

Using the National Student Clearinghouse to Measure Long-Term College Readiness Outcomes

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Abstract

Youth-serving organizations play a pivotal role in preparing youth for higher education. Immediately after program completion, the impact of college-readiness or precollegiate programs on knowledge, skills, and aspirations can be assessed through survey instruments and interviews. However, studying medium- to long-term outcomes, such as college enrollment and completion, poses methodological challenges and time constraints, primarily because multiple data collection points may occur throughout a youth's educational journey. Using the Indiana 4-H Youth Development organization as a case, this study aimed to demonstrate how the National Student Clearinghouse (NSC) can be used to measure long-term college readiness outcomes conveniently and efficiently. Key findings from this study affirm the effectiveness of the NSC and identify opportunities for youth-serving organizations to measure a range of college-readiness outcomes across their diverse audiences. By providing valid and reliable data, the NSC can help inform college readiness policies, practices, and research.

Keywords: college readiness outcomes, youth-serving organizations, National Student Clearinghouse, higher education, precollegiate program



Youth-serving organizations are instrumental in guiding youth toward diverse postsecondary opportunities, including higher education. According to Aarts and Greijn (2010) and Oyewole (2010), obtaining a college degree not only benefits the youth themselves but also benefits their families, society, and the economy. Benefits are categorized into private/individual monetary (e.g., higher salaries/earnings), private/individual nonmonetary (e.g., improved health, advanced knowledge), external/public monetary (e.g., higher taxes, less need for government welfare aid), and external/public nonmonetary (e.g., lower crime rate; Chan, 2016; Hermannsson et al., 2017; McMahon, 2021). Despite the benefits of higher education and the increasing demand for graduate skills (Hermannsson et al., 2017), college enrollment and completion in the United States have been declining (Lee & Shapiro, 2023; National Center for Education Statistics, 2023).

College readiness or precollegiate programs are established to prepare interested youth to enroll in, persist in, and complete college (Knaggs et al., 2013), thereby helping address the decline in college enrollment and completion. These programs are administered by youth-serving organizations or institutions whose primary interest is to provide opportunities for youth to discover and cultivate their talents and skills, apply them effectively, and grow into responsible, successful adults. In the United States, various state and federal college readiness programs, such as Upward Bound, Indiana's 21st Century Scholars Program, and Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP), aim to support students in their pursuit of higher education (Knaggs et al., 2013; Schultz & Mueller, 2006; Xing et al., 2020). In addition, youth development organizations such as the National FFA Organization, Boys and Girls Clubs of America, Junior Achievement, and 4-H also

prepare youth for postsecondary education (Edge Research, 2019; Wilson et al., 2021). Similarly, higher education institutions offer precollegiate programs to familiarize high school students with the college environment and equip them with the skills needed for postsecondary academic success. In view of these efforts, it becomes essential to investigate the extent to which youth explore and act upon the opportunities they have been prepared for.

College readiness efforts need to be evaluated to determine their impact on diverse youth and how they contribute to addressing the decline in youth's pursuit of higher education. Immediately after the end of any college-readiness or precollegiate program for a specific batch or cohort, it is common, convenient, and cost-effective for professionals to evaluate short-term outcomes among participants. These outcomes might involve changes in knowledge, attitudes, skills, and aspirations (Hetherington, 2020). Assessing medium- and long-term outcomes, such as college enrollment, persistence, and completion, is crucial because these outcomes determine whether the program's overall goals or objectives were achieved. For this purpose, longitudinal studies, which collect data continuously over an extended period, help track participants' progress through college, as students can transfer between institutions or discontinue their education altogether.

Purpose of the Study

Using Indiana 4-H as a case, this article details the use of the National Student Clearinghouse to measure the long-term impact of college readiness and illustrates the role 4-H plays in bridging the gap between higher education and youth in the local community. The study will also assess the effectiveness and limitations of the NSC and present future opportunities for youth-serving organizations and higher education institutions.

Literature Review

The Cooperative Extension System in the United States is a partnership between the United States Department of Agriculture–National Institute of Food and Agriculture (USDA–NIFA), land-grant universities, and communities to disseminate research-based information advancing the fields of agriculture, natural resources, family and consumer

sciences, and youth development (Comer et al., 2006). 4-H Youth Development, the largest youth development organization in the United States, is one of Cooperative Extension's program areas, administered through land-grant universities (National 4-H Council, n.d.). 4-H annually provides positive youth development experiences to about 6 million youth in the United States. These experiences equip youth with intellectual, social, and life skills that enable them to succeed in various fields of interest. In general, 4-H programs revolve around science, technology, engineering, mathematics, agriculture, healthy living, civic engagement, and so on.

Higher education is one postsecondary opportunity that 4-H prepares youth to explore. In addition to the broad 4-H postsecondary programming, individual land-grant universities implement specific college readiness programs, such as 4-H Next Chapter (University of Nebraska–Lincoln, n.d.), 4-H Academy, 4-H Round-Up (Purdue University Extension, 2026), and Juntos 4-H (North Carolina State University, n.d.). Such programs play a significant role in youth's pursuit of higher education (Edwards, 2010). Through the efforts of 4-H, land-grant universities continue to reach youth across their states, addressing local needs, extending research outcomes to youth development, and preparing youth for postsecondary success.

Measuring College Readiness

Measuring the impact of these college readiness efforts on the youth population is convenient for the short term; however, it becomes challenging to measure long-term outcomes such as college enrollment and completion. 4-H researchers have used surveys to assess the impact of 4-H programs on college readiness, examining outcomes such as college enrollment, grade point averages, college transition and persistence, degree attainment, and the acquisition of soft and social skills (Behnke et al., 2020; Bourdeau et al., 2014; Piescher et al., 2014; Ratkos & Knollenberg, 2015; Seevers et al., 2011; University of Delaware Cooperative Extension, 2019; Walahoski, 2013). Although these studies concluded that 4-H contributes to college readiness, they highlighted common limitations, including low response rates, reliance on self-reported data, inaccuracies, challenges in maintaining current contact information, and small sample sizes. Additionally, some studies measured

the impact at a single point in time and will require ongoing study to determine its longevity.

To conveniently track long-term outcomes of college readiness programs, state and national data systems such as Integrated Postsecondary Education Data Systems (IPEDS), Statewide Longitudinal Data Systems (SLDS), and National Student Clearinghouse (NSC) have been adopted as secondary sources of data collection (Dynarski et al., 2015; Hetherington, 2020; Howell & Howell, 2018; Levesque et al., 2015). These secondary systems, which support population studies rather than sampling, can facilitate extensive longitudinal data collection, enabling the evaluation of long-term outcomes that are convenient for researchers and institutions. In addition, they do not contain self-reported data, reducing the likelihood of inaccurate data.

One data source is IPEDS. The IPEDS obtains extensive educational information annually from about 7,000 institutions in the United States: a mandatory report from Title IV institutions and voluntary reports from non-Title IV institutions (NCES, n.d.). These institutions are of various types (academic, vocational, and continuing education), and they include 4-year, 2-year or less, and religious universities and colleges; community and technical colleges; non-degree-granting institutions; and public, private nonprofit, and private for-profit liberal arts colleges. The IPEDS collects and publicly publishes data on more than 250 variables classified into several survey components, including 12-month enrollment, academic libraries, admissions, completions, fall enrollments, finance, graduation rates, human resources, institutional characteristics, outcome measures (graduation rate and first-year retention rate), and student financial aid (NCES, n.d.; Perkins & Carrier, 2023).

Researchers and youth-serving organizations can use the IPEDS to measure various educational outcomes, which can then be analyzed by demographic characteristics. However, IPEDS collects and reports information on the institutional level, not the individual level, meaning researchers and youth-serving organizations cannot identify specific youth within the broader population reported by IPEDS, a result that occurs because personally identifiable information (PII) is not connected to the data collected. The United States Department of Labor (n.d.)

defines PII as “information . . . that directly identifies an individual (e.g., name, address, social security number or other identifying number or code, telephone number, email address, etc.)” (para. 1). Therefore, although researchers can examine broad data sets through IPEDS, they cannot segment users of specific programs.

Another valuable secondary data source is the State Longitudinal Data System (SLDS), developed to manage the educational information of individuals in each state of the U.S. (Dynarski et al., 2015; Hough & Beard, 2017; Levesque et al., 2015). Specific to states, longitudinal tracking includes an individual’s early learning, K-12, postsecondary, and workforce journey (Education Commission of the States, 2021; Levesque et al., 2015). The SLDS report includes (1) student, school, and district identifiers; (2) student demographics and accountability subgroups; (3) participation in federal programs; (4) school enrollment and attendance rates; (5) completion and withdrawal; (6) behavioral data such as suspensions and expulsions; (7) state and local assessment data; (8) courses taken, grades, and credits earned; (9) College Board and ACT data; and (10) staff data, including teacher data (Levesque et al., 2015, p. 5).

Unlike the IPEDS, which reports institutional-level information, the SLDS reports individual educational information using personally identifiable information such as Social Security numbers, official names, and dates of birth. Therefore, using PII, youth-serving organizations and institutions can use the SLDS to match and study long-term college-readiness outcomes for youth of interest. However, it is worth noting that the SLDS, as its name implies, collects and reports only information on students in institutions within the state, and in some states, only public schools are captured (Davis et al., 2018; Dynarski et al., 2015; Glennie et al., 2014; Hough & Beard, 2017; Levesque et al., 2015). These limitations inhibit tracking transient youth who pursue educational opportunities across various states, with individual data ending in the previous state of residence and starting in the new state. With the IPEDS and SLDS serving unique purposes, a final private-sector solution emerges. The NSC offers a longitudinal data system that provides individual-level information on youth seeking educational opportunities throughout the United States.

The National Student Clearinghouse

The NSC is a secure nongovernmental organization specializing in educational data reporting, data exchange, verification, and research services in the United States (Dundar & Shapiro, 2016). In compliance with the Higher Education Act, the Family Educational Rights and Privacy Act (FERPA), and other applicable regulations, the NSC, through its StudentTracker service, reports longitudinal educational information on 97% of students enrolled in U.S. colleges and universities, leveraging partnerships from 3,600 educational institutions (NSC, n.d.-c). These institutions include public and private (for-profit and nonprofit), in-state and out-of-state, 2-year and 4-year colleges and universities, and vocational and trade schools throughout the country.

Some of the variables that StudentTracker reports include semester-based enrollment institution, enrollment dates, transfer information, degree earned, degree completion date, college completion status, majors, and class standing (Schoenecker & Reeves, 2008). For youth-serving organizations interested in these educational outcomes, including those that span the boundary between higher education and various youth communities, the NSC is one source to explore. Furthermore, the NSC uses personally identifiable student information to ascertain longitudinal educational outcomes as students pursue postsecondary opportunities across the United States. Personally identifiable information allows youth-serving organizations to obtain educational information about their target group within the NSC population more efficiently. Certain states integrate NSC into their SLDS as an auxiliary data system to track and report on private and out-of-state postsecondary institutions (Levesque et al., 2015).

Researchers (Hetherington, 2020; Howell & Howell, 2018) have used the NSC StudentTracker to assess long-term educational outcomes, highlighting an opportunity for greater use of the tool to advance the field of youth development. Hetherington (2020) used the NSC to determine college enrollment and completion among Michigan 4-H alumni from 2012 to 2019. A notable finding was that the college-going rate of Michigan 4-H alumni (61%) exceeds the statewide average (55%). Before Howell and Howell were introduced to the NSC, Brigham Young University's Salt Lake Center Campus could not track the educational journey of

its nonmatriculated students. Using the NSC, the researchers analyzed the graduation rates of nonmatriculated Brigham Young University students from 2004 to 2014, the number of institutions attended prior to graduation, and the duration spent at these institutions. Howell and Howell (2018) achieved their research objectives and reported, "I have never seen a treasure trove of data so relevant to this field" (p. 11). These outcomes validate the NSC's role in measuring medium- to long-term college readiness outcomes.

Purdue Extension's 4-H Youth Development Program

Since its inception approximately 120 years ago (Smith & Kirkpatrick, 1990), Indiana 4-H has offered a wide range of positive development opportunities and experiences for Indiana youth. Administered through Purdue University, Indiana's land-grant university, Indiana 4-H reaches youth across Indiana's 92 counties with the support of educators and volunteers. The program serves diverse youth of all genders, races, and ethnicities living in rural, suburban, and urban areas (with more emphasis on expanding outreach to urban areas). Among other outcomes, Indiana 4-H prepares youth for postsecondary success through its college-readiness programs, exposing them not only to diverse career interests but also to Purdue University's resources, faculty, and experiences. For more than a century, no comprehensive study has examined the outcomes of Indiana 4-H college-readiness efforts. Indiana 4-H lacked the means to track its alumni's postsecondary journeys. This deficiency limits the ability to share exhaustive college data with stakeholders or determine the rate at which their diverse alumni pursue postsecondary education. In the past, Indiana 4-H employed surveys to obtain "next-step information" from their graduating seniors (Mosier, 2008); however, there was no way to determine if they eventually enrolled in, persisted in, or completed postsecondary education, reflecting the challenges associated with longitudinal data collection using self-reported surveys.

Even though the objectives and target groups of college readiness programs may yield varied outcomes, Edwards (2010) stressed the importance of achieving college enrollment and graduation. Therefore, Indiana 4-H ascertained the enrollment outcome of its alumni using the NSC. This

article outlines the process for using the NSC to measure long-term college readiness outcomes for youth-serving organizations and institutions. It focuses specifically on Indiana 4-H to illustrate the implementation of this approach for college enrollment as a college-readiness outcome and to evaluate the effectiveness of the NSC as a data source for strengthening engagement outcomes between Purdue University Extension and Indiana youth.

Project Details

The Indiana 4-H alumni tracking project began in response to an identified need, as Indiana experienced a rapid decline in college-going rates among high school graduates (Indiana Commission for Higher Education, 2022). Indiana 4-H had an interest in determining its college enrollment rate, as the organization is seen in the state as a trusted higher education partner. To gain access to these data, Purdue University (4-H Youth Development) executed a contract with the NSC. The contract allows the requesting institution to tailor its inquiry to specific data needs from the NSC and to specify the reporting period. Cost depends on factors including the number of students and the educational information requested. Purdue University secured a 5-year contract to retrieve 22,500 records over the duration of the contract.

The project studied Indiana 4-H alumni who graduated high school between 2018 and 2023 ($N = 15,173$). Alumni data were obtained from 4-HOnline, a secure proprietary database that manages 4-H enrollments and programs at the state and county levels. In addition to first name, middle name, last name, suffix, and dates of birth, demographic information such as high school graduation year, residence type, military family connection, military service branch, gender, number of years spent in 4-H, race, ethnicities, high school type, and county of 4-H enrollment were available in the 4-HOnline database. Demographic information may be missing for students who did not provide it. Notably, across various youth-serving organizations and institutions, demographic characteristics and data management systems can vary.

The NSC requests the official names and dates of birth for the population of interest to match them against records in its robust database and to report longitudinal educational information for the matched individuals. This

process allowed Indiana 4-H to obtain longitudinal postsecondary educational information for the 15,173 alumni, obviating any need to sample the population using survey instruments. The expertise used in this project is largely data formatting and analysis using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS). Depending on the researcher's or professional's proficiency level and preference, any software can be used to achieve the same outcome. The following section explains the process Indiana 4-H used to assess its alumni's educational data.

Step-by-Step Guide to Accessing NSC Data

A specific procedure was implemented to obtain the NSC data. The procedure involved preparing and uploading a submission file to the NSC through a secure file transfer protocol (FTP) account for matching and reporting purposes. First, the Purdue University Human Research Protection Program (HRPP) approved the project as exempt from the Institutional Review Board under the secondary research category because it did not engage participants directly for data collection. It is worth noting that during enrollment in 4-H, members consent to the use of their information for 4-H program improvement and justification. However, the NSC complies with FERPA, which gives students the right to keep their educational information private and to determine who can access it. Therefore, it is expected that some 4-H alumni, even after consenting at the Indiana 4-H level, may choose to block their educational information when they enroll in a postsecondary institution.

Preparation

Six years of alumni data (2018 to 2023), containing personally identifiable information and demographic characteristics, were exported from 4-HOnline. We formatted the data in three stages.

Stage 1 Formatting. Six years of data were merged into a single Microsoft Excel file, ensuring that all column headings were identical. Unwanted characters were removed, the information in each cell was uniformly formatted by column, and middle names were changed to initials. This merged file is referred to as our "working dataset."

Stage 2 Formatting. The NSC requires only students' full names and their date of birth to make a match. To connect the NSC's educational reports with demographic

information, we leveraged the return field. This return field is one additional column that the NSC allows in the submission file. A requesting institution can include any information in the field during submission, and NSC will return it unchanged. For our organization, we captured various demographic variables, including years in 4-H, enrollment county, residence, gender, ethnicity, race, type of high school, whether a family member is in the military, military service branch, and high school graduation year. Demographic variables were encoded and included in the working dataset. After the coding, the concatenate function in MS Excel was used to generate a unique 19-digit code for each student. We randomly selected and decoded 50 codes from five counties to ensure encoding validity. This process confirmed our encoding and indicated reliability when we connected the NSC data to the decoded demographic variables.

Stage 3 Formatting. A new Excel submission file was created in accordance with the NSC’s instructions. This submission file contained only first names, middle name initials, last names, suffixes, dates of birth, and return fields of alumni, as requested by the NSC. The submission file underwent additional formatting per the NSC guide provided by the NSC staff (NSC, n.d.-b).

Submission

The submission file was uploaded through a secure file transfer protocol (FTP) account created by the NSC. The processing, validation, matching, and reporting process could take less than a week. However, if errors are found in the submission file, it could take longer. To avoid delays, it is essential to meticulously format and prepare the submission file in accordance with the NSC instructions.

NSC Reports

After we submitted the file to the NSC, the NSC returned three different reports to Purdue University: the control, aggregate, and detail reports. In its management of student data, the NSC adheres strictly to FERPA guidelines, emphasizing students’ privacy and granting them control over the disclosure of their educational records. As a result, the NSC did not report information on Indiana 4-H alumni who opted for FERPA protections and those who did not pursue higher education.

First Report (Control Report)

The control report documented the number of Indiana 4-H alumni that the NSC had no educational data on (4,369) and the number of alumni the NSC matched (10,804). Of the 10,804 youth, 82 had FERPA blocks, and 10,722 did not. The results of the control report showed that the NSC matched 71% of Indiana 4-H alumni ($N = 15,173$) who graduated from high school between 2018 and 2023 (see Table 1). This result implies that at least 71% of the population enrolled in postsecondary education after high school. The 29% unmatched population could have pursued noneducational postsecondary opportunities, enrolled in postsecondary educational institutions that do not partner with the NSC, or had an error or change in personally identifiable information.

Second Report (Aggregate Report)

The aggregate report detailed the first postsecondary institution where 71% of matched alumni enrolled. Institutional information includes the name of institutions, location (state), type (by level: 4-year and 2-year; by control: public and private), and the number/percentage of youth enrolled in each institution. Furthermore, for each school, the report recorded the number of

Table 1. Postsecondary Institution Enrollment of Indiana 4-H Alumni

	<i>n</i>	%
Indiana 4-H alumni	15,173	
Matched (enrolled in college)	10,804	71
Without FERPA block	10,722	
With FERPA block	82	
Unmatched (did not enroll in college)	4,369	29

students who placed a FERPA block and those who obtained a degree from each initial enrollment institution and transfer institution.

Third Report (Detail Report)

The detail report contained educational information on 10,722 youth who enrolled in postsecondary institutions without FERPA blocks. Educational information was reported individually and per semester, as participating institutions send student data to the NSC every semester. This updating enables researchers and evaluators to recognize transient youth and changes, such as institution and major, during their postsecondary education.

The third report details the institutions where each student enrolled, transferred (if applicable), and graduated, along with their respective locations and types (public or private, 2-year or 4-year). It also includes the start and end dates of each semester’s enrollment and the academic classification of each student (e.g., freshman, sophomore, junior, senior, certificate, associate, bachelor, master). Additionally, the report covers enrollment status (full-time, three-quarter-time, half-time, less than half-time, leave of absence, withdrawn, or deceased), enrollment majors, graduation status, graduation date, degree title, and majors. Finally, the unique 19-digit return field was returned in the detail report. The data were decoded with the demographic characteristics of each youth and linked to the educational information from the NSC. At this initial stage of leveraging the NSC, Indiana 4-H determined college enrollment. In the long term, NSC reports will be used to study additional

outcomes, such as persistence, completion, and college majors.

Findings

The general findings of the NSC control report showed that at least 71% of the population was enrolled in postsecondary educational institutions. Table 2 shows enrollment by high school graduation year, with an observed decline. Although not specifically addressed in this study, COVID-19 could have contributed to rate of enrollment changes in the 2019–2020 graduation year and subsequent years. In addition, data on 63% of the 2022–2023 graduating class could be affected by our immediate data request from the NSC in the fall of 2023. The request did not capture alumni who might have planned to pursue higher education later in the fall 2023 semester. Additional analysis of the NSC detail report informed college enrollment by demographic characteristics (see Table 3). With the low representation of some demographic characteristics levels, such as nonbinary gender and Native Hawaiian or Pacific Islander race, future researchers should cautiously make inferences about the college enrollment rates.

The data in Table 3 illustrates how college enrollment rates of Indiana 4-H alumni varied across demographic characteristics, resulting from various factors. Recognizing this variation could be a starting point for further investigation into how the efforts of youth-serving organizations are impacting diverse audiences, the factors driving variations in these impacts, and the areas that require improvement. Using race as a lens,

Table 2. College Enrollment Rate of Indiana 4-H Alumni by High School Graduation Year

4-H high school graduation year	Total high school graduates	Enrolled in college	No college information	College enrollment rates
	<i>N</i>	<i>n</i>	<i>n</i>	%
2017–2018	1,600	1,207	393	75.5
2018–2019	1,824	1,384	440	76.0
2019–2020	3,140	2,325	815	74.1
2020–2021	2,593	1,819	774	70.2
2021–2022	3,111	2,164	947	70.0
2022–2023	2,905	1,823	1,082	63.0
Total	15,173	10,722	4,451	

**Table 3. College Enrollment Rate of Indiana 4-H Alumni
by High School Graduation Year**

	College enrollment		College enrollment rate
	<i>n</i>	%	%
Gender			
Male	3,554	33.1	60.3
Female	7,132	66.5	77.4
Nonbinary	-	-	0.0
Not provided	36	0.3	55.4
Ethnicity			
Non-Hispanic	10,458	97.5	71.0
Hispanic	197	1.8	66.0
Not provided	67	0.6	52.0
Race			
White	10,231	95.4	80.0
Black	28	0.3	60.0
Asian	67	0.6	77.0
American Indian or Alaskan Native	12	0.1	57.0
Pacific Islander	2	0.0	100.0
Balance of other combinations	145	1.4	63.0
Undetermined	237	2.2	64.0
Residence			
Farm	4,090	38.1	67.0
Town under 10,000 or rural non-farm	4,139	38.6	73.0
Town/city/suburbs between 10k to 50k	1,748	16.3	74.0
City/suburb of more than 50,000	545	5.1	72.0
Central city of more than 50,000	175	1.6	74.0
Not provided	25	0.2	70.0
High school type			
Public	9,508	88.7	73.0
Home school or alternative	523	4.9	48.0
Private	411	3.8	74.0
Charter	60	0.6	63.0
Vocational	17	0.2	46.0
Magnet or specialized	15	0.1	83.0
College/university	4	0.0	80.0
Not provided	184	1.7	67.0
Military family connection			
No military family connection	10,070	94.0	71.0
Military family connection	632	6.0	67.0
Not provided	20	0.2	77.0
Number of years spent in 4-H			
1 and less	179	1.7	53.0
2	126	1.2	62.0
3	124	1.2	64.0
4	151	1.4	62.0
5	201	1.9	61.0
6	230	2.1	62.0
7	309	2.9	71.0
8	425	4.0	68.0
9	662	6.2	68.0
10	8,304	77.4	73.0
11 and more	11	0.1	69.0

Griffin and Birkenstock (2022) reported inequities in college readiness programming across racial groups. According to Table 3, youth who identified as American Indian or Alaskan Native and Black races enrolled at a lower rate compared to other races; some cultural, structural, or personal experiences might have contributed. In that case, designing programs that recognize these experiences might be helpful; for example, a program like Juntos 4-H provides college readiness experiences for the Latinx/Hispanic community.

Implications of Early-Stage Assessment

Indiana 4-H demonstrated how the NSC's StudentTracker service can be used to track specific long-term college-readiness outcomes for youth-serving organizations and institutions. The findings of this study validate the effectiveness of the NSC in measuring long-term college readiness outcomes. The NSC provides an opportunity to use data to strengthen higher education and community engagement, build pathways to higher education, and fulfill other missions in serving the community, as demonstrated by Indiana 4-H. As a result of this project, Indiana 4-H will assess its college-readiness programs, investments, and other contributing factors that affect outcomes. College enrollment by demographic characteristics provides valuable information to inform greater investment in college readiness programming for the diverse audience that Indiana 4-H serves. For example, programming can be implemented or improved for Black/African American Indiana 4-H'ers, American Indian/Alaskan Native Indiana 4-H'ers, or specific counties with low college enrollment rates.

Next Steps

First, Indiana 4-H will continue this research to determine its alumni's persistence and college completion. Second, extending the scope of this study beyond Indiana 4-H could help determine the impact of national 4-H, which is important because 4-H reaches 6 million youth annually through various activities and experiences. Third, some 4-H programs are one-time camps, conference engagements, or targeted programs such as 4-H Academy, 4-H Roundup, and 4-H Next Chapter. At the same time, most are

all-year-round experiences that typically last between 1 and 10 years. These experiences may affect youth in different ways, making it essential not only to evaluate the long-term outcomes for the entire 4-H population but also to analyze the impact of these specific programs and activities. This approach will help justify the effectiveness of targeted programming.

Furthermore, Indiana 4-H has coordinated the Juntos 4-H program for 5 years. Juntos 4-H is an academic success program for Latinx youth and families, many of whom are first-generation college students. This program began in North Carolina and has expanded to other states across the United States (North Carolina State University, n.d.). In Indiana, Juntos 4-H began in three counties and has grown to nine. The program aims to increase high school graduation and enrollment in higher education institutions for Latinx youth; it addresses the higher rate of high school dropout among this largest minority group in the United States (Behnke et al., 2020). Within the next 2 years, Indiana 4-H will have the first cohort of Juntos 4-H'ers graduating from high school. The NSC can be used to examine the college enrollment rate of Juntos 4-H alumni compared to the broader Indiana 4-H program and the statewide Latinx population.

Lessons Learned/Best Practices

As a secondary data source, the NSC provided accurate and reliable data on the study population. It eliminated (a) the need to contact Indiana 4-H alumni who completed their high school education within the 6 years studied, (b) the low response rate, (c) the use of self-reported data, (d) time consumption in gathering data from 15,173 individuals, (e) participant attrition, and (f) using survey instruments to collect longitudinal data every semester. Population research made feasible by the NSC reinforced the conclusions of this exploratory study. This study adds to the body of evidence supporting the notion that 4-H helps prepare students for college (Behnke et al., 2020; Bourdeau et al., 2014; Hetherington, 2020; Piescher et al., 2014; Ratkos & Knollenberg, 2015; Seevers et al., 2011; University of Delaware Cooperative Extension, 2019; Walahoski, 2013). The NSC detail report provides data for youth-serving organizations to determine not only college enrollment but

retention/persistence, transfer rates, choice of institutions, majors, graduation rates, and degree types.

Despite being a helpful tool, the NSC data has some limitations. For this study, it was assumed that Indiana 4-H'ers without educational information from the NSC did not attend college. However, some individuals may be enrolled in institutions that do not report their data to the NSC. Additionally, the college enrollment rate for Indiana 4-H alumni could be higher if there were no mismatches in personally identifiable information. As we prepared the data, we identified challenges with individuals using their middle name, hyphenated last names, and additional characters, which may have led to a lower match rate.

In addition, the NSC operates under FERPA, which shows respect for student privacy; however, it poses some limitations in studying (1) college readiness outcomes by demographic characteristics and (2) other broad college readiness outcomes, except enrollment and completion. To elaborate, the NSC control report provides the total count of students enrolled in postsecondary institutions, including those with FERPA blocks. However, in the detail report, which provides educational information on students enrolled in college, students with FERPA blocks were not captured. This discrepancy challenged our ability to identify which demographic characteristics the FERPA students fit. In our findings, by demographic characteristics, we underreported the college enrollment rate because we grouped FERPA block students with the “no college information” group. Nonetheless, we assumed that 82 youth is not a significant number that impacts the overall study. For this same reason, some outcomes, such as graduate school enrollment or majors, will not include students with FERPA blocks. This exclusion is a result of the privacy of educational information. Similarly, if the same outcomes are examined by demographic characteristics, there is a greater likelihood that counts among those in college will be underreported.

It is worth noting that the NSC alone cannot establish causal relationships, as supported by Hetherington (2020) and Howell and Howell (2018). Various factors may have influenced the college enrollment rate among Indiana 4-H alumni; drawing causal conclusions would require a different type of study. Furthermore, the NSC does not capture specific characteristics that could enhance our ability to analyze the role of factors such as financial aid, socioeconomic status, and parents' educational background in decisions to pursue higher education. The IPEDS and SLDS capture some of these characteristics, including student financial aid (NCES, n.d.) and participation in federal programs (Levesque et al., 2015). At this level, the NSC provides valuable descriptive data on the student population that can serve various purposes and illustrates impact stories when compared with baseline data.

To conclude, although limitations are common in studies and methodologies, the NSC offers a more effective method for tracking specific long-term college readiness outcomes for youth-serving organizations and institutions preparing diverse youth for higher education. Outcomes include college enrollment, persistence, transfer rates, institution type and location, enrollment status, majors, class level, graduation rates, and degree types, measured across various demographic characteristics. The use of the NSC allows the study of entire populations rather than relying on samples. In addition, it enables one-time data collection spanning multiple years, thereby reducing time demands and mitigating participant attrition. This approach also eliminates reliance on survey instruments, which are often characterized by low response rates and inaccuracies associated with self-reported data. In addition to examining patterns and trends through descriptive statistics, inferential statistics can be used to explore relationships and associations between variables. Such comprehensive analysis enhances understanding of college readiness outcomes and informs policy decisions to improve youth success in pursuing higher education, benefiting not only the youth themselves but also their families, society, and the global community.



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