of Ohio's available job opportunities required a high school diploma or less, according to the same Georgetown report. These forecasts excluded economic and political shocks. Additionally, researchers estimate a shortage of 16 to 23 million college-educated adults by 2025 (Carnevale & Rose, 2011). In response to the projections surrounding the number of employment opportunities requiring at least a bachelor's degree, secondary graduates are encouraged by their family members and secondary school counselors to enroll in an IHE directly from high school. Although secondary graduates are choosing to embark on a college education directly after high school, students are faced with challenges surrounding their college readiness, ability to transition to college from high school successfully, and persisting in college until degree attainment.

The K-12 Education System in the United States

In the US, public education entities are primarily overseen by state and local governments. Education entities are known as K-12 schools. K-12 schools offer education services to students from primary education to secondary education. Every state is responsible for their own curriculum and assessments (Peurach, Cohen,Yurkofsky, & Spillane, 2019). States' ability to operate without any federal interference provides states with self-autonomy in developing their curriculum and standards. The US Department of Education identified local

education agencies (LEAs) as public school districts responsible for implementing the federal government's education policies. LEAs are governed by the local school board and are bound to a specific geographical location.

Typically, LEAs use property taxes to fund school expenses, resulting in an immense amount of variation in the available resources between LEAs within the same state (Leachman, Masterson, & Figueroa, 2017). Public school districts are known to reflect the geographical area's financial capabilities, resulting in the poverty level of public schools varying by school type (city, suburban, town, or rural). The poverty rate of K-12 schools is dictated by the percentage of students eligible for free or reduced-price lunch (FRPL). Under the National School Lunch Program (NSLP), students who belong to households with an income under 185% of the poverty line are eligible for FRPL. The National Center for Education Statistics (NCES, 2020) defines low-poverty schools as those where 25% or fewer of the students are eligible for FRPL; mid-low poverty schools are those where 25.1 to 50% of the students are eligible for FRPL; mid-high poverty schools are those where 50.1 to 75% are eligible for FRPL; and high-poverty schools are those where more than 75% of the students are eligible for FRPL.

To examine and compare schools on similar benchmarks, Ohio groups LEAs according to district size, school poverty level, socioeconomic composite, location, race and ethnicity, and tax capacity (Ohio Department of Education [ODE], 2013). Each typology classifies districts as high student poverty, average student poverty, low student poverty, very low student poverty, and very high student poverty. Ohio factors FRPL status within the poverty level descriptor (see Table 2). The descriptors for each district typology enable educators to understand the differences between districts in Ohio. Generally, school districts with high poverty rates are not equipped with the same resources, curricula, or programs as school districts identified as low poverty. As a result,

secondary graduates may require additional resources to succeed in college, depending on the type of school district.

College Readiness

Many FTIC students matriculate into an IHE underprepared to meet post-secondary education demands (Conley, 2016; Tierney & Duncheon, 2015). While these students meet the admission requirements for the IHE, thus being eligible for college, college eligibility does not always equate to college readiness. College readiness is the overall academic and non-academic preparation and competencies a student needs to enter college and persist until degree attainment, without remediation in core academic courses (Conley, 2010; Tierney & Duncheon, 2015). With time, the construct of college readiness has become more complex, with various scholars identifying a range of components associated with college readiness. Examples of the many components of college readiness identified in the literature include academic indicators—such as grade point average (GPA), placement tests, and students' prior coursework in secondary school—and non-academic indicators—such as motivation, grit, and sense of belonging (Tinto, 1975, 2017). Given the complexity and full range of components associated with college readiness, scholar David Conley (2012) developed a college-readiness framework, which has gained credence over the years among numerous researchers in education.

Conley's (2012) college-readiness framework gained scholarly interest because it went beyond identifying only the academic measures of college readiness and included the non-academic skills required by students to succeed in IHEs. The four critical components of Conley's (2012) college-readiness framework include:

1. key cognitive strategies, or the ability to analyze, evaluate, and develop the problem-solving strategies necessary for college-level work

2. key content knowledge, or the foundational content from core courses in high school, such as English and mathematics
3. key learning skills, or academic behaviors, such as goal setting, self-awareness, and motivation
4. key transition knowledge and skills, or the knowledge required to navigate college successfully.

Moreover, as Conley's (2012) work on college readiness became well known to researchers, other scholars used the framework to examine the construct of college readiness further. Tierney and Duncheon's (2015) work on college readiness was an extension of Conley's (2012) framework. Their framework summarized college readiness in three broad categories, encompassing academic and non-academic factors of college readiness:

1. cognitive academic factors or content knowledge
2. non-cognitive academic factors, such as mindsets and behaviors
3. campus integration factors, such as knowledge of the campus community and relationship to self and others.

Conley's (2012) and Tierney and Duncheon's (2015) frameworks point to the diversity of the components of college readiness. Subsequently, education practitioners are continuously seeking ways to improve the success of students in college. By enhancing the college readiness of FTIC students, remediation rates in early-level content courses would decrease, and persistence and retention rates would increase, thereby increasing the number of college degrees earned by students.

Persistence and Retention

The terms "persistence" and "retention" were popularized by educational leaders in response to the increase in students enrolling in IHEs directly after graduating from high school.

Persistence is students' ability to progress successfully towards earning a bachelor's degree, while retention is the percentage of FTIC students remaining enrolled in their chosen IHE (Levitz & Noel, 1990). Prominent scholars contend that persistence indicates student success, whereas retention indicates institutional success (Pascarella & Terenzini, 2005; Tinto, 1975). However, Noel-Levitz (2007) claimed that persistence and retention are interchangeable terms, as the two concepts are inextricably tied to each other. Given that the relationship between student success and institutional success is reciprocal, policymakers and educators scrutinize IHEs with low persistence and retention rates.

IHEs unable to retain their students are suspected of being unable to provide students with the services they need or expect to succeed at the institution. As Noel-Levitz (2007) stated, "institutions with low persistence and retention rates expose institutional problems in meeting the needs and expectations of its students but also represents [a] symbolic failure in accomplishing [their] institutional purpose" (p. 1). The overarching mission of all IHEs is for all students enrolled at the institution to thrive academically and persist until degree attainment; however, educational practitioners recognize the complexities in bridging all the elements of college readiness to decrease the attrition rate of IHEs.

Recently, student persistence and retention rates continued to gain scholarly interest in response to the growing body of literature pointing to the lack of college readiness of secondary graduates. Leaders referenced the insignificant increase in the overall persistence and retention rates at IHEs as evidence of high school graduates' overall lack of college readiness (Villar-Aguilés, Hernàndez-Dobon, & García-Ros, 2017). According to estimates by the Shapiro et al., (2019), the persistence and retention rates for full-time, FTIC students enrolled in four-year public institutions increased by a mere 0.3% and 1.8%, respectively, from 2009 to 2017. For the same period, the persistence and retention rates for full-time, FTIC students enrolled in two-year

public institutions increased by only 0.7% and 0.8%, respectively. Although the persistence and retention rates for all students have insignificantly increased over the years, disparities exist in persistence and retention rates among students of different demographics.

Differences in persistence and retention rates among varying student groups are not a new phenomenon; instead, scholars began to notice students' high college drop-out rates with different demographic characteristics from the mid-1980s (Musu-Gillette et al., 2017). As a result of researchers taking notice of differences in student persistence and retention rates, Beal and Noel (1980) categorized the factors influencing student persistence and retention rates into two broad categories:

1. student characteristics, including academic factors, demographics, aspiration, and financial factors
2. environmental characteristics, including services offered by IHEs and student involvement in extra-curricular activities.

Over time, research studies have consistently demonstrated disparities in persistence and retention rates according to student and environmental characteristics.

Allen, Robbins, Casillas, and Oh (2008) conducted a study on the effect of student and environmental characteristics on FTIC student persistence and retention rates. The study sample included 6,872 students enrolled in their third year of college in 23 different IHEs located within the Midwest and Southeast region of the US. The study followed the participants from their first semester of college enrollment to the beginning of their third year of college, anticipating following these students until graduation. The researchers examined variables including high school GPA, gender, race and ethnicity, socioeconomic status, effort, and social connectedness as forecasters of first-year college GPA, thus combining the characteristics outlined by Beal and Noel (1980). The study results indicated the variables investigated in the study to affect FTIC

student persistence and retention rates. While research has demonstrated student and environmental characteristics to be valid predictors of college completion rates, increasing the overall college readiness of all students requires collaborative efforts between LEAs and IHEs. Part of the collaborative effort between the two education sectors is for educational leaders and practitioners to recognize the underlying educational inequalities of students with different demographic attributes.

Remediation

Historically, US secondary schools are tasked with preparing high school graduates for college; however, more recently, the focus shifted from secondary graduates being eligible for college to being ready for college. The shift from college eligibility to college readiness comes from a growing body of research pointing to the importance of post-secondary degree attainment. Metrics to evaluate the academic preparation of high school graduates and their likelihood of being prepared for college-level coursework include students' standardized test scores on entrance exams, prior coursework in high school, and grades in high school courses to determine whether applicants have the knowledge base for introductory college courses (Duncheon & Muñoz, 2019). Moreover, academic preparation in secondary school is one of the strongest predictors of FTIC students succeeding in credit-bearing course content without the need for remediation, and thus considered college-ready (Adelman, 2006; Duncheon & Muñoz, 2019; Jackson & Kurlaender, 2014).

In the US, students admitted to an IHE with academic deficiencies in reading, writing, or mathematics are assigned to compensatory college-preparatory coursework. The compensatory courses in English and mathematics are known as remedial education courses (Boatman & Long, 2018). Remediation is not a new concept; instead, universities have offered remedial courses for underprepared FTIC students since the nineteenth century (Park et al., 2016). Placement test

results mainly determine student assignment to remedial coursework upon enrolling in an IHE; however, state policies vary when it comes to student assignment to remediation. Nineteen states allow for IHEs to use multiple measures and assessments in remedial placement decisions. In comparison, 31 states have a statewide standardized assessment for placement decisions (Whinnery & Pompelia, 2018). For example, IHEs in Ohio have latitude in choosing the assessments and standards for remedial placement, whereas Florida uses a statewide testing standard for making remedial placement decisions.

Over time, educational practitioners and researchers have pointed to the significantly high numbers of students enrolling as FTIC and requiring remedial courses in English, mathematics, or both. Scholars have attributed the high percentage of students requiring remediation to secondary and post-secondary institutions operating independently of each other (Boatman & Long, 2018; Conley, 2016). Research has indicated that the national rate of FTIC students requiring some form of remediation in core courses is 40 to 60%, thereby indicating the academic deficiencies of FTIC students (Jimenez et al., 2016). Although remediation is a service offered by IHEs to better prepare students for college-level coursework, remedial education may have unintended consequences for secondary graduates' college success.

Remediation may be a barrier to student success for a number of reasons. For instance, remedial courses elevate the financial burden on American students via increased tuition costs. Researchers Jimenez et al. (2016) approximated that, nationwide, students paid US$1.3 billion for remedial courses per annum upon enrolling in IHEs. In addition to the financial burden of remedial education on students, remediation is likely to increase the time students require to graduate with a bachelor's degree and decrease the overall likelihood of students graduating from IHEs (Lane et al., 2020; McCann & English, 2017). Research has estimated that fewer than 10% of FTIC students enrolled in two- or four-year IHEs and required to take at least one remedial

course graduated on time (Lane et al., 2020)—that is, within two years at a two-year institution or four years at a four-year institution. Other scholars have claimed that students required to take at least one remedial course upon enrolling in an IHE are 74% more likely to drop out from their chosen institution when compared with their counterparts not required to take a remedial course (Barry, Nguyen, & Dannenbger, 2016). While the purpose of remedial courses is to prepare FTIC students for entry-level college coursework, remedial courses can be disadvantageous to student success in college.

Generally, there are two competing assumptions surrounding remedial education. First, remedial courses are services offered by IHEs to assist students with deficiencies in reading, writing, and mathematics, thereby preparing students for entry-level college course work, which results in enabling students to persist until degree attainment. Second, remedial courses hinder student progress, as these courses are often non-credit-bearing courses that prolong a student's timeline to graduation, thus deterring students from persisting until degree completion. While researchers have conducted studies to determine which of the competing assumptions on remedial education is true, the results of those studies on the effectiveness of remediation on students' post-secondary outcomes have consistently remained mixed. For example, Hoyt (1999) found remediation to have little to no effect on student persistence until graduation. In contrast, Livingston (2007) revealed that students required to take remedial courses were less likely to persist and graduate with a degree than students not enrolled in remedial coursework.

Although the actual effectiveness of remediation on college success remains unknown, remediation rates would be significantly lower if FTIC students enrolled in IHEs proficient in reading, writing, and arithmetic skills. Considering that the objective of remedial courses is to assist underprepared students in core academic subjects, researchers have found students'

academic performance in high school to be a valid predictor of a students' college readiness level.

Pre-College Academic Performance

Students' pre-college academic performance, often defined by high school GPA, standardized test scores, and high school rank, has been cited in the literature as a reliable predictor of college readiness. Studies have found pre-college variables to predict whether FTIC students are prepared for credit-bearing college courses or if they require remedial courses to better prepare them for entry-level coursework (García-Ros, Pérez-González, & Cavas-Martínez, 2019; Zachry-Rutschow & Schneider, 2012). Given that concerns about remediation's effects on FTIC students' post-secondary outcomes remain prevalent, students' academic achievement in high school is often linked to their ability to succeed in credit-bearing college courses without needing remediation.

Countless studies have found high school GPA to be one of the strongest predictors of first-year college performance. Adebayo (2008) explored how students with lower pre-college academic performance (lower scores on standardized tests, lower percentile ranks, and lower high school GPAs) performed at the end of their first semester at IHE. Through regression analyses, the results of Adebayo's (2008) study concluded high school GPA to be a significant predictor of first-semester GPA and student persistence from first-semester college enrollment to second-semester enrollment. Knowing that high school GPA can be a predictor of first-year college success, IHE leaders can offer support to these students through early interventions, tutoring services, and advising services.

To further assess the reliability of pre-college academic achievement as a valid predictor of first-year college success, Schmitt, Keeney, and Oswald (2009) collected data from a total of 2,771 incoming FTIC students across 10 universities nationwide. The researchers followed

students throughout their college career to establish the relationship between students' pre-college academic performance and ability to persist until degree attainment. The data were analyzed through regression analysis. The results of the study indicated high school cumulative GPA and standardized test scores to be strong predictors of FTIC students' ability to perform academically at their chosen IHE and persist until degree attainment. Further, by evaluating the relationship between pre-college performance and college success, IHE leaders were able to identify which groups of students needed additional support and the type of support students required to succeed in college. Although academic achievement is a critical component of college readiness, a strong academic record is only one of the many attributes required to succeed.

Non-Academic Factors of College Readiness

Post-secondary institutions desire every student to transition from secondary education to college successfully; however, at times, FTIC students may need support transitioning from secondary to post-secondary education. A successful transition to college includes students being able to adapt to their new environment, gain knowledge of their campus, and attain a sense of belonging to their campus community (Tierney & Duncheon, 2015; Tinto, 1975). Researchers have proclaimed that the extent to which FTIC students can transition successfully from secondary to post-secondary education further influences their decision to persist until degree attainment (Hess, 2016; van Herpen, Meeuwisse, Hofman, & Severiens, 2020).

Ames et al. (2011) investigated students' ability to maintain their academic performance between their senior year in high school and their freshman year in college by examining psychological wellbeing and degree of adjustment to the institution. A survey was administered to 1,075 participants before their first year in college. The first round of data was collected in August, prior to college classes, while the second round of data was collected in November. The

total sample in the study after the second round of data collection was 600. These 600 participants included those maintaining their GPA from high school and those with declining GPAs. The data were analyzed via multivariate analysis. The results indicated significant differences between maintainers and decliners on variables such as perceived stress, psychological wellbeing, and university adjustment, as identified by students' ability to transit to college, integrate socially, manage time to attend classes and social activities, and adapt to surroundings. Students' academic success relied partly on their academic preparation and their ability to successfully transition from high school to college, establish new relationships, and navigate their college campus effectively.

While all students have varying needs to be successful in transitioning from high school to college and feeling a sense of belonging and community to their campus, researchers have highlighted a lack of coordinated curriculum and overall alignment of the two sectors of education as one of the reasons that FTIC students have challenges transitioning to college successfully (Davis & Hoffman, 2008; Melguizo & Ngo, 2020). An alignment of the two education sectors would allow administrators and leaders from secondary and post-secondary sectors of education to devise a coordinated curriculum. Therefore, FTIC students would be equipped with the content knowledge and skills required to succeed in early-level college coursework. Educational practitioners acknowledge the academic deficiencies of secondary graduates. Thus, a PK-16 partnership has been identified in the literature as a viable solution to address the challenges that students face when transitioning from high school to college and the overall problem of college readiness.

PK-16 Partnerships

Partnerships between LEAs and IHEs can be traced back to the 1880s. Teachers of Cambridge elementary schools and college faculty from Harvard's Teachers' College were

brought together at a conference organized by then president of Harvard University, Charles Eliot, to create effective teacher education programs (Floden & Clark, 1988). Teacher education programs at the university level required prospective teachers to student teach, also known as field experience, to adequately prepare teacher candidates and expose them to the range of responsibilities in a K-12 setting (Greenberg, Pomerance, & Walsh, 2011). Student teaching is a complex enterprise that involves collaborative efforts between faculty, staff, and administrators from the K-12 sector and post-secondary sector. More recently, partnerships between LEAs and IHEs have focused on creating a unified system of education from pre-kindergarten through to the first four years of post-secondary education (the sixteenth grade) or graduate study (the twentieth grade).

The creation of an educational network comprising the two sectors of education, K-12 and IHEs, has been identified in the literature base as K-16, P-16, and P-20 (Davis & Hoffman, 2008). The premise of a PK-16 or PK-20 initiative is for educators across sectors to focus their efforts on the uniformity of standards from one level to the next. By creating a system for students to transition smoothly from one level of education to the next, educators can focus on enhancing student learning and increasing the likelihood of all students succeeding from early childhood through a four-year post-secondary degree program. Researchers have highlighted a lack of coordinated curriculum and overall alignment of the two sectors as one of the prominent reasons for the attrition of FTIC. Secondary and post-secondary educators have acknowledged the academic deficiencies hindering FTIC students' success as a result of the two sectors operating independently from one another (Davis & Hoffman, 2008). Fostering a PK-16 partnership offers leaders an opportunity to enhance students' college readiness by coordinating their efforts to promote student success in college.

The growing aspirations of high school graduates to attend college and attain a post-secondary degree underscore the importance of creating an overarching system between LEAs and IHEs: “The formation of a clear system of communication, resource sharing, and strategic planning will go a long way to establish meaningful P-16 partnerships that benefit both systems” (Engram, 2012, p. 68). Through collaborative efforts, leaders from K-12 and IHEs can transmit data on their graduates, establish goals to ensure equitable access and the success of all FTIC students, and align course content across the two sectors. PK-16 partnerships can bridge the historical divide between LEAs and IHEs and devise continuous programs to enhance the college readiness of all secondary graduates.

PK-16 Initiatives

In the 1990s, education organizations, such as the Education Trust, National Governors Association, National Association of System Heads, and Achieve, Inc., brought together LEA and IHE leaders to tackle issues related to students’ transition from high school to college (Rippner, 2015). PK-16 partnerships are a strategy to create alignment across sectors to combat the lack of college readiness of FTIC students. However, the creation of a single aligned system of education in the US from K-12 to Grade 16 is challenging to implement (Davis & Hoffman, 2008; Engram, 2012). A single education system in the US is challenging to implement because LEAs and IHEs have traditionally operated independently of one another, with different missions: “K-12 has emphasized universality, a common mission, and uniform standards. Higher education has emphasized selectivity, diverse missions, and standards that vary among programs and institutions” (Davis & Hoffman, 2008, p. 127). Despite the varying missions of the two sectors of education, leaders and practitioners from both sectors envision their graduates to have the knowledge, skills, and abilities to succeed in all aspects of their lives.

PK-16 initiatives between LEAs and IHEs can elevate the learning opportunities for students at all levels. Kendall et al. (2007) contended that high school graduates are entering college less prepared, with the need for remedial non-credit-bearing coursework rising because of the misalignment between LEAs and IHEs. To this end, the creation of PK-16 partnerships through collaborative efforts between educational practitioners across sectors remains a viable solution to promote students' college readiness, even though the K-12 and IHE systems are inherently independent of one another. For instance, educational leaders from both sectors may work collaboratively to align academic assessments, develop improved data-sharing practices, and facilitate professional development seminars across sectors designed to focus on the academic and non-academic constructs of college readiness.

In an effort to promote the college success of secondary graduates, there has been a significant increase in secondary and post-secondary college readiness partnership efforts (Hartman, 2017; Rippner, 2015). For example, in 2015, the California State University (CSU) system launched the Graduation Initiative 2025, as indicated on the CSU webpage. The initiative's goal is to increase the number of students graduating from the CSU system by 500,000 more students by 2025. CSU is partnering with Californian high schools to ensure FTIC students arrive at campus ready to meet college education demands. Moreover, the purpose of CSU's initiative is to identify barriers to student success by working collaboratively with K-12 area high schools by transmitting data from the CSU system back to Californian high schools.

The Graduation Initiative 2025 launched by CSU plans to use data-driven decision making (D3M) processes to support students' college success. Researchers involved in implementing the initiative have developed a data dashboard for LEAs across the state to track their graduates' performance at any of the 23 campuses encompassed by the CSU system. The data made available to districts may be promising; however, this project does not center around

collaborative efforts between LEAs and IHEs. Instead, the expectation is for K-12 practitioners to analyze the data on their own to improve the college readiness of their students. Moreover, data transmission is only one component of successful PK-16 partnerships. While PK-16 partnerships are beneficial, the challenge lies in successfully implementing collaborative efforts between educators from both sectors revolving around the mission of college success for all students.

The PK-16 Pathways of Promise (P³) Project Intervention

The PK-16 Pathways of Promise (P³) Project was an extension of a small-scale pilot effort conducted by researchers at an IHE (IHE1) in Northwest Ohio in the summer of 2016. The P³ Project expanded the number of partner LEAs from six to 10 in the first year of the grant and added two more LEAs in the second year of funding. In addition to expanding the pilot project by adding LEAs, the P³ Project added another IHE (IHE2) in Year 1 of the grant and added a third IHE (IHE3) in Year 2 of the grant. As discussed, the focus of the project was to create collaborative partnerships to provide districts with data on the performance of their students in their first year of college. In turn, the LEAs were to use the data on their students' first year in college to identify instructional, curricular, and personnel modifications to more effectively prepare future students for post-secondary settings.

A major component of the program was the inclusion of professional development opportunities for the participating school districts. As noted below, additional grants were provided for increasing programming targeting post-secondary success. With the additional funds (as noted below) the districts were to use the data from the IHEs to engage in activities to prepare students for their first year in college experience. The intervention components, as outlined below, provided a variety of supports for the school personnel. As part of the P³ Project:

1. participating LEAs received data on their secondary graduates' performance from the students' IHE of attendance
2. administrators from participating LEAs attended data summits organized by P³ Project personnel to build LEA capacity in data literacy and support LEAs in developing continuous program improvement plans grounded in the data
3. participating LEAs were awarded US$10,000 sub-awards to support programs, professional development, and instructional initiatives aimed at increasing the college readiness of their graduates at their respective schools.

The IHEs identified students who enrolled as FTIC students at their respective institutions from fall of 2010, who graduated from one of the LEAs participating in the project. As noted, the goal of the project was to foster ongoing support and collaboration between IHEs and LEA partners to improve the college readiness of FTIC students.

The P³ Project team identified and collected authentic indicators of college readiness. The student data collected and compiled by the IHEs included high school GPA, Scholastic Aptitude Test (SAT) and/or American College Testing (ACT) scores, first-year college GPA, number of credits attempted in early-level college courses (e.g., remedial or introductory college writing, college writing, remedial mathematics courses, college algebra, statistics, and trigonometry/calculus), number of credits earned in early-level college courses, grades earned in early-level courses, and credit hours earned at the end of the academic year.

IHE leaders compiled the student-level data for each partner district in a Microsoft Excel file. Each student in the dataset received an unidentifiable identification (ID) number. Once the final dataset was compiled by each IHE, the P³ researchers prepared a dataset for each participating LEA. LEA personnel were then invited to a data summit in the fall of 2017, where they received the data files. Each LEA received two distinct Excel files. The first Excel file

included the data for each district's respective graduates, while the other Excel file was the combined dataset that contained data on the graduates of all participating LEAs. For confidentiality purposes, the LEA names were replaced with random numbers in the combined dataset provided to district leaders. To prepare the student data with the participating districts, IHE leaders masked each LEA name with a random number to maintain the anonymity of each district's data. Although district leaders were unable to identify the data specific to each LEA, participating districts were still able to examine the performance of their own graduates, as well as the performance of the graduates of the other LEA partners.

The personnel in attendance included district superintendents, district curriculum and instruction directors, guidance counselors, and classroom teachers (typically teacher-leaders in their respective schools or districts). The data summit was held in a conference hall and lasted approximately four hours. During the data summit, LEA leaders were introduced to the data and guided through the data by Pathways of Promise (P^3) researchers. Additionally, district leaders were provided with a step-by-step guide with instructions on how to navigate and analyze the dataset, and a contact list of several staff and faculty members from the IHEs who indicated their willingness to work with the districts in analyzing their graduates' post-secondary performance. The contact list included IHE faculty and staff and the area of their expertise. Moreover, the P^3 team sought to provide district leaders with the tools necessary for them to be able to analyze and use the data to make informed decisions as the districts launched professional development initiatives for their teachers and staff centered on college readiness.

Professional development initiatives and opportunities are a costly endeavor for school districts. Thus, to further support and promote the college readiness of their graduates, LEAs were awarded with US$10,000 in sub-awarded grant funds to support ongoing programming, professional development, and instructional initiatives at their respective high schools. The

participating LEAs proposed using the US$10,000 for professional development on several levels. The professional development proposed by LEA leaders included training and seminars for teachers to engage in more rigorous mathematics and English instruction, professional development on how to promote students' critical thinking skills, resources to prepare students for higher-level course content, seminars on the factors associated with being ready for college, and professional development on how to further encourage and support high school students' higher-level thinking to align with college-level coursework.

The professional development implemented by district leaders was centered on finding ways to further promote instruction at the high school level to enhance their students' post-secondary success. Finally, districts also used their funds on additional resources to better prepare students for college course content by providing dedicated time and additional support for their students. The participating districts were given full autonomy to use the grant funds as they deemed necessary after analyzing the data for their respective districts. However, LEAs centered the professional development, training, and seminars on recognizing the skills that FTIC students need to be successful in college and how to between prepare students for college-level coursework.

After the data summit, district personnel received a survey to provide their feedback. In addition to providing their feedback on the summit, district leaders expressed their desire for additional data that would help inform their efforts to improve the college readiness of their graduates. LEA leaders were interested in receiving feedback from IHE faculty on how FTIC students perform in entry-level courses and the skills students need to improve to be successful in college. Additionally, LEA personnel were interested in discussing the reasons that students leave and do not persist until degree completion. While these data would not be school specific,

receiving this kind of feedback from university instructors would be beneficial for school leaders when implementing professional development, training, and seminars on college readiness.

District personnel were invited to a second data summit during the summer of 2018. Similar to the first data summit held in the fall of 2017, when districts received the two Excel files with the data, this data summit lasted approximately five hours. During this summit, IHE faculty specialized in English, mathematics, and the natural sciences facilitated sessions on first-year college student expectations in early-level content courses. This data summit centered around LEAs engaging with IHE faculty and discussing the type of content FTIC students are learning in these early-level courses. LEA leaders were provided with an overview of the curriculum of each of these courses. IHE leaders facilitated this data summit as per the feedback of LEA leaders from the first data summit, wherein they requested to engage with IHE instructors, learn more about the curriculum delivered to first-year students in early-level courses, and learn about the skills secondary graduates must possess to be successful in earning credits for college entry-level coursework.

IHE leaders facilitated a third data summit in the summer of 2019. During this summit, district leaders were introduced to the data dashboard, which they requested during the second data summit. The data dashboard contained the aggregated data for students who graduated from any LEA in Ohio and attended one of the P³ IHEs over a five-year period. The data dashboard enabled LEA leaders to seamlessly view highlights of their own school's data, as well as compare their data with any other school in Ohio. As aforementioned, LEA names were omitted and replaced with a unique number to preserve the anonymity of each school. The data dashboard explained each data point in more detail, included definitions and parameters of the data compiled, and included definitions of terms that are commonly used in higher education. Moreover, the data dashboard was a major deliverable of the P³ Project. As stated, the P³ Project

proposed to develop and field-test a scalable model for identifying authentic indicators of college readiness in university data systems, transmit these data back to partner LEAs, and establish a collaborative partnership between IHEs and LEAs for the continuous development of strategies to be implemented by LEA leaders to improve the college readiness of their secondary graduates.

The following section will include screenshots of the data dashboard. Figure 2 presents the definitions that are used throughout the dashboard and are commonly used in higher education. Figures 3, 4, and 5 detail all the variables compiled as part of the P³ Project. Figure 6 depicts the total FTIC students entering one of the P³ IHEs. Figure 7 shows the pass rate for entry-level courses for a specific high school. Figure 8 presents the number of students from the specified high school who were retained, the proportion of students who earned at least 30 credit hours by the end of the academic year, and how these data points compare with the LEA district typology and the overall average for all LEAs in Ohio.

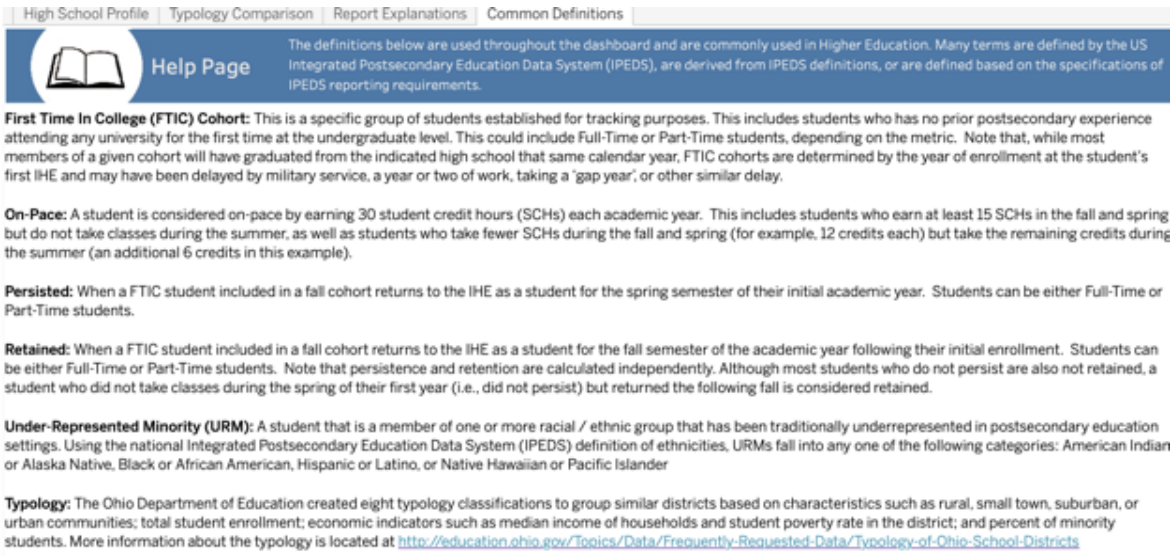


Figure 2. Common definitions used throughout the data dashboard.

High School Profile | Typology Comparison | Report Explanations | Common Definitions

Help Page

Below, the individual reports on each tab are explained in detail, including definitions and parameters of the data compiled. All reports are derived from five years' worth of aggregated student data.

High School Profile Tab

Total First Time Entering Students: The line graph is labeled with the total number of First Time In College (FTIC) students (see Common Definitions tab) entering any P³ IHE from the selected HS over each of the past five years. The stacked bar graph beneath the line indicates the proportion of those students that enrolled at each P³ IHE, labeled as a percent. Roll your mouse over (or tap) a segment of the stacked bar chart for additional detail on the number of students included in that segment. P³ IHEs shown are:

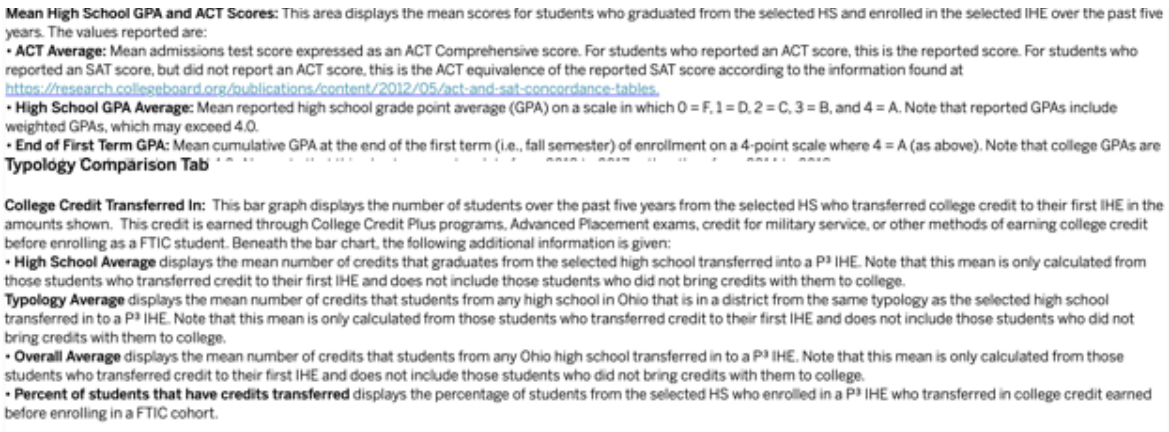
- [redacted] is shown in orange.
- [redacted] is shown in purple.
- [redacted] is shown in blue.

Demographic Comparisons: Displays the percentage from each of two, mutually exclusive groups described below for students entering the FTIC cohorts (see Common Definitions below) of the selected IHE from the selected HS. Percentages are based on the last five years of data available. Demographics displayed are:

- **Full-Time vs Part-Time:** Full-time students enroll in at least 12 student credit hours (SCHs) per semester, while part-time students enroll in less than 12 SCHs.
- **Male vs Female:** Although IPEDS does not define gender, sex, or the categories of male or female, IHEs are required to report student gender as male and female. This Chart displays the percentage of students identified in each group.
- **URM vs Non-URM:** The proportion of students identified as a member of one or more underrepresented minority group (see Common Definitions tab), and the proportion of those who are not. Note that students who do not specify race or ethnicity have not identified as URM and are therefore counted in the Non-URM category.
- **Persist vs Not Persist:** The proportion of students from each FTIC cohort who enroll in classes for the spring semester following their initial fall semester (persist) compared to those who do not take classes during their first spring semester (not persist). Note that this chart aggregates data from 2013 to 2017, rather than from 2014 to 2018.
- **Retained vs Not Retained:** The proportion of students from each FTIC cohort who enroll in classes for the fall semester of the academic year following their initial fall semester (retained) compared to those who do not (not retained). Note that persistence and retention are calculated independently. Although most students who do not persist are also not retained, a student who did not take classes during the spring of their first year (i.e., did not persist) but returned the following fall is considered retained. Note that this chart aggregates data from 2013 to 2017, rather than from 2014 to 2018.

Programs Entered: IHE data systems identify student majors or academic programs by IPEDS-defined classification of instructional programs (CIP) codes. CIP codes are six digits long, but are defined in a hierarchy such that academic programs can be discussed in groups of similar programs based on the first four digits of the CIP code, or in larger groupings of related programs based on the first two digits of the CIP code. The bubbles on this chart represent the percentage of students over the most recent five years from the selected IHE and the selected HS who entered a program contained in one of these two-digit CIP code groups. The size of the bubble indicates the number of students, and it is labeled (if it is large enough for the label to fit) with the percentage of students and the name of the 2-digit CIP code category. Roll your mouse over (or tap) to see the name of the program category and the percentage of students. Note that any student who has not declared a major is typically counted in CIP 24, Liberal Arts and Sciences, General Studies and Humanities (there are declared majors that fit in CIP 24, but these programs are relatively uncommon.

Figure 3. Definitions of the variables compiled as part of the P³ project.



Mean High School GPA and ACT Scores: This area displays the mean scores for students who graduated from the selected HS and enrolled in the selected IHE over the past five years. The values reported are:

- **ACT Average:** Mean admissions test score expressed as an ACT Comprehensive score. For students who reported an ACT score, this is the reported score. For students who reported an SAT score, but did not report an ACT score, this is the ACT equivalence of the reported SAT score according to the information found at https://research.collegeboard.org/publications/content/2012/05/act-and-sat-concordance-tables.
- **High School GPA Average:** Mean reported high school grade point average (GPA) on a scale in which 0 = F, 1 = D, 2 = C, 3 = B, and 4 = A. Note that reported GPAs include weighted GPAs, which may exceed 4.0.
- **End of First Term GPA:** Mean cumulative GPA at the end of the first term (i.e., fall semester) of enrollment on a 4-point scale where 4 = A (as above). Note that college GPAs are

Typology Comparison Tab

College Credit Transferred In: This bar graph displays the number of students over the past five years from the selected HS who transferred college credit to their first IHE in the amounts shown. This credit is earned through College Credit Plus programs, Advanced Placement exams, credit for military service, or other methods of earning college credit before enrolling as a FTIC student. Beneath the bar chart, the following additional information is given:

- **High School Average** displays the mean number of credits that graduates from the selected high school transferred into a P³ IHE. Note that this mean is only calculated from those students who transferred credit to their first IHE and does not include those students who did not bring credits with them to college.

Typology Average displays the mean number of credits that students from any high school in Ohio that is in a district from the same typology as the selected high school transferred in to a P³ IHE. Note that this mean is only calculated from those students who transferred credit to their first IHE and does not include those students who did not bring credits with them to college.

- **Overall Average** displays the mean number of credits that students from any Ohio high school transferred in to a P³ IHE. Note that this mean is only calculated from those students who transferred credit to their first IHE and does not include those students who did not bring credits with them to college.
- **Percent of students that have credits transferred** displays the percentage of students from the selected HS who enrolled in a P³ IHE who transferred in college credit earned before enrolling in a FTIC cohort.

Figure 4. Definitions of variables compiled as part of the P³ project (continued).

Pass Rate for Key Entry-Level Courses: The bar graph displays the percentage of grades earned at a P³ IHE by students who graduated from the selected HS that resulted in useable credit for that course (i.e., an A, B, or C). Note that the percentage displayed is the percentage of attempts at courses in that category. If, for example, the same student attempted the same course three times before earning a passing grade, that student would be counted three times in the denominator but only once in the numerator when calculating the percentage displayed. Each bar also has a green reference line that indicates the comparable pass rate for grades earned by graduates from any high school in Ohio that is in a district that has the same typology as the selected high school, and a red reference line indicates the comparable pass rate for grades earned by graduates of any Ohio high school, at P³ IHEs. The course categories displayed are:

- **Calculus** – Courses in this category are more advanced mathematics courses (though still considered entry-level for sufficiently prepared students), which contain calculus and satisfy the general education mathematics requirement.
- **College Algebra** – Courses in this category are early courses in college mathematics which satisfy the general education mathematics requirement.
- **Elementary Chemistry** – Courses in this category are entry-level courses in chemistry which satisfy general education requirements.
- **Introductory Biology** – Courses in this category are entry-level courses in biology which satisfy general education requirements.
- **Psychology** – Courses in this category are first courses in psychology which satisfy a social sciences general education requirement.
- **Remedial Math** – Courses in this category are mathematics courses which do not satisfy the general education mathematics requirement.
- **Sociology** – Courses in this category are first courses in sociology which satisfy a social sciences general education requirement.
- **Statistics** – Courses in this category are early courses in statistics which satisfy the general education mathematics requirement.
- **Writing/Comp 1** – Courses in this category are writing courses which do not satisfy the general education English composition requirement.
- **Writing/Comp 2** – Courses in this category are writing courses which satisfy the general education English composition requirement.

Retained and On Pace/Off Pace: This horizontal bar graph indicates the percentage of students from the indicated high school who are both retained at a P³ IHE (see Common Definitions tab) and either on-pace or off-pace (see definition of On-Pace below), depending on the value selected in the pull-down directly above this chart. Note that the on-pace graphs and off-pace graphs are direct inverses of one another and should total 100%. The two different views are offered as display options to suit user preferences. Each bar also has a green reference line that indicates the comparable on-pace/off-pace rate for graduates from any high school in Ohio that has the same typology as the selected high school, and a red reference line indicates the comparable pace/off-pace rate for graduates of any Ohio high school, at P³ IHEs.

Figure 5. Definitions of variables compiled as part of the P³ project (continued).

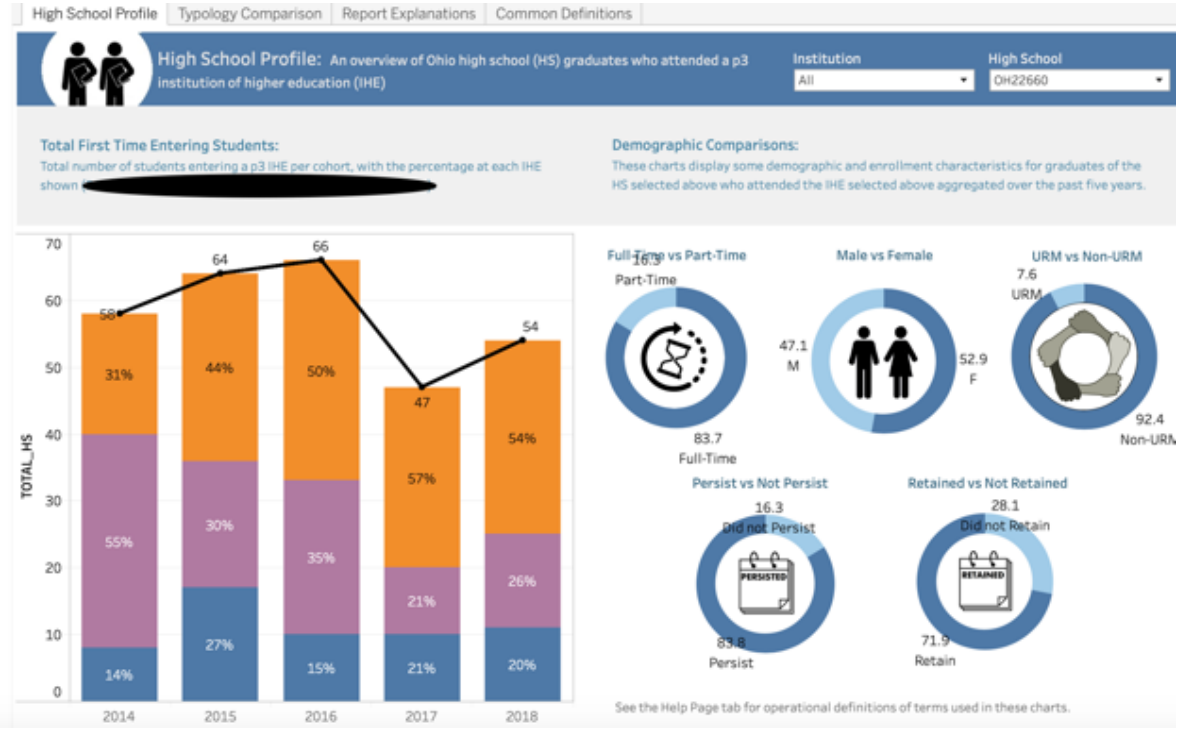


Figure 6. Total FTIC students entering one of the P³ IHEs, with orange representing IHE1, blue IHE2, and purple IHE3.

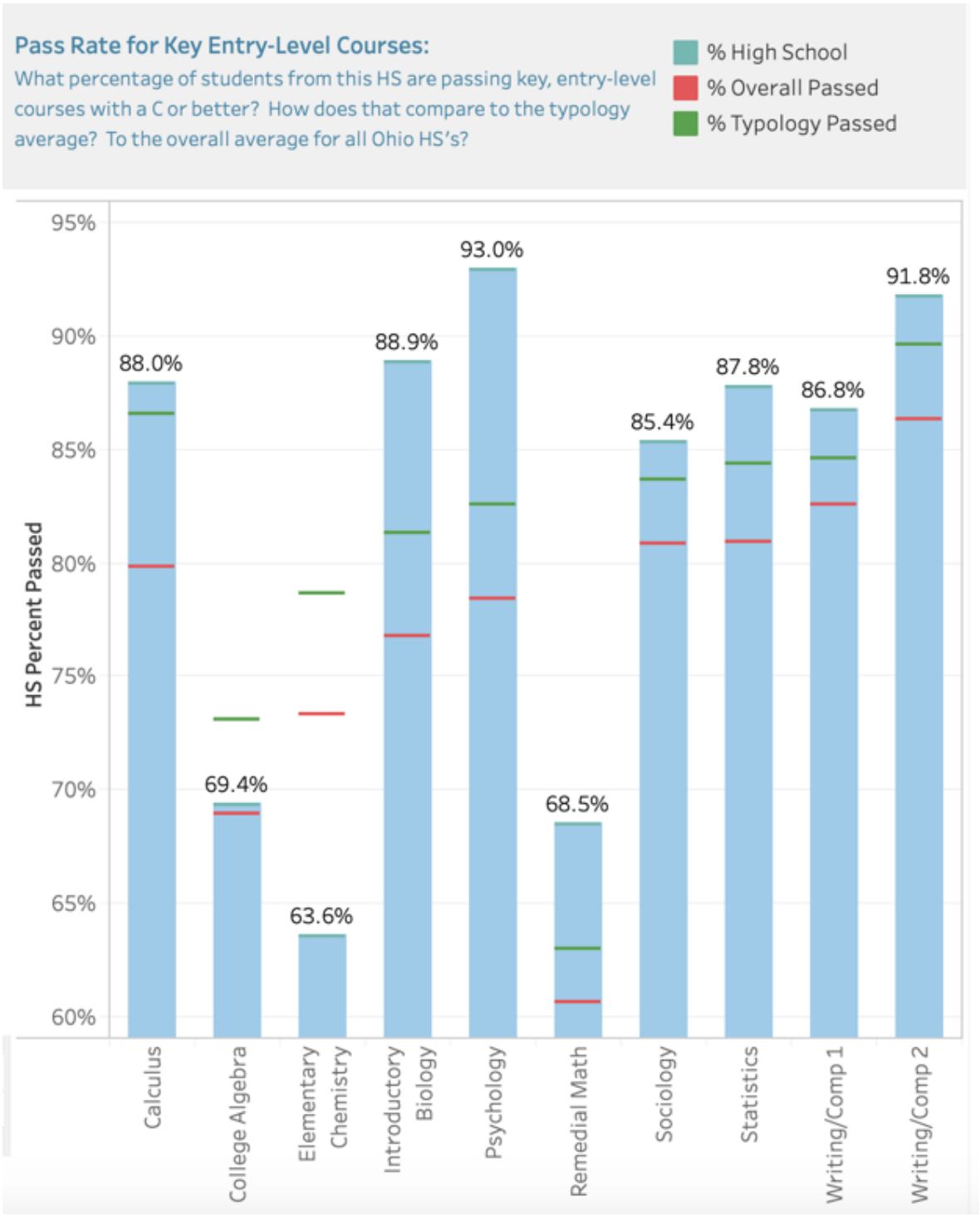


Figure 7. Depiction of the pass rates for entry-level courses for a specified high school (HS).

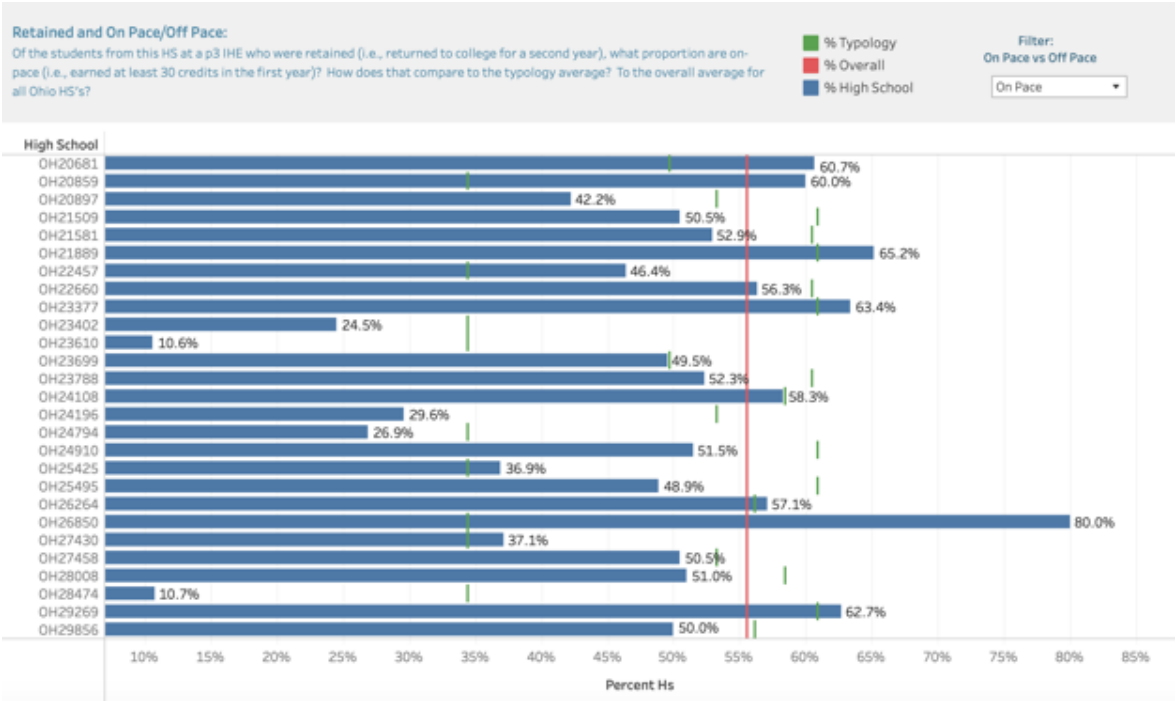


Figure 8. Depiction of the comparison between high schools on retention.

Summary

As outlined in this review, researchers have estimated a shortage of 16 to 23 million college-educated adults by 2025. The lack of college-educated employees has the potential to result in an inadequate workforce. The projections of employment opportunities requiring some post-secondary education or training have led to an immense need to supply the labor market with citizens with a bachelor's degree or credential. However, previously researched college-readiness studies have highlighted the substantial number of FTIC students matriculating into IHEs underprepared for college-level coursework, as evidenced by the relatively high percentage of students requiring remedial education and the insignificant increase in student persistence and retention rates over the years.

The meta-analysis presented in this chapter indicated that research has found pre-college academic performance variables to be reliable predictors of college readiness. Researchers have ascertained that many students cannot transition successfully from high school to college,

thereby matriculating into IHEs lacking the knowledge and skills required to succeed in credit-bearing college courses. The misalignment between the two education sectors is one of the main reasons for the unsuccessful transition of students from high school to college.

Education leaders have been devising ways to address the challenges associated with the lack of FTIC students' college readiness by creating a PK-16 partnership between K-12 and higher education officials. A PK-16 collaboration is a method by which educational practitioners can address students' academic deficiencies by aligning academic assessments, developing improved data-sharing practices, and facilitating professional development seminars across sectors.

Unique collaborative efforts, such as the P^3 Project, can significantly improve the college readiness of FTIC students by focusing on ways in which students can transition smoothly from secondary to post-secondary education. However, a paucity of research exists on the long-term effectiveness of PK-16 initiatives centered around collaborative efforts between K-12 and higher education to enhance FTIC students' post-secondary outcomes. To this end, quantitative data analysis must assess the effectiveness of a pre-college intervention in improving high school graduates' college readiness, thus enhancing their post-secondary outcomes. Chapter 3 presents a detailed description of the methodology used to investigate the P^3 Project intervention's effects on FTIC students' post-secondary outcomes.

CHAPTER 3: METHODOLOGY

The purpose of this quasi-experimental study was to evaluate the intervention that participating local education agencies (LEAs) received as part of the PK-16 Pathways of Promise (P^3) Project. Specifically, the study assessed whether the post-secondary outcomes (first-year college grade point average [GPA], proportion of credits lost, cumulative number of credit-bearing hours earned by the end of the academic year, and persistence and retention) for full-time, first-time-in-college (FTIC) students were enhanced as a result of LEAs participating in the P^3 Project.

The P^3 Project was an innovative initiative to foster collaboration between secondary and post-secondary education sectors to enhance students' college readiness. Collaborative efforts between leaders from the two sectors of education have the potential to create a system for students to transition smoothly from one level of education to the next, thus removing some of the challenges associated with post-secondary degree attainment.

This chapter details the research design, sample, instrumentation, questions guiding the study, and data analysis procedures. The data analysis began with the final compiled P^3 dataset, which encompassed full-time, FTIC students from all LEAs in Ohio, from 2010 until 2018, matriculating in one of the three partner P^3 institutions of higher education (IHEs; IHE1, IHE2, or IHE3).

Research Design

The design for this quantitative study was quasi-experimental. First, a quasi-experimental research design was appropriate because the researcher did not randomly assign participants to groups, and an outcome comparison of the two groups was made. The two groups involved in this research design were the intervention and comparison groups. The study compared differences in the post-secondary outcomes between the intervention group of full-time, FTIC

students graduating from LEAs participating in the P³ Project, and the comparison group of full-time, FTIC students graduating from all other LEAs in Ohio.

Variables

Quasi-experimental research designs are also referred to as nonrandomized studies and pre–post intervention study designs. In this study, while the independent variable was manipulated, participants were not randomly assigned to groups (Cook, Campbell, & Day, 1979). The independent variable was the intervention given to the participants in the study. The dependent variables were the study outcomes, while the control variables were the confounding factors that could influence the study results by distorting the relationship between the independent and dependent variables (Creswell, 2003). Table 5 outlines the independent, dependent, and control variables in the study.

Table 5

Variables of the Study

Independent variable	Dependent variables	Control variables
P³ Project (yes/no)	First-year GPA Proportion of student credit-bearing hours lost Accumulated student credit-bearing hours Persistence Retention	Sex Ethnicity High school GPA Ohio district typology

Independent Variables

P³ Project (dichotomous variable): There were two groups within this independent variable: the intervention (n = 1,574) and the comparison (n = 42,843) groups. The intervention group included secondary graduates from LEAs participating in the P³ Project from 2016 to 2018. The intervention group encompassed the 2017 and 2018 cohort of FTIC students enrolling as full-time in IHE1, IHE2, or IHE3 and graduated from P³ LEAs. The comparison group

encompassed FTIC students enrolling as full-time in IHE1, IHE2, or IHE3 and graduated from LEAs in Ohio that were not part of the P³ Project between 2010 and 2018. Figure 9 provides a participation flowchart.

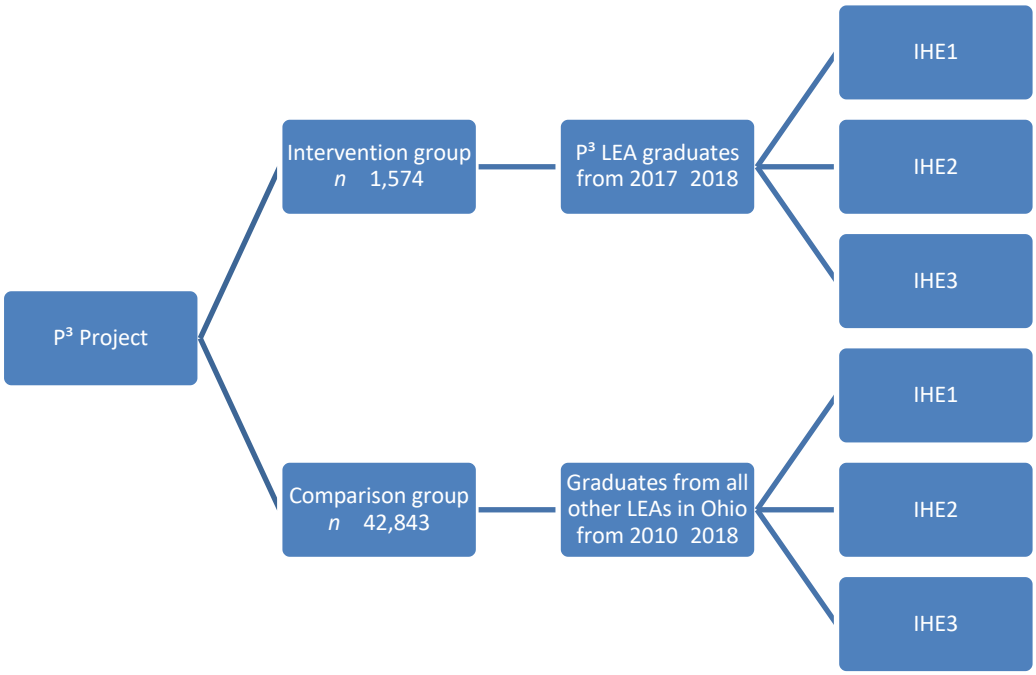


Figure 9. P³ Project participation flowchart.

Dependent Variables

First-year GPA (continuous variable): The cumulative first-semester and second-semester GPA for participants at their respective IHE, ranging from 0.0 to 4.0.

Proportion of lost credit-bearing hours (continuous variable): The proportion of credit hours, ranging from 0 to 1, in early-level courses (writing composition, college algebra, statistics, psychology, sociology, chemistry, and biology) that did not count towards graduation (i.e., remedial courses and/or courses for which the student received an unsatisfactory grade, received an incomplete result, or withdrew from the course).

Accumulated credit-bearing hours (continuous variable): The total number of credit-bearing hours that participants earned at the commencement of their first academic year.

Persistence (binary variable): Measured as either 0 for participants who did not re-enroll in spring semester courses after their first fall semester, or 1 for participants who re-enrolled for spring semester courses, after completing their first semester at their chosen IHE.

Retention (binary variable): Measured as either 0 for participants who did not re-enroll in courses after completing their first full academic year, or 1 for participants who re-enrolled in courses after completing their first full academic year at their chosen IHE.

Control Variables

Sex (categorical variable): The biological factors (male/female) used to group the participants in the study.

Race/ethnicity (categorical variable): The racial categories (American Indian or Alaskan Native, Asian, African American, Caucasian, Hispanic, Native Hawaiian or Pacific Islander, race and ethnicity unknown, or two or more races) used to group the participants in the study.

High school GPA (continuous variable): Participants' overall GPA by the end of their high school career.

Ohio district typology (categorical variable): The Ohio Department of Education (ODE) classifies LEAs from 1 to 8 according to similar geographic (rural, small town, urban, and suburban) and demographic characteristics (poverty level and school population).

Method

Context and Setting

The three IHEs in the study were located in Northwest Ohio. IHE1 is a medium-sized rural public four-year institution and is primarily a residential campus. IHE2 is a medium-sized suburban public four-university and is mainly a commuter campus. IHE3 is a suburban public two-year institution.

Population and Sample

This study's population were residents of the United States (US) who graduated from LEAs in Ohio and were admitted to one of the three P³ IHEs from 2010 to 2018. The sample for the study included two groups: an intervention group and a comparison group. The intervention group encompassed the 2017 and 2018 cohort of FTIC students enrolling as full-time in IHE1, IHE2, or IHE3 and graduated from P³ LEAs. The comparison group encompassed FTIC students enrolling as full-time in IHE1, IHE2, or IHE3 and not part of the intervention of the P³ Project. Study participants were qualified for inclusion in the study based on three criterion points. Qualifying criteria included:

1. the successful completion of all high school requirements as mandated by the state of Ohio
2. FTIC attendees
3. registration as full-time in one of the three P³ IHEs.

A differentiating factor between the two groups in the study was whether participants graduated from LEAs participating in the P³ Project in 2017 and 2018.

Research Questions

1. Is there a statistically significant difference in first-year college GPA for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?

The following specific null hypothesis was examined for first-year college GPA:

H_0: First-year GPAs for students who graduate from LEAs participating in the P³ Project will not be statistically significantly different compared with students who graduated from LEAs not participating in the P³ Project.

2. Is there a statistically significant difference in the proportion of credits lost in early-level courses for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?

The following specific null hypothesis was examined for the proportion of credits lost in early-level courses:

H_0: The proportion of credits lost in early-level courses for students who graduate from LEAs participating in the P³ Project will not be statistically significantly different compared with students who graduate from LEAs not participating in the P³ Project.

3. Is there a statistically significant difference in accumulated credit-bearing hours earned for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?

The following specific null hypothesis was examined for accumulated credit-bearing hours earned:

H_0: Accumulated credit-bearing hours earned for students who graduate from LEAs participating in the P³ Project will not be statistically significantly different compared with students who graduate from LEAs not participating in the P³ Project.

4. Is there a statistically significant difference in persistence for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?

The following specific null hypothesis was examined for persistence:

H_0: The persistence for students who graduate from LEAs participating in the P³ Project will not be statistically significantly different compared with students who graduate from LEAs not participating in the P³ Project.

5. Is there a statistically significant difference in retention for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?

The following specific null hypothesis was examined for first-year college GPA:

H_0: The retention for students who graduate from LEAs participating in the P³ Project will not be statistically significantly different compared with students who graduate from LEAs not participating in the P³ Project.

Threats to Validity

Typically, the term "validity" is used in various domains in the social sciences. From one perspective, validity in quantitative social science research refers "to the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests" (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014, p. 1). Conversely, social scientists refer to validity in terms of internal and external validity as essential aspects of research design (Cook et al., 1979; Shadish, Cook, & Campbell, 2002). The present study focused on the latter—the internal and external validity of a quasi-experimental research design. Internal validity is the extent to which causal inferences may be possible, thus providing evidence of cause and effect. In comparison, external validity refers to the generalizability of the findings of a study.

Internal threats to validity. In a quasi-experimental research design, a study requires at least two groups—one group that receives the intervention and one group that does not receive the intervention. This research design is easily implemented in educational settings, as

researchers often do not assign individual students to groups, and group membership is often not assigned via random selection (Onwuegbuzie, 2003; Salkind, 2012). Selection bias is a threat to the study's internal validity, as there is a lack of random assignment to groups. Group differences may include, yet are not limited to, gender, socioeconomic status, demographics, cognitive abilities, and personality attributes.

The present study compared the intervention and comparison groups based on the post-secondary outcomes by controlling for the control variables, including gender, race/ethnicity, high school GPA, and school typology. Although the researcher attempted equivalency between groups, it is essential to note that this did not guarantee group equivalence. In a quasi-experimental research design, the researcher is unable to measure all potential differences between groups, as group membership is not randomized and groups may differ on variables that are not detectible to the researcher, such as first-generation students, high-risk students, marginalized students, students identified as gifted, or honor students.

According to researchers Flannelly, Flannelly, and Jankowski (2018), "history and maturation should be thought of as universal threats to [internal validity] because they are always present when an independent variable is present" (p. 127). Participants may experience events during the study that pose as extraneous variables. In the present research, student data were collected from 2010 to 2018. During this timeframe, events such as teacher turnover in LEAs; changes within the administration, such as hiring a new curriculum director; or leadership changes in LEAs and/or IHEs were extraneous variables for which the study could not account.

External threats to validity. The present study did not adequately control for all the external threats to validity. The present study encompassed students graduating from all LEAs to control for population validity in Ohio. Although the findings may not be generalizable to other IHEs across the nation, the results may be generalizable to IHEs with similar characteristics and

demographics as those in the study. Similarly, the findings may not withstand the test of time because of outside forces, such as new education policies and operational, structural, or leadership changes within LEAs or IHEs.

Procedures and Instrumentation

In the summer of 2016, leaders from IHE1 piloted a project designed to bridge the gap between IHEs and LEAs by initiating a dialogue centered on increasing secondary graduates' success in college. The pilot project provided six LEA administrators—otherwise referred to as partner LEAs—with data on their graduates who were enrolled at IHE1. The data included scores on mathematics and English placement tests, final grades in benchmark courses, overall college GPA, major, high school GPA, and American College Testing (ACT) or Scholastic Aptitude Test (SAT) scores. LEAs regularly receive data on their students' performance on standardized tests (PSAT, SAT, or ACT scores). However, the data provided to LEAs in this pilot represented the first time any of these LEAs had received data related to their graduates' post-secondary performance.

In an effort to build and expand the pilot project, a team of faculty, staff, and researchers from IHE1 submitted a grant proposal to the Ohio Department of Higher Education (ODHE) to fund the continuation of the piloted project. IHE1 received a two-year grant to fund the continuation of the pilot. The P³ Project was a continuation of the pilot project. The P³ Project proposed developing and field-testing a scalable model for identifying key performance indicators of college readiness in university data systems, transmit these data back to partner LEAs, and establish a collaborative partnership between IHEs and LEAs for the continuous improvement of college readiness indicators of secondary graduates. The P³ Project expanded the number of partner LEAs from the initial six to 10 in the first year of the grant and added two

more LEAs in the second year of funding. In addition to expanding the pilot project by adding LEAs, the P³ Project added another IHE2 in Year 1 of the grant and IHE3 in Year 2 of the grant.

The data compiled as part of the P³ Project included student demographic data, high school academic preparedness indicators, college outcomes at the end of students' first academic year, and students' cumulative college performance. Although Pell Grant eligibility is collected as part of the college admissions process, the Financial Aid Office at IHE1 did not release these data to P³ Project personnel because of student confidentiality concerns expressed by the Financial Aid Office. Thus, Pell Grant eligibility was not included in the final dataset.

In the first year of the project, data were compiled for n = 5,042 secondary graduates from one of the 10 LEAs and enrolled as FTIC students at IHE1 or IHE2 from 2010 until 2018. In the second year of the project, data were compiled for n = 16,250 college students who graduated from one of the 20 secondary schools from one of the 13 partner LEAs and enrolled as FTIC students at IHE1, IHE2, or IHE3 from 2010 until 2018. The final dataset encompassed data for n = 60,676 college students who graduated from all LEAs in Ohio and enrolled as FTIC students at IHE1, IHE2, or IHE3 from 2010 to 2018. The present quasi-experimental research study began with the final compiled raw P³ dataset encompassing the academic performance of FTIC students from all LEAs in Ohio from 2010 to 2018. Figure 10 provides a flowchart for the data compiled for Years 1 and 2 of the project.

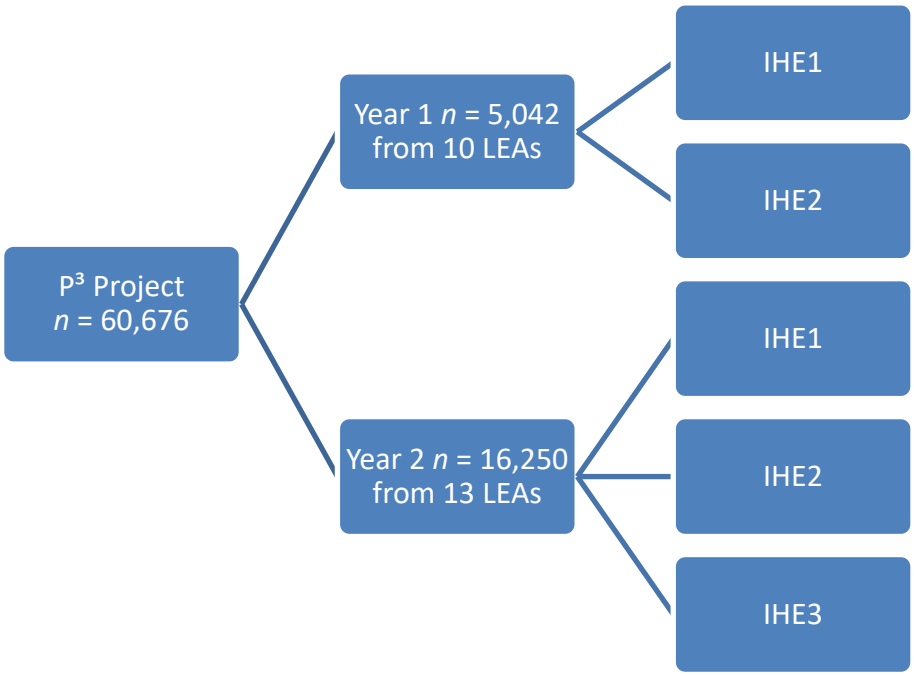


Figure 10. Data compiled for the P³ project.

P³ Project Intervention

The P³ data were delivered to partner LEAs at an annual "data summit." IHE leaders designed the annual data summits to foster ongoing support and collaboration with LEA partners to improve the college readiness of FTIC students. The data summits were used to build LEA capacity in data literacy and support LEAs for developing continuous program improvement plans grounded in the data. LEA partners participated in three data summits as part of the P³ Project. To further support the college readiness initiatives of partner LEAs, sub-awards of US$10,000 were provided to LEA partners. Participating LEAs submitted a proposal for US$10,000 in sub-awarded grant funds to support programs, professional development, and instructional initiatives to increase the college readiness of their graduates based on the analyses of the data provided to LEA administrators. The intervention in the present study included:

1. participating LEAs receiving data on their secondary graduates' performance at an IHE

2. administrators from participating LEAs attending data summits organized by P³ Project personnel to build LEA capacity in data literacy and support LEAs in developing continuous program improvement plans grounded in the data
3. participating LEAs being awarded US$10,000 in sub-awards to support programs, professional development, and instructional initiatives aimed at increasing the college readiness of their graduates at their respective schools.

The study's intervention group comprised secondary graduates from participating P³ LEAs, while the comparison group participants were secondary graduates from all other LEAs in Ohio.

Ethical Concerns

Individual student and LEA identification numbers were altered by P³ Project personnel to keep all records anonymous. The research study did not identify or list student names on any documents. The researcher made all efforts to keep data confidential. The researcher enabled two-factor authentication on all devices. She avoided using a public device when handling the data files. She refrained from storing any restricted data files in her e-mail inbox. The study did not present additional risk to the participants beyond that to which they would normally be exposed.

Analysis

Research studies using existing data often require extensive data cleaning. The final P³ Excel file (n = 60,676) was screened and assessed for missing data, data entry errors, and specific data entries irrelevant to the study's purpose. The researcher eliminated the following data entries:

1. all part-time students
2. records for students graduating high school in the 1970s to 1990s
3. records for students graduating high school from 2000 to 2009

4. records for students with mismatched high school graduation year and cohort term
5. records with data entry errors, such as high school graduating year of 2020 to 2024
6. records with missing entries, such as students without a high school graduating year or without a high school GPA.

The final dataset analyzed encompassed n = 44,417 student records. The dependent variables were then extracted for each student record. SAS analytic software was used for data analysis. The alpha-level selected by the researcher was .0001. The researcher set the significance level at .0001 to reduce the risk of a type I error or false positive by 1 in 1,000 hypotheses. Moreover, the dataset analyzed for this study was large. Thus, by setting the significance level at .0001, detecting differences between groups was more difficult, yet provided stronger evidence for statistical differences between the intervention and comparison groups.

Descriptive statistics were produced for the post-secondary outcomes for the intervention and comparison groups. Multilevel modeling (MLM) was the appropriate methodological approach for the analysis of the data. While MLM is an extension of regression analysis, multiple regression assumes the data are independent. However, MLM assumes data are not independent of one another, thus addressing the inherent nature of clustering in educational data. The researcher used a classic two-level effects model in this study. The student level (Level 1) explained the variability in students' post-secondary outcomes relative to their peers. In contrast, the high school level (Level 2) corresponded to the variation in post-secondary outcomes between the high schools in the study. The null and full models for each post-secondary variable were conducted in SAS. The researcher calculated the intraclass correlation coefficient (ICC) for the dependent variables. Finally, the standardized effect sizes were calculated for the dependent variables.

Summary

This chapter has presented a detailed description of the research design, sample, procedures, and instrumentation; the research questions guiding this study; and the data analysis procedures. In preparation for data analysis, the researcher assessed, screened, and prepared the raw P³ dataset encompassing FTIC students from all LEAs in Ohio matriculating in one of the three partner P³ IHEs. To analyze the data and perform MLM, the researcher used SAS analytic software. Chapter 4 will present the data analysis and results for the research questions guiding this study.

CHAPTER 4: RESULTS

This study investigated high school graduates' post-secondary outcomes for two groups—the intervention and comparison group. The researcher sought to explore if there were statistically significant differences in the post-secondary outcomes for first-year college grade point average (GPA), the proportion of credits lost in early-level courses, the cumulative number of credit-bearing hours earned by the end of the academic year, and the persistence and retention of full-time, first-time-in-college (FTIC) students graduating from local education agencies (LEAs) participating in the P³ Project when compared with full-time, FTIC students graduating from all other LEAs in Ohio, after controlling for sex, ethnicity, high school GPA, and school typology. Specifically, the researcher evaluated the intervention of the PK-16 Pathways of Promise (P³) Project through quantitative analysis and multilevel modeling (MLM). This chapter summarizes the descriptive data and MLM results of the post-secondary outcomes for the intervention and comparison groups.

The P³ Project was an extension of a small-scale pilot effort conducted by researchers at IHE1 during 2016 to partner with local LEAs. The pilot project provided LEA leaders with data on their graduates' academic performance at an institution of higher education (IHE). The P³ Project expanded the pilot project to additional LEAs and IHEs. As part of the P³ Project, IHE1, HE2, and IHE3 identified FTIC students at their respective institutions from fall of 2010 to 2018 who graduated from one of the partner LEAs in the P³ Project.

The IHEs compiled data on these students' academic preparedness upon graduating from secondary school, academic outcomes after their first year in college, grades earned in one of six specific groups of courses typically taken during a student's first year, cumulative college outcomes, and graduation status. After researchers from the three IHEs compiled the academic performance data for secondary graduates from partner LEAs, a final dataset was compiled by

the researchers with the data for the academic performance at their institution for secondary graduates from all LEAs in Ohio from 2010 to 2018. The present quasi-experimental research study began with the final compiled dataset for the academic performance of all secondary graduates from LEAs in Ohio matriculating into one of the three P³ IHEs.

Demographic Summary of Participants

In this quasi-experimental study, the researcher investigated post-secondary outcomes of the intervention and comparison groups. The intervention group (n = 1,574) comprised secondary graduates from participating or partner LEAs (n = 20) and matriculating in one of the three IHEs in the study as full-time, FTIC students. The comparison group (n = 42,843) comprised secondary graduates from all other LEAs in Ohio (n = 651) and also attending one of the three IHEs in the study as full-time, FTIC students. Of the study participants, only 4% received the intervention of the P³ Project, while 96% of the participants did not receive the intervention. There were more females than males in the study, with 56% females and 44% males. Further, 76% of participants were Caucasian, 11% were African American, and 5% were Hispanic. Fifty per cent of participants were enrolled in IHE1, 38% were enrolled in IHE2, and 12% were enrolled in IHE3.

In Ohio, the Ohio Department of Education (ODE) classifies LEAs according to students' similar demographic characteristics. The district typologies encompass the school poverty level, students' socioeconomic status, location composite, race and ethnicity, and tax capacity. Students' post-secondary outcomes are likely to be influenced by their graduating district typology (Anyon, 2014; Duncheon, 2018). Most participants in the current study were from Typology 5—suburban, with low student poverty, and an average student population size. Table 6 provides the number of participants in the study from each district typology for the comparison and intervention groups.

Table 6

Number of Participants from Each District Typology

Typology	Comparison *n*	Intervention *n*
1	2,365	0
2	3,102	0
3	6,012	116
4	5,314	81
5	11,369	817
6	5,980	277
7	4,649	186
8	4,052	97

Research Questions

The research questions addressed by this study were as follows:

1. Is there a statistically significant difference in first-year college GPA for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?
2. Is there a statistically significant difference in the proportion of credits lost in early-level courses for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?
3. Is there a statistically significant difference in accumulated credit-bearing hours earned for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?
4. Is there a statistically significant difference in persistence for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?

5. Is there a statistically significant difference in retention for full-time, FTIC students who graduated from participating LEAs in the P³ Project when compared with full-time, FTIC students who graduated from all other LEAs in Ohio?

Overall, there were statistically significant differences between the intervention and comparison groups when assessing the post-secondary outcome variables of the cumulative number of credit-bearing hours earned by the end of the academic year, persistence, and retention, after controlling for sex, ethnicity, high school GPA, and school typology. Students in the comparison group were significantly more likely to accumulate more credit-bearing hours by the end of their first academic year than were students in the intervention group. However, students in the intervention group were significantly more likely to persist from first-semester enrollment to second-semester enrollment and significantly more likely to return to second-year enrollment by their chosen IHE than were students in the comparison group. The findings section describes the MLM results for each post-secondary outcome in more detail. However, before conducting the MLM, the researcher derived the mean and standard deviation for each dependent variable. Table 7 displays the descriptive statistics for the post-secondary outcomes for the comparison and intervention groups.

Table 7

Post-secondary Outcomes Descriptive Statistics for the Comparison (n = 42,843) and the Intervention Groups (n = 1,574)

Variable	Group	*M*	*SD*
First-year GPA	Comparison	2.62	1.10
	Intervention	2.68	1.21
Proportion of credits	Comparison	0.62	0.40
	Intervention	0.56	0.42
Cumulative credits	Comparison	22.50	10.34
	Intervention	16.52	7.76
Persistence	Comparison	0.88	0.33
	Intervention	0.84	0.35
Retention	Comparison	0.68	0.46
	Intervention	0.70	0.45

While MLM is an extension of regression analysis, a multiple regression assumes the data are independent. However, MLM assumes data are not independent from one another, thus addressing the inherent nature of clustering in educational data. Clustered data occurs when subjects are nested in ways that increase the probability of similar experiences (e.g., students nested within high schools or doctors nested within hospitals). Given that clustered data violate the assumption of independence, this leads to biased standard errors.

In the present research study, the objective was to assess the intervention of the P³ Project on FTIC students' post-secondary outcomes by using the high schools as the nesting effect in the model. The rationale for using the high schools as the nesting unit in the study stemmed from the fact that students attending the same secondary school were systematically more likely to have similar experiences. Students within each school shared several attributes not shared by other schools, such as teachers, classroom atmosphere, and leadership practices. Given that the students were nested within the high schools, this study used a classic two-level effects model.

The student level (Level 1) explained the variability in students' post-secondary outcomes relative to their peers. In contrast, the high school level (Level 2) corresponded to the variation in post-secondary outcomes between the high schools in the study. Figure 11 illustrates the two-level effects model used in this study.

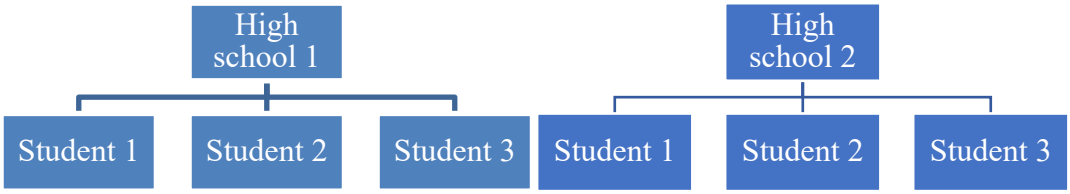


Figure 11. Two-level effects model with students nested in high schools.

Given that the researcher used a classic two-level effects model in this study, the first step of MLM is to generate the unconditional means or null model. The null model was used as the study's baseline model without any student-level predictor variables or control variables. Thus, the null model had significantly more error, as reflected in the model's likelihood statistics, when compared with the researcher's full model, which included the control variables of sex, ethnicity, high school GPA, and typology. In Figure 12, the null model is represented by arrow 1, signifying the model with only the nesting variable and dependent variable. In contrast, the full model used in the study included the student-level control variables, as illustrated by arrow 2.

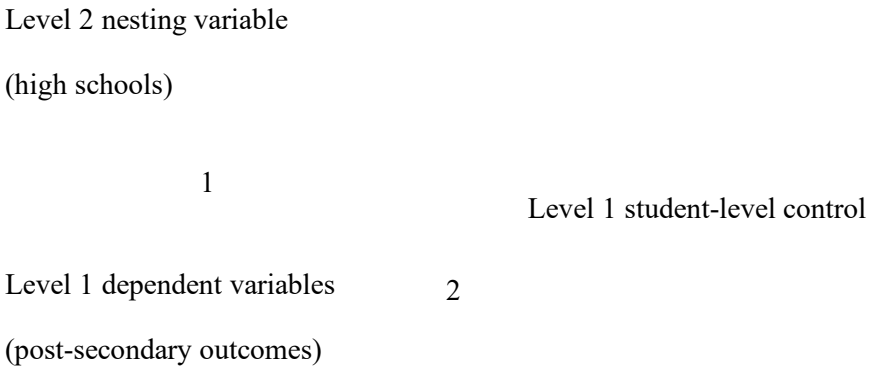


Figure 12. Depiction of the null and the full models used in the study.

Another primary purpose of the null model is to estimate the proportion of total variation in a continuous dependent variable attributable to differences between the high schools in the study by calculating the intraclass correlation coefficient (ICC). Table 8 highlights the improvement in the model fit statistics from the null model to the full model for first-year GPA, the proportion of credits earned in early-level courses, and the cumulative number of credit hours earned at the end of the academic year, as well as the ICC for the null models for those dependent variables. The ICC for persistence and retention rates was not calculated because of the binary nature of the variables. Table 9 shows the model fit statistics for persistence and retention rates for the null and full model using the -2Log Likelihood (-2LL), where the smaller the -2LL, the better the model fit.

Table 8

Comparison of the Model Fit Statistics for the Null and the Full Models for First-year GPA, the Proportion of Credits Lost, and the Cumulative Number of Credit-bearing hours Earned

Variable	Model	AIC*	BIC*	ICC%
First-year GPA	Null	131,584	131,594	11.5
	Full	124,199	124,209	
Proportion of credits	Null	42,011	42,021	8
	Full	38,258	38,268	
Cumulative credits	Null	325,567	325,577	25.5
	Full	315,142	315,152	

Note: * smaller is better.

Table 9

Comparison of the Model Fit Statistics for the Null and the Full Models for Persistence and Retention Rates

Variable	Model	-2LL*
Persistence	Null	42,324
	Full	33,414
Retention	Null	58,422
	Full	53,174

Note: * smaller is better.

Findings

The findings section features the MLM results for each post-secondary outcome in more detail. It describes the results for the null model, full model, ICC, program coefficient, *f* test, and standardized effect size.

First-Year GPA

The results for the null model for first-year GPA found that 0.115 (an ICC of 11.5%, as shown in Table 3) of the variability in first-year GPA was accounted for by the high schools in the study, leaving 88.5% of the variability in first-year GPA to be accounted for by the individual

students in the study. The intercept or mean for the null model for a first-year GPA was 2.65. Thus, the average first-year GPA for the high schools in the study was 2.65.

In the full model, the control variables of sex, ethnicity, high school GPA, and school typology accounted for 69% of the difference in the mean high school first-year GPA for each high school. However, even after controlling for the effects of the student-level predictors in the study, the ICC for the full model was 0.04. This indicated that 4% of the variation in the mean for the first-year GPA remained to be accounted for by the high schools in the study, even after controlling for the effects of sex, ethnicity, high school GPA, and school typology. Thus, 4% of the variation in the mean first-year GPA was attributed to unique factors or circumstances tied to individual high schools, such as a specific school in Northwest Ohio or Southeast Ohio that was not represented by the student-level predictors described above.

Moreover, the program effect of the P³ Project for first-year GPA was 0.006. This meant that students in the intervention group achieved a first-year GPA of 0.006 units more than students in the comparison group by the end of their first academic year. Although the program coefficient of the P³ Project was positive, first-year GPA was not significantly related to the intervention of the P³ Project: F (1,44321) = 0.08, p = 0.77, 95% CI [0.05, 0.86], f^2 = 0.01, which is a small effect (J. Cohen, 1988).

The first-year GPA analysis revealed that the intervention group students achieved a higher GPA than the students in the comparison group; however, the difference between the two groups was small, with an effect size of 0.01, and not statistically significant. More specifically, even after controlling for sex, ethnicity, high school GPA, and school typology, the difference between the first-year GPA for students in the intervention group was not significantly different from the first-year GPA for students in the comparison group. Thus, we failed to reject the null hypothesis that there was no difference in the first-year GPA for students who graduated from

participating LEAs compared with students who graduated from non-participating LEAs. Figure 13 illustrates the mean first-year GPA by IHE for each typology for the comparison and intervention groups.

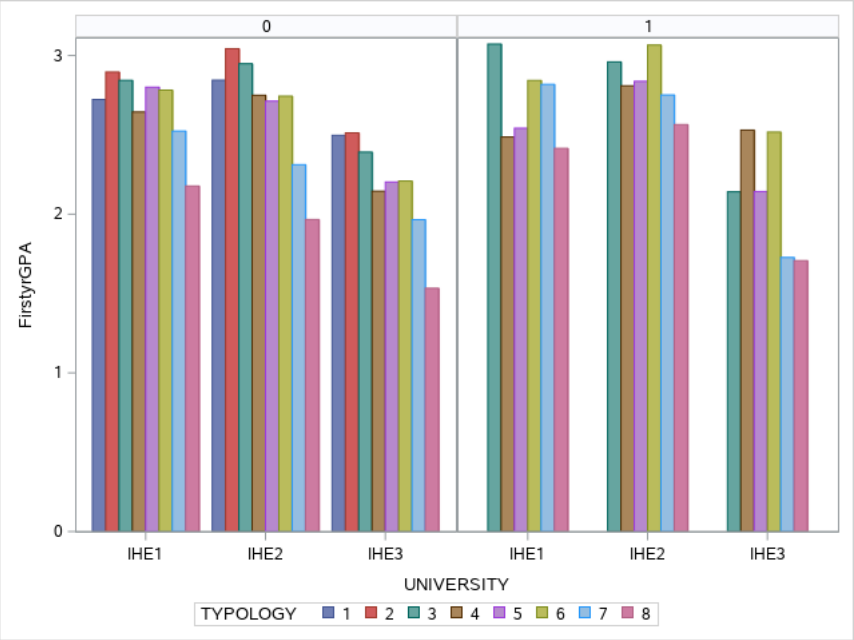


Figure 13. The mean first-year GPA for the comparison (0) and the intervention (1) groups.

The Proportion of Credit-Bearing Hours Lost

The results for the null model for the proportion of credits lost in early-level courses indicated that 0.08 (an ICC of 8%, as shown in Table 3) of the variability in the proportion of credits lost in early-level courses was accounted for by the high schools in the study, leaving 92% of the variability in the proportions of credits earned to be accounted for by the individual students in the study. The average proportion of credits lost for the high schools in the study was 0.62, as indicated by the null model's intercept.

In the full model, the control variables of sex, ethnicity, high school GPA, and school typology accounted for 58% of the difference in the mean proportion of credits lost for each high school. However, even after controlling for the effects of the student-level predictors in the study,

the ICC for the full model was 0.04. This indicated that 4% of the variation in the mean for the proportion of credits lost in early-level courses remained to be accounted for by the high schools in the study, even after controlling for the effects of sex, ethnicity, high school GPA, and school typology. Thus, 4% of the variation in the mean proportion of credits lost in early-level courses was attributed to unique factors or circumstances tied to individual high schools, such as a specific school in Northwest Ohio or Southeast Ohio that was not represented by the student-level predictors described above.

Moreover, the program effect of the P³ Project for the proportion of credits lost in early-level courses was -0.023, which meant that intervention group students earned 0.023 credits less than the students in the comparison group; however, the proportion of credit-bearing hours lost in early-level courses was not significantly related to the intervention of the P³ Project: F (1,44279) = 8.52, p = 0.004, 95% CI [-0.17, 0.11], f^2 = 0.01, which is a small effect (J. Cohen, 1988).

The proportion of credit-bearing hours lost in early-level courses revealed that the intervention group students earned fewer credits in early-level courses; however, the difference between the two groups was small, with an effect size of 0.01, and not statistically significant. More specifically, even after controlling for sex, ethnicity, high school GPA, and school typology, the difference between the proportion of credit-bearing hours lost in early-level courses for students in the intervention group was not significantly different than the proportion of credit-bearing hours lost in level courses for students in the comparison group. Thus, we failed to reject the null hypothesis that there was no difference in the proportion of credit-bearing hours lost in early-level courses for students who graduated from participating LEAs compared with students who graduated from non-participating LEAs. Figure 14 illustrates the mean proportion of credit hours lost in early-level courses by IHE for each typology for the comparison and intervention groups.

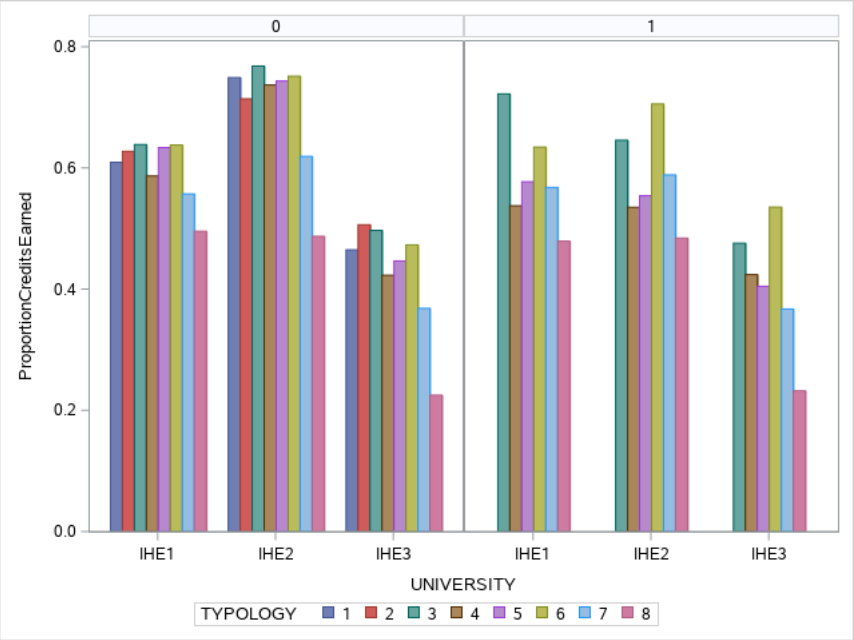


Figure 14. The mean for the proportion of credits lost for the comparison (0) and the intervention (1) groups.

The Cumulative Number of Credit-Bearing Hours Earned

The results for the null model for the cumulative number of credit-bearing hours earned at the end of the academic year indicated that 0.225 (an ICC of 22.5%, as shown in Table 3) of the variability in the cumulative number of credit-bearing hours earned was accounted for by the high schools in the study, leaving 77.5% of the variability in the cumulative number of credit-bearing hours earned to be accounted for by the individual students in the study. The average cumulative number of credit-bearing hours earned for the high schools in the study was 22, as indicated by the null model's intercept.

In the full model, the control variables of sex, ethnicity, high school GPA, and school typology accounted for 79% of the difference in the mean cumulative credit-bearing hours earned. However, even after controlling for the effects of the student-level predictors in the study, the ICC for the full model was 0.08. This indicated that 8% of the variation in the mean

for the cumulative number of credit-bearing hours earned remained to be accounted for by the high schools in the study, even after controlling for the effects of sex, ethnicity, high school GPA, and school typology. Thus, 8% of the variation in the mean cumulative credit-bearing hours earned was attributed to unique factors or circumstances tied to individual high schools, such as a specific school in Northwest Ohio or Southeast Ohio that was not represented by the student-level predictors described above.

Moreover, the program effect of the P³ Project for the cumulative number of credit-bearing hours earned at the end of the academic year was -3.5, which meant that the students in the intervention group accumulated 3.5 credits less than the students in the comparison group at the end of the academic year. The cumulative number of credit-bearing hours earned at the end of the academic year was significantly related to the intervention of the P³ Project: F (1,44080) = 395, p <.0001, 95% CI [-2, 7.64], f^2 = 0.07, which is a small effect (J. Cohen, 1988).

The analysis for the cumulative number of credit-bearing hours earned at the end of the academic year revealed that, even though there were statistically significant differences between the students in the intervention and comparison group, the difference between the two groups was small, with an effect size of 0.07. More specifically, after controlling for sex, ethnicity, high school GPA, and school typology, the difference between the cumulative number of credit-bearing hours earned for students in the intervention group was significantly different than the cumulative number of credits for students in the comparison group. Thus, we rejected the null hypothesis that there was no difference in the cumulative number of credit-bearing hours earned at the end of the academic year for students who graduated from participating LEAs compared with students who graduated from non-participating LEAs. Figure 15 illustrates the mean for the cumulative number of credit-bearing hours earned by the end of the academic year for each typology for the comparison and intervention groups.

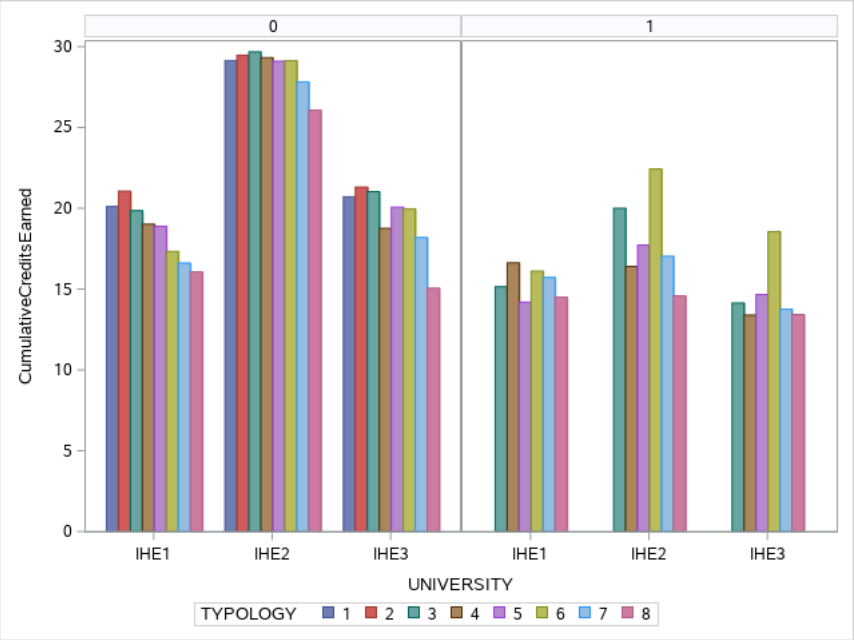


Figure 15. The mean for the cumulative number of credit-bearing hours earned for the comparison (0) and the intervention (1) groups.

Persistence and Retention

The response distribution for persistence and retention was binary. The results modeled the success rate of student persistence and retention. Given that persistence and retention were binary, these post-secondary outcomes were quantified by an odds ratio. The odds ratio was used to express the effect of the P³ program's intervention for the dichotomous variables of persistence and retention. Table 10 provides the frequency totals for persistence and retention.

Table 10

Response Profile for the Post-secondary Outcomes of, Persistence and Retention

Variable	Response	Total frequency
Persistence	Yes	36,076
	No	8,341
Retention	Yes	27,947
	No	16,470

Persistence. Persistence was significantly related to the intervention of the P³ Project: F (1,44321) = 134, p < .0001, 95% CI [0.46, 0.57], $dcox$ = 0.40, which is a medium effect (Cox, 1958). After accounting for all the student-level variables in the study, the P³ Project generated an odds ratio of 0.51 for persistence. This meant that secondary graduates from participating P³ LEAs had 51 times the likelihood of persisting from first-semester enrollment until second-semester enrollment, compared with secondary graduates from all other LEAs in Ohio. There was a statistically significant difference between the intervention and comparison groups; thus, we rejected the null hypotheses for persistence—that there was no difference in persistence for students who graduated from participating LEAs when compared with students who graduated from non-participating LEAs.

Retention. Persistence was significantly related to the intervention of the P³ Project: F (1,44321) = 50, p <.0001, 95% CI [0.60, 0.74], $dcox$ = 0.25, which is a small effect (Cox, 1958). After accounting for all the student-level variables in the study, the P³ Project generated an odds ratio of 0.66 for retention. This meant that secondary graduates from participating P³ LEAs had 66 times the likelihood of returning for a second year compared with secondary graduates from all other LEAs in Ohio. There was a statistically significant difference between the intervention and comparison groups; thus, we rejected the null hypotheses for retention—that there was no difference in the retention for students who graduated from participating LEAs when compared with students who graduated from non-participating LEAs.

Summary of the Results

In summation, there were statistically significant differences between the intervention group and comparison group when investigating the cumulative number of credit-bearing hours earned by the end of the academic year, persistence, and retention, after controlling for sex, ethnicity, high school GPA, and school typology. Although there were statistically significant

differences between the two groups in the study, the differences in post-secondary achievement—represented by the coefficient of the intervention variable and effect sizes—were minimal. The analysis for persistence showed that students in the intervention group were more likely to return to their chosen IHE for a second semester, and the effect size between the two groups was a medium effect. The analysis for retention showed that students in the intervention group were more likely to return to their chosen IHE the following fall, and the effect size between the two groups was a small effect. Table 11 provides a summation of the results for all the dependent variables in the study.

Table 11

Summation of the Results for the Post-Secondary Outcomes in Study

Variable	*F*	*p*	95% CI	Effect size
First-year GPA	0.08	0.77	[0.05, 0.86]	0.01
Proportion of credits	8.52	0.004	[-0.17, 0.11]	0.01
Cumulative credits	395	< 0.0001	[-2, 7.64]	0.07
Persistence	134	< 0.0001	[0.46, 0.57]	0.40
Retention	50	< 0.0001	[0.60, 0.74]	0.25

Note: * $p < 0.0001$.

Summary

This study sought to examine whether participation in the P³ Project enhanced the post-secondary outcomes for full-time, FTIC students. Specifically, through quantitative analysis, the researcher conducted an in-depth analysis of the intervention of the P³ Project on first-year GPA, the proportion of credit-bearing hours lost in early-level courses, the cumulative number of credit-bearing hours earned at the end of the academic year, and persistence and retention. MLM was used as a statistical technique to handle the clustering of data. The nesting subject in the model was the high schools. The ICC was calculated for the unconditional means model to estimate the variance in the outcome variables explained by the differences between the high schools in the study.

Overall, there were statistically significant differences between the intervention group and comparison group when assessing the cumulative number of credit-bearing hours earned by the end of the academic year, persistence, and retention. Thus, the researcher rejected the null hypothesis for these variables. However, the effect sizes for first-year GPA, the proportion of credit-bearing hours lost in early-level courses, and the cumulative number of credit-bearing hours earned at the end of the academic year yielded a small effect size. Full-time, FTIC students in the intervention group had a likelihood ratio of persisting 51 times more than the comparison group and a likelihood ratio of being retained 66 times more than the comparison group.

The P³ Project may not be the sole contributing factor to these results. Chapter 5 provides a discussion of the results as they relate to the research questions guiding this study. It also provides the conclusions derived from the results of the relevant literature. Additionally, recommendations for leadership, limitations, and future research are presented.

CHAPTER 5: DISCUSSION, RECOMMENDATIONS, AND CONCLUSIONS

The PK-16 Pathways of Promise (P^3) Project forged a collaborative partnership between institutions of higher education (IHEs) and school districts or local education agencies (LEAs) in Northwest Ohio. The sample for the study included two groups: an intervention group and a comparison group. Both the intervention and comparison groups encompassed full-time, first-time-in-college (FTIC) students enrolling in one of the three IHEs (IHE1, IHE2, or IHE3) in Northwest Ohio, following graduation from a P^3 participating district. However, as part of the collaborative project, school districts comprising the intervention group were geographically clustered in Northwest Ohio, while the comparison group encompassed school districts from the entire state. This study's findings lead to novel considerations suggesting that geographic location may be a predominant factor in the first-year academic success of full-time, FTIC students.

Overall, there were statistically significant differences between the intervention and comparison groups when assessing the cumulative number of credit-bearing hours earned by the end of the academic year, persistence rates, and retention rates, after controlling for sex, ethnicity, high school grade point average (GPA), and school typology. This chapter further discusses the study results and investigates how the findings integrate with and contribute to the current literature. Additionally, this chapter includes implications for leadership and practice, the limitations of the study, recommendations for future research, and a conclusion.

The overarching objectives of the P^3 Project were grounded in the assumption that collaborative data sharing between leaders from the two sectors of education would enhance the academic achievement of FTIC students. The data collected by IHEs and shared with secondary-level LEAs allowed the school leaders to examine their graduates' performance in college. The project shared data identified as first-year academic outcomes commonly associated with FTIC

students. The LEAs used the performance data to evaluate and continuously improve their secondary graduates' preparation for college.

The post-secondary outcomes examined in this study were first-year-in-college GPA, the proportion of credits lost in early-level courses, the cumulative number of credit-bearing hours earned by the end of the academic year, persistence rates, and retention rates. Specifically, the study examined whether the intervention of the P^3 Project enhanced the academic achievement outcomes of full-time, FTIC students matriculating from secondary to post-secondary education, based on selected variables associated with college readiness, through an extension of regression analysis known as multilevel modeling (MLM).

In quantitative studies, a regression analysis assumes data points are independent of one another, whereas MLM assumes data points are not independent from another. Given that MLM assumes data are not independent from one another, MLM was the appropriate methodological approach to address the inherent nature of the clustering of data in educational settings. In educational settings, students are nested or belong to the same entity (school community) and are thus likely to share similar experiences. In this study, students graduating from the same secondary school were systematically more likely to share attributes such as teachers, classroom atmosphere, and leadership practices and policies within that secondary school. Moreover, MLM allowed the researcher to control for the following student-level confounding variables: sex, ethnicity, high school GPA, and typology. As described, confounding variables provide alternative explanations for the results of the study, threatening the internal validity of the study. To ensure that the desired relationships were measured, the influence of such variables was controlled.

This examination was undergirded by the literature base specific to college readiness, highlighting the misalignment between secondary school and post-secondary institutions. While

there has been some literature on data sharing and PK-16 partnerships, the current literature is limited relative to partnerships between LEAs and IHEs to improving the post-secondary outcomes of full-time, FTIC students. To this end, a lack of research exists on the potential of enhancing the academic outcomes of secondary graduates through collaborative efforts between leaders from secondary and post-secondary education.

Existing research confirms that many high school graduates matriculating into college are underprepared for the rigor of a college education (Conley, 2016). Education practitioners have examined FTIC students' lack of college readiness using several factors. These factors include the number of non-credit-bearing hours students accumulate as a result of remedial courses, poor performance in credit-bearing early-level courses (i.e., credit-bearing courses for which the student receives an unsatisfactory grade, receives an incomplete result, or withdraws), and persistence and retention rates. Remedial courses are offered by IHEs to provide academic assistance to students with deficiencies in reading, writing, and mathematics; however, remedial courses may have unintended consequences for the success of FTIC students (Lane et al., 2020; McCann & English, 2017).

Students required to take remedial courses often take longer to graduate, since these courses are likely to be non-credit-bearing courses, which do not count towards degree requirements. According to Livingston (2007), FTIC students who are not required to enroll in remedial courses are more likely to persist until degree completion than are their counterparts needing remedial education. The formation of PK-16 partnerships provides leaders with an opportunity to improve the college readiness of FTIC students by aligning course content requirements and providing students with the content knowledge required to be successful in college-level coursework, without losing credits as a result of remediation or unsatisfactory grades in credit-bearing early-level coursework.

Discussion

There were 1,574 students from P³ LEAs in the final dataset analyzed for this investigation. The study results revealed two broad areas of significance. First, students in the comparison group were significantly more likely to accumulate more credit-bearing hours by the end of their first academic year than were the intervention group. Second, students in the intervention group were significantly more likely to persist and be retained by their chosen IHE than were students in the comparison group. Although there were two overall areas of significance between the intervention and comparison groups, the differences in post-secondary achievement between the two groups in the study were minimal, as shown by the project effect size for each post-secondary outcome investigated.

In education research studies that compare differences in group outcomes, the program effect size is the "magnitude of the difference between [the two] groups" (Sullivan & Feinn, 2012, p. 279). In the current study, the effect size for the variables of first-year GPA, the proportion of credit-bearing hours lost in early-level courses, and the cumulative number of credit-bearing hours earned were 0.01, 0.01, and 0.07, respectively, between the intervention and comparison groups. According to J. Cohen (1988), an effect size less than 0.02, 0.15, and 0.35 represents a small, medium, and large effect size, respectively. Correspondingly, the effect sizes of the three post-secondary variables examined in the study were small. Bakker et al. (2019) contended statistical differences to be less informative for studies with large datasets, and effect sizes to be more relevant, as effect sizes help the researcher decipher whether the difference between the two groups is substantial. Research on Cohen's effect size or the strength of the group differences in the study is not inconsequential. Glass et al. (as cited in Coe, Waring, Hedges, & Arthur, 2017) contended that:

> the practical importance of an effect depends entirely on its relative costs and benefits. In education, if it could be shown that making a small and inexpensive change would raise academic achievement by an effect size of even as little as 0.1, then this could be a very significant improvement, particularly if the improvement is applied uniformly to all students, and even more so if the effect were cumulative over time. (p. 343)

The effect sizes for the post-secondary outcomes investigated in this study were critical. The researcher sought to examine whether the academic achievement of secondary graduates from P^3 LEAs was enhanced because of the LEAs participating in the project.

To deepen the meaning of the study findings, it is helpful to understand the characteristics and attributes of the participating LEAs. The Ohio Department of Education (ODE) created eight district typologies to categorize similar school districts in the state of Ohio based on their geographic (rural, small town, urban, and suburban) and demographic (poverty level and school population) characteristics. Typology 1, 4, and 7 are identified as having a high student poverty rate. Typology 8 is classified as having a very high student poverty rate, while Typology 2 has an average student poverty rate. Typology 3 and 5 are categorized as having a low student poverty rate, and Typology 6 has a very low student poverty rate. The major groupings and full descriptors of each typology are provided in Table 2 in Chapter 1.

Previous research has shown that students who graduate from high schools with similar demographic characteristics are likely to have comparable pre-college and post-secondary outcomes (Kena et al., 2016; Morgan et al., 2018). As such, the current study controlled for district typology. However, a brief analysis of the post-secondary outcomes assessed in this study relative to the district typologies showed that the first-year college performance of FTIC students varied slightly across the eight typologies, with the exception of district Typology 8. Tables 12,

13, and 14 provide an overview of the mean and standard deviation for the first-year post-secondary outcomes investigated in this study for each district typology.

Table 12 contains the descriptive results for the post-secondary outcome of first year in college GPA, Table 13 outlines the descriptive results for the post-secondary outcome of the proportion of credit-bearing hours lost, and Table 14 encompasses the descriptive results for the post-secondary outcomes of the cumulative number of credit-bearing hours earned by the end of the academic year.

Table 12

Descriptive Statistics for First-year-in-college GPA for Each District Typology

Typology	*M*	*SD*
1	2.72	1.09
2	2.88	1.03
3	2.80	1.05
4	2.61	1.08
5	2.71	1.04
6	2.75	1.00
7	2.36	1.56
8	1.93	1.91

Table 13

Descriptive Statistics for the Proportion of Credits Lost in Early-level Courses for Each District Typology

Typology	*M*	*SD*
1	0.62	0.39
2	0.63	0.40
3	0.65	0.38
4	0.62	0.39
5	0.65	0.38
6	0.66	0.37
7	0.80	0.39
8	0.59	0.40

Table 14

Descriptive Statistics for the Cumulative Number of Credit-bearing Hours Earned by the End of the Academic Year for Each District Typology

Typology	*M*	*SD*
1	22.45	11.69
2	23.73	11.28
3	22.86	10.51
4	22.79	10.44
5	22.51	10.34
6	20.65	9.66
7	22.00	9.31
8	21.68	9.83

Overall, students from district Typology 8 had the lowest first-year GPA and lost a greater proportion of credit-bearing hours (proportion of credits lost in early-level courses because of remediation, an incomplete result, a withdrawal, or an unsatisfactory grade). Generally, scholars agree that interventions and programs implemented to improve secondary graduates' college readiness are most effective for at-risk students or those at a greater risk of failing academically (Hallett, Kezar, Perez, & Kitchen, 2020). The objective of the P³ Project was the continuous

improvement of college-readiness efforts in partner LEAs, but the P³ Project was broad-scoped and did not specifically target at-risk students. Given that the students in the intervention group were not classified as at-risk students, negligible differences were found in the post-secondary academic achievement between the comparison and intervention groups. A college-readiness program specifically tailored to LEA districts according to their needs would have the potential to further enhance the success of FTIC students.

Moreover, despite the variance in the post-secondary outcomes relative to district typology, the comparison and intervention groups had similar post-secondary achievement outcomes by the end of the academic year. However, the preliminary analysis of high school GPAs and American College Testing (ACT) scores revealed that the intervention group achieved higher school GPAs and ACT scores. As such, despite the lack of significance when assessing the post-secondary outcomes of first-year GPA and the proportion of credits lost in early-level courses, the intervention group achieved higher high school GPAs and ACT scores when compared with the comparison group. Table 15 provides the descriptive statistics for the high school GPAs and ACT scores for the comparison and intervention groups.

Table 15

Descriptive Statistics for High School GPA and ACT for the Comparison (n = 42,843) and the Intervention (n = 1,574) Groups

Variable	Group	*M*	*SD*
High school GPA	Comparison	3.23	0.59
	Intervention	3.31	0.60
ACT scores	Comparison	22.08	4.07
	Intervention	22.23	4.42

Secondary graduates are tasked with selecting the IHE they would like to attend. The decision-making process includes choosing an IHE congruent with the student's overall

academic abilities, needs, and aspirations. For example, a student with a learning disability might select an IHE with enhanced academic support and accessibility services. In comparison, a student seeking to major in agronomy might elect to enroll in an IHE located in an agricultural area. As illustrated in the typologies, many students in the study lived in areas of high poverty and the corresponding LEAs. As a result of issues of poverty, these students may be more likely to commute to school, as opposed to incurring the costs associated with being a residential student. This perspective is supported by the research of Weiss (2014), who found that students with financial or emotional familial obligations or who cannot afford the financial burden of living on campus are more inclined to attend an IHE identified as a commuter campus. Further, students may choose a specific IHE to attend based on whether it is a residential campus, commuter campus, or several other institutional characteristics (G. Marsh, 2014). The institutional characteristics include, yet are not limited to, the campus's geographic location; whether the IHE is mainly a residential campus or commuter campus; the majors offered by the IHE; and the services offered to students, such as advising, tutoring, and student organizations. While the comparison and intervention groups had similar academic backgrounds, major differences between the two groups existed relative to their geographic location. Students in the intervention group lived approximately 20 to 25 miles from the IHEs in the study. Conversely, students in the comparison group lived more than 25 miles from the IHEs.

Nationally, the mean distance from a student's home to their IHE is 94 miles (Baldwin, 2015). The P³ Project was built on robust partnerships between IHEs that typically serve Northwest Ohio and the school districts located within a limited geographical area. This means that, on average, students graduating from partner LEAs and attending one of the IHEs in the study resided within a 25-mile radius of the college. In contrast, students in the comparison group resided in different regional areas within Ohio, yet attended one of the IHEs in the study.

Based on their home districts' geographical locations, students in the comparison group were assumed to be more likely to attend one of the IHEs as a residential student.

While universities have different policies regarding living on campus, most IHEs require full-time, FTIC students to live in the residence halls on campus, unless their homes are within a predetermined radius, usually 25 miles—in which case, students can choose to live off campus (Ward, 2020; Weiss, 2014). Several studies have found that FTIC students who live close to their families while attending college are more likely to live at home, feel less homesick, receive additional emotional and financial support from their family, and be able to transition more smoothly from secondary to post-secondary education (Baldwin, 2015; Chickering, 1974; Farris, 2010). With research spanning over 40 years, research conducted by Baldwin (2015) corresponded to a critical finding in the current study—the intervention group students who resided closer to the IHEs had a greater propensity to live at home. This led to the exploration of possible relationships between student success and distance between home and school. While the researcher expected the post-secondary outcomes for the intervention group to be related to academic enhancements because of the P³ Project, the scholar's role is to follow where the data lead. This study's findings led to novel considerations suggesting that geographic location may be a predominant factor in the first-year academic success of full-time, FTIC students. A discussion surrounding proximity from home and IHE distance and the retention of first-year students should continue. The following section provides a discussion of the significant post-secondary outcomes examined in this study.

The Cumulative Number of Credit-Bearing Hours Earned

As presented, the comparison group accumulated 3.5 credit-bearing hours more than the intervention group by the end of the academic year. This is noteworthy, as three credit hours at IHEs are typically equal to one credit-bearing course. Generally, full-time, FTIC students are

encouraged to enroll in 15 credit hours per semester. By enrolling in 15 credit hours per semester, students would be on track to accumulate 30 credit hours by the end of the academic year. Ideally, by accumulating 30 credit hours at the end of the academic year, undergraduate students would earn a bachelor's degree in four years. With this matriculation plan, students in the comparison group were working towards fulfilling their degree requirements faster than the intervention group. While there were significant differences between the intervention and comparison groups for the number of credit-bearing hours accumulated by the end of their first year, the effect size for this post-secondary outcome was small, signifying a negligible effect of the program on the accumulated number of credit-bearing hours earned by the participants in the study.

Initially, the results were perplexing, as the comparison group accumulated more credit-bearing hours than did the intervention group. However, the intervention group was more likely to return for a second semester and return to their chosen IHE for a second academic year. A deeper reflection of the results revealed that geographical location, course rigor, and a sense of belonging might offer possible explanations for the group differences.

Geographical location. The difference in the cumulative number of credit-bearing hours earned between the two groups in the study may be attributed to factors unrelated to students' degree of academic preparedness. Given that the intervention group comprised students from Northwest Ohio enrolling in IHEs in Northwest Ohio, one may presume that students in the intervention group were less likely to relocate to another part of the state to attend college. Moving away from home to attend university has been recognized as an essential component of the college experience (Holdsworth, 2006); however, other literature shows that students who decide to attend an IHE close to their permanent residence may experience demands for their time, such as employment, financial obligations, or other familial responsibilities (Nelson, Misra,

Sype, & Mackie, 2016). FTIC students with such personal and financial obligations may be tasked with finding a balance between attending to non-academic obligations and their college careers. When students cannot balance their time accordingly, academic success may be compromised by these extraneous factors. Thus, students may be more susceptible to receiving an unsatisfactory grade in a class, an incomplete result, or withdrawal, and thereby not earning the credits for those courses.

Additional time demands on FTIC students may present challenges hindering the likelihood of success. Obligations beyond the campus environment may reduce students' knowledge of or opportunities to use the undergraduate academic and social support services offered by IHEs. Universities across the United States (US) offer academic support services to undergraduate students, which are often underused, especially by students with multiple constraints on their time, such as part-time employment or familial obligations, such as taking care of a younger sibling (Farris, 2010). Researchers have asserted that academic support services—particularly study skills enhancement, tutoring, counseling, and advising services—are a critical component in undergraduate college success, persistence, and retention (Zhang, Gossett, Simpson, & Davis, 2017). Residential students are more likely to use the services and facilities offered to them by an IHE (Farris, 2010). In many circumstances, services such as a writing center or tutoring activities and workshops are designed to fit residential students' schedules. While commuter students often travel to campus to attend classes and leave, residential students have numerous academic enhancement opportunities throughout the semester. Additionally, residential students have added benefits to living on campus, such as being part of a learning community in the residence hall (Enochs & Roland, 2006). The learning communities offer residential students the opportunity to engage in specialized academic programs, such as exam review sessions and tutoring hours in the residence halls.

The academic programs and activities offered to residential students may provide them with added support for academic achievement of which commuters may be unaware or with which they may be unable to engage. The consensus between researchers remains that all full-time, FTIC students face challenges with adjusting to collegiate coursework. The comparison group in the study may have enjoyed more opportunities to seek extra help from the tutoring center, writing center, or other services. In contrast, the intervention group may not have used the academic services, programs, and facilities, as their time may have been divided among other personal obligations, affording less time on campus. Alongside these reasons, the three-credit difference between the comparison and intervention group may be attributed to students' declared majors.

Coursework rigor. Generally, students are required to declare their major upon enrolling in an IHE; however, some students are unable to declare a major and remain "undecided" or have not yet determined the major they would like to pursue. Some students may have a desire to pursue a particular major, yet do not meet specific requirements, such as GPA or mathematics placement results; thus, they become part of the undecided student population (Bogenschutz, 1994). Moreover, the difference in the number of credit-bearing hours accumulated by the end of the academic year between the two groups in the study may be attributed to the type of courses taken during the first year. For instance, whether a student takes general coursework or courses as part of a major may affect their success in earning the course credits. For example, a student enrolling in an IHE as an undecided student may have a schedule of general requirement courses. In contrast, a student declaring a STEM major may have a schedule with higher-level, more challenging mathematics or science classes. Although all students are required to complete hours towards general education courses, students with a predetermined major may be advised to take

more rigorous courses in their first semester to stay on track and potentially graduate in four years (Wright, 2018).

FTIC students are prone to making misinformed decisions relative to their college careers (Dennis, 2007). Thus, students exploring different majors may be advised against taking courses from specific majors, as those courses may not count towards the major they decide to pursue. As a result, students may be advised to remain full-time by enrolling in 12 credit hours, instead of 15 credit hours, until they decide on a specific major. With respect to the three-credit hour difference between the groups, the relationship between declaring a major and persistence until degree attainment has been debated. For instance, the results of a study by Spight (2020) indicated no significant differences in persistence between students who enrolled as declared or undeclared. The findings of the current study may challenge Spight's (2020) assertion, given that students in the intervention group were more likely to persist for a second semester and a second year.

The findings of the current study led to investigating the possible difference between declared and undecided full-time, FTIC students. Undergraduate students are assigned a college advisor specific to the student's major. Seidman (2005) asserted that, when undergraduate students receive the appropriate level of advising, they are able to make well-informed academic decisions about their college careers. The differences in advising practices may affect the success of full-time, FTIC students. Moreover, Dennis (2007) contended that "the [transition] from high school to college is a time for considerable unease and instability for most students. This is especially true for undecided students" (p. 51). While data relative to declared and undeclared majors between the two study groups were not collected, the intervention group was more likely to persist. This persistence characteristic may be attributed to the group's ability to declare a specific college major upon enrolling in their IHE.

According to Cooney (2000), who studied undecided students and persistence, undecided students tend to feel less connected to their courses and future life aspirations, making it challenging for them to remain dedicated to persisting at their current university. The findings of other research studies concur with Cooney's (2000) findings. Researchers St. John, Hu, Simmons, Carter, and Weber (2004) found undecided students to be susceptible to attrition. The findings of the current study support other research indicating a relationship between persistence and major declaration. Students in the comparison group were navigating many aspects of the adjustment process, such as being away from family and friends, feeling homesick, adjusting to their new campus, and deciding on a major. All these factors could have perpetuated the attrition rate for the participants in the comparison group, and raise further questions for future research.

Sense of belonging and persistence and retention. Persistence and retention remain interchangeable terms, as the two concepts are inextricably tied to student success. In the current study, persistence was defined as students returning to their chosen IHE for a second semester. In contrast, retention was defined as students returning to their chosen IHE for a second academic year. The study found that students in the intervention group had 51 times the likelihood of persisting and 66 times the likelihood of being retained compared with their counterparts in the comparison group. Villar-Aguilés et al. (2017) referenced the insignificant increase in the overall persistence and retention rates of FTIC students at IHEs as evidence of high school graduates' overall lack of college readiness. However, other scholars have found persistence and retention rates to be associated with other non-academic factors of college readiness, such as feeling a sense of belonging to the campus community, adapting to living away from home, and social integration factors (Tierney & Duncheon, 2015; Tinto, 1975).

As noted, the intervention group participants were more likely to reside geographically closer to the IHEs than were the comparison group. To this end, the comparison group

participants were more likely to relocate to Northwest Ohio to attend one of the IHEs in the study. Strayhorn (2012) suggested that feeling a sense of belonging to the campus community is of greater importance to students who relocate to an unfamiliar environment than to those who live closer to their families. Students who move away from home to attend college leave behind family members, friends, and other support systems. These students may feel homesick and lonely as a result of moving away from home. While some students are able to foster new relationships with their peers on campus and in the community, other students struggle with socially integrating within their new campus environment. Although the dataset analyzed for this study did not provide direct answers regarding why the comparison group was less likely to persist and be retained by their institution, as compared with their counterparts in the intervention group, numerous researchers have found distance to be a significant factor in student persistence and retention.

Studies ranging from the 1940s until well beyond the 2000s have found that the closer a student lives to their IHE, the more likely the student will be retained by the institution (Aiken, 1964; Arreguin, 2008; McNeely, 1940; Swafford, 2017). FTIC students may involuntarily decide not to return for a second year because they are unable to adjust to the campus, feel as though they do not belong, feel homesick, and are unable to cope without their family and friends. This study's results point to the significance of distance as a powerful determinant of FTIC students' decision to persist.

Proximity of Home to Chosen Institution of Higher Education

The success of secondary graduates at the post-secondary level was one of the primary objectives of the P³ Project. The project was an innovative initiative to transmit data from IHEs to LEAs to tackle the academic challenges faced by FTIC students through a systematic process of data sharing. While the data provided to district leaders are promising, the data do not provide

school districts with a complete assessment of their graduates' performance. However, the results of this study point to a critical component in the academic achievement of FTIC students: the distance from their home to their IHE.

Students' success in college relies partly on their academic integration and other non-academic factors. The non-academic factors include a successful transition from secondary to post-secondary education, navigating their campus community, and feeling a sense of belonging to their campus environment. Over the years, it has become increasingly evident that the construct of college readiness must evolve to include the non-academic factors of college readiness. While this study specifically evaluated the academic factors of college readiness (first-year GPA, proportion of credit-bearing hours lost in early-level courses, cumulative number of credit-bearing hours earned, and persistence and retention), the results showcased critical and less investigated variables associated with the academic success of FTIC students. As shown in table 15 on page 87, the students in the comparison and intervention groups had similar high school GPAs and ACT scores. Scholars concur that students with similar academic backgrounds gravitate towards similar IHEs (Franklin, 2013). However, the proximity between the students' home residence and the IHEs in the study was a distinguishing factor between the two groups. The students in the intervention group who graduated from partner P³ LEAs in Northwest Ohio attended IHEs that, on average, were within a 25-mile radius from their home. Conversely, students in the comparison group attended the IHEs located in Northwest Ohio, yet graduated from LEAs located anywhere in the 220-mile radius across Ohio.

Over the years, researchers have found distance to be a significant factor in student persistence and attrition. This study's results not only concur with the literature on distance and student persistence and retention, but also underscore the need for critical research on the influence of geographical location for FTIC students. While many FTIC students seek

universities away from home, studies have found that the greater the distance students live from home, the less likely they are to persist and be retained by their IHE. Although much of the literature has suggested that the low persistence rates are attributable to a lack of college readiness, other scholars, such as Baldwin (2015) and Weiss (2014), have contended that attrition rates are perpetuated by distance and FTIC students feeling homesick.

The P³ Project was built on developing strong partnerships with LEAs to inform the creation of interventions to improve post-secondary student outcomes. For many educational endeavors, the default is to focus solely on academic interventions. However, this investigation found the vital difference between the two study groups to be related to geographical location. Connecting distance with the post-secondary outcomes assessed in this study offers encouraging insight into expanding the variables that may influence full-time, FTIC students' persistence and retention.

Recommendations for Leadership, Implementation, and Practice

This study's findings provided IHE leaders directly involved in the P³ Project with an evaluation of their efforts to collaborate with local LEAs to identify common indicators of college readiness. The data collected and used to drive targeted professional development with partner LEAs included first-year college GPA, number of credits attempted, number of credits earned, grades earned in first-year early-level courses, and graduation status. To work toward organizational change, IHE leaders fostered a sense of urgency for change through reflective dialogue with leaders from local LEAs (Burke, 2014; Earl & Katz, 2006; Kotter, 1996). IHE leaders highlighted the academic deficiencies faced by FTIC and the financial implications associated with these deficiencies to formulate the project's vision. The project centered around starting a dialogue and forging a collaborative effort in promoting student success in college.

Improving the post-secondary outcomes of FTIC students can occur by fostering collaboration by creating a shared vision between institutions and challenging current thought processes. Leadership involves pursuing opportunities to make a difference and change the status quo by actively involving others (Kouzes & Posner, 2003). The P³ Project was an innovative approach to help students be college-ready by challenging the one-sided approach of collecting pre-college data in the form of standardized tests (Preliminary Scholastic Aptitude Test [PSAT], Scholastic Aptitude Test [SAT], or ACT scores). The data provided to LEAs as part of the project represented the first time any of these LEAs had received data related to their graduates' post-secondary performance. While a major component of the P³ Project was sharing post-secondary data with LEA leaders, the present study revealed that enhancing the academic achievement of FTIC students requires leaders to formulate robust partnerships that address the academic and non-academic factors of college readiness. The findings of the present study align with Conley's (2012) college-readiness framework, which includes four critical components, as identified below:

1. key cognitive strategies, or the ability to analyze, evaluate, and develop the problem-solving strategies necessary for college-level work
2. key content knowledge, or the foundational content from core courses in high school, such as English and mathematics
3. key learning skills, or academic behaviors, such as goal setting, self-awareness, and motivation
4. key transition knowledge and skills, or the knowledge required to navigate college successfully.

The current study suggested that Conley's framework could be expanded to include more specific goals targeting the components in Items 3 and 4 based on the geographic distance

between LEAs and IHEs. More detailed pre-college attention on goal setting, self-awareness, motivation, and knowledge to navigate college when living away from home may be informative for FTIC students. Educators have emphasized the importance of conventional predictors of college readiness, as defined by letter grades and test scores, to succeed in college. However, the results of the study uncover the prominence of the non-academic factors of college readiness.

The PK-16 Pathways of Promise proposed to develop and field-test a scalable model for identifying key performance indicators of college readiness in university data systems, transmitting these data to PK-12 LEAs, and establishing a collaborative partnership between IHEs and LEAs for the continuous improvement of college readiness efforts. While the initial focus was related to academics, the findings of this study suggest that additional attention is required to other variables, such as the geographical location of IHEs, when trying to enhance the post-secondary academic achievement of full-time, FTIC students. This study's findings demonstrate the need for effective leadership strategies to continue making positive strides toward college readiness and student success. These strategies may include:

1. providing secondary students with college-readiness seminars and workshops as soon as they begin ninth grade, targeting the non-conventional factors of college readiness, such as navigating the campus community, fostering relationships and social interactions, and developing coping mechanisms to help with feelings of loneliness and homesickness
2. increasing secondary students' awareness of all the facilities and services available to them by their chosen IHE, such as the tutoring center, writing center, career center, counseling center, accessibility and services center, advising service, and student organizations

3. ensuring students can identify the advantages in the practical usage of all the facilities and services available to them by their chosen IHE, such as the tutoring center, writing center, career center, counseling center, accessibility and services center, advising service, and student organizations
4. ensuring students receive adequate advising in high school and their chosen IHE relative to college and major exploration leading to the selection of a major earlier in their matriculation
5. promoting collaborative advising practices between LEAs and IHEs prior to FTIC matriculation
6. identifying full-time, FTIC students struggling to sustain their grades in early-level courses and implementing early interventions, such as guiding them to the tutoring center, writing center, or counseling center
7. requiring full-time, FTIC students to schedule mandatory advising sessions throughout the semester for students to seek help, ask questions, and have a dedicated mentor to help them navigate and troubleshoot their challenges with adjusting and transitioning to their campus
8. establishing support groups and programs specifically for full-time, FTIC students that foster a sense of belonging by connecting students to others from their area, other full-time, FTIC students, and upper-class students from their major
9. assessing students' circumstances, such as their role in the family support system, employment status, and overall college–life balance, and providing them with the necessary advising, opportunities, and assistance to better balance their college–life situation

10. informing students of the advantages and disadvantages of moving away from home for college and using an assessment to evaluate a student's emotional readiness and skill relative to living away from home and ability to develop and foster new relationships
11. providing transportation assistance for students to visit home throughout the semester to spend time with family and friends
12. recognizing the different services and assistance residential and commuter students require to persist until degree completion
13. designing academic enhancement programs that align with commuter students' schedules, such as extending the working hours of the writing center, tutoring center, and counselling center, as well as having programs and activities on weekends
14. focusing on decision-driven data collection (D3C) instead of data-driven decision making (D3M) by accentuating the need for leaders to gain the training required to use the appropriate data to address the appropriate questions
15. promoting training and professional development for leaders to use the appropriate data, as opposed to limiting the data gathered.

All the above-mentioned areas demand minor and major transformations involving leaders, faculty, and staff from secondary and post-secondary education sectors. Introducing change to institutional systems brings unique opportunities and challenges.

The literature on leadership and change specifies that certain qualities of transformational leaders are required to enact change (Burke, 2014). The ability to cultivate an environment conducive to robust dialogue and support goal achievement is essential in progressing college-readiness efforts. Transformational leaders are described as visionary individuals with the ability to encourage and motivate people involved in the process, even in times of uncertainty (Hersey,

Blanchard, & Johnson, 2001). Part of the transformational change in the Pathways of Promise (P3) Project included forming a team to develop and execute the vision of the project. The project's vision hinged on the notion that more effective communication and collaboration between LEAs and IHEs would enhance FTIC students' academic achievement. Leaders are motivated by the possibility of what their organization can attain, changing the status quo, and producing something that no one besides them would be able to create by inspiring a shared vision (Kouzes & Posner, 2003).

What might have started as IHE leaders' vision transformed into a collective vision viewed by IHE and LEA leaders as "our" vision. While the vision of the P³ Project was to share data with LEAs and foster a dialogue centered around college readiness, to further enhance the college readiness of participating LEAs, IHE leaders must continue to provide valuable resources for LEA leaders. In turn, LEA leaders must continue to support their staff and teachers by keeping them informed and connected (Hersey et al., 2001; Kouzes & Posner, 2003).

The data alone do not answer all the questions or provide all the information needed by leaders to address the challenges associated with college readiness. Further, as noted in retrospect, data on whether students in the study resided on campus or commuted to campus, and the distance between their home and the IHE they attended, would have enhanced the result to provide a more specific and targeted college-readiness program. Efforts to improve instruction at the secondary level will require LEA curriculum directors to work with IHE faculty to align curricula and introduce a college-preparatory program. College-preparatory programs focusing on the academic and non-academic components of college readiness are critical to the continuous effort to improve the college readiness of FTIC students.

Moreover, the findings of this study suggest that PK-16 partnerships have the potential to improve the performance of FTIC students; however, leaders from the two sectors of education

must have a deeper understanding of the holistic college experience. Academic preparedness for college is only one component of college readiness. FTIC students should be informed of the inherent differences between college campuses.

Merely having access to data is not congruent with knowing how to interpret or use the data (Levin & Wadmany, 2008). Leaders must be cognizant of the amount of guidance group members require to complete a task. House and Mitchell's (1974) path-goal theory of leadership proposes the importance of diagnosing the situation before implementing a leadership intervention. In this case, the results of this study point to the importance of considering the non-academic factors of college readiness. As leaders from the two sectors of education continue collaborating and implementing a college-readiness project, the project should include all the components associated with college readiness, instead of merely focusing on the academic data components. LEA partners must be made aware of the concept of sense of belonging, social integration, and the non-cognitive factors of college readiness that aid with the successful transition of FTIC students.

This study's overall results did not specifically indicate significant enhancements in the post-secondary academic outcomes of students graduating from partner LEAs. The study did provide data suggesting the expansion of LEAs' typical view about which data are useful to promote student success. The continuation of PK-16 partnerships and collaborative initiatives is essential to enhance the post-secondary outcomes of FTIC students and improve secondary graduates' overall college readiness. Leadership is stepping into the unknown and challenging the process by taking innovative risks, experimenting, and failing (Kouzes & Posner, 2003). While LEA partners must feel confident to plan and implement programming based on the academic data specific for their secondary school to enhance their graduates' post-secondary outcomes, educators must address the non-academic components of college readiness. Members

from both sectors of education, secondary and post-secondary, must be able and willing to modify and improve instructional strategies to include the non-academic components of college readiness to ensure the successful transition, persistence, and retention of FTIC students.

Recommendations for IHE and LEA Leaders

The goals of the P³ Project were grounded in the assumption that effective communication and collaboration between LEAs and IHEs will enhance the post-secondary academic achievement of FTIC students. While IHE leaders are tasked with providing students with quality education at an affordable price, LEA leaders are expected to demonstrate that their graduates meet college-readiness benchmarks. Student success at the post-secondary level is determined not only by proficiency in key content areas, but also by non-cognitive behaviors and skills. Although the P³ Project provided LEAs with data on their graduates to help leaders evaluate their effectiveness in graduating college-ready students, as shown by the current study, enhancing FTIC students' success goes beyond initiatives to share data. A true PK-16 partnership encompasses a collaboration of constituents throughout all levels of the organization. The collaboration of the two sectors of education entails sharing resources and information to address a problem too complex to be resolved by individual entities, such as the complexity of the problem of college readiness.

IHE leaders must look beyond the academic data to enhance the post-secondary achievement of secondary graduates. The academic data provided to LEAs do not answer why students perform differently or why students do not persist and decide to leave. The instructors for the early-level courses at IHEs may identify trends that may be used to enhance FTIC students' performance. This quantitative and qualitative data would also be beneficial for LEA teachers to leverage to inform specific classroom instruction and curriculum revisions. The possibilities for long-term outcomes from the P³ data require time and commitment from

participating districts, IHE faculty with expertise in assessment and evaluation, and IHE faculty for specific content areas, including early-level courses. Secondary and post-secondary educators have the opportunity to learn pedagogical strategies from each other. Moreover, establishing a coordinated PK-16 partnership to examine the depth and breadth of content provided to secondary graduates and improve these graduates' college readiness requires the development of a network of knowledge and support from all levels of the two sectors of education.

Leaders from the two sectors of education must be aware of each other's abilities and constraints to accomplish common goals and objectives centered on student success. The P^3 Project created a sense of new possibilities to use data to enhance partner graduates' post-secondary outcomes; however, creating a school-to-college pipeline requires adequate resources and commitment from partners to continuously evaluate college-readiness efforts.

Over the years, education entities have focused their attention on data-driven decision making or D3M (Cho & Wayman, 2014; Custer, King, Atinc, Read, & Sethi, 2018). However, more recently, Wiliam (2014) proclaimed that the focus should be on gathering only the data required for the problem being investigated, thus shifting the attention from D3M to D3C. While D3M focuses on the collection of myriad sources of data without first distinguishing the questions that need to be answered, D3C emphasizes the importance of collecting particular data specific to the claim being investigated. In this study, the methods of D3C were used to examine the problem of college readiness by providing LEA leaders with data specific to the academic performance of FTIC students.

Generally, IHEs receive a considerable amount of data from students' secondary schools on their pre-college performance, while LEAs typically do not receive any data on their students' post-secondary performance. This one-directional model of data sharing is problematic, given that LEAs are tasked with preparing their graduates for college-level coursework, yet are

unaware of how their graduates are performing in college. The P³ Project created a systemic process of sharing authentic data on student performance at an IHE with LEA leaders. LEAs participating in the P³ Project received data on their students' post-secondary performance in the form of Excel sheets. IHE leaders compiled the student-level data for each partner district in Excel files. In an effort to streamline and make the data more accessible to LEA partners, the P³ team created a data dashboard for the LEAs participating in the project. The data dashboard contained the data for students who graduated from any LEA in Ohio and attended one of the P³ IHEs, aggregated over a five-year period. The data dashboard enabled LEA leaders to seamlessly view highlights of their own school's data, as well as compare their data with any other school in Ohio.

The data made available to LEA leaders was specific to the post-secondary performance of their graduates. Given that the overarching problem being investigated was the college readiness of FTIC students, IHE leaders refrained from providing district leaders with myriad data; rather, the P³ team of researchers compiled data explicitly related to the problem of college readiness. This process allowed IHE leaders to implement the process of D3C by providing LEAs participating in the P³ Project data relevant to student success and college readiness. While the process of D3C allows leaders to reduce the chances of making misinformed decisions, the data may be limiting. Typically, the processes of D3M and D3C are viewed independently of each other, but perhaps leaders should become more adept with collecting data using the D3M model, yet analyzing the data to answer the specific questions being examined using the D3C model. Thus, further investigation to find ways for leaders to unify the use of D3M and D3C techniques may be necessary.

The P³ Project allowed district leaders to analyze the changes in their graduates' performance through the data transmitted from the IHEs. However, the level of support for each

district varied on a number of variables, such as size, resources, and the skills of staff members. For example, some partner LEAs may be more adept at analyzing different forms of data, as they have staff members with knowledge and know-how in data analysis, while data analysis may be a newer concept to other participating LEAs. The creation of the data dashboard bridged some of the skills gap with the data analysis, as the dashboard made the data more easily accessible to partner leaders. However, moving forward, it is certainly important for IHE leaders to be aware of the needs and level of support each individual partner may require with data literacy and analysis. Additionally, IHE leaders may need to place greater emphasis on fostering relationships with district leaders and collaborating with LEAs on a more individualized level.

Finally, IHE leaders seeking to make systemic change must deviate away from taking a "deficit model" approach when working with LEAs, emphasizing the challenges or weaknesses of first-year students. However, IHEs are equally responsible for ensuring students are provided with all the academic and non-academic services they need to thrive academically and persist until graduation. Although LEAs and IHEs are viewed as two separate entities that operate independently of one another, leaders from the two sectors of education are equally accountable for the success of all students. Further, as district leaders and IHE leaders proactively engage in programming and partnerships to promote the college readiness of students, leaders from both sectors would be upholding their mission to student success.

Limitations

A major limitation of this study was the lack of data beyond 2018. While this project began in 2016, any efforts undertaken by LEAs to better prepare their graduates for post-secondary education will remain unknown beyond 2018. Another limitation of this study was the inherent drawback of the time required for the full effect of an intervention to be known. The intervention is such that its full effect on the college performance of FTIC students from partner

LEAs cannot be known for several years. As a result, the efforts taken by LEAs to improve the college readiness of their graduates and promote student success in IHEs were not fully recognizable in the current study.

Recommendations for Future Research

Based on the study findings, further research on intervention programs to improve the college readiness of FTIC students would benefit leaders from both sectors of education—secondary and post-secondary. Beyond the value of the data, the project enabled leaders from both education sectors to collaborate and form strong PK-16 partnerships revolving around the continuous improvement of college readiness and student success. Specifically, further research on PK-16 partnerships and data transmission from one sector of education to the other is recommended. When leaders make decisions using available data, even if those data do not suit their needs, they risk making misinformed decisions. A more in-depth evaluation of D3M versus D3C is necessary. Leaders must home in on the academic and non-academic data required to improve the post-secondary outcomes of FTIC students.

The data collection for this study occurred prior to the COVID-19 pandemic. While the true effect of the pandemic could not be illustrated in this study, future considerations for college-readiness programs should include the effect of the 2020 COVID-19 pandemic on the academic preparation of FTIC students. As a result of the pandemic, the majority of K-12 and post-secondary institutions were required to implement online instruction from March 2020. K-12 and IHE leaders fostering partnerships and working collaboratively to develop and implement college-readiness programs in a post-COVID-19 era must be cognizant of the academic and social challenges FTIC students encountered as a result of the use of distance learning.

The ongoing challenges associated with the successful matriculation and adjustment of first-time students to their new campus community are likely to be amplified with the

implementation of an online and/or hybrid platform of instruction. Specifically, the 2020 cohort of FTIC students were required to remotely navigate the different facets of the college campus. In addition to these students adapting to various instruction modes (i.e., hybrid, remote, distance learning), many IHEs were offering academic enhancement services and programs, such as tutoring, academic coaching, and counseling services, remotely in 2020 and 2021. To this end, it is particularly important to examine the effects of online instruction on the academic success, social integration, and persistence and retention rates of FTIC students in a post-COVID-19 era. Additionally, future research on the effects of online instruction on the pre-college performance of high school students must be conducted.

Although the pandemic was an unforeseen event, the application of D3M collection techniques would have been advantageous. The IHEs in this study offer online courses; however, through the use of D3C, as opposed to D3M, the data collected as part of the P³ Project was not inclusive of online instruction. Consequently, this study was unable to investigate the difference in persistence and retention rates of full-time, FTIC students enrolled in in-person courses versus online courses. These data would have provided leaders with empirical evidence on the performance of full-time, FTIC students engaged in online early-level courses who were matriculating to one of the three IHEs in the study pre-COVID-19. Further, the closure of K-12 and IHE institutions and the implementation of online learning for an extended period could not have been predicted; however, the unprecedented events of the pandemic have highlighted the need for leaders to appropriately apply and differentiate between D3M and D3C techniques to successfully find ways to improve the academic success and college readiness of FTIC students.

Research on how leaders from both education sectors can implement intervention programs similar to the P³ Project is recommended. The key to improving the college readiness of FTIC students is the implementation of intervention programs addressing all academic and

non-academic components of college readiness. The ultimate goal of said intervention programs is to ensure high school graduates are prepared for college-level coursework demands and adjusting to their new campus community. The intervention programs would allow for curriculum directors and classroom teachers at the secondary level to work with program directors, instructors, and advisors at the post-secondary level to better prepare FTIC students for the transition from secondary to post-secondary education.

During any point in time when a leader is attempting to implement change—such as an organizational shift, a new way of delivering content in the classroom, or initiating a partnership with expectations for all group members involved—it can be challenging. In light of these challenges, when a leader enables the voices of all stakeholders to be heard through reflective dialogue and fosters a sense of urgency to work for change around a shared objective, then this kind of reflective dialogue has been shown to develop a collaborative environment for all stakeholders to work toward organizational change (Burke, 2014; Earl & Katz, 2006). Further research on establishing an aligned PK-16 partnership will allow leaders to thoroughly examine the content provided to high school graduates and start working toward developing a plan to offer specific fundamental content knowledge and strategies to prepare secondary graduates for college-level coursework. Additionally, research on the kind of formative feedback structures necessary for leaders from both education sectors to facilitate change within their organizations to boost college readiness and success would be beneficial.

A longitudinal study that continues to follow all graduates who have received the intervention is necessary to understand the true effect of the P³ Project as it pertains to the post-secondary outcomes of FTIC students. Year-to-year analyses of LEAs participating in the P³ Project may provide insight into the effectiveness of college-readiness interventions over time. Additionally, matching schools by district typology and analyzing the post-secondary outcomes

for students in the intervention and comparison group would provide meaningful comparisons of year-to-year academic performance for these schools.

A study analyzing the post-secondary outcomes of students at IHE1, IHE2, and IHE3 separately would provide researchers with a more precise examination of how secondary graduates perform at their chosen institution after receiving the intervention of the P³ Project. Finally, a mixed-methods study may be conducted to illustrate both the depth and limitations of the data.

Conclusions

The initial focus of this study was related to the academic readiness of full-time, FTIC students. However, the findings of this study led to novel considerations suggesting that geographic location may be a predominant factor in the first-year academic success of full-time, FTIC students. Connecting the proximity of FTIC students' home to their chosen IHE with the post-secondary outcomes assessed in this study offers encouraging insight to expand the variables that may influence full-time, FTIC students' persistence and retention.

This study's results not only coincide with the literature on distance and student persistence and retention, but also underscore the need for critical research on the influence of geographical location, deciding on a major early in studies, and residing on campus or commuting to campus for full-time, FTIC students. Further, a vital goal of the P³ Project was to provide data to PK-12 districts on their graduates. However, the study's findings demonstrate the need for effective leadership strategies to continue making positive strides toward college readiness and student success.

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APPENDIX A: IRB APPROVAL

BGSU
BOWLING GREEN STATE UNIVERSITY
Office of Research Compliance

DATE: May 18, 2020

TO: Rabab Darwish

FROM: Bowling Green State University Institutional Review Board

PROJECT TITLE: [1594395-1] The Role of Decision-Driven Data Collection on Northwest Ohio Local Education Agencies' Intervention on First-time, Full-time Students' Post-Secondary Outcomes in Institutions of Higher Education: A Quasi- Experimental Evaluation of the PK-16 Pathways of Promise (P^3) Project

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: May 14, 2020

REVIEW CATEGORY: Exemption category # *4*

Thank you for your submission of New Project materials for this project. The Bowling Green State University Institutional Review Board has determined this project is exempt from IRB review according to federal regulations AND that the proposed research has met the principles outlined in the Belmont Report. You may now begin the research activities.

Note that changes cannot be made to exempt research because of the possibility that proposed changes may change the research in such a way that it no longer meets the criteria for exemption. If you want to make changes to this project, contact the Office of Research Compliance for guidance.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the Office of Research Compliance at 419-372-7716 or orc@bgsu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Bowling Green State University Institutional Review Board's records.