Noncredit Education in Community College: Students, Course Enrollments, and Academic Outcomes

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Abstract

The past two decades have seen a noticeable increase in noncredit instructional offerings in postsecondary education. While noncredit programs have been advocated as a promising way to address educational equity, knowledge about the noncredit sector, such as the types of students enrolled in noncredit courses and their academic outcomes, is sparse. Drawing upon a rich dataset that includes transcript and demographic information on both for-credit and noncredit students in nine community colleges in one state, this study explores the demographic and academic profiles of students enrolled in various fields of noncredit education, their academic outcomes and progress, and potential factors that influence noncredit course completion and transition to the for-credit sector.

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1. Introduction

The past two decades have seen a noticeable increase in noncredit instructional offerings in postsecondary education. These courses are typically aimed at persons who have personal or professional interest in the subject matter, and they do not offer college credit that counts toward a college credential.[1] Due to their lower cost, the broad selection of topics they cover, and flexibility in how offerings are managed and delivered, noncredit courses have attracted many non-traditional students, especially adult learners, low-income students, and language minority students. According to the National Household Education Survey (National Center for Education Statistics [NCES], 1998, 2003), the noncredit student headcount grew from 90 percent of for-credit students in 1995 to 108 percent by 1999, and this trend continued through the next decade. Most such growth has been associated with vocational and workforce training (Van Noy & Jacobs, 2009), especially in two-year community colleges, whose missions explicitly include vocational and noncredit community outreach (Bailey & Morest, 2004; Labaree, 1997). Indeed, by 1999, 41 percent of less-than-four-year institutions offered occupational programs on a noncredit basis (NCES, 2001).

In comparison with for-credit programs, noncredit programs are thought to better meet the needs of non-traditional students for several reasons. For example, without the burden of accreditation and other faculty-, college-, and state-level oversights, such programs can better respond to quickly shifting workforce demands, providing skills in a way that is flexible and responsive to employer needs (Arena, 2013; Frentzos, 2005; Grubb, Badway, & Bell, 2003; Harmon & MacAllum, 2003; Hickman & Quinley, 1997; U.S. Government Accountability Office, 2004; Van Noy & Jacobs, 2009; Waks, 2002). In addition, due to their flexibility in course schedule, location, and delivery format, noncredit courses may serve as the primary method by which adult learners access postsecondary education, increase their job marketability, and upgrade their working skills to adapt to the changing business landscape (Adelman, 2000; Cantor, 2000; Grubb et al., 2003; Lustig, 2005; Milam, 2005). This flexibility, combined with their lower cost,

[1] Throughout this paper, we use the word *credential* to refer to both college degrees (such as bachelor's and associate degrees) and non-degree awards (such as certificates).

means that noncredit courses are thought to disproportionately enroll many of the lowest performing students and low-income adults (Grubb et al., 2003), potentially providing a pathway to economic opportunity for these populations.

Noncredit education has become an essential component of a robust economy. Carnevale, Smith, and Strohl (2010) contended that by 2018, the United States will need to fill 30 million jobs that require postsecondary education,[2] and many organizations, policymakers, and researchers have identified noncredit vocational education as a key resource for addressing this national need (e.g., Arena, 2013; Council for Adult and Experiential Learning & Council on Competitiveness, 2009; Pusser et al., 2007; Van Noy & Jacobs, 2009; Van Noy, Jacobs, Korey, Bailey, & Hughes, 2008; Voorhees & Milam, 2005).

Despite such rapid growth in—and high hopes for—noncredit education, noncredit students are not included in most state and national postsecondary datasets; accordingly, knowledge about noncredit programs is sparse. The limited available information is primarily anecdotal, based on interviews and surveys of school administrators. Yet Voorhees and Milam (2005) have pointed out, and many other researchers agree (e.g., Arena, 2013; Pusser et al., 2007; Van Noy et al., 2008), that it is not possible to fully understand non-traditional pathways to college education without having clearer and more systematic information about this "hidden college." The increasingly important role of noncredit education raises fundamental questions about the varied student needs that these types of programs must meet, the extent to which community colleges have kept pace with the growing demand for workforce training, and the outcomes of noncredit students.

To fill this research gap, this study intends to provide a comprehensive understanding of noncredit course offerings and the types of students who enroll in noncredit programs in community colleges. Drawing upon a distinctive dataset that includes transcript and demographic information on both for-credit and noncredit students in nine community colleges in one state, we explore the demographic and academic profiles of students enrolled in various fields of noncredit courses, student

[2] Cited in Mullin (2011).

enrollment patterns, the characteristics of noncredit courses, and potential factors that influence student transition to credit-bearing[3] programs.

This is the first large-scale analysis of noncredit students and their course enrollment patterns across multiple institutions; findings from this study therefore have important implications not only for noncredit program planning and administration but also for national data collection efforts on noncredit education activities. Moreover, as the federal government increasingly focuses on postsecondary accountability, including through the potential use of institutional rating and ranking systems, this study will provide useful foundational information about the types of students and the types of outcomes that are typical to students enrolled in noncredit courses at community colleges.

Our results support the recent anecdotal evidence that students enrolled in noncredit vocational programs tend to be adult learners and are typically from a lower socioeconomic background than credit students at community colleges. While the majority of students are enrolled in noncredit programs for personal enrichment and skill learning, a nontrivial proportion of them seek to attain a certificate or degree. Yet, our results indicate that only a small proportion of them take advantage of noncredit courses as a "bridging" mechanism to enter the for-credit sector in community college. Even fewer attain any type of educational credential within six years after their initial enrollment. Our analysis on course enrollment patterns indicates that noncredit students typically drop out of college and return after their initial semester, including those who expressed certificate or degree intent upon initial enrollment. Additional analysis that relates various school inputs and student outcomes indicates that financial support and institutional services available to noncredit students may need to be improved to facilitate their academic progression and success.

[3] Throughout this paper, *credit-bearing courses* refers to both college-level and developmental education courses.

2. Prior Literature on Noncredit Education in Community Colleges

There is a dearth of data on noncredit education. There is, for example, no national record of noncredit students, nor is there any national standard on data collection for noncredit students (Jenkins & Boswell, 2002). We carried out an extensive literature search and review on the topic, and it seems that the limited information regarding the noncredit sector in higher education comes from a handful of studies (Grubb et al., 2003; Van Noy et al., 2008; Voorhees & Milan, 2005) that collected anecdotal evidence by reviewing state policies regarding noncredit education, conducting surveys with state and institutional officials, and interviewing college administrators.

These studies, in general, found that the majority of two-year institutions viewed noncredit course activity as important or very important to their missions. These studies also suggest that, compared with for-credit students, students enrolled in noncredit courses tend to be older learners or adult learners who hope to obtain skills that will help with their career progression. Probably as a consequence, while noncredit courses encompass a wide range of fields, they are more likely to be offered in areas that are closely tied to an occupation, such as allied health, information technology, and business. These qualitative and survey studies provide valuable information regarding the policies and practices related to noncredit vocational education in community colleges. Yet in the absence of a more systematic statistical portrait, researchers argue that it is very difficult to trace enrollment volume or to gain a solid understanding of the noncredit student body (e.g., Milam, 2005; Van Noy et al., 2008; Voorhees & Milam, 2005).

Moreover, researchers and policymakers interested in noncredit coursework have increasingly noted the importance of understanding the academic outcomes of noncredit education. Grubb et al. (2003, p. 220), for example, argued that "access without progress is an empty promise." In particular, researchers have emphasized the potential and importance of noncredit education to serve as a "bridge" to enrollment in for-credit education, especially among low-income students (e.g., Arena, 2013; Grubb et al., 2003; Van Noy et al., 2008). Based on interview data with directors of noncredit education and institutional researchers in 13 community colleges, Grubb et al. (2003) described noncredit programs as a "first step into college" for many low-income students and the "last best hope for lots of students."

Among different types of noncredit courses that serve multiple purposes, the promise of noncredit education as a pathway to for-credit programs may be particularly important to vocational courses, where many of the enrollees are adult learners who specifically seek to increase their job marketability. For these individuals, the motivation for colleges to facilitate transition from noncredit to credit programs and subsequent credential attainment is straightforward: while there is consistent evidence on the substantial economic returns to community college credentials, such as an associate degree or certificate (see Belfield & Bailey, 2011 for a review of these studies), the economic benefits for small amounts of noncredit courses without attaining any credential are often limited and uncertain. In this regard, to expand economic opportunities for low-income adults coming back to college, the most substantial benefit of noncredit vocational programming may lie in its potential to smooth their transition into certificate or degree-granting programs. Indeed, researchers (e.g., Grubb et al., 2003; Van Noy et al., 2008) have explicitly indicated the need to understand the academic progress of students who start in noncredit workforce courses, especially those who intend to attain a certificate or degree. Yet, due to data unavailability, the extent to which students actually transition from noncredit to for-credit programs has been largely unknown. Nor has there been any systematic understanding of potential factors that may influence the transition and credential outcomes for credential-seeking students who started in noncredit programs.

In sum, despite their increasingly important role in the national economic landscape, the field has very little information about noncredit courses, the students enrolled in these courses, and their academic progress. Using an uncommonly rich dataset, this study intends to address fundamental questions about noncredit vocational education, including those concerning student profiles and their academic pathways, which will provide meaningful guidance to noncredit administrators as well as to policymakers.

3. Data and Research Setting

3.1 Research Questions

The primary goal of this study is to provide a comprehensive understanding of noncredit education in community colleges and to examine the extent to which noncredit programs serve as a viable pathway to credential attainment in these colleges. Specifically, we explore the following research questions:

1. What is the volume of noncredit course enrollments and how does this vary across different programs of study?
2. What are the characteristics of noncredit students in community colleges and how do these students differ from those enrolled in credit-bearing programs?
3. What student-, course-, and institution-level characteristics best predict successful student completion of noncredit courses?
4. To what extent do credential-seeking noncredit students transition to credit-bearing programs? What student- and institution-level characteristics predict successful transition to credit-bearing programs? What are the credential attainment outcomes for credential-seeking noncredit students?

3.2 Data

To answer these fundamental questions about noncredit education, we use data from a subset of colleges under the Completion by Design initiative, which is a major Bill & Melinda Gates Foundation–funded community college reform designed to help low-income young adults progress through community college with a higher chance of completion. The analytic sample contains 397,314 course enrollments of 60,846 first-time-in-college (FTIC) students in the 2007 cohort[4] from nine colleges in one state community college system. Students who first enrolled in either a credit-bearing or noncredit course in 2007 were tracked for six academic years through summer 2013. The

[4] We merged the Completion by Design data with National Student Clearinghouse (NSC) data and dropped all students with previous college enrollments before the fall semester of 2007 from the analytic sample.

data include information on their demographic and academic attributes, institutions attended, pre-enrollment education, academic goals, credentials awarded, and transcript data on course enrollments and performance. This administrative dataset was further merged with data from the Integrated Postsecondary Education Data System (IPEDS) to retrieve key institution-level characteristics of the nine colleges over the same time period.

The nine community colleges have widely varying institutional characteristics and include a mix of large and small schools, as well as institutions located in rural, suburban, and urban settings. Most colleges are comprehensive (offering both transfer-oriented and occupationally oriented programs), but four are technical colleges that primarily offer occupational programs. Table 1 describes the nine colleges' institutional characteristics in fall 2007, based on statistics reported to the IPEDS database. Compared with the national sample, the nine community and technical colleges serve a population with a larger proportion of non-traditional students. Specifically, students are more likely to be older than 25 upon college enrollment, less likely to receive federal grant aid, and less likely to be enrolled as full-time students. In addition, the expenditures per full-time equivalent (FTE) student across all core functions in the nine colleges are lower than the national average.

In terms of demographics, the dataset provides information on each student's gender, race/ethnicity, and age at college entry. Importantly, student address information has been matched with U.S. Census block data through geo-coding to create proxy measures of student socioeconomic status.[5] The dataset also includes rich information on student academic attributes, including whether a student has earned a high school diploma, whether she has earned a GED, whether the student was dual-enrolled as a high school student, and her educational objective at the beginning of her college enrollment. The transcript data include information on each noncredit or credit-bearing course, such as course number, course delivery format, and final grade earned in the course for credit-bearing courses (ranging from a failing grade of 0.0 to an excellent grade of 4.0, including decimals such as 3.4) and pass/fail information for noncredit courses.

[5] Address data were deleted after geo-coding to ensure student confidentiality.

Table 1
Characteristics of Nine Community and Technical Colleges in Our Sample vs. All U.S. Public Two-Year Colleges: 2007

	All U.S. Public Two-Year Colleges	Nine Community and Technical Colleges in Our Sample
Student demographics		
% White	63.7 (24.3)	61.2 (18.7)
% Black	13.5 (15.9)	24.8 (15.5)
% Hispanic	10.3 (15.4)	3.1 (1.4)
% Age: under 18	8.8 (8.7)	7.6 (7.6)
% Age: 18–24	50.5 (11.9)	45.1 (7.8)
% Age: 25–64	39.9 (11.9)	46.8 (7.0)
% Age: over 65	0.8 (1.9)	0.2 (0.4)
% Received federal financial aid	42.0 (18.5)	34.7 (15.7)
% Enrolled full-time	45.0 (17.5)	35.7 (8.0)
Academic Performance		
Graduation rate (%)	26.5 (18.8)	16.22 (5.0)
First-year retention rate (%)	58.1 (12.7)	65.89 (14.9)
Expenditures (dollars per FTE)		
Instructional	5797.38 (26226.09)	4529.22 (639.07)
Academic	1057.51 (5593.60)	782.11 (342.03)
Student service	1238.21 (3121.33)	589.33 (169.13)
Institutional support	1963.56 (8405.27)	1353.78 (424.13)
Location		
% Urban	30.1	33.3
% Suburban[a]	39.7	-
% Rural	30.2	66.7
Observations	1,029	9

Note. Table based on statistics reported to the 2007 IPEDS database. Standard deviations for continuous variables are in parentheses.

[a]IPEDS includes four categories for location: Urban, Suburban, Town, and Rural. We grouped Suburban and Town together and called the category Suburban.

3.3 Background Information on Noncredit Education in the Nine Colleges

Noncredit education in the nine colleges has several categories of programs, including vocational training, adult basic education (ABE), and English as a second language (ESL). According to discussions with directors of noncredit education and institutional researchers at the nine colleges, while some of the vocational training occurs in the form of customized contracts with specific employers that may involve experienced workers, the majority of vocational courses are state-funded, lower-level occupational courses. Among the 397,314 course enrollments of the 60,846 students examined in the current study, 62 percent of the enrollments are in credit-bearing courses

(including both college-level and developmental courses) while the rest include four types of noncredit courses: vocational courses (18 percent), ABE (9 percent), ESL (7 percent), and GED (general educational development, 4 percent), all of which are not associated with credit hours that can be applied to a certificate or degree program.

Different from a credit-bearing course that has a fixed length of study, the length of a noncredit course varies from less than one day to as long as eight weeks, depending on the schedule and purpose of the particular course. Students taking courses that fall within the "basic skills" program (including ABE and GED) are not charged a registration fee, while the remainder of the noncredit courses (mostly vocational training) have registration fees that are based on the length of the noncredit course. For example, in one of the nine colleges, the registration fee starts at $70 for a course with less than 25 hours of seat time, $125 for a course running 25–50 hours, and approximately $180 for a course that is more than 50 hours. Registration fees do vary across colleges, but only in a slight way. Therefore, compared with tuition for credit-bearing courses, which typically costs about $70 per credit hour and thus approximately $210 for a three-credit-hour course, the economic burden of enrolling in a noncredit course is substantially lower for students.

Yet, in terms of generating funding for the institution, because noncredit students typically enroll for short periods of time, they account for only a small amount of FTE enrollment, even though noncredit students may constitute the majority of the headcount in a community college. For example, in one of the nine colleges, the headcount of noncredit students represented almost 60 percent of all students but only less than 18 percent of FTE students for academic year 2013–2014. As a result, while noncredit programming is crucial to the community-serving mandates of these colleges, noncredit student enrollments are only modest in terms of the revenue they generate. Probably as a consequence, there are currently few services or academic supports provided explicitly for students enrolled in noncredit courses.

3.4 Key Measures

To understand fundamental questions about noncredit education and the link between the noncredit and for-credit sectors in community college, it is important to distinguish between students who started with noncredit courses and then transitioned to

for-credit programs from students who initially enrolled in credit-bearing programs and mixed their credit courses with one or more noncredit courses during their tenure. Considering that there may be bureaucratic hurdles for noncredit students who enroll in credit-bearing courses that do not exist for students who started their college career in a credit-bearing program, we differentiate between for-credit and noncredit students based on their course enrollment patterns during their initial semester in college. Specifically, we define noncredit students as those who exclusively took noncredit courses in their first term of enrollment. About 70.2 percent of the 60,846 students in our sample are noncredit students according to this definition.

The dataset does not include explicit information on the specific programs that students enrolled in for each semester. Therefore we use student course enrollment patterns to determine whether a noncredit student successfully transitioned to a credit-bearing program. Specifically, we define *transition to credit-bearing programs* (referred to as *transition* hereafter) as a case in which a noncredit student took at least one credit-bearing course during the six years since his initial enrollment. To further take into account student persistence in the credit-bearing programs after making the transition, we further define *successful transition* as a case in which a noncredit student enrolled in credit-bearing courses for at least two semesters and completed at least one credit-bearing college-level course.

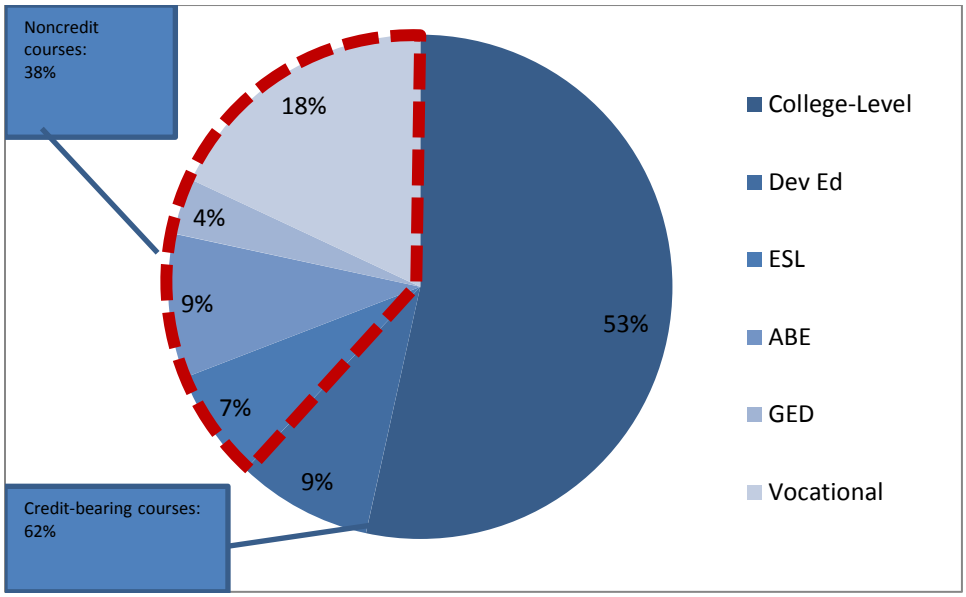
Descriptive analyses indicate that among all the 43,032 noncredit students in our sample, only 7.2 percent transitioned to take for-credit courses and only 4.9 percent transitioned and persisted in credit-bearing programs, according to our *successful transition* definition. As will be shown in more detail in the following sections, the remaining noncredit students either never enrolled in a credit-bearing course (i.e., did not transition) or dropped out of college after taking a small number of credit-bearing courses (i.e., transitioned but failed to persist for two semesters).

4. Overview of Noncredit Course Offerings and Noncredit Students

4.1 Noncredit Courses

As shown in Figure 1, among all the course enrollments taken by the entire students sample (N = 60, 846) from academic year 2007 to 2012, about 38 percent were in noncredit courses.

Figure 1
Course Enrollments by Course Type



Vocational courses were the most popular among all noncredit courses, accounting for nearly half of course enrollments in the noncredit sector. Indeed, vocational courses are a unique type of noncredit course: while other types of noncredit education are clearly intended for basic skills and are not classified under a specific program of study (most of the ESL/ABE/GED classes are classified as basic skills training and general workforce training according to the classification of instructional programs [CIP] codes assigned by NCES), noncredit vocational courses often have comparable courses in the same fields of study in credential-bearing programs and therefore present stronger links between the noncredit and for-credit sectors. The first two columns of Table 2 show the percentage of all credit-bearing and noncredit course

enrollments in our sample in each program field (hence each column add up to 100 percent).[6]

Table 2
Course Enrollments by Field of Study

Program Field	Percentage of All Credit-Bearing Course Enrollments in Program Field	Percentage of All Noncredit Course Enrollments in Program Field	Percentage of Course Enrollments in Program Field That Are Noncredit	Observations
Humanities and social sciences	34.0	3.5	2.8	89,528
Math and science	13.7	0.5	1.1	34,119
Information science, communication, and design	8.0	7.9	22.4	25,318
Engineering sciences	2.9	4.8	32.5	10,655
Allied health	3.5	11.0	48.0	16,420
Nursing	0.5	2.4	60.0	2,911
Mechanics, repair, and welding	3.6	3.2	20.8	11,083
Protective services	3.4	24.1	67.2	25,686
Construction	0.9	1.7	36.3	3,426
Business and marketing	6.3	11.3	34.3	23,586
Education and childcare	2.2	1.7	18.1	6,720
Transportation	0.2	0.1	19.3	538
Cosmetology, culinary, and admin service	0.9	0.3	9.3	2,463
Developmental education / General workforce training	19.9	27.3	13.5	144,861
Observations	**246,956**	**71,656**		

Note. The sample is composed of for-credit and noncredit vocational courses that 2007 FTIC students in the nine community and technical colleges enrolled in within six academic years. The percentages in the first two columns refer to the percentages of course offering across different fields of study for credit-bearing and noncredit courses respectively; the percentages in the third column refer to the percentages of course enrollments across credit-bearing and noncredit for each field of study. Since ABE, ESL, and GED courses are mostly basic skills training, they are classified under the same category as developmental education courses, shown in the bottom row as "Developmental education / General workforce training."

It appears that program fields that are clearly tied to an occupation—such as protective services, business, and allied health—generate a substantial number of course enrollments in the noncredit sector. The third column shows the row percentages for

[6] Since ABE, ESL, and GED courses are mostly basic skills training, they are classified under the same category as developmental courses, noted as "Developmental education/General workforce training" in Table 2.

noncredit course enrollments: that is, it shows the percentage of course enrollments in each field of study that are in the noncredit sector. The pattern echoes the first two columns: noncredit course enrollments were more prevalent in fields that are more closely tied to an occupation, particularly protective services (67 percent), nursing (60 percent), and allied health (48 percent). In contrast, noncredit courses were least likely to be offered in humanities and social sciences (3 percent) and math and science (1 percent).

Table 3 provides information about course completion. The table presents the average course completion rates in the for-credit and noncredit sectors, respectively. Interestingly, while most categories of noncredit courses, such as ESL, ABE, and GED, had lower pass rates compared with credit-bearing college-level courses, noncredit vocational courses had course completion rates that were similar to those for college-level courses (76 percent vs. 78 percent). This implies that the types of students enrolled in noncredit vocational courses may be different from those enrolled in other categories of noncredit courses, which will be explored in the next section.

Table 3
Course Completion Rate by Type of Course

Course Type	Course Completion Rate
For-credit courses	
College-level	77.6%
Dev ed	65.0%
Noncredit courses	
ESL	59.3%
ABE	53.2%
GED	56.0%
Noncredit vocational	75.7%

Note. Sample consists of all courses that 2007 FTIC cohort students in the nine community and technical colleges enrolled in within six academic years. Credit-bearing and noncredit courses are classified in terms of whether the courses are associated with credits that can be applied to a certificate or degree program. In our analysis, we classify all college-level and developmental courses as credit-bearing, and ESL, ABE, GED, and noncredit vocational courses as noncredit courses.

Table 4 further presents course completion by field of study for college-level courses and noncredit vocational courses, respectively.[7] The course completion rate in the noncredit and for-credit sectors were similar in most of the fields. There are exceptions, however. In particular, the completion rates in the field of allied health (69 percent vs. 88 percent) and nursing (70 percent vs. 94 percent) were substantially lower in the noncredit sector than in the for-credit sector. But this is probably because credit-bearing allied health and nursing programs are highly selective, while noncredit nursing and health programs are open-access. With more detailed program-level data available, future research may wish to compare the program features, requirements, and course content between noncredit and for-credit courses within each field of study.

Table 4
Course Completion Rates by Field of Study

Program Field	Credit-Bearing Courses	Noncredit Vocational Courses
Humanities and social sciences	75.9%	74.7%
Math and science	75.1%	85.6%
Information science, communication, and design	74.2%	72.1%
Engineering sciences	81.9%	85.9%
Allied health	88.1%	68.9%
Nursing	94.2%	69.5%
Mechanics, repair, and welding	85.2%	80.3%
Protective services	82.0%	91.6%
Construction	80.8%	77.3%
Business and marketing	78.2%	76.3%
Education and childcare	79.6%	66.7%
Transportation	73.0%	64.4%
Cosmetology, culinary, and admin service	85.6%	88.2%

Note. Sample consists of credit-bearing and noncredit vocational courses that 2007 FTIC cohort students in the nine community and technical colleges enrolled in within six academic years.

[7] Since GED, ABE, and ESL courses are not associated with specific fields of study, we focused on college-level courses and noncredit vocational courses in Table 4.

4.2 Characteristics of Noncredit Students

As mentioned previously, among all the 60,846 students in our sample, 70.1 percent started in noncredit courses. Table 5 presents the characteristics of noncredit students (column 1), noncredit credential-seeking students (column 2), and for-credit students (column 3).

On a descriptive basis, it appears that the noncredit students were substantially different from the for-credit students in terms of both demographic attributes and academic preparation. Specifically, noncredit students were much older than for-credit students upon college enrollment: the average age of students who started their college career in a noncredit course was 34 years of age, which is more than 12 years older than students directly enrolled in for-credit programs. Almost none of the noncredit students enrolled full-time (equivalent to four courses) during their first term (part-time enrollment is very common among adult learners), while 35 percent of the for-credit students did so. Compared with for-credit students, noncredit students were also more likely to be students of color, especially Black and Hispanic students.

Noncredit students also tended to be from lower socioeconomic backgrounds, as measured by multiple indicators of their neighborhood of residence including median household income, poverty rate, the percentage of the non–English speaking population, the percentage of residents with a bachelor's degree, and the percentage working in professional occupation. Yet, since financial aid is exclusively offered to students enrolled in certificate or degree programs, nearly none of the noncredit students in our sample, despite their perhaps greater need for financial aid, received any financial support from the college. In contrast, 14 percent of the students enrolled in certificate or degree programs received Pell grants. In terms of academic attributes, noncredit students were much less likely to have earned a high school diploma (23 percent vs. 93 percent), or to have ever dual-enrolled in high school (less than 1 percent vs. 15 percent). In general, the characteristics of the noncredit students in our sample echo what is found in existing literature in that students enrolled in noncredit programs tend to be low-performing, low-income adults who are seeking to expand their job prospects through noncredit programs. (Table 5 also presents information about noncredit credential-seeking students; we discuss these students later in this paper.)

Table 5
Demographic and Academic Characteristics of Students Enrolled in Noncredit and For-Credit Programs

	Noncredit Students Overall	Noncredit Credential-Seeking Students	Credit Students
Female	47.4%	48.3%	53.5%
Age (years)	34.3	31.1	22.1
Race/ethnicity			
White	49.5%	50.6%	65.6%
African American	25.5%	28.5%	22.4%
Hispanic	15.5%	15.2%	3.8%
Asian	4.6%	2.1%	2.1%
Other/Unknown	4.9%	3.6%	6.1%
SES			
Census median household income	$49,756.8	$52,679.6	$57,096.6
Census poverty proportion	12.5%	11.2%	9.1%
Census non–English speaker proportion	13.1%	12.6%	11.2%
Census BA proportion	29.4%	30.4%	32.5%
Census employed in management, professional occupations proportion	34.2%	35.4%	37.4%
Earned high school diploma	23.1%	71.2%	93.0%
Earned GED	3.2%	12.4%	2.8%
Previously dual-enrolled in high school	0.1%	< 0.1%	14.7%
In-state student	65.8%	63.2%	67.0%
Pell grant recipient	< 0.1%	0.2%	13.5%
Full-time in first term	0.4%	4.0%	34.5%
First-term intention			
BA, AA, or transfer to four-year institution	0.6%	7.7%	32.2%
Certificate	7.5%	92.3%	42.9%
Noncredit vocational	49.1%		
Other noncredit	40.9%		
Unknown	1.9%	< 0.1%	24.8%
Observations	43,032	3,492	17,814

Note. Sample consists of all 2007 FTIC students in the nine community and technical colleges.

4.3 Enrollment Patterns of Noncredit Students

Previous studies have shown that among students taking credit-bearing courses, continuity and intensity of enrollment are positively associated with credential completion and transition to four-year institutions (Crosta, 2014). In order to understand noncredit students' course-taking behavior and the potential barriers for them to transition to the for-credit sector, it would be informative not only to examine whether a noncredit student has ever taken any credit-bearing courses, but also when he initiated this transition and how he proceeded after that.

Table 6 presents the 15 most frequent course enrollment patterns in our sample for noncredit and for-credit students, respectively.

Table 6
Most Frequent Enrollment Patterns of Noncredit and For-Credit Students

Noncredit Students			Credit Students		
Pattern	Number of Students	Percent of N	Pattern	Number of Students	Percent of N
0300000000000000000	9,488	22.0	1000000000000000000	2,101	11.8
3000000000000000000	8,081	18.8	1100000000000000000	1,620	9.1
0030000000000000000	5,586	13.0	0100000000000000000	1,610	9.0
3300000000000000000	1,832	4.3	0010000000000000000	762	4.3
0330000000000000000	1,314	3.1	1101100000000000000	459	2.6
0033000000000000000	1,162	2.7	1101000000000000000	359	2.0
0333000000000000000	530	1.2	0101100000000000000	220	1.2
0033300000000000000	392	0.9	0101000000000000000	212	1.2
0303000000000000000	359	0.8	1111100000000000000	173	1.0
3330000000000000000	333	0.8	1101101100000000000	172	1.0
0300300000000000000	291	0.7	1101101000000000000	157	0.9
0333300000000000000	270	0.6	1110000000000000000	152	0.9
0030300000000000000	209	0.5	0011000000000000000	120	0.7
3003000000000000000	203	0.5	1001000000000000000	106	0.6
3333000000000000000	195	0.5	1101101101100000000	105	0.6
N = 43,032			N = 17,814		

Note. Sample includes all 2007 FTIC students who started in noncredit and credit-bearing courses in the nine community and technical colleges. The patterns that start with one zero refer to students who did not enroll in the first fall term; the patterns that start with two zeros refer to students who started in summer 2008, who are still considered 2007 FTIC students.

Following the analyses by Crosta (2014), for each student, we used a vector containing 18 indices that consists of a series of zeros, ones, twos, and threes to represent the intensity and continuity of his enrollment pattern. Specifically, the *i*th location of the vector describes the enrollment status of the student in term *i*, including summer terms. The index is a 0 if the student did not enroll in either noncredit course or for-credit courses at all, a 1 if the student enrolled exclusively in for-credit courses, (i.e., college-level courses or remedial courses), a 2 if the student enrolled in both for-credit and noncredit courses, and a 3 if the student enrolled exclusively in noncredit courses, (i.e., ABE, ESL, GED, and noncredit vocational courses). For example, a traditional college-goer who began in fall 2007 and followed a two-year degree track may have enrolled only in for-credit courses in the fall and spring terms. That student's vector would look like this:

110110110110000000

where 1 represents enrollment in for-credit courses.

In contrast, the vector for a student who started in noncredit courses and then transitioned to for-credit programs later might look like this:

330321110110000000

where the student started exclusively in noncredit courses; after these initial college experiences over the first four terms and with support from his college, he enrolled in a credit-bearing program and started taking courses that count toward a credential.[8]

The actual course enrollment patterns by noncredit students shown in Table 6 indicate that more than half (53.8 percent) of noncredit students enrolled in community college for only one semester and never returned. Due to the short duration of enrollment in college among most of the noncredit students in our sample, noncredit students on average completed only about two noncredit courses. Compared with for-credit students, they were also much less likely to follow the "traditional" college path in which students enroll in college in consecutive terms. In addition, both noncredit and for-credit students

[8] The indices start with fall 2007. Therefore, if a student started his college career in spring 2008, he would automatically have a zero for the first index (i.e., fall 2007).

mostly took courses in either the noncredit or for-credit sectors, respectively, and seldom mixed their courses across different sectors.

5. Credential-Seeking Noncredit Students and Transition to the For-Credit Sector

5.1 Certificate or Degree Intent

Among all the 43,032 noncredit students in our sample, about 50 percent reported having the intention to enroll in noncredit vocational training, and 41 percent reported an intention to enroll in basic skills training (ABE/GED) including ESL during their first term of enrollment. However, a nontrivial proportion of these noncredit students (8.1 percent of all noncredit students, or 3,492 students)[9] explicitly indicated during the first term the intention to earn a vocational certificate or a degree, or to transfer to a four-year college for a bachelor's degree. The great majority (92.3 percent) of these students intended to earn a certificate. It is important to examine whether noncredit education served as a bridging pathway to help credential-seeking noncredit students to attain any type of higher education certificate or degree.

As shown in Column 2 of Table 5, the demographic and academic characteristics of credential-seeking noncredit students generally fell in the range between those of noncredit students and for-credit students: They were about three years younger than the average age of all noncredit students when they first came to college, and they came from slightly better socioeconomic backgrounds in terms of neighborhood household income level, non–English speaking population, and population that obtained bachelor's degree and held work in professional occupations. They were also substantially more likely to have earned a high school diploma (71 percent vs. 23 percent) than the noncredit students overall. Yet, compared with students enrolled in credit-bearing programs, these credential-seeking students who started in noncredit courses still represent a lower-income, lower-performing population.

[9] Nearly all of these noncredit credential-seeking students started their college career in a noncredit vocational course (as opposed to a basic training course).

5.2 Transition to Credential Programs

Among this subgroup of noncredit students who expressed a clear intention to attain an educational credential, only a small proportion of them ever made it to the for-credit sector (took at least one credit-bearing course) or successfully transitioned (enrolled in for-credit courses for at least two semesters and passed at least one credit-bearing course). More specifically, 31.6 percent of the 3,492 credential-seeking noncredit students made the transition, and 21.7 percent of the 3,492 students transitioned successfully.

The enrollment pattern of credential-seeking noncredit students (Table 7) shows that even among students who expressed intent upon initial enrollment to earn an education credential, more than half enrolled in community colleges for only one semester and exclusively in noncredit courses.

Table 7
Most Frequent Enrollment Patterns of Credential-Seeking Noncredit Students by Transition Outcome

Credential-Seeking Noncredit Students Who Never Took Credit-Bearing Courses			Credential-Seeking Noncredit Students Who Transitioned To Credit-Bearing Courses			Credential-Seeking Noncredit Students Who Successfully Transitioned to Credit-Bearing Courses		
Pattern	**Students**	**% of N**	**Pattern**	**Students**	**% of N**	**Pattern**	**Students**	**% of N**
0300000000000000000	580	24.3%	0031000000000000000	19	1.7%	0031100000000000000	13	1.7%
3000000000000000000	519	21.7%	3100000000000000000	16	1.4%	0301100000000000000	8	1.1%
0030000000000000000	303	12.7%	0031100000000000000	15	1.4%	0301101000000000000	6	0.8%
3300000000000000000	100	4.2%	0301000000000000000	11	1.0%	3300000000000110000	5	0.7%
0330000000000000000	69	2.9%	0301100000000000000	8	0.7%	3000000000110000000	5	0.7%
0033000000000000000	59	2.5%	0301101000000000000	6	0.5%	0030001100000000000	5	0.7%
0303000000000000000	34	1.4%	0030100000000000000	6	0.5%	3101110000000000000	4	0.5%
0033300000000000000	29	1.2%	0032000000000000000	5	0.5%	0031101100000000000	4	0.5%
0300300000000000000	19	0.8%	0030001100000000000	5	0.5%	0300000000000011000	4	0.5%
0030300000000000000	18	0.8%	0331000000000000000	5	0.5%	0311101100000000000	3	0.4%
N = 2,388			N = 1,104			N = 758		

Note. Sample includes all 2007 credential-seeking noncredit FTIC students by transition outcome in the nine community and technical colleges.

Due to the low rate of transition to the for-credit sector, noncredit credential-seeking students on average only completed 0.5 credit-bearing courses with 1.6 credits earned. For those who did transition to the for-credit sector, most started to take credit-bearing courses in their second term of enrollment. In addition, the transitioned or successfully transitioned noncredit students followed very idiosyncratic enrollment patterns. For the 1,104 transitioned students, there were 881 distinct enrollment patterns. For the 758 successfully transitioned students, there were 659 distinct enrollment patterns. These idiosyncratic patterns may suggest that there is no general structured pathway or institutional support for credential-seeking noncredit students in terms of when and how to make the transition. Instead, these students seem to be simply left on their own to figure out a path to the for-credit sector.

5.3 Credential Outcomes

Since only a relatively small proportion of credential-seeking noncredit students actually made the transition to for-credit programs (31.6 percent) and an even smaller share of them continuously enrolled in for-credit programs (21.7 percent), the vast majority of credential-seeking noncredit students (94.9 percent) did not attain any kind of educational credential within six years. As shown in Table 8, among all the noncredit credential-seeking students, only 1 percent earned a certificate, 2 percent earned an associate degree, and another 2 percent earned a bachelor's degree within six years.

Table 8
Highest Award Obtained for Certificate-Seeking Noncredit Students

Highest Award Obtained	Percentage
No degree/certificate	94.9%
Certificate	1.1%
Associate degree	2.0%
Bachelor's degree	1.8%
Observations	3,492

Note. Sample includes 2007 credential-seeking noncredit FTIC students in the nine community and technical colleges.

These results indicate that there were clearly obstacles that prevented noncredit students from completing a credential after making the transition to credit-bearing programs and remaining continuously enrolled in credit-bearing courses.

6. The Determinants of Successful Course and Transition Outcomes

Our analysis so far shows that most noncredit students did not persist long in college and that the majority of them, even among those who had degree or certificate intent, failed to transition to a credit-bearing program or failed to persist after they made it to the for-credit sector. However, there is considerable variation in these outcomes among students. Can we identify student, course, or institutional characteristics that are related to a higher likelihood of completing a noncredit course, transitioning to the for-credit sector, and persisting after making the transition?

In this section, we supplement our descriptive evidence with a multivariate analysis that allows us to differentiate the relations among various individual and institutional factors and the academic progress among noncredit students. In doing so, we explore three specific outcomes: (a) course completion in all noncredit courses (as opposed to failing or dropping out of a course), (b) the probability of transition to a credit-bearing course among noncredit credential-seeking students (defined as taking at least one credit-bearing course), and (c) the probability of successful transition (defined as enrolling in for-credit courses for at least two semesters and passing at least one for-credit course).

6.1 Empirical Model and Hypothesis

We use a series of regressions to explore the potential individual-level and college-level characteristics that may be correlated with course completion and transition to the for-credit sector. Given the data's multilevel structure—with variables measured at the student- and institutional levels—we use multilevel modeling (Bryk & Raudenbush, 1988; Goldstein, 1986) to explore factors that influence these course and transition outcomes, where students are clustered within colleges. Given the binary nature of the outcomes measures, we conduct multilevel modeling within the framework of

hierarchical generalized linear modeling techniques (HGLM, see Bryk & Thum, 1989; Patrick, 2000; Rachman-Moore & Wolfe, 1984; Raudenbush & Bryk, 2002), with student inputs on level 1 and environmental factors on level 2. To explore the determinants of course completion, the analytical sample includes all noncredit courses (N = 142,548), where the level-1 structural model takes the form:

$$\Pr(Y_{ik}) = \beta_{0k} + \beta_{1k}X_{ik} + \varepsilon_{ik} \qquad (1)$$

where Y_{ik} is whether student *i* in college *k* successfully completed a noncredit course; X_{ik} is a vector of individual-associated baseline variables, which include demographic characteristics (including socioeconomic status),[10] pre-enrollment education, and academic indicators including each student's educational intent upon initial enrollment. All continuous variables, such as student age upon initial college enrollment, are grand-mean centered to aid in interpreting parameters (Kreft, de Leeuw, & Aiken, 1995; Schumacker & Bembry, 1995).

The level-2 model is formulated by adding institution-level characteristics to measure environmental influences on course completion. Following Porchea, Allen, Robbins, and Phelps (2010), we use a random intercept model:

$$\beta_{0jk} = \beta_{00k} + \beta_{01k}\,\alpha_{jk} + r_{0jk} \qquad (2)$$

$$\beta_{1k} = \beta_{1k}$$

where β_{0k} is the level-2 intercept, and α_{jk} is a vector of institution-level characteristics, including the location of the college, institutional size, student services, institution demographic composition, and institutional expenditures on academic support and on

[10] Demographic variables controlled for in the model include students' age upon first enrollment term, gender, race/ethnicity, and socioeconomic status of their residence neighborhood (median household income, percentage of poverty, percentage of non–English speaking population, percentage of population that obtained a bachelor's degree or higher, and percentage of population that works in professional occupations). Please see Table 9 for the full list of covariates included in the model.

institutional support, respectively. To explore determinants of transition to the for-credit sector, we use similar model specifications, but conduct the analysis at the student level and restricted the sample to noncredit credential-seeking students (N = 3,492).

6.2 Findings: Determinants of Course Completion and Transition

As shown in Table 9, colleges with greater per-FTE academic support expenses and a more traditional student composition are associated with higher completion in noncredit courses. Unsurprisingly, students coming from a better socioeconomic background and with better academic preparation were more likely to complete a noncredit course. After controlling for course, student, and school characteristics, the variation of the completion rate across courses in different program fields still persists.

Table 9
Predictors of Noncredit Course Completion

Predictors	Dependent Variable: Course Completion
Tuition and fees, 2007–08	−0.0005***
	(1.19e-05)
Total enrollment	5.50e-05***
	(3.86e-06)
Percent of undergraduate enrollment under 18	0.0391***
	(0.0005)
Percentage receiving federal grant aid	0.0029***
	(0.0011)
Institutional support expenses per FTE	−0.0007***
	(3.55e-05)
Academic support expenses per FTE	0.0008***
	(3.23e-05)
City (Base group: rural areas)	−0.4020***
	(0.0710)
Suburb	−0.7480***
	(0.0539)
Female	0.0080***
	(0.0021)
Age at first enrollment term	3.05e-06
	(3.04e-05)
African American (Base group: White)	−0.0105***
	(0.0023)
Hispanic	0.0086***
	(0.0029)
Asian	−0.0219***
	(0.0039)
Other race/ethnicity	−0.0266***
	(0.0049)

Predictors	Dependent Variable: Course Completion
Census median household income	2.30e-07***
	(6.86e-08)
Census poverty proportion	−0.0072
	(0.0088)
Census non–English speaker proportion	−0.0076
	(0.0105)
Census bachelor's degree proportion	−0.0330***
	(0.0112)
Census employed in management or professional occupations proportion	0.0917***
	(0.0135)
Obtained high school diploma (Base group: did not earn high school diploma or GED)	0.0050*
	(0.0026)
Earned GED	−0.0564***
	(0.0037)
Dual enrollment in high school	0.0323***
	(0.0105)
Student intent in first term: vocational certificate (Base group: academic degree or transfer to 4-year institutions)	0.0216***
	(0.0066)
Student intent in first term: noncredit vocational training	0.0964***
	(0.0067)
Student intent in first term: other types of noncredit training[a]	−0.0547***
	(0.0064)
Student intent in first term: unknown	0.0353***
	(0.0081)
In-state student	0.0436
	(0.0291)
Pell grant recipient	0.0469***
	(0.0150)
Full-time in first term	0.0814***
	(0.0064)
Face-to face-course (Base group: online course)	−0.0094**
	(0.0037)
Summer course	−0.0067***
	(0.0023)
Field of study: math and science (Base group: humanities, arts, and English)	0.0699***
	(0.0205)
Field of study: Information science and communication technology	−0.0038
	(0.0077)
Field of study: engineering science	0.0269***
	(0.0087)
Field of study: allied health	0.0921***
	(0.0073)
Field of study: nursing	−0.0058
	(0.0107)
Field of study: mechanics, repair and welding	0.0830***
	(0.0098)
Field of study: protective services	0.1660***
	(0.0064)
Field of study: construction	0.0307**
	(0.0123)

Predictors	Dependent Variable: Course Completion
Field of study: business and marketing	−0.0070
	(0.0071)
Field of study: education and childcare	−0.1030***
	(0.0124)
Field of study: transportation	0.0112
	(0.0457)
Field of study: cosmetology, culinary, and administration service	0.1520***
	(0.0260)
ABE/GED/ESL course (Base group: vocational course)	−0.0254***
	(0.0059)
Observations	142,548

Note. Sample includes all noncredit courses that 2007 FTIC cohort students in the nine community and technical colleges enrolled within six academic years. Standard errors in parentheses.

[a] Includes students who intended to take ABE, GED, ESL courses, as well as those who intended to take skill training and personal enrichment courses.

*** $p < .01$, ** $p < .05$, * $p < 0.1$.

Compared with courses designed for basic skills training, courses in areas that could be linked to an occupation such as allied health, protective services, construction, and mechanics are associated with higher completion rates.

To explore which institution- and individual-level variables best predict transition to for-credit programs, we also make us of a multilevel model. The results are presented in Table 10.

Table 10
Predictors of Transition from Noncredit to For-Credit Programs (Multilevel Models)

	(1)	(2)
Variables	**Transition**	**Successful Transition**
Tuition and fees, 2007–08	–0.0006***	–0.0006***
	(8.72e-05)	(8.32e-05)
Total enrollment	–5.75e-05***	–3.92e-05***
	(4.45e-06)	(4.24e-06)
Percent of undergraduate enrollment under 18	0.0225***	0.0202***
	(0.0057)	(0.0054)
Percentage receiving federal grant aid	–0.0243***	–0.0206***
	(0.0025)	(0.0024)
Institutional support expenses per FTE	0.0007***	0.0007***
	(0.0001)	(0.0001)
Academic support expenses per FTE	–0.0011***	–0.0010***
	(0.0001)	(0.0001)
City (Base group: rural areas) city	1.3240***	1.0490***
	(0.1390)	(0.1330)

Suburb	1.2390***	1.092***
	(0.1540)	(0.147)
Female	0.0484***	0.0607***
	(0.0132)	(0.0126)
Age at first enrollment term	–0.0042***	–0.0036***
	(0.0006)	(0.0005)
African American (Base group: White)	0.0081	–0.0214
	(0.0161)	(0.0154)
Hispanic	0.0065	–0.0135
	(0.0298)	(0.0284)
Asian	0.1010**	0.0109
	(0.0456)	(0.0436)
Other race/ethnicity	0.1080***	0.0794***
	(0.0225)	(0.0214)
Census median household income	2.22e-07	–2.56e-07
	(4.07e-07)	(3.89e-07)
Census poverty proportion	0.0300	0.0929
	(0.0688)	(0.0617)
Census non–English speaker proportion	0.104	0.0473
	(0.0730)	(0.0657)
Census bacherlor's degree proportion	–0.0663	0.0683
	(2.22e-07)	(0.0697)
Census employed in management or professional occupations proportion	–0.0006***	0.0476
	(8.72e-05)	(0.0854)
Obtained high school diploma (Base group: did not earn high school diploma or GED)	0.0373**	0.0393**
	(0.0181)	(0.0172)
Earned GED	0.1060***	0.0632***
	(0.0252)	(0.0241)
Student intent in first term: get a vocational certificate (Base group: get an academic degree or transfer to a 4-year institution)	–0.1420***	–0.1510***
	(0.0251)	(0.0240)
Pell grant recipient	–0.1530	–0.0750
	(0.1450)	(0.1390)
Full-time in first term	0.2940***	0.2640***
	(0.0396)	(0.0378)
With remedial placement information	0.2200***	0.1630***
	(0.0201)	(0.0192)
Constant	1.5400***	1.1470***
	(0.1100)	(0.1050)
Observations	3,492	3,492
Number of colleges	9	9

Note. Sample is composed of all FTIC credential-seeking noncredit students in the 2007 cohort in the nine community and technical colleges enrolled within six academic years. Standard errors in parentheses.

*** $p < .01$, ** $p < .05$, * $p < .1$.

In column 1, the dependent variable is an indicator of taking at least one for-credit course during six years. The analytical sample includes credential-seeking students who started in noncredit programs during their first term of enrollment. In column 2, we use the same sample, but the dependent variable is an indicator of whether the students enrolled in credit-bearing courses for at least two semesters and completed at least one credit-bearing course.

The coefficients in both models present similar findings: At the institutional level, the most prominent predictors are the location of the college, where colleges in urban and suburban areas are associated with a substantially higher probability of transition and successful transition from the noncredit sector to the for-credit sector. At the individual level, female students and students who had characteristics that were more similar to traditional college students (i.e., younger, with a high school diploma, and enrolled full-time during the first term) are associated with higher probabilities of making the transition and successfully persisting after making it to the credit program.

7. Discussion and Conclusion

While noncredit programs have been advocated as a mechanism for expanding educational opportunities, particularly for low-income students, there is surprisingly little information on students enrolled in these programs and their subsequent academic outcomes. This study is one of the initial attempts toward understanding the promise of noncredit programs in addressing equity concerns in higher education access and success by examining the characteristics, course enrollment patterns, and academic outcomes of students who started their college careers in noncredit courses. To explore these questions, we use an unusually rich dataset that includes demographic and transcript information on all noncredit students across multiple institutions. The resulting analysis complements existing studies, which have been mainly based on interviews with college administrators. The current research findings also highlight several potential areas for future research on noncredit education.

First, consistent with the anecdotal evidence, we find that noncredit education in community colleges has various categories serving different purposes. In particular, we

identify substantial variation in course completion by field of study even after controlling for student academic and demographic characteristics. The current data do not provide a clear answer as to why noncredit course completion was higher in some fields than in others: this variation could be due to the design and organization of specific noncredit programs. It may also be largely due to the effectiveness of the instructors teaching these courses. The academic and institutional support that each department provides to noncredit students may vary as well, all of which warrant future exploration.

Second, no matter which specific noncredit course a student is enrolled in, noncredit students generally tend to be low-performing and low-income adult learners. These individuals, in spite of their educational aspirations, may be subject to academic, financial, and time constraints and can easily be impeded by bureaucratic hurdles involved with certificate and degree program admission (Scott-Clayton, 2011). In this regard, noncredit programs, with their many advantages, such as low cost, open enrollment, and flexibility, have the potential to provide easier access to higher education, compared with credit-bearing programs. Yet, our results suggest that more than half of noncredit students drop out of college after their initial term, even among students who expressed intent to transition to credit-bearing programs. Future research may wish to explore whether such short enrollment in noncredit programs is due to the length of the program itself or to students' failure to persist in college. If it is the former, where these programs were intended for skill upgrade within one or a limited number of courses in a short duration of time, it would be important to examine the extent to which such short-term training does indeed benefit students in the labor market; if it is the latter, it would be critical to examine why students drop out soon after their initial enrollment and to examine potential ways to improve their persistence in noncredit programs.

Moreover, understanding the massive dropout pattern among noncredit students is particularly important for supporting students who wish to use noncredit programs as a pathway to an educational credential. Indeed, while the majority of students who enroll in noncredit programs do so for personal enrichment and skill learning, about 8 percent of noncredit students in our sample sought to attain a certificate or degree.[11] Yet, only about

[11] More than 90 percent of these students intended to earn a certificate.

one third of these credential-seeking students succeeded in ever transitioning to a for-credit program, and only about one in twenty attained any type of credential within six years after their initial enrollment. The idiosyncratic patterns of course enrollment and of transition to credential programs seem to suggest that there is no general structured pathway or institutional support for credential-seeking noncredit students (Bailey, Jaggars, & Jenkins, 2015). These findings are consistent with the results of previous studies that have identified a general lack of programmatic and curricular structure for community college students seeking various academic pathways in the for-credit sector (e.g., Baker, 2014; Scott-Clayton, 2011). Scott-Clayton's (p. 1) summarizing point is that, "For many students at community colleges, finding a path to degree completion is the equivalent of navigating a shapeless river on a dark night." The lack of structure in the for-credit sector is a particular concern for noncredit students who seek to gain entry to for-credit programs, for they face all the challenges that for-credit students face and more. Thus, to enable noncredit education to serve as a viable path to credential attainment, future research will need to identify typical obstacles faced by noncredit students, what institutional support should be provided to help students overcome these obstacles, and what institutional changes might be required to reduce such obstacles.

One obvious issue with noncredit education, borne out by discussions with some of the administrative staff at our sample colleges, is the lack of funding for state-supported noncredit education programs. Since noncredit students are substantially more likely to enroll part-time, they generate a much smaller amount of funding compared with students enrolled in credit-bearing programs, despite their higher headcount. This means that noncredit students need to share resources, which are already more limited compared with resources provided to for-credit students, with a larger number of students enrolled in the noncredit sector. As a result, it was and will continue to be difficult for colleges to provide sufficient services and support to noncredit students, such as child care, academic guidance, and career-oriented counseling, given traditional funding formulas.

Finally, the possibility that student academic success and progress may largely be influenced by the support and services available to students is supported by our analysis that relates various institutional and individual factors with students' probability of transition from noncredit to for-credit programs. At the individual level, the strongest

predictor is student initial enrollment intensity, where full-time enrollees are substantially more likely to transfer to a for-credit program later. While it is possible that full-time enrollees are more motivated and committed to their academic careers and are therefore inherently more likely to continue toward credential attainment, first-term intensity may also reflect the financial and time constraints that noncredit students are often subject to. Therefore, one potential area for further research is ascertaining whether providing financial support to noncredit students would help them persist and make steady academic progress. If financial support during the initial terms of enrollment improved the likelihood of noncredit students' transfer to for-credit programs, it would provide motivation for implementing policies to enable access to financial aid among credential-seeking noncredit students.

At the institutional level, colleges with lower tuition and fees and greater amount of expenses per FTE on institutional support are associated with higher rates of successful transition from noncredit to for-credit programs. The positive influence of lower tuition echoes the hypothesis raised earlier in the paper that financial constraints may be a major barrier against successful bridging to the for-credit sector, as the student cost for for-credit courses is much higher than for noncredit courses. While financial support is available to credential-seeking students in for-credit programs, it seems that almost none of the credential-seeking noncredit students in our study, even those who successfully made it to a credit program, received any financial aid. Do these kinds of students apply for support but are declined, or do students fail to complete the application for aid application? If it is the latter, colleges should consider delivering financial aid information to noncredit students more explicitly and consider providing institutional support to help noncredit students go through the administrative procedures to apply for need-based aid. Such institutional services and support are important to student success in general, but they may be particularly important to students enrolled in noncredit programs, where the majority are low-income adult learners who are likely to be first-generation students, to have difficulty with bureaucratic hurdles, and who need to balance their academic life with concomitant work and family responsibilities. Future research may wish to explore the effectiveness and cost benefit of various types of services that can be offered to credential-seeking noncredit students. Until students are provided with

the necessary resources and support to benefit from noncredit programs when intending them as a bridge to for-credit programs, the capacity of noncredit education to be used as such a bridge is extremely limited.

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