



# Maintaining the Asterisk: Tribal Colleges and Universities, Their Communities, and the Carnegie Classification System

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## About the Carnegie Classifications White Papers

The Carnegie Foundation for the Advancement of Teaching and the American Council on Education (ACE) partnered in February 2022 to reimagine the future of the Carnegie Classifications. As part of this collaboration, the Carnegie Foundation and ACE are working to develop new and refined versions of the classifications that better reflect the public purpose, mission, focus, and impact of higher education.

An aspect of this work involves learning from experts about key topics that can inform future methodological and data decisions. The Carnegie Classifications White Papers series aims to contribute to the body of knowledge and research about the impact of the historic Basic Classification, areas of consideration for a new Social and Economic Mobility Classification, and the role of classification systems. The analysis and takeaways from these papers provide guidance for potential updates. All released white papers can be found at [carnegieclassifications.acenet.edu](https://carnegieclassifications.acenet.edu).

Reimagining the Carnegie Classifications is made possible by a cohort of funders that are dedicated to utilizing the classifications to help postsecondary education advance students' social and economic mobility through learner-centered outcomes. Partners include ECMC Foundation, the Bill & Melinda Gates Foundation, Imaginable Futures, the Kresge Foundation, Lumina Foundation, Mellon Foundation, Alfred P. Sloan Foundation, and Strada Education Foundation, as well as a donor who wishes to remain anonymous.



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# Introduction

Native and Indigenous populations are often structurally ignored, excluded, and omitted in higher education as well as in society—a phenomenon labeled by scholars as the “Native American asterisk” (Garland 2013, xv). This further marginalizes Native people and contributes to a lack of understanding of this population and ignorance of solutions to address structural challenges that impact them (Shotton, Lowe, and Waterman 2013). While this phenomenon has been observed and considered primarily within examinations of people and populations, the Carnegie Classification system perpetuates this exclusion through its classification of colleges and universities. Within the Carnegie Classification of Higher Education institutions, the Basic Classification begins with a process that isolates Tribal Colleges and Universities (TCUs), institutions with historical and contemporary missions to serve and advance Native communities (Crazy Bull and Guillory 2018). As the American Council on Education embarks on reconsiderations of how the Carnegie Classification categorizes and describes higher education institutions, now is an optimal time to revisit these classification decisions and center TCUs in considerations of how to classify higher education and conceptualize their contributions to communities and society.

Through a lens centered on the contributions of TCUs to social and economic mobility, this paper examines and critiques the current system of classifying TCUs within the Carnegie Classification Basic Classification. This paper is driven by the following questions:

- How does the current Basic Classification treat TCUs and, by extension, the missions and communities they serve?
- In what ways might the Basic Classification be reshaped to better account for the distinct missions and contributions to social and economic mobility offered by TCUs?
- What can be learned from the work of TCUs as we inform Carnegie Classification work into the future?

## Background: Understanding Tribal Colleges and Universities

Tribal Colleges and Universities (TCUs) in the United States are unique institutions of higher education, created over the last six decades to serve a rather specific population. Over time, their purposes have broadened, and they often incorporate a strong cultural component tied to the identity of their respective chartering Tribal Nation or Nations (American Indian College Fund 2023). Tribal colleges are a hidden gem in the higher education community and drive the economy in the regions and among the populations they serve. Experts at reaching a student base that other higher education systems haven’t always been accessible to, TCUs have missions and visions driven by Tribal cultures and values, and they are open to Native and non-Native students, often at tuition rates far lower than that of their mainstream counterparts. TCUs are accredited by the same bodies as other colleges in the U.S., though efforts have been made to create an accrediting body that acknowledges the uniqueness of the knowledge systems and populations that are represented and served by TCUs. Still, these institutions follow similar structures, rules, and regulations as their larger mainstream counterparts. Most TCUs are designated as public institutions of higher education, and most offer open enrollment for their applicants and serve a sizable non-Native population in addition to their Tribally enrolled students (PNPI 2023).

Born of the self-determination era and social justice movements of the 1960s, TCUs addressed a crucial need among a population hit hard by poverty, dispossession, historical trauma, oppression, and the many other impacts of colonization. The religious and state policies of education that focused on assimilation of Native people proved disastrous, and Tribal citizens seeking to exercise sovereignty and their right to self-determination took matters

into their own hands. The first Tribal college, Diné College, was founded on the Navajo Nation in 1968. Soon after, more Tribal Nations followed suit. Today, 35 fully accredited Tribal Colleges and Universities exist on or near Tribally controlled lands across the United States. While Native students overall make up less than 1 percent of all undergraduate students attending institutions of higher education in the U.S., TCUs enroll approximately 10 percent of all undergraduate Native students (Marroquín 2019; PNPI 2023). These institutions specialize in college readiness preparation, as many of the students they serve are first-generation college students, low income, or require remedial courses (Pavel, Inglebret, and Banks 2001). Studies have shown that students who attended a TCU and subsequently transferred were four times more likely to graduate than their peers who went directly to non-TCUs following high school (Bryan 2018). The missions of TCUs are unique in that many of them center the culture of their respective chartering Tribal Nation as the purpose of their existence through language, lifeways, and history (Crazy Bull and Guillory 2018). This reflects a founding mission, whereby TCUs came about as a means of not only preservation but reclamation of knowledge systems that had already existed for millennia. Community colleges, whose own origin movement somewhat parallels the establishment of the earliest TCUs, served as a model for TCUs, reflecting an institutional commitment to providing offerings connected to community needs (Pavel, Inglebret, and Banks 2001), yet doing so in a way that is distinctly their own.

Distinctly, TCUs offer Indigenous students the opportunity to pursue degree programs that are based within Indigenous educational approaches and rooted in Tribal knowledge systems, histories, languages, and cultural ways of being. Brayboy et al. (2012) pointed out this disconnection between mainstream institutions of higher education and Tribal Nation building:

Although Indigenous students may be interested in going to college to gain skills and knowledge in areas that may benefit their nation, ultimately, these skills are of little use to them if they lack firsthand knowledge or understanding of Native institutions, communities, and values. In short, the skills obtained at the university may be irrelevant to the nation. (29)

This is what sets TCUs apart from mainstream higher education institutions. Tribal colleges offer degree programs that directly respond to Tribal community needs, integrate culturally responsive and/or Tribal-specific frameworks or models, and bridge Tribal knowledge systems and contemporary issues within Tribal communities. Tribal college graduates are uniquely trained and prepared to directly contribute to Tribal communities.

## TCUs and the Carnegie Classification of Institutions of Higher Education

The Carnegie Classification describes itself as the “nation’s leading framework for categorizing diverse U.S. higher education institutions” and for “recognizing and describing institutional diversity in U.S. higher education” (Indiana University Center for Postsecondary Research 2021). It further provides a way for colleges and universities to understand their “work and impact . . . in relation to each other” (Indiana University Center for Postsecondary Research 2021). Beyond general utility in shaping the way we understand the nearly 4,000 degree-granting colleges and universities in the U.S., the Carnegie system is used as the guiding framework for institutions as they explore mission engagements, guides how bodies like *U.S. News and World Report* determine annual rankings of higher education (Morse and Brooks 2022), and shapes eligibility metrics used by grantmaking agencies to determine funding opportunities.

TCUs were not classified as a unique group in the first three iterations of the Carnegie Classification of Institutions of Higher Education; instead, beginning in 1976, a number of TCUs had been integrated into the Basic Classifications, with long-serving institutions like Navajo Community College (now Diné College) and Haskell

Indian Junior College (now Haskell Indian Nations University) classified alongside community and technical colleges (Carnegie Council on Policy Studies in Higher Education 1976; Carnegie Foundation 1987). In the 1994 revision, TCUs appeared as a separate category of 29 institutions (Evangelauf 1994). Their inclusion follows a Carnegie report in 1989 (Carnegie Foundation 1989) that underscored the distinct missions of TCUs.

While the report situated the historical and contemporary challenges of higher education in serving Native populations, it arguably took a well-intended yet deficit lens toward Native communities and these colleges and universities serving them. This context is an important predecessor to TCUs first appearance within a separate institutional category in the 1994 classification. In the forward to the update, Ernest Boyer, then president of the Carnegie Foundation for the Advancement of Teaching, highlighted TCUs as being institutions founded around the same time as the inception of the classification itself and “whose mission is of the greatest consequence to Native Americans and to the country” (Carnegie Foundation 1994, viii). He closed the paragraph focused on these institutions in the foreword, saying that “the growth of these institutions is remarkable, and it will be of great interest to follow their progress” (viii). The intention to place TCUs into a separate classification was seemingly one of acknowledging a distinct mission of these institutions and identifying them as a grouping for further study. Consequently, then as now, but without explicit rationale, the decision flowchart within Carnegie’s current approach to classifying colleges and universities has an initial step that includes filtering out TCUs (CCIHE 2021).

Overall, the classification is intended to group American higher education institutions “according to their missions . . . [with an] aim to cluster institutions with similar programs and purposes” (Carnegie Foundation 1989). To do so, a series of subsequent steps include sorting institutions by types of degree offerings. However, because TCUs are set aside into a separate group in the Basic Classification, they are isolated from engaging structurally with other institutions that may have similar types of degree profiles and subsequently ignored within the systems that use the Classification to better understand comparisons across institutions.

The separation of TCUs as an initial step also situates them as a single institution type. TCUs are not monolithic, as they respond to their community needs in varying ways particular to their own contexts (Nelson and Frye 2016). This underscores a need to better understand the dimensions of their diversity as it pertains to degree programs, and it raises a concern as to what is gained and lost by the isolation of these institutions outside of the Carnegie Basic Classification. TCUs have not yet opted into the elective classifications, signaling their own continued exclusion and failure of the Carnegie system to engage them in even those classifications that might well align and speak to their missions and identity.

There are some benefits to situating TCUs in this way. The Carnegie system, like many others that influence higher education, is grounded in western ideologies that at times conflict with the broader TCU mission and commitments. Further, the Carnegie Classification has had unintended consequences on higher education, such as perpetuating prestige regimes that prioritize research output over other objectives of higher education, emphasizing competition between institutions, or minimizing and delegitimizing those institutional engagements and outcomes not included in the classification methodology (McCormick 2013; McCormick and Zhao 2005). Operating outside of this classification structure may have shielded TCUs from these undue pressures. Further, this highlights a need to understand TCUs deeply before any exploration of integration into the current existing Carnegie system.



## A Framework for Understanding TCUs and Higher Education: Tribal Nation Building

TCUs are unique institutions of higher education within Tribal communities, chartered by Tribal governments with a purpose to strengthen Tribal Nations and communities. In order to understand the full purpose of TCUs, Tribal Nation building (Brayboy et al. 2012) is a necessary theoretical framing. Tribal Nation building is deliberately driven by sovereignty, self-determination, and “autonomy of the [Tribal] community” (Brayboy et al. 2012, 13), and consists of legal/political, cultural, economic, health/nutrition, and educational aspects. Additionally, Brayboy et al. (2012) assert that Tribal Nation building must be rooted in reclaiming Indigenous knowledge systems. These components of Tribal Nation building can be found within the mission, vision, and goals of TCUs.

TCUs directly contribute to Tribal Nation building through providing access to higher education for their Tribal citizens and others within their Tribal communities. In this model, a reciprocal relationship exists between individuals and communities, where the development of the individual directly benefits the community (Brayboy et al. 2012). Additionally, individuals who are bestowed gifts of knowledge/wisdom, teachings, and guidance are expected to share these gifts with others for the betterment and strengthening of their cultures and communities. These reciprocal relationships coexist with the values of relationality, respect, and acknowledging the importance of land and place. The community’s survival is central to these interactions and is therefore more important than the individual (Brayboy et al. 2012). Through TCUs, students engage in a higher education environment that is in direct relationship with their Tribal community.

Economic development is also a central component of Tribal Nation building as Tribal nations seek to address the lack of jobs and income among their Tribal citizens and develop culturally appropriate economic models that aim to build stable, Tribal-specific, and Tribal-controlled economic enterprises (Brayboy et al. 2012). Tribal colleges directly contribute to the economic development of Tribal communities through the production of an educated workforce. However, the impact of TCUs on economic development can also be seen in how Tribal citizens—and others—within Tribal communities engage within TCUs to step into leadership roles in those same communities.

This framework provides a depth to the concepts of social and economic mobility, pushing mobility from a concept solely situated in individual advancement to one that more deeply recognizes the interconnectedness between higher education institutions and the communities and society that they are a part of.

## Engaging TCUs in the Context of the Carnegie Classification

This conceptual grounding provides a framework from which to proceed in situating TCUs within the context of the rest of higher education, approaching this in a way that foregrounds and uplifts the key contributions and distinctions of TCUs to higher education and society as a whole. We first situate TCUs within the Basic Classification and then compare TCUs to peers within their Basic Classification categories along key outcomes to inform decisions for the Carnegie Classification moving forward.

## Recategorizing TCUs Through Integration into the Carnegie Basic Classification System

Within the Carnegie Basic Classification, the first step in classifying institutions includes the filtering out of all TCUs into their own classification (Indiana University Center for Postsecondary Research 2021). From there, the universe of colleges and universities in the United States is analyzed through a sequential process that designates

special focus institutions based on the types of degrees awarded and the field in which there is a high concentration. The logic then shifts to focus on the highest degree awarded, with consideration based on numbers of graduate degrees and proportions and types of undergraduate degrees awarded. For this analysis, we reapproached the process, eliminating the first step, considering how TCUs might integrate into the rest of the classification, and seeking to answer the following: *If TCUs were integrated within the current Carnegie Basic Classification, how would they be categorized?*

## Methodological Notes

For this analysis, we followed the logic model for the Carnegie Classification of Higher Education Institutions for the 2021 Basic Classification and applied it to all 35 Tribal Colleges and Universities.<sup>1</sup> See *The Carnegie Classification of Institutions of Higher Education: 2021 Edition* (Indiana University Center for Postsecondary Research 2021) for full outline of logic steps. Given that the 2021 Basic Classification used institutional data from 2019–20, we based the categorization on the data reported to IPEDS for the same year to explore how TCUs would have been categorized that year had the first step of the logic model not been included.

## How They Categorized

Table 1 provides a summary overview of how TCUs align within the rest of the classification. Across 35 TCUs, more than half fell into Associate's Colleges categories; about 43 percent were Baccalaureate/Associate's Colleges; and one was categorized as a Baccalaureate College.

Across the 19 institutions that aligned with the Associate's Colleges categories, the great majority had a student and program mix that situated them as “high transfer–high traditional institutions”—that is, institutions for which one-third or fewer of degrees were awarded in career and technical disciplines and where a greater proportion of students enrolled were degree-seeking students, a proxy for determining enrollment by traditional students. This classification underscores the critical role TCUs play in providing educational pathways that are accessible within Native communities. Just two institutions had a high nontraditional student mix, both falling under the high transfer programming categorization—Fond du Lac Tribal and Community College and Nebraska Indian Community College, two institutions that have main campuses outside of Tribal lands and serve their more urban regions as part of their TCU missions.

Fifteen of the 16 TCUs that offer Baccalaureate degrees met criteria as a Baccalaureate/Associate's College—institutions with at least one baccalaureate degree program and that award at least 50 percent degrees at the associate's level. Across these institutions, their institutional average for associate's degrees awarded was 65.5 percent and 33.1 percent for bachelor's degrees. Two of these institutions—Bay Mills Community College and Nueta Hidatsa Sahnish College—were Associate's Dominant, highlighting their more recent efforts to expand offerings to provide pathways to the baccalaureate degree while honoring their community college–aligned mission history. The rest were mixed, having institutional averages of 11.1 percent to just under half of all degrees awarded being at the baccalaureate level.

Just one institution—Institute of American Indian Arts (IAIA) in Santa Fe, New Mexico—met criteria to be classified as a Baccalaureate College, with 51 percent of all degrees accounted for by its 39 baccalaureate programs.

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1 The American Indian Higher Education Consortium, the central organization representing TCUs, recognizes 37 Tribal Colleges and Universities currently. The 35 reported on here are the TCUs that are individually reporting into the IPEDS system. The discrepancy lies with two institutions—California Indian Nations College and San Carlos Apache College—which are both sites for other institutions (Tohono O'odham Community College and University of California, Riverside, respectively). For the purposes of this paper, the more conservative number of 35 is used to reflect the current structure of the data systems in place.

The college, which serves 91 tribes from 36 states (IAIA 2023), fell within the Arts and Sciences Focus, underscoring the historical emphasis on being the premier institution for provision of creative arts degrees grounded in Native traditions.

**TABLE 1. INTEGRATING TCUS WITHIN THE BASIC CARNEGIE CLASSIFICATION, 2021**

Classification	Number of TCUs in This Category	TCUs in This Category
Doctoral Universities	0	
Master’s Colleges and Universities	0	
Baccalaureate Colleges:	1 (overall)	
Arts and Sciences Focus	1	Institute of American Indian Arts
Diverse Fields	0	
Baccalaureate/Associate’s Colleges	15 (overall)	
Mixed Baccalaureate/Associate’s Colleges	13	College of Menominee Nation Diné College Haskell Indian Nations University Iḷisaġvik College Navajo Technical University Northwest Indian College Oglala Lakota College Salish Kootenai College Sinte Gleska University Sitting Bull College Stone Child College Turtle Mountain Community College United Tribes Technical College
Associate’s Dominant	2	Bay Mills Community College Nueta Hidatsa Sahnish College
Associate’s Colleges:	19 (overall)	
High Transfer–High Traditional	12	Blackfeet Community College Chief Dull Knife College College of the Muscogee Nation Fort Peck Community College Keweenaw Bay Ojibwa College Lac Courte Oreilles Ojibwe College Leech Lake Tribal College Little Priest Tribal College Saginaw Chippewa Tribal College Sisseton Wahpeton College Tohono O’Odham Community College White Earth Tribal and Community College
High Transfer–Mixed Traditional/Nontraditional	0	
High Transfer–High Nontraditional	2	Fond du Lac Tribal and Community College Nebraska Indian Community College
Mixed Transfer/Career and Technical–High Traditional	2	Cankdeska Cikana Community College Southwestern Indian Polytechnic Institute



Mixed Transfer/Career and Technical–Mixed Traditional/Nontraditional	0	
Mixed Transfer/Career and Technical–High Nontraditional	0	
High Career and Technical–High Traditional	3	Aaniih Nakoda College Little Big Horn College Red Lake Nation College
High Career and Technical–Mixed Traditional/Nontraditional	0	
High Career and Technical–High Nontraditional	0	
Special Focus Institutions	0	

## How They Did Not Categorize

None of the institutions met the qualifications to be classified within the Doctoral Universities, Master’s Colleges and Universities (MCUs), or Special Focus Institutions categories. However, there were some notable observations here. While there is just one forthcoming doctoral program offered at a TCU—Navajo Technical University will begin its PhD in Diné Culture and Language Sustainability with an inaugural cohort in fall 2023 (Frank 2023)—five offer master’s degrees (*Tribal College Journal* 2019). According to Carnegie’s Basic Classification methodology, MCUs are institutions that award at least 50 master’s degrees. No TCU awarded this number of degrees, yet these offerings account for a sizeable proportion of all degrees offered at a few institutions. The Institute of American Indian Arts, which offers an MFA in creative writing, awarded 29 degrees in 2019–20, reflecting 37.7 percent of all degrees they awarded, while 13.1 percent of all of Sinte Gleska University’s degrees were awarded within its two master’s programs in education and human services. Across all MCUs that are categorized as smaller programs, master’s degrees accounted for 37.7 percent of all degrees awarded across these institutions, with an institutional average of 23.7 percent (calculations by authors). Thus proportionally, IAIA’s production of master’s degrees is greater than the average for smaller MCUs and on par for all degrees awarded across these institutions. Even Sinte Gleska University, which would be categorized as a Baccalaureate/Associate’s College, awarded greater proportions of master’s degrees than 27 percent of all MCUs with smaller degree programs.

While these institutions may or may not be served by a reclassification, the methodological decision to categorize institutions based on the number of degrees awarded, as opposed to proportion of degrees, structurally excludes institutions with relatively sizable graduate degree offerings but smaller overall student populations.

Further, though just IAIA met the 50 percent criteria to be categorized within Baccalaureate College categories, 16 TCUs offer bachelor’s degrees. Haskell Indian Nations University (44 percent) and Northwest Indian College (47 percent) fell just short of the degree threshold, while six institutions awarded at least one-third of all degrees to bachelor’s degree-seeking students (College of Menominee Nation, Diné College, Navajo Technical University, Oglala Lakota College, Salish Kootenai College, and Sinte Gleska University). This raises questions as to what could be gained by expanding the range for institutions to be able to explore others with similar structures.

## Further Reflections and Considerations for the Carnegie Classification

The analysis above highlights the varying intersecting points of TCUs and the Carnegie Classifications’ approach to structuring higher education. Important points captured here speak to the methodological decision to categorize based on raw numbers as opposed to proportional measures and who and what is lost in that decision. Additional insights about these approaches and how TCUs would be structurally marginalized by this logic offer important recognition of how the structure itself may be shortsighted not just for TCUs but other institutions with similar size and community-serving missions. Additionally, these categorizations are largely based on the number or proportions of degrees awarded across academic programs—not degrees offered, consideration of enrollment measures, or engagement with institutional identity.

Particularly for institutions like TCUs that serve great proportions of students and communities typically disserved by higher education, do the areas where degrees are awarded accurately capture the energies and attention institutions invest into their communities and their institutional identity? TCUs are not the only institution type that works diligently to graduate their students; within some degree areas, this completion can be simpler, while within others, the efforts involved include an engagement with the inequity in the social institutions outside of the college itself to greater proportions. The focus on institutional outcomes (e.g., degrees produced) obscures the considerable efforts of these institutions to support students to degree completion. These themes are engaged more deeply in the next set of analyses.

Further, one indication of institutional identity is that of name. For instance, Haskell Indian Nations University, which would be categorized as a Baccalaureate/Associate's College: Mixed Baccalaureate/Associate's College, has embraced the title and identity of a university since 1993, reflecting a commitment to education and research that serves its community (Haskell Indian Nations University 2017). How an institution recognizes itself and the effort made to take on such an identity are important to recognize. Not doing so makes the effort of such an identity shift invisible, including all of the structures institutions must navigate and the resources institutions must invest to do so.

## Comparing TCUs with Non-TCUs Across Mission-Centered Measures

Building on this first set of analyses and reflections, the next portion of this paper examines how institutions compare to their peers within these groups. In doing so, we explore measures that are driven by the TCU Nation-building mission to look at social and economic mobility through a TCU lens.

### Methodological Notes

The measures chosen in this section are informed by a TCU-centered framework and perspective of social and economic mobility. Thus, this analysis both situates TCUs within the Carnegie universe and also offers comparisons within that universe along measures that help expand how we consider higher education institutions' contributions to social and economic mobility. Data were derived from IPEDS and the U.S. Census for all institutions. Following the logic of the previous analysis, unless otherwise noted, institutional data were analyzed for the year 2019–20. More details on analysis, including the construction of data variables, are included in the appendix.

### Exploring Contributions of TCUs to Students and Community

With a mind to contributions to social and economic mobility, we determined a set of measures and compared TCUs with non-TCUs and across groupings of Basic Classification categories. Tables 2 through 5 present institution-level averages across Carnegie Classification groupings.

**Serving Students and Student Outcomes.** We first sought to explore who is served by TCUs, homing in on categories not always captured in typical analysis but that highlight key aspects of TCUs versatility, adaptability, and ways of serving students (see table 2). Not surprisingly, but still importantly, TCU student bodies overall have an average of 81.4 percent of Native undergraduate degree-seeking students as compared with 1.1 percent for non-TCUs across the same Carnegie categories represented. When accounting for all Black, Indigenous, and people of color (BIPOC) students, TCUs still have student bodies that are overall almost 40 percentage points greater. Similar trends hold for the racial and ethnic demographics of transfer students, where over 70 percent of transfer students entering TCUs are Native as opposed to just 1.3 percent of non-TCUs. There are comparable student populations across institutions among enrollments of part-time or nondegree-seeking students, while TCUs serve greater proportions of students with registered disabilities (10.6 percent versus 8.3 percent), are low-income (54.3 percent versus 39.0 percent), or who did not enter college directly after high school.

Focusing on outcomes for students (see table 3), retention for part-time and full-time students, as well as completion rates, were lower for TCUs than non-TCUs generally, though retention rates across both groups of students were higher for Baccalaureate/Associate’s College TCUs than non-TCUs—50.0 percent part-time students retained at TCUs and 66.6 percent full-time students retained, as compared with 41.4 percent and 62.8 percent retained at non-TCUs, respectively. Additionally, examination of eight-year outcomes shows that across the board, greater proportions of students were still enrolled at TCUs than at non-TCUs. This point in particular highlights the ability of TCUs to continue serving students and the nontraditional pathways they take toward their degrees.

The last set of student-serving measures we examined focused on institutional financial investment in students (see table 4). Institutional grant aid was awarded at higher rates within TCUs than at non-TCUs by as much as double institutional averages within Associate’s Colleges. The distinction of TCUs within this group of institutions, which categorically capture the majority of the nation’s community colleges, demonstrate a difference in institutional investments with resources and how much aid different institutions allocate as part of their financial models.

**TABLE 2. SERVING STUDENTS: VERSATILITY, ADAPTABILITY, AND STUDENT SUPPORT: INSTITUTIONAL-LEVEL MEANS ACROSS CARNEGIE CLASSIFICATION CATEGORIES**

Percent of Students, by Type	All Institutions Within Represented Categories		Associate’s Colleges		Baccalaureate/ Associate’s Colleges		Baccalaureate Colleges	
	TCUs	Non-TCUs	TCUs	Non-TCUs	TCUs	Non-TCUs	TCUs	Non-TCUs
Native (American Indian or Alaskan Native) degree-seeking undergraduates	81.4%	1.1%	78.9%	1.3%	85.5%	0.8%	68.7%	0.9%
BIPOC degree-seeking undergraduates	87.9%	48.8%	85.7%	47.2%	90.6%	55.9%	90.3%	48.9%
Degree-seeking students enrolled part time	34.0%	34.5%	36.5%	46.5%	31.85%	38.9%	16.90%	11.6%
Students who are not degree-seeking	20.7%	20.2%	19.5%	27.9%	19.99%	18.3%	51.93%	7.3%
Students enrolled in distance education	6.1%	16.3%	3.1%	18.5%	9.95%	19.9%	6.18%	10.9%
Students receiving Pell Grants (indicator of low-income status)	54.3%	39.0%	52.9%	37.2%	57.1%	44.1%	38.0%	40.3%
Students with registered disability	10.6%	8.3%	7.0%	6.6%	13.0%	7.4%	-	10.7%
All undergraduates who are transfer students	5.7%	9.0%	5.2%	9.7%	5.8%	9.9%	13.8%	7.5%
All transfer students who are Native (American Indian or Alaskan Native)	71.9%	1.3%	58.0%	1.4%	85.8%	0.8%	59.2%	1.2%
First-time-in-college undergraduates who are not entering directly from high school	58.7%	32.2%	58.4%	38.6%	60.5%	43.2%	38.7%	16.1%

Sources: Data from IPEDS 2019–20 and U.S. Census Bureau American Community Survey five-year data for 2016–21.

**TABLE 3. OUTCOMES FOR STUDENTS: INSTITUTIONAL-LEVEL MEANS ACROSS CARNEGIE CLASSIFICATION CATEGORIES**

	All Institutions		Associate's Colleges		Baccalaureate/ Associate's Colleges		Baccalaureate Colleges	
	TCUs	Non-TCUs	TCUs	Non-TCUs	TCUs	Non-TCUs	TCUs	Non-TCUs
<b>Percent of Students, by Type</b>								
Part-time cohort retained	36.6%	43.0%	32.4%	43.2%	50.0%	41.4%	33.0%	42.7%
Full-time students retained	53.3%	65.2%	46.1%	61.5%	66.6%	62.8%	56.0%	72.1%
<b>Eight-Year Outcomes</b>								
Still enrolled	2.74%	1.12%	2.78%	1.50%	2.80%	1.13%	1%	0.44%
Enrolled subsequently at other institution	12.59%	23.46%	11.28%	25.13%	12.67%	23.12%	35%	20.59%
Completed	25.53%	38.44%	24.33%	30.52%	26.4%	35.05%	34%	53.98%

Sources: Data from IPEDS 2019–20 and U.S. Census Bureau American Community Survey five-year data for 2016–21.

**TABLE 4. FINANCIAL INVESTMENT IN STUDENTS: INSTITUTIONAL-LEVEL MEANS ACROSS CARNEGIE CLASSIFICATION CATEGORIES**

	All Institutions		Associate's Colleges		Baccalaureate/ Associate's Colleges		Baccalaureate Colleges	
	TCUs	Non-TCUs	TCUs	Non-TCUs	TCUs	Non-TCUs	TCUs	Non-TCUs
Full-time, first-time undergraduates awarded institutional grant aid	45.6%	40.7%	45.5%	22.8%	42.9%	31.5%	86.0%	77.3%
Institutional spending toward student services	13.8%	13.7%	14.8%	11.7%	12.8%	14.0%	8.7%	17.3%

Sources: Data from IPEDS 2019–20 and U.S. Census Bureau American Community Survey five-year data for 2016–21.

**Community Impact Measures.** The last set of measures sought to approach social and economic mobility through an explicit TCU lens, which encourages a consideration of contributions to mobility as one centered in community—rather than individual—impact (see table 5). Overall, TCUs outpace other similar institutions in terms of the proportion of college spending dedicated to public service activities—on average, TCUs spent 4.0 percent of their overall spending on efforts that directly serve their communities as opposed to 1.2 percent across non-TCUs in similar classification categories. For Baccalaureate/Associate’s Colleges, that difference was even more pronounced; spending at TCUs made up 5.6 percent of spending on average as opposed to 1.1 percent at non-TCUs.

For the next set of measures, we sought to explore a set of ratios that would consider colleges’ roles in contributing to the overall levels of educational attainment in the region. Informed by the TCU model of Nation building, we conceptualized social mobility contributions as the role of the institution in enhancing levels of education within the surrounding community. While limited in the ability to capture this, we worked through a variety of measures. The first set of measures examined the proportional impact of degree production of the college relative to degrees within the county. While the data available for the current analysis does not capture what proportion of the college degree holders in the county obtained their degrees from the college, we can speak to the proportional impact of degrees produced on the overall levels of education in the region. Overall for TCUs, there were about four

associate's degrees produced by the college for every 100 associate's degree holders in the county and one bachelor's degree for every 100 baccalaureate degree holders relative to their county educational attainment levels as opposed to seven and two associate's and baccalaureate degrees respectively for every 100 degree holders for non-TCUs and their counties. Across institutions awarding both associate's and baccalaureate degrees, the contributions of TCUs to their surrounding community was slightly higher—at about three new degrees for every community member for TCUs as opposed to two new degrees for non-TCUs.

We then examined this contribution with consideration of the role of the college in retaining educated community members. Our analysis captured the proportion of degree holders in the community made up by college faculty and staff, finding overall that this rate was double for TCUs relative to non-TCUs. For Baccalaureate/Associate's Colleges, TCU employees comprised 6.0 percent of all degree holders in the county as compared with just 1.3 percent from non-TCU employees within their counties. This highlights the key role TCUs play in providing opportunities for employment that help keep educated community members within the community.

In an effort to account for the influence of higher education institutions on providing employment opportunities that keep educational attainment in the region, we next recalculated contributions of degrees awarded to community educational attainment levels while excluding the college and university employees. Proportional impact was generally comparable to educational attainment contributions reported earlier in this section.

The last measure sought to take a longitudinal perspective on institutions' contributions to educational attainment in the community and consider the last decade of growth in communities and how colleges and universities contributed to educational attainment in the county. For many regions, we observed loss of educational attainment within the community, as demonstrated in negative measures. For TCUs, however, the impact was positive. Over the past decade, TCUs added about four-and-a-half college degrees to their communities for every 10 new degree-holding residents in the county. Interestingly, within counties served by non-TCUs, there was overall loss of educational attainment in the community—for every 10 degree holders who left the county, the institution added four degrees. Thus, TCUs have been able to slow the rate of loss of educational attainment in their counties during a time when similar institutions struggled to keep up with the loss of educational attainment in the community. However, this also raises another interesting consideration—given these data together, it may be an indication of how TCUs are able to keep Tribal members within their community and offer opportunities to pursue a degree and have full careers and lives without leaving their communities.

**TABLE 5. COMMUNITY IMPACT MEASURES: INSTITUTIONAL-LEVEL MEANS ACROSS CARNEGIE CLASSIFICATION CATEGORIES**

	All Institutions		Associate's Colleges		Baccalaureate/ Associate's Colleges		Baccalaureate Colleges	
	TCUs	Non-TCUs	TCUs	Non-TCUs	TCUs	Non-TCUs	TCUs	Non-TCUs
Proportion of college spending dedicated to public service activities	4.0%	1.2%	2.9%	1.3%	5.6%	1.1%	0.0%	1.0%
<b>Overall contributions to community educational attainment</b>								
Associate's degrees	0.0418	0.0712	0.0285	0.0875	0.0614	0.0563	0.0008	0.0167
Baccalaureate degrees	0.0119	0.0182	-	0.0000	0.0128	0.0047	0.0006	0.0230
Total degree contributions*	0.0287	0.0201	-	0.0002	0.0309	0.0205	0.0006	0.0201
<b>Faculty and staff as contributors to community educational levels</b>								
Proportion of degree holders in community made up by college faculty and staff	4.12%	1.98%	2.81%	2.19%	6.03%	1.30%	0.27%	1.88%
Contributions of degrees awarded to community educational attainment levels, excluding those employed full time in degreed positions	0.0264	0.0198	0.0112	0.0306	0.0318	0.0212	0.0006	0.0210
<b>Longitudinal perspective on degree contribution</b>								
Proportion of degrees in county accounted for by college in past decade	0.4742	-4.0736	0.7295	-7.7034	0.1773	1.3726	0.0774	0.3705

\*Due to listwise validation in descriptive analysis, this statistic presented only for institutions awarding both associate's and baccalaureate degrees.

Sources: Data from IPEDS 2019–20 and U.S. Census Bureau American Community Survey five-year data for 2016–21.

## Reflecting on Impacts of TCUs

These analyses provide an exploratory entry point into examining data measures that might help in engaging the question of how colleges and universities contribute to social and economic mobility through a TCU lens. These measures reflect a bigger shift as well, pushing for a framework that goes from evaluating organizational contributions to individuals as an indicator of impact on social and economic mobility to considering organizational contributions to communities as a whole. While there are a number of limitations to the approaches explored here, it provides a starting point from which to capture the regional impact these institutions have.

Comparison within groupings allows for a more nuanced capturing of these institutions' contributions with other institutions that are similar in particular ways. By not comparing TCUs to just one another as a monolith, the analysis here allowed for deeper understanding of the diversity within TCUs themselves. While they share a similar mission of Nation building and culturally informed practices, they do so through varying mechanisms and varying impacts.



The analysis here also helps in understanding the dimensions of mission fulfillment through efforts and not just outcomes, helping to contribute to a broader understanding of how we should describe and categorize higher education institutions in ways that better group them by mission and identity and account for the structural inequities that interact with their efforts to serve their students and communities for the betterment of society.

Lastly, the consideration of longitudinal impacts offers a contextualized understanding of who institutions are. The cross-sectional nature of the Carnegie categorizations feels particularly acute when examining smaller institutions where numbers and proportions of degree offerings and awards may show seismic shifts from year-to-year. A more longitudinal perspective of institutional activities might better control for this fluctuation, as institutions are categorized based on outcomes over efforts. While surely broad phenomena such as economic recession or a global pandemic will impact all of higher education, institutions will be affected differently, and examining institutional impacts over time might better capture which institutions do.

## Considerations for the Carnegie Classification of Higher Education Institutions

These analyses have two aims—one, to explore the structural marginalization of TCUs through the current logic approach of the Carnegie Classification of Institutions of Higher Education, and two, to use learnings from TCUs as institutions with explicit commitments to the social and economic mobility of their regions to highlight structural opportunities for how the system might better reapproach typologizing higher education.

Reflecting on the Carnegie Basic Classification prior to its major overhaul in 2005, McCormick (2000) noted that despite its benefits to the field, the limitations of the classification center on its prioritization and emphasis on some institutional characteristics over others. The primary sorting continues to focus on degree program outcomes, overall. The Carnegie classification system is intended to provide a basis for shared understanding about what institutions are (Douglass 2005; McCormick 2000). The delimitation of TCUs within their own category, within this logic, would then suggest that there is a broad understanding of these institutions. However, the converse seems to be true—these institutions remain largely misunderstood within the broader context of higher education. Similar to other unintended implications of the classification, isolating TCUs categorically within the Carnegie system further marginalizes these institutions, their students, and the communities they serve. Further, it inhibits the ability of the rest of higher education to learn from them and how they contribute to their communities and advance mobility beyond just economic outcomes.

It might be of interest to TCUs to remain outside of the Carnegie system and wise for the Carnegie Classification architects to continue with this structural decision. As discussed earlier in this paper, it would be harmful for the unintended implications of the classification to impact TCUs as they have other institutions (Orphan and Miller 2020; Zerquera 2023) and to erode the community focus of these institutions as they operate individually within their regions and collectively with each other. Additionally, the analysis here locates a tension between institutional efforts to define themselves and how the classification process might situate them, as highlighted in the case of Haskell Indian Nations University. The institution's university identity, which is enacted in a distinctly TCU way, may be explicitly challenged by a categorization as a baccalaureate college. The integration may apply undue pressure to fulfill the university label differently in order to meet the metrics of Carnegie's system. There is clear misalignment between how TCUs define and fulfill their mission and the outcomes and mission indicators captured by the Carnegie Classification system. Without significant revisions to the Carnegie classification methodology, TCUs would likely be disserved by integration. Addressing these challenges will be critical before moving toward integration.

Carnegie's expansion into the community engagement classification speaks largely to the aims of TCUs, defining community engagement as "the collaboration between institutions of higher education and their larger communities (local, regional/state, national, global) for the mutually beneficial creation and exchange of knowledge and resources in a context of partnership and reciprocity" (Carnegie Foundation, n.d.). However, the classification is restrictive due to the resources involved in submitting materials for consideration, which go beyond many TCUs' data capacity. Further, its elective status limits the ability of the classification to influence higher education overall in its work to uphold the public good purposes of higher education or influence on classification.

In moving forward, the Carnegie Classification project should consider the suggestions posed throughout this paper and summarized here:

- Integrate TCUs within the Carnegie Basic classification—with TCU identity serving as a primary sorter and not an additional characterization, the current Carnegie Classification methodology maintains misconceptions about who these institutions are and who and how they serve; inhibits TCUs' abilities to compare and be compared with other institutions with similar structures; and structurally excludes TCUs from being integrated into analyses of higher education, grant opportunities, ranking systems, and research
- In exploring integration into the system, center the potential implications of the Carnegie structure on TCUs and engage directly with TCU leaders and communities to mitigate those impacts
- Expand classification methodology to include proportional outcomes relative to institutional size as opposed to raw numbers of degree production
- Expand considerations of institutional identity to consider how institutions define themselves through degree offerings and activities—not just degrees awarded and outcomes
- Within the Social and Economic Mobility Classification and Basic Classification, account for institutional effort if outcomes continue to be integrated as measures for classification (i.e., degrees awarded); for example, a system of weights and measures could account for the institutional effort to serve students disserved by other social institutions or who are stratified out of other institutional spaces
- Shift the approach to measuring social and economic mobility from one primarily centered on economic outcomes measured at the individual level and expand the conceptualization of social mobility to include community-level measures and the interactions of institutions within their community contexts

The American Council on Education has a particular opportunity at this moment to push higher education forward to rethink itself and its relationship with the world around us. Tribal Colleges and Universities are not just a monolithic institution type; rather, they are a diverse set of institutions that share a commitment to the communities they serve and do so with a degree of effort and commitment that has been ignored by the Carnegie Classification system. We can learn much from institutions like TCUs and can benefit from centering these institutions and the work they do.

# References

- American Indian College Fund. 2023. *Seven Generations: A Framework for Ensuring Tribal College and University Sustainability*. Denver, CO: American Indian College Fund.
- Brayboy, Bryan McKinley Jones, Amy J. Fann, Angelina E. Castagno, and Jessica A. Solyom. 2012. "Postsecondary Education for American Indian and Alaska Natives: Higher Education for Nation Building and Self-Determination." *ASHE Higher Education Report* 37, no. 5.
- Bryan, Rachel. 2018. *Native American Student Success: The Effect of Tribal Colleges and Universities on Native American Student Retention*. CMSI Research Brief. Philadelphia: Center for Minority Serving Institutions at the University of Pennsylvania. <https://cmsi.gse.rutgers.edu/sites/default/files/Native%20American%20Student%20Success.pdf>.
- Carnegie Council on Policy Studies in Higher Education. 1976. *A Classification of Institutions of Higher Education, Revised Edition*. Berkeley, CA: Carnegie Council on Policy Studies in Higher Education.
- Carnegie Foundation (Carnegie Foundation for the Advancement of Teaching). n.d. *The Carnegie Foundation for the Advancement of Teaching Elective Classification for Community Engagement: 2024 First Time Documentation Framework*. Accessed June 20, 2023. <https://carnegieclassifications.acenet.edu/wp-content/uploads/2023/02/2024-Carnegie-Community-Engagement-First-Time-Framework.pdf>.
- Carnegie Foundation (Carnegie Foundation for the Advancement of Teaching). 1987. *A Classification of Institutions of Higher Education, 1987 Edition*. Princeton, NJ: Princeton University Press.
- Carnegie Foundation (Carnegie Foundation for the Advancement of Teaching). 1989. *Tribal Colleges: Shaping the Future of Native America*. Lawrenceville, NJ: Princeton University Press.
- Carnegie Foundation (Carnegie Foundation for the Advancement of Teaching). 1994. *A Classification of Institutions of Higher Education: A Technical Report, 1994 Edition*. Ewing, NY: California/Princeton Fulfillment Services.
- CCIHE (Carnegie Classifications of Institutions of Higher Education). 2021. "Basic Classification Methodology Flowchart." Accessed June 20, 2023. <https://carnegieclassifications.acenet.edu/wp-content/uploads/2023/03/CCIHE2021-FlowCharts.pdf>.
- Crazy Bull, Cheryl, and Justin Guillory. 2018. "Revolution in Higher Education: Identity & Cultural Beliefs Inspire Tribal Colleges & Universities." *Daedalus* 147, no. 2 (Spring): 95–104.
- Douglass, John Aubrey. 2005. *The Carnegie Commission and Council on Higher Education: A Retrospective*. CSHE Research & Occasional Paper Series 14.05. Berkeley, CA: Center for Studies in Higher Education, University of California, Berkeley.
- Evangelauf, Jean. 1994. "A New 'Carnegie Classification.'" *The Chronicle of Higher Education*, April 6, 1994. <https://www.chronicle.com/article/a-new-carnegie-classification/>.
- Frank, Cuyler. 2023. "Navajo Technical University Approved to Offer First TCU Doctoral Program." Tribal College, March 9, 2023. <https://tribalcollegejournal.org/navajo-technical-university-approved-to-offer-first-tcu-doctoral-program/>.
- Garland, John L. 2013. "Foreword." In *Beyond the Asterisk: Understanding Native Students in Higher Education*, edited by Heather J. Shotton, Shelly C. Lowe, and Stephanie J. Waterman, xv–xvi. Sterling, VA: Stylus Publishing.

- Haskell Indian Nations University. 2017. "School History." Accessed June 20, 2023. <https://www.haskell.edu/about/history/>.
- IAIA (Institute of American Indian Arts). 2023. "Home." Accessed April 16, 2023. <https://iaia.edu/>.
- Indiana University Center for Postsecondary Research. 2021. *The Carnegie Classification of Institutions of Higher Education, 2021 Edition*. Bloomington, IN: Indiana University CPR.
- Marroquín, Craig. 2019. *Tribal Colleges and Universities: A Testament of Resilience and Nation Building*. CMSI Research Brief. Philadelphia: Center for Minority Serving Institutions at the University of Pennsylvania. <https://cmsi.gse.rutgers.edu/sites/default/files/TCUs.pdf>.
- McCormick, Alexander C. 2000. "What's Ahead for the Carnegie Classifications?" AAHE Bulletin (January). <https://www.aahea.org/articles/jan00f1.htm>.
- McCormick, Alexander C. 2013. "Classifying Higher Education Institutions: Lessons from the Carnegie Classification." *Pensamiento Educativo: Revista de Investigación Educativa Latinoamericana* 50 (1): 65–75.
- McCormick, Alexander C., and Chun-Mei Zhao. 2005. "Rethinking and Reframing the Carnegie Classification." *Change: The Magazine of Higher Learning* 37 (5): 51–57. <https://doi.org/10.3200/CHNG.37.5.51-57>.
- Morse, Robert, and Eric Brooks. 2022. "How U.S. News Calculated the 2022–2023 Best Colleges Rankings." *U.S. News & World Report*, September 11, 2022. <https://www.usnews.com/education/best-colleges/articles/how-us-news-calculated-the-rankings>.
- Nelson, Christine A., and Joanna R. Frye. 2016. *Tribal College and University Funding: Tribal Sovereignty at the Intersection of Federal, State, and Local Funding*. Washington, DC: American Council on Education.
- Orphan, Cecilia M., and Graham N.S. Miller. 2020. "The Company Regional Comprehensive Universities Desire to Keep: Choosing Institutional Membership Associations." *The Journal of Higher Education* 91 (2): 300–325. <https://doi.org/10.1080/00221546.2019.1631073>.
- Pavel, D. Michael, Ella Inglebret, and Susan Rae Banks. 2001. "Tribal Colleges and Universities in an Era of Dynamic Development." *Peabody Journal of Education* 76 (1): 50–72. [https://doi.org/10.1207/S15327930PJE7601\\_04](https://doi.org/10.1207/S15327930PJE7601_04).
- PNPI (Postsecondary National Policy Institute). 2023. *Tribal Colleges and Universities Primer*. Washington, DC: PNPI. <https://pnpi.org/download/tribal-colleges-and-universities-primer/>.
- Shotton, Heather J., Shelly C. Lowe, and Stephanie J. Waterman. 2013. *Beyond the Asterisk: Understanding Native Students in Higher Education*. Sterling, VA: Stylus.
- Tribal College Journal*. 2019. *Degree Programs at Tribal Colleges and Universities, 2019–2020*. Mancos, CO: Tribal College Journal. <https://tribalcollegejournal.org/pdfs/Degree-Programs-at-Tribal-Colleges-and-Universities.pdf>.
- Zerquera, Desiree D. 2023. "Still Striving, and for What? Centering Equity in the Study of Prestige Seeking in Higher Education." In *Higher Education: Handbook of Theory and Research, Volume 38*, edited by Laura W. Perna, 265–324. Cham, Switzerland: Springer Nature Switzerland.

# Appendix: Measures of Serving Community

## Measures: Overall contributions to community educational attainment (associate's, baccalaureate, and total)

X = proportional amount of degrees added by the college in relation to existing educational attainment levels in county

$$X = \frac{\text{\# degrees awarded}}{\text{\# degree holders in county}}$$

Included IPEDS variable for number of (1) associate's degrees, and (2) baccalaureate degrees awarded in 2019–20.

For number of degree holders, we used U.S. Census American Community Survey five-year data for 2016–21 (which intersects with 2019 institutional data) at the county level to capture county residents who hold an associate's degree or higher. We then matched county-level educational attainment data to all institutions in our database. According to the U.S. Census Bureau, five-year estimates are a better predictor for smaller communities since they capture greater swaths of the community population. Given the target area being the demographically smaller regions where TCUs are located, the five-year estimates were chosen to provide a more accurate measure of educational attainment in the counties these institutions are situated within.

This was calculated for (1) all institutions granting associate's degrees, (2) all institutions granting baccalaureate degrees, and (3) institutions granting associate's and baccalaureate degrees.

## Measure: Proportion of degree holders in community made up by college faculty and staff

X = proportion of degree holders in community made up by college faculty and staff

$$X\% = \frac{\text{\# institution employees in degreed positions}^*}{\text{\# degree holders in the county}}$$

\*Included IPEDS variable for number of faculty and staff employed by the college in 2019–20, excluding those occupations typically not requiring a college degree: service occupations (e.g., food preparation, grounds maintenance, law enforcement); sales and related (e.g., cashiers, retail salespersons); natural resources, construction, and maintenance (e.g., construction workers, mechanics, agricultural workers); and production, transportation, and material moving operations (e.g., food processing workers, motor vehicle workers).

For number of degree holders, we used U.S. Census American Community Survey five-year data for 2016–21 (which intersects with 2019 institutional data) at the county level to capture county residents who hold an associate's degree or higher. We then matched county-level educational attainment data to all institutions in our database. According to U.S. Census Bureau, five-year estimates are a better predictor for smaller communities since they capture greater swaths of the community population. Given the target area being the demographically smaller regions where TCUs are located, the five-year estimates were chosen to provide a more accurate measure of educational attainment in the counties these institutions are situated within.

## Measure: Proportion of degrees in county accounted for by college in the past decade

X = degree-holder growth in the county relative to number of degrees in region

$$X = \frac{\text{Sum of all baccalaureate and associate's degrees awarded, 2010 through 2020}}{(\# \text{ associate's and baccalaureate degree holders in county, 2020}) - (\# \text{ associate's and baccalaureate degree holders in county, 2010})}$$

Included IPEDS variable for number of (1) associate's degrees and (2) baccalaureate degrees awarded for each year, 2010–11 through 2019–20.

For number of degree holders, we used U.S. Census decennial data for 2010 and 2020 at the county level to capture county residents who had “some college or associate’s” or “bachelor’s degree or higher.” We then matched county-level educational attainment data to all institutions in our database.



