UNIVERSITY OF HOUSTON
LAW CENTER

Campus-based Aid Programs as Determinants of Retention Among Hispanic Community College Students

Monograph 87-2

Amaury Nora
Assistant Professor of Higher Education
School of Education
University of Southern California
WPH - 701
Los Angeles, CA 90089-0031
(213) 743-2310

$5.00
University of Houston Law Center/Institute for Higher Education Law and Governance (IHELG)

The University of Houston Institute for Higher Education Law and Governance (IHELG) provides a unique service to colleges and universities worldwide. It has as its primary aim providing information and publications to colleges and universities related to the field of higher education law, and also has a broader mission to be a focal point for discussion and thoughtful analysis of higher education legal issues. IHELG provides information, research, and analysis for those involved in managing the higher education enterprise internationally through publications, conferences, and the maintenance of a database of individuals and institutions. IHELG is especially concerned with creating dialogue and cooperation among academic institutions in the United States, and also has interests in higher education in industrialized nations and those in the developing countries of the Third World.

The UHLC/IHELG works in a series of concentric circles. At the core of the enterprise is the analytic study of postsecondary institutions—with special emphasis on the legal issues that affect colleges and universities. The next ring of the circle is made up of affiliated scholars whose research is in law and higher education as a field of study. Many scholars from all over the world have either spent time in residence, or have participated in Institute activities. Finally, many others from governmental agencies and legislative staff concerned with higher education participate in the activities of the Center. All IHELG monographs are available to a wide audience, at low cost.

Programs and Resources

IHELG has as its purpose the stimulation of an international consciousness among higher education institutions concerning issues of higher education law and the provision of documentation and analysis relating to higher education development. The following activities form the core of the Institute’s activities:

Higher Education Law Library

Houston Roundtable on Higher Education Law

Houston Roundtable on Higher Education Finance

Publication series

Study opportunities

Conferences

Bibliographical and document service

Networking and commentary

Research projects funded internally or externally
Although research on student persistence is very extensive and structural models have now been examined to determine the impact of pre-college and institutional factors on retention rates (Nora, 1985), few studies (Voorhees, 1985a,b) have incorporated measures of student finances and financial aid in testing Tinto's (1975) model of student attrition on varied student populations. Studies which have assessed the impact of campus-based resources on student persistence have been conducted primarily on student samples from four-year, residential institutions. No studies of any kind have tested Tinto's (1975) model on Hispanic community college students in which aspects of financial aid (need, amount of aid received) have been included. Moreover, studies which examine the influence of financial aid on persistence (Voorhees, 1985a,b; Herndon, 1982) often incorporate variables (residency and housing status) which are not relevant to community college student populations. These variables are not pertinent to Hispanic community college students because most, if not all, of Chicano students attending two-year institutions come from the surrounding community in which the community college is situated and live at home (Olivas, 1979; Cohen & Brawer, 1982). Indicators of academic achievement such as SAT or ACT composite scores many times are not available due to admission policies (open-door) found in most community colleges (Cohen & Brawer, 1982).

The issue of financial aid and student persistence, particularly as it relates to Hispanic college students, takes on an even more serious nature in light of recent findings in the
literature. A study by Olivas (1986) on Hispanic financial aid recipients found that not only are students uninformed about their parents' income, but that half of all Hispanic students in the study overestimated their actual income. "The data reported ...a pronounced tendency for low income Hispanic families to overreport actual income," consequently, "overreporting income can lead to lower eligibility and aid awards, which would necessitate a larger portion of college costs being borne by the students or families" (p. 7). In a separate study on financial aid packaging policies and Hispanics in higher education, Olivas (1985) found that over 60% in a representative sample of over 16,000 Hispanic students received only single-source aid and that this one source of aid was "almost exclusively Basic Educational Opportunity Grants (or BEOGs, known as Pell Grants since 1981)" (p. 464). Even when multiple source aid was awarded to Hispanic students, 95% of all multiple sources in the study included a Pell Grant award, a non-campus based grant. "Inasmuch as Hispanic students are disproportionately enrolled in public two-year colleges, ...the extraordinary reliance on federal funds may ...mean that federal cutbacks in financial aid programs have disproportionately affected community colleges and Hispanic students" (p. 467). These findings, although noteworthy within their own contexts, take on added importance when coupled with other findings on financial aid and persistence. Studies by Astin (1975), Voorhees (1985), Brooks (1981), and Herndon (1982) have found that student
financial aid (e.g., CWS, campus-based grants) has a positive effect on student persistence. If Hispanic community college students, who may qualify for financial assistance, are overestimating actual income on financial aid forms and being denied financial aid, not only are the students having to bear more of the costs of a college education, but their chances of succeeding and attaining some form of credential are reduced.

REVIEW OF THE LITERATURE

Studies on the impact of financial aid on student persistence have not resulted in similar findings. Earlier studies by Astin (1975), Barnes and Keene (1974), and Blanchfield (1971; 1972) indicated agreement among their findings in certain areas and differences among others. In a study by Astin (1975), different forms of financial aid (grants, loans, CWS) were examined to assess their effect on persistence. Astin (1975) concluded that grants were found to have a positive effect on student persistence; however, only minor support from grants was found to have an effect on persistence for men (major support was not) while both major and minor grant support assistance was associated with higher persistence for women. Major or minor support from loans during the freshman year were found to have a moderately negative effect on persistence for men. The effect of major support from loans was only slightly negative for women, but the effect of minor support on persistence was positive for this same group. College Work Study (CWS) was associated with small, but significant, increases in persistence for men. A moderate increase in persistence for women was associated with
CWS, but only for those women with other outside employment. Work Study programs were most likely to have positive effects on students at middle-income levels. Moreover, Astin (1975) found that black students were more apt to participate in work study programs during the freshman year than were whites, and that their participation in the programs was associated with a substantial reduction in dropout rates.

In a separate study, Barnes and Keene (1974) examined the effect of student participation in CWS programs on academic adjustment (measured by student GPAs) and found that involvement of students in work study programs during their freshman year did not interfere with academic performance. On the other hand, Blanchfield (1971; 1972), utilizing a discriminant function analysis, found that while percentage of college costs financed by grants, first-semester GPA, high school rank, and scores on a measure of social consciousness were significant in predicting persisters and nonpersisters, nondiscriminating independent variables included scores on the SAT, percentage of college costs financed by loans, and high school average. Grants were associated with persisters; loans did not discriminate between the two groups.

In more recent studies, similar findings have been reported by Peng and Fetters (1978), Voorhees (1985), Jensen (1981), Bergen and Zieke (1979), McCreight and Lenny (1982), Wenc (1983), Brooks (1981), Kreiger (1980), and Herndon (1982). Jensen (1981) examined the impact of students' total aid awards on persistence
and concluded that student financial assistance made a small contribution to the persistence of students during their first year. McCreight and Lenny (1982) found grant recipients did not persist or perform at a significantly different rate than did a nonrecipient control group. Bergen and Zieke (1979) compared persistence and academic achievement of freshman Pell Grant recipients with a nonfinancial-aid control group in a longitudinal study and found no significant differences between the control group and the experimental group in either persistence or academic performance. Kreiger (1980) examined the effect of combinations of financial aid on student persistence and found no significant differences in persistence to graduation between a control group and an experimental group. Brooks (1981) similarly examined combinations of financial aid in which he compared persistence and academic achievement of National Direct Student Loan (NDSL) recipients and students awarded assistance through the CWS program. Although Brooks found no significant differences in persistence rates between the two groups, academic achievement (GPA) was significantly higher for the CWS group.

Studies by Herndon (1982), Voorhees (1985), and Wenc (1983), however, have found that student financial aid is positively related to student persistence. Wenc (1983), in assessing the impact of work study programs on persistence, concluded that students receiving CWS persist better than do other financial aid recipients because they are more integrated within the institution's social and academic structures. In a profile analysis, Herndon (1982) identified a set of variables that
distinguished financial aid persists from dropouts. These variables included: (1) student eligibility index, (2) CWS awarded, and (3) residence in college housing. A profile of a persisting financial aid recipient was a student with good high school grades and standardized achievement test scores, resided in college housing, and received CWS as a form of aid. Given that the literature points out that Hispanic community college students do not typically receive good high school grades or standardized achievement test scores (indeed, many do not even take the standardized tests) (Olivas, 1979; Cohen & Brawer, 1982), commute from home (Olivas, 1979; Cohen & Brawer, 1982), and receive single-source aid mainly in the form of non-campus based Pell Grants (Olivas, 1985), the above mentioned factors would considerably affect their chances of persisting in college. Finally, Voorhees (1985) examined the connection between federal campus-based financial aid programs and the persistence of high need freshmen through a structural persistence model in which he focused on the effects (direct and indirect) of financial aid in the persistence process. Parameter estimates indicated that financial need, student residency status, and noncampus-based loans and grants have direct effects on student persistence regardless on the type or amount of campus-based aid awarded. In addition, the direct effect of campus-based resources (NDSL, CWS, SEOG) on persistence was significant and positive in the study.

Because the results of earlier and recent studies are contradictory, it is crucial that researchers closely examine the
methodologies and statistical techniques utilized in most studies. Voorhees (1985) notes:

Another weakness in the literature that examines financial aid and persistence is the overreliance on research designs that presuppose no underlying structure among variables selected for investigation. The result has been a profusion of "stepwise" multiple regression analyses and multidiscriminant analyses that dissect, or pull apart, variables without regard to how they might work together to impact persistence rates. While these studies offer interesting speculation about the "true" impact of types of aid on persistence, the practice of isolating a particular variable, or variables, ignores the fact that many of the variables with the potential to influence persistence are intercorrelated. The conclusions of such studies often contradict one another and thus, taken in total, fail to provide concrete direction to the financial aid practitioner (p.22).

The present research will test a structural equation model of retention for a Chicano two-year college student population. The model (see Figure 1) represents a multiequation model with five endogenous variables. The five endogenous variables include academic performance, three campus-based resources (NDSL, CWS, SEOG), and the dependent variable, retention. Exogenous variables include noncampus-based resources, high school grades, and student financial need. Background characteristics were examined to determine the direct effects and indirect effects (through intervening variables) these factors had on minority retention rates and the direct and indirect effects of campus-based resources and academic performance on minority retention rates. Structural equation modeling (Bentler, 1980; Bentler & Speckart, 1981, 1979; Bentler & Woodward, 1978; Joreskog & Sorbom, 1981; Kenny, 1979; Long, 1976; Pedhazur, 1982) was used to examine the
Figure 1
Full Causal Model

- Semesters Enrolled
- Hours Earned
- Credentials Earned

- Campus-based Res.
- Non-campus based Res.
- Pell Grants
- High School Grades
- NDSL
- SROG
- OWS
- Financial Need
- Grades

- Need

- Academic Performance
- Cumulative Grade Point Average

Retention
structural coefficients and measurement model of the hypothesized causal model. Based on Tinto's (1975) model of student retention, the LISREL model in the present research incorporates a modification to the measurement model made earlier by Nora (1985) and includes measures of student finances examined by Voorhees (1985). The use of multiple indicators for the latent construct (retention) in the measurement model incorporates three measures of retention by using each measure as a single indicator of the latent dependent variable:

Tinto (1982) in "Defining Dropout: A Matter of Perspective", concluded: 'the field of dropout research is in a state of disarray, in large measure because we have been unable to agree about what behaviors constitute an appropriate definition of dropout' (p. 3). Lenning, Beal, and Sauer (1980) concluded that there were four types of students in considering retention and attrition: (1) the persister, (2) the stop-out, (3) the attainer, and (4) the drop out. In defining the four student types, they provided a composite definition of retention/attrition. A persister was a student who continuously enrolled without any interruption. A stop-out was a student who left the institution for a period of time and then returned for additional study. The attainer was the student who dropped out prior to graduation, but after attaining a particular goal. The dropout was one who left the institution and did not return for additional study at any time. If measures of retention and attrition were to incorporate these four overlapping constructs, one variable could be used in retention research that would capture a more thorough meaning of attrition/retention. Lenning, Beal, and Sauer (1980) cited that retention and attrition should be measured by graduation rates, course completion, and goal attainment. Rendon (1982) points out that because of the diverse nature of community college students (terms of age, attendance patterns, and choice of goals), it is necessary to examine dependent measures which permit the examination of students' outcomes based on traditional and nontraditional measures of
...The use of multiple indicators for a complex variable like retention permitted the inclusion of all aspects of attrition previously mentioned (Nora, 1985, p. 13-14).

Consistent with Voorhees' (1985a,b) findings, two exogenous variables, student financial need and noncampus-based resources, were hypothesized to have direct effects on student persistence; moreover, student financial need was hypothesized to have a direct effect on academic performance. These three added paths, and the use of multiple indicators to provide a measure of the latent dependent variable, represent the structural and measurement modifications in Tinto's (1975) conceptual model.

METHOD

Subjects

The study population (N=170) was drawn from a total population of 883 first-time Chicano students who were enrolled full- or part-time in 1982 in a community college in south Texas. This two-year institution was selected because it was situated in a community with a Hispanic population of at least 70,000 with a median family income of less than $5,000 and a Hispanic enrollment of over 45 percent. Those characteristics made the institution similar in geographic data and enrollment patterns to other two-year institutions in south Texas (Olivas, 1979; U.S. Bureau of the Census, 1977).

The total population consisted of all entering freshman students who received some form of financial aid (BEOG, SEOG, NDSL) between Fall 1982 and Summer 1985. The study population represented a random sample of all students who applied and
received financial aid during the three year period in the present study.

Procedures

Data on all exogenous (financial need, noncampus-based grants, high school grades), endogenous (SEOG, NDSL, CWS, cumulative grade point average) variables and the dependent variable, retention (number of semesters enrolled, number of hours earned, credentials earned) were all collected from student transcripts and files. All indicators (observed) variables of latent (unobserved) variables with the exceptions of campus-based resources and the dependent variable, retention, were single item measures. These variables were: (1) financial need, (2) noncampus-based grants, (3) high school grades, and (4) cumulative grade point average at the two-year institutions. Financial need represented a measure of each student's relative cost to attend college. Financial need was computed as the difference between student or family resources and the individual's college costs. Noncampus-based resources represented the total amount of loans and grants other than the campus-based NDSL loans (guaranteed student loans, nursing loans, Law Enforcement Administration loans, etc). High school grades represented the student's final average of all high school coursework.

Multiple indicators were used to provide a measure of the construct campus-based resources. Three single item indicators (SEOG, NDSL, CWS) were used to measure the construct. The three
indicators represented actual dollar amounts awarded to the students from the three federal campus-based financial aid programs.

Three indicators were used to measure the retention construct: the total number of hours earned by the end of Summer 1985; the total number of semesters enrolled by the end of the study period; and a dichotomous variable, credentials earned. Students attaining some form of credential from the two-year institution were placed in one category (1=yes), and students not receiving any were placed in a second category (2=no).

Data Analysis

Because two of the constructs in the present research were measured by multiple indicators and because of the concern for measurement error in any quantitative study, structural equation modeling was utilized to test the causal model. The use of unmeasured latent variables (factors) with multiple indicators in causal models is referred to as structural equation modeling. The present research uses analysis of linear structural relations by Jorskog and Sorbom (1984), a structural equation model labelled LISREL.

Structural equation modeling utilizes unmeasured variables with multiple indicators and incorporates the inclusion of error or unique variances in the model as separate parameters in order to estimate the causal regression parameters (LISREL) estimates without the influence of measurement error in the observed variable. An appropriate latent variable causal model can be used to provide a basis for correct inference, even when only a few
indicators per construct are employed. This is true because a measurement model is contained within the complete structural model.

Covariance structure models combine a measurement model and structural (causal) model into a complete model and are analogous to a combination of a factor analysis and path analysis. The measurement model is similar to factor analysis; however, it is confirmatory in nature, unlike traditional factor analysis. Confirmatory factor analysis does not have the rotation problems found in exploratory factor analysis, and unique variables (residuals) can be correlated (Long, 1983). The structural model is similar to path analysis (simultaneous regression equations), except that these regression equations are based on latent (unobserved) variables, and there is the possibility of correlated residuals.

The most powerful aspect of LISREL (covariance structure models) is that the parameters for the measurement and causal model can be estimated simultaneously, standard errors can be obtained, and the goodness of fit evaluated (Bentler & Speckart, 1981; Pedhazur, 1982; Long, 1983). In assessing the goodness of fit of the model, several indices (tests of significance) must be examined (Joreskog & Sorbom, 1984; Long, 1983; Pedhazur, 1982). Included in these tests are Chi-squared goodness of fit, goodness of fit index (GFI), adjusted goodness of fit index, and the root mean square residual (RMR). Because a polyserial correlation matrix was used to analyze the data, a chi-squared goodness of fit was not possible, due to the use of an unweighted least square solution. All other indices for assessing the fit of the model were used, including the total coefficient of determination for the Y variables and the structural equations. The coefficient of determination is similar to the percentage of the variation in the dependent variable that is explained by the regression (Long, 1983).

...Most treatments of ordinal variables are based on two assumptions: equal intervals between categories and a standard normal distribution. However, when observed variables are of mixed scale types (ordinal and interval), the use of ordinary product moment correlations is not recommended (Joreskog & Sorbom, 1984). Rather, it is suggested that estimates of polyserial correlations (one discrete and one continuous variable) among the observed variables be computed and that a matrix of such correlations be analyzed by the unweighted least square (ULS) method.
If the observed variables to be analyzed by the LISREL VI computer program are continuous variables (interval scales) and normally distributed, the use of maximum likelihood estimates (ML), their associated standard errors, and Chi-squared goodness of fit measure may be used. However, if observed variables are nonsymmetric (highly nonnormally distributed), it is suggested that initial estimates and ULS estimates be used instead of ML estimates (Nora, 1987, p. 21-22).

In the present research, the data included one variable (credentials earned) measured at the ordinal level and which was not normally distributed. The ULS method recommended by Joreskog and Sorbom (1984) for discrete data was used in the data analysis. All measures were examined to assess the overall fit of the model in the present research.

RESULTS

The mean financial need for the sample population was $3560, ranging from a need of $180 to a high of $12,227. The mean high school grade for financial aid recipients was 83.38. The mean for noncampus-based awards (Fell grants) was $1617 with only 12 (6.31%) students not receiving this particular form of financial assistance. Once enrolled in the community college, students were enrolled for a mean of 6.17 semesters (including summer sessions), earned a mean of 55.26 semester hours, and received a mean GPA of 2.524. Although the mean number of semester hours earned indicated that many students could have received a community college certificate or associate degree, only 17.64 percent of the sample population received some form of credential from the two-year institution in which they were enrolled; a total of 141 (82.38%) students did not. The means for campus-
based resources (SEOGs, CWS, NDSLs) were $811, $674, and $51, respectively. However, 29.47 percent, 70.52 percent, and 96.84 percent of the students in the sample population did not receive SEOGs, CWS, or NDSLs, respectively. These findings are supported by Olivas (1985) in that, among Hispanic college students, financial aid is almost exclusively restricted to Pell grants.

The measurement and structural model parameter estimates of the causal model are displayed in Table 1 and provide information (parameter estimates) relating the observed or manifest variables to their underlying constructs. Unique variances (residuals) are included to report the amount of each indicator's variance that is not accounted for by the latent variables. Because all the factors were scaled to unit variance and single indicators for the latent exogenous variables were assumed to be measured without error, no LISREL estimates are reported in Table 1.

The parameter estimates in Table 1 are each subscripted in order to designate the relationship between latent variables. The two letters in each subscript represent two factors (latent variables). The following letters were used to designate factors in the structural model: (1) G=high school grades, (2) N=noncampus-based resources, (3) F=financial need, (4) C=college-based resources, (5) A=academic performance, and (6) R=retention. In each subscript for the regression weights, the first letter refers to the dependent variable in a particular equation, and the second letter refers to the predictor variable, with the predictor variable having temporal priority for any two latent variables in the structural model.
## TABLE 1. Factor-Standardized Parameter Estimates: Measurement and Structural Models

<table>
<thead>
<tr>
<th>Factors and Variables</th>
<th>Factor Loading</th>
<th>Unique Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement Model Parameters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noncampus-based resources</td>
<td>1.000</td>
<td>0.0</td>
</tr>
<tr>
<td>High school grades</td>
<td>1.000</td>
<td>0.0</td>
</tr>
<tr>
<td>Financial need</td>
<td>1.000</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Campus-based resources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEOG</td>
<td>0.629</td>
<td>0.604</td>
</tr>
<tr>
<td>NDSL</td>
<td>0.105</td>
<td>0.989</td>
</tr>
<tr>
<td>CWS</td>
<td>0.488</td>
<td>0.761</td>
</tr>
<tr>
<td>Academic performance</td>
<td>1.000</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Retention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of hours enrolled</td>
<td>0.736</td>
<td>0.000</td>
</tr>
<tr>
<td>Total number of semesters</td>
<td>0.998</td>
<td>0.458</td>
</tr>
<tr>
<td>Graduation (credentials earned)</td>
<td>0.426</td>
<td>0.819</td>
</tr>
</tbody>
</table>

### Causal model parameters

<table>
<thead>
<tr>
<th>Standardized parameters</th>
<th>Standard weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression weights</td>
<td></td>
</tr>
<tr>
<td>beta(RC)</td>
<td>.197</td>
</tr>
<tr>
<td>beta(RA)</td>
<td>.208</td>
</tr>
</tbody>
</table>
\[
\begin{align*}
\text{beta(AC)} & \quad 0.271 \\
\text{gamma(RN)} & \quad 0.613 \\
\text{gamma(RG)} & \quad 0.110 \\
\text{gamma(RP)} & \quad -0.132 \\
\text{gamma(CN)} & \quad 0.700 \\
\text{gamma(CF)} & \quad 0.179 \\
\text{gamma(AN)} & \quad -0.076 \\
\text{gamma(AG)} & \quad 0.381 \\
\text{gamma(AF)} & \quad 0.017 \\
\end{align*}
\]

Residual variances

- Campus-based resources \quad 0.189
- Academic performance \quad 0.784
- Retention \quad 0.235
Standardized weights were used because of the differences in scales among the observed variables. Nonequivalent factor variances in unstandardized regression coefficients would make it hard to compare the differences in parameter estimates for the measurement and structural models. Moreover, Bentler and Speckart (1981) specify: "Standardization has no effect on any statistical tests made. It has the advantage of increasing ease in comparing parameter estimates; in particular dependent or endogenous factor residuals become interpretable as the proportion of unexplained variance not accounted for by the predictor or exogenous factors" (p. 233) (Ncra, 1986, p. 25).

**Campus-based Resources**

The first equation in the structural model examined the effects of three precollege variables on campus-based resources, a measure of financial aid received by students from federal financial aid programs. Because the exogenous variables were scaled to unit variance and single indicators were used for each construct, the factor loadings were all 1.000. The unique variance for the indicator variables were all 0.000. The factor loadings for SEOG (.629), loans (.105), CWS (.488) supported the use of these three variables in their measurement of campus-based resources. The R-SQ or proportion of variance explained by the exogenous variables in the equation was 52%.

A comparison of the standardized coefficients revealed that both of the predictor variables, Pell grants and financial need, accounted for the variance in campus-based resources. As expected, students who received higher amounts of noncampus-based resources and whose financial need was higher received higher amounts of campus-based resources.
Academic Performance

The second structural equation in the model examined the effects of three exogenous variables (high school grades, financial need, and noncampus-based resources) and one endogenous variable (campus-based resources) on academic performance, a measure of the students' cumulative grade point average. The squared multiple correlation (R-SQ) for academic performance was .216. Therefore, high school grades, financial need, Pell grants, and campus-based resources accounted for 22% of the variance in academic performance. Students who had higher levels of financial need (gamma=.017), high school grades (gamma=.381), and campus-based resources (beta=.271) had higher levels of academic performance. The standard weight of noncampus-based resources on academic performance was -.076. Again, as expected, students with higher levels of Pell grants had lower cumulative grade point averages. However, the standardized weights for both noncampus-based resources and financial need were only -.076 and .017, respectively. This would indicate that both Pell grants and student financial need were not significant in explaining students' academic performance as were high school grades.

Retention

The final structural equation examined the effects of three exogenous latent variables (noncampus-based resources, grades, and financial need) and two endogenous variables (campus-based resources and academic performance) on the dependent variable (retention), a measure of the total number of hours earned over a three-year period, the total number of semesters enrolled, and
whether the student graduated (earned some form of credential) or not during the three years. The squared multiple correlation for the structural equation was .764 (see Table 2). Therefore, the variables accounted for 76% of the explained variance in retention. The use of the three indicators to measure the dependent variable was highly supported (λ = .736, .998, and .426).

The regression weights for the three exogenous variables (noncampus-based resources, grades, and financial need) hypothesized to have an effect on retention were .613, .110, and -.132, respectively. Students with higher levels of financial need were enrolled in less number of semesters, earned less hours, and were less likely to receive some form of credential. However, at the same time, students who received high levels of noncampus-based resources and who performed academically better at the high school level were enrolled in more semesters, earned more hours, and were more likely to receive some form of credential.

The regression coefficients for academic performance and campus-based resources were .197 and .208, respectively. Students with higher levels of campus-based resources and academic performance had higher levels of retention (enrolled in more total semesters, earned more hours, and received some form of credential). The regression coefficient for Pell grants (γ = .613) was much larger than all the other variables in the equation.
TABLE 2. Parameter Estimates for Retention

<table>
<thead>
<tr>
<th>Variables</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicators of Retention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of semester hours</td>
<td>1.000</td>
<td>.736</td>
</tr>
<tr>
<td>Total number of semesters</td>
<td>.738</td>
<td>.998</td>
</tr>
<tr>
<td>Graduation</td>
<td>.426</td>
<td>.426</td>
</tr>
<tr>
<td><strong>Structural Equation for Retention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noncampus-based resources</td>
<td>.612</td>
<td>.700</td>
</tr>
<tr>
<td>High school grades</td>
<td>.110</td>
<td>.110</td>
</tr>
<tr>
<td>Financial need</td>
<td>-.132</td>
<td>-.132</td>
</tr>
<tr>
<td>Campus-based resources</td>
<td>.313</td>
<td>.197</td>
</tr>
<tr>
<td>Academic performance</td>
<td>.208</td>
<td>.208</td>
</tr>
</tbody>
</table>

Squared multiple correlation for retention: \( R = .805 \)
Measures of Goodness of Fit

The Goodness of Fit Index for the causal model was .970, the Adjusted Goodness of Fit Index .949, and the Root Mean Square Residual .07. The Total Coefficient of Determination for the overall model was .805; the squared multiple correlations ($R^2$) for the latent constructs (campus-based resources, academic performance, and retention) were .524, .216, and .764. All the measures of the overall strength of the structural model indicated that the modified model in the study represented a plausible model of retention. Figure 2 displays the factor loadings and parameter estimates for the full causal model.

DIRECT, INDIRECT, AND TOTAL EFFECTS

The effect coefficients for the structural model are included in Table 3. The results indicated that two factors had a significant impact on Hispanic community college retention rates: noncampus-based resources (Pell grants) and campus-based resources (SEOGs, CWS, NDSLs), total effects being .774 and .402, respectively. The impact of campus-based resources on retention, however, was enhanced when it was mediated through academic performance; the direct effect of campus-based resources was only .197, the effect coefficient (direct and indirect effects) was .402. Moreover, the findings indicated that these factors had a significantly larger effect on retention than GPA as reported by Fox (1985) and Voorhees (1985).

Other variables in the model which were significant included the direct effect of high school grades on the student's academic performance in the two-year institution ($gamma=.381$) and the
Figure 2
Full Statistical Model
<table>
<thead>
<tr>
<th>Variable</th>
<th>Direct effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noncampus-based resources</td>
<td>.613</td>
<td>.774</td>
</tr>
<tr>
<td>Grades</td>
<td>.110</td>
<td>.189</td>
</tr>
<tr>
<td>Need</td>
<td>-.132</td>
<td>-.084</td>
</tr>
<tr>
<td>Campus-based resources</td>
<td>.197</td>
<td>.402</td>
</tr>
<tr>
<td>GPA</td>
<td>.208</td>
<td>.208</td>
</tr>
<tr>
<td>Campus-based resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noncampus-based resources</td>
<td>.700</td>
<td>.441</td>
</tr>
<tr>
<td>Need</td>
<td>.179</td>
<td>.113</td>
</tr>
<tr>
<td>GPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noncampus-based resources</td>
<td>-.076</td>
<td>.114</td>
</tr>
<tr>
<td>Grades</td>
<td>.381</td>
<td>.381</td>
</tr>
<tr>
<td>Need</td>
<td>.017</td>
<td>.065</td>
</tr>
<tr>
<td>Campus-based resources</td>
<td>.271</td>
<td>.430</td>
</tr>
</tbody>
</table>
direct effect of campus-based resources on academic performance (beta=.271). More importantly, the direct effect of high school grades on retention, although significant, was only .110. Even when the total effects were examined, the effect coefficient was .189. Another direct effect which was significant was that of need on retention (gamma=-.132). Again, however, this effect was negated by the intervening variables (total effects=-.084). There were no significant direct effects of need (gamma=.017) and noncampus-based resources (gamma=-.076) on academic performance.

In sum, Hispanic community college students who received higher levels of noncampus- and campus-based financial aid awards were enrolled in more semesters, earned more semester hours, and received some form of credential. Moreover, Hispanic students who received higher levels of campus-based resources earned high grade point averages. Although the direct effect of campus-based resources on retention was not as large as that of noncampus-based resources or academic performance, students who received SEOGs, CWS, and NDSLs did considerably better in their academic performance, and consequently had higher levels of retention.

DISCUSSION

While studies on student retention have extensively examined the relationship among various factors believed to have an impact on student attrition, many, if not all, of these studies have excluded measures of student finances or financial aid. The exclusion of these factors, coupled with the fact that very few retention studies examine attrition in community colleges (and
even less, Hispanic college student attrition at these institutions) results in an almost total information void when it comes to identifying factors, and the relation among these factors, which impact on Hispanic college student retention at two-year institutions. Given that reductions have been made in financial support to college students, what empirical evidence is there to substantiate the notion held by some educators and administrators (and to a certain extent by a large segment of the population) that financial aid to students has countered the negative effects that financial need has on retention decisions?

Although evidence exists (Voorhees, 1985) that campus- and noncampus-based resources have a significant impact on retention, this finding exists only for students at four-year residential institutions. Moreover, even if the findings could be conceived as carrying over to college students in two-year institutions, the impact of both campus- and noncampus-based resources may prove to be variant among the two student populations.

In the present study both campus- and noncampus-based (Pell grants) resources were found to be significant in the retention process reflected in the causal model. Not only were both of these factors found to have a large impact on retention, but were also found to have even larger effects than the students' high school grades and their cumulative grade point averages at the two-year institution. While it was found that prior high school grades had the largest impact on cumulative grade point average, neither the students' high school grades nor their academic performance at the community college had as large an
effect on retention as did campus- and noncampus-based resources. The findings would indicate that Hispanic college students are not leaving higher education because of their academic performance, but largely because of financial reasons. Moreover, other studies (Olivas, 1985) have found an extraordinary reliance of Hispanic students on Pell grants, a finding which was substantiated in the present study. Because of the large impact of this variable on retention for Hispanic students, the dangers cited by Olivas (government cutbacks in Pell Grants and unpackaged aid's effect on student persistence) become even more noteworthy. Olivas notes:

Pell Grant awards were scaled back from a maximum of $1,800 in 1979-80 to $1,670 in 1981-82 [16], and institutions not accustomed to packaging aid awards may require Hispanics to make up the difference by parental contribution or summer earnings. With poverty and the lack of summer job opportunities of minority youth, this gap may not be made up by all students. In particular, two-year colleges continue to underutilize campus-based financial aid programs [25,40]. (1985, p. 471)

In addition, the negative effect of financial need on retention (direct effect = -.132) was almost totally negated when it was mediated through campus-based resources (total effect = -.084). This meant that although students with high levels of financial need should have enrolled in less semesters, earned less hours, and should not have received some form of credential, these effects were cancelled out by SEOGs, NDSLs, and College Work Study.

What do all these findings mean? If the reasons why Hispanic college students have not been retained by two-year institutions
are not largely academic but financial, what considerations must be made by community college administrators when it comes to Hispanic college students? One must first consider the nature of the Hispanic community college student clientele. Most two-year college students come from low socio-economic status background and from families where college attendance has not been firmly established. Because both campus- and noncampus-based resources were found to have a significantly large impact on retention among Hispanic community college students, two-year institutions need to do more than simply meet a student’s financial need. Community college administrators need to develop a comprehensive financial aid advisement program that reaches out to students and their parents not only after graduation but even before graduating from high school. Hispanic students and parents need to be informed about the costs associated with a college education and the financial assistance available to students. Parents and students should be educated about the importance of completing IRS and student financial aid applications in a correct and timely fashion, making correct estimates about their income and selecting a comprehensive financial aid package. Olivas (1986) notes: "To be sure, this type of assistance is difficult to provide, for the forms are complex and require great attention to detail. However, the students most in need of financial aid are those least likely to have the expertise required to execute the forms" (p. 251).
FUTURE RESEARCH

Although the present causal model is posited in a theoretical framework based on Tinto's (1975) model of student attrition in that pre-college and intervening factors at the two-year institution were examined to identify the impact that these two factors had on retention, several factors incorporated in Tinto's model (social integration and institutional and goal commitments) were excluded. However, the fact remains that over 80 percent of the variance was accounted for by the structural equation which included measures of financial aid received by students and in which both campus- and noncampus-based resources were found to have the largest impact. The present research suggests that although Tinto's model of student attrition has been found to explain retention decisions among Hispanic college students (Nora, 1986), measures relating to student finances and financial aid need to be incorporated in future studies that examine retention among Hispanic students at two-year institutions.

CONCLUDING COMMENTS

"There are four debates in higher-education finance that have major equity implications for Hispanics in higher education: two-year colleges, financial-aid packaging, financing graduate studies, and returns on schooling. While each of these is of obvious concern to majority students as well, the demographic condition and underrepresentation of Hispanics in higher education make these issues crucial for Hispanics. Although major technical and conceptual problems remain in analyzing these
areas, more researchers have been investigating the problems, leading to greater clarity in these equity issues" (Olivas, 1986, p.6). While research on financial aid and Hispanics has focused on the issue of increasing access to postsecondary education, studies on the differential impact of financial aid on Hispanic students should now begin to examine the impact of measures of financial need and resources on Hispanic student attrition. It is hoped that the present research provides a beginning in the understanding of the impact of financial aid on Hispanic student retention.
REFERENCES


University of Michigan.


