A typology of Hispanic-Serving Institutions:

Student, financial, and community contexts

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Abstract

Although Hispanic-Serving Institutions (HSIs), institutions that enroll at least 25% Latino students, are increasing in numbers, research about these institutions remains limited. For example, research is inconclusive as to whether Latino students in HSIs have different outcomes from their counterparts in other institutions. One reason for this is that HSIs are diverse, including public and private 2-year and 4-year not-for-profit institutions. Furthermore, they have distinctive institutional characteristics from those typically emphasized in institutional typologies such as Carnegie classification system. To understand better the heterogeneity among HSIs based on their unique institutional qualities, this study developed a typology of HSIs that takes into account their distinctive structural, demographic, financial, and community context characteristics. Using cluster analysis to examine a census of U.S. mainland and Puerto Rican 2-year and 4-year HSIs in the Integrated Postsecondary Education Data System (IPEDS), we identified six types of HSIs. This typology provides a foundation for building a more institutionally relevant way of classifying HSIs and other Minority Serving Institutions (MSIs). It can inform future research about HSIs' organizational identities and effects on student outcomes. Furthermore, this study's findings can guide practices to examine HSIs' peer institutions and institutional performance in more contextually appropriate ways.

A typology of Hispanic-Serving Institutions: Student, financial, and community contexts

As Hispanics grow in the U.S. population and on college campuses, the presence of Hispanic-Serving Institutions (HSIs) among American higher education institutions is increasing (Hispanic Association of Colleges and Universities, 2012). HSIs are typically defined as 2-year or 4-year, degree accredited, degree-granting, not-for-profit colleges and universities that enroll at least 25% full-time Hispanic students (Santiago, 2006). They provide critical access to higher education for historically underserved students, enrolling over half of Latino college students (Hispanic Association of Colleges and Universities, 2012) and producing 40% of Latino baccalaureate degree holders (Malcom-Piqueux & Lee, 2011). On average, HSIs serve a student body composed of half (52%) of students on Pell Grants (Author, 2012b).

Despite the importance and growing number of HSIs, little work has been done to understand the diversity among these institutions. According to the Hispanic Association of Colleges and Universities (HACU),

> a major shortcoming [in research on HSIs] is the absence of a typology of HSIs to allow reasonable comparisons among similar institutions. The existing Carnegie classification system is not sufficiently nuanced. The unique nature of HSIs, the students they serve, their variety, and a host of other key characteristics provide the array of variables needed to make meaningful comparisons. (2012, p. 12)

In response, this study sought to advance a typology of HSIs to identify the diversity among these institutions. It addressed the questions: (1) What structural, faculty and student characteristics, and financial and community context variables describe and differentiate among the population of accredited, non-profit HSIs? and; (2) How can the population of HSIs be classified into a typology of institutions that is based on their distinctive institutional

characteristics? Findings identify six types or clusters of Hispanic Serving Institutions with distinctively salient institutional and community characteristics including: (1) Urban Enclave Community Colleges, (2) Rural Dispersed Community Colleges, (3) Big Systems 4-Year Institutions, (4) Small Communities 4-Year Institutions, (5) Puerto Rican Institutions, and (6) Health Science Schools. The findings address gaps in understanding the heterogeneity among HSIs and provide researchers, policymakers, and practitioners with a framework to identify appropriate peer institutions for HSIs.

Classifying Hispanic Serving Institutions

The Carnegie Foundation for the Advancement of Teaching Classification System is the dominant, and arguably default (McCormick, 2005) way to describe, categorize, and characterize post-secondary institutions. Although efforts have been made in recent decades to revise the classification scheme to more accurately account for the complexity and diversity of postsecondary institutions in the U.S., the Carnegie System is still not able to provide the needed granularity to account for meaningful differences among institutional types (Prescott, 2011). To address these limitations, researchers have engaged in work to describe and develop alternative classification systems various types of institutions in the U.S. and abroad (e.g., Author, 2014; Brint et al., 2006; Fumasoli & Huisman, 2013; Huisman, 1998; Kirst, Stevens, & Proctor, 2010; Lysons, 1990; Marisotis & Shedd, 2003; Shin, 2009; Tight, 1988; van Vught, 2008). Although many of these efforts have included or considered HSIs, no study to date has been conducted to describe characteristics that identify and differentiate HSIs.

The need for a classification system specific to Hispanic Serving Institutions can best be explained by highlighting the unique qualities and characteristics of these institutions. Most distinctively, HSIs enroll and produce large proportions of Latino college students and graduates.

HSIs enroll over half (54%) of Latino U.S. college students (HACU, 2012), graduate 59% of all Latino associate's degree holders and 40% of Latino baccalaureate holders (Malcom-Piqueux & Lee, 2011), and transfer high numbers of Latino students from 2- to 4-year institutions (Harmon, 2012). HSIs grant over half (54%) of all bachelor's degrees awarded to Latinos in Science, Technology, Engineering, and Math (STEM) fields (Harmon, 2012). Although only 12% of 4-year HSIs are Carnegie-classified as research or doctoral-granting institutions (Author, 2012b), one-quarter of all Latino doctorates receive degrees from HSIs. It is notable that HSIs also enroll large proportions of low-income students. Half (52%) of students in 4-year HSIs with broad missions receive Pell Grants (Author, 2012b). Additionally, students in HSI community colleges have lower incomes than those in non-HSI community colleges (Author, 2011).

HSIs are also unique in their location and mission. On the U.S. mainland, these institutions are concentrated in the Southwest and West (Author, 2012b; Santiago, 2006). Although few studies acknowledge Puerto Rican HSIs (Author, 2012b), these constitute a significant segment of HSIs. Only two HSIs are considered to have very high research activity by current Carnegie classification standards. Nearly one-third (30%) of 4-year HSIs offer very few bachelor's degrees or only offer bachelor's degrees in a few specialized fields (Author, 2012b). Furthermore, HSIs are distinctive in their financial context characteristics. They are chronically underfunded, able to spend two-thirds or less than other institutions on instruction, student support services, and academic support functions (HACU, 2012; Merisotis & McCarthy, 2005). Not surprisingly, leaders of HSIs express that limited institutional resources pose one of their biggest concerns (De Los Santos & Cuamea, 2010). HSIs' resources are so low that some have characterized them as doing more with fewer resources (Malcom et al., 2010).

Community context characteristics also distinguish HSIs, which are located in places where Latinos have historically settled (Santiago, 2006). More HSIs are community colleges than 4-year institutions (Mercer & Stedman, 2008) and therefore are particularly dedicated to addressing their local service areas and Latino populations (Cohen & Brawer, 2008; Vega & Martínez, 2012). Location and staying close to home also appear to be more important for students who choose 2-year or 4-year HSIs than those who choose non-HSIs (Author, 2011; Butler, 2010; Cejda, Casparis, Rhodes, & Seal-Nyman, 2008), even among Latino students academically qualified to attend more selective institutions (Santiago, 2007).

Furthermore, it can be difficult, if not impossible, to find non-HSIs with similar institutional characteristics as HSIs for comparison purposes. Researchers using propensity score matching to identify non-HSIs with institutional qualities similar to HSIs have failed to find a full sample of non-HSIs that matches existing HSIs, particularly among public 4-year HSIs (Rodríguez & Calderón Galdeano, 2012). Four-year HSIs are typically criticized for their low Latino graduation rates, but, when incoming student characteristics and institutional resources are taken into account, Latino graduation rates in HSIs equal or surpass those of four-year non-HSIs (Rodríguez & Calderon Galdeano, 2012; Vega & Martínez, 2012). Nonetheless, performance funding formulas typically do not account for such institutional characteristics in measuring graduation rates (Dougherty & Reddy, 2013), even though having a lower-SES student background and fewer institutional resources (characteristic of most HSIs) is independently and negatively related to institutional persistence rates (Bound, Lovenheim, & Turner, 2010; Titus, 2006a, 2006b).

This brief review suggests that HSIs have distinctive qualities that render mainstream institutional classifications systems like Carnegie less applicable. By developing a typology

based on all HSIs that takes into account a wider range of characteristics that are particularly

salient for HSIs, this study makes at least four contributions to higher education research on

institutional typologies: (a) an analysis of the entire population (a census) of accredited non-

profit HSIs, (b) accounting for student characteristics that are especially salient to HSIs, but not

addressed in other classification systems, including the percentage of Hispanic students, students

on Pell grants, and women, (c) incorporating financial context characteristics related to HSIs'

student outcomes (Author, 2012b, García, 2013), and (d) consideration of community context

characteristics, including local poverty and unemployment rates.

Conceptual Framework

Berger and Milem's (2000) framework for understanding the effect of organizational

behavior on student outcomes and Titus's (2006a, 2006b) extension of that framework served as

conceptual guides toward developing a typology of HSIs. Berger and Milem's work postulates

that student entry characteristics and organizational characteristics serve to shape student

experiences and institutional peer group characteristics, which, in turn, influence student

outcomes. The model includes student entry characteristics include students' demographic and

pre-college characteristics. Student experiences include formal and informal behaviors in the

academic, social, and bureaucratic domains after students begin college and the students'

perceptions of the organizational environment in these areas (Berger & Milem, 2000).

Organizational characteristics include structural demographic features (e.g., size, control,

selectivity, Carnegie type, and location) and organizational behavior, defined as the norms and

shared culture of organizational personnel and systems. Peer group characteristics include

students' psychological, behavioral, and structural (demographic) qualities.

Titus's (2006a, 2006b) application of Berger and Milem's framework further specified the role of "institutional financial context" on organizational behavior. Institutional financial context is part of the systemic dimension (Berger & Milem, 2000) of external forces that shape organizational behavior. According to resource dependency theory (Pfeffer & Salancik, 1978), these forces include state and federal law, technology, and market dynamics that shape an organization's capacity to conduct operations and develop organizational autonomy.

Certain institutional financial context characteristics, including the student body's socioeconomic status (SES) and the amount of institutional resources, have been found to be independently related to institutional persistence rates (Bound et al., 2010; Titus, 2006a, 2006b). In addition, a lower SES student body and amount of institutional resources are negatively associated with HSIs' persistence rates (Author, 2012b; Garcia, 2013). Therefore, it is inappropriate to assess HSIs' performance on student outcomes only in terms of persistence outcomes, without taking into account the student body characteristics and institutional resources that contribute to the capacity to generate particular outcomes (Astin, 1985).

Institutional geographical location and local economic conditions can also shape student outcomes (Berger & Milem, 2000; Perna, 2006). These factors, which we call "community context characteristics" (e.g., local education level, unemployment rate), are also related to institutional persistence rates in 4-year institutions (Author, 2012c; Vega & Martínez, 2012). Community context characteristics are particularly salient when understanding the nature of HSIs because: (a) they are located in places with high concentrations of Latinos, (b) most HSIs are community colleges (Mercer & Stedman, 2008), (c) community colleges tend to enroll students from local communities (Cohen & Brawer, 2008), and (d) HSIs are especially likely to enroll students wishing to remain close to home for college (Author, 2011; Butler, 2010; Cejda et

al., 2008). In sum, our conceptual framework accounts for the relationships between structural and demographic features, financial context variables, and community context characteristics that can shape student outcomes (Berger, 2000; Titus, 2006a, 2006b; Vega & Martínez, 2012), particularly in HSI settings.

Method

Data Sources and Population

Data were drawn from the Integrated Postsecondary Students Study (IPEDS) for 2008-09, U.S. Census Data in the 2005-09 American Community Survey, and USDA Economic Research Service 2003 Rural-Urban Continuum Codes. Although more recent IPEDS data were available, items from the 2008-09 academic year were identified as having the least amount of missing data for critical data elements and were therefore chosen for analysis. The data included the entire population of accredited, not for profit Hispanic Serving Institutions (HSIs) in 2008-09 (N=268). The method used by the Hispanic Association of Colleges and Universities (HACU) and Excelencia en Education was used to calculate HSI status (see footnote in Appendix A).

Variables

Several variables were included to capture structural demographic characteristics of HSIs including the highest degree awarded, control (i.e., public or private), emphasis on graduate education, measured by the percentage of students who were enrolled in graduate programs, and full-time enrollment (see Appendix A). The percent of Hispanic faculty and percent of full-time faculty were included as faculty characteristics of HSIs. The percent of Hispanic undergraduate students, full-time students, students receiving Pell Grant aid, and women were used to account for student characteristics at HSIs. A selectivity measure, percent of applicants admitted to the institution, was also included among student characteristics.

Several expense variables were used to capture an institution's financial context

including the total sum spent on instruction, academic support, and student services divided by

the number of full-time students (FTE). Additionally, the total dollar amount received in revenue

from the state government and revenue from tuition and fees per FTE were included as measures

of institutional revenue. A categorical measure of institutional region (e.g., West, South) was

used to categorize HSIs' locations. Similarly, a categorical variable indicating whether an

institution was located in a city, suburb, town or rural area was used to distinguish HSIs'

urbanicity. Additional community context variables included the percentage of persons in the

county: (a) with a bachelor's degree or higher, (b) who were unemployed, and (c) who self-

classified as Hispanic. Median housing price and median salary for the population in the county

were also used as community context characteristics. An institutions' six year graduation rate

was used as the final measure to distinguish among HSIs.

Analysis

Descriptive statistics and cluster analysis were used to identify institutional and

community context characteristics that distinguished among HSIs and, accordingly, to identify a

typology of institutions. Cluster analysis organizes a large data set into smaller groups or sets

according to similarities, patterns, or distances (Everitt, Landau, & Reese, 2001). As such, the

objective of cluster analysis is to empirically identify groups or clusters with homogenous

profiles (Rapkin & Luke, 1993). There are several distinctive advantages to using cluster

analysis to address the unique methodological challenges of developing a typology of HSIs.

First, it is a useful "data reduction technique" (Pastor, 2010) to create a classification scheme,

making it especially useful in conducting exploratory (rather than confirmatory) studies. Second,

this technique does not require a priori hypotheses, which is advantageous for conducting

research on a data-driven (rather than assumption-driven) typology. Third, cluster analysis

determines a group structure. In essence, cluster analysis is analogous to the qualitative approach

of grounded theory (Strauss & Corbin, 1990), whose purpose is to collect and examine data with

no prior assumptions and to build theory (in this case a typology) based on patterns in the data.

Data were screened for missing data, outliers, and multicollinearity prior to analysis. The

two variables describing faculty (i.e., percent Hispanic and percent full-time) were found to have

large amounts of missing data and were therefore included in the descriptive findings but

excluded from the cluster analysis. Three additional variables were found to have small amounts

of missing data (4-12 percent) that could be assumed to be missing at random and were handled

using multiple imputations (MI) with LISREL 8.80 (Enders, 2008). Eight institutions were

identified as having Mahalanobis' distances that were larger than three standard deviations from

the mean. Cluster profiles developed from highly correlated variables tend to yield a low number

of clusters (Rapkin & Luke, 1993). As such, variables with variance inflation factors (VIF) of

greater than five were included in the descriptive findings but were excluded from the cluster

analysis (i.e., instructional expenses, state appropriations, tuition and fees, percent of Hispanics

in the county).

Certain steps and decision rules were used to allocate cases to clusters. A hierarchical

clustering algorithm was utilized, placing cases (i.e., HSIs) closest together and then combining

small clusters of cases into larger clusters until a single cluster remained. Institutional and

community characteristics varied in terms of scale, units, and dispersion, and were therefore

standardized prior to calculating squared Euclidean distances (Everitt et al., 2001; Lorr, 1983).

Ward's minimum-variance method was used to link cases, as somewhat equally sized clusters

were expected (Lorr, 1983). Because the method is sensitive to outliers, the analysis was run

both with and without the outliers. The inclusion of the outliers was not shown to substantially alter the cluster structure; therefore, the outliers were retained in the analysis (Lorr, 1983).

As recommended by Rapkin and Luke (1993), several features were considered to determine the number of clusters, including an examination of the dendrogram, adequacy of the number of cases in each cluster, significance of one-way ANOVA's on profile variables, and the meaningfulness and interpretability of the clusters. Finally, the quality of the solution was assessed by the stability of the clusters and the degree to which the interpretability of the mean profile scores for each of the clusters (Rapkin & Luke, 1993). Hierarchical cluster solutions are sensitive to case order (SPSS, 2013). As such, several solutions were computed with cases sorted on different random variables to test the stability of the cluster solution. Distinctive features of each cluster in an absolute sense as well as in terms of differences with other clusters were used to distinguish and label the clusters (Rapkin & Luke, 1993). We also examined the specific HSIs within each cluster to further inform our labeling of the clusters (a complete list of HSIs within each cluster is available from the authors upon request).

Limitations

Several limitations should be kept in mind when understanding this research. First, a perennial challenge with studying HSIs is that, because they are defined by enrollment level of Hispanics, their designation as HSIs can vary from year to year. Therefore, the analysis may have included institutions that were not HSIs in other years, or excluded institutions that were HSIs in other years. Second, we had to exclude certain variables from the cluster analysis, due to missing data that could not be imputed (e.g., the percentage of full-time faculty and percentage of Hispanic faculty). Third, the results of cluster analysis are highly dependent on variables included in analysis. For example, we did not have easy access to a student outcome measure

other than graduation rates, despite research indicating that the percentage of students who remain enrolled in (rather than complete) higher education may be more a more appropriate outcome measure at colleges and broad access institutions that constitute most HSIs (Cook & Pullaro, 2010). Fourth, several institutional characteristics were too highly correlated (i.e., instructional expenses, tuition, median salary, percent in county who are Hispanic) to include simultaneously in the cluster analysis.

Results

Variability among Hispanic Serving Institutions

Descriptive findings highlighted the variability in characteristics among the population of accredited, non-profit Hispanic Serving Institutions (see Table 1).

INSERT TABLE 1 HERE

The majority of HSIs in 2008 were public institutions (74%) that did not offer bachelor's degrees (54%). Tremendous variability was shown in HSIs' size; these institutions enrolled anywhere between 23 and 36,075 students ($M = 6,173$, $SD = 6,385$). High variation was also found in the percentage of Hispanic faculty at institutions, ranging between 0 and 100 percent ($M = 28$, $SD = 33$). The average HSI enrolled a student body that was 53 percent Hispanic, but the percentage of Hispanics ranged from 25 to 100. Although the average HSI enrolled 50 percent of students full-time, the percentage of full-time students ranged between two and 98 percent. Furthermore, HSIs, on average, enrolled 40 percent of students on Pell Grants, but the population of students in this category was shown to range between four and 97 percent across HSIs. The mean percentage of females enrolled at HSIs was 59 ($SD = 11$). HSIs offered admission to the majority of applicants, with the average institution enrolling 85 percent of applicants ($SD = 23$).

Furthermore, large variation was shown regarding the financial context (i.e., revenues and expenditures) among HSIs. For instance, although the average institution spent roughly five thousand dollars per student on instruction, some spent as little as 160 dollars and other HSIs spent exponentially more ($SD = 20, 473$). Similarly, tuition and fees at HSIs were found to range between 61 and over 50,000 dollars per student ($M = 3,146$ dollars, $SD = 6,442$).

Certain community context characteristics of the population of HSIs also varied. HSIs were concentrated in the West and South (67%), although 19 percent of institutions were located in Puerto Rico. The majority of HSIs were found to be located in cities (54%) and suburbs (25%). However, significant variability was found in the educational attainment levels of HSIs' counties; between nine and 63 percent of these counties had populations with a bachelor's degree or higher ($M = 25\%$, $SD = 9$). Unemployment in these counties ranged from 3 percent to 27 percent, and the median annual salary in these places was roughly 25,000 dollars, ranging from approximately 11,000 to 52,000 dollars ($SD = 7,410$). Finally, the graduation rate at HSIs varied significantly, with the average institution graduating 27 percent of first-time, full-time degree or certificate-seeking students within six academic years for a bachelor's degree ($SD = 18$). In sum, the descriptive results confirmed the significant heterogeneity among HSIs and the need for a cluster analysis to make further sense of this heterogeneity.

Description of Clusters

This section describes the six-cluster solution and highlights defining characteristics of each cluster from the analysis. Table 2 provides a complete descriptive profile of each cluster.

INSERT TABLE 2 HERE

Cluster 1 –Urban Enclave Community Colleges. Cluster 1 included the most prevalent type of HSI identified, representing 37 percent (n = 99) of all HSIs, exclusively composed of

public institutions offering associates degrees and certificates as their highest degrees. These institutions enrolled large numbers of students, and were concentrated in cities or suburbs (98%) and in large metropolitan areas in which Hispanics have historically been concentrated, particularly in the West (54%). Together, these qualities informed the label "urban enclave." Among all clusters, they had the lowest expenditures and revenue and enrolled proportionally lower percentages of full-time faculty. Cluster 1 institutions were overrepresented in affluent counties, with higher salaries and house prices than counties for HSIs in other clusters. These institutions had the lowest average graduation rates (15%) among the clusters.

   Cluster 2 –Rural Dispersed Community Colleges. This cluster represented 13 percent of HSIs (n = 35). Like Cluster 1, Cluster 2 was limited to public institutions that offer associates degrees and certificates as the highest degree. These institutions were nearly all located in towns and rural, isolated areas (97%), inspiring the label "rural dispersed." Most (63%) of Cluster 2 institutions were located in the South, especially Southwestern states. These colleges had relatively low student enrollment, especially compared to Cluster 1's community colleges. They were overrepresented in counties with low levels of educational attainment, house prices and median annual salaries, and they had relatively low average graduation rates (17%).

   Cluster 3 –Big Systems Four-Years. Cluster 3 represented 21 percent of HSIs (n = 57), and had the largest student enrollments of all clusters. Many of these institutions were campuses of state public institution systems (e.g., California State University system, City University of New York, University of Texas), inspiring the label "big systems." This cluster was almost exclusively made up of institutions offering bachelors' degrees or higher (97%). Most Cluster 3 institutions (77%) were public universities and colleges, and these institutions were also overrepresented in cities and in the South (especially Southwestern) region of the country. Full-

time faculty, female students, and students receiving Pell Grant assistance were overrepresented in Cluster 3. These institutions provided broad access to students, offering admission to a higher percentage of students when compared to the other clusters made up of four-year institutions. Among the four-year clusters, these institutions also had the lowest average graduation rates.

Cluster 4 –Small Communities 4-Years. Cluster 4 represented nine percent of HSIs (n = 24). Nearly all (96%) were private and offered bachelor's degrees or higher (92%), including many smaller liberal arts institutions and several religious institutions as well, inspiring the label "small communities." These institutions were exclusively located in urban and suburban areas, and predominantly in the West and South. Among all clusters, Cluster 4 institutions were located in areas with the highest levels of educational attainment. An emphasis on graduate education was overrepresented among Cluster 4 institutions. Cluster 4 institutions employed a lower percentage of Hispanic faculty members, on average, when compared to the other clusters. Full-time and female students were also overrepresented at Cluster 4 institutions. As private institutions, Cluster 4 colleges and universities were characterized by higher tuition and fees and received little governmental support. When compared to the first three clusters, they included the most selective institutions, with the highest average graduation rates (53%).

Cluster 5 – Puerto Rican Institutions. Cluster 5 represented 19 percent of HSIs (n = 51); nearly all of these institutions (96%) were located in cities and suburbs. In contrast to the first four clusters, Cluster 5 institutions were almost exclusively located in Puerto Rico (98%). The majority were private (69%) universities that offered bachelor's degrees or higher (86%). Being located in Puerto Rico, they were particularly characterized by a nearly exclusive presence of Hispanic faculty (95%) and students (99%). Among all clusters, Cluster 5 institutions served the highest percentage of students receiving Pell Grants, and were overrepresented in areas with

high unemployment and low median annual salaries. These institutions also had relatively low

expenditures and revenue, compared to the U.S. mainland clusters offering bachelor's degrees.

Cluster 6 –Health Sciences Schools. Cluster 6 represented the only two Hispanic-

serving schools focused on health sciences and medical studies: the University of Texas Health

Sciences Center and the University of Puerto Rico Medical School, both located in urban areas

with relatively low median salaries and house prices. These institutions were distinguished by

low enrollment, a high percentage of full-time students and faculty, higher proportions of female

students, and selective admissions requirements. Among all clusters, they had the highest

expenditures and revenue, and had graduation rates of 100 percent.

<center>**Discussion and Implications**</center>

By classifying the full population of HSIs into six clusters according to distinctively

salient institutional and community characteristics, this study maps HSIs into a typology within

the broader landscape of U.S. higher education. First, Urban Enclave Community College HSIs

are located in major metropolitan areas and economic hubs with historically large proportions of

Hispanics, particularly in the West. Second, Rural Dispersed Community College HSIs are

dispersed in isolated, economically less active, rural locations in the Southwest – particularly

Texas, New Mexico, and Arizona. Third, the Big Systems HSIs are comprised mainly of large

state systems of 4-year public institutions that offer broad access to lower-income and Hispanic

students. Fourth, the Small Communities HSIs are composed largely of smaller liberal art private

institutions, several of which have a religious mission (Catholic, or, to a lesser degree,

Protestant) and are more selective and focused on doctoral education, with higher graduation

rates than Big Systems, Puerto Rican, and community college HSIs.

One of the main contributions of our study is to illustrate in empirical terms how Puerto Rican HSIs are distinctive from other HSIs and U.S. higher education institutions. Puerto Rican HSIs are largely private 4-year institutions, with nearly all Latino faculty and students. They have the highest proportions of low-SES students among the clusters and the fewest institutional resources among 4-year institutions. Puerto Rican HSIs are also located in the highest unemployment areas, with lower median and annual salaries. These findings corroborate research indicating that Puerto Rican higher education faces significant economic and structural constraints (Rodríguez, 2011) and that Puerto Rican HSIs face particularly intense challenges among 4-year HSIs in raising student graduation rates (Author, 2012b).

Health Sciences HSIs are perhaps the most distinctive among the types. They include just two institutions that are focused solely on the health professions and serve a significant proportion of medical school students. Similar to other medical schools, these institutions are more selective, have significantly higher expenditures and revenues than other institutional types, and graduate high proportions of students (in this case 100%) of students.

Another main contribution of our study is to advance new theoretical perspectives on classifying HSIs and, by association, other Minority-Serving and Broad Access Institutions. In applying a talent development lens (Astin, 1985), we incorporate certain institutional characteristics typically not considered in more conventional classification schemes. Broadly, we consider how structural-demographic and organizational behavior characteristics germane to HSIs are related to student outcomes (Berger & Milem, 2000). More specifically, we incorporate financial context and community context characteristics pertinent to HSIs that are related to student outcomes (Titus, 2006a, 2006b, Vega & Martínez, 2012). We find that taking these

characteristics into account helps distinguish among HSIs in unique ways. Accordingly, this

research can inform the development of future typologies of broad access institutions.

By addressing a full census of HSIs, our research challenges and deconstructs the

common depiction of HSIs as a monolithic group of institutions. As noted, our research offers

empirical evidence that illustrates how Puerto Rican HSIs are distinctive from other institutions.

It indicates that not all HSI community colleges or 4-year institutions are the same and

demonstrates how these institutions are different from one another. Accordingly, this research

provides researchers with future tools to disaggregate among HSIs, to establish appropriate

comparison institutions with HSIs, or to classify Emerging HSIs that are poised to become HSIs.

Notably, Emerging HSIs that become HSIs may generate new types of HSIs, and future research

should update this typology to track such developments. For example, Hispanics have been

migrating to new places in the U.S., such as North Carolina, Georgia, and Pennsylvania, a

phenomenon some have termed the "New Latino Diaspora" (Wortham, Clonan-Roy, Link, &

Martínez, 2013). Future research should monitor Latino migration patterns and their influence on

local higher education contexts and the emergence of new HSIs (e.g., Torres & Zerquera, 2012).

In practice, this typology can assist HSI personnel in understanding where their

institutions fall within the broader landscape of HSIs. In particular, this typology can assist such

personnel in selecting appropriate peer institutions for comparison or mentoring purposes. The

typology can also provide essential context to examine how HSIs' institutional and community

characteristics influence student outcomes. Furthermore, this study can inform policymakers

about how to contextualize properly HSIs' contributions and outcomes in light of the limited

institutional resources that these institutions receive, as well as the fact that HSIs serve

populations with historically low access to higher education (Hurtado, 2006). Given that state

and federal calls for accountability emphasize student graduation rates without taking into account institutional resources or demographic qualities of the student body (especially socioeconomic status) (Dougherty & Reddy, 2013), empirical evidence about HSIs' resources in relation to student outcomes is essential to provide proper context for understanding the capacity of HSIs to increase graduation rates. There is mounting evidence that HSIs' limited institutional resources and the lower financial resources of their student bodies account completely for the reason that HSIs have lower graduation rates than other institutions (Author, 2012b; Rodríguez & Calderon Galdeano, 2013; Vega & Martínez, 2012). Such evidence is essential to challenge performance funding formulas that are solely based on student outcomes rather than student or institutional inputs and thus disadvantage institutions like HSIs (Dougherty & Reddy, 2013). Penalizing these institutions for serving historically underserved students by reducing their already limited resources even further raises considerable concerns about equitable postsecondary success for historically underserved groups.

Future data collection on other institutional characteristics of HSIs, particularly those that reflect organizational culture or behavior, would be useful to incorporate into a typology of HSIs. Such information could include examination of: (a) a fine-grained and nuanced content analysis of a census of HSIs' mission statements (Torres & Zerquera, 2012), (b) institutional leaders' perceptions of institutional status and challenges (Brint et al., 2006; De los Santos & Cuamea, 2010), (c) institutional activities to serve the local Hispanic population and Hispanic student body (Torres & Zerquera, 2012), and (d) the presence of curricular offerings such as the presence of ethnic studies courses on Latinos (Cole, 2010). This study's use of cluster analysis to build a typology of HSIs is a starting point for multivariate analyses (Rapkin & Luke, 1993) to understand better the role of types of HSIs in influencing student outcomes and other measures

of institutional effectiveness. Findings also provide a departure point to study current and future

HSIs, how these institutions' influence the landscape of American higher education, and how

they contribute to postsecondary access and opportunity for historically underserved populations

in higher education.

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Table 1
Variation among Hispanic Serving Institutions (n=268)

Characteristic	Mean or %	Minimum	Maximum	Std. Dev.
Structural				
Level (4-year)	46%	--	--	--
Control (Public)	74%	--	--	--
Emphasis on graduate education	9.8%	0.0%	87.0%	17.2
Enrollment size	6,173	23	36,075	6,385.2
Faculty Characteristics				
% Hispanic	28%	0%	100%	32.8
% Full-time faculty	41%	12%	98%	18.7
Student Characteristics				
% Hispanic	53%	25%	100%	27.3
% Full-time	50%	2%	98%	23.5
% Students on Pell Grants	40%	4%	97%	23.9
% Female	59%	13%	97%	10.6
% Admitted	85%	12%	100%	23.3
Financial Context				
Instruction	4,702.12	160.45	278,587.80	20,473.4
Academic support	1,022.43	34.51	38,862.90	3,144.92
Student services	837.91	39.37	7,430.80	1,049.52
State appropriations	3,389.74	0.00	276,282.17	19,428.82
Tuition and fees	3,146.02	61.93	50,284.64	6,442.14
Community Context				
Region of country				
West	32%	--	--	--
Central	6%	--	--	--
South	35%	--	--	--
East	7%	--	--	--
Rocky Mountains	2%	--	--	--
Puerto Rico	19%	--	--	--
Urbanicity				
City	54%	--	--	--
Suburb	25%	--	--	--
Town	12%	--	--	--
Rural	9%	--	--	--
% with College Degree	25%	9%	63%	8.7
% Unemployment	9%	3%	27%	3.8

% Hispanics in county	66%	4%	100%	28.7
Median housing price	229,565.85	67,700.00	800,400.00	176,153.0
Median Salary	25,387.49	11,314.00	51,945.00	7,410.79
Student Outcome				
Graduation Rate	27.1	0	100	17.7

Percentages may not sum to 100 due to rounding.

Table 2
Profile Description of Clusters

Cluster Characteristic	Urban Enclave Community Colleges (n = 99)	Rural Dispersed Community Colleges (n = 35)	Big Systems 4-Year Institutions (n =57)	Small Communities 4-Year Institutions (n = 24)	Puerto Rican Institutions (n = 51)	Health Science Schools (n = 2)
	% or Mean	% or Mean	% or Mean	% or Mean	% or Mean	% or Mean
Structural						
Level (offers bachelor's degrees)	0%	0%	97%	92%	86%	100%
Control (public institution)	100%	100%	77%	4%	31%	100%
Emphasis on graduate education	0%	0%	18%	38%	10%	68%
Enrollment size	8,194	2,603	9,047	2,671	3,279	2,495
Faculty Characteristics						
% Hispanic	15%	13%	15%	10%	95%	95%
% Full-time faculty	34%	41%	52%	46%	40%	77%
Student Characteristics						
% Hispanic	40.77	40.72	46.07	45.13	98.54	67.25
% Full time	30.65	36.63	59.83	67.11	77.00	88.06
% Students on Pell Grant	23.35	26.40	42.16	40.71	76.59	37.50
% Female	57.61	56.77	61.89	63.79	58.22	67.00
% Admitted	100.00	100.00	70.75	68.33	68.06	15.50
Financial Context						
Instruction	1,215.64	1,495.07	4,390.27	9,267.74	3,121.40	226,514.02
Academic support	245.16	258.71	1,045.04	2,680.80	872.67	32,914.74
Student services	322.65	445.57	1,165.90	2,863.60	648.25	4,767.38
State appropriations	1,006.05	1,414.34	5,352.90	362.68	8,890.12	215,799.21
Tuition and fees	334.57	434.74	3,543.42	17,056.89	3,339.89	20,094.15
Community Context						
Region of the country						
West	54%	20%	28%	42%	0%	0%
Central	8%	11%	5%	0%	0%	0%

South	30%	63%	53%	42%	0%	50%
East	6%	3%	12%	13%	2%	0%
Rocky Mountains	2%	3%	2%	0%	0%	0%
Puerto Rico	0%	0%	0%	0%	98%	50%
Urbanicity						
City	71%	0%	60%	63%	47%	100.00
Suburb	27%	3%	11%	38%	49%	0%
Town	1%	54%	18%	0%	2%	0%
Rural	1%	43%	12%	0%	2%	0%
% with college degree	28%	18%	25%	29%	24%	28%
% Unemployment	8%	8%	8%	8%	15%	10%
% Hispanics in county	40%	45%	48%	45%	97%	78%
Median house price	364,304.04	145,748.57	276,608.77	348,958.33	129,292.16	135,750.00
Median salary	29,622.86	23,628.11	26,647.46	28,564.00	15,644.82	21,107.00
Student Outcome						
Graduation Rate	15.32	17.37	29.98	53.33	36.51	100.00

Appendix A
Variables, Definitions, and Coding

Variable	Definition
Structural	
Level	Binary flag = Highest degree offered is an Associates' (0) Offers bachelors' degrees or higher (1)
Control	Binary flag = Public (0) or Private (1)
Emphasis on graduate education	Continuous variable = full-time equivalent (FTE) graduate students/total FTE
Enrollment size	Full-time equivalent enrollment – fall 2008
Faculty Characteristics	
% Hispanic[1]	Continuous variable = percentage of full and part-time faculty in instruction, research, and/or public service who are Hispanic
% Full-time faculty[1]	Continuous variable = percentage of faculty who are employed full-time in instruction, research, and/or public service
Student Characteristics	
% Hispanic	Continuous variable = percentage FTE undergraduates who are Hispanic[2]
% Full-time	Continuous variable = percentage of total enrollment classified as full-time students
% Students on Pell Grants	Continuous variable = percentage of undergraduate students receiving Pell grant aid
% Female	Continuous variable = percentage of total enrollment who are women
% Admitted	Continuous variable = percentage of applicants admitted to the institution in fall 2008
Financial Context	
Instruction[3]	Sum of expenses for academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and remedial and tutorial instruction conducted by the teaching faculty for the institution's students divided by FTE
Academic support	Sum of expenses associated with activities and services that support the institution's primary missions of instruction, research, and public service divided by the institution's FTE
Student services	Sum of all expenses associated with admissions, registrar activities, and activities whose primary purpose is to contribute to students' emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program divided by the institution's FTE
State appropriations[3]	Revenue received from a state government through a direct

	appropriation of its legislative body, except for state grants and contracts (and capital appropriations for public institutions) divided by institution's FTE.
Tuition and fees[3]	Revenue from tuition and educational fees divided by institution's FTE. Excludes room, board, and other services rendered by auxiliary enterprises.
Community Context	
Region of country	Categorical variable representing institutional location (0=West, 1=Central, 2=South, 3=East, 4=Rocky Mountains, 5=Puerto Rico)
Urbanicity	Categorical variable representing urbanicity of county (0=City, 1=Suburb, 2=Town, 3=Rural)
% with College Degree	Continuous variable = percentage of the county 25 years and older with a bachelor's or higher degree
% Unemployment	Continuous variable = percentage unemployment for population 16 years and older
% Hispanics in county[3]	Continuous variable = percentage of the county who are Hispanic
Median housing price	Continuous variable = median value of houses for owner-occupied households
Median Salary[3]	Median earnings adjusted for 2009 dollars for population 16 years and older with earnings
Student Outcome	
Graduation Rate	Percentage of first-time, full-time degree or certificate seeing students who graduated within 150% of normal time (i.e., six academic years)

Data Sources: IPEDS, U.S. Census (2005-09 American Community Survey), and USDA Economic Research Service 2003 Rural-Urban Continuum Codes.

[1] Variable contained a large amount of missing data and could not be included in the cluster analysis.

[2] Calculation based on method used by HACU and Excelencia. Uses an institution's total and Hispanic full-time and part-time undergraduates, including students seeking or not seeking a degree or certificate. Three separate equations were used to calculate HSI status: (1) Total FTE = full-time + part-time/IPEDS multiplier; (2) Hispanic FTE = full-time + part-time/IPEDS multiplier; and (3) % Hispanic = Hispanic FTE/Total FTE * 100%. The IPEDS multiplier is based on an institution's sector.

[3] Due to multicollinearity issues, variable was excluded from the cluster analysis.