

Prior Learning Assessment and Student Outcomes at the Colorado Community College System

Li Kuang Heather McKay

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RUTGERS

Education and Employment
Research Center

School of Management and Labor Relations

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EXECUTIVE SUMMARY

This report focuses on the association between Prior Learning Assessment (PLA) and students' academic outcomes by tracking students admitted to Colorado Community College System (CCCS) institutions between fall 2007 and summer 2010. In the analysis, we compare the academic outcomes of PLA and non-PLA students by examining their graduation rates, persistence, and time to degree.

Our findings are in large part consistent with results from prior research on PLA impact in postsecondary education. On average, PLA earners had a higher graduation rate regardless of the degree they were pursuing. In addition, PLA credits also motivated students to stay in school and continue working on their degrees. In our sample, non-degree-earners who earned PLA credits had higher retention rates than their non-PLA counterparts, enrolling and earning credits on an ongoing basis. PLA credit also accelerated certification processes for many students. However, due to data limitations, findings from this study of the impact of PLA on time to degree were not as strong as expected, especially for students pursuing 1- or 2- year certificates. Further studies with more accurate data documenting students' enrollment status are needed to better demonstrate the impact of PLA on students' time to degree.

Almost 1.7 percent of students in our sample had been assessed for PLA credit at some point since their admission to CCCS. Comparing their academic outcomes with those who did not earn PLA credits, we find that the awarding of PLA credit was related to consistently higher postsecondary-degree completion rates. Degree-earning rates for students who received PLA credits were three to five times higher than they were for students who did not receive any PLA credit. PLA earners were more likely than non-PLA earners to finish their certificate programs as well, but the difference in graduation rates of certificate programs between the two groups was not as dramatic as the difference in associate degree completion rates.

In addition to enhancing postsecondary-degree graduation rates, PLA credit also had a positive academic influence on students who had not yet earned a degree by motivating them to stay enrolled and take credits toward their degrees. Only about 31.5 percent of PLA earners left school after 1 year of study; that rate is much lower than the nearly 52.5 percent of non-PLA earners who left CCCS schools after 1 year.

Finally, our data, to some extent, support the hypothesis that PLA credits shorten the time to degree, especially for students working toward their associate degree. The general pattern of time to associate degree was that time to degree decreased as the number of PLA credits earned increased.¹ Time saved by PLA credits ranged from about 1 month to 7.5 months. However, PLA's impact on time to degree for students pursuing certificates rather than associate degrees was not clear. Our data fail to support the hypothesis of PLA shortening time to degree for

¹ The standard errors of these estimates were decreasing as well, suggesting robust estimates of PLA impact.

certificate students.² Further studies are needed to better capture the impact of PLA on time to degree in this arena by examining how PLA credit eligibility was assessed among certificate students and how those credits were applied. Thus, more accurate data are needed to track students' academic histories carefully from entrance to graduation.

To demonstrate the positive effects of PLA on increased graduation rates, greater persistence, and reduced time to degree, we also address the potential alternative explanation that students who were more academically prepared and motivated were more likely to earn PLA credits. This is a key argument to address because if that were the case, the improved academic outcomes we highlight in our analysis may be attributed to the capability and aspiration of PLA students rather than to the impact of PLA credit. To address this potential counterargument, we reexamine the relationship between PLA and graduation rates while controlling for students' academic capability (as measured by their GPAs and whether they took remedial courses). Our results demonstrate that academic readiness cannot fully explain the higher graduation rates we found among the PLA credit earners in our sample. In other words, PLA earners had higher graduation rates than their non-PLA-earning counterparts regardless of their overall academic aptitude.

After examining the relationships between PLA credit earning and the various academic outcomes discussed above, we go on to evaluate whether these relationships vary by institution size, students' sociodemographic characteristics, and students' life experiences of economic hardship and military service.

We also examine the relationship between PLA and school size. CCCS consortium schools vary in terms of the size of their student populations. While the larger CCCS schools boast a population of over 20,000 students, the smaller CCCS colleges enroll fewer than 2,000 students. In general, the number of PLA tools used by each school differed in relation to the size of its student body, with larger colleges tending to use more tools than the smaller ones. Therefore, the influence of PLA credit on students' academic outcomes might differ by school size due to students' differential access to the full range of PLA tools available within the CCCS system.

Our study revealed that PLA students had higher graduation rates than non-PLA students had in all CCCS schools regardless of school size. While graduation rates for both PLA earners and non-PLA earners were higher in small colleges than they were in large colleges, of particular interest is our finding that PLA earners in small colleges had higher graduation rates than PLA earners in large colleges had. Further studies are needed to examine the mechanisms that helped students in small CCCS colleges to be more successful than their counterparts in larger colleges with regard to completing their postsecondary degrees.

When students' sociodemographic characteristics and life experiences were considered alongside their PLA status, we found that PLA earners of both genders had higher graduation

² It is worth noting here that the standard errors for the estimates we were able to calculate were large, indicating a lack of reliability.

rates relative to their non-PLA-earning counterparts. Among both PLA and non-PLA earners, females had slightly higher graduation rates as well as higher rates of persistence than their male counterparts. For the most part, female PLA earners shortened their time to associate degrees more than male PLA earners did—male students finished their associate degrees faster only when they earned more than 36 PLA credits. For students pursuing certificates, our findings on the association between PLA and time to degree were inconsistent and unreliable. Further studies and better data are needed to evaluate PLA's impact on time to degree across gender categories.

We also examine the associations between PLA and academic outcomes for each age group. Regardless of student's age, PLA earners consistently graduated at a higher rate than non-PLA earners. The greatest difference in graduation rates by PLA-credit-earning status was found among students aged 45 to 54. Although students younger than age 24 had higher a retention rate than older students, older students—those between 45 and 54 years of age—had the fastest time to associate degrees. We did not find that age affected the way in which PLA credit shortened students' time to certificate credentials.

Regardless of race/ethnicity, PLA credit earners benefitted academically by finishing their degrees/credentials at higher rates than non-PLA earners did. Across every racial group, PLA earners had higher graduation rates than non-PLA earners. Compared with white and black students, Hispanic students had a higher persistence rate, meaning they were more likely to be reenrolled after their first year and to continue earning credits over time. While PLA credit accelerated time to associate degree in general across categories of race/ethnicity, the effects were more obvious for white students than they were for other racial groups. Time to certificate credentials was not clear and was not reliably estimated due to sparse data. Further studies are needed with better data to examine PLA's impact on time to certification across categories of race/ethnicity.

The positive associations between PLA and graduation rates persist among students regardless of economic conditions. However, we find that students who were eligible for financial aid—in other words, those who were economically disadvantaged—had both higher graduation rates and higher persistence rates than their more economically advantaged counterparts. These findings contradict prior research that has linked better academic outcomes to financially better off students (Horn 2006). One possible explanation for the higher graduation and persistence rates among the economically disadvantaged students in our sample may be our measurement; it's possible that relying on the eligibility of financial aid to distinguish financial advantage from disadvantage was flawed because CCCS did not distinguish students who were ineligible for financial aid from students who did not report on their financial aid status. If financial aid students were more likely to underreport their status, we may have underestimated the graduation and persistence rates for students without financial aid by assuming that all students who did not report that they were eligible for financial aid were the same as students *without* financial difficulties. Though PLA credit shortened the time to associate degrees for

students in both economic groups, it took longer for the disadvantaged students to complete their associate degree at each PLA-credit-earning interval.

PLA earners had higher graduation rates than non-PLA-earners regardless of their veteran status. However, the associations between PLA and graduation rates were stronger for non-military students. Among those students, the difference in the graduation rates of PLA and non-PLA earners was much greater than that of PLA and non-PLA earners with a military background. While PLA earners also had higher persistence rates than non-PLA earners in general, these benefits did not differ by military service background. However, we did find a difference in time to degree: It took longer for students with a military background to finish their associate degrees. Further studies are needed to examine whether and how PLA credit differentially affects military and non-military students with regard to time to certification.

INTRODUCTION

The Colorado Helps Advanced Manufacturing Program (CHAMP) is a US Department of Labor Trade Adjustment Assistance Community College and Career Training grant intended to facilitate the redesign or creation of degree and certificate programs that respond effectively to the needs of the 21st-century manufacturing sector. Under the grant, academic institutions partner with manufacturing industries to develop and/or refine academic programs that can meet changing employer requirements and more quickly and efficiently prepare and credential displaced workers. Strategies to be developed under the grant include the involvement of industry and workforce partners, a review of prior learning assessment (PLA), the matriculation of community college students to four-year institutions, and the establishment of campus navigators to support and assist students.

Activities under the CHAMP grant are led by a select consortium of nine colleges within the wider CCCS. The CCCS affiliates involved in the program are Aims Community College (AIMS), Community College of Denver (CCD), Emily Griffith Technical College (EGTC), Front Range Community College (FRCC), Lamar Community College (LCC), Pikes Peak Community College (PPCC), Pueblo Community College (PCC), Red Rocks Community College (RRCC), and Metro State University, Denver (MSU). MSU, a four-year institution, has been designated as the university to which students can apply CHAMP credits toward earning a bachelor's degree in engineering.

The focus of this paper is the redesign of the policy, practice, and implementation of Prior Learning Assessment (PLA) at CCCS, one of the major components of CHAMP. CCCS colleges have used PLA as an alternative means for awarding academic credits for over 40 years, but historically its use lacked uniformity within the system. Institutions varied in the extent to which students had knowledge about PLA, in students' access to PLA, and in how PLA was administered. During the first two years of the CHAMP grant, CCCS and participating colleges developed policy and practice recommendations for PLA use. As year three of the grant begins, these changes will begin to be implemented at colleges. Future reports will look at both the development and implementation of these redesigns.

One important part of understanding the changes being made to PLA under the CHAMP grant is understanding how PLA was used prior to CHAMP. As such, the Education and Employment Research Center³ (EERC) at Rutgers, the State University of New Jersey, produced this report as part of the wider CHAMP grant evaluation. Because the effectiveness of PLA in helping students advance academically has not yet been carefully examined within the state of Colorado, establishing a baseline understanding of this relationship will help us to better recognize any future effects of the redesigns implemented under the CHAMP grant. To that end, this report explores the relationships between PLA and three major academic outcomes:

³ The Education and Employment Research Center at Rutgers, The State University of New Jersey, serves as the third-party evaluator for the CHAMP grant.

graduation rate, student persistence, and time to degree. Using data provided by CCCS on its students' registration history and academic profiles, we focus on students admitted to CCCS colleges between fall 2007 and summer 2010 and follow their student records over an eight-year period to examine the effects of PLA on their academic performance. This analysis of before-CHAMP data thus yields a baseline report of PLA's impact on CCCS students that EERC can use to compare against in assessing the effects of CHAMP-redesigned PLA programs on students' academic performance later in the grant period.

This report uses student data from the following thirteen CCCS colleges, which vary in school size, student population served, and number of programs offered. See Appendix A for more information on the characteristics of these CCCS schools.

- Arapahoe Community College (ACC)
- Colorado Northwestern Community College (CNCC)
- Community College of Aurora (CCA)
- Community College of Denver (CCD)
- Front Range Community College (FRCC)
- Lamar Community College (LCC)
- Morgan Community College (MCC)
- Northeastern Junior College (NJC)
- Otero Junior College (OJC)
- Pikes Peak Community College (PPCC)
- Pueblo Community College (PCC)
- Red Rocks Community College (RRCC)
- Trinidad State Junior College (TSJC)

Research questions

Following the cohort of CCCS students admitted to consortium colleges between fall 2007 and summer 2010, we examine the following broad research questions:

- Are students with PLA credits more likely than those who do not earn PLA credits to graduate?
We examine the graduation rates of CCCS students earning associate degrees, 2-year certificates, and 1-year certificates in terms of those who earned PLA credit and those who did not earn PLA credit.
- Do students with PLA credit have better persistence rates than students without PLA credit?
This question concerns students who did not earn credentials during the study period. We examine whether students with PLA credits were more likely than

those who did not earn PLA credits to re-enroll after their first term and continue to earn academic credits.

- Do students with PLA credits earn their credentials in a shorter period of time than students without PLA credits?

This question compares time to degree for PLA students vs. non-PLA students. We want to determine whether earning PLA credit shortens the time it takes for students to earn a degree or certificate.

In addition to these three major questions, we also want to further evaluate the following:

- Do the benefits of earning PLA credit vary by school size or by students' academic ability?
- Do the benefits of earning PLA credit vary by students' sociodemographic characteristics or life experiences such as gender, race/ethnicity, age, financial hardship, and military service?

This report also presents tuition data to determine whether PLA credit, which in large part is aimed at lowering the cost of education, is realizing that goal.

Summary of findings

Findings in this report are based on the records of 299,377 students enrolled⁴ in any of the 13 CCCS consortium colleges between fall 2007 and summer 2010. Given that less than two percent of all CCCS students earned PLA credit, a three-year cohort was necessary to ensure a sample size large enough to capture PLA effects.

The study shows that PLA students had better academic outcomes. Graduation rate, in particular, was much higher among students who earned PLA credit than among their non-PLA-earning counterparts. Among non-degree earners, PLA-earning students were more likely than students who did not earn PLA credit to stay in school. Finally, PLA also helped some students accelerate the time it took them to complete their degree, though that outcome was dependent upon the number of PLA credits earned and the type of degree that they pursued.

PLA and graduation rates

PLA earners in the study had much higher graduation rates than non-PLA earners. Over 40 percent of students who earned PLA credit went on to earn a postsecondary degree, while only

⁴ Our data is imperfect with respect to the boundaries of our population of interest. While it was our intention to focus on students who were newly admitted to CCCS schools beginning in 2007 or later, we learned only after our data analysis was already well underway that the data we received from CCCS contained entries for some students who had been enrolled earlier than 2007 and were still taking classes. Unfortunately, there was no way for us to filter those students out of the data set.

about 13 percent of non-PLA-earning students did so. In terms of degree earned, we found the following graduation rates for PLA and non-PLA earners:

- About 35 percent of PLA earners received their associate degree compared to less than seven percent of non-PLA-earning students.
- Nearly five and a half percent of PLA earners completed a 2-year certificate program compared to about five percent of non-PLA earners.
- Two and a half percent of PLA earners finished a 1-year certificate compared to one and a half percent of non-PLA earners.

PLA students had higher graduation rates than non-PLA students. This relationship holds even when we take into account students' demographic characteristics and the size of the college they attend. In other words, PLA credits improve graduate rates . . .

- in both large and small CCCS colleges;
- regardless of student's academic ability (as measured by GPA and whether remedial courses were required);
- regardless of students' demographic characteristics (gender, race/ethnicity, and age); and
- regardless of student's financial conditions and military service experience.

PLA and persistence

PLA earners who did not earn their degree during the study period had better persistence rates than non-PLA earners as suggested by their consistently higher re-enrollment rate over time. Over 52 percent of non-PLA earners without degrees stopped earning credit after only one year of study while only about 31.5 percent of PLA students dropped off the rolls at that point. Higher percentages of PLA students without degrees re-enrolled and earned credits in every subsequent year—seven in all—for which data was examined for this study.

PLA and time to degree

PLA earners receiving associate degrees saved on average between 1 and 7.5 months of time in reaching their goal as compared to non-PLA earners.⁵ The relationship between PLA credits and time to degree is not as clear for students pursuing certifications. There was a limited number of PLA students earning certificates in our sample, which hampered our ability to fully understand this relationship. Moreover, as certificate programs did not require as many credits and usually required less time to complete than associate degrees, the time-saving benefits of PLA credits may not be as distinct. However, further study is needed to investigate how PLA

⁵ The variance for the average months to associate degree lowered along with the increase in PLA credits earned, suggesting reliable estimates.

credits were applied for by students pursuing certificates and how they were administered on behalf of those students.

Limitations

Results presented in this report are based on longitudinal administrative data collected by CCCS. As it stands, there are three major limitations for the current results:

1. *Scope of the analysis.* This is an observational study focusing on exploring the difference in graduation rates, persistence, and time to degree between students who received PLA credits and those who did not. The statistical analysis detailed in this report is not meant to establish or imply any causal effects of PLA processes. The difference in the outcome measures should not be interpreted as the result of PLA practices. Causal impact can only be examined through experimental study or by using other causal inference analytical methods that take into account the differences between those who earned PLA credits and those who did not.
2. *Limitations in the data.* Data for the current analysis are from the CCCS administrative system. The data sets recorded a list of all courses taken by each CCCS student along with his or her admission and, if applicable, graduation date. However, since data were not collected by the degree a student was pursuing, we do not know which degree program any given student's PLA credits were applied to, how many PLA credits were applied, or when those PLA credits were applied for. Moreover, CCCS documented information on two critical life experiences: being economically disadvantaged (defined as those eligible for financial aid) and being a veteran of the military. In both of these cases, the data-collecting process did not differentiate those who did not have these experiences from those who failed to report on their status. (In other words, a lack of response on these items was equivalent to a negative response.) Because of this, we have had to assume that those who did not respond to either (or both) of the item(s) did not have that life experience—an assumption that could introduce errors into the analysis.
3. *Lack of nuance with regard to different PLA processes.* This study does not compare student outcomes according to which PLA methods or assessments were employed in each case. We treat the effects of all PLA methods as the same. Further studies with detailed data on PLA credits assessments and usage are needed to compare the effectiveness of different PLA methods.

LITERATURE REVIEW ON PLA EFFECTS

Although Prior Learning Assessment (PLA) has been practiced in American colleges and universities for over 40 years, systematic research on its effects and consequences has been limited by the scale of the study, the range of outcomes examined, and the way data have been collected and analyzed. A broad literature on PLA is dominated by research focusing on

describing the PLA program, the curriculum design, PLA assessment methodology, recognition and validation of PLA credits, and faculty and student perspectives on the utility of PLA credits (Travers, 2011; LeGrow, Sheckley, and Kehrhahn, 2002; Vanstone, 1999; Klein-Collins, 2010). The few studies that focused on PLA effects on student outcomes usually relied on a small sample of students from one college program or on students in one institution (for example, Hoffmann, LeMaster, and Flickinger, 1996). Very few studies (for example, Klein-Collins, 2010; Aarts et al., 1999; Centre for Education Information, 2002) have used large-scale data to examine PLA impact on students' academic performance.

When academic outcomes are considered, studies suggest that PLA has a positive impact on students' academic success in terms of leading to higher graduation rates, increased student retention, and saving students both money and time. Specifically, studies have shown that, compared with non-PLA students, students earning PLA credits are more likely to persist through their program with higher retention rates, higher grade point averages, and higher graduation rates (Klein-Collins, 2010). Moreover, earning PLA credits saves college and university tuitions and helps students, especially adult students, to graduate faster (Klein-Collins, 2010).

Many studies focusing on the impact of PLA on student outcomes have been published since the 1990s. Instead of a comprehensive review of PLA's impact on students' academic performance overall, some research focused on just one or two specific academic outcomes, usually persistence and graduation rate (Synder, 1990; Pearson, 2000; Fonte, 2008). Others undertook a more long-term evaluation of student success by investigating outcomes beyond graduation, such as employment rates after degree (Aarts et al., 1999).

Focusing on PLA's impact on students' persistence, Snyder (1990) tracked 2,825 students who entered a Philadelphia-area community college over a four-year period beginning in the fall 1982. He found significantly higher persistence rates among PLA students than among students not earning PLA credits. Pearson (2000) found that earning PLA credit contributed significantly to adult students' persistence toward degree completion. Using data on part-time baccalaureate students at a Midwestern private liberal arts college to compare adult students who earned PLA credits with those who did not, he reported greater persistence to degree among the PLA students after controlling for age, gender, parental educational attainment, high school academic performance, prior college credits, and work intensity.

In a study of the financial impact of PLA on institutions, Fonte (2008) analyzed the records of a group of students that had been followed up on by one institution for over 10 years. He found that among those students, PLA earners had a graduation rate of 88 percent—a rate that was far higher than the average 5-year persistence rate for students in 4-year institutions nationwide (59% as reported in Horn, Berger, & Carroll, 2004; Travers, 2011). Though the study did not have a comparison group of non-PLA students, the high graduation rate among PLA students suggested the positive impact of PLA. Similar positive PLA effects were also reported by Freers (1994) in her study of students at Orange Coast College. Other studies have shown that, in

addition to higher persistent rates, PLA students also have higher graduation rates than their non-PLA students (Travers, 2011; Klein-Collins, 2010).

Besides persistence and graduation outcomes, researchers have also explored the impact of PLA on students' cognitive skill development. LeGrow, Sheckley, and Kehrhahn (2002) demonstrated that adults receiving PLA credits had better problem-solving skills than adults completing classroom courses. Their analysis was based on a volunteer sample of 54 students in a business management program at a large university in the eastern United States. The study concluded that students develop cognitive skills outside the academic environment that are equivalent to those typically acquired in the classroom. Similar findings were also suggested by Conrad (2008).

A recent dissertation study examined the differences in academic performance between 339 PLA students and 321 non-PLA students at Mountwest Community College from 2006 to 2011 (Chappell, 2012). Consistent with prior research, the study found PLA credit shortened the time to degree, but the key finding here is that this relationship was affected by how that PLA credit was earned. The positive effect of PLA credits on shortening time to degree was significant for students who earned their PLA credits through the military and through institutional or state credit evaluations, but the observed difference was not significant when the PLA credits were earned by taking a standardized exam. This was one of the few studies of PLA's effects on student outcomes that has taken into account the method used to award PLA credit.

Some of the PLA literature explores a comprehensive array of students' academic outcomes. Using survey data on PLA earners at Vermont State College, Sargent (1999) demonstrated the positive effects of PLA on students' degree program participation, persistence, attainment, and time to degree. Of the 253 survey respondents, 89 percent participated in a college degree program and 82 percent obtained a degree. Most of the respondents cited PLA as an important factor that helped them to complete their degree. The average time to degree was 2 years for an associate degree, 4 years for a bachelor's degree, and 7 years for a master's degree. Although this study suggests that PLA had positive effects on academic performance, the results were limited as the study did not include a comparison cohort of non-PLA students.

The Institute for Research on Adults in Higher Education published several articles focusing on the impact of PLA on academic outcomes (1996, 1997). In these studies, Hoffmann and colleagues followed students over a four-year period at the University of Maryland's University College and found that, compared with non-PLA students, PLA students had higher persistence rates, higher graduation rates, earned more credits, had higher grade point averages, and graduated faster (Hoffmann, LeMaster, and Flickinger, 1996, 1997; Klein-Collins, 2010).

Although the above literature has demonstrated positive effects of PLA on students' academic performance, these studies are limited in various ways—for example, they focus on a single college or institution, base their results on a small sample, or lack a comparison sample—that make it hard to clearly interpret PLA's effects. Their results are confined to the college under

study, which limits our understanding of PLA's impact on students on a larger scale. In order to better capture the influence of PLA on adult learners, data collection across institutions over time using a control group for comparison is necessary.

In 2010, the Council for Adult and Experiential Learning (CAEL) published a comprehensive report on PLA's impact on adult students in 48 colleges and universities—46 schools from all regions of the United States along with two institutions in Canada (Klein-Collins, 2010). Their sample consisted of over 62,000 adult learners matriculated in 2001–02 who were followed for a period of seven years. The study reported that PLA students had higher graduation rates, better persistence, and lower time to degree compared with non-PLA students. These findings held regardless of size, level, or type of institution as well as for students of different age, gender, race/ethnicity, and academic ability. Among students who did not achieve their degree during the observational period, the study found that PLA students took more credits and had a slightly higher grade point average than non-PLA students.

In Canada, a comparable large-scale study was conducted examining PLA impact in 1999 (Aarts et al., 1999). The authors examined PLA students from 1993–94 to 1997–98 for 7 participating colleges. Data on a sample of almost 12,000 non-PLA students in 58 programs were included as the comparison cohort for the PLA earners. The study found that PLA students had higher graduation rates than their non-PLA counterparts; they also graduated with higher grade point averages and took more courses. Their average course grades were as high as or higher than the average course grades of non-PLA students in the same program. PLA was found to be efficient for part-time adult learners, shortening their programs and reducing both course loads and cost. It was particularly beneficial to part-time students who decided to return to education to achieve employment-related training and occupational credentials.

Although these large-scale studies carried out comprehensive evaluations of PLA impact, study samples were usually drawn from a mixed pool of both community colleges and 4-year universities nationwide. While choosing students nationwide created a nationally representative sample, it also introduced a challenge to evaluation given that college students residing in different parts of the nation tend to be relatively heterogeneous in terms of their demographic background. Furthermore, students' academic performance is affected by the local and state educational policies in place where they reside, so any findings regarding a relationship between PLA and student outcomes that do not take these policies into account may be unreliable. To address these limitations, large-scale studies working with cross regional samples should employ more advanced analytical tools, such as a mixed model, that can account for the influence of local policies.

To address some of the data-related issues we have identified with regard to previous studies that have been either too small and site-specific or too large and diverse, our study seeks a middle ground by examining the relationship between PLA and students' academic performance using large comparison samples drawn from diverse institutions within a single region—thirteen community colleges in the Colorado Community College System.

CCCS colleges share many commonalities. The CCCS colleges are similar in terms of the local and state educational policies that might influence student's academic outcomes. They are all also within the same administrative system, which provides a structural similarity. They offer the same tuition rate and share the same registration and reporting system. They all offer certificate programs and associate degrees. CCCS students are allowed to take courses in any of the consortium schools, they are allowed to transfer between schools, and any course they take at a CCCS school will be recognized by any other school within the consortium. A common course number system is also used across all system colleges.

There is enough variation among CCCS schools, however, to add a layer of richness to our data that single-school studies cannot capture. For example, the schools are different in terms of the size and demographic characteristics of their student populations (see Appendix table A). Larger schools such as FRCC, PPCC, and ACC range in size from 10,000 to more than 66,000 students. MCC, NJC, and OJC, on the other hand, are much smaller schools with fewer than 6,000 students. Some schools have higher minority populations than others, and some admit more veteran students or athletes. In terms of PLA, each school is different in terms of the assessment methods being used, the cost of assessment, and the way PLA credits can be applied.

In this report, we take into account school size as well as a variety of demographic characteristics and life experiences that may have affected the associations between PLA and student outcomes.

PLA AND PLA PROGRAMS OFFERED BY CCCS

All CCCS consortium colleges offer some type of PLA opportunities through which students can earn PLA credits. . However, each college has its own policy and regulations regarding the assessment and application of PLA credit.

Defining PLA

Prior learning is non-classroom or experience-based learning that is usually attained outside the postsecondary education institution. Credit can be acquired for knowledge gained from work and life experiences; community and volunteer extension courses; non-credit training; and participation in informal courses and in-service training sponsored by associations, businesses, government, and industry. Credit for prior learning is not awarded for experience itself but for college-level learning, which entails knowledge, skills, and competencies that students have obtained as a result of their prior learning experience (CAEL, 2013). PLA credit can be earned using the following methods:

➤ *Portfolios*

- Credit is awarded through the development of a portfolio.
- Evaluation is performed by a subject-matter expert or panel of experts.

- *Published guides*, such as
 - the American Council on Education (ACE) for military training & experiences,
 - the ACE (non-collegiate) for industrial and corporate training programs, or
 - other published guides developed by nationally recognized organizations.

- Institutional *Challenge exams* that
 - are equivalent to a comprehensive final exam,
 - may be written, oral, demonstration-based, or a combination of all three, and
 - are evaluated by an area dean or a designated subject matter expert.

- *Standardized exams*, such as those published by
 - College-level Examination Program (CLEP),
 - Excelsior College—formerly the American College Testing Proficiency Program (ACT-PEP/RCE/EXCELSIOR),
 - Defense Activity for Nontraditional Educational Support (DANTES) ,
 - Advanced Placement (AP), and
 - International Baccalaureate (IB).

The assessment tools offered in each CCCS college differed, and each school had its own regulations on the number of PLA credits that could be applied toward a degree as well as its own prerequisites for PLA assessment.

PLA programs offered in CCCS colleges

CCCS institutions differ in terms of which of the four PLA tools listed above are offered and in how often any particular tool is used. Table 1 presents the PLA tools used by each of the 13 CCCS institutions. Eight out of the thirteen colleges used all four PLA methods. Credit for prior learning through standardized exams was well accepted among CCCS colleges⁶: All schools used some form of standardized exam for PLA.⁷ In fact, OJC used only standardized exams for PLA, and another school, LCC, used only standardized exams and portfolios. Portfolio assessment was also well accepted—OJC was the only institution that did not use portfolios as a means for awarding PLA credit to students in the study sample. Small colleges such as LCC, PCC, and OJC did not use published guides to award PLA credit. Challenge exams were the least commonly offered PLA method among all CCCS schools.

⁶ There is also a system wide Standardized Test Matrix that identifies specific course crosswalks so the college confer the same course credit for the particular test/score.

⁷ Our data do not report which standardized exam was used in each case.

Table 1. PLA Methods Offered by CCCS Colleges, by College

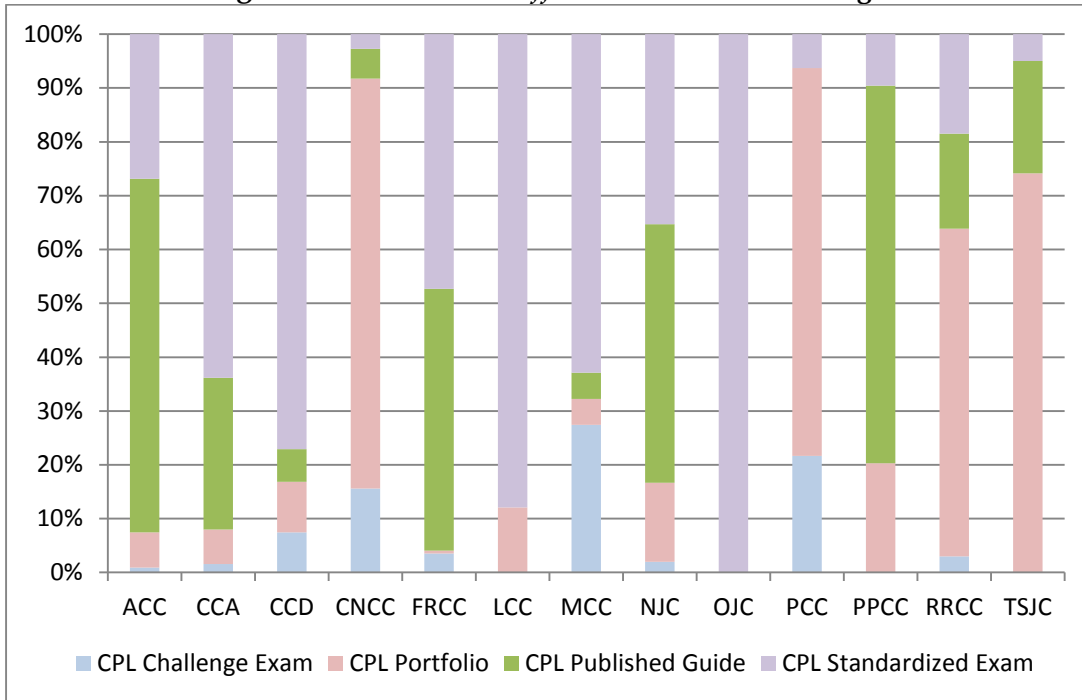
| College | Challenge exams | Portfolios | Published guides | Standardized exams | Number of PLA methods offered |
|---------|-----------------|------------|------------------|--------------------|-------------------------------|
| ACC | X | X | X | X | 4 |
| CCA | X | X | X | X | 4 |
| CCD | X | X | X | X | 4 |
| CNCC | X | X | X | X | 4 |
| FRCC | X | X | X | X | 4 |
| LCC | | X | | X | 2 |
| MCC | X | X | X | X | 4 |
| NJC | X | X | X | X | 4 |
| OJC | | | | X | 1 |
| PCC | X | X | | X | 3 |
| PPCC | | X | X | X | 3 |
| RRCC | X | X | X | X | 4 |
| TSJC | | X | X | X | 3 |

Table 2. Proportion of CCCS Colleges Offering Each PLA Method, by Method

| PLA methods | % of colleges offering |
|---------------------------|------------------------|
| Challenge exams (CHAL) | 69% |
| Portfolios (PORT) | 92% |
| Published Guides (PUBG) | 77% |
| Standardized Exams (STAN) | 100% |

Table 2 shows that standardized exams were offered by all CCCS schools regardless of school size. Fewer CCCS colleges awarded PLA credit using Challenge exams and published-guide assessment: 69 percent (9 colleges) offered challenge exams, and 77 percent (10 colleges) offered published-guides assessment. Smaller colleges were less likely than larger colleges to offer these forms of assessment.

Figure 1. PLA methods offered in each CCCS college.



For ease of comparison, this figure provides a graphic presentation of the frequencies of usage of different PLA tools in each of the CCCS colleges. Table 3 provides the actual numerical frequencies depicted in Figure 1.

Table 3. Rates of Usage across PLA Methods, by CCCS College

| College | Challenge exams | Portfolios | Published guides | Standardized exams | Number of PLA methods offered |
|---------|-----------------|------------|------------------|--------------------|-------------------------------|
| ACC | 0.92% | 6.53% | 65.69% | 26.86% | 4 |
| CCA | 1.57% | 6.44% | 28.18% | 63.81% | 4 |
| CCD | 7.44% | 9.41% | 6.04% | 77.11% | 4 |
| CNCC | 15.6% | 76.15% | 5.5% | 2.75% | 4 |
| FRCC | 3.51% | 0.58% | 48.58% | 47.33% | 4 |
| LCC | 0% | 12.09% | 0% | 87.91% | 2 |
| MCC | 27.42% | 4.84% | 4.84% | 62.9% | 4 |
| NJC | 1.96% | 14.71% | 48.04% | 35.29% | 4 |
| OJC | 0% | 0% | 0% | 100% | 1 |
| PCC | 21.64% | 72.06% | 6.3% | 0% | 3 |
| PPCC | 0% | 20.31% | 70.15% | 9.54% | 3 |
| RRCC | 3.02% | 60.87% | 17.66% | 18.45% | 4 |
| TSJC | 0% | 74.17% | 20.83% | 5% | 3 |

Although most CCCS colleges offered multiple methods of PLA, schools varied in how often they used each PLA tool. PLA methods were not equally likely to be used across the schools at which they were offered. On the contrary, the frequencies presented in Table 3 and in Figure 1 suggest that each school had a preferred choice of PLA method—one that was used substantially more often than all other available options.⁸ Of all available PLA tools, Challenge exams were used least often in CCCS colleges, accounting for less than 10 percent of all PLAs in six of the nine schools in which they were offered. Among the three remaining schools—CNCC, MCC, and PCC—Challenge exam usage ranged from 15 to less than 30 percent. All colleges offered standardized exams, with CCA, CCD, LCC, and OJC turning to that method most often. Over 60 percent of PLAs were conducted using standardized exams in these schools. Portfolio assessment was used by all CCCS schools except for OJC. This method was most often used at CNCC, PCC, RRCC, and TSJC, where it accounted for about 60 to 76 percent of PLA credits. Finally, published guides were used more frequently than other methods at ACC, PPCC, and FRCC.

While the use of different methods of assessment is interesting, we provide this baseline information with caution. There is some evidence that colleges may not have always been accurate when documenting assessment type. Creating uniformity around this reporting process is one of the goals of the CHAMP grant, and as we begin to look at the effects of the changes brought on by the redesigns, we may notice some discrepancies when we compare PLA usage data gathered throughout the CHAMP period to the pre-existing PLA usage data we examine here.

STUDENTS AT CCCS

For this report, we examined the records of all students admitted to CCCS colleges between fall 2007 and summer 2010 to track their academic enrollment, course history, and graduation information over a period of eight years. The data set included 299,377 CCCS students, among which 5,013 students (about 1.7%) had been assessed for PLA credit since their admission.⁹ In the first part of our analysis, we follow the convention of existing studies on PLA impact and use the term *PLA students* to refer to those who had been assessed for PLA credit and *non-PLA students* to signify those who had not. When we tighten our focus to examine the impact of PLA on academic outcomes, however, we will refer to *PLA earners*—those who were assessed for and received PLA credits—and *non-PLA-earners*—students who received no PLA credit.

The total number of students in each CCCS school varied widely, ranging from the smallest college, OJC, with 3,353 students to FRCC, the largest school in CCCS, with a student

⁸ These frequencies were calculated by the number of times each method was used divided by the total number of PLA assessments in each school. A student can earn PLA credits using multiple methods.

⁹ Prior learning assessment (PLA) refers to exactly that—assessment. It does not always lead to the granting of academic credit. Among these 5,013 *PLA students*—students who had been assessed for PLA credit—only 4,620 were awarded academic credits. Only these 4,620 successful cases are designated *PLA earners* in our analysis of PLA's effects on academic outcomes to follow.

population of 66,758 students (Table 4).¹⁰ The proportion of students being assessed for PLA credit also varied, from as few as 0.6 percent in MCC to as many as 3.4 percent in PPCC. Smaller colleges such as OJC, MCC, NJC, and TSJC also had smaller percentages of PLA students, while at larger colleges such as FRCC and CCA, those percentages were relatively higher (about 1.4% and 2.1%, respectively). Though LCC is the smallest college in CCCS, the proportion of PLA students there—just over 1.6 percent—was more in line with the larger colleges and was about the same as the average proportion of PLA students in CCCS overall.

Table 4. Proportion of Students Assessed for PLA Credits, by College

| College | Total number students | Number of PLA students | % of PLA students in school |
|---------|-----------------------|------------------------|-----------------------------|
| ACC | 38,898 | 405 | 1.04% |
| CCA | 23,230 | 484 | 2.08% |
| CCD | 38,401 | 324 | 0.84% |
| CNCC | 5,015 | 45 | 0.90% |
| FRCC | 66,758 | 931 | 1.39% |
| LCC | 3,050 | 50 | 1.64% |
| MCC | 5,632 | 35 | 0.62% |
| NJC | 5,851 | 39 | 0.67% |
| OJC | 3,353 | 16 | 0.48% |
| PCC | 21,344 | 334 | 1.56% |
| PPCC | 51,911 | 1,778 | 3.43% |
| RRCC | 29,215 | 517 | 1.77% |
| TSJC | 6,719 | 55 | 0.82% |

Demographic characteristics of CCCS students in sample, by school size

As shown in Table 4, the percentage of PLA students varied from school to school. In general, larger CCCS colleges—such as ACC, CCA, CCD, FRCC, PPCC, and RRCC—had higher percentages of PLA students, wherein about 0.8 percent to just over 3.4 percent of students were assessed for PLA credit. (Of these larger schools, only CCD assessed less than 1 percent of students for PLA credit.) In contrast, most of the smaller colleges—CNCC, MCC, NJC, OJC, and TSJC—had less than 1 percent of students assessed for PLA credit. Of the smaller colleges in our study, only at LCC and PCC did PLA students make up more than 1.5 percent of the student population. The school that had the lowest proportion of PLA students—just .48 percent—was OJC, where standardized testing was the only PLA option offered. The college that had the highest proportion of PLA students—3.4 percent—was PPCC, which offered three different PLA options.

¹⁰ The number of students is from the sample data (3-year cohort) provided by CCCS. As noted earlier, this population was initially thought to include only students who were newly admitted within the cohort parameters, but we later discovered that the data set we received contained information on some students who had been admitted prior to 2007.

Figure 2. Proportion of PLA students in larger CCCS colleges

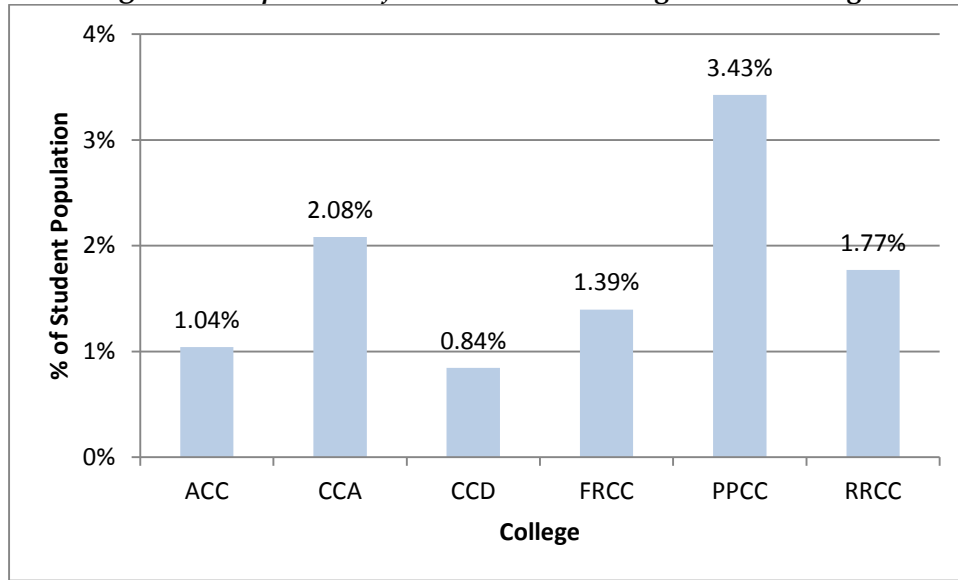
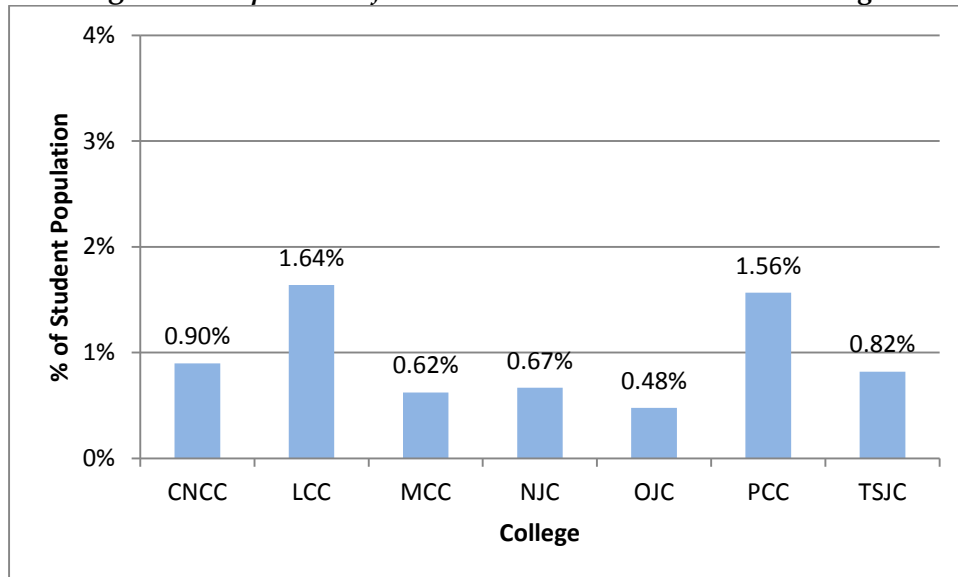


Figure 3. Proportion of PLA students in smaller CCCS colleges



Gender

Figure 4 compares the gender distribution of the full sample with that of the PLA population. While 56 percent of CCCS students were female, females made up a smaller percentage—only about 40 percent—of PLA students. Thus, female students were underrepresented in the PLA population.

Figure 4. Gender distribution among all students and among PLA students

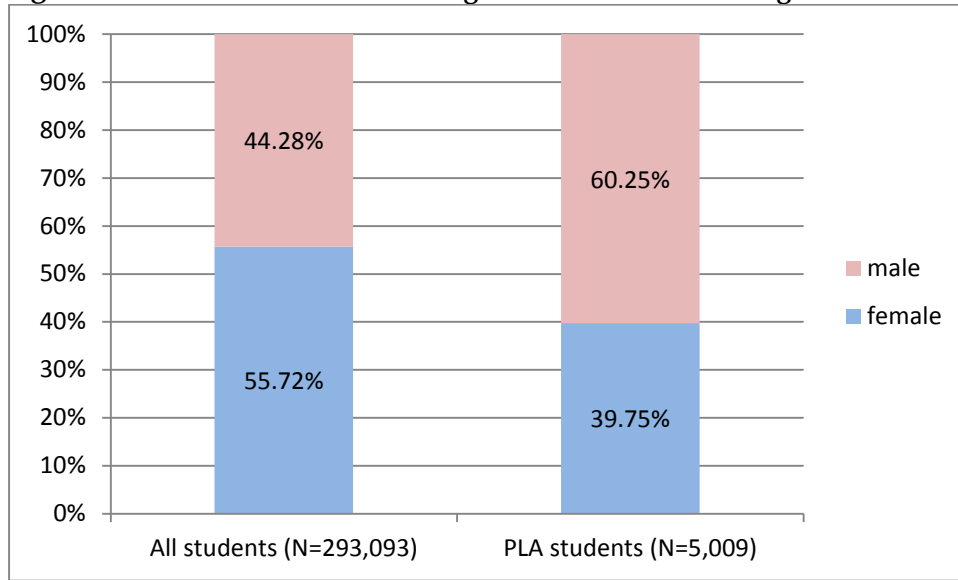
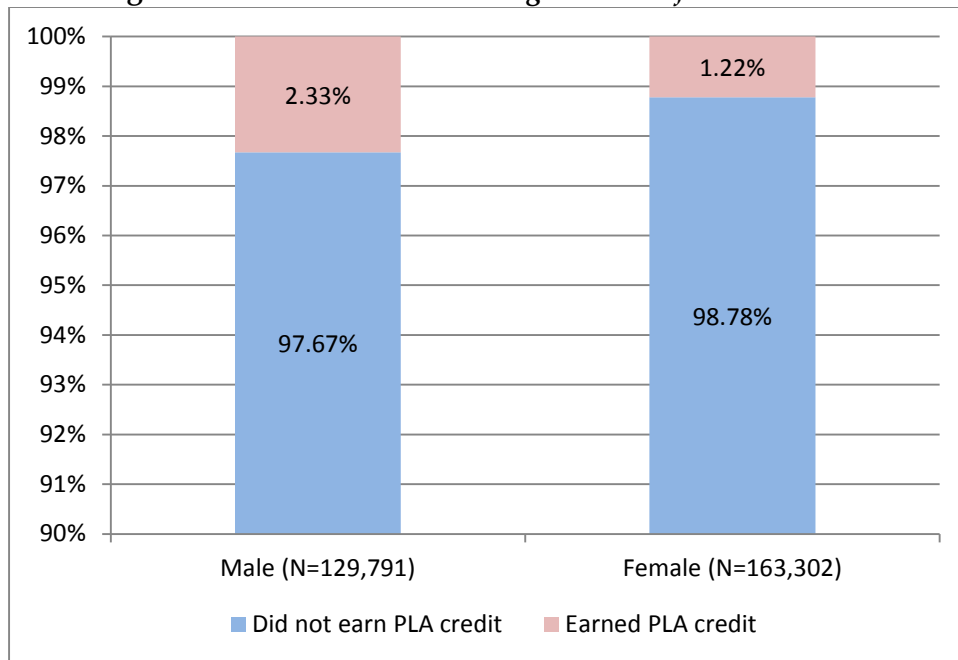


Figure 5 gives us another look at this gender imbalance. It shows that, across the entire student population of CCCS colleges, a larger proportion of male students (2.3%) than female students (1.2%) were granted PLA credit during the study period.

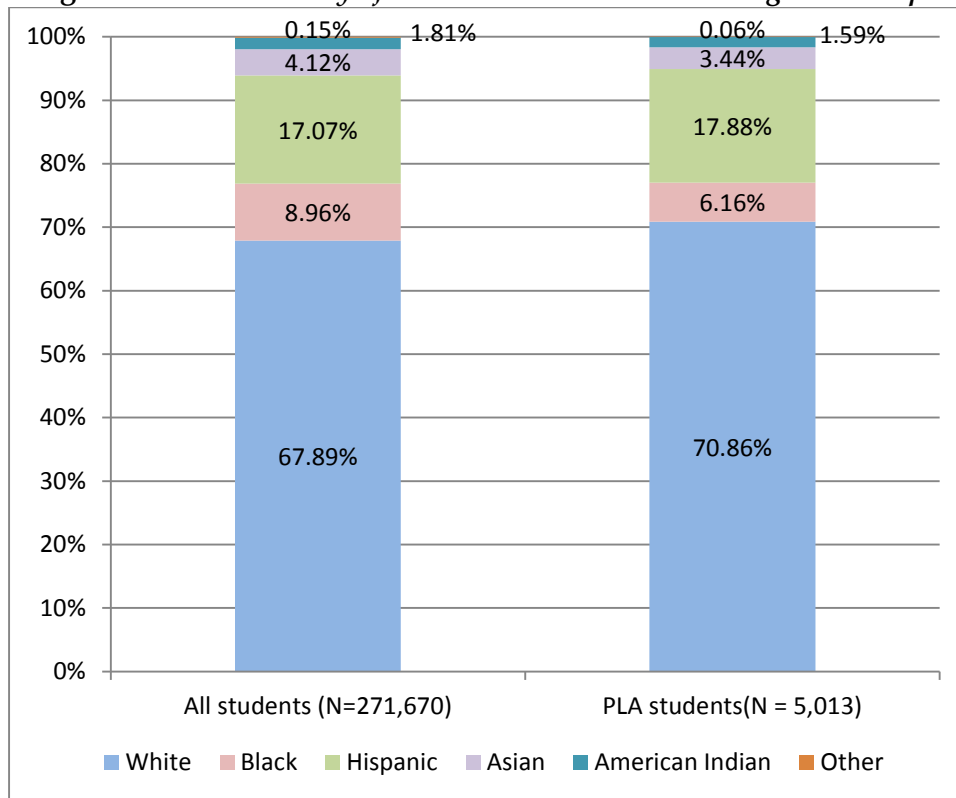
Figure 5. PLA distribution among male and female students



Race/ethnicity

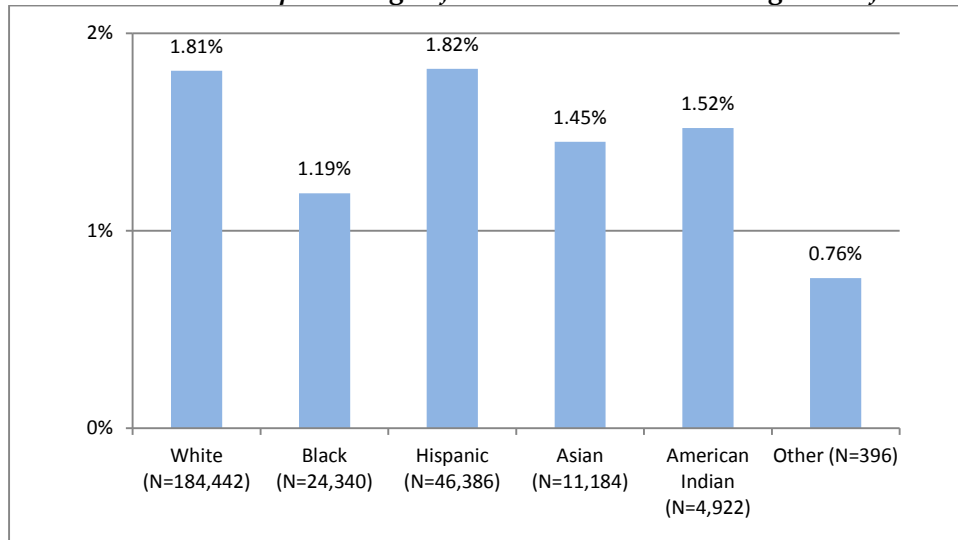
The majority—about 68 percent—of CCCS students in our sample were white (non-Hispanic). About 17 percent were Hispanic, 9 percent were black (non-Hispanic), just over 4 percent were Asian, and almost 2 percent were American Indians (Figure 6). These groups were not proportionally represented in the PLA sample. The distribution of PLA students shows that the percentage of white PLA students (71%) was slightly higher than the percentage of white students among the full student population. Conversely, disproportionately lower numbers of black students (about 6% in the PLA sample compared to almost 9% in the full sample) and students of other races (1.6% in the PLA sample vs. 1.8% in the full sample) were found among the PLA sample. The proportion of Hispanic students was about the same in the PLA sample as in the full sample. In sum, comparing the racial distribution of the full sample and the PLA sample suggests that, with the exception of Hispanics, minority populations were less likely than their white classmates to be assessed for PLA credit.

Figure 6. Race/Ethnicity of all CCCS students and among PLA sample



The distribution of PLA students by race/ethnicity (Figure 7) also suggests that the proportion of PLA students differs across these categories. White and Hispanic students had the highest proportions of PLA students—about 1.8% for both groups. This was slightly higher than the average PLA rate for CCCS students overall of just under 1.7 percent. The proportions of black, Asian, American Indian, and students of other races earning PLA credit, on the other hand, each were lower than that general average.

Figure 7. PLA students as a percentage of all students within categories of race/ethnicity

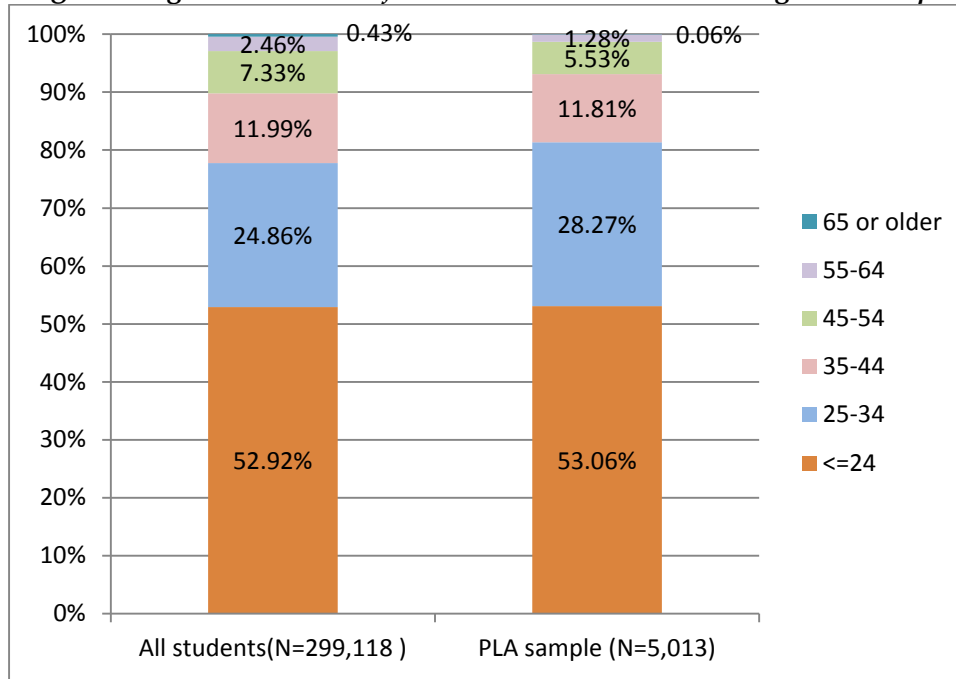


Age

The age distributions of students in the overall CCCS and PLA samples are presented in Figure 8. Over half of CCCS students were younger than 24, about a quarter were aged 25–34, and about 12 percent were aged 35–44. The remaining students were 45 or older.

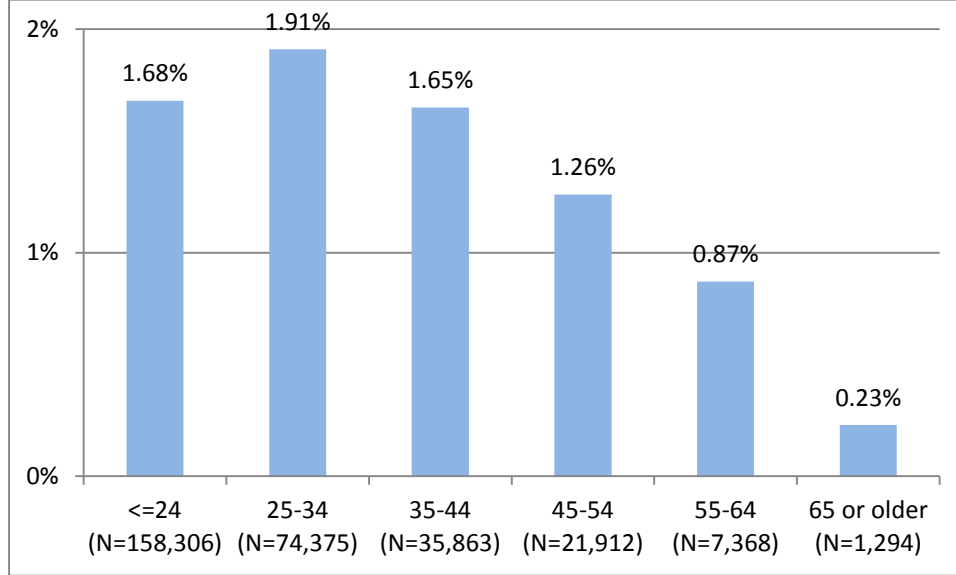
The distribution of age groups in the PLA sample is not dramatically different from that in the full sample. Similar to the full sample, over 50 percent of the PLA sample was made up of students who were younger than 24, and again, the next largest age group was 25- to 34-year-olds, accounting for nearly 30 percent more. Of interest here, though, is the finding that greater proportions of younger students (those below the age of 35) than elder students were assessed for PLA credit. This implies that increases in age translate to a reduction in PLA rates.

Figure 8. Age distribution of all CCCS students and among PLA sample



According to Figure 9, which shows the percentages of PLA students in each age group, the category with the highest PLA rate was 25–34 years olds—about 2 percent of CCCS students in that age group earned PLA credit. The two categories with the next largest proportions of PLA students were those younger than 24 years old and those 35–44 years old—both of these categories are immediately adjacent to the first group and both had roughly the same proportion of PLA students—about 1.7 percent. CCCS students over age 45 had a lower-than-average PLA rate (just under 1.3%), and those over age 65 had the lowest PLA rate (0.2%). When we consider the two youngest age categories together, we see that students younger than 34 years old were assessed for PLA credit at a rate a little higher than average.

Figure 9. PLA students as a percentage of all students within categories of age



Financial aid status¹¹

As shown in Figure 10, about 26 percent of CCCS students were eligible for financial aid. In the PLA sample, however, we find that a higher proportion of students (about 34%) reported being eligible for financial aid. Moreover, when we compare the PLA rate of students who were eligible for financial aid against the PLA rate of those who were not eligible for financial aid—as illustrated in Figure 11—we find that economically disadvantaged students were more likely to be assessed for PLA credits than those who were better off financially (2.2% vs. 1.5%, respectively). This means, given that the average rate of the CCCS student population as a whole was about 1.7 percent, students who were eligible for financial aid were assessed for PLA credit at a rate that was higher than average, while students ineligible for financial aid had a lower-than-average PLA rate.

¹¹ Results in this section should be interpreted with caution: CCCS tracked students who were eligible for financial aid, but their data failed to distinguish students who were ineligible from those who did not report on their financial aid status. To use the data, we had to assume that those who did not report being eligible for financial aid were ineligible. Therefore, the proportion of students eligible for financial aid in this report is a conservative measure.

Figure 10. Financial aid eligibility of all CCCS students and among PLA sample

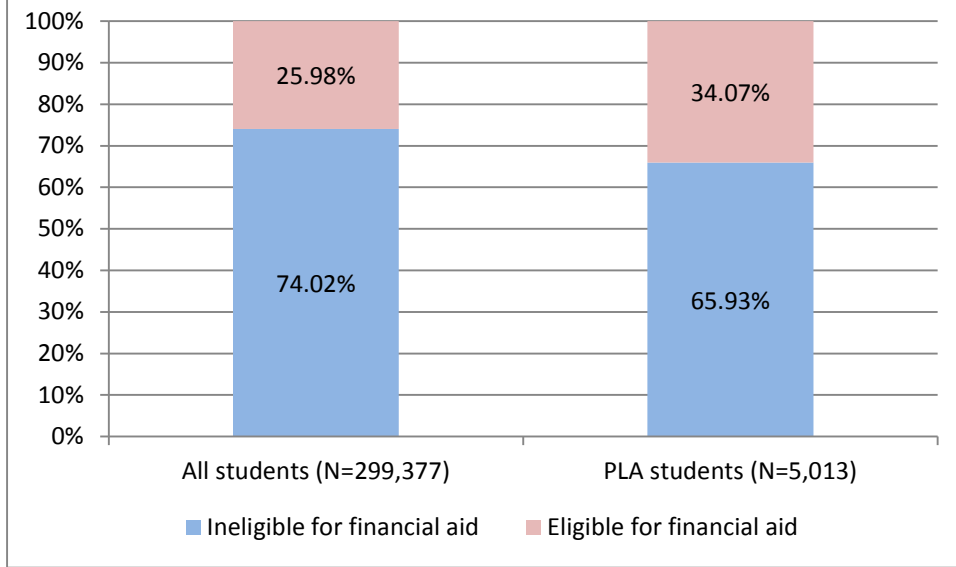
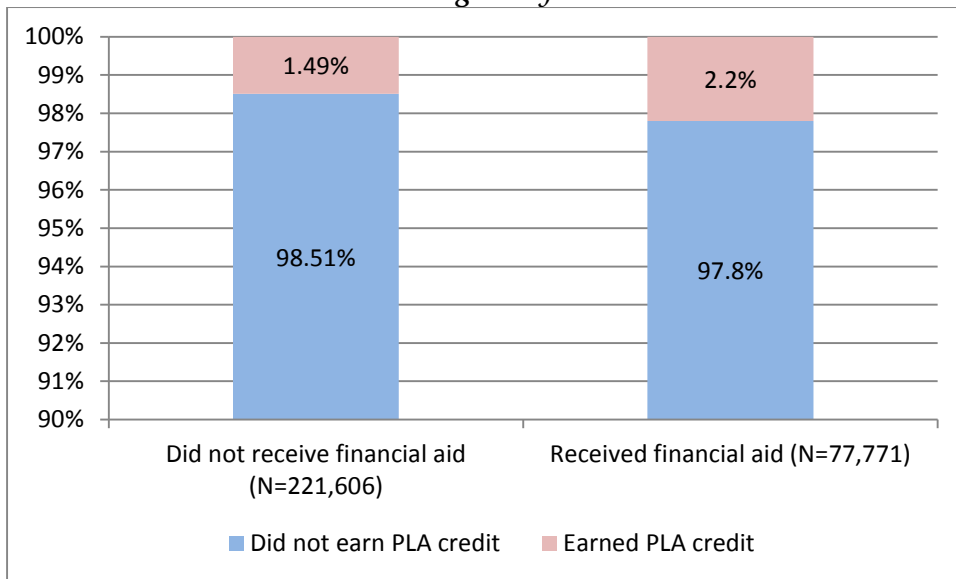


Figure 11. PLA students as a percentage of all students within categories of financial aid eligibility



*Military service*¹²

Figure 12 compares the rate of military experience among the general CCCS population with the rate of service among PLA students. While only 4.6 percent of all CCCS students had

¹² As with the data on financial aid, CCCS documented military service experience but did not differentiate those who did not *report on* military service from those who did not *have* military experience. Therefore, our data, and therefore our interpretations, assume that those who did not report on their military experience are without military service experience.

military experience, that rate was five times higher in the PLA sample: Over 25 percent of PLA students in our sample had some kind of military experience. In Figure 13, we shift our focus to compare PLA rates in terms of students' military service status. About 9 percent of the students with military service experience was assessed for PLA credit as compared with 1.3 percent of students who did not have a military service background (Figure 13). The PLA rate for students with a military background was nine times higher than that for students without military background. The higher PLA rate among students with a military background may be because students in the military are more likely to be assessed for PLA.

Figure 12. Military service status of all CCCS students and among PLA sample

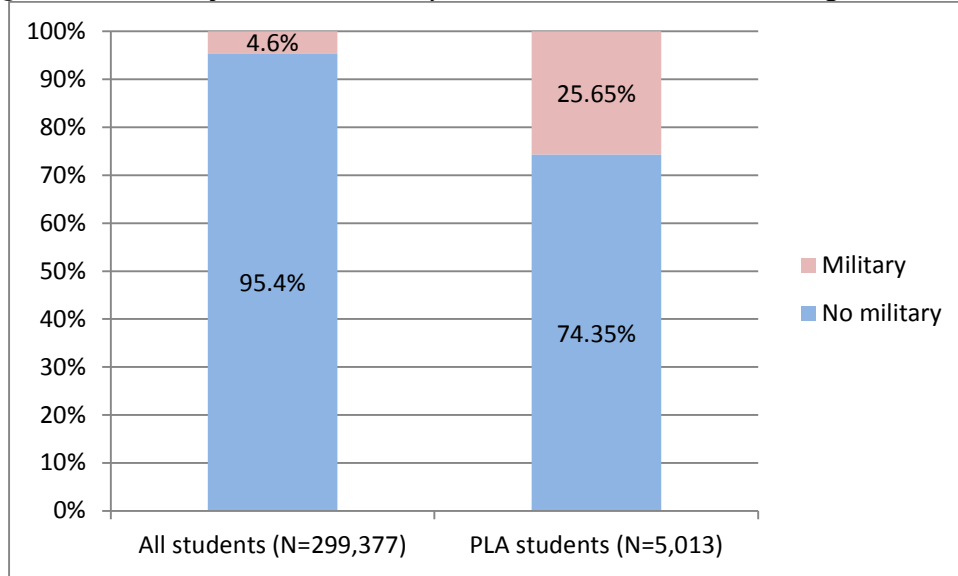
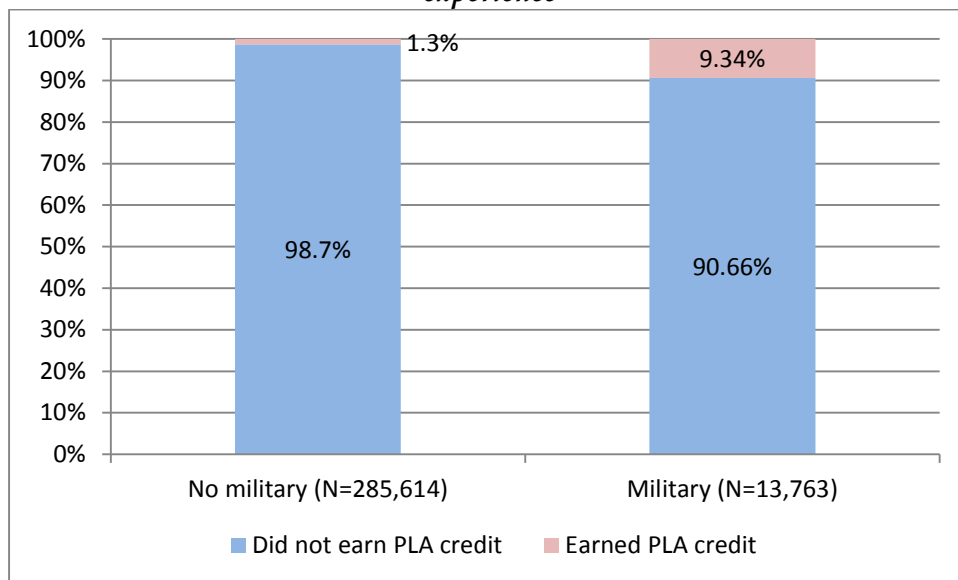


Figure 13. PLA students as a percentage of all students within categories of military service experience



Remedial coursework

Of all the CCCS students in our sample, about 38 percent had taken at least one remedial course (Figure 14). A slightly higher proportion of PLA students had taken remedial courses (39.26%). The rates of PLA assessment did not differ much among students who had taken remedial courses at CCCS and those who had not. As shown in Figure 15, the PLA rate for both groups was just over 2 percent.

Figure 14. Proportion of students taking remedial courses among all CCCS students and among PLA sample

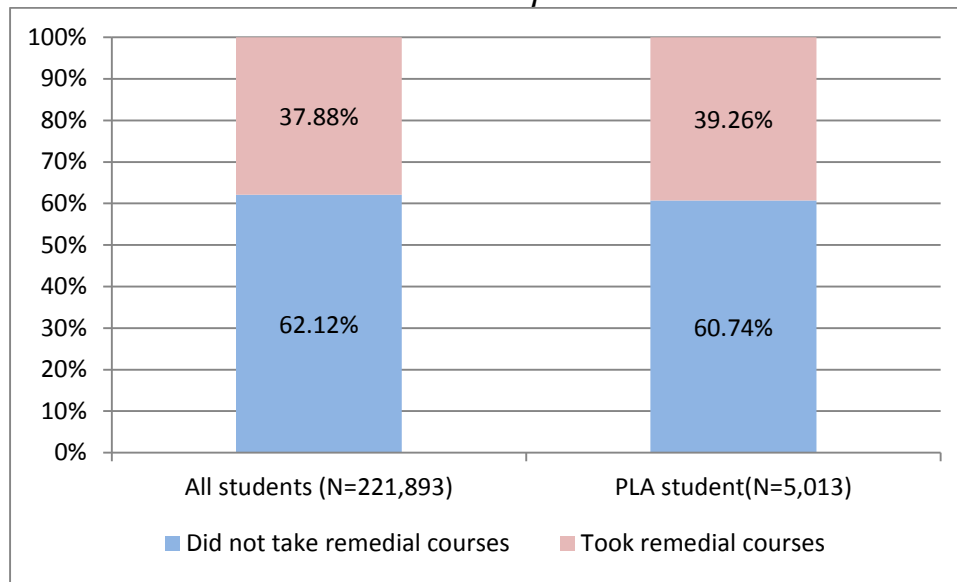
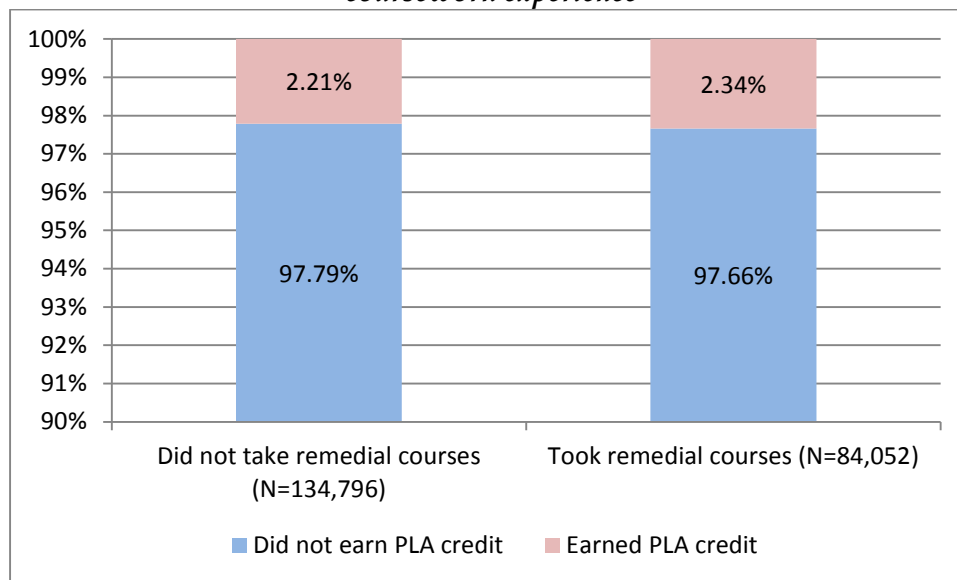


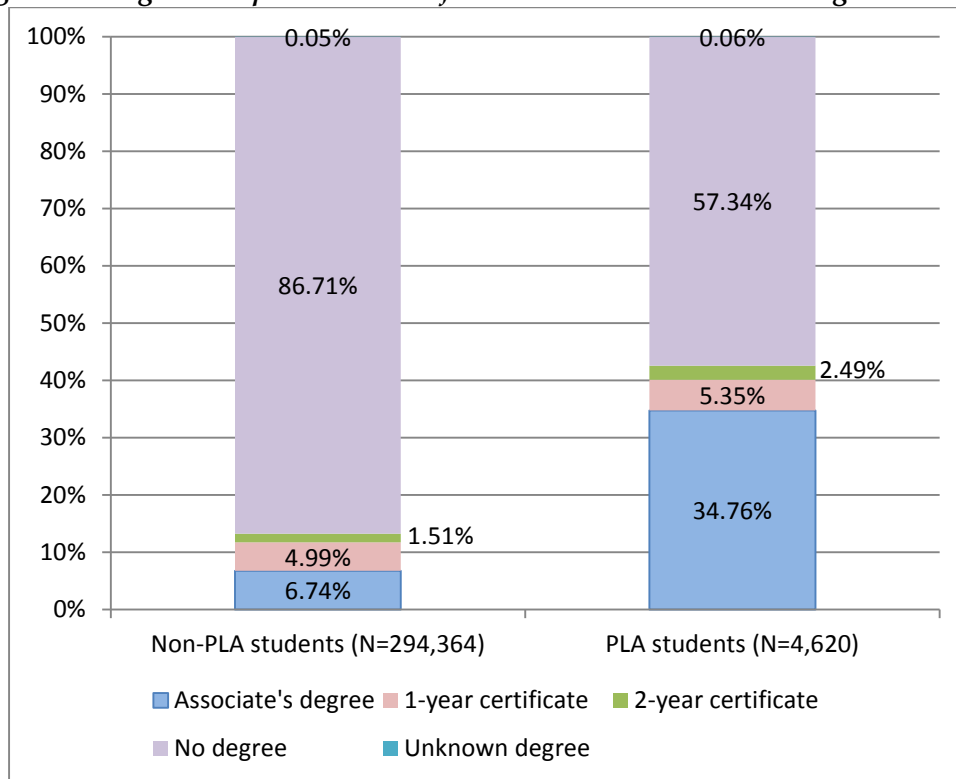
Figure 15. PLA students as a percentage of all students within categories of remedial coursework experience



PLA CREDITS AND DEGREE COMPLETION

One of the major research questions for this report is whether earning PLA credits increases a student's likelihood of earning his or her degree. Our study confirms the positive impact, suggested by the existing literature, of PLA credits on graduation rates. Figure 16 presents the degree completion rates for all CCCS students and for the PLA-earning sample.¹³ The rate of graduation for PLA earners at CCCS was considerably higher than that of non-PLA earners. The overall graduation rate for PLA earners at CCCS was almost 43 percent, while only about 13 percent of non-PLA earners went on to receive a postsecondary degree. PLA earners on average had a higher graduation rate than their non-PLA-earning counterparts regardless of the degree they were pursuing. Considering the population of PLA earners as a whole, nearly 35 percent earned an associate degree (compared with only about 7% of non-PLA earners); 2.5 percent earned a 2-year certificate (compared to 1.5% of non-PLA-earners); and 5.3 percent earned a 1-year certificate (compared to just under 5% of non-PLA earners).

Figure 16. Degree completion rates of all CCCS students and among PLA sample



¹³ For the remainder of the report, we restrict our analyses to only those students who successfully earned PLA credit.

Graduation rates for PLA earners and non-PLA earners, by school size

In every CCCS college, PLA earners graduated at a much higher rate than non-PLA earners. Here we examine whether the strong association between PLA credit earning and students' graduation rates differed by college size. Figure 17 compares graduation rates by PLA credit-earning status in relatively larger CCCS schools, and Figure 18 presents the same comparisons for students in relatively smaller CCCS colleges.

Though, as suggested in the previous section, the proportion of students assessed for PLA credit in smaller CCCS colleges tended to be lower than that of larger colleges, PLA earners in small colleges had higher graduation rates than students in large colleges. The average graduation rate was nearly 64 percent for PLA earners in small colleges, compared to about 40 percent among the larger colleges.

Students in small colleges within CCCS, in general, had higher graduation rates than their counterparts in larger colleges, regardless of their PLA earning status

Figure 17. Graduation rate comparing non-PLA students vs. PLA students in large CCCS colleges

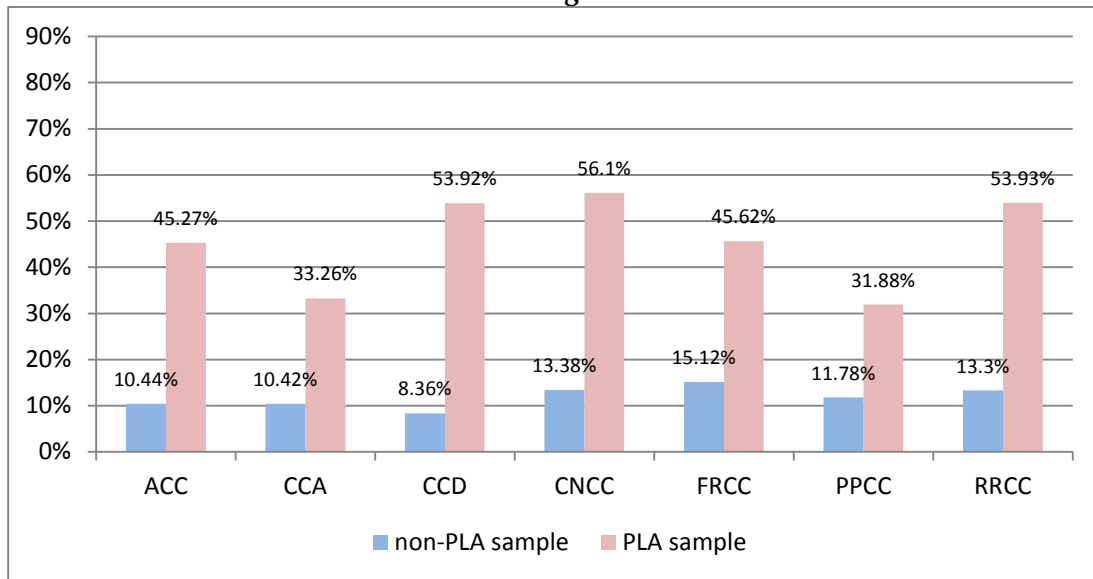
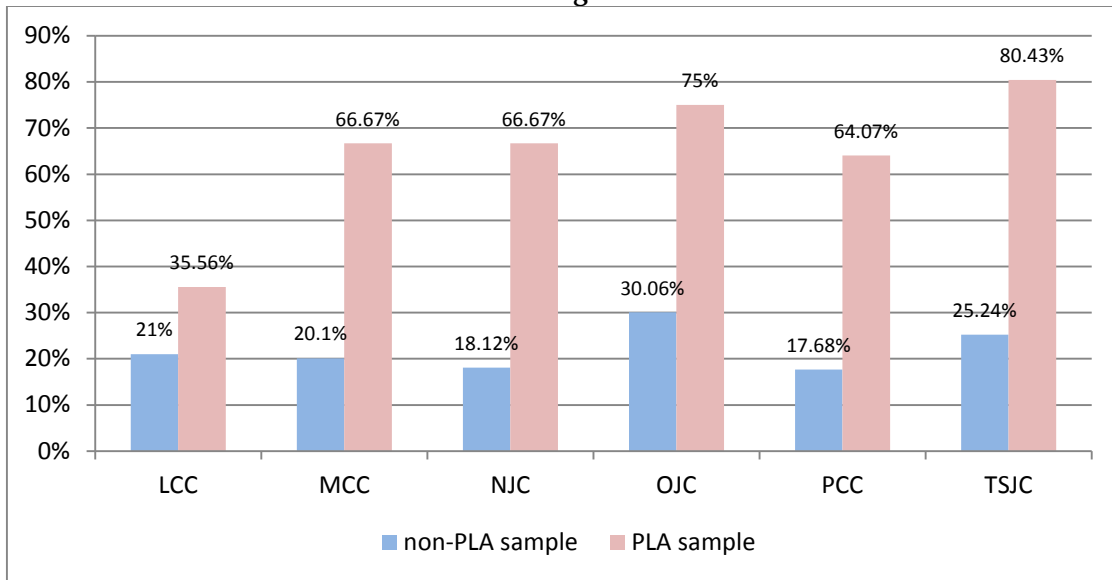


Figure 18. Graduation rate comparing non-PLA students vs. PLA students in small CCCS colleges



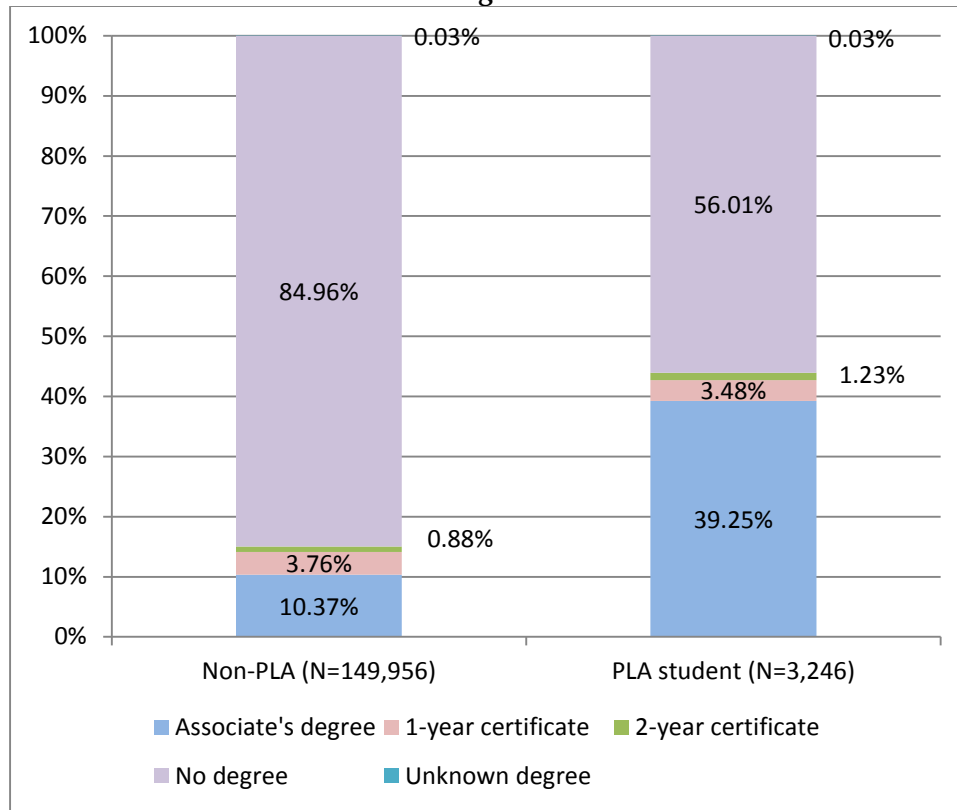
In sum, students who earned PLA credits had much higher graduation rates than students who did not receive PLA credits. The relationship persists regardless of school size.

Degree completion by initial academic goals¹⁴

Another important question for this report is whether students completed their academic goal. Did students stick to their original goal of academic study and complete that goal? When we focus on those CCCS students who declared, at the time of their admission, that their goal of study was an associate degree, we find that 39 percent of PLA earners succeeded in finishing that degree while only 10 percent of non-PLA earners did so. An additional 1.2 percent of PLA earners failed to complete their associate degree but instead earned a two-year certificate, whereas only 0.9 percent of non-PLA earners were able to complete that alternate pathway. About an equal percentage of students in the PLA-earning and non-PLA-earning samples (3.5% and 3.8%, respectively) earned a 1-year certificate instead of associate degree.

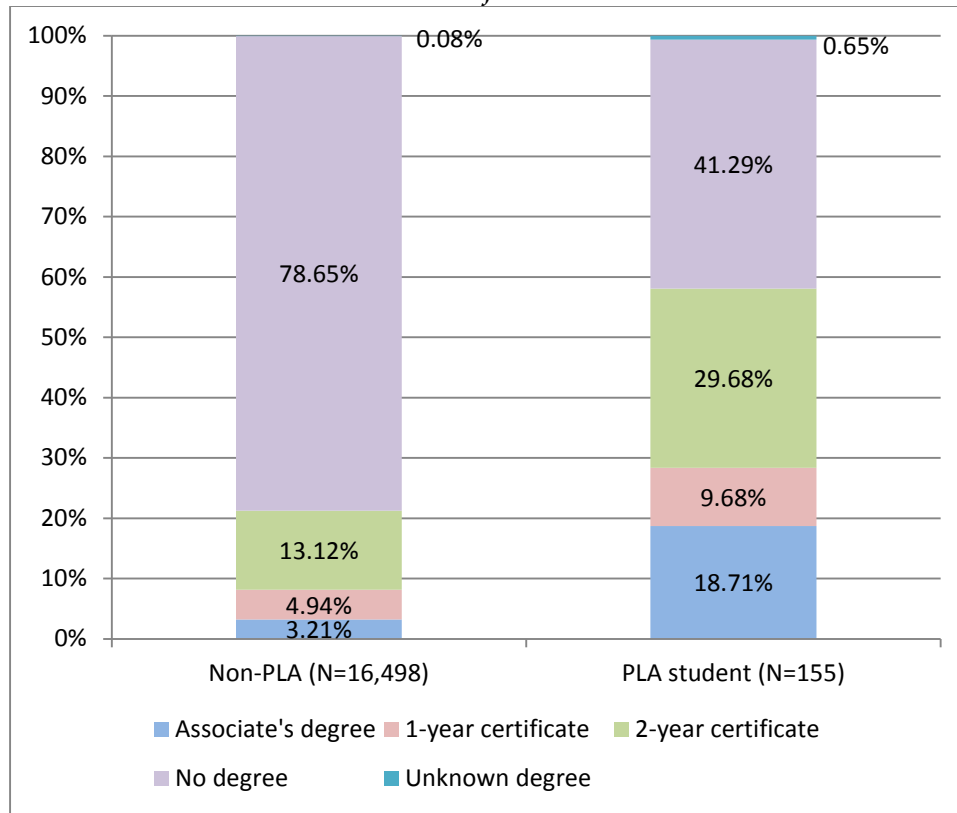
¹⁴ Since data from CCCS do not link time starting a degree, degree declared at admission, PLA credits received, and the final degree earned to create a full academic history for each student, we have to make assumptions with regard to the type of degree a student was after, the time they started the degree, the total number of PLA credits applied, and the degree earned. We defined the starting date as the earliest date we have indicating the student's admission to CCCS and the degree he/she declared at the admission as the initial degree a student was pursuing. If the student, over time, received the degree declared at admission, we considered his/her final degree consistent with the initially declared degree, even if another credential was earned prior to that one. If the student did not declare an intended degree at admission or did not earn the degree declared at admission, we chose the first degree earned after admission. For students in the PLA-earning sample, we chose either the declared degree of interest or the first degree earned after the first PLA assessment if the student did not earn the degree of interest declared at admission. The total number of PLA credits earned represented the sum of PLA credits earned between admission and first degree.

Figure 19. Degree completion by non-PLA and PLA students indicating initial goal of associate degree



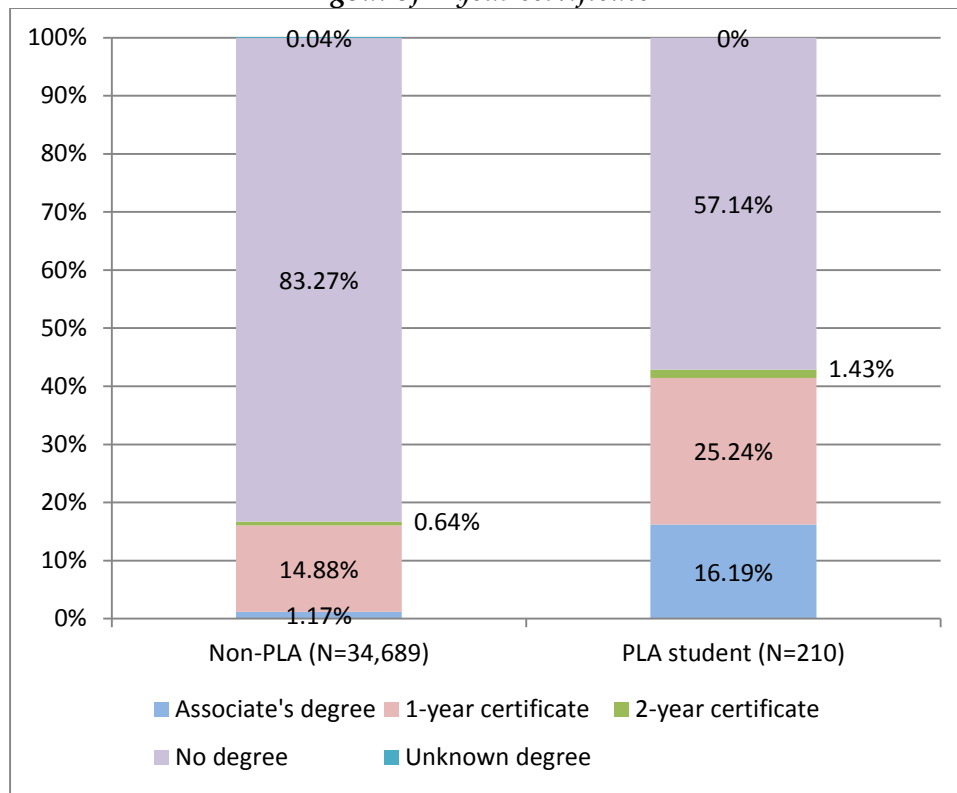
Focusing on students who declared their intent to pursue a 2-year certificate at admission, we find that 30 percent of PLA earners succeeded in reaching that goal while only 13 percent of non-PLA earners did so (Figure 20). However, almost 19 percent of PLA students earned an associate degree instead of a 2-year certificate—a rate that is six times higher than that of their counterparts in the non-PLA-earning sample. Noteworthy is that although some students earned a 1-year certificate instead, the proportion of PLA earners who completed a 1-year certificate was twice that of students in the non-PLA-earning sample.

Figure 20. Degree completion by non-PLA and PLA students indicating initial goal of 2-year certificate



As shown in Figure 21, the CCCS data suggests that many students who declared their intent to pursue a 1-year certificate altered their ultimate goal of study as well. Among these students, only 25 percent of the PLA earners successfully completed their credentials, and that rate was even lower—less than 15 percent—among the non-PLA earners. 17 percent of PLA earners completed an associate degree instead of a 1-year certificate; this rate was much higher than that of non-PLA earners, among whom only about 1 percent went on to complete an associate degree. A small group—1.4 percent—of PLA earners completed a 2-year certificate instead of their declared 1-year certificate, while only 0.6 percent of non-PLA earners did the same.

Figure 21. Degree completion rates of non-PLA students and PLA students indicating initial goal of 1-year certificate



PLA and graduation rates, by student's academic strength

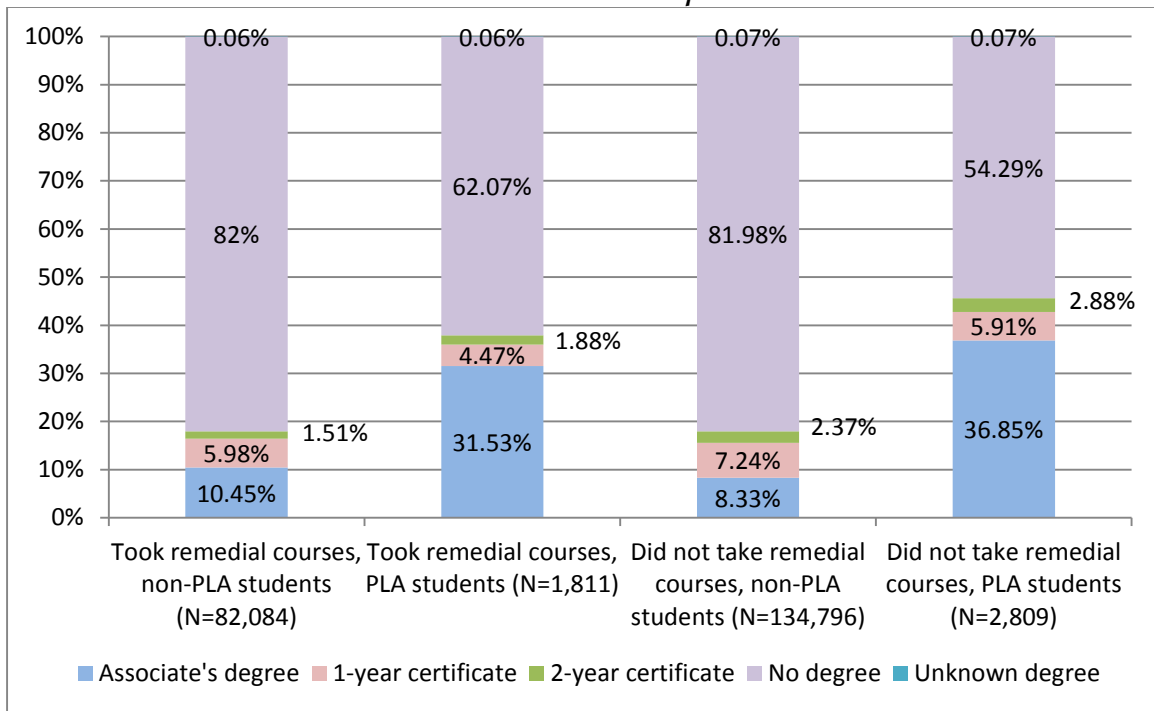
Prior research has suggested that the impact of PLA credit can be attributed to a student's academic ability. It is possible that students who earn PLA credit are students who are already highly motivated or who possess relatively high levels of academic preparedness, and motivation and academic strength admittedly play import roles in student success rates, particularly when it comes to degree completion. Therefore, an important question for this report is whether a higher graduation rate for PLA earners exists even when comparing them with students with comparable academic abilities. To approach this question, we compare the graduation rates of PLA and non-PLA earners with similar academic capabilities. We used two different measurements to assess academic capability: 1) by taking into account whether students had taken remedial coursework—a measure of their academic readiness—and 2) by considering their grade point average (GPA) upon graduation. Taking remedial courses may serve as an indicator of poor academic skills, while GPA serves as an indicator of overall academic performance. Since CCCS data provide information on GPA only for students upon graduation, we focus on the relationships between PLA credit, graduation rates, remedial coursework, and GPA only for those who earned a degree/credential.

Graduation rates and remedial coursework

Among degree-earning CCCS students who took remedial coursework, PLA-earning students had much higher degree completion rates than non-PLA-earning students. As shown in Figure 22, 31.5 percent of those PLA earners graduated with associate degrees, whereas only 10.5 percent of non-PLA earners did so. PLA earners had a slightly lower rate of graduating with 1-year certificates than non-PLA students did (4.5% vs. 6%). However, when we consider graduation rates regardless of the type of credential earned, we see that even for students without strong academic backgrounds, PLA earners had better graduation rates than non-PLA earners (38% vs. 18% respectively).

Among students who did not take remedial courses, PLA earners again had a higher graduation rate than non-PLA earners (46% for PLA earners vs. 18% for non-PLA earners). Among these PLA earners, 37 percent graduated with associate degrees compared to only about 8 percent of non-PLA earners. In sum, the benefits of PLA to degree completion were consistent for students regardless of their academic readiness.

Figure 22. Graduation rates for non-PLA students and PLA students within categories of remedial coursework experience

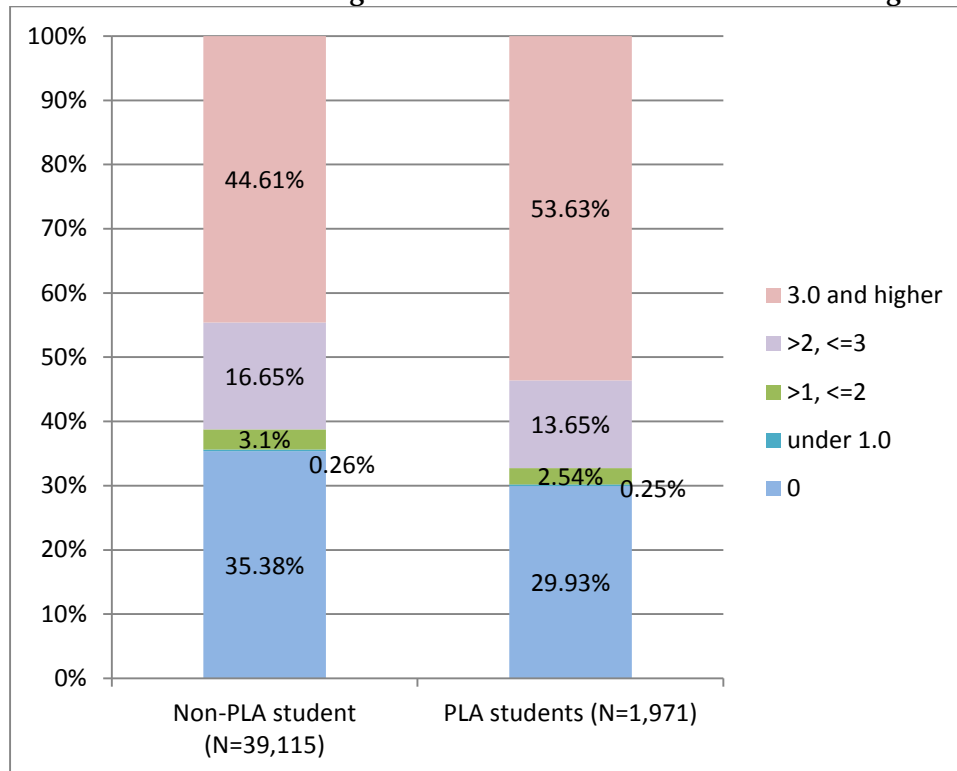


Graduation rates and GPA

Next we examine the relationship between PLA credit earning and students' GPA among CCCS students who have graduated. Prior research has suggested that the PLA process may help to develop students' cognitive and academic skills in ways that can contribute to their academic success, which implies a relationship between PLA and both higher GPAs and higher degree completion rates. Because the current CCCS data only report cumulative GPAs for students who have earned a credential, however, we are unable to examine degree completion rates in this section.

When we look at the cumulative GPAs of graduated students, we find that PLA earners had higher GPAs than non-PLA earners. Figure 23 reveals that a little over half—54 percent—of PLA earners had GPAs of 3.0 or higher compared to about 45 percent of non-PLA earners, and 67 percent of PLA earners had GPAs of 2.0 or higher compared to 61 percent of non-PLA earners. Moreover, while the average GPA upon graduation for PLA earners was 2.5, the average GPA for non-PLA earners was 2.2. The greater proportion of students with higher GPAs among the PLA-earning sample suggests that earning PLA credit may help motivate students to develop their academic capabilities.

Figure 23. Cumulative GPA among non-PLA students and PLA students degree recipients



To better solve the confounding problem between PLA and students' academic ability, better data are needed. We recommend that future data sets track the cumulative GPAs not only of

those students who have graduated but also of non-degree-earning students so that researchers can examine how PLA is linked to graduation rates.

PLA CREDITS AND PERSISTENCE

The results presented above show that the PLA earners in our sample had much higher graduation rates than the non-PLA earners. However, questions still remain as to what happened to the students who did not earn a postsecondary credential. As suggested in the literature on PLA effects, we suspect that the PLA process may help students stay in school and continue pursuing their goal of study. Therefore, in this section we will examine whether the non-degree earners with PLA credit had greater persistence rates than their non-PLA-earning counterparts.

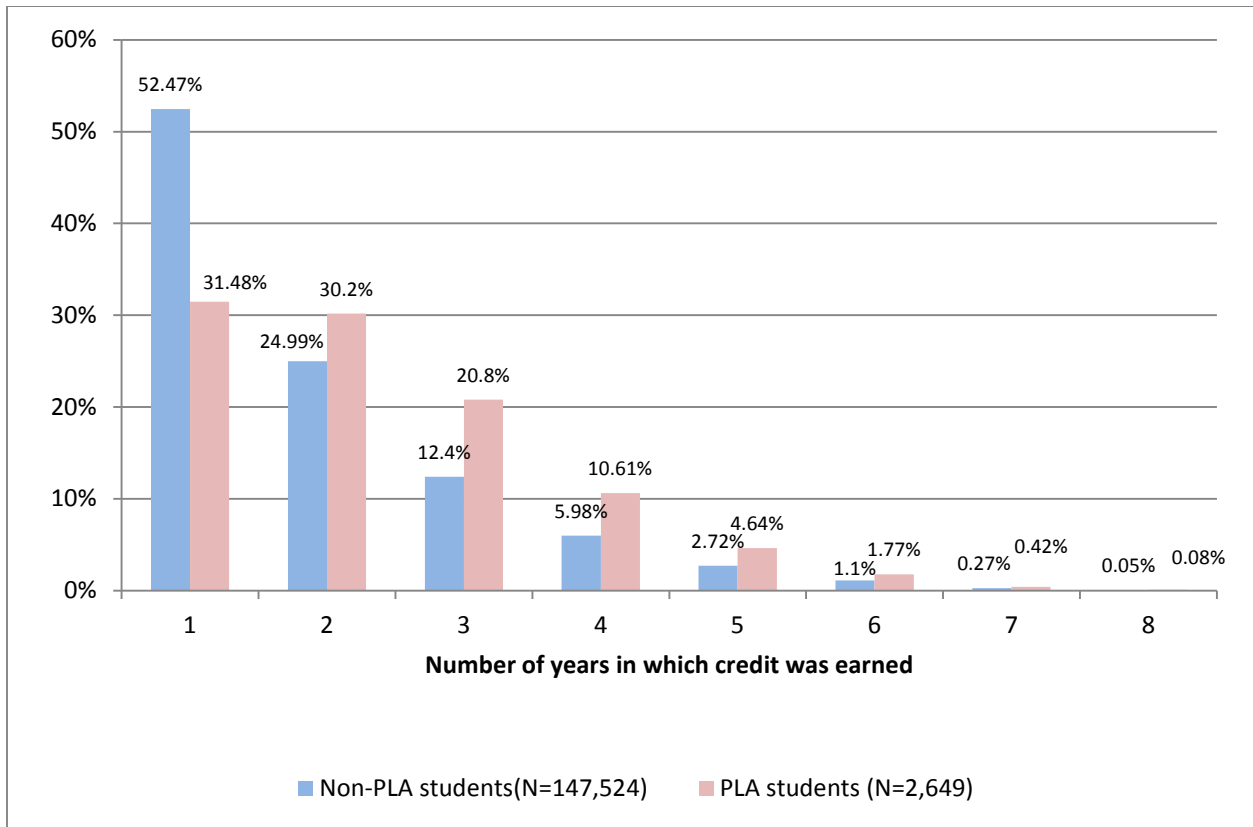
To tackle this problem, we measure persistence by counting the total number of years students enrolled and earned credits subsequent to admission. Next, we use a more stringent measure, considering the number of *continuous* years that non-degree-earning students were enrolled in school and earning credit subsequent to their initial admission. The duration of time in school indicates a student's persistence in his or her academic study. However, the current data from CCCS do not provide information on the number of credits required for each degree/certificate program, and there is no way of linking the credits students accumulated over time to the degree program under study. Therefore, we cannot know the percentage of credits that the non-degree-earning students earned towards their degree goals from the combination of transfer credits, PLA credits, and credit earned from coursework at each school. We can only examine whether students re-enrolled at the institution on an ongoing basis.

When we examine the number of years of credit-earning between 2007 and 2015 by the non-degree-earning CCCS students in our sample, we see strong patterns of higher persistence among PLA earners as compared to students who did not earn PLA credit.

Persistence by the number of years of credit-earning

We first examine persistence by counting the number of years that non-degree-earning students re-enrolled and earned credit in CCCS colleges. Data on the number of years of credit-earning since admission suggest a strong pattern of higher persistence among PLA earners than non-PLA earners. Figure 24 shows that a higher percentage of PLA earners without degrees re-enrolled and earned credits in more than one year. A little over half—52.5 percent—of the non-PLA-earning students stopped earning credits after only one year. This rate was far lower—only 31.5 percent—among PLA earners. The higher proportion of non-PLA-earners dropping out after one year suggests lower persistence among that population compared with the population of PLA earners. Higher percentages of PLA earners than non-PLA earners continued to re-enroll and earn academic credits over time.

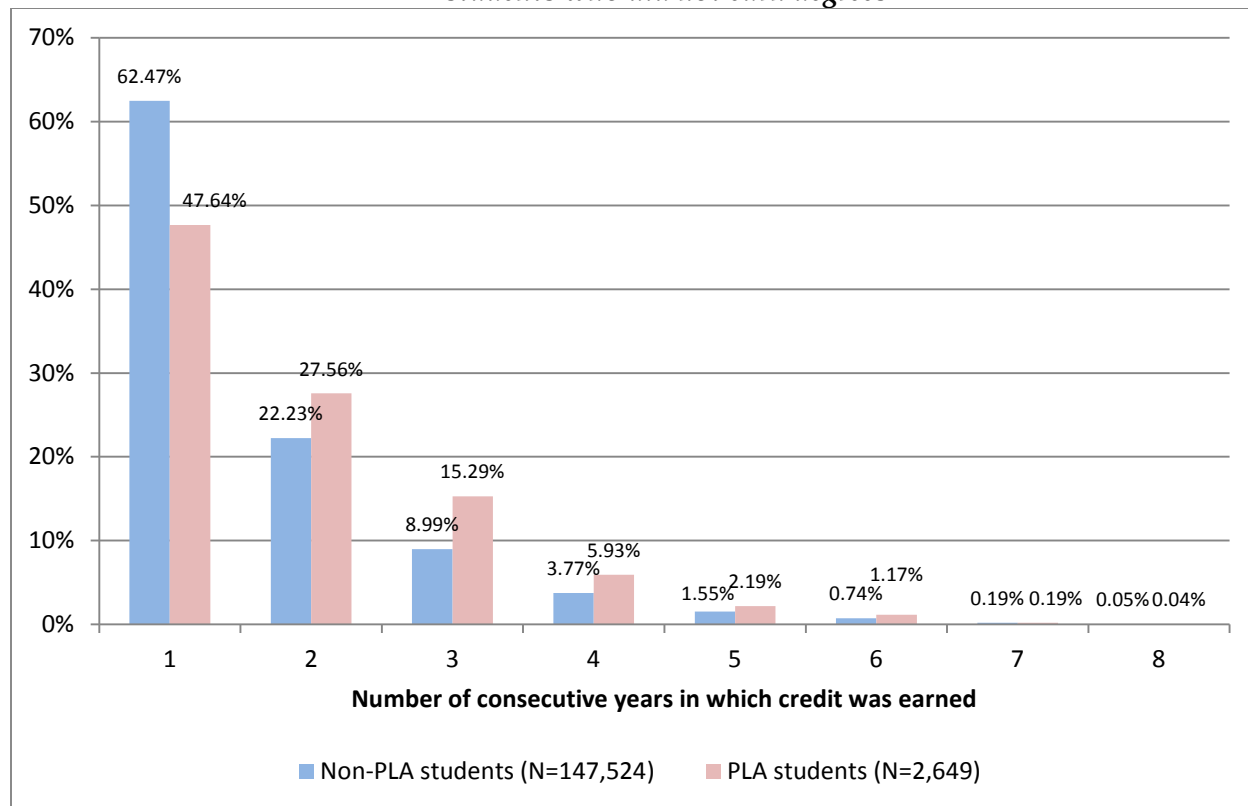
Figure 24. Number of years of credit-bearing enrollment by non-PLA students and PLA students who did not earn a credential



Another way to examine students' persistence in their academic study is by the number of consecutive years they remained enrolled in school. This more stringent measure of persistence requires no interruption in students' academic instruction. The total number of years students are enrolled in school shows the duration of academic study while number of consecutive years enrolled reflects the sequencing of that study and whether students drift in and out of school over time.

Again, when we examine consecutive years enrolled, we find more PLA earners enrolled in credit-bearing coursework for longer than one year. This remains true up until the seventh year of data, when equal proportions of PLA earners and non-PLA earners enrolled and earned credits. 62.5 percent of non-PLA earners stopped earning credits after their first year of study, which is a much greater proportion than the 48.4 percent of PLA earners who did so. Though PLA earners' persistence rates were consistently higher than that of non-PLA earners for the majority of the study period, continuous enrollment rates decreased over time for both groups of students.

Figure 25. Number of consecutive years of credit-bearing enrollment by non-PLA students and PLA students who did not earn degrees



PLA CREDITS AND TIME TO DEGREE

Prior research has found that PLA programs save students time in their pursuit of postsecondary credentials. Therefore, we expect to find that CCCS students who earned PLA credit have shorter times to degree than students who did not receive PLA credit.

When calculating time to degree, we limited our population of interest to all CCCS degree earners and grouped the cases according to each of the three credential types (associate degree, 2-year certificate, and 1-year certificate). We then measured the time to degree by counting the number of months that passed between students' first admission to CCCS until the time they received their degree. As explained earlier (see footnote 13), CCCS administrative data did not link the academic/course history of each student to the degree that student was pursuing, so the time to degree measure in this report should be interpreted with caution—some students might have been working on more than one credential at the same time or they may have switched between credentialing programs, such as from a certificate program to an associate degree program, over time. In cases where more than one credential was pursued, we do not know to which degree PLA credits were applied or the number of PLA credits that were applied. If a student switched his/her degree of interest after admission, we do not have any way of knowing. Therefore, the current approach to calculating time to degree (detailed in footnote 13)

is a conservative measure. In addition, the starting time of the earned-degree outcome may be later than the true first-admission date.¹⁵ Future work is needed to evaluate time to degree with better data that allows researchers to track students' course history, enrollment history, intended degree program(s), and degree outcome(s).

We also compare time to degree by the number of PLA credits received and by each type of credential of interest. In other words, we examine time to a specific degree by comparing students at different levels of PLA credit-earning. We expect to find that the time to degree decreased as the number of PLA credits earned increased. Due to data limitations, we made several assumptions regarding each student's academic history: first, that students would pursue the degree of interest declared at the first admission; second, that PLA credits would be applied to either the degree of interest at admission or to the first degree a student received if the student did not earn the degree of interest declared at admission; and third, that PLA assessments were conducted before the degree was earned.

Time to Associate degree

Using the current data, we find that PLA earners' average time to associate degree was 37 months, which was one month shorter than the average time to associate degree for non-PLA earners. When we examined the time to associate degree by the number of PLA credits received, we found that, as a general rule, as the number of earned PLA credits increased, the average time (months) to associate degree decreased. On average, the greatest time savings was for students earning 36 to 48 credits (7.5 months shorter compared with the average time for students without PLA credits). Students earning more than 48 PLA credits also saved time compared with students with no PLA earnings—an average of 3.9 months. The small rise in average time to associate degree for students earning 6–12 PLA credits cannot be fully explained with the available data. Better data are needed with more accurate reporting of starting time, degree conferral date, and number of PLA credits earned toward associate degrees.

To test the strength of the relationship between PLA and time to degree, we found that the Pearson correlation between number of PLA credits and months to degree for students earning associate degrees is $-.08$ ($p < 0.01$). This value suggests that the correlation between time to degree and the number of PLA credits earned is fairly weak in magnitude. This, then, suggests that as the number of PLA credits increases, the months to associate degree decrease, but those differences are relatively slight.

¹⁵ However, a few students may have started their programs earlier than the admission date recorded for them in our data set. Further research is needed to confirm the results reported here.

Figure 26. Average time to associate degree by number of PLA credits earned

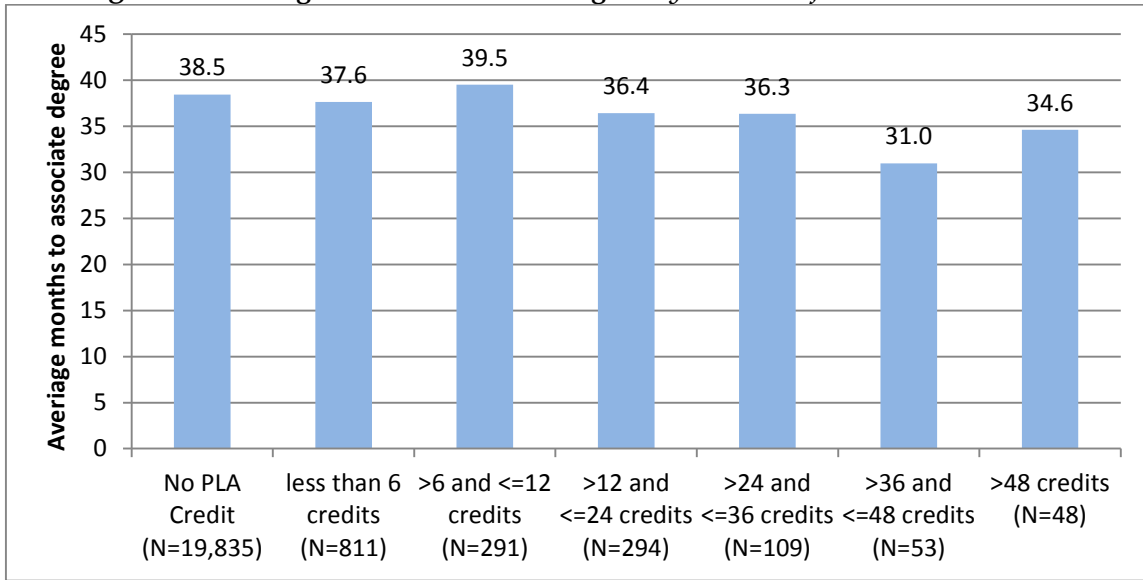


Table 5 presents the means and standard deviations for the estimated values of time to degree for students earning different numbers of PLA credits. As the number of PLA credits earned increase, the standard deviations from the means first decrease and then increase. The range of the middle 50 percent of the student population in each PLA-credit-earning category also decreases along with the increase of PLA credits (except for that of students earning 24–36 PLA credits).

Focusing on PLA earners, we find that both the standard deviations and the size of the ranges encompassing the middle 50 percent of students begin to decrease once students earn between 6 and 24 PLA credits. These statistics spike back up again for those earning more than 24 PLA credits; while the ranges resume their decrease after 36 credits are earned, the standard deviations continue to rise. One reason may be due to decreasing sample sizes; as the number of PLA credits earned increased, the number of students in the category decreased, leaving very few cases in the higher PLA-credit-earning categories. In other words, among students with fewer than 24 PLA credits, the greater the number of PLA credits, the closer the student’s time to degree is to the mean. However, when the total number of PLA credits earned is greater than 24, the more PLA credits earned, the more dispersed the time to degree becomes from the mean, suggesting greater variation in time to degree for students at higher levels of PLA-credit-earning categories. Moreover, it also suggests unreliable estimates of time to degree for students earning more than 24 PLA credits.

Table 5. PLA credit-earning and distance from the mean months to degree, associate degree

| | N | Mean | Standard deviation | Variance | Median | Months to degree range for middle 50% | Number of months between the top student and the bottom student in the middle 50% |
|----------------------|-------|-------|--------------------|----------|--------|---------------------------------------|---|
| No PLA Credit | 19835 | 38.45 | 19.59 | 383.69 | 35 | 23-52 | 29 |
| less than 6 credits | 811 | 37.63 | 19.05 | 362.80 | 35 | 23-52 | 29 |
| >6 and <=12 credits | 291 | 39.51 | 18.40 | 338.63 | 35 | 26-52 | 26 |
| >12 and <=24 credits | 294 | 36.43 | 18.79 | 352.96 | 35 | 21-47 | 26 |
| >24 and <=36 credits | 109 | 36.35 | 20.21 | 408.25 | 32 | 20-51 | 31 |
| >36 and <=48 credits | 53 | 30.98 | 20.53 | 421.52 | 23 | 16-40 | 24 |
| >48 credits | 48 | 34.60 | 20.20 | 408.20 | 27.5 | 20-43 | 23 |

PLA and tuition savings: Associate degrees

As the above section finds that PLA credits save students time in earning their associate degrees, it would be interesting to know if money was saved as well. We found that when students earn 6 PLA credits, they save, on average, 1 month in the process of earning their associate degrees. However, these 6 PLA credits, when applied to their degree, save them at least \$1,000 in total. More PLA credits translate to increased tuition savings. Table 6 provides an example of the tuition savings associated with a widely used PLA standard test tool—the CLEP exam. For this analysis, we report money saved using the lowest tuition rate of \$205 per credit hours for CCCS schools.¹⁶

¹⁶ \$205 per credit is the current tuition rate. We do not have information on the tuition rates in the previous years.

Table 6. PLA and tuition savings

| College ¹⁷ | Tuition needed for 6 course credits (current) | Cost for PLA assessment for CLEP exam ¹⁸ | Difference in tuition (Dollars saved by the student) |
|-----------------------|---|---|--|
| ACC | \$205 per credit hour for on-campus classes X 6 (\$1,230) | \$130 | \$1,100 |
| CCD | | \$35 | \$1,195 |
| FRCC | | \$25 | \$1,205 |
| MCC | | \$25 | \$1,205 |
| NJC | | \$25 | \$1,205 |
| PPCC | | \$20 | \$1,210 |
| RRCC | | \$25 | \$1,205 |
| TSJC | | \$30 | \$1,200 |

Time to 2-year certificate

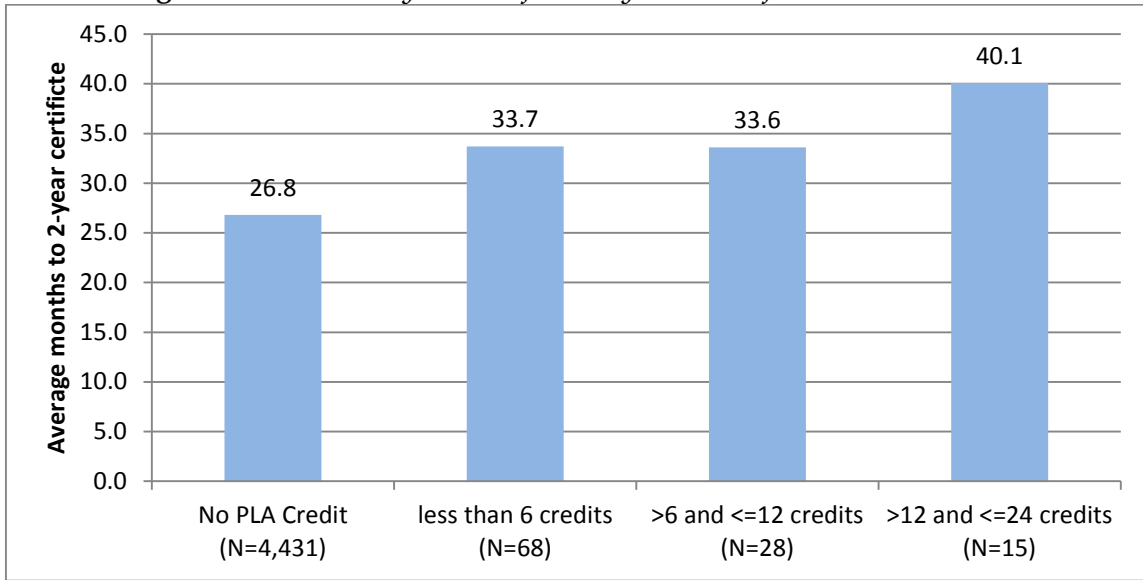
Compared with students pursuing associate degrees, there were fewer students pursuing 2-year certificates in our data set.¹⁹ Looking at these students' time to degree, we do not find that students earning PLA credits had any time advantage. Instead, it took longer for those earning PLA credits to earn their 2-year certificates (Figure 27). The Pearson correlation between the number of PLA credits earned and months to degree for students earning 2-year certificates is 0.015, with a 2-sided p-value of 0.87, which suggests that the positive correlation between the number PLA credits earned and time to 2-year certificates is very weak and statistically insignificant.

¹⁷ The assessment cost was referenced by a CCCS qualitative report on PLA use. In the report, although all colleges reported that they used CLEP, only 11 colleges reported their PLA assessment cost. Moreover, only 8 of them provided the cost of assessment.

¹⁸ The assessment rates can be found in the CAEL report *CAEL qualitative study on CCCS students before 2013*.

¹⁹ We eliminate 4 cases of students earning more than 24 PLA credits, as 2-year certificate programs require less than 24 credits.

Figure 27. Time to 2-year certificate by number of PLA credits earned



When we look at the standard errors of the mean estimates, we see larger variances of the mean estimates of time to degree for PLA earners than for non-PLA earners, indicating unreliable estimates of average time to degree. The number of students observed in the PLA-earning sample is small. For PLA earners, the standard deviations of time to degree and the range of time to degree for the middle 50 percent of students at each PLA-credit-earning interval also increase along with the increase of PLA credits (Table 7).

Table 7. PLA credit-earning and distance from the mean months to degree, 2 year certificate

| | N | Mean | Standard deviation | Variance | Median | Months to degree between the top range for middle 50% | Number of months between the top student and the bottom student in the middle 50% |
|----------------------|------|-------|--------------------|----------|--------|---|--|
| No PLA Credit | 4431 | 26.79 | 21.07 | 443.83 | 20 | 10-40 | 30 |
| less than 6 credits | 68 | 33.69 | 23.34 | 544.54 | 24.5 | 13-51 | 38 |
| >6 and <=12 credits | 28 | 33.61 | 22.28 | 496.47 | 35.5 | 11-52 | 41 |
| >12 and <=24 credits | 15 | 40.07 | 20.91 | 437.07 | 38 | 20-57 | 37 |

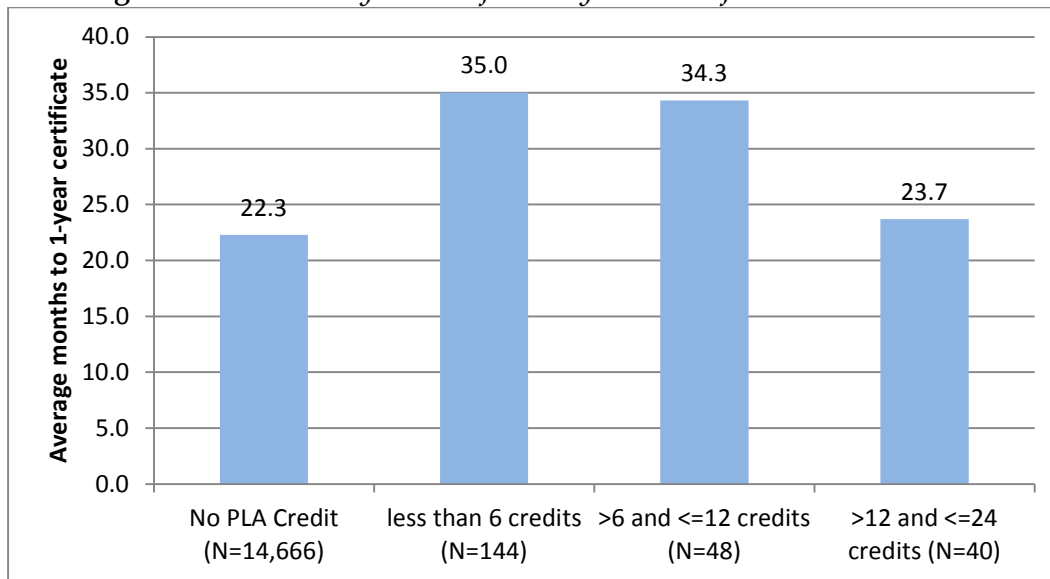
Further studies are needed to investigate how PLA was implemented among students pursuing certificates and the regulations governing how PLA credits could apply. According to a CAEL qualitative report published in 2013 (CAEL 2013), the PLA regulations at CCCS required that PLA credits be applied only after students earned some traditional academic credits. For students pursuing a 2-year certificate, which generally requires less than 48 credits, we do not know whether students wanted to be assessed for PLA credits, whether they had access to PLA

tools, and how PLA credits were applied to their credentialing programs. This information may help us to understand the reason behind the small number of PLA students pursuing 2-year certificates and the large variance around the mean estimates.

Time to 1-year certificate

When the entire population of CCCS students in our sample are considered, the average time to 1-year certificate was 22.5 months. Substantially fewer PLA earners than non-PLA-earners received 1-year certificates (14,666 non-PLA-earners vs. 232 PLA earners). Moreover, the current data suggests that it took longer—about 33 months total on average—for the PLA earners to complete their 1-year certificates. Since 1-year certificates usually require about 12–24 credits, we examined those earning less than 24 credits carefully, and the data, presented in Figure 28, show that students earning less than 12 PLA credits spent on average over 30 months earning their credential. However, when students earned 12–24 PLA credits, their time to a 1-year certificate decreased to about 24 months, which was only one month more than the average time to degree for non-PLA students.

Figure 28. Time to 1-year certificate by number of PLA credits earned



In this model, the standard deviation of time to degree is high, suggesting an unreliable measure of the variable. (See Table 8.) The middle 50 percent of students earning less than 12 PLA credits varied widely in their time to degree. Some took as long as 55 months to earn a 1-year certificate.

Table 8. PLA credit-earning and distance from the mean months to degree, 1-year certificate

| | N | Mean | Standard deviation | Variance | Median | Months to degree range for middle 50% | Number of months between the top student and the bottom student in the middle 50% |
|----------------------|-------|-------|--------------------|----------|--------|---------------------------------------|---|
| No PLA Credit | 14666 | 22.30 | 21.86 | 477.73 | 14 | 4-35 | 31 |
| less than 6 credits | 144 | 35.02 | 22.48 | 505.52 | 32 | 16-51.5 | 35.5 |
| >6 and <=12 credits | 48 | 34.31 | 26.80 | 718.18 | 29.5 | 10-55 | 45 |
| >12 and <=24 credits | 40 | 23.70 | 21.01 | 441.45 | 19 | 5.5-36 | 31.5 |

Though we expected to find that applying PLA credits expedited time to degree, we also recognize that our time-to-degree variable is poorly documented in the current data sets, particularly when it comes to students earning 1- and 2-certificates. We have far fewer students in our data sets who have earned certificate credentials than associate degrees. As stated in the above section, due to the length of the 1-year certificate program and the limited number of credits required to complete the certificate, students enrolled in certificate programs may not be interested in pursuing PLA, which might require long-term assessment and advanced writing skills. Additionally, students may have other reasons for pursuing PLA credits, such as wage gain, and they may never intend to complete a credential despite declaring an intended program at admission. Again, without detailed information on how PLA was assessed for students in 1-year certificate programs, we cannot explain why PLA did not save them time. Future work is needed to better track students’ academic history by credential earned.

PLA AND ACADEMIC OUTCOMES: STUDENT DEMOGRAPHICS

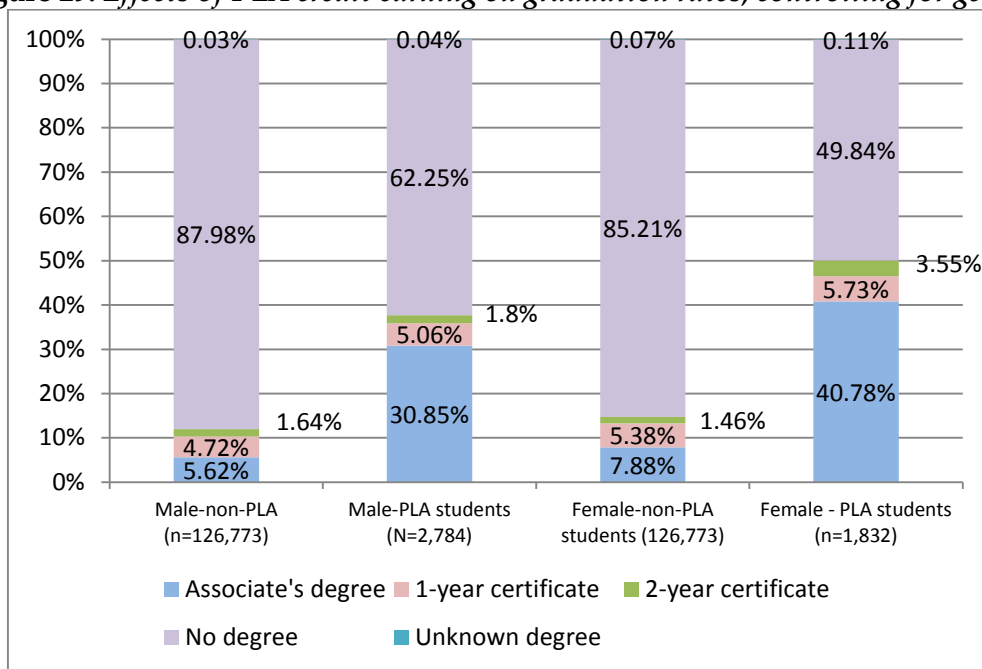
The above sections compare the differences in academic outcomes (graduation rates, persistence, and time to degree) for students who earned PLA credits and those who did not. In this section, we further explore how the relationship between PLA earning and student’s academic outcomes—graduation rate and time to degree—would vary by students’ sociodemographic characteristics and their life correlates such as financial aid and military service experience.

Gender

The positive association between PLA and graduation rate was observed and consistent for both male and female students. PLA earners of both genders graduated at a rate that was over three times higher than the rate of non-PLA earners. Figure 29 shows that among male PLA earners, 38 percent earned a degree compared with only 12 percent of male non-PLA earners (Figure 29). Female PLA earners had an even higher graduation rate: 50 percent of them graduated compared with only 15 percent of their non-PLA-earning counterparts.

The difference in graduation rates between PLA- and non-PLA-earning students was due in large part to the difference in associate degree completion rates. PLA earners had a much higher associate degree completion rate than non-PLA earners demonstrated. This dramatic difference held true for both males and females. In total, almost 31 percent of male PLA students received associate degrees, whereas less than 6 percent of the male non-PLA earners did so. Female PLA earners had an even higher graduation rate among students pursuing associate degrees: Nearly 41 percent of them earned associate degrees while less than 8 percent of non-PLA-earning females did so. However, the graduation rates for certificate programs, especially 2-year certificate programs, were more similar among male and female students regardless of whether they earned PLA credits (for 2-year certificates: 4.7% vs. 5.1% for male students, and 5.4% vs. 5.7% for female students). Female PLA earners had a slightly higher completion rate of 1-year certificates than non-PLA-earning female students (3.6% vs. 1.5%).

Figure 29. Effects of PLA credit earning on graduation rates, controlling for gender



Among the non-degree earners, we observed a higher persistence rate among PLA earners than non-PLA earners regardless of gender. Figures 30 and 31 show the re-enrollment rates for female and male students. In both gender categories, over 50 percent of the students who did not receive PLA credits dropped out of CCCS and never returned. These percentages were much lower among students earning PLA credits: Only 28 percent of female PLA earners and 33 percent of male PLA earners dropped out of college after the first year. Among both males and females, after that first year, a higher percentage of PLA earners than non-PLA-earners consistently re-enrolled and earned credits for the duration of the study period. Comparing male and female students, we see higher retention rates among the female PLA earners than the

male PLA earners as indicated by the higher proportion of female than male PLA earners still in school after four years.

Figure 30. PLA and persistence among female CCCS students

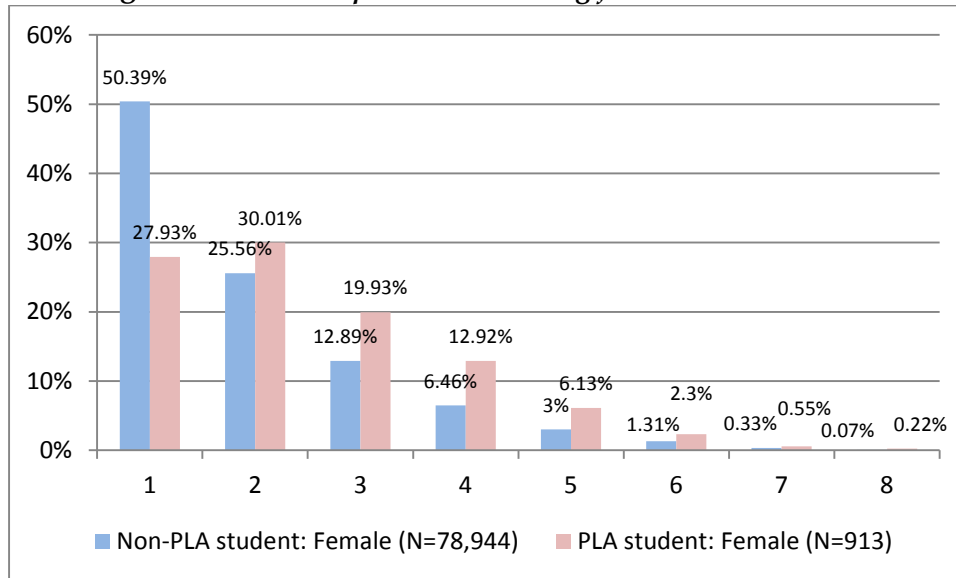
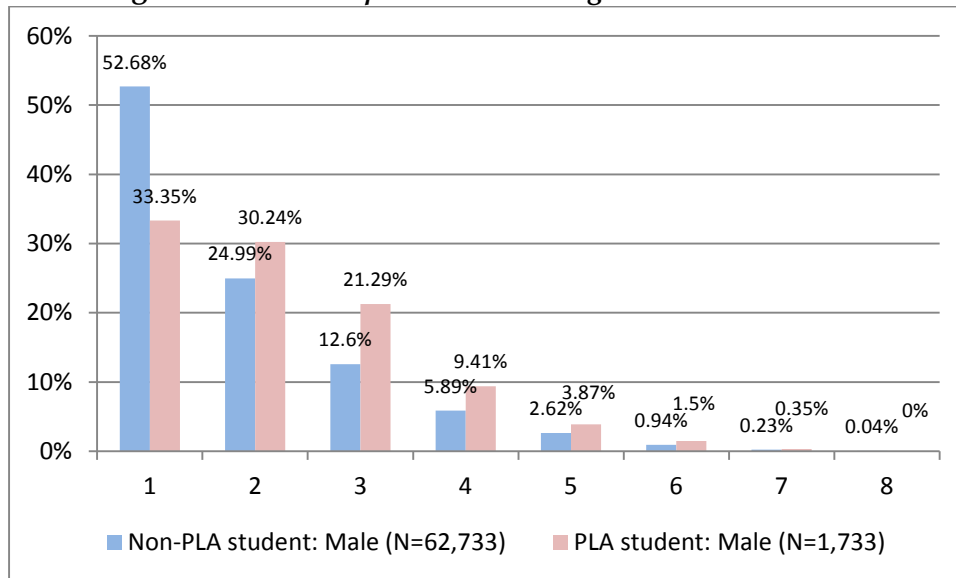


Figure 31. PLA and persistence among male CCCS students

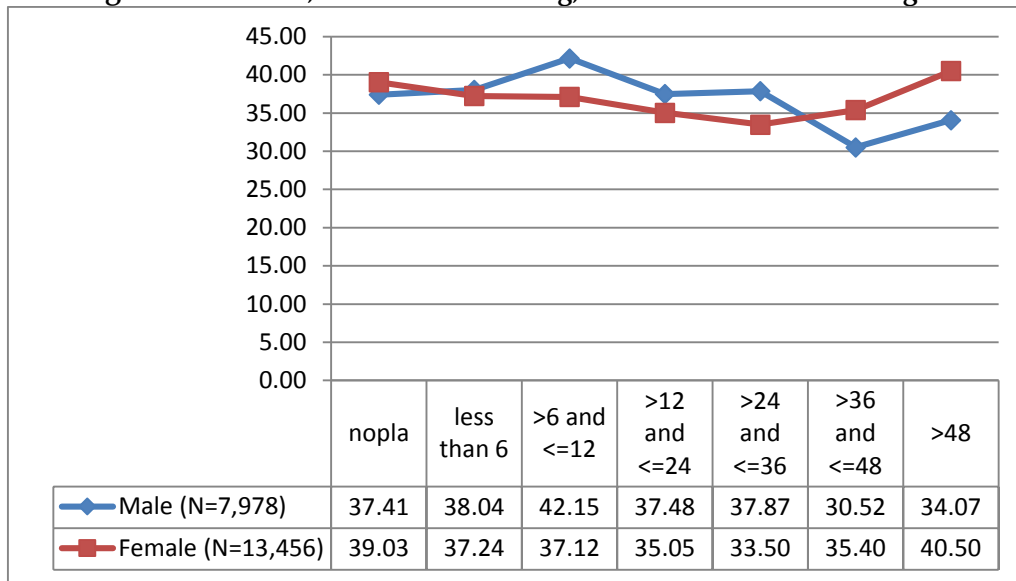


Gender differences were revealed when we considered the time to associate degree, as shown in Figure 32. However, the differences were not dramatic. Female non-PLA earners required more time to earn their associate degree—39 months on average—compared with male non-PLA earners, who took about 37 months. However, with just a small number of PLA credits, female students’ time to a degree decreased more than male students, and that time-earning advantage held across PLA-credit-earning intervals until more than 36 PLA credits were earned.

Male PLA earners generally spent more time to finish their associate degree. The most time saved for male students was among those earning 36-48 PLA credits. Compared with their non-PLA-earning counterparts, male students earning 36-48 PLA credits saved, on average, about 7 months in their pursuit of an associate degrees.

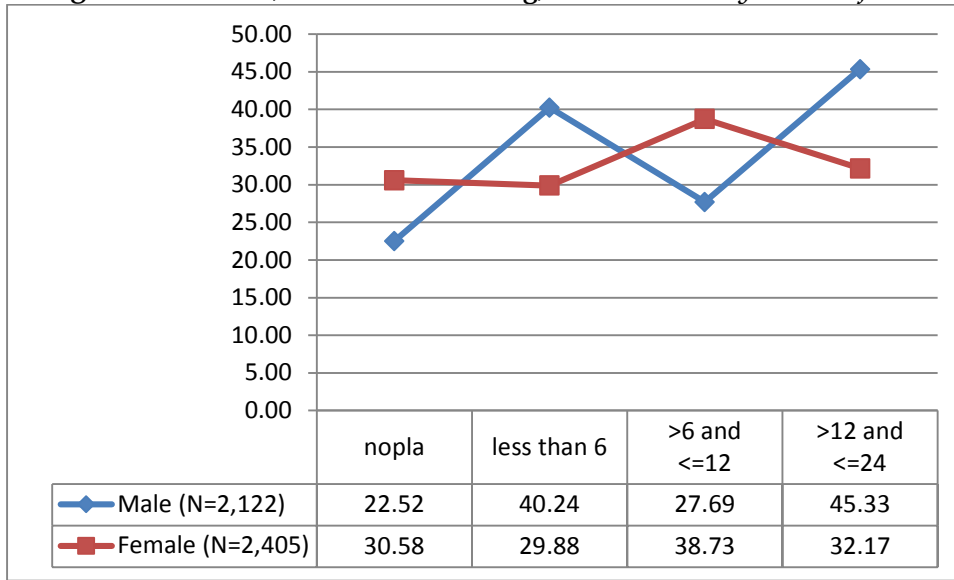
In general, PLA credits were more successful in reducing the time to associate degree for female students than for their male counterparts. Female students who earned 24-36 PLA credits, for example, completed their associate degree over 4 months earlier than their male counterparts (33.5 months for females vs. about 38 months for males). However, male students with more than 36 PLA credits finished their degrees earlier than their female counterparts, and female students earning more than 48 PLA credits took more than the average time to graduate.

Figure 32. Gender, PLA credit-earning, and time to associate degree



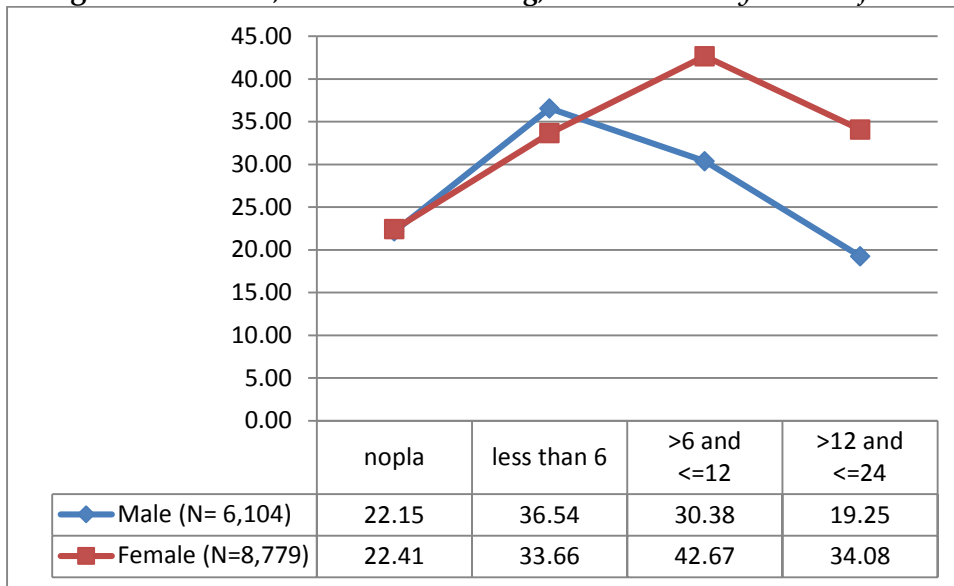
When examining time to 2-year certificates, we find that it took female non-PLA earners about 8 months longer than it took than male non-PLA earners to finish their credential programs. However, female PLA earners who received less than 6 PLA credits earned their credentials 10 months faster than their male counterparts. The trend reversed for female and male students when they earned 6-12 PLA credits, with male students completing their programs, on average, 11 months faster than females. Among those who earned 12-24 PLA credits, females graduated 13 months faster than males.

Figure 33. Gender, PLA credit-earning, and time to 2-year certificate



The difference in time to a 1-year certificate between female and male non-PLA earners was minimal. Without PLA credit, students of both genders earned their 1-year certificate in about 22 months. However, it took longer for PLA earners of both genders to complete their 1-year certificates programs. Female PLA earners on average received their credential faster than their male counterparts when awarded less than 6 PLA credits, but they spent more time to degree than male PLA earners when they earned more than 6 PLA credits.

Figure 34. Gender, PLA credit-earning, and time to 1-year certificate

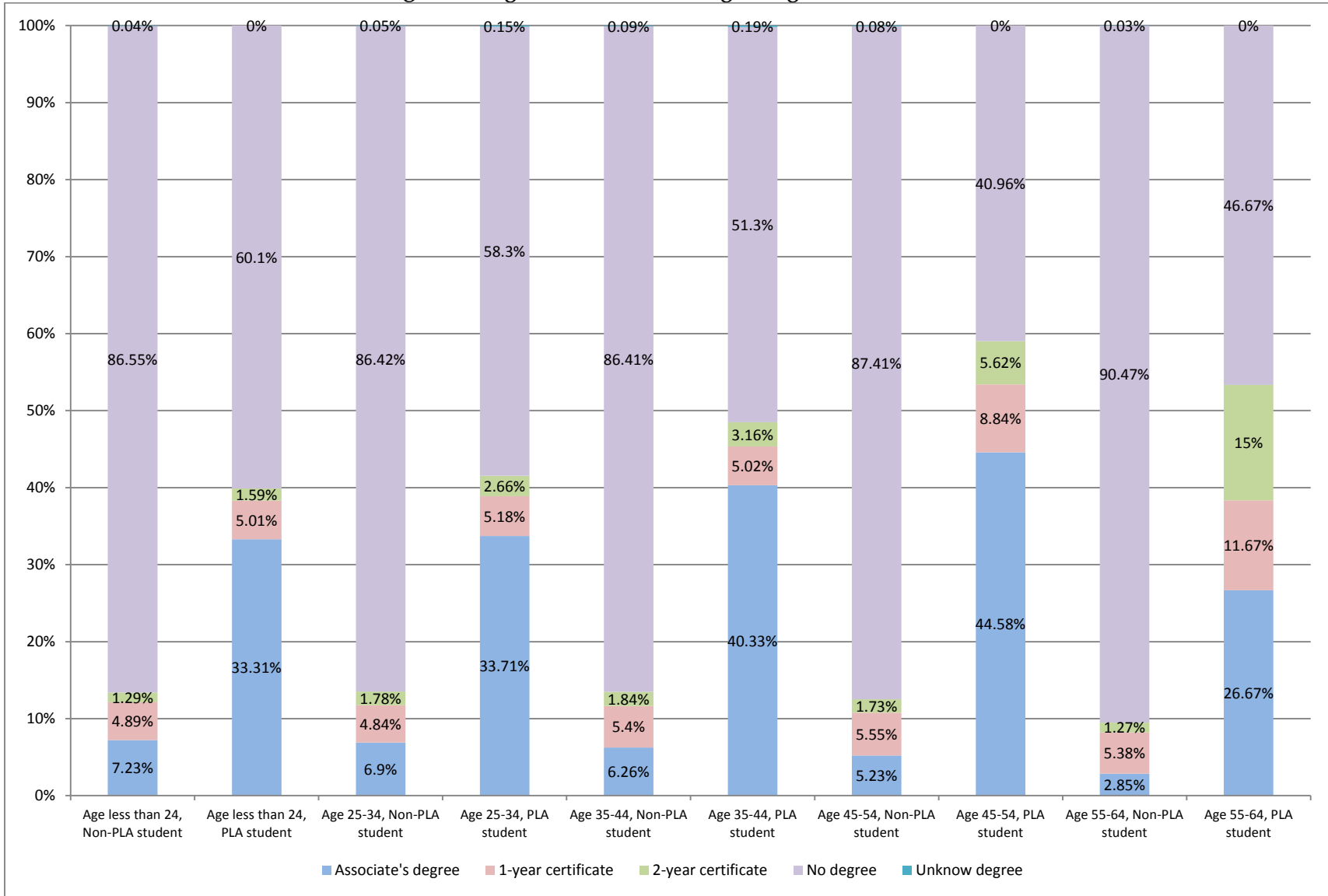


Age

When evaluating the relationship between PLA, graduation rates, and age, we find that in every age group, students who earned PLA credit had higher graduation rates than non-PLA earners.²⁰ Graduation rates were 3 to 5 times higher for PLA earners in each age group relative to non-PLA earners. A particularly dramatic difference in graduation rate by PLA status was found among students age 45 to 54—while 53% of PLA earners in that age group graduated with a credential, less than 10% of those who did not earn PLA credit completed their programs. A great portion of the difference in graduation rates can be attributed to the difference in the associate degree completion rates between PLA-earning and non-PLA-earning students in each category. The differences between graduation rates for students of different age groups pursuing certificates were minimal.

²⁰ We exclude those aged 65 and older from this analysis due to a sparse data problem. Our data set includes only 3 PLA students older than 65.

Figure 35. Age, PLA credit-earning, and graduation rates

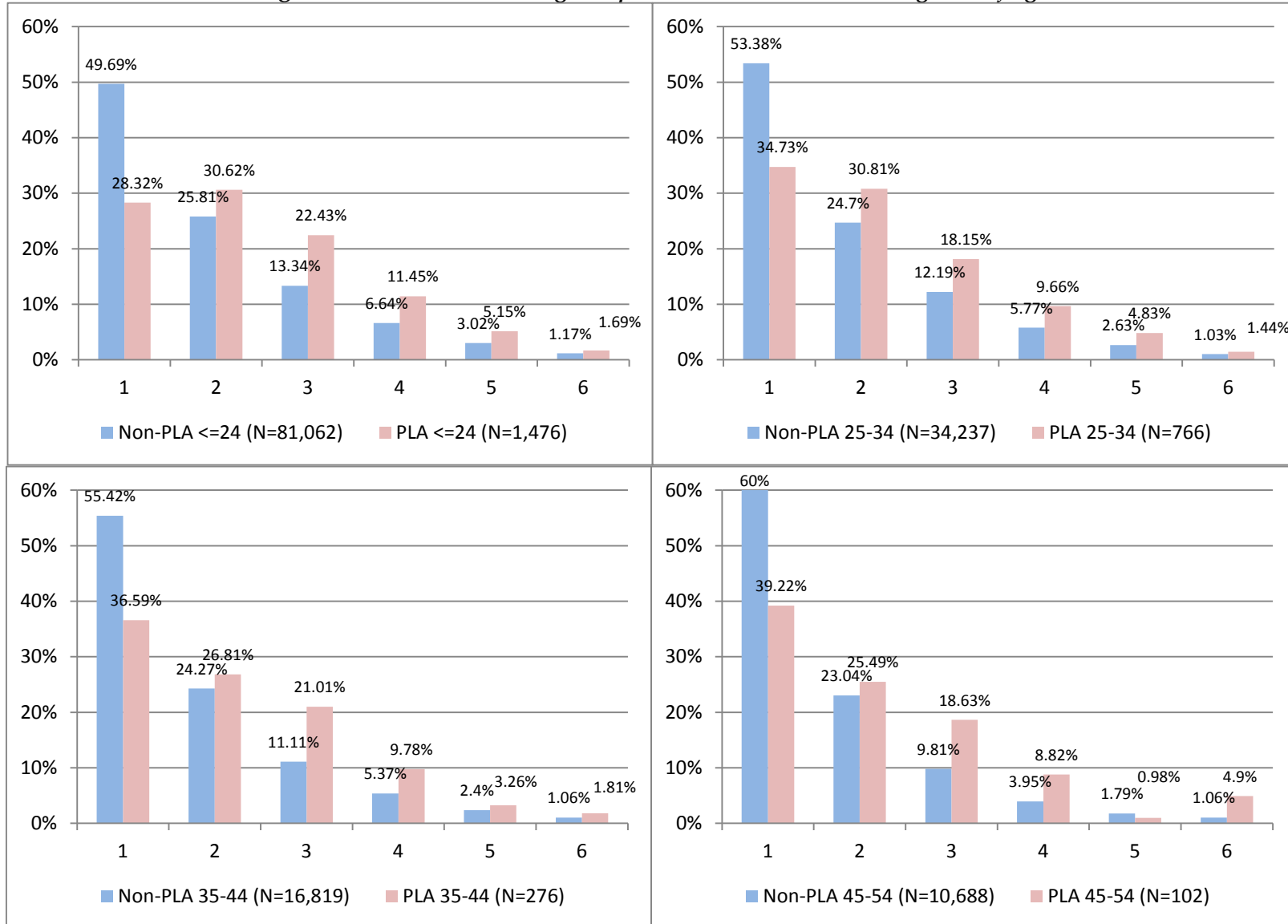


Among students who did not earn any degree, we find higher persistence rates among PLA earners than non-PLA earners in every age group.²¹ Across age categories, as shown in Figure 35, most of the non-PLA earners dropped out of CCCS after one year. The majority of students who earned PLA credit, on the other hand, re-enrolled after 1 year. Although it is increasingly difficult to keep working on a degree over multiple years (suggested by the decreasing proportions of students who re-enroll as the number of years in school increases), PLA earners had better persistence in their academic studies. The proportion of PLA earners who remained enrolled in credit-bearing courses at CCCS was consistently higher than the proportion of non-PLA earners who did so despite the increase in the duration of years of study.

Comparing the persistence rates of PLA earners in all four age groups suggests that young PLA earners (those younger than age 24) had the highest retention rate. In addition, a smaller percentage (28%) of PLA students in this age group than in any other age group quit school after 1 year.

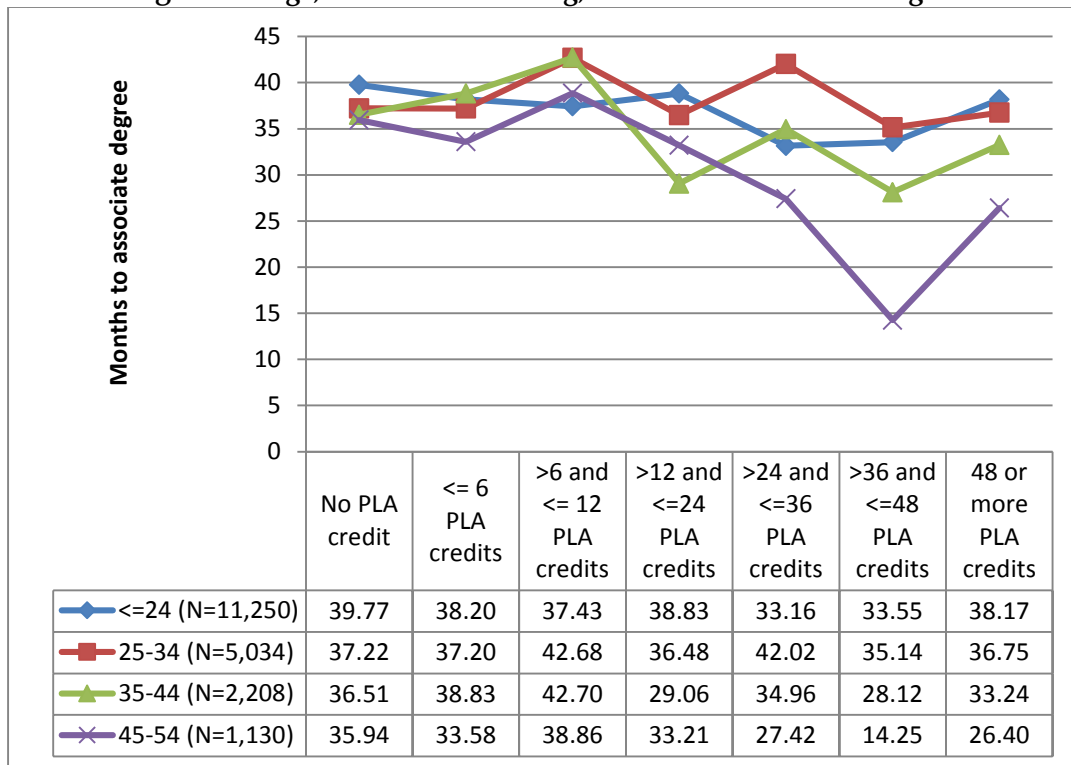
²¹ We focus on four age groups due to sparse data problem for PLA student aged 65 or older.

Figure 36. PLA credit-earning and persistence rates within categories of age



Time to associate degree also varied by students' age.²² These relationships are illustrated in Figure 36. Non-PLA earners between the ages of 45 and 54, on average, had the fastest time to associate degree (36 months), while among the non-PLA earners, those younger than 24 spent more time than other age group in earning their associate degree (nearly 40 months). Among PLA earners, students aged 45–54, on average, earned their degrees faster than PLA earners in other age groups (The only exception to this rule is when they earned between 6 and 12 PLA credits, when they spent one more month than the fastest students in that PLA-earning category—those aged 25–34). In general, the more PLA credits earned, the shorter time to degree for students, regardless of age. For example, older PLA earners—those over 35 years old—experienced a dramatic decrease in time to degree when earning over 12 PLA credits, and students in almost all four age groups had the fastest time to degree when they earned between 36 and 48 PLA credits. Students younger than 24 had the fastest time to degree—33.6 months—when they earned 36-48 PLA credits. Likewise, students between ages 25 and 34, on average, received their associate degree in 35 months when they earned 36-48 PLA credits. On average, students between 45 and 54 years old finished their associate degrees in 14 months. This statistical estimate was based on four PLA students in that age range, however, so we need to interpret it with caution.

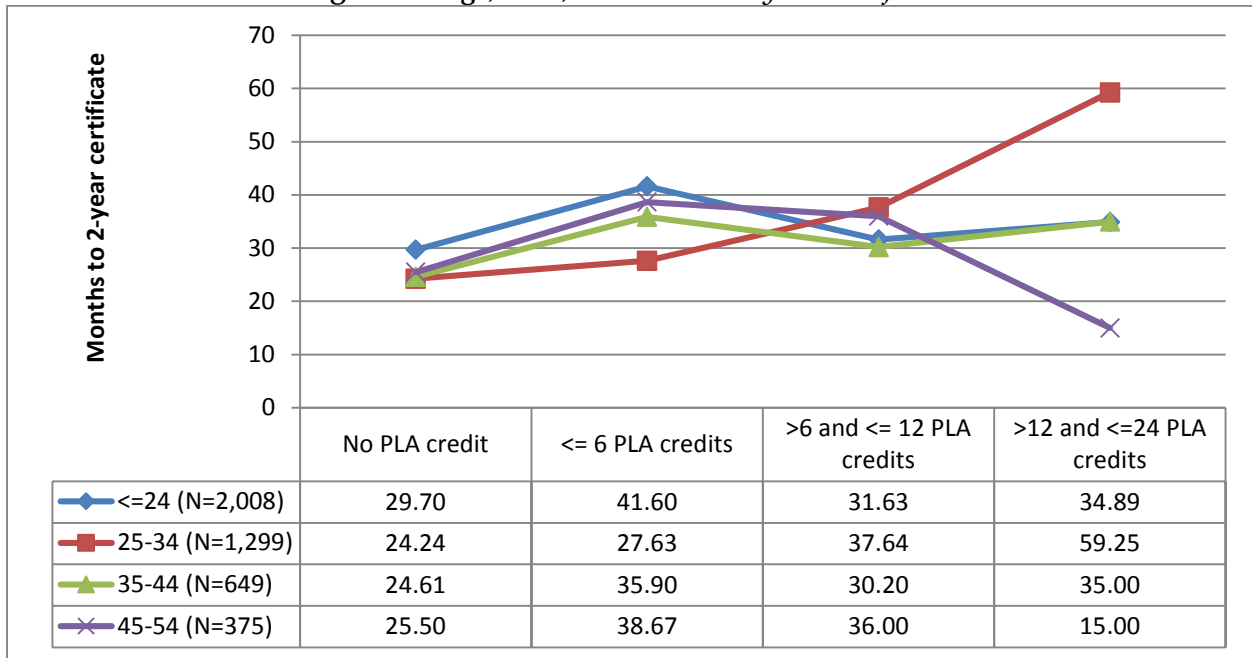
Figure 37. Age, PLA credit-earning, and time to associate degree



²² Since some PLA categories do not have students at older age groups, we do not report time to degree for students older than 54. Categorizing age and PLA credits leads to the problem of sparse cell. The estimated average months to degree should be interpreted with caution. More data are needed to validate our findings.

When we examine the relationship between PLA credits and graduation rates for certificate programs, we do not find the positive impact of PLA credits on reducing time to degree (Figure 37). Instead, non-PLA students spent less time earning their credentials than PLA students did. Further studies are needed to investigate how PLA students differed from non-PLA students who were pursuing certificate programs and how PLA credits were applied to degree programs. In addition, more precise data on students' time of enrollment and number of PLA credits applied to degree program may help to explain the greater time needed for PLA students to complete their credentials.

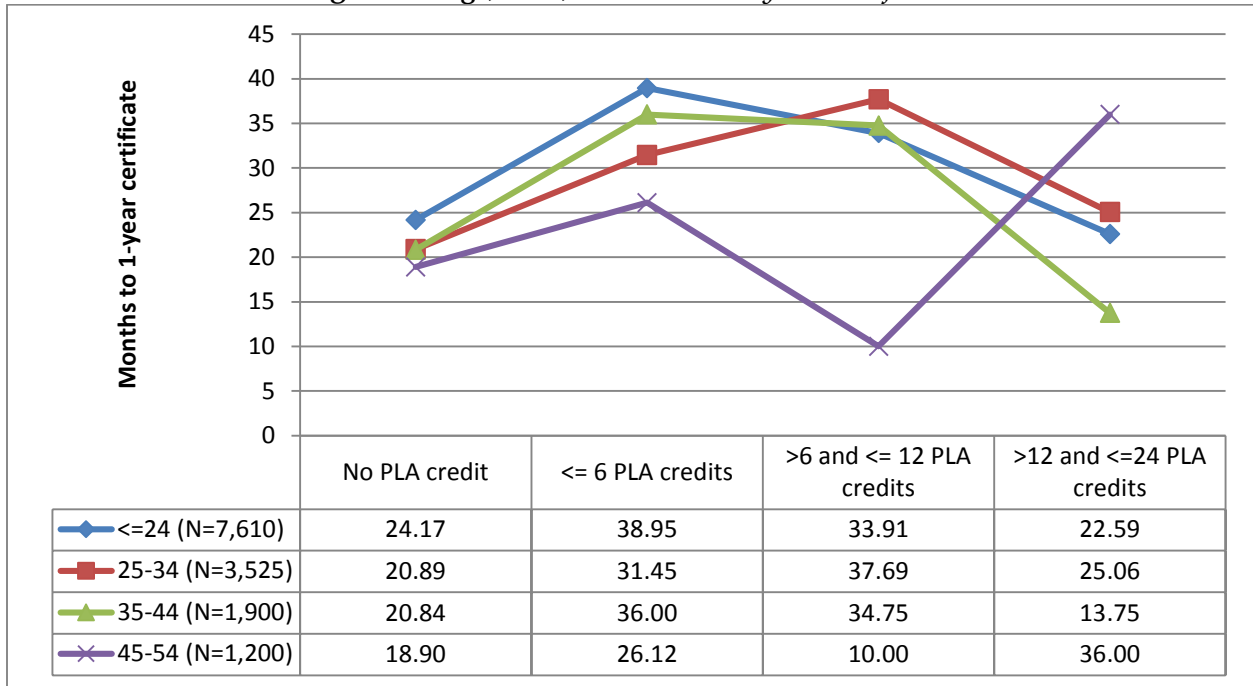
Figure 38. Age, PLA, and time to 2-year certificate



PLA earners generally spent more time pursuing their 1-year certificates than their non-PLA-earning counterparts, as we see in Figure 38. Students between ages 45 and 54 also earned their 1-year certificates faster than those in other age groups at all PLA-credit-earning intervals except for the 12–24-credit category. At that level of PLA-credit earning, students between ages 35 and 44 graduated with their 1-year certificates, on average, within about 14 months, which was faster than students in all other age groups.

Time to degree data, especially for PLA earners, need further investigation. Moreover, as the number of PLA earners pursuing certificates was limited in our data set, future data collection efforts need to focus on better documenting academic and PLA-related data as it relates to the specific degree each student is working on.

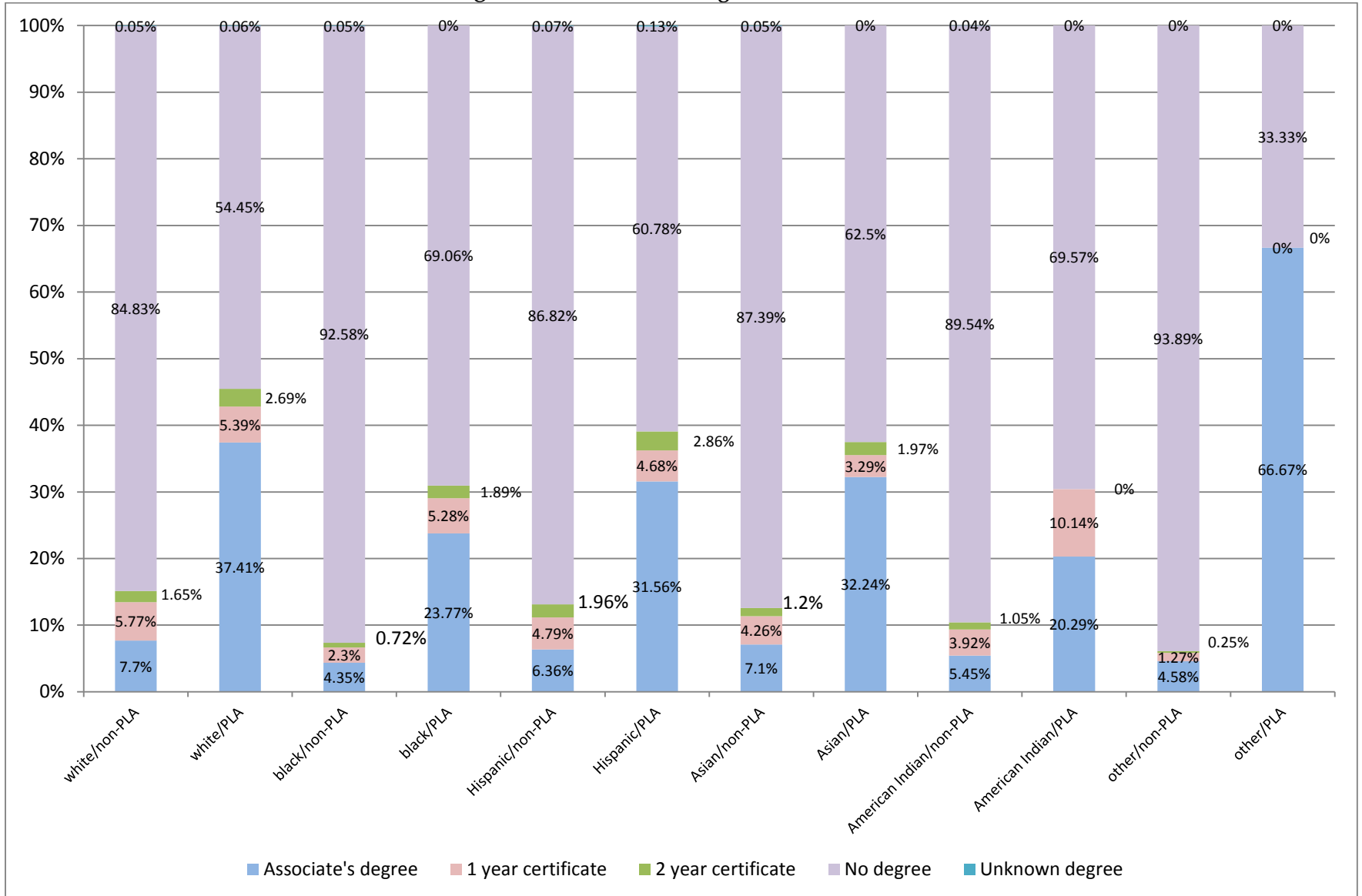
Figure 39. Age, PLA, and time to 1-year certificate



Race/ethnicity

When examining the graduation rates of PLA earners and non-PLA earners by race/ethnicity, we find that for each race/ethnic group, graduation rates for PLA earners were higher than those of non-PLA earners. (See Figure 39.) The biggest difference between the two groups within categories of race/ethnicity was found in the graduation rates of students who received associate degrees. The graduation rates of white, black, and Hispanic PLA earners were approximately five times higher than those of their non-PLA-earning counterparts. The difference between Asian PLA earners and non-PLA-earners for was only slightly less dramatic as that of other racial groups—around 37 percent of Asian PLA earners graduated with associate degrees, a rate that was about 4.5 percent higher than that of non-PLA-earners (less than 13%).

Figure 40. Race, PLA, and graduation rates



PLA was positively associated with re-enrollment regardless of race (Figures 40, 41, and 42).²³ White, black, and Hispanic PLA earners all had higher retention rates than their non-PLA-earning counterparts. Almost half of black and Hispanic non-PLA earners and over half of white non-PLA-earners stopped taking classes at CCCS after their first year. Hispanic PLA earners had the highest persistence rates, as the proportion of those students taking courses and earning credits was consistently higher throughout the study period.

Figure 41. PLA and persistence rates among white CCCS students

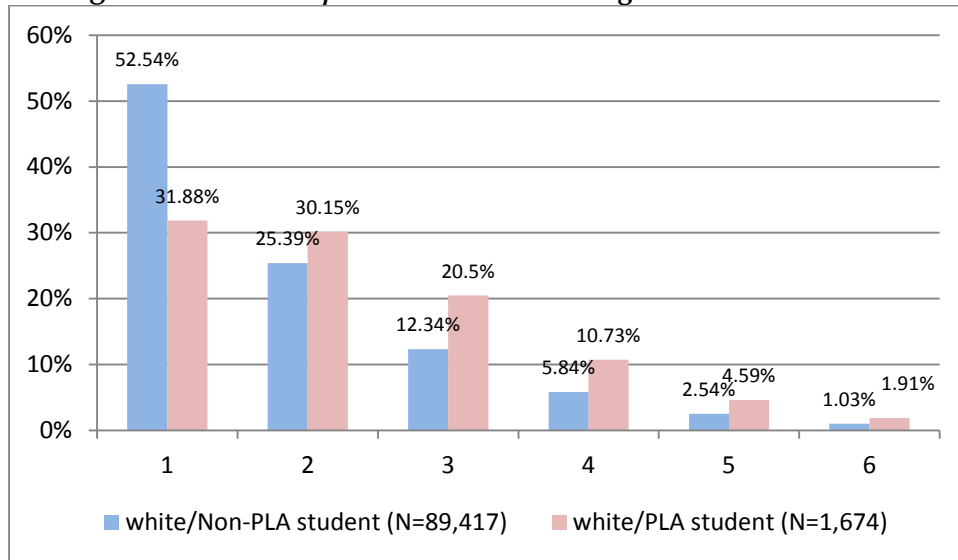
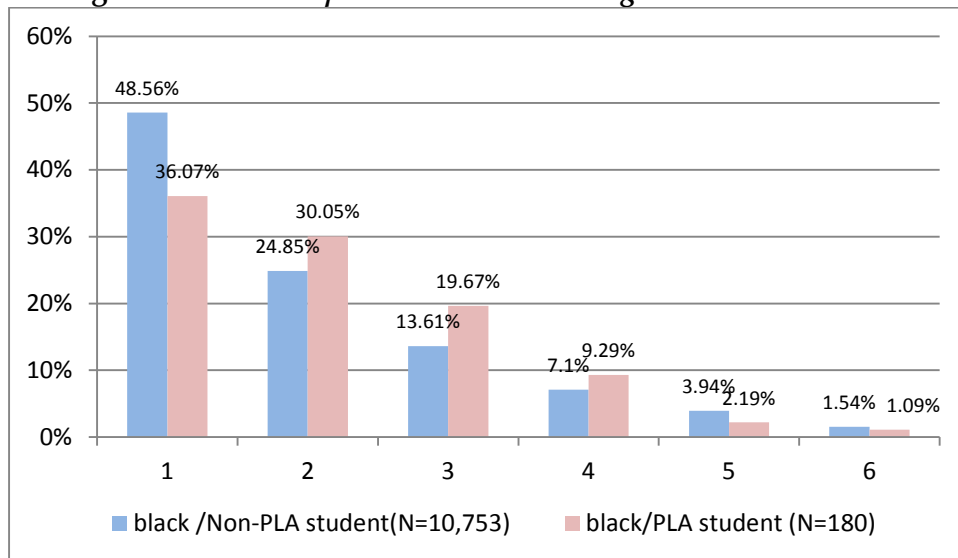
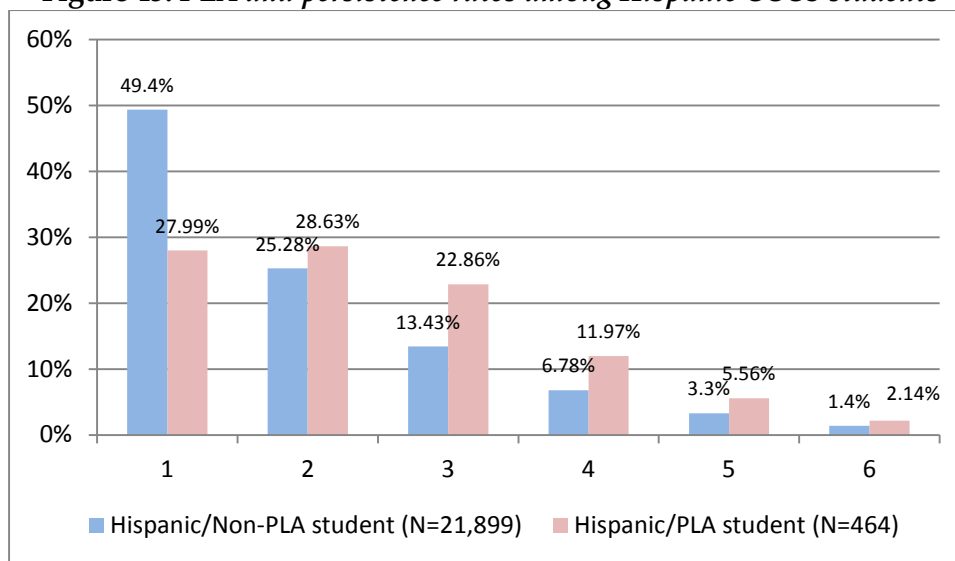


Figure 42. PLA and persistence rates among black CCCS students



²³ We only focus on white, black, and Hispanic students due to sparse data problem.

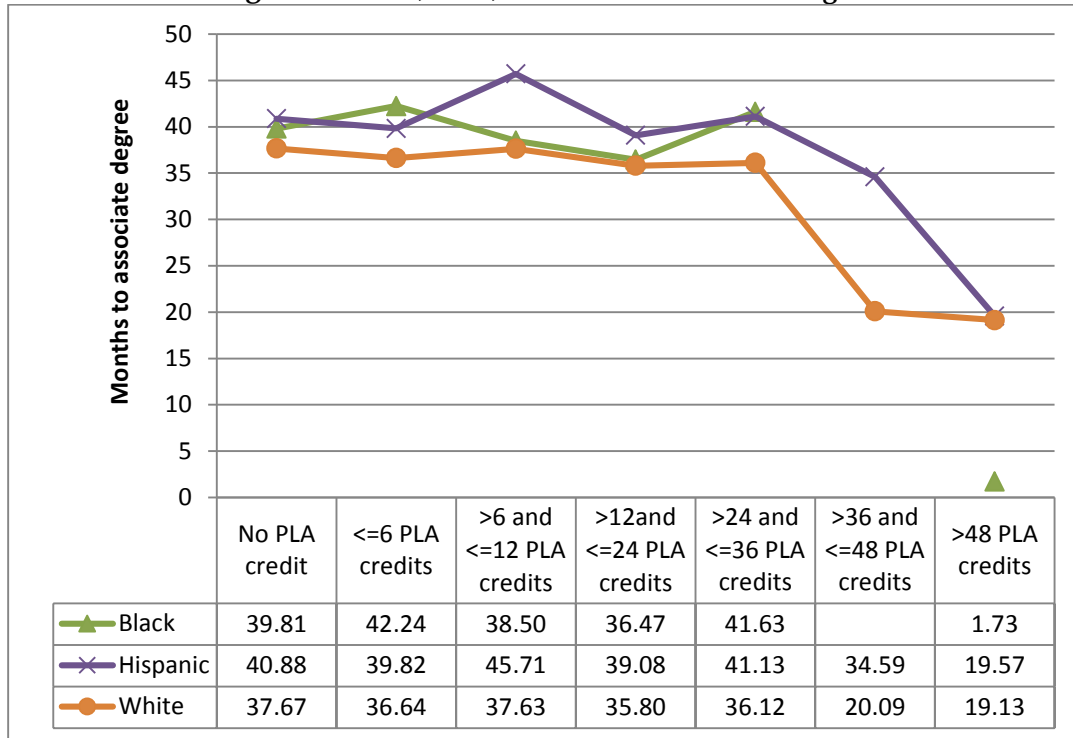
Figure 43. PLA and persistence rates among Hispanic CCCS students



Due to sparse data problems, we only examine time to degree by white, black, and Hispanic students who received associate degrees. We do not have enough data to examine the relationship between race, number of PLA credits, and time to credential. There were few minority students pursuing 2-year or 1-year certificates. When we examined the relationship between PLA credits and time to certificates while taking race into account, some of the PLA-credit-earning categories were empty.

For time to associate degree, the general pattern was that time to degree decreased as the number of PLA credits earned increased. However, even we see the general pattern in Figure 43, the decrease in time to degree was not consistent with the increase in PLA credits. For example, Hispanic students earning 6-12 PLA credits spent more time to degree than those earning fewer PLA credits. White students who earned over 48 PLA credits saved the greatest amount of time in pursuing their associate degree. Compared to their counterparts who did not earn PLA credit, they saved over 18 months.

Figure 44. Race, PLA, and time to associate degree



Financial hardship

As shown in Figure 44, students eligible for financial aid assistance who earned PLA credits had higher graduation rates than non-PLA earners who were also qualified for financial aid under the Federal Pell Grant program (47% compared to 24%). Among students who did not qualify for financial aid, PLA earners also graduated at higher rates than non-PLA earners (40% of PLA earners graduated compared to less than 10% of non-PLA earners).

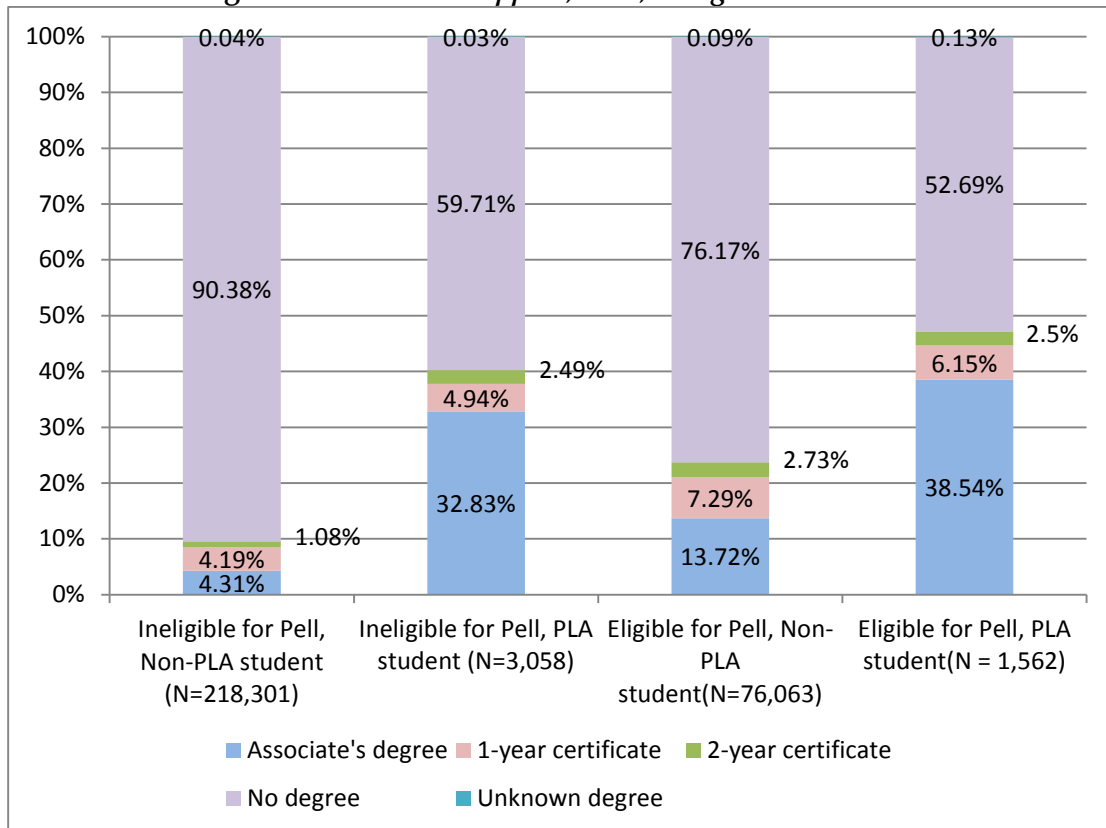
Instead of finding that economic disadvantage had a negative impact on student degree completion as suggested by the literature (Klein-Collins, 2010), we found that, across all three degree types, graduation rates were higher among students who were eligible for financial aid than they were among those who were ineligible for assistance. PLA earners eligible for financial aid graduated with associate degrees at a rate of 38.5 percent on average compared to 32.8 percent of ineligible PLA earners. Among non-PLA earners, economically disadvantaged students also had higher graduation rates than their more financially secure counterparts across all degree types. For example, nearly 14 percent of non-PLA-earners who were eligible for financial aid received associate degrees, whereas only about 4 percent of those who were not eligible for financial aid did so.

The positive impact of PLA credit on graduation rates varies by financial aid status among students working on certificate programs. Earning PLA credits did not have an effect on completion rates among students pursuing 2-year or 1-year certificates who qualified for

financial support. However, we found that earning PLA credits had a positive impact on the completion rates of the economically advantaged students pursuing certificates. With regard to both 1- and 2-year certificates, PLA earners who were ineligible for financial aid had higher graduation rates than non-PLA earners in the same financial category.

Overall, we found that PLA earners who were eligible for financial aid had higher graduation rates than PLA earners who were ineligible for financial aid. However, CCCS data on student's financial aid status may be inaccurate because CCCS did not differentiate students ineligible for financial aid from those who did not report on their Pell status. As a result, our data assumes that nonreporters and financial-aid-ineligible students are the same, and that assumption may explain the lower graduation rates we found among those students. Further studies are needed with more accurate reporting on Pell status for students in CCCS.

Figure 45. Financial support, PLA, and graduation rates



Figures 45 and 46 show the retention rates of non-degree earners at CCCS who were economically disadvantaged and those who were not. The results indicate that regardless of financial aid status, earning PLA credit may have motivated students to stay in school and earn credits, which conforms to what has been suggested in the literature. Higher percentages of students in both economic categories who earned PLA credits re-enrolled in CCCS after their first year and continued to do so on an ongoing basis (all five subsequent years for which data was analyzed) compared with their non-PLA-earning counterparts.

Figure 46. PLA and persistence among CCCS students ineligible for financial aid

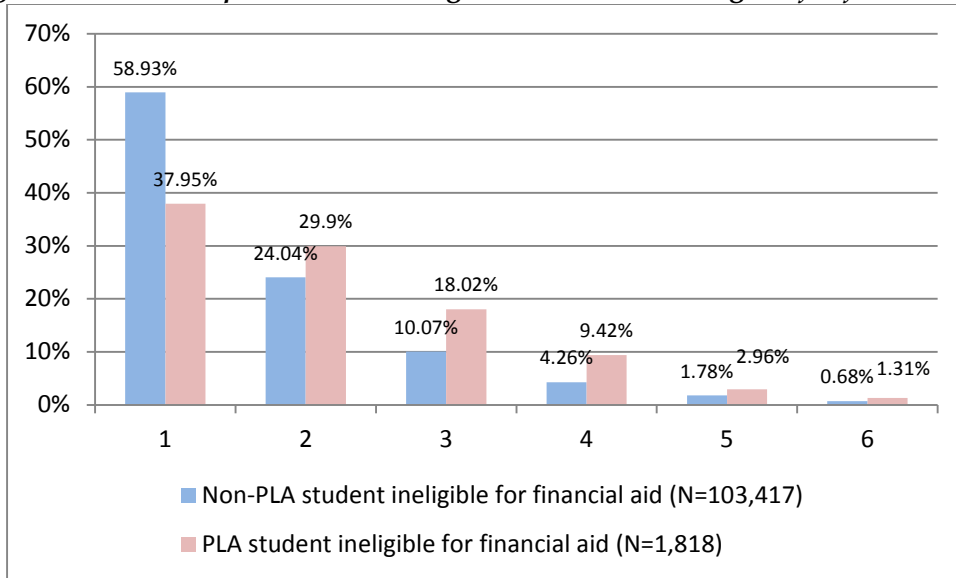
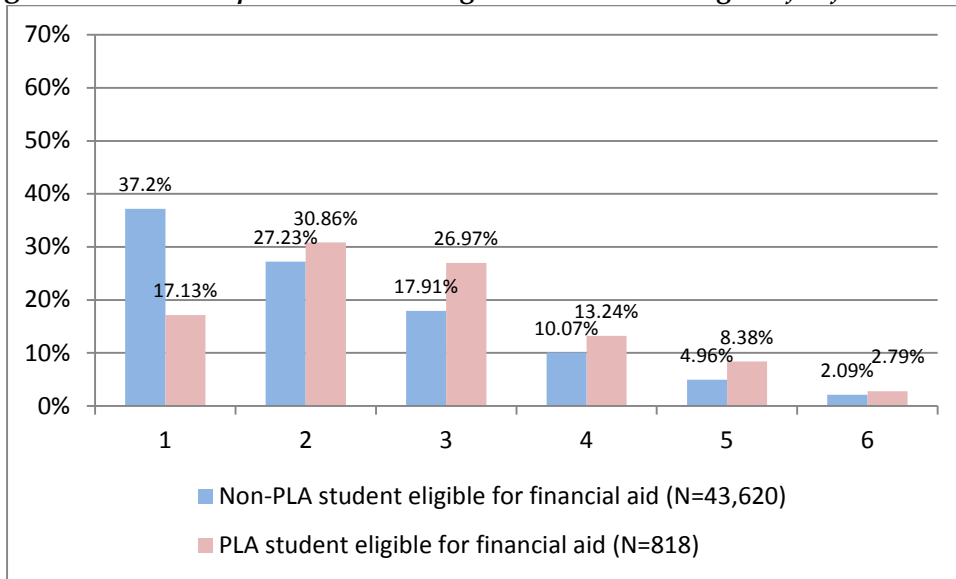


Figure 47. PLA and persistence among CCCS students eligible for financial aid

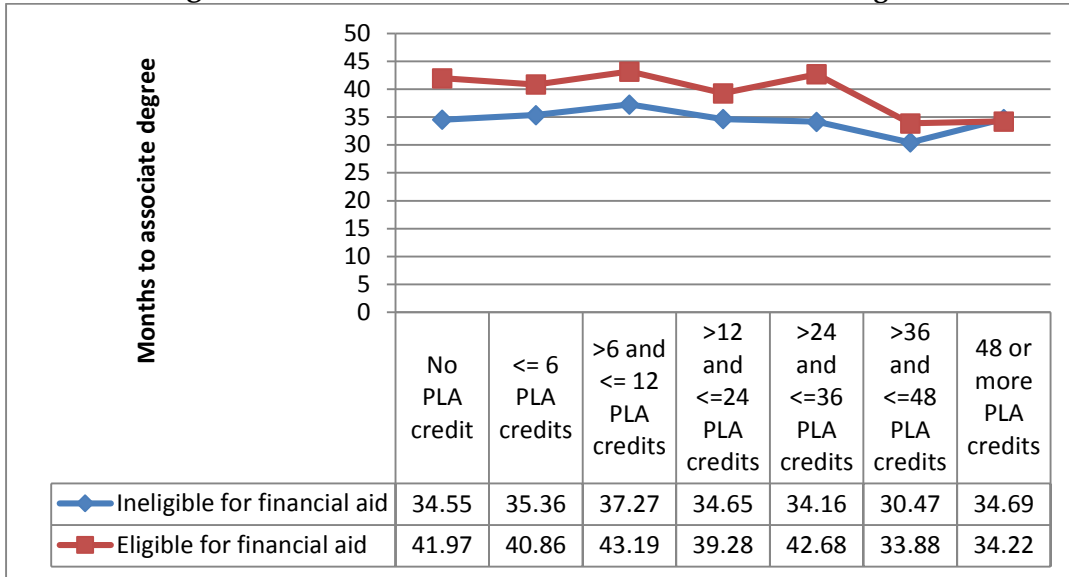


Though the economically disadvantaged PLA earners in our study had higher graduation rates than other students, they spent, on average, more time earning their degrees than students who did not face financial hardship. Figure 47 shows that at every level of PLA credits, financially disadvantaged students spent more time completing their credentials.

Our analysis of economic hardship, PLA credit-earning, and time to associate degree is presented in Figure 47. Financially disadvantaged students took longer to finish their associate degree. Without any PLA credits, students eligible for financial aid spent, on average, 7 more months completing their degrees than their more financially secure counterparts. Students

without financial difficulties who earned 36–48 PLA credits saved more than 4 months compared with their non-PLA-earning counterparts (30.5 months for PLA earners vs. 34.6 month for non-PLA earners).

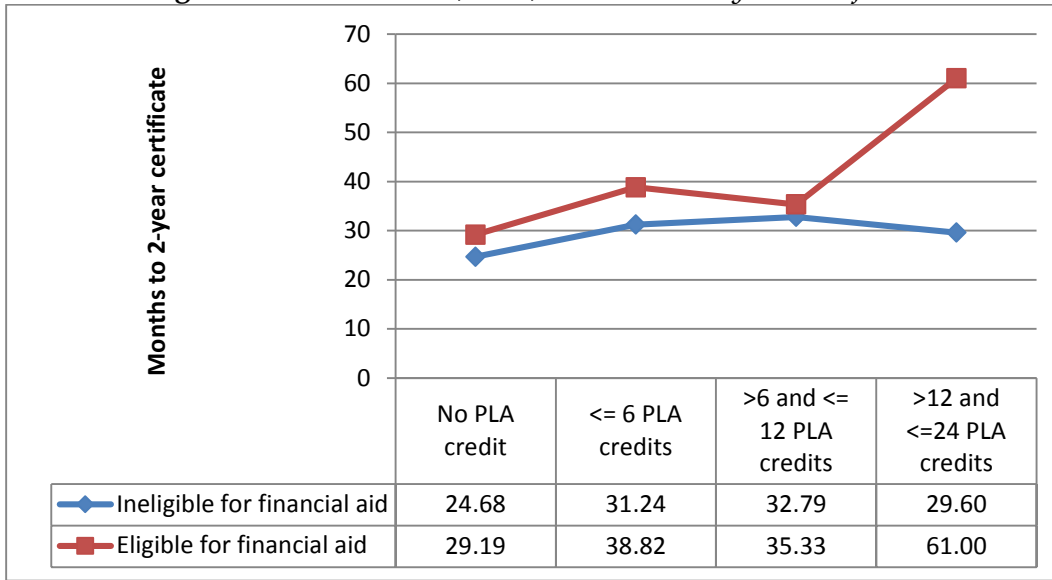
Figure 48. Financial aid, PLA, and time to associate degree



Because there were few students in the higher PLA-credit-earning categories, our findings on economic hardship, PLA credit-earning, and time to associate degree should be interpreted with caution. The sparse data may result in estimates that are unreliable.

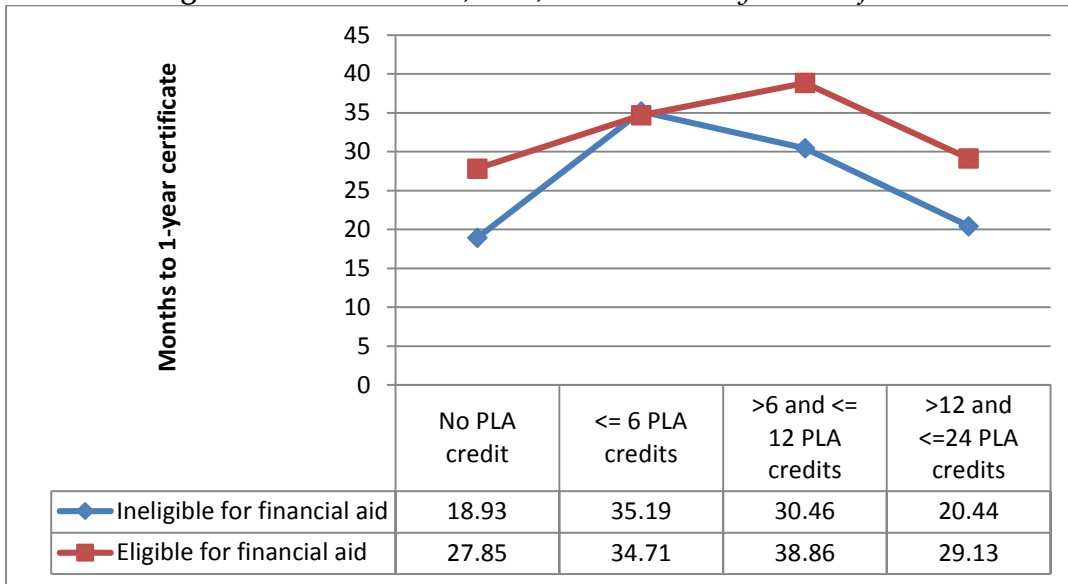
Figure 48 displays the results of our analysis of the relationship between financial aid eligibility, PLA credit-earning, and time to 2-year certificate. As was the case with those pursuing associate degrees, economically disadvantaged students pursuing 2-year certificates also spent more time completing their credentials than their more financially secure counterparts did. Financially disadvantaged non-PLA earners spent over 4 months longer pursuing their 2-year certificates than did those who were better off economically. Increases in PLA credits did not save time to degree.

Figure 49. Financial aid, PLA, and time to 2-year certificate



Similar results, presented in Figure 49, were also observed among students earning 1-year certificates. Financially disadvantaged students spent more time pursuing their 1-year certificates, and earning PLA credits did not save time to degree—for those students or for the students in our sample who were ineligible for financial aid.

Figure 50. Financial aid, PLA, and time to 1-year certificate



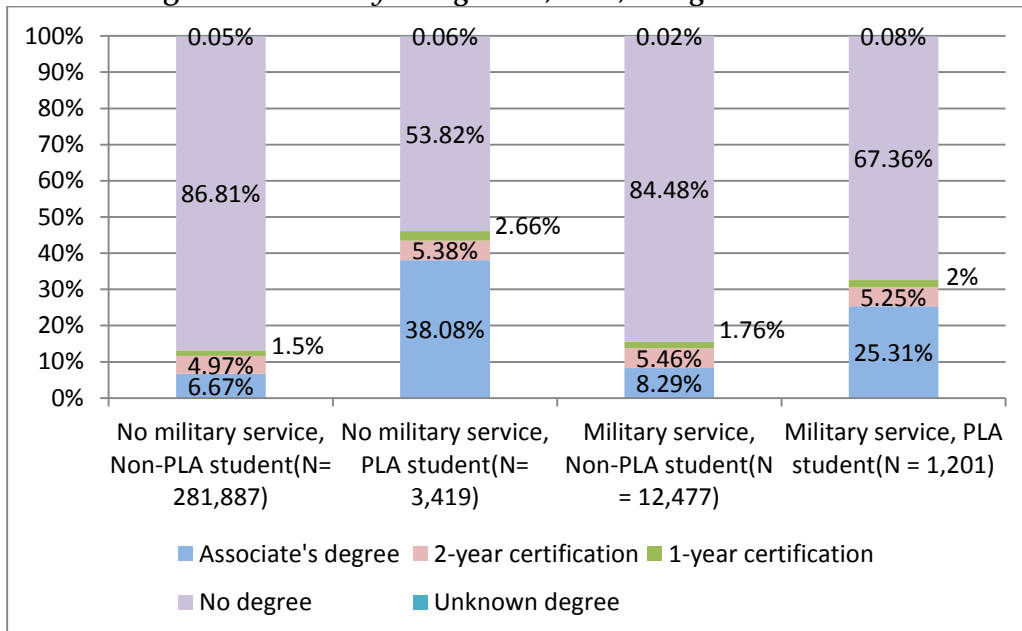
Military service

We also examine the association between PLA credit-earning, graduation rates, and military service experience. Our data show that regardless of military background, students who earned PLA credit graduated at a higher rate as compared to students who did not earn PLA credit.

Among the students who did not report any military experiences, 46 percent of PLA earners successfully earned a credential as compared to only 13 percent of non-PLA students who did so. However, as shown in Figure 50, the difference in graduation rates between PLA earners and non-PLA earners who had military experience was less dramatic. Among military affiliated students, the graduation rate was higher for PLA earners than for non-PLA earners (32.6% vs. 15.5%). Most of the difference in graduation rates between students who earned PLA credit and those who did not can be attributed to the difference in graduation rates of associate degree programs. The difference in graduation rates between PLA-earning and non-PLA-earning students with no history of military service (38% vs. 7%, respectively) was about twice as large as the difference in graduation rates found among students who had some military background (25% of PLA earners vs. 8% of non-PLA-earners). PLA credits thus had a stronger association with graduation rates among non-military-affiliated students.

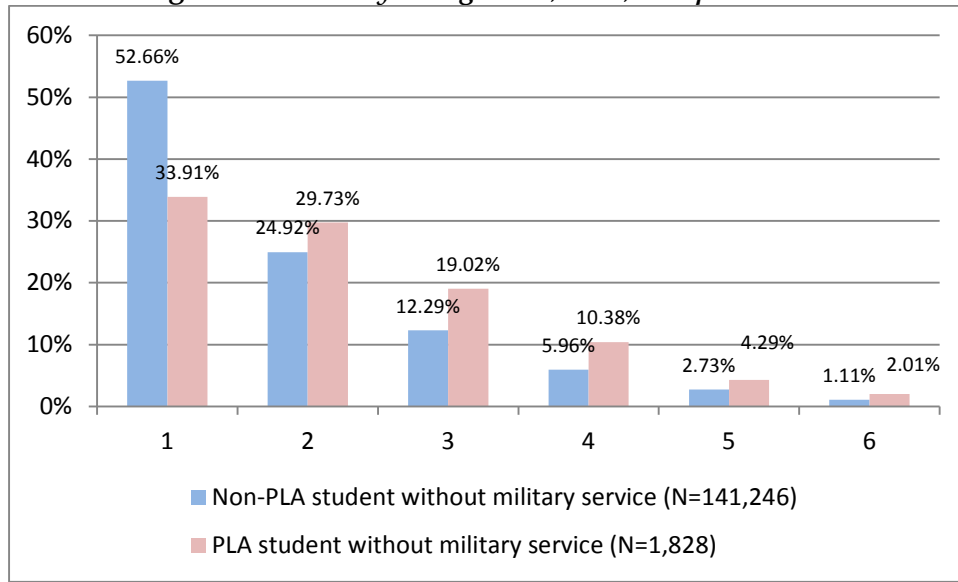
However, as discussed earlier, we do not have accurate data on student' military background. There is no way to distinguish students who chose not to report their military affiliation status from those who did not have such affiliation. By treating them as the same as those who did not have a military background, we may have introduced errors to the estimates of graduation rate for students without military experience.

Figure 51. Military background, PLA, and graduation rates



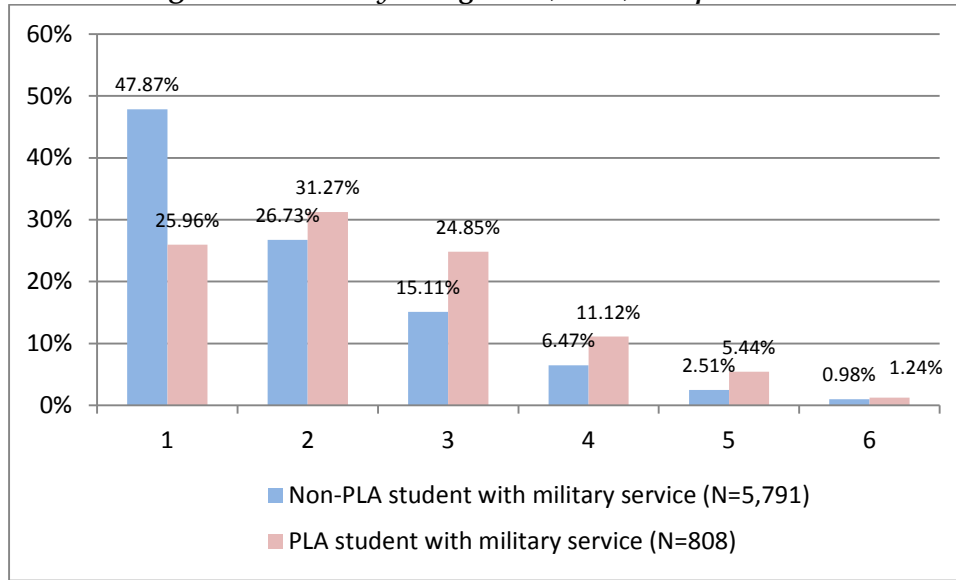
When we examined how non-degree earners accumulated academic credits throughout the course of the study period, we found that, when they are compared with students who did not earn PLA credit, a consistently higher proportion of PLA earners re-enrolled and earned credits over time. This finding is true for both students with military backgrounds and those without. Figure 51 shows that a little over half—53 percent—of non-PLA earners without military affiliations stopped taking courses at CCCS after one year, but only 34 percent of PLA earners did so. A greater proportion of PLA earners than non-PLA-earners continued their studies for two, three, four, five, and six years—the entire period for which data was analyzed.

Figure 52. Military background, PLA, and persistence



Similar patterns were found for students with military experience, as shown in Figure 52. PLA credit-earning was strongly associated with students' persistence. That relationship did not differ much when students' military background was taken into account.

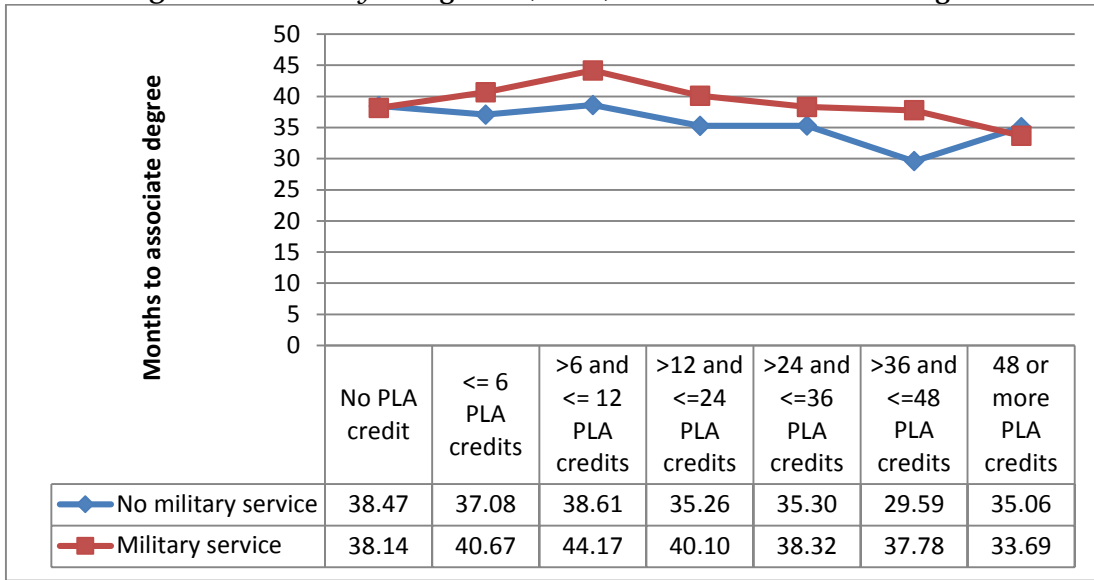
Figure 53. Military background, PLA, and persistence



Non-military students who earned PLA credits spent less time pursuing their associate degrees than PLA earners who had military backgrounds, as shown in Figure 53. Without receiving PLA credits, students spent the same amount of time completing their associate degree (around 38 months) regardless of whether they had experience in the military. However, non-military PLA earners experienced shorter times to degree, and their advantage generally increased along with the number of PLA credits they earned. (That pattern reversed itself once more than 48 PLA credits were earned.) Non-military students earning 36-48 PLA credits had the shortest time to an associate degree—just under 30 months on average—which saved them almost 9 months compared to non-military students who did not earn PLA credit.

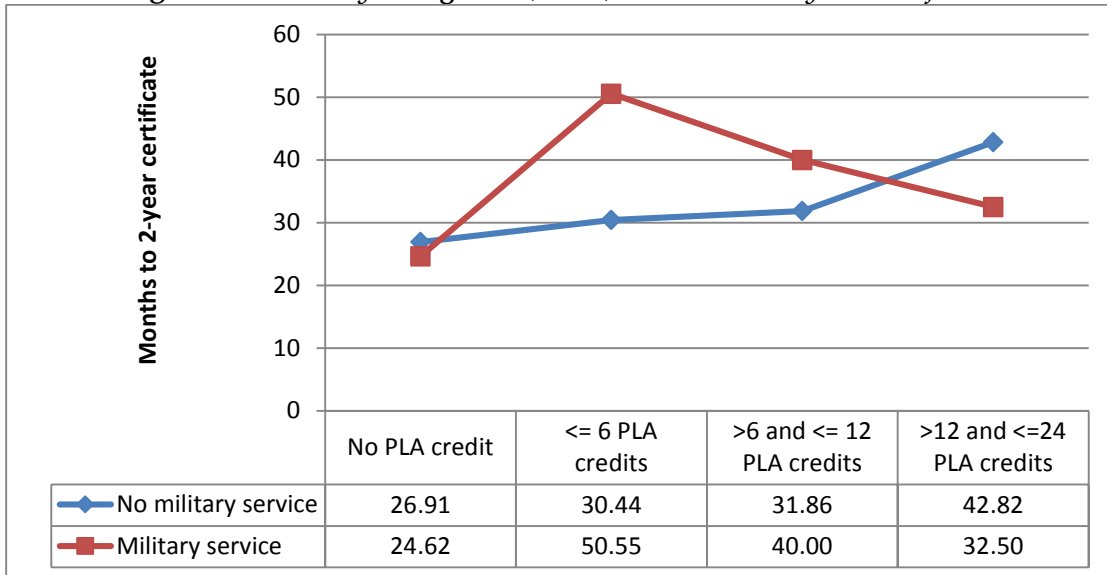
Unlike the steady decrease in time to degree we found in non-military students with PLA credits, PLA credits did not save military students time in earning their associate degrees. In general, military students earning PLA credits spent more time pursuing their degrees than non-PLA earners with military backgrounds until more than 36 credits were earned.

Figure 54. Military background, PLA, and time to associate degree



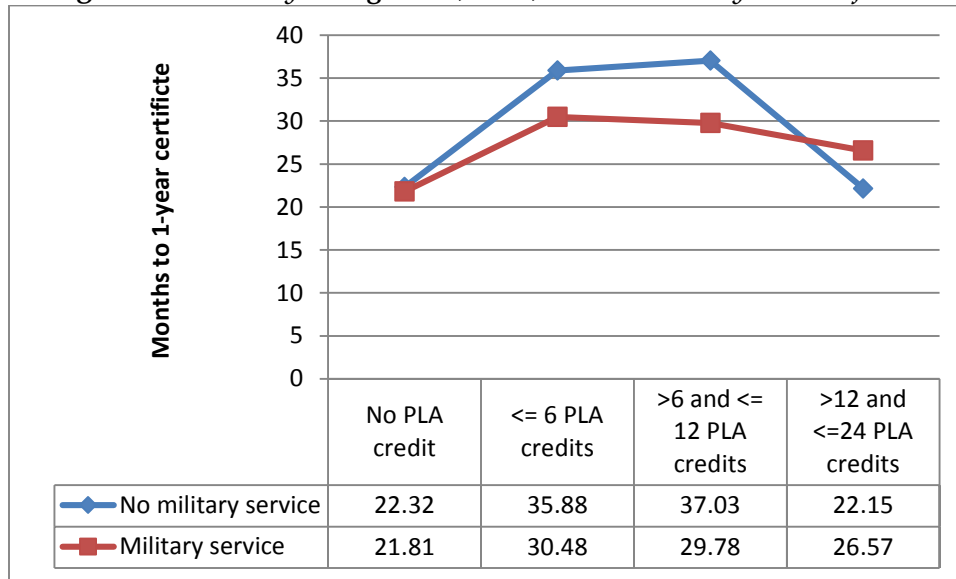
PLA credits did not save students time in pursuing certificate credentials. In fact, PLA earners spent more time to degree than non-PLA students regardless of military service background for both 1- and 2-year certificate programs. (These analyses are shown in Figures 54 and 55.) Among non-PLA earners, students with military backgrounds received their certificates faster than those without a military service history. The same was true among students who earned PLA credits—military students spent more time to degree than non-military students—only up to the point at which they earned more than 12 PLA credits. Earning 12–24 PLA credits saved military students pursuing 2-year certificates 10 months’ time.

Figure 55. Military background, PLA, and time to 2-year certificate



Military students without PLA credits also received 1-year certificates faster than non-military students without PLA credits. However, PLA credits did not save either group of students time in earning their 1-year certificates. Rather, students earning PLA credits spent more time earning their credentials than students without PLA credits regardless of military background.

Figure 56. Military background, PLA, and time to 1-year certificate



These findings contradict our expectation that PLA credits shorten the time students spend earning their degrees. As explained earlier, further study is required to examine how PLA credits were assessed and applied on behalf of students earning certificates.

Again, to better capture the effects of PLA credits on time to degree, we need more accurate data on how PLA credits were assessed and applied, more detailed data on students’ academic histories, and more accurate reporting on students’ military background.

CONCLUSION AND LIMITATIONS

In this report, we have successfully demonstrated the benefits of PLA with regard to the three academic outcomes of interest: Our findings, in general, support our hypotheses that in postsecondary education, the PLA process helps students complete their credentials, motivates them to continue their studies, and accelerates the certification process. The strong associations between PLA and graduation rates, persistence, and time to degree persist regardless of students’ sociodemographic characteristics and life experiences. However, our findings should not be interpreted as causal. These strong associations are worthy of further investigations that can help us to better understand the underlying process through which PLA has an impact. Only when the operating mechanisms are fully understood can we initiate and implement better educational interventions to help students advance academically in postsecondary educational settings.

This report is not without limitation. First, we have very low PLA rate among the CCCS students in our study. The number of PLA students pursuing 1-year or 2-year certificates was especially small. These low numbers resulted in a sparse-data problem that prevented us from getting reliable statistical estimates, especially among students pursuing certificates. Second, our CCCS administrative data failed to track students' records by the degrees they were working on. This forced us to make several assumptions regarding the time of enrollment, the degree students were pursuing, and the number of PLA credits applied to the final degree, any or all of which could introduce errors to our estimates of PLA's influence on our variables of interest. Finally, we are aware that the current data we have are problematic in several ways. As explained earlier, we do not have precise reports on students' financial aid status or military experience, we have no way of knowing exactly when a given student was first enrolled in college (and therefore the boundaries around our study sample are blurred), and some of the data we received contained errors or was mislabeled.

Despite all these limitations, however, we remain confident in the strong positive associations we found between PLA and graduation and persistence rates, as well as the moderate relationship between PLA and time to degree (especially among associate degree students). In the future, we need to collect more—and more accurate—data to better capture PLA's effects. In addition to better academic records pertaining to the date of every student's entrance to the college, the exact degree they intended to pursue, the number of PLA credits they earned, and how those PLA credits were applied, we need more information on how CCCS colleges outreach to students to do PLA assessments, how PLA credits are assessed and applied, and students' attitudes towards PLA assessments. These questions may help reveal the mechanisms underlying the PLA process and help us to better understand the impact of PLA on a variety of student outcomes.

APPENDIX A. – CCCS Schools

| College | # of Campus | # of Students | Year | Female | Minority Student | Black | Hispanic | White | Part time students | Age | Notes |
|---------|-------------|---------------|-----------|--------|---------------------|-----------------|----------------------------------|-------|--------------------|--|---|
| ACC | 3 | 9,778 | fall 2013 | 58% | | | 11.70% | 72% | > 75% | | |
| CCA | 2 | >15,000 | | | 55% (2nd highest) | 25.6% (highest) | | | 76% | 20% <18 | medical tech, film school, veteran students |
| CCD | 1 | 12,474 | 2012 | 57% | >55% (most diverse) | | 25% (Hispanic-serving institute) | <50% | 73% | Median 27 (slightly higher when high school students are excluded) | |
| CNCC | 4 | | | 58% | 29% | | | | 61% | | rural area; aviation training |
| FRCC | 4 | >21,000 | 2012 | 58% | 20% | | | | 69% | | The largest school in CCCS. |
| LCC | 1 | 1,195 | 2012 | 57% | | | | 66% | 57% | Median 23 | the smallest in CCCS |
| MCC | 1 | 2,620 | 2012 | 67% | | | | | | | |
| NJC | 1 | 3,113 | 2012 | 59% | | | | 71% | 51% | Median 30 | |
| OJC | 1 | 1,214 | 2012 | | 37% | | | | 52% | 40% over 25 | Competitive Athletic international students |
| PCC | 4 | 6,636 | fall 2011 | 60% | 39% | | | | 56% | Median 29 | |
| PPCC | 4 | > 22,000 | 2011–12 | 58% | 27% | | | | 61% | 33% <20; 37% 21–30; 30% >30 | military students 20% |
| RRCC | 2 | 15,000 | 2011–12 | 51% | 22% | | | | 78% | | |
| TSJC | 2 | > 2,000 | | 56% | 48% | | 43% | | 62% | 12% <18; 63% 18–34; 25% >34 | |

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