What Influences a Student to Attend a Regionally Isolated University?

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Abstract

Prospective college students use a small set of socioeconomic factors in deciding on an institution to attend. These factors are further narrowed when their regional context is sparsely populated and substitution choice is low. This study found that proximity and scholarships influence student choice of university in geographically isolated areas.

Keywords

Service Areas, College Influence Factors, GIS, Cluster Analysis, Geographically Isolated University

Introduction

The literature is fairly extensive in delineating socioeconomic factors that influence a prospective college student to choose a particular institution. In fact, several papers, some dating back 80 years, outline specific factors and enumerate the relative importance of those factors in college choice. Additionally, longitudinal comparisons of the literature can also be effective in determining how factors and relative importance has changed over time in respect to socioeconomic changes in society and academia. However, the literature is silent in addressing the institution's geographic context as a driver of student influence factors. Intuitively, regional context and distance to competing institutions effect the available student population. This should be especially true for universities in relatively isolated areas. As a consequence, regionally isolated universities will likely attract students with different socioeconomic concerns than non-regionally isolated universities.

The research in this paper partially addresses the geographical context vacancy in the literature by examining those factors influencing college choice in a regionally isolated geographic area where substitution choice is low. The specific goal of this research is to develop a segmentation schema of the existing student population and determine the factors that were most influential in choosing Angelo State University (ASU).

Factors that Influence College Choice

Factors that influence college choice have been studied since the 1930s. From the literature, it appears, not much has changed in the way of factors that influence college choice since that time. A study conducted at the University of Kentucky by E.M. Reeves in 1932 showed that the six most influential factors were "nearness of the institution, acquaintance with

other students attending, subject-matter interest, parental wishes, less expensive, and influence of friends and relatives" (Reeves 1932, p67).   He also found that one of the least influential factors was scholarship and other financial aid (Reeves 1932); this may be due to the fact that financial aid and scholarships were not prevalent until the 1950s. Even though the first scholarship was awarded in 1643 at Harvard, scholarships and financial aid was not common in universities until the GI Bill of 1944, and it was not until the early 1950s that universities developed formulas for distributing the growing endowments and scholarships funds (ChessInc., 2011).

Later studies showed that financial aid was in the top six of factors that influenced student choice of colleges or universities (Ming 2010, Higher Ed 2010, Wajeeh and Micceri 1997, Noel-Levitz 2007). Students, in most of the studies conducted, ranked academic programs in the top three of influential factors (Ming 2010, Erdmann 1983, Reeves 1932, Higher Ed. 2010, Wajeeh and Micceri 1997, Noel-Levitz 2007, Ford et al. 1999).   Over the last several years cost has become a more important factor, ranked sixth place by Wajeeh and Micceri in 1997, then ranked first place by Noel-Levitz in 2007. However, for the last few years with the increase in financial aid available, students have ranked cost lower factor but still in the top five (Higher Ed. 2010, Ming 2010). In conclusion, the literature showed that academic programs, reputation, cost, financial aid, nearness of institution, careers/jobs, facilities, size of institution, parent recommendation, campus visit, advertising, and high school counselors are all factors that can influence students college choice, even though some have a greater influence, it is important to recognize each of them (Reeves 1932, Ming 2010, Erdmann 1983, Higher Ed. 2010, Wajeeh and Micceri 1997, Noel-Levitz 2007, Ford et al. 1999).

The Regional Context of Angelo State University

Angelo State University (ASU) is a medium sized regional university located in San Angelo near the geographic center of Texas- approximately 250 miles from Dallas-Fort Worth and 200 miles from the Austin - San Antonio metropolitan areas. San Angelo is the largest city and county seat of Tom Green County, a moderately populated county (107,864 Census 2011) of approximately 1563mi^2 land area (ESRI 2011) equating to approximately 70 persons per mi^2 population density. This makes Tom Green the 201st densest of the 254 counties in Texas, but a little below the state average of 98 persons per mi^2 (ESRI 2011). However, on a regional level, Tom Green is the second largest in area, but the most densely populated of the thirteen counties in the Concho Valley Council of Governments (COGs). The average density of the Concho Valley COG, excluding Tom Green, is 3 persons per mi^2; definitely qualifying the region as sparsely populated.

In terms of transportation, San Angelo lies in a triangular region formed by the intersection of Interstate highways I-20 to the north, I-10 to the south, and I-35 to the east. San Angelo, in particular is interested by three United State highways (67, 87, and 277) and one Texas state highway (208). Other than not being directly on a major Interstate, San Angelo sits in the center of a fairly robust transportation network with little to no travel barriers.

Methods

Regional Analysis

A geographic information system (GIS) was used to better understand the geographic dispersion of students attending ASU and the distance-based market structure of Angelo State University. First, student home residence information was obtained from ASU (ASU 2009) and

geocoded using a third-party service. Geocoding is the process of taking aspatial information, such as street addresses, applying that information to a spatial indexed database to produce spatial coordinates. The geographical student home residence data were then overlaid with a network of state and national highways (interstate, primary, and secondary road systems) that provided the ability to calculate actual driving distances based on roads, as opposed to map distances. In addition, the locations of all Texas public four year universities were added as nodes on the road network to calculate a closest facility index and distance matrix for (1) each student to ASU, (2) each student to their closest university, and (3) ASU to each of the other universities on the network.

Student Survey

Literature describing college choice influence factors provided several factors and relative importance for initial analysis.   However, it was assumed that influence factors, and their comparative importance, are temporally related to trends in society, high school advising, current economic stimuli, and university admittance policy. To address this issue, three student panels, sophomores and juniors in the College of Business, were asked to discuss which factors they ultimately found decisive in selecting ASU; thus, following the methodology outlined in Ford et al. (1999). Factors nominated by the panel did not diverge greatly from the literature. However, comparative importance of those factors differed in respect to the literature and across panels. Therefore, a student survey was created and distributed to seven undergraduate classes at ASU at the beginning of the spring 2010 semester.   The survey resulted in 242 responses, which were recorded as completed then filtered by removing incomplete responses and outliers, leaving 148 surveys for analysis.

The student survey consisted of three binomial questions and one Likert scale question with ten levels. The binomial response questions were used verify internal consistency of respondent answers and to determine (1) if ASU was the student's first choice in university, (2) if they considered ASU as a local school, and (3) if the respondent had been enticed to attend ASU through scholarship. The Likert scale question listed the ten most influential college choice factors identified by the student panels. Specifically, the question asked students to rate the importance of (1) family, (2) friends, (3) travel convenience, (4) school reputation, (5) sports/athletics, (6) cost of tuition, (7) cost of living in San Angelo, (8) sports scholarship, (9) academic scholarship, and (10) degree offerings at ASU on a five-point scale.

Survey Analysis

The first step in the analysis was to segment the survey respondents into groupings using agglomerative hierarchical cluster analysis (CA). Euclidean distance was selected as the similarity metric because the influence factors were rated by the respondents in Likert five-point scale. A Ward linkage was selected because it aggregates clusters of minimum within-cluster sum of squares, which would also be beneficial in later Multivariate Analysis of Variance (MANOVA) testing of the clusters. The number of clusters suitable to partition the surveys was initially found by choosing the balance point in similarity in an agglomerative dendrogram plot. Further verification of clustering accuracy was performed by scree plot ("Elbow Criterion"), ability to interpret cluster characteristics, and MANOVA analysis flowing methodologies found in Malhotra (2004), Johnson (1998), and Huberty and Olejnik (2006), respectively.

Once interpretable and justifiable clusters of respondents were found each level of the Likert scale question was analyzed by Analysis of Variance (ANOVA) procedure with cluster

number as treatment level. This was to determine how each cluster differed in importance regarding the influence question. Instances where there was a significant difference in at least two cluster means a Tukey's Honestly Significant Difference (HSD) multiple comparison was then used to further determine which clusters differed statistically.

Finally each cluster was checked against the responses from the binomial questions to insure internal consistency among the respondent's answers. The results of the ANOVA test and binomial responses aided in developing a narrative underlying each segment of the sample surveyed.

Results and Discussion

Geographic Profile of Student Residence

The GIS analysis of the student residence location helped to define the distance context of ASU's market area. The analysis shows that the vast majority of students attending ASU were from Texas (97.4%). Of those students, 98% have home residences less than 375 miles from ASU. The remaining 1.5% of students outside 375 miles are sparsely scattered in the corners of the state. Analyzing the service area further, 62% of students live within 150 miles of campus. In this case, 150 miles is significant because it includes student residences close to the two interstates north and south of ASU and excludes students within the Austin and San Antonio metropolitan areas and the surrounding municipalities (Figure 1).
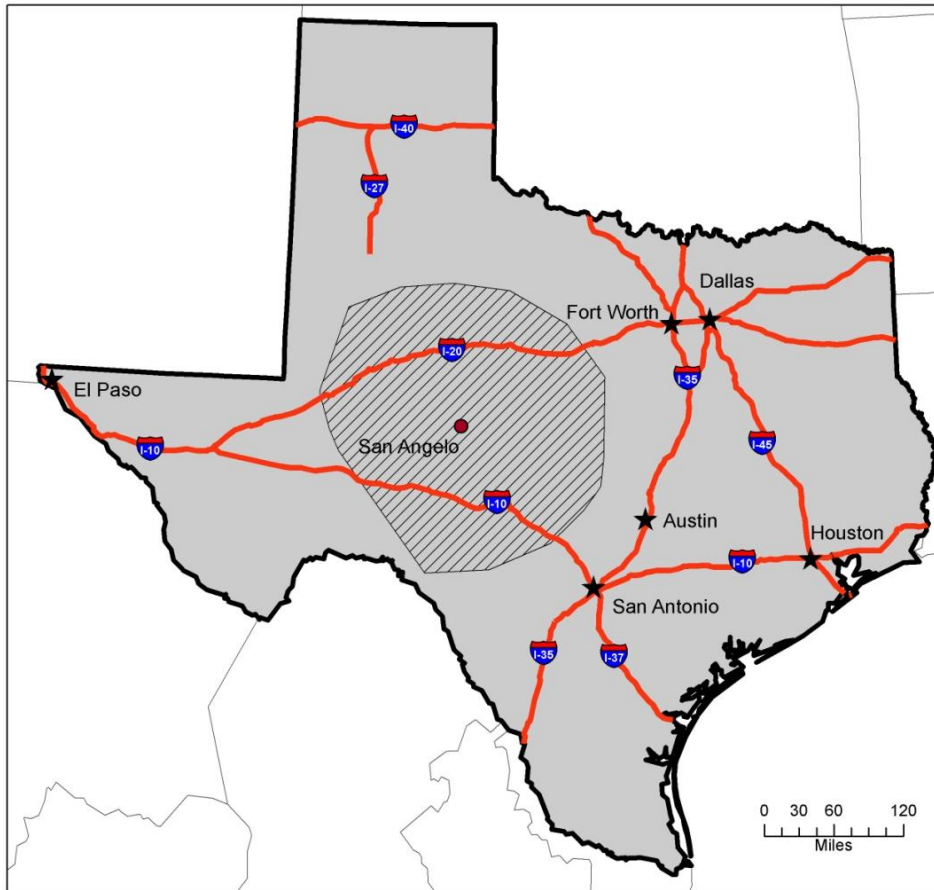
Figure 1: Service area around San Angelo that captures 62% of students. Boundary distance is 150 miles at maximum extent.

In terms of proximity to other schools, of the 6233 Texas resident students, 51.5% live closer to ASU than another four-year public institution. The average distance to ASU for students who live closer to ASU than another four-year institution was 97 miles. ASU's closest (within 200 miles) four-year public neighbor universities are University of Texas of the Permian Basin (132 miles), Tarleton State University (156 miles), Texas Tech University (184 miles), and University of Texas at Austin (203 miles). There are 28 other public universities farther than 200 miles from ASU within Texas.

Cluster Analysis of Surveys

The first stage of analysis on the surveys was to perform cluster analysis on the responses of the Likert scale question of influence factors and ensure, as much as possible, that the numbers of clusters were correct. A simple hierarchical agglomerative cluster analysis was performed on the ten dimensions of influence and the number of clusters were determined and confirmed by four methods. First, a visual inspection of the agglomerative cluster dendrogram showed that four to six clusters adequately balanced similarity height and number of clusters. Second, a plot of within-cluster sum of squares error (WSS) plotted against number of clusters (scree plot) showed that five clusters offered the optimal reduction in overall WSS. Third, five clusters lent very well to interpretation, an important aspect in determining the number of clusters (Johnson 1998). Finally, a Multivariate Analysis of Variance (MANOVA) showed that the mean value of clusters, in ten dimensions, were significantly different (Pillai's Trace $= 2.313$, $p < 2.2\text{e-}16$).

Given the MANOVA model confirmed a significant difference in cluster means in ten dimensions; subsequent Analysis of Variance (ANOVA) models of the individual factors by cluster was performed. Of the ten separate ANOVA tests, each showed a significant difference in cluster means, at the $\alpha = 0.05$ level, and were then tested by Tukey's HSD multiple comparison to determine the difference between cluster means. Table 1 shows the cluster means.

Table 1: Mean response by cluster or group and influence factor based of Likert five-point scale where 5 = most influential and 1 = least influential. % Sample was calculated with n = 148.

Factor	Group 1	Group 2	Group 3	Group 4	Group 5
Family	2.650	4.073	3.980	1.313	2.909
Friends	1.950	2.854	3.367	2.688	1.864
Travel Convenience	2.400	4.439	4.265	2.438	2.045
Academic Reputation	2.500	2.902	3.286	2.500	3.045
Sports	4.750	1.488	2.265	1.188	1.682
Cost of Tuition	2.600	4.000	4.143	3.500	4.818
Cost of Living	2.550	3.805	3.653	3.313	3.636
Sports Scholarship	4.050	1.073	1.531	1.125	1.045
Academic Scholarship	2.200	1.341	4.122	1.188	4.273
Degree Offering	1.900	1.829	3.469	1.313	3.136
% Sample	13.50%	27.70%	33.10%	10.80%	14.90%

Interpretation of Student Segments

Cluster analysis of student surveys provided well defined groups and lent well to interpretation. A combination of the Likert scale question (Table 1) and binomial questions (Table 2) assist in forming the overall narrative. The following are generalized characteristics of each group noting specific tendencies in the factors that most and least influenced them to choose ASU.

Group 1 is a segment of non-local student athletes who rate sports and sports scholarship high and all other factors moderate to low (Table 1). In addition, ASU was not their first choice of schools, ASU was not considered to be a local school, and they were incentivized to come to ASU by scholarship (Table 2).

Group 2 is a segment of local students who rated family, travel, cost of tuition, and cost of living high (Table 1). A majority of this group considers ASU to be their local school, but few of this group received scholarships (Table 2).

Group 3 is a segment of local students who rated family, travel, cost of tuition, cost of living, and academic scholarship high (Table 1). A majority of this group considers ASU to be their local school, and nearly this entire group received scholarships (Table 2).

Group 4 is a difficult segment to interpret, given that only influence factors, cost of tuition and cost of living, were rated moderately high (Table 1). Also, this group showed only a slight majority did not receive a scholarship (Table 2). In addition to providing little information by rating the questions; this group, because of the response values, could not be forced into another cluster.

Group 5 is a segment of non-local students who rated cost of tuition, cost of living, and academic scholarship high (Table 1). Although only a slight majority said that ASU was not their local school (Table 2), they rated family, friends, and travel convenience low (Table 1). A vast majority of this group was incentivized to attend ASU through academic scholarships.

Table 2: Response to binomial questions by group. % Sample was calculated with n = 148.

	ASU was first choice		ASU is local		Received Scholarship	
	No	Yes	No	Yes	No	Yes
Group 1	70.0%	30.0%	80.0%	20.0%	15.0%	85.0%
Group 2	41.5%	58.5%	19.5%	80.5%	75.6%	24.4%
Group 3	42.9%	57.1%	24.5%	75.5%	12.2%	87.8%
Group 4	56.3%	43.8%	56.3%	43.8%	62.5%	37.5%
Group 5	59.1%	40.9%	63.6%	36.4%	9.1%	90.9%
% Sample	50.0%	50.0%	39.9%	60.1%	35.1%	64.9%

After cluster (group) membership was established, the proportion of the sample was found for each group (Table 1) and checked against the binomial questions to determine if the respondents were consistent between questions. When asked "do you consider ASU to be your local school", 60.1% (89) of students responded "yes" which matches well with the addition of

the proportions from group 2 and 3 (60.8%). When asked "did you receive a scholarship while at ASU", 64. 9% (96) of students responded yes which matches the addition of groups 1, 3, and 5 (61.5%).

Conclusions

This paper explored the influence factors that lead students to choose a particular university. While the literature is robust in suggesting factors from previous studies, no singular instance could be found that documented influence factors given a geographic context. Specifically, a regionally isolated university such as Angelo State University (ASU), where substitution choice is low affects the factors students use in selecting schools to attend. Geographic analysis for student residence data and a sample survey was used to determine the market area of ASU, influence factors, and relative importance of those factors. There are some draw backs to our methodology and multiple instances for improving the analysis. Our method of surveying students at one university, by asking why they chose that university, produces results very specific in context, in this case specific to ASU. However, we feel that the findings in this research add a new and important geographic dimension to the body of existing work. Additionally, this work gives ASU a defined spatial extent to its market area and a clear narrative of the segment characteristics of its students.

Results from the geographic information system (GIS) analysis show that a majority of students attending ASU come from within a 150 mile zone around main campus. This area was defined as ASU's service area for local students. Within this zone a vast majority of students have residences closer to ASU than another institution. Thus ASU's regional isolation and distance to substitutes is a partial driver of student choice.

Results from the sample survey show that ASU's student population can be grouped into five segments. We found a that ASU's student population are non-local student athletes on sports scholarships, local students without scholarships, local student with academic scholarships, non-local students on scholarships, and an indefinable group accounting for students not in the other four groups.

Taken in aggregate, the segmentation analysis reveals two prevalent themes that influence students to choose ASU. Here we generalize the results of the sample to the population of ASU students. Students choose ASU because it is their local school or they were incentivized to attend by scholarship. Among those who consider ASU as the local school, family, travel convenience, cost of tuition and living heavily weighted their decision. For those that were incentivized to attend ASU three disjoint sub-themes were prevalent: (1) weighting on sports and sports scholarships, (2) weighting on family, travel convenience, cost of tuition and living, and (3) weighting on academic scholarship and cost of tuition and living.

The authors are confident that the survey captured the distinct nature of the student segments attending ASU. However, an important next step is to reevaluate the group of students that did not lend to interpretation. While this group represents a small percentage of the population, its lack of fit, in fact lack of any substantial motivating factor, is disconcerting.

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