

Examining the Baccalaureate Completion of Associate in Applied Science Transfers

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BRIEF DESCRIPTION

This study examined the baccalaureate completion of 11,770 transfer students who earned a single Associate in Applied Science (AAS) degree from a North Carolina community college from 2002-2015 and transferred to a University of North Carolina System (UNC System) institution. The completion measure in this study allowed at least four years post-transfer for baccalaureate attainment. Findings suggest that baccalaureate completion is associated with student, community college, and community-level factors. Results from multilevel logistic regression models suggested that age¹, Pell receipt (used as a proxy for financial need), and students transferring from community colleges designated high Career and Technical Education (CTE) by the Carnegie Classifications² are negatively associated with baccalaureate completion to a statistically significant degree. While cumulative university GPA was essentially the same across age, race/ethnicity, and Pell receipt status, descriptive findings suggested that students 25 and older, students experiencing financial need, and students of color³ are experiencing systemic barriers to baccalaureate completion.

INTRODUCTION

As leaders in North Carolina's government, education, and business sectors aim for a highly-credentialed workforce by 2030 (myFutureNC.org), the successful transfer of community college students to universities and subsequent baccalaureate attainment are more important now than ever. While the earning of any associate degree helps the state meet its 2030 goal of 2 million North Carolinians between the ages of 25 and 44 having earned a high-quality education credential or college degree, not all associate degrees were designed for vertical (community college-to-university) transfer. Associate in Arts and Associate in Science (AA and AS) degrees earned at North Carolina community colleges will transfer to public four-year colleges and universities in the state through the statewide Comprehensive Articulation Agreement (CAA) and afford students junior status at the institution of admission (i.e., their general education requirements are waived upon admission).

¹ Denotes students' age at time of transfer. Results from multilevel models suggested that as age increased by one year, the likelihood of baccalaureate completion decreased ($p < .001$).

² https://carnegieclassifications.iu.edu/classification_descriptions/basic.php

³ Black, Hispanic/Latinx, Asian, American Indian/Alaskan Native, Race unknown, Native Hawaiian/Pacific Islander, Two or More Races.

Associate in Applied Science (AAS) degrees, however, do not typically receive the same privilege by design.⁴ Most AAS degrees were originally designed as terminal degrees in CTE to prepare graduates entering the workforce—not for college transfer. Largely, the onus is placed on community college-university partnerships to develop bilateral articulation agreements (i.e., 2 + 2) between individual AAS programs of study at the community college and related programs at their four-year partner institutions. The purpose of this study was to illuminate barriers and facilitators to the baccalaureate attainment of AAS transfer students in an effort to advocate for more equitable transfer pathways for students pursuing career programs in community colleges.

Previous research shows that AAS students may be as likely as AA/AS students to pursue transfer options (Berkner et al., 2000; Chase, 2011; Cohen & Ignash, 1994; Hill, 2016), yet there are notable differences across the two student populations (Hirschy et al., 2011). Comparing AA/AS and AAS transfer students in North Carolina, we noted a few key differences between the two populations. The average age at the time of transfer for AAS students was 32, compared to an average age of 25 for AA/AS students. The AAS transfer student population had higher percentages of women and Black students compared to their AA/AS counterparts. These findings align with previous findings by Hirschy et al. (2011) that AAS students are more likely to be older, more likely to be students of color, and more likely to be women. A demographic comparison between the two populations is presented in Table 1.

Table 1
Demographic Comparison of AAS Transfers and AA/AS Transfers

STUDENT CHARACTERISTICS	AAS (N = 11,770)	AA or AS (N = 47,510)
Average Age at Transfer	32	25
Women	66%	56%
White	65%	70%
Black	21%	11%
Hispanic/Latinx	3%	7%
Other Race*	11%	12%
Pell Receipt	50%	62%

*Asian, American Indian/Alaskan Native, Race unknown, Native Hawaiian/Pacific Islander, Two or more Races. Note. The gender variable was binary in the data set.

⁴ A select few AAS degrees have uniform (statewide) articulation agreements between the North Carolina Community College System and the UNC System (e.g., nursing and early childhood education). The vast majority of AAS programs, however, do not have uniform articulation agreements currently in place. Specific AAS program fields were unavailable in the dataset used for this study, so the sample likely includes some students in these areas with uniform articulation agreements.

In North Carolina, AAS students are increasingly represented among community college transfers to the state’s public, four-year institutions. From Fall 2010 to Fall 2019, the number of transfer students with an AAS nearly doubled, reaching almost 1,900 in Fall 2019, and the AAS transfer population grew from 14% of all community college transfers to 18%.⁵ Yet these students experience lower baccalaureate completion rates four years after transfer compared to AA/AS students (D’Amico et al., 2020).

Vertical transfers from the state’s most economically distressed areas have a greater proportion of their transfer students making the transition with an AAS degree. The North Carolina Department of Commerce designates levels of economic distress to the state’s 100 counties, ranging from Tier 1 to Tier 3, with Tier 1 being the most economically distressed. Tiers are determined using a four-variable calculation: average unemployment rate, median household income, percentage growth in population, and adjusted property tax base per capita (NC Department of Commerce, 2020). Twenty community colleges in North Carolina exclusively serve counties designated Tier 1 (most economically distressed). Approximately 25% of Fall 2019 transfers to UNC institutions from these colleges transferred with an AAS. Conversely, only 11% of Fall 2019 transfers from community colleges exclusively serving Tier 3 counties transferred with an AAS. Considering the importance of a vertical pathway to universities and recent patterns of AAS transfer, examining differences across the AAS transfer student population is both critical and timely to promote fair and equitable access to the baccalaureate. AAS transfer prevalence by economic distress of community college service areas in North Carolina are presented in Table 2.

Table 2
AAS Transfer Prevalence by Economic Distress* of Community College Service Area

SERVICE AREA ECONOMIC DISTRESS TIERS*	NUMBER OF COLLEGES	PERCENT OF FALL 2019 TRANSFERS WITH AN AAS
Tier 1	20	24.6%
Tier 1/2	7	24.1%
Tier 1/2/3, 1/3	3	13.1%
Tier 2	13	20.5%
Tier 2/3	7	20.1%
Tier 3	8	11.0%

*Note. Data were manually compiled. Economic distress is shown by 2020 Tier designation reported by the NC Department of Commerce (Tier 1 = most distress). Multi-tier service areas include community colleges that serve counties with different levels of economic distress.⁶

⁵ Data source: UNC System Interactive Data Dashboards (<https://www.northcarolina.edu/impact/stats-data-reports/>)

⁶ For more information on community college service areas, see https://www.nccommunitycolleges.edu/sites/default/files/academic-programs/crpm/attachments/section18_15jan2019_service_area_assignments.pdf

THE PROJECT

This study used multilevel modeling⁷ to examine the extent to which student, community college, and community-level factors predicted the baccalaureate completion of 11,770 AAS completers between 2002 and 2015.⁸ Data were obtained from a UNC System Office transfer student data set provided by the Belk Center for Community College Leadership and Research at NC State. Findings suggested that baccalaureate attainment is a function of student, community college, and community-level factors. Findings are discussed in more detail in the sections below.

Most notably, results of the analyses suggested that older students, students in financial need, and students of color experience substantial barriers to baccalaureate completion after controlling for academic ability (i.e., cumulative university GPA). The baccalaureate attainment of AAS transfer students varied significantly across their community colleges of origin. To some extent, a community college's disciplinary focus (i.e., high CTE institutions with larger AAS populations) explained this variation. Findings suggested that AAS transfer students of color, students 25 and older, and students receiving Pell (used as a proxy for financial need) are experiencing barriers to baccalaureate completion. The following section describes key points from the analyses.

KEY POINTS

Descriptive Results:

- » **An average graduation rate of 62%** for AAS transfers suggests that AAS completers can and do earn the baccalaureate⁹ (Table 3).
- » **The AAS population consists largely of adult students**, with 75% of the sample aged 25 or older. Students who were 25 or older had a lower baccalaureate completion rate than younger students (Table 3).
- » **Around one quarter of the sample were students of color**¹⁰. Potentially indicative of systemic barriers to completion, students of color had lower baccalaureate completion rates and a higher percentage of Pell receipt than white students (Table 3).

⁷ Multilevel modeling (MLM) examines variance in the outcome variable when predictor variables exist at multiple levels of a hierarchical structure (e.g., students nested within colleges). Prior to the introduction of MLM, ordinary least squares (OLS) regression models would make inferences across multiple levels of hierarchically structured data, but these OLS models did not accurately account for shared variance due to the nested nature of the data (Raudenbush & Bryk, 2002; Woltman, Feldstain, MacKay, & Rocchi, 2012). Failure to account for clustering, or nesting, violates the assumption of independence required for OLS regression models and requires alternative statistical techniques (Raudenbush & Bryk, 2002).

⁸ This is a subset of all AAS students including only those who earned a single AAS degree; students with multiple AAS degrees, AAS degrees and certificates/diplomas, and students who earned an AAS in addition to AA/AS/AGE degrees were excluded to ensure the analyses included only those students earning an AAS in a CTE field as their primary community college credential.

⁹ For comparison, prior findings using UNC System Data Dashboards showed the four-year post transfer completion rate for students with more traditional transfer degrees (AA/AS) at 71% for the Fall 2012 cohort (D'Amico & Chapman, 2018). For additional cohorts see <https://www.northcarolina.edu/impact/stats-data-reports/>

¹⁰ Black, Hispanic/Latinx, Asian, American Indian/Alaskan Native, Race unknown, Native Hawaiian/Pacific Islander, Two or More Races.

Table 3**Overview of Baccalaureate Completion by Student Variables (N = 11,770)**

VARIABLE	N	% GRADUATED	CUMULATIVE GPA	% PELL
Pell recipient	5,896	61	3.2	100
Non-Pell recipient	5,874	63	3.4	0
Female	7,808	62	3.4	51
Male	3,962	62	3.2	48
Hispanic/ Latinx	406	55	3.3	57
Black	2,472	55	3.0	73
White	7,673	65	3.4	41
Other*	1,219	62	3.3	59
24 and younger	3,001	68	3.1	50
25 and older	8,769	60	3.4	50

*Asian, American Indian/Alaskan Native, Race unknown, Native Hawaiian/Pacific Islander, Two or more Races.
 Note. The gender variable was binary in the data set.

- » **The majority of high CTE institutions** served economically distressed counties and had higher percentages of students of color and Pell recipients (Table 4).
- » **Although the difference was small**, students transferring from the state's most economically distressed areas had slightly lower baccalaureate completion rates (Table 4).

Table 4**Community College Characteristics by Outcome and Predictor Variables (N = 58)**

VARIABLE	N (COLLEGES)	% GRADUATED	% PELL	% STUDENTS OF COLOR*
Distress tier				
Tier 1	20	61	56	46
Tier 1/2	7	59	52	24
Tier 1/2/3, 1/3	3	64	48	27
Tier 2	13	63	49	31
Tier 2/3	7	64	46	22
Tier 3	8	62	44	37
Disciplinary focus (Carnegie Classifications)				
High transfer	12	63	50	37
High CTE	7	57	67	54
Mixed CTE/ transfer	39	62	49	30
Size (Carnegie Classifications)				
Very Small	3	62	56	46
Small	37	62	52	33
Medium	13	63	47	29
Large	3	61	57	48
Very Large	2	63	42	42

* Black, Hispanic/Latinx, Asian, American Indian/Alaskan Native, Race unknown, Native Hawaiian/Pacific Islander, Two or more Races.

Results from Multilevel Models:

- » **Findings suggested that as a student's age increased**, the likelihood of baccalaureate completion decreased ($p < .001$). Thus, older students were less likely to complete compared to younger students.
- » **Pell receipt, which was used as a proxy for financial need**, was negatively associated with baccalaureate attainment, thus showing systemic challenges for low-income students ($p < .001$).
- » **Cumulative GPA at the university was an exceptionally strong predictor** of baccalaureate completion ($p < .001$), and there were no major differences in cumulative GPA across student demographics (see Table 4).
- » **Students who transferred from community colleges** designated *high CTE* institutions were associated with a lower likelihood of baccalaureate completion than students transferring from *high transfer* institutions ($p < .001$).

FOR DECISION MAKERS: IMPACT ON PRACTICE & POLICY

The following provides a brief discussion and synopsis of recommendations for research and practice:

- 1. Particular attention to older, place-bound students who are career-focused (especially those who are at career-focused, high CTE institutions) is needed at both state and institutional levels:**
Specific attention, perhaps through a statewide information repository that includes established bilateral articulation agreements, is needed toward creating more seamless and transparent transfer pathways for this population. While North Carolina's CAA indicates the Transfer Advisory Committee (TAC) will not track bilateral articulation agreements for AAS programs, our findings suggest this would be a worthwhile endeavor for the state of North Carolina. Given potential credit articulation issues between AAS degree programs and traditional baccalaureate degree programs, the expansion of applied baccalaureate degrees could create opportunities for these students and exact systemic change.
- 2. Findings from this study strongly support the need for expansion of AAS transfer pathways:**
While the more common path in North Carolina is through bilateral (institution-to-institution) articulation agreements between community colleges and UNC System institutions, *expanding the list of uniform (statewide) agreements would provide the greatest opportunities for consistent credit mobility and equitable pathways to the baccalaureate.* For consideration also is that now more than 20 states are offering the community college baccalaureate (CCB) to provide seamless opportunities for students.

3. There is an urgent need for more equitable routes to the baccalaureate (i.e., bilateral and uniform articulation agreements, CCBs, and applied baccalaureates) for low-income students and students of color:

There were no discernable differences across students' university GPA with regard to race/ethnicity, and Pell receipt; however, there were differences in baccalaureate attainment related to these demographic characteristics, suggesting that completion is not merely a function of academic ability. **More research and data gathering that focus on low-income students and students of color is needed at state and institutional levels to determine root causes of these inequities. Research that examines the AAS degree programs of choice for low-income students and students of color, their transfer trends and trajectories, transfer destinations, and student outcomes would provide valuable data toward this end.**

4. There is a prevalence of AAS transfers from the most economically distressed counties in North Carolina:

This is promising for students given there were only slight differences in baccalaureate completion across economic distress tiers. Policy-makers and practitioners should continue to develop and foster equitable pathways to the baccalaureate, such as bilateral and uniform (statewide) articulation agreements, for AAS completers knowing that this is a viable pathway for students from economically distressed counties. We suggest three specific practices for all community colleges, but especially those in economically distressed service areas, to promote the seamless transfer of AAS students: (1) Community colleges should look at specific AAS programs that students are completing at their institution prior to transfer; (2) Community colleges should determine which baccalaureate programs AAS students are transferring to, and whether these programs are included in bilateral articulation agreements; and (3) Community colleges should be ensuring through the advising process that the AAS is the student's intended credential. **In all, community colleges should be guiding AAS students who intend to transfer toward baccalaureate pathways that result in little or no loss of credits.**

CONCLUSION

Recently ratified, NC House Bill 664, supported by the efforts of myFutureNC, has established a statewide goal that 2 million North Carolinians between the ages of 25 and 44 will have a high-quality credential or degree by 2030 to avoid a massive credential deficit in the state's workforce. While the earning of an AAS degree at a community college helps to advance North Carolina's audacious goal, creating strong pathways for AAS students to the baccalaureate provides an incentive for students to earn the AAS and offers an opportunity to reach even higher levels of educational attainment. With an average graduation rate of 62%, data from the present study suggest that AAS completers can and do earn the baccalaureate. While AAS completers have no perceptible differences in cumulative GPA at the university across race/ethnicity, age, gender, and Pell receipt, there are statistically significant differences in baccalaureate completion impacting students of color, students 25 and older, and low-income students. North Carolina has an opportunity to create robust and equitable pathways for AAS students to earn the baccalaureate.

ABOUT THIS BRIEF

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