



EDUCATION AND EMPLOYMENT RESEARCH CENTER

Review of Recent Research on Noncredit Outcomes

Michelle Van Noy, Sam Scovill, and Nicole Sandelier Boyd

JANUARY 2024

(UPDATED MARCH 2024)



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School of Management
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Contents

Executive Summary	1
Introduction	2
Noncredit and Non-degree Credentials	3
Methods	6
Approach to Examining Outcomes	8
Type of Activity	8
Samples	10
Methodology	15
Comparisons	15
Analytic Approach	18
Findings	20
Enrollment Characteristic	20
Educational Outcomes	21
Labor Market Outcomes	25
Conclusion	33
Key Takeaways	33
Recommendations for Policy and Practice	34
Future Directions for Research	35
Works Cited	38

Executive Summary

Despite growing interest, research on the outcomes of noncredit education has been scarce primarily due to issues with data availability. In this paper, we identify a core group of key articles on noncredit education and nondegree credential (NDC) outcomes. These include educational outcomes (i.e., completion and continued education) as well as labor market outcomes (i.e., employment status and earnings). We focus on 15 research studies on the outcomes of students from noncredit education and NDC in the United States published in the past five years. We examine three main kinds of activity including noncredit, clock-hour programs, and NDCs. We also include some outcomes of for-credit for studies where noncredit and for credit were examined together. Due to data limitations the studies included use a variety of data sources and this results in varying sample size and composition. The studies, because they are using different data and asking different research questions also use multiple methodologies to make different kinds of comparisons. For example, some studies present descriptive statistics while others conduct statistical analyses. With so much variation in data sources and analytic approaches it was challenging to make apples-to-apples comparisons between studies, but we have a few key takeaways that summarize what we found. The key takeaways for this paper based on our analysis of these articles are the following: (1) few noncredit students transition to credit pathways, (2) noncredit programs lead to modest labor market outcomes, (3) more research is needed to make sense of the range of noncredit programs. In addition to these key takeaways we have recommendations for policy and practice that include: (1) policies must support the further development of a strong data infrastructure, (2) strategies should be developed to improve pathways and articulation, and (3) where data are available, make them available. More research is necessary in this area to continue to understand the impact of noncredit education and NDCs on both labor market and educational outcomes.

Introduction

Policymakers and individuals are increasingly interested in education and training that can be delivered quickly and flexibly to help people enter and advance in careers, rather than costly and time-consuming traditional degree programs. Noncredit education, often offered by community colleges, is a common form of such training given its wide range of program and course offerings, including those that deliver occupational, avocational, basic skills, and customized training (D’Amico et al., 2014; Van Noy, 2023). Occupational and customized training can offer pathways to non-degree credentials (NDCs) such as certificates, certifications, licenses, and badges across many occupations and industries with a range of goals and expected outcomes and with variation in their length and format (Van Noy, 2023; D’Amico et al., 2023). While community colleges have long been a major source of noncredit education, other providers include four-year institutions, private providers, unions, and employers, as well as various other emerging entities. Despite the interest in and promise of these noncredit programming, little is known about the outcomes of these pathways for students because little data are typically collected on them (D’Amico et al., 2017; Xu & Ran, 2019; Business Roundtable, 2009). But data and research are beginning to be generated. States are expanding data collecting and reporting efforts on noncredit education, and researchers are using these data and developing additional data sources to understand whether noncredit programs are leading students to successful outcomes.

This review focuses on understanding and contextualizing what is known about noncredit education and NDCs outcomes to make sense of this growing and evolving research base. As interest in ensuring quality among noncredit and NDCs grows, such a project is essential to helping states develop informed policy and practice. While discussions about how to define quality are ongoing, student outcomes in terms of the labor market and education are commonly held essential measures of quality across definitions (Education Strategy Group, 2019; Duke-Benfield et al., 2019; Van Noy et al., 2019; Lumina Foundation, 2019; Postsecondary Value Commission, 2021).

To provide a basis for assessing the value of noncredit and NDCs, we begin by examining existing definitions of noncredit and NDCs. We then turn our focus to key outcomes, including noncredit students’ and NDC holders’ labor market outcomes as well as noncredit students’ educational progression after program completion. This review seeks to understand the approaches researchers have used to examine noncredit and NDC outcomes and any trends that have emerged in their findings. By examining what is known about these programs and credentials, we intend for this review to inform future policy and practice by providing a deeper understanding of the pros and cons, costs and benefits, and equity implications of noncredit and NDC options relative to credit-bearing options.

Noncredit and Non-degree Credentials

In general, noncredit education refers to educational offerings that, in contrast to for-credit programs, do not qualify for Title IV financial aid. According to Voorhees and Milam (2005), credit hours are used to determine the amount of financial aid a student is entitled to (p. 5). Laitinen (2012) points out, however, that the credit hour originated as a basis for calculating hours for faculty retirement, and while it counts instructional time both inside and outside the classroom, it was not created to measure quality and does not adequately reflect student learning outcomes. Though other factors may differentiate noncredit from for-credit education, these can vary from setting to setting and even program to program—the most consistent distinction is whether the offering qualifies for financial aid.

Noncredit education includes a range of offerings: open-enrollment occupational training geared toward adults seeking skills for new or current jobs; occupational training arranged and paid for by employers for their employees; courses to fulfill personal interests; English as a Second Language (ESL) courses for non-native speakers; and pre-college remedial education (Bahr et al., 2022; D’Amico et al., 2014). According to D’Amico et al. (2014), there are four types of noncredit education:

- » **Pre-college remediation:** Adult basic education, ESL, GED high school equivalency preparation, some developmental education.
- » **Occupational training:** Instruction geared toward skill development to enter or advance in a job.
- » **Contract training:** Occupational training sponsored by employers for their workers.
- » **Personal interest:** Instruction not intended for job entry or advancement but instead designed to meet the recreational or avocational interests of community members.

Among these four types, occupational noncredit education and contract training have the goal of immediate preparation for careers or career advancement. While there is variation by state and institution, these occupationally oriented forms of noncredit tend to be the most common (D’Amico et al., 2023). They are also the program offerings most commonly considered in policy discussions related to shorter-term pathways to careers.

Clock-hour programs are a kind of noncredit program in which instructional activity is measured in what are called clock hours instead of credit hours. The Integrated Postsecondary Education Data System (IPEDS) defines a clock hour as follows: “A period of time consisting of (1) A 50- to 60-minute class, lecture, or recitation in a 60-minute period; (2) A 50- to 60-minute faculty-supervised laboratory, shop training, or internship in a 60-minute period; or (3) Sixty minutes of preparation in a correspondence course” (IPEDS Glossary, 2023). These types of courses are common in states’ vocational/occupational-oriented institutions—for example, Ohio Technical Centers (OTCs) or Tennessee Colleges of Applied Technology (TCAT) both provide clock-hour programs to their students. Credit-hour programs are similar to, but distinct from, clock-hour programs in that they explicitly offer college credit. IPEDS defines credit hours as “a unit of measure representing the equivalent of an hour (50 minutes) of instruction per week over the entire term. It is applied toward the total number of credit hours needed for

completing the requirements of a degree, diploma, certificate, or other recognized postsecondary credential” (IPEDS Glossary, 2023). Credit-hour programs are restricted to the terms of the traditional academic calendar, whereas clock-hour programs can begin and end at any time. Conversely, the activities associated with clock-hour programs are more specific than those associated with credit-hour programs.

Noncredit programs, which take many forms, are often considered in tandem with NDCs. Some noncredit offerings lead to the award of certain kinds of NDCs (typically certificates or badges and microcredentials), while others prepare students to take exams they must pass before they can attain other types of NDCs (e.g., certifications and licenses). The most common forms of NDCs can be broken down into five categories:

- » **Noncredit certificates:** Credentials awarded by an institution for completion of a noncredit educational program—e.g., courses or programs offered by educational institutions and online providers, military- or employer-based training—with clearly articulated learning outcomes.
- » **Industry certifications:** Credentials awarded by an industry body or governmental agency for the demonstration of skills, typically via examination based on industry or occupational standards.
- » **Occupational or professional licensure:** Credentials whose attainment may be required to work in an occupation, awarded by a governmental agency for the test-based demonstration of competence in a specific occupation and sometimes also for the completion of an educational program.
- » **Journeyworker certification:** Credentials awarded after completion of an apprenticeship or a structured educational and workplace program based on industry and occupational standards.
- » **Badges and microcredentials:** Newly emerging forms of credentials awarded for completion of a short program of study or the demonstration of a targeted set of skills.

In addition to NDCs associated with noncredit program offerings, for-credit certificates are also NDCs. These are credentials awarded by an educational institution for completion of a for-credit educational program, usually less than one year in length. Some studies included in our review examine for-credit certificates in their samples in tandem with noncredit certificates.

Beyond these types of NDCs, even more variation exists because of the many different types of organizations that award NDCs or offer preparation for individuals to attain them. While for-credit certificates are offered only by accredited educational institutions, noncredit certificates are offered by a very wide range of organizations. Similarly, badges and microcredentials are emerging credentials also awarded by a range of organizations. Certifications, licenses, and apprenticeships are awarded only by certain organizations, but many other organizations offer the preparation—often in the form of noncredit education—individuals need to attain these credentials from the organizations that award them. Table 1 provides a snapshot of these patterns, which are evolving as credentials and providers evolve.

Table 1. Organizations that Prepare and/or Award NDCs, By Type of NDC

Organizations	Types of NDCs				
	Certificates (credit and noncredit)	Certifications	Licensure	Apprenticeships	Badges/microcredentials
Education institutions, including community and 4-year colleges (both credit and noncredit programs)	A, I	I	I	I	A, I
Private training providers, including proprietary schools, online providers, and bootcamps	A, I	I	I		A, I
Employers	A, I	I	I	I	A, I
Union training funds	A, I			I	
Professional and industry associations		A			
State governments			A	A	

A= award NDC, I=instruction for NDC; Source: Van Noy, M., & Michael, S. (2022)

Noncredit programs attract students in different life stages with a variety of goals and education backgrounds, including those who seek specific occupational skills and credentials with the goal of entering a career, changing careers, or advancing in their current field of employment (Van Noy et al., 2008; D’Amico et al., 2019). This literature review does not present an exhaustive survey of all of the research on each NDC or provider type but rather focuses in on research that examines noncredit and NDC outcomes. This research typically is focused on noncredit community college education but can include a range of NDCs and providers when focused on NDCs more broadly. Little research has been done to date on most of the NDCs and providers listed in Table 1, and more data and research are required to fully understand this emerging area of educational activity. In the recommendations for further research, we offer suggestions for research focused on noncredit providers beyond community colleges to inform ongoing pressing conversations about funding, policy, and practice.

Methods

We identify a core group of key articles on noncredit education and NDC outcomes. These include educational outcomes (i.e., completion and continued education) as well as labor market outcomes (i.e., employment status and earnings). We focus on research on the outcomes of students in noncredit education and NDC earning in the United States published in the past five years. After examining a total of 49 studies, we chose 15 to include in the review. Many of these articles include research intentionally funded by ECMC Foundation to examine noncredit and NDC outcomes. Table 2 includes a full list of the papers included in this review.

Table 2. Research Papers on Noncredit/NDC Outcomes Reviewed

Citation
Bahr, P. R., Columbus, R., Cepa, K., May-Trifiletti, J., & Kaser, S. (2022). <i>Investigating the hidden college: A study of community college noncredit education in five states</i> . University of Michigan and Opportunity America.
Baum, S., Holzer, H., & Luetmer, G. (2020). <i>Should the federal government fund short-term postsecondary certificate programs?</i> Urban Institute.
Beer, A., Brown, K., & Juszkievicz, J. (2021). <i>Value of community college short-term credentials</i> . Association of Community College Trustees.
Carruthers, K., & Sanford, T. (2018). Way station or launch pad? Unpacking the returns to adult technical education. <i>Journal of Public Economics</i> 165, 146–59.
Certification Data Exchange Project (CDEP). (2017). <i>Connecting industry-recognized certification data to education and workforce outcomes: measuring the value added to skills, employment and wages</i> . Association for Career and Technical Education.
Cronen, S., McQuiggan, M., Isenberg, E., & Grady, S. (2017). <i>Adult training and education: Results from the national household education surveys program of 2016</i> . National Center for Education Statistics.
D’Amico, M. M., Morgan, G. B., Thornton, Z. M., & Bassis, V. (2020). Noncredit education enrollment and outcomes: Exploring the “black box” of noncredit community college education. <i>Career and Technical Education Research</i> , 45(2), 17–38.
Daugherty, L., & Anderson, D. M. (2021). <i>Stackable credential pipelines in Ohio: Evidence on programs and earnings outcomes</i> . RAND Corporation.
Daugherty, L., Kramer, J. W., Anderson, D. M., & Bozick, R. (2020). <i>Stacking educational credentials in Ohio: Pathways through postsecondary education in health care, manufacturing and engineering technology, and information technology</i> . RAND Corporation.
Hester, C., & Kitmitto, S. (2020). <i>The relative returns to credit- and non-credit-bearing credentials</i> . American Institutes for Research.
Lee, L., Neumeister, J. R., Simko, C., & Davoren, A. K. (2020). <i>Characteristics, quality, and outcomes from nontraditional workforce training programs: Results from the survey of educational attainment</i> . NORC, University of Chicago.

McConville, S., Bohn, S., Brooks, B., & Dadgar, M. (2021). *Improving career education pathways into California's workforce*. Public Policy Institute of California.

Strada, Gallup, & Lumina (2019). *Certified value: When do adults without degrees benefit from earning certificates and certifications?*

Tesfai, L., Dancy, K., & McCarthy, M. A. (2018). *Paying more and getting less: How non-degree credentials reflect labor market inequality between men and women*. New America.

Xu, D., & Ran, F. X. (2019). Noncredit education in community college: Students, course enrollments, and academic outcomes. *Community College Review*, 1–25.

We reviewed these studies to understand the scope of their examination of noncredit and NDCs in terms of definitions and methodology. Once we identified the foundational approaches to examining outcomes, we reviewed the findings that emerged the studies collectively to generate a sense of their overall direction, factoring in the range of methodological approaches represented across the full body of research. It is not simple or straightforward to compare findings across studies given these differences, but we offer some general observations. We also offer recommendations on ways to continue to generate research on noncredit and NDC outcomes that can lead to more comparability in research given the variation in data availability, credentials, and program offerings.

Approach to Examining Outcomes

There were three key distinctive elements in how the studies included in our review approached their examination of outcomes—their definitions of noncredit and NDCs; the sample of students they focused on in terms of location, timing, and age; and the methodology for calculating outcomes in their analysis (e.g., their statistical approach, the type of comparison group, the way they operationalized measures of outcomes). Each element is discussed in the following section.

Type of Activity

While all these papers focused on short-term programs primarily aimed at workforce preparation, how they defined these programs varied. As such, we review the definitions and terminology used to discuss short-term programs, typically noncredit and NDCs, and what we know about their content. For the purposes of this analysis, we focus on outcomes related to the following types of programs and credentials:

- » **Noncredit:** Bahr et al., 2022; Beer et al., 2021; D’Amico et al., 2020; Lee et al., 2020; Xu & Ran, 2019— typically including noncredit certificates: Baum et al., 2020; Hester & Kitmitto, 2020; Strada, Gallup, & Lumina, 2019.
- » **Clock-hour programs:** Carruthers & Sanford, 2018; Daugherty & Anderson, 2021; Daugherty et al., 2020.
- » **NDCs:** typically including certificates, certifications, and licenses from a range of providers, CDEP, 2017; Strada, Gallup, & Lumina, 2019; Tesfai et al., 2018; Cronen et al., 2018.

In addition to looking at noncredit and NDCs, a few studies also included examinations of for-credit certificates (Lee et al., 2020; Hester & Kitmitto, 2020; Beer et al., 2021; Baum et al., 2020). See Table 2 for a summary and description of the type of noncredit and NDCs that each focused on.

In addition, noncredit and NDCs can be offered in varying organizational settings by different providers. The majority of studies in our sample looked at noncredit education or NDCs in community colleges (Bahr et al., 2022; Baum et al., 2020; Beer et al., 2021; D’Amico et al., 2020; Daugherty & Anderson, 2021; Daugherty et al., 2020; McConville et al., 2021; Xu & Ran, 2019; CDEP, 2017). Other studies discussed subbaccalaureate institutions more generally (Tesfai et al., 2018; Cronen et al., 2018), and still others discussed high school education through four-year universities (Hester & Kitmitto, 2020; Lee et al., 2020). One study (Carruthers & Sanford, 2018) looked solely at Tennessee Colleges of Applied Technology whereas another surveyed a range of colleges, universities, and professional/trade organizations (Strada, Gallup, & Lumina, 2019).

Table 3: Type of Activity Examined in Studies Included in Review

Citation	Description			
	Noncredit	For credit	Clock hour	NDCs*
Bahr et al. (2022)	X			Community college noncredit education in 5 states (CA, IN, IA, LA, TX)
Baum et al. (2020)	X	X		Noncredit and for-credit certificates at all types of higher education institutions that offer associate degrees, bachelor’s degrees, and certificates
Beer et al. (2021)	X	X		Short-term programs at community colleges; does not distinguish between for-credit and noncredit
Carruthers & Sanford (2018)			X	Clock-hour diplomas and certificates earned at Tennessee Colleges for Applied Technology
CDEP (2017)			X	Industry certification for CompTIA in 7 states
Cronen et al. (2018)			X	NDCs including certifications, licenses, and postsecondary education certificates
D’Amico et al. (2020)	X			Community college noncredit education in Iowa
Daugherty & Anderson (2021)			X	Noncredit and for-credit stackable credentials in Ohio higher education institutions
Daugherty et al. (2020)			X	Noncredit and for-credit stackable credentials in Ohio higher education institutions
Hester & Kitmitto (2020)	X	X		Noncredit and for-credit certificates from the NLSY97 records
Lee et al. (2020)			X	NDCs including accredited and portable non-degree training and non-accredited and/or non-portable training
McConville et al. (2021)	X	X		Noncredit and for-credit career education including short-term certificates, long-term certificates, and associate degrees in CA
Strada, Gallup, & Lumina (2019)			X	NDCs, certificates, and certifications
Tesfai et al. (2018)			X	NDCs, certificates, certifications, and licenses
Xu & Ran (2019)	X			Credit and noncredit education in community colleges in 9 institutions

*Notes: NDCs=certificates, certifications, licenses

Beyond the basic description of the type of noncredit program or NDC and the organization that provides it, additional information on the content provides a better understanding of the nature of the outcomes to be expected as a result of its completion. For example, programs examined in the studies we reviewed varied in their length, field of study, instructional approach, and other characteristics (D'Amico et al., 2023). Further, noncredit occupational programs varied based on whether they provided all or a targeted set of the skills needed for an occupation, as well as whether they were intended for occupations that require a bachelor's degree (Van Noy, 2023). However, most studies contained limited information on the content of the programs and credentials whose outcomes they examined, so their research may include a wide range of programs and credentials that merited more focused study. Future research should include more detailed information about the programs and credentials under study including their length, industry acceptance, and whether they include a full set of skills for an occupation.

Samples

Due to the lack of data collection related to noncredit education and NDCs, research to date has been limited. In recent years, more data have become available as interest in better understanding these kinds of educational experiences and credentials has increased. To that end, researchers have sought out a range of possible data sources to begin to paint a picture of noncredit education and NDCs. These studies draw on two main data sources: national surveys and state administrative data. Together, these studies provide an impression of noncredit student outcomes in different contexts and time frames. See Table 4 for a description of the data sources and samples in the studies reviewed. We report on the findings with this variation in mind, as these studies provide early insight into students' diverse and varied experiences with noncredit and NDCs.

The few national data sources that are available include surveys with limited metrics that can be used to examine noncredit and NDCs: the National Longitudinal Survey of Youth (Hester & Kitmitto, 2020); the Survey of Educational Attainment from NORC (Lee et al., 2020); the Adult Training and Education Survey (ATES) (Cronen et al., 2017; Tesfai et al., 2018; Baum et al., 2020); the National Postsecondary Longitudinal Student Aid Study (NPSAS) in 2016 (Baum et al., 2020); Beginning Postsecondary Students Study (BPS) (Baum et al., 2020); and Strada's Education Consumer Survey (Strada, Gallup, & Lumina, 2019).

Among these national surveys, some speak more directly to noncredit education and NDCs, with the ATES and Strada surveys more intentionally designed to measure these experiences. ATES, which is representative of the U.S. noninstitutional population of adults of all ages, covers the full range of educational attainment outcomes. The Strada Education Consumer Survey, a nationally representative sample of U.S. adults ages 18–65, can determine the impact of certificates and certifications but does not distinguish between credit and noncredit. The Survey of Educational Attainment conducted by NORC authors Lee et al. (2020) reports on a general population sample of U.S. adults ages 18–64 and distinguishes between NDCs and the type of provider.

Several other national surveys are intended to track the trajectories and experiences of young people and/or college students and provide insights on noncredit and NDCs in a less direct fashion. The National Longitudinal Survey of Youth (NLSY97) used by Hester & Kitmitto (2020) includes a nationally representative sample of

youth ages 12–16 as of December 1996. This survey distinguishes between credit and noncredit training. BPS is a longitudinal survey based on the same cohort of first-time students enrolled in postsecondary education included in NPSAS. Neither survey distinguishes between credit and noncredit, and neither records the length of certificates. Both can only speak to the experiences of students in postsecondary institutions by comparing completers with noncompleters (Baum et al., 2020).

Given the lack of comprehensive national data, states have increasingly been relied upon as a source of data on noncredit education and NDCs. While noncredit data systems are not available across all 50 states, many states have data on wages that can be linked with further education data to help begin to understand student outcomes. These administrative data sets often provide large samples on which to conduct analysis. Data from state-level community college systems and boards form the basis for analysis of student outcomes in several states, including Louisiana (Beer et al., 2021; Bahr et al., 2022); North Carolina (Beer et al., 2021); Virginia (Beer et al., 2021); Iowa (Bahr et al., 2022; D’Amico et al., 2020); California (Bahr et al., 2022; McConville et al., 2021); Ohio (Daugherty & Anderson, 2021); and Texas (Bahr et al., 2022). Further data from CompTIA industry certifications in several states (California, Florida, Illinois, North Carolina, Oklahoma, and Kentucky) come together as part of the Certification Data Exchange Project (CDEP) (2017), which allows researchers to compare CompTIA data with community college student records. Institutional data aggregated from across several states also can form opportunities for analysis such as with Xu & Ran (2019).

While these analyses provide just a subsample of the noncredit activity in the field, the coverage and reach across so many states begins to provide a sense of the fuller picture of noncredit programming. One limitation inherent to administrative data is that these data are not created with the end point of research in mind; they are created through institutional records often originating from forms on which students may or may not complete the requested information. For example, high numbers of missing responses are common on key demographic variables like race/ethnicity (Bahr et al., 2022; D’Amico et al., 2023). As states and institutions begin to focus more on understanding how noncredit participation varies across demographic groups populations, these data may grow and become more established (D’Amico et al., 2023).

Table 4. Data Sources and Samples of Studies Included in Review

Study	Data Source(s)	Sample Size	Data Collection Year	Data Type			Data Collection Type		Ages
				State Administrative	National Survey	Longitudinal	Cross-sectional		
	Iowa Department of Education	293,770 & 200,040	2013–2014 to 2017–2018	✓					
	California Community Colleges Chancellor’s Office	772,130 & 2,2028,040	2013–2014 to 2017–2018	✓					
Bahr et al. (2022)	Texas Higher Education Coordinating Board	389,925 & 1,385,074	2013–2014 to 2017–2018	✓				17–64	
	Louisiana Community and Technical System (LCTCS)	30,237 & NR	2017–2018	✓			✓		
	Ivy Tech Community College of Indiana	9,057 & 86,244	2017–2018	✓			✓		

	National Postsecondary Longitudinal Study (NPSAS)		2016		✓	✓	
Baum et al. (2020)	Beginning Postsecondary Students Study (BPS)	NR	2003–2004 and 2011–2012		✓		25–64
	Adult Training and Education Survey (ATES)		2016		✓	✓	
Beer et al. (2021)	LCTCS; North Carolina Community College System; Virginia Community College System (VCCS)	NR	2017	✓		✓	NR
Carruthers & Sanford (2018)	Tennessee Higher Education Commission & Tennessee Department of Labor and Development	258,258	2004–2008				20–60
CDEP (2017)	CompTIA	1,000,000+; 4,444; All others = 89,000	Unclear	✓		✓	NR
Cronen et al. (2017)	National Household Education Surveys Program; ATES	47,744 & 196.3 million	2016		✓	✓	16–65

D'Amico et al. (2020)	Iowa Department of Education Division of Community Colleges and Workforce Preparation	181,765	2016-2017	✓	✓	38.5 (mean)
Daugherty & Anderson (2021)	Ohio Longitudinal Data Archive, Employment and Wage Data for Unemployment Insurance in Ohio & Collection of Certificate Program Applications for Approval	28,239	2004-2005 to 2018-2019 & 2014-2019	✓	✓	NR
Daugherty et al. (2020)	Ohio Longitudinal Data Archive	27,509	2004-2005 to 2014-2015	✓	✓	NR
Hester & Kitmitto (2020)	National Longitudinal Survey of Youth 1997 (NLSY97)	9,000	1996-2000 to 2008-2014		✓	18-30
Lee et al. (2020)	Survey of Educational Attainment	2,290	2019		✓	18-64
McConville et al. (2021)	Management Information System for California Community Colleges Chancellors Office	~1,000,000	2007-2019	✓	✓	24-50 or older

Strada, Gallup, & Lumina (2019)	Education Consumer Survey	50,000	2016–2018	✓	✓	25–64
Tesfai et al. (2018)	ATES	NR	2016	✓	✓	NR
Xu & Ran (2019)	9 colleges using Completion by Design Initiative (CBD); Integrated Postsecondary Education Data System (IPEDS)	60,846	2007–2013	✓	✓	Under 18, 18–24, 25–64, 65 and Over

Methodology

When making sense of these research studies, two essential characteristics define and differentiate them. One is what they use as a comparison group for noncredit or NDC—either for-credit education and/or degree or the absence of noncredit education and/or NDC—and the other is the analytic approach to the research—causal vs. descriptive. We discuss these common characteristics further in the sections that follow.

Comparisons

Inherent to the examination of outcomes is a comparison relative to another group. For noncredit and NDCs, how the comparison group, or counterfactual, is defined is determined by the research question about the outcomes and the embedded assumptions of what a reasonable alternative path for the same individuals would be. It is also determined by the practical reality of data availability.

In the studies in our review, the counterfactual is always more education or less education, but there is some variation in the strategies they use to draw the comparison with noncredit and NDC outcomes. One strategy is to examine the outcomes of the same individual over time in pre-post studies, typically beginning with the student’s status at pre-enrollment. Thus, the before is the “no noncredit or NDC” comparison condition and the after is the noncredit or NDC treatment condition. Another strategy is to compare outcomes across samples with either less or more education at the same point in time. This can be done by comparing outcomes of a group of individuals with noncredit or NDCs to those of a comparable group of individuals—either a group with no noncredit or NDC or, alternatively, a group with more education (e.g., a credit degree or credential). See Table 5 for descriptions of the comparison groups used in each study.

Comparing individuals with noncredit or NDCs to those with either less education (no noncredit or NDC) or more education (a degree) answers different questions: Is noncredit/NDC better than no education in the labor market? Is noncredit/NDC as beneficial as a degree?

Table 5. Comparison Groups of Studies Included in Review

Citation	Comparison Group		Description of Comparison
	Same Individual Over Time	Across Samples, Less Education Across Samples, More Education	
Bahr et al. (2022)	X		Completion and labor market outcomes before and after enrollment in noncredit education
Baum et al. (2020)		X X	BPS: Certificate-student earnings vs. earnings of noncompleters and students with associate, bachelor's ATES: Certificate-student earnings vs. earnings with no high school diploma through obtaining a bachelor's degree
Beer et al. (2021)	X		Pre- vs. post-program participation earnings by industry
Carruthers & Sanford (2018)		X	Labor market outcomes for completers vs. noncompleters of TCAT certificates and diplomas
CDEP (2017)	X	X	Labor market outcomes for pre- vs. post-CompTIA certification; labor market outcomes for CompTIA vs. no CompTIA
Cronen et al. (2017)		X	Labor market outcomes for NDC holders vs. those who do not have NDCs
D'Amico et al. (2020)		X	Noncredit students in Iowa compared on completion rates
Daugherty & Anderson (2021)	X		Labor market outcomes and progression of pre-certificate earnings vs. post-certificate credential stacking and earnings for students stacking credentials after having earned an initial certificate in health care, MET, or IT
Daugherty et al. (2020)		X	Progression of first-time certificate earners vs. credential earners who stacked or completed additional certificates
Hester & Kitmitto (2020)		X	Labor market outcomes of non-credit-bearing certificates vs. credit-bearing certificates/less than four-year degree
Lee et al. (2020)		X	Completion of associate and bachelor's degree holders with NDCs vs. non-degree holders with NDCs

McConville et al. (2021)	X	Career education progress and labor market outcomes by groups/demographics
Strada, Gallup, & Lumina (2019)	X	Labor market outcomes of non-degree adults without certificate/certification vs. non-degree adults with certificate/certification
Tesfai et al. (2018)	X	Completion and labor market outcomes of NDC holders by gender
Xu & Ran (2019)	X	Completion and progress of noncredit vs. credit-bearing college-level courses at community colleges

The other approach of comparing noncredit to credit education requires consideration of the qualities of the programs to consider their similarities and differences to be sure to compare apples to apples, to get the closest match in terms of program content and intensity. In the case of short-term certificates, credit and noncredit variations may be relatively comparable depending on their content, which can vary substantially depending on the institution. These terms do not have standard meaning yet, though definitions are beginning to converge (as noted above). If a clear match can be made, this comparison offers an interesting and potentially useful way to tease out the impact of offering programs in the credit format. Before getting too far into these comparisons, it is important to consider variations across field of study in whether a program is offered in credit or noncredit.

Research on outcomes from short-term credit-bearing credentials is more established and provides useful benchmarks within which to consider findings. We can place these outcomes in the context of other studies comparing them to the outcomes from for-credit certificates. For example, Belfield & Bailey (2017) take a comprehensive look at research on returns from associate degrees and certificates using administrative data from eight states. All the studies in this review use fixed effect models and control for demographics. Their consensus on returns is that there are both clear and consistent returns to associate degrees but only modest and “probably temporary” returns to certificates. They also find evidence of returns for credit completion. The returns to certificates seem to vary positively with how long the program of study is as well as the field of study, with high returns for vocational subjects and health-related fields but very little returns for “academically focused” associate degrees (Belfield & Bailey, 2017, p. 13).

It is important to view noncredit and NDCs in the context of the potential counterfactuals, including no education and pursuit of a degree. These counterfactuals reflect the wider range of pathways and options that students are considering and potentially pursuing based on what is available to them and part of their current set of preferences. That is, what would students do in the absence of noncredit and NDCs, even if it is not on the same pathway? Would they complete a bachelor’s degree? An associate degree? Would they attend some college, but not complete a program? Would they not pursue any additional education and training?

Analytic Approach

Depending on the kind of data that are available, different analytic approaches are available to examine the relationship between noncredit education/NDCs and their education and employment outcomes. Each approach offers different contributions to the understanding of these outcomes. Much work at this stage is devoted to gaining a basic understanding of noncredit and NDCs. As such, research is focused on descriptive analyses to generate a basic understanding of the nature of these outcomes and how they might vary across the student population. Among the research papers in our review, 10 focused on descriptive analyses of student outcomes. Among these, several focused on providing descriptive information on student outcomes in terms of employment rates: Carruthers & Sanford (2018), Hester & Kitmitto (2020), Beer et al. (2021), Bahr et al. (2022), Daugherty & Anderson (2021), Baum et al. (2020), Tesfai et al. (2018), CDEP (2017), McConville et al. (2021), and Strada, Gallup, & Lumina (2019). Others provide descriptive information on students' educational outcomes: Lee et al. (2020), Daugherty & Anderson (2021), Daugherty et al. (2020), Baum et al. (2020), Cronen et al. (2017), Xu & Ran (2019), D'Amico et al. (2020), and McConville et al. (2021). These studies demonstrate the reach of these programs, often within state policy contexts, as well as the range of possible outcomes. Table 6 summarizes the analytic approach of the studies in our review.

Table 6. Analytic Approach of Studies Included in Review

Citation	Analytic Approach		Description of Analytic Approach
	Descriptive	Statistical	
Bahr et al. (2022)	X		Descriptive statistics of student characteristics, enrollment patterns, educational outcomes, and labor market outcomes
Baum et al. (2020)	X	X	Descriptive statistics of labor market outcomes, regression controlling for gender, credit vs. noncredit, number of hours of program, program length, field of study
Beer et al. (2021)	X		Descriptive statistics of industry and labor market outcomes
Carruthers & Sanford (2018)		X	Linear regression of labor market outcomes controlling for individual heterogeneity in earnings, earnings dip associated with training, working terms, student characteristics
CDEP (2017)	X		Descriptive statistics of degree codes, industry, and certification outcomes
Cronen et al. (2017)	X		Descriptive statistics of student characteristics accounting for work credentials, program characteristics
D'Amico et al. (2020)	X	X	Descriptive statistics of enrollment and outcomes regression controlling for demographics, type of noncredit

Daugherty & Anderson (2021)	X		Regression controlling for current college enrollment, age, individual fixed effects, quarter fixed effects
Daugherty et al. (2020)	X		Descriptive statistics of stacking outcomes
Hester & Kitmitto (2020)	X		Individual fixed effects, regression controlling for education level, marital status, number of children, enrolled in school, enrolled in training, demographic characteristics
Lee et al. (2020)	X	X	Descriptive statistics of completion outcomes, logistic regression of satisfaction across training controlling for demographic characteristics, career characteristics, training characteristics
McConville et al. (2021)	X	X	Descriptive statistics of outcomes, logistic regression of completion controlling for demographics, year, discipline, prior education level, college fixed effects
Strada, Gallup, & Lumina (2019)	X		Descriptive statistics of demographics and labor market outcomes
Tesfai et al. (2018)	X		Sample mean comparisons of completion and labor market outcomes
Xu & Ran (2019)	X		Descriptive statistics of demographics and completion outcomes

These descriptive analyses provide a general understanding of the landscape of possible outcomes for these programs. They do not, however, control for possible confounding variables that would explain differences in outcomes based on other characteristics—such as other prior education or prior work experience, for example—that could also be explanatory factors related to their outcomes. Thus, multivariate analyses and/or quasi-experimental analyses using statistical techniques to control for these other confounding characteristics are needed to begin to tease out the unique contribution of noncredit education and NDCs to these outcomes.

These kinds of analyses are only possible given the correct set of data points, which are not always available. Fortunately, in some cases, available data have allowed for causal analyses to control for individual characteristics that may be correlated with outcomes. Of the papers reviewed, seven used types of multivariate analysis including linear or logistic regression (Lee et al., 2020; Baum et al., 2020; Daugherty & Anderson, 2021; D’Amico et al., 2020; McConville et al., 2021; Carruthers & Sanford, 2018) or fixed effects models (Daugherty & Anderson, 2021; Hester & Kitmitto, 2020). These allowed the authors to control for factors like demographic characteristics, career characteristics, and training characteristics (Lee et al., 2020) as well as age, gender, race/ethnicity, and college enrollment (Daugherty & Anderson, 2021). In the case of fixed effects models, available data allowed for the control of individual-level differences that do not change over time, e.g., gender, by examining changes over time in the outcomes for the individual.

Findings

Key outcomes of interest for students in noncredit and NDCs are their educational outcomes and their labor market outcomes. Studies in this review use various ways to operationalize measures within each of these two broad categories. The following sections discuss the definitions of each type of outcome and summarize the key findings based on these outcomes across the studies in this review. We begin by reviewing what these studies reveal about the enrollment characteristics of the students in noncredit education. We examine the studies' findings on educational outcomes and labor market outcomes.

Enrollment Characteristics

Several studies include information on the demographics of students. Among these, three studies—Bahr et al. (2022), Xu & Ran (2019), and McConville et al. (2021)—provide insight on the characteristics of the noncredit student population in the locations of their samples. Across these studies, noncredit students tended to be older. Xu & Ran (2019) found that over 48 percent of their sample were women, and the average age was just over 30 years old. Bahr et al. (2022) found that the majority of noncredit students were older than 25 in all the study's states except for California. McConville et al. (2021) found that almost half of the students pursuing career education programs were 25 years of age or older.

In terms of gender, the studies found mixed patterns of enrollment. Bahr et al. (2022) found in Iowa, California, and Indiana, students were majority female, but noncredit students in Texas and Louisiana were majority male. Some of the variation by gender may reflect patterns of enrollment based on field of study. McConville et al. (2021) found there were gendered differences among disciplines, but men and women were equally represented overall.

In terms of race/ethnicity, McConville et al. (2021) examined the racial/ethnic composition of students pursuing career education programs in California and found the following results: 39 percent Latino, 35 percent white, 14 percent Asian, 7 percent Black, and 1 percent each Native American, Pacific Islander, and multi-race students. Xu & Ran (2019) found that the demographic composition of noncredit credential-seeking students was similar to that of noncredit students overall and can be broken down as follows: 51 percent white, 29 percent African American, 15 percent Hispanic, 2 percent Asian, and 4 percent identifying as Other. Bahr et al. (2022) found that across the five states in their study, the majority of noncredit students were white in Iowa (80 percent), Louisiana (62 percent), and Indiana (83 percent), and a plurality was white in Texas (41 percent) and Hispanic in California (48 percent). However, these numbers are cautiously calculated given the substantial amount of missing data about race/ethnicity in the set (Bahr et al., 2022).

Xu & Ran (2019) provide insight on noncredit students' prior education and income. The two largest differences between noncredit credential-seeking students and noncredit students overall were the percentage that earned a high school diploma and the first-term intention of the student. The majority of noncredit credential-seeking students (71%) earned a high school diploma compared to just 23 percent of noncredit students overall. This is in contrast to students in for-credit programs, who had a higher high school graduation rate (93%). The average income of noncredit credential-seeking students totaled under \$53,000 compared to \$57,096 among for-credit students.

Cronen et al. (2017) focus on the characteristics of U.S. adults in a 2016 national sample who reported that they hold an NDC such as a postsecondary certificate, certification, or license. They found that 27 percent, including 29 percent of females and 24 percent of males, held an NDC. White and Black respondents had similar rates of NDC holders—about 30 percent (white: 29%; Black 28%)—while fewer Hispanic (19%) and Asian or Pacific Islander (21%) respondents reported having an NDC. Close to one-third of respondents ages 35–54 (35–44: 32%; 45–54: 31%) hold NDCs versus only 11 percent of those ages 16–24. Those with more education were more likely to have an NDC: 49 percent of those with a graduate or professional degree, 31 percent of bachelor’s degree holders, 42 percent of associate degree holders, and 29 percent of those with some college but no degree had an NDC compared with high school degree holders (17%) and those with less than a high school degree (7%). Of postsecondary certificate holders who were employed, most were employed in administrative support (17%). For certification holders, the two most common fields of occupation were health care (17%) and business management and operations (14%). For licenses, the two most common occupational fields were health care (25%) and education and library occupations (16%).

D’Amico et al. (2020) examined how demographics impacted the type of noncredit participants enrolled in. They found that, compared to men, women were less likely to enroll in personal interest, pre-college remediation, and sponsored occupational training and more likely to enroll in individual enrollment occupational training. Among women, occupational training through individual enrollment was most common (66.9%) compared to men (59.7%). Overall, their findings regarding race, found that white students were more likely than students of color to enroll in individual occupational training. Hispanic/Latinx students and Black or African American students were more likely to be in pre-college remediation than white students. Additionally, Hispanic/Latinx students were more likely to enroll in personal interest compared white students.

Educational Outcomes

There are several ways to measure educational outcomes for noncredit students. Among our studies, Lee et al. (2020) and D’Amico et al. (2020) used the most basic measure— noncredit course completion. More often, however, efforts examined how noncredit education functions and whether it creates pathways for students to pursue additional education: Bahr et al. (2022); Daugherty & Anderson (2021); McConville et al. (2021); Daugherty et al. (2020); and Xu & Ran (2019). Xu & Ran (2019) focus on progression from noncredit programs to further education through stackable credential pathways:

Completion. Various measures of completion are used across the studies. Some examine how many contact hours are amassed: Bahr et al. (2022) and D’Amico et al. (2020). Others look at the percent of individuals who complete a program or NDC: Daugherty & Anderson (2021); McConville et al. (2021); Baum et al. (2020); D’Amico et al. (2020); Lee et al. (2020); Xu & Ran (2019); and Cronen et al. (2017). Table 7 summarizes findings on educational outcomes for completion of noncredit education and of NDCs.

Examining noncredit students across five states (Iowa, California, Texas, Louisiana, and Indiana), Bahr et al. (2022) found that across states, noncredit community college students tried fewer classes and amassed fewer contact hours compared to for-credit students. However, there was variation in the total number of contact

hours attempted, with Indiana students attempting an average of 39 contact hours of noncredit coursework in 2 years versus students in Texas, who attempted 111 contact hours on average (Bahr et al., 2022, pp. 15–17). D’Amico et al. (2020) found noncredit enrollment in Iowa’s community college noncredit education was the highest in terms of contact hours and completions in pre-college remediation, with an average of 66 contact hours and 2 completions. For occupational training, the average contact hours was 11 with an average of 2 completions. Their sample, which utilized data from the Iowa Department of Education Division of Community Colleges and Workforce Preparation, included 181,765 records from the 2016–17 academic year.

Among students enrolled in noncredit in California, McConville et al. (2021) found that the majority of students who pursued career education at California’s community colleges did not earn a credential. For example, only about 25 percent of students in family and consumer sciences, engineering, and public and protective services completed a credential within six years of earning their first credits in career education. Other industries saw even lower completion rates. An exception to this overall finding was health programs, which experienced completion rates of over 50 percent. This exception is likely due to the close alignment of health programs with the nursing field, which requires licensing tests and government-issued licenses. Further, the study found that it takes approximately two and a half years for a student to complete their first credential, regardless of the length of the program.

Among their sample of community college students from nine institutions, Xu & Ran (2019) found that 40 percent of all community college course enrollments from 2007 to 2012 were in noncredit courses. Nearly half of those noncredit enrollments were in vocational courses. Course completion rates in the noncredit courses were similar to those of for-credit courses. However, when they examined the data by field of study, they found completion rates were substantially lower in noncredit courses compared to for-credit courses in allied health (69 percent vs. 88 percent), and nursing (70 percent vs. 94 percent). Despite the lower noncredit completion rates in these fields, noncredit course enrollments were more prevalent in these fields than in other fields, probably because they are closely aligned to an occupation.

Other studies that examine attainment found relatively low levels of completion, both for NDCs and for noncredit. Focusing on NDC attainment among adults ages 18 to 64, utilizing a weighted nationally representative sample of U.S. households, Lee et al. (2020) found that among individuals who had no college degree, 31 percent completed certifications/licenses, 36 percent completed certificates, 27 percent completed work experiences, and 22 percent completed continuing education. Tesfai et al. (2018) found that there were no significant differences in the attainment of NDCs by gender. Men and women without bachelor’s degrees were equally likely to have earned a certificate, certification, or license.

Table 7. Summary of Completion Outcomes Determined by Studies Included in Review

Key Finding, By Type of Activity	Summary*
Noncredit	
Bahr et al. (2022)	
<ul style="list-style-type: none"> Noncredit community college students tried fewer classes and amassed fewer contact hours compared to for-credit students. 	-
D’Amico et al. (2020)	
<ul style="list-style-type: none"> In 2016–17, Iowa’s noncredit enrollment was concentrated in occupational training. 	/
<ul style="list-style-type: none"> Individuals completing courses at colleges with a high CTE focus had a great number of course completions. Likely connected to the high prevalence of health and industrial field programs in the dataset. 	+
<ul style="list-style-type: none"> Women were half as likely to enroll in sponsored occupational training but more likely to enroll in occupational training by individual enrollment. 	/
McConville et al. (2021)	
<ul style="list-style-type: none"> Most students who pursue career education do not earn a credential or a stackable credential. 	-
<ul style="list-style-type: none"> Students that complete at least 1 full-time term have higher completion rates. 	+
Xu & Ran (2019)	
<ul style="list-style-type: none"> Most categories of noncredit courses had lower pass rates than credit-bearing college-level courses, but noncredit vocational courses had course completion rates that were similar to those for college-level courses. 	/
<ul style="list-style-type: none"> Noncredit course enrollments were more prevalent in fields that are closely tied to an occupation, e.g., protective services, nursing, allied health. 	+
Non-degree credentials	
Lee et al. (2020)	
<ul style="list-style-type: none"> Most workers had completed at least one training program. Those with a BA or an AA were significantly more likely to have completed at least one training program compared to those without degrees. 	/
Tesfai et al. (2018)	
<ul style="list-style-type: none"> There are no substantial differences in NDC attainment by gender. 	+

* Indicates the direction of the outcome for noncredit/NDC: positive (+), negative (-), mixed (/)

Connections to credit. Analyses of state data provide important insights on the connections that noncredit students have with credit programs. These connections include the possibility of transition from noncredit programs to credit programs as well as the possibility of simultaneous enrollment—the ability to be enrolled in both noncredit and for-credit programming at the same time. In general, rates of transition to credit programs among noncredit students are low. Table 8 summarizes findings on educational outcomes for continued education via stackable credentials and transitions to credit for noncredit education, including clock-hour programs.

In their five-state study Bahr et al. (2022) found that except for those in California, only about 1 in 20 noncredit students moved into for-credit education within two years of entering community college. In California over half of noncredit students simultaneously enrolled in for-credit courses during their first semester in community college. In other states, those numbers were in the single digits. For example, in Indiana only 3 percent of noncredit students enrolled simultaneously in noncredit and for-credit programs. Regarding transitioning from noncredit to credit or taking noncredit and for-credit simultaneously, female students in Iowa and Texas were more likely to be in these two categories. Only California and Texas had data of high enough quality to investigate whether race/ethnicity impacts students' transition from noncredit to credit or simultaneous enrollment. In both states, Hispanic students were most likely to enroll simultaneously. Xu & Ran (2019) found that the vast majority (about 95%) of credential-seeking noncredit students did not complete any kind of credential within six years. The study also found that only a small percentage of credential-seeking noncredit students transitioned to for-credit programs.

In clock-hour programs in Ohio, Daugherty et al. (2020) found that OTC students who earned noncredit certificates (16%) were less likely to earn additional credentials within four years compared to similar students in community colleges (39%) and universities (51%). Of those who received an OTC certificate and went on to stack credentials, the majority transferred to a community college or university. Most of the students who stacked credentials did so within the same field of study in which they earned their first certificate although some variation in stacking occurred across fields of study. Compared to manufacturing and engineering technologies (MET) and information technology (IT), health care students had the lowest rate of stacking, but most first-time credential earners were in health care. Variation also occurred by race/ethnicity. Compared to white students and younger learners, Black students and adult learners had lower rates of stacking. The authors suggest that this may have been due to the overrepresentation of these groups in OTCs, where the rates of stacking are lower than other institution types. At OTCs, non-white MET students were represented at higher rates among first-time certificate earners and stackers.

Certificate earners at OTCs were younger and more likely to be white than were students earning credit-bearing certificates (Daugherty & Anderson, 2021). They were also more likely to be in health care. Women had larger returns to their certificates than men due to their higher concentration in health care. The authors also found that Hispanic students had larger earnings gains from a first certificate than white or Black students. Hispanic students, however, had similar returns to stacking as their white counterparts.

Table 8. Summary of Findings on Stackable Credentials and Transitions to Credit Determined by Studies Included in Review

Key Finding, By Type of Activity
Noncredit
Bahr et al. (2022)
<ul style="list-style-type: none"> Only about 1 in 20 noncredit students moved into for-credit education within two years of entering community college.
McConville et al. (2021)
<ul style="list-style-type: none"> It was rare for students to earn a first credential (about 25%) and rarer still for a student to earn a stackable credential—only 5 percent complete a stackable credential.
Xu & Ran (2019)
<ul style="list-style-type: none"> A small portion—32 percent—of credential-seeking noncredit students took at least one credit-bearing course, and 22 percent enrolled in for-credit courses for at least two semesters and passed at least one credit-bearing course. The vast majority of credential-seeking noncredit students did not attain any kind of educational credential within 6 years.
Clock Hour
Daugherty & Anderson (2021)
<ul style="list-style-type: none"> Among OTC certificate earners, less than 15 percent of students went on to stack credentials.
Daugherty et al. (2020)
<ul style="list-style-type: none"> Students earning a certificate at a community college (39%) or university (51%) were more likely than their peers who first earned a certificate at an OTC (16%) to later earn additional credentials. Of the students who earned an initial certificate at an OTC and went on to stack credentials, most eventually transferred to a community college or university. Among students who did stack credentials, most students stacked within initial certificate field.

Labor Market Outcomes

There are a variety of issues involved in defining how to measure labor market outcomes including the length of time after program completion and the measures used. Several studies focus on students’ employment status—specifically, whether they obtained employment at some point after the program: Bahr et al. (2022); Baum et al. (2020); Hester & Kitmitto (2020); Strada, Gallup, & Lumina (2019); Carruthers & Sanford (2018); Tesfai et al. (2018); and CDEP (2017). Others focus on reporting the average earnings of those in noncredit programs: Beer et al. (2021); Daugherty & Anderson (2021); McConville et al. (2021); Baum et al. (2020); Strada, Gallup, & Lumina (2019) and CDEP (2017). The studies report each of these outcomes relative to the comparison group that is the focal point of their research. Table 9 summarizes findings on labor market outcomes.

Several studies use data from administrative records to examine student labor market outcomes from noncredit education by tracking students' employment and earnings over time, comparing these outcomes pre- and post-enrollment in noncredit education. Many studies use descriptive methods to report on these outcomes. Among these studies, there is an overall trend showing modest positive outcomes without controlling for other factors. With pre-enrollment earning controlled for, several studies demonstrate modest increases associated with these programs. It is important to view labor market outcomes over time with caution, however, noting that many students who enroll in education do so because they are unemployed and, as a result, experience a dip in their earnings that would naturally recover even in the absence of education (Heckman & Smith, 1995).

Throughout this section, we discuss each of the studies starting with descriptive studies, followed by studies that employ various statistical approaches to control for confounding characteristics that could otherwise explain differences in outcomes across those with and without noncredit education. While both employment and earnings are discussed in many studies, our review focuses primarily on earnings outcomes, which were more consistently examined and are most often the subject of focus within discussions of labor market outcomes. Table 9 provides a summary of labor market outcomes for noncredit education, clock-hour programs, and NDCs.

Table 9. Summary of Findings on Labor Market Outcomes Determined by Studies Included in Review

Description of Key Findings, By Type of Activity	Summary*
Noncredit	
Bahr et al. (2022)	
<ul style="list-style-type: none"> In Texas, there were modest earnings gains after noncredit enrollment. 	
<ul style="list-style-type: none"> Annual earnings were approximately \$6,000 higher one year after noncredit entry relative to one year before enrollment. 	+
Baum et al. (2020)	
<ul style="list-style-type: none"> For-credit certificates had more labor market value than noncredit certificates. 	-
<ul style="list-style-type: none"> Adults who completed bachelor's degrees were more likely than those who completed certificates or associate degrees to be in jobs related to their majors. 	-
<ul style="list-style-type: none"> Men who dropped out of certificate and associate degree programs earned more than women who completed their programs. 	-
<ul style="list-style-type: none"> Certificates in different fields were associated with widely divergent labor market outcomes. 	/
Beer et al. (2020)	
<ul style="list-style-type: none"> Mix of programs by industry varied by region within and across states. 	
<ul style="list-style-type: none"> Earnings outcomes varied dramatically by industry and region from earnings losses to substantial gains. 	/
<ul style="list-style-type: none"> Industries were highly gendered. 	

Hester & Kitmitto (2020)

- Credit-bearing programs did not yield a significant increase in the likelihood of employment compared to noncredit programs. /
- Credit-bearing completers earned more annually compared to noncredit program completers.

McConville et al. (2021)

- Students who reported their current job was closely related to their recent training programs reported wage gains three times larger compared to students whose job was not related to their training. + -
- Health care occupations have the highest share of workers holding a professional license or certificate. Only 25 percent of students in family and consumer sciences, engineering, and public/protective services completed a credential within six years of earning their first credits in career education. +

Clock Hour**Carruthers & Sanford (2018)**

- Holding a certificate or diploma seemed to increase the likelihood of employment, albeit at different rates. +
- Certificate and diploma earners seemed to have increased earnings, albeit at different rates. +
- TCAT students flowed disproportionately into the health industry and out of manufacturing. /

Daugherty & Anderson (2021)

- All groups of students saw an increase in earnings after they completed a certificate. No differences in earning patterns were observed among individuals who did and did not stack credentials among those who had initially earned an OTC certificate. +
- Stacking in the same field led to higher earnings compared to stacking in different fields; this was more likely to occur in health care than in MET or IT. +
- Among OTC certificate earners, less than 15 percent of students went on to stack credentials. -

Non-degree Credentials**CDEP (2017)**

- In California average wages were substantially higher one year after certification compared to one year prior. The average earnings increase across all certifications was over 40 percent. +
 - In Florida there were mixed results on employment based on industry. !
-

Cronen et al. (2017)

- Adults with a postsecondary certificate were most often employed in administrative support.
 - Certification holders most commonly worked in health care and business management/operations. /
 - License holders most commonly worked in health care and education/library occupations.
-

Lee et al. (2020)

- Workers who had completed certifications/licenses or certificates reported more average weekly hours of work than workers with no training. +
 - Earnings were higher for non-degreed workers who completed certifications/licenses or certificates than for non-degreed students with no training. +
-

Strada, Gallup, & Lumina (2019)

- Adults without a postsecondary degree who held a certificate or certification had higher full-time employment rates than those with no credentials. Men with a certificate or certification were 7 percentage points more likely to be employed than were those without a credential. Women with those NDCs, on the other hand, were 8 percentage points more likely to be employed than those without. +
 - Adults without a postsecondary degree who held a certificate or certification earned a median annual income of \$45,000, which was \$15,000 higher than those without a credential. +
 - Wage premiums for credentials and certifications varied by industry / gender. /
-

Tesfai et al. (2018)

- Adults who lacked a bachelor's degree but had a certificate, certification, or license were more likely to be employed than their counterparts without those credentials. +
 - Employment rates among certificate holders were the weakest across all 16 occupational areas. -
 - Earnings associated with all types of NDCs were substantially higher for individuals in male-dominated fields rather than female-dominated occupations. -
-

* Indicates the direction of the outcome for noncredit/NDC: positive (+), negative (-), mixed (/)

In their descriptive analysis of noncredit student outcomes, Bahr et al. (2022) found that in Texas, there was some evidence of modest labor market returns. Among the five states in their noncredit research project, Texas was the only state where the researchers were able to link data on noncredit students' enrollment history with earnings records. They found that students had higher employment rates and higher earnings one year after noncredit entry compared to their pre-enrollment levels. Among the students enrolled in noncredit, 87 percent of the sample was employed compared with 83 percent who were employed before enrolling. The descriptive results for earnings indicate that a year after noncredit entry, average earnings were about \$6,000 higher than before enrollment.

Similarly, in their descriptive analysis, Beer et al. (2021) found increases in labor market outcomes—in terms of both employment and earnings outcomes—in each of the three community college systems where they conducted their analysis: Louisiana, Virginia, and North Carolina. Overall, their findings indicated that programs were highly gendered and that there were varied levels of wage gains by both industry and regions within states. It is important to reiterate that their study did not distinguish between credit and noncredit but rather examined short-term programs generally. Almost all students experienced increased wages in Louisiana following the completion of a short-term program, except for those in business-related programs at Delgado and Baton Rouge. Post-participation earnings ranged from a -\$355 loss to a +\$9,462 gain in Baton Rouge, +\$3,358 to +\$6,982 in Bossier Parish, and -\$162 to +\$7,371 in Delgado. Notably, in Louisiana, all reports of median wage loss were associated with programs under the business, management, marketing, and related support services umbrella. In North Carolina students overall experienced wage gains after a short-term program, ranging from +\$358 to +\$15,434 in North Central, +\$2,360 to +\$13,188 in Southwest, and +\$4,048 to +\$24,678 in Western North Carolina. In Virginia there was variability in wage gains both by region and by program area. Importantly, construction trades program participants experienced a loss of median wages one year after program participation in two North Carolina areas: North Central (-\$932) and Southwest (-\$716). Median wage losses were also reported for programs in business, management, marketing, and related support services (North Central), recalling the results found in parts of Louisiana, as well as in mechanical and repair technologies/technicians (Southwest). In North Carolina, programs with majority male enrollment (e.g., security and protective service professions) had higher earnings gains post-enrollment (ranging from +\$13,188 to +\$15,434, depending on the region of the state) than programs like health professions with mostly female enrollment, which experienced lower wages post-enrollment (+\$3,060 in North Central and +\$4,048 in Western).

Another way of assessing noncredit education outcomes is to compare the outcomes of those in noncredit education with those who have less education, whether that be high school graduates who have not pursued additional education or individuals with less than one year of college education but no credential. Using this approach can offer the value add of noncredit education relative to a potential counterfactual of similar individuals who have not pursued noncredit education. Baum et al. (2020) studied wages, employment, and education for both noncredit and for-credit certificate holders ages 25–64 in the United States. Looking at certificate holders overall, without distinguishing between for-credit and noncredit certificates, they found that in 2016, the median certificate holder earned more than the average high school graduate (+\$3,500) and the average adult with less than a year of college (+\$2,000). However, certificate holders earned less than adults with one or more years of college but no degree (-\$1,600). Those with some college and no credential were also more likely to be employed than certificate holders. Certificate holders were more likely than workers with a high school education to be employed. In their regression analysis, the authors learned that adults whose jobs were related to their certificates had a higher earnings premium than others did. When they compared outcomes for noncredit with those of for-credit certificate holders, they found that noncredit certificates had less labor market value than for-credit certificates, with average wages for a credit certificate at \$29,900 and noncredit at \$34,700.

Similar to Beer et al. (2021), Baum et al. (2020) found variation in outcomes based on gender. Men with certificates had a higher earnings premium than women, earning 13 percent more than high school graduates compared with women's 7 percent advantage. For-credit certificates were associated with higher earnings for both men and women, as were longer certificates (480 hours or more). By field, there was broad variation in labor market

outcomes among certificate holders. Adults who earned certificates in liberal arts, education, cosmetology, and culinary arts earned less than high school graduates. Technical certificate earners made about 20 percent more than high school graduates, and those in law enforcement and business earned about 13 percent more.

Comparing noncredit with credit-bearing programs is another strategy researchers use to understand the outcomes of noncredit education. In this type of analysis, ensuring comparability across these programs is a challenge. Using statistical controls in generating their outcomes, Hester & Kitmitto (2020) used this approach, and they found an insignificant increase in the likelihood of employment among completers of for-credit programs compared with completers of noncredit programs. However, they also found that credit-bearing programs yielded a 17 percent increase in yearly earnings, which equated to about a \$5,500 gain in earnings relative to employed noncredit program completers' average earnings of \$33,000. Hester & Kitmitto (2020) created subgroups that were categorized as follows: low-wealth, non-white, and parent without a bachelor's degree. Employment findings remained consistent across subgroups. However, their results on earnings suggested that respondents from low-wealth families and non-white respondents did not experience significant earnings increases for completing credit-bearing programs.

Daugherty & Anderson (2021) used rigorous statistical controls in their analyses of clock-hour programs from noncredit OTC programs. Although clock-hour programs are funded by the state, the courses have no credit equivalent and do not transfer to degree programs. The researchers used fixed effects models along with regression to control for differences in outcomes between noncredit students and students in credit-bearing programs. In this particular type of program, they found that all groups of students saw an increase in earnings after they completed a certificate. Six years after earning an OTC certificate, average earnings increased by \$7,500 per quarter compared to at least \$9,000 per quarter for individuals who earned credit-bearing certificates (Daugherty & Anderson, 2021, p. 16).

Further demonstrating the potential value of career pathways, Daugherty & Anderson found that—for students in OTCs most notably—stacking credentials in the same field compared to different fields led to higher earnings, and that this was most likely to occur in health care compared with MET or IT. This study looked at participants' first credential earned, such as short-term credit-bearing, long-term credit-bearing, or OTC certificate, and how the participants stacked them. While the noncredit programs from the OTCs appeared to be associated with increases in employment and earnings outcomes, these increases seemed to be lower than those observed among similar credit-bearing credentials. Less than 15 percent of those who earned clock-hour (noncredit) certificates from OTCs went on to stack credentials. That number is much higher among those receiving short-term and long-term certificates, with just under 50 percent of short-term certificate earners and 43 percent of long-term-certificate holders stacking additional credentials within six years. Those who earned certificates from OTCs had somewhat lower earnings after six years compared to those who earned credit-bearing certificates.

In their study of students in the Tennessee Technical Colleges (which are similar to OTCs in Ohio), Carruthers & Sanford (2018) found that students who earned a certificate or diploma from Tennessee Colleges of Applied Technology (TCAT) had an increased likelihood of employment compared to individuals with high school degrees

who did not pursue a credential via the TCATs. They also increased their earnings, though those increases differed depending on industry. Certificate earners saw a rise in earnings of \$292 per quarter, which the authors argued was largely due to gains in employment. The authors estimated the earnings of TCAT diploma earners rose \$1034 each quarter. TCAT students flowed disproportionately into the health industry and out of manufacturing.

According to Cronen et al. (2017), adults with a postsecondary certificate were most often employed in administrative support, while certification holders most commonly worked in health care and business management/ operations. In addition, license holders most commonly worked in health care and education/ library occupations. In a separate study, McConville et al. (2021) found that students who reported having a current job that was closely related to their recent training programs reported wage gains three times larger than the wages of students whose job was not related to their training. Health care occupations had the highest share of workers reporting that they had a professional license or certificate. However, only 25 percent of students in family and consumer sciences, engineering, and public/protective services completed a credential within six years of earning their first credits in career education.

To examine the labor market outcomes of NDCs, CDEP (2017) examined wage and employment outcomes for individuals who attained industry certifications via CompTIA. The study found that average wages were nearly 42 percent higher one year after certification in each of the four types of CompTIA certifications: professional, scientific, and technical services; health care and social assistance; manufacturing; and public administration. But individuals who pursued certification in education services, retail trade, and accommodation and food services experienced lower wages one year after certification.

Like CDEP (2017), Tesfai et al. (2018) found that license and certification holders had higher employment rates than those with a certificate. Male-dominated fields earned substantially higher wages compared to female-dominated fields in relation to all types of NDCs. In fact, across all fields, a much larger proportion of men (47%) earned more than \$50,000 annually compared to women (19%). For example, in computer industries, a male-dominated field, people with NDCs rarely make less than \$30,000, whereas in administrative support, a female-dominated field, people with NDCs often make less than \$30,000 per year. Furthermore, the study found that male-dominated professions required fewer qualifications for entry or advancement.

According to a national survey of adults by Strada, Gallup, & Lumina (2019), adults without a postsecondary degree who held a certificate or certification perceived their education path as more valuable than those with no credentials. In addition, they had higher full-time employment rates and earned a median annual income of \$45,000, which was \$15,000 higher than those without a credential. However, the study found that wage premiums varied depending on a subject's occupation and gender. Certificates and certifications were very valuable in traditionally male-dominated fields for non-degree-holding adults, including construction, protective services, mining, architecture, and engineering. Individuals who held a certificate or certification in those fields earned nearly \$20,000 more on average than those who did not. In addition, some of these jobs were among the top paying in the country, including engineering occupations, which had a median personal income of \$85,000 annually at the time of the study. On the contrary, female-dominated fields, like office

and administrative support, education, training, and library services, had very little to no wage premium for certificate or certification holders. In terms of employment by gender, men with a certificate or certification were 7 percentage points more likely to be employed than were those without a credential, compared to 8 percentage points for women.

Lee et al. (2020) found that wage earnings were higher for workers without a college degree who completed some type of postsecondary training programs such as a certificate, certification/license, work experience, or continuing education. They found that workers with no degree and no training reported lower weekly hours than respondents who had completed a training.

Overall these findings on labor market outcomes provide preliminary evidence that noncredit programs are associated with some degree of positive outcome in the labor market. Further, they illustrate the correlation between field of study and outcomes that has been widely documented in analyses of labor market outcomes associated with credit-bearing degrees (Carnevale et al., 2021; Carnevale et al., 2015). This correlation shows that labor market structure is as important, if not more so, than the educational program of workers in determining earnings and employment outcomes. Along those same lines, this research documents gender disparities in outcomes that are pervasive across fields and educational levels. Some gender outcomes reflect gender sorting into occupations, and some reflect differential outcomes within the same types of occupations (Carnevale et al., 2018).

Conclusion

Research on outcomes from noncredit education and NDCs is an emergent area. Much remains to be learned, and while the current state of research yields some important insights, numerous directions for future research are clear. Several takeaways emerge from this review of the literature that lead to policy recommendations that can help guide the field. This section provides a discussion of these key takeaways, policy recommendations, and directions for future research.

Key Takeaways

The research reviewed in this paper presents an early sketch of the students who enroll in noncredit education seeking NDCs as well as their outcomes. A few key takeaways emerge, though it is important to recognize the challenges in making clear and consistent comparisons across studies. Given the emergent nature of data and research on noncredit education and NDCs, there is a lack of consistency in the terms used and how they are applied. Across the studies reviewed, the authors used varied language to describe noncredit and NDCs, sometimes allowing ambiguity about their definitions of those terms to limit the ability to make sense of their results. Further, challenges in access to data on noncredit means that samples vary dramatically across studies, making comparability of outcomes challenging. Despite these challenges, however, some trends across these studies are clear.

Few noncredit students transition to credit pathways. An essential question to understanding the role of noncredit education in potentially bridging students to long-term educational pathways is the rate of stacking in these programs. The research reviewed here shows that rates of stacking are generally low, but there is some evidence of stacking happening within programs located in community colleges. Painting a complete picture of stacking relies on a thorough understanding of completion and attainment outcomes, however, and there currently is not a lot of research on completion in noncredit education. There is some evidence that completion rates in noncredit programs are lower than in for-credit programs, but more research is needed on this aspect of the noncredit experience. There is some evidence on attainment measured by contact hours completed; results vary across studies and contexts, which is likely a reflection of the diverse mix of noncredit program areas.

Noncredit programs lead to modest outcomes. A great deal of attention is focused on labor market outcomes and whether noncredit education and NDCs lead students to good employment and earnings. Based on the research reviewed, there is evidence of some gains on labor market outcomes. Compared with having no postsecondary education, attaining an NDC is associated with higher earnings for students; on the other hand, holding an NDC is associated with lower earnings than holding a degree. Labor market outcomes also vary by field, industry, state, and gender. For example, noncredit outcomes are gendered such that male-dominated fields show higher wages and employment gains than female-dominated fields. More research is needed to better understand these nuances and to examine the broader set of questions about outcomes further with more robust data and methods.

More research is needed to make sense of the range of noncredit programs. Data are becoming increasingly available that can provide more information on how noncredit programs may benefit individuals and their local economies. Many states around the country are working on building their infrastructure for collecting administrative data on noncredit education (D’Amico, Van Noy, Srivastava, Bahr & Xu, 2023). These efforts include collecting data on student enrollments in noncredit education, which can sometimes be linked to wage data and attainment of NDCs such as licenses and certifications. Despite these efforts to expand data availability, there remains an overall lack of data to adequately analyze noncredit on a larger scale at this time.

Recommendations for Policy and Practice

While data and research are being generated, the development of policy related to NDCs must move forward. Even in its nascent state, the current body of knowledge on NDCs lends itself to several clear recommendations for policy and practice. These findings can inform policymakers at the federal, state, and local levels, as well as leaders at educational, nonprofit, and philanthropic institutions nationwide.

Policies must support the further development of a strong data infrastructure. With that goal in mind, policymakers and institutional leaders should support efforts to develop systems to capture data on noncredit and NDCs. To do this, it will be necessary to work out governance issues within states to determine who collects these data. In addition, any discussion of data infrastructure development must occur in tandem with discussions around quality. As part of these efforts, governmental bodies and funders may require all noncredit programs, regardless of provider type, to collect data on student outcomes and to publish their employment rates and earnings gains or losses. Data collection requirements should be developed for noncredit programming that emphasize outcomes as well as demographic data to compare outcomes across groups. At the same time, adding noncredit and NDCs to federal data collection efforts such as IPEDS and other federal surveys could have a transformational effect on the noncredit education and NDC data infrastructure by prompting the development and widespread adoption of measures and data collection processes.

Strategies should be developed to improve pathways and articulation. Given the low rates of movement between noncredit and credit pathways, this is clearly an area for improvement. Policymakers and practitioners may consider ways to create articulation agreements between noncredit and credit programs to encourage the alignment of noncredit programs with for-credit programs on career pathways. Further, efforts to design stackable credentials should consider developing pathways within the context of industries and occupations to make sure the stacked credentials are fully articulated and accepted.

Carefully consider the role of the labor market when making policy. Much of the wide variation in noncredit and NDC labor market outcomes can be traced to variations in field of study, industry, and occupation. A range of policies seeks to address this variation, many of them designed to eliminate noncredit programs that consistently do not lead to positive education or employment outcomes for students. While it may seem reasonable to reserve funding for only the best-performing programs, certain tradeoffs inherent in such policies must be carefully considered. It is important to be aware of what it means to the labor market structure when building accountability systems that potentially penalize low-wage but socially vital fields—especially care

occupations such as certified nursing assistants and early childhood education. The unintended consequences of policies that base funding for noncredit and NDCs only on labor market outcomes create a difficult dilemma and a need for nuance in policymaking.

Where data are available, make them available. Information on the outcomes of noncredit and NDCs can provide important guidance when making choices about which programs to consider. As data become available on the education and employment outcomes of noncredit programs and NDCs, it is essential to make this information available to other researchers and to the public as part of transparency efforts. Further, the efficacy of transparency efforts should be part of ongoing research to help refine how this information is conveyed. That research should consider feedback on that data's use and its impact on consumer choice.

Directions for Future Research

While the existing research provides some emergent findings and directions for policy and practice, more research is clearly needed to fully inform the field and shape future directions. As noncredit education and NDCs proliferate, research on their impact is essential to ensure learners and the wider community benefit. In particular, nuance in this research is necessary to capture that impact and to fully understand the equity implications of this area of educational activity.

More rigorous analyses of outcomes are needed. As more data become available, additional research is needed to continue the empirical examination of noncredit in increasingly rigorous ways. More analyses are needed that can examine student outcomes longitudinally and use statistical techniques to create rigorous comparison groups. Research is needed that can utilize state data sets that are linked with wage data and other kinds of outcomes data such as license and industry certification attainment. In these analyses, it is essential to vary the comparison groups when conducting analyses of outcomes to make sure to compare noncredit students and NDC holders with those who have no noncredit or NDC as well as with those who have higher levels of educational attainment (e.g., a college degree). Each of these comparisons provides a different picture of the role of noncredit education and NDCs, and each is important to examine. Research must also build upon the findings from current research on labor market outcomes to determine whether there are long-term benefits to noncredit and NDCs. All analyses must examine outcomes across demographic groups to examine equity implications in the outcomes of noncredit and NDCs. Furthermore, in the instance of low-wage but socially desirable fields, economic evaluations (e.g., benefit-cost analyses) should be conducted to determine whether the net benefits to individuals and society outweigh the costs.

Analyses of noncredit-to-credit transitions need to be linked by programmatic features. In understanding career pathways, it is important to understand more about how noncredit programs are aligned to for-credit programs. Analyses of outcomes are important, and so is linking these analyses to programmatic features that may support articulation. Research that helps identify programmatic features that support these transitions is key to improving policy and practice and promoting more successful transitions. Better strategies to promote these pathways are key to ensuring that noncredit and NDCs do not exclude students from opportunities that additional educational pathways would provide.

Program and student goals are important for understanding labor market outcomes. To better understand learner outcomes, it is essential to understand the particular programs that lead to these outcomes, as well as the goals of the students who pursue them. Ongoing research should examine the goals of both noncredit programs and the individuals who enroll in them to help unpack the meaning of outcomes and to determine what outcomes can be reasonably expected. First, to unpack what noncredit programs and NDCs are involves program-level analyses designed to understand features such as their intensity, their links to industry, and whether they prepare students fully for occupational entry or train them in a targeted set of skills for advancement. Determining these distinctions can help better create and define a common language with which to describe noncredit and to effectively measure and compare outcomes. Second, it is important to understand the students who are interested in these programs and credentials, and their goals. More analysis at the program level can help better conduct this type of student-level analysis. Studies should attempt to collect demographic data to examine who enrolls in noncredit across demographic groups and whether their noncredit programming outcomes are similar. In addition to quantitative studies of outcomes, research should take a qualitative approach to understand how student characteristics impact experiences with noncredit and NDCs. A more nuanced approach to understanding outcomes is essential to unpacking how noncredit and NDCs can promote equity or perpetuate inequality.

Examine and consider outcomes within their specific labor market context. Given the wide variation in outcomes by field, it is important to understand the particular industry and occupational dynamics that drive the use and value of noncredit and NDCs. To do this requires more studies of labor market outcomes in various contexts: across states with different kinds of regional economies, across industries in a single area, across programs that are focused on particular industry requirements, etc. As policymakers consider policies tied to labor market outcomes (as previously discussed), it is important that research more clearly link the role of the labor market structure in determining the noncredit programs offered and their observed outcomes and to explore how the labor market directly influences these outcomes. When considering an entire industry, research might consider how outcomes vary by state/regional economy as well as by noncredit provider. Further, it is important to understand how these programs and credentials fit into broader system-level changes currently under way in some state contexts—e.g., skills-based hiring, learning and employment records—that are driving interest in and use of NDCs. A deeper understanding of the labor market dynamics around these programs helps to place the equity implications of nondegree and NDC outcomes data within a broader dialogue around the opportunity structure of the labor market.

Extend research to more noncredit programs and NDCs. A wide range of noncredit programs and NDCs offer many paths to gaining skills for the workforce that go beyond traditional educational degrees. The research to date provides insight on a small subset of noncredit programs and NDCs, and More data and research must be done if we are to make sense of the potential opportunities they provide for individuals. Various providers exist in the noncredit space, including 2-year and 4-year institutions, employers, private providers, unions etc. This variation in providers introduces even more complexity to the already difficult task of making sense of the landscape of noncredit and NDC outcomes. The research to date on training provided via WIOA, which can often

include noncredit programs, revealed limited outcomes for individuals. Unless individuals were connected to the labor force prior to receiving job training, most research found little to no significant difference in post-program long-term employment or earnings (e.g., Dunham et al., 2020; Hamilton, 2020; Maxwell et al., 2013; Schochet et al., 2012; Stout, 2015; Vollmer et al., 2017). Noncredit may also be delivered via unions or employers. Research that examined the relationship between training through the function of human resource management and its interaction with unions found that the presence of unions increased the level of human resource management-sponsored training (Osterman, 1995), and unions often offered training programs jointly with employers (e.g., Berik & Bilginsoy, 2000). Future research should build on existing knowledge and look at both education and employment outcomes from a variety of providers (e.g., community colleges, technical centers, non-profits) to determine how provider type impacts stackability or employment.

As more data become available, further research on noncredit education and NDCs will be possible, which in turn will enable the generation of further data on additional areas of educational activity. This broader understanding of pathways to prepare for the workforce is essential to the development of public policy that ensures investments are made in programs with value for students both in terms of their educational pathways and labor market outcomes and that adequately meets the essential needs of US society at large. Data and research are foundational to inform decisions to guide the field in a way that will help ensure an equitable future for students and promote the success of the US economy.

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About

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Rutgers' Education and Employment Research Center (EERC) is housed within the School of Management and Labor Relations. EERC conducts research and evaluation on programs and policies at the intersection of education and employment. Our work strives to improve policy and practice so that institutions may provide educational programs and pathways that ensure individuals obtain the education needed for success in the workplace, and employers have a skilled workforce to meet their human resource needs. For more information on our mission and current research, visit smlr.rutgers.edu/eerc.

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ECMC Foundation

ECMC Foundation is a national foundation whose North Star goal is to eliminate equity gaps in postsecondary completion by 2040 so that underserved learners have greater opportunity for social and economic mobility. The Foundation's mission is to improve higher education for career success among underserved populations through evidence-based innovation. ECMC Foundation makes strategic grants and program-related investments to support both nonprofit and for-profit ventures, guided by a strategic framework which aims to advance systemic change by removing barriers to postsecondary completion; building the capacity of organizations, institutions and systems; and transforming the postsecondary ecosystem. Learn more about ECMC Foundation by visiting www.ecmcfoundation.org and our parent company, ECMC Group, by visiting www.ecmcgroup.org.

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