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ABSTRACT

Using a sample of 738 students from 4 metropolitan universities--University of Alabama at Birmingham, University of Louisville (Kentucky), University of North Carolina at Charlotte, and Wichita State University (Kansas), data from Pace's College Student Experience Questionnaire, and a modified form of Pascarella's general causal model, a study assessed the effects of background characteristics, differential college environments, and individual effort on student gains in intellectual and social skills. The model was augmented with variables descriptive of urban students, such as: part-time or full-time enrollment status, non-traditional or traditional age, on/off campus living arrangements, and marital status. The study found that such student background characteristics had no direct effects on gains, but they did have indirect effects via effort and environmental conditions. Overall, the study findings suggest that, in order to increase gains, non-traditional students at metropolitan universities must be approached by academic and student affairs professionals in ways different than their traditional counterparts at residential colleges. Appendices provide lists of College Student Experiences Questionnaire effort scales, environment scales, and estimate of gains scores. Contains 23 references. (Author/GLR)

Influences on Student Learning at Metropolitan Institutions

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Influences on Student Learning at Metropolitan Institutions

ABSTRACT

Using a sample of 738 students from four metropolitan universities and data from Pace's College Student Experience Questionnaire the study used a modified form of Pascarella's general causal model to assess the effects of background characteristics, differential college environments and individual effort on student gains in intellectual and social skills. The model was augmented with variables descriptive of urban students: for example, part-time or full-time enrollment status, non-traditional age, on/off campus living arrangements, and marital status. The study found that such background student characteristics had no direct effects on gains, but they did have indirect effects via effort and environmental conditions. Overall, the study found that in order to increase gains, non-traditional students at metropolitan universities must be approached by academic and student affairs professionals in ways different than their traditional counterparts at residential colleges.

Influences on Student Learning at Metropolitan Institutions

Student learning is more a function of the amount of effort students devote to educationally meaningful activities rather than the type of institution attended (Astin, 1984; Pace, 1987; Pascarella & Terenzini, 1991). Most of what is known about the learning and personal development of undergraduates, however, is based on the experiences of traditional-age, full-time students at residential colleges. Indeed, Pascarella and Terenzini (1991) concluded that "specifying the effects of college with the vast numbers of [new majority] students who now populate American postsecondary education may be the single most important area of research on college impacts in the next decade" (p. 632).

"New majority students" (Ehrlich, 1991) are undergraduates who are students of color or over the age of 23, attend college part time, live off campus, have families, and work more than 20 hours a week. For many, their educational program may be the third or fourth priority in their lives following family, work, church and community service. It is possible that some of the most widely-held notions about the determinants of college impact may have little relevance these students, many of whom attend metropolitan universities because they typically have no other option for obtaining a baccalaureate degree.

As alluded to above, "within-college" differences in student learning are typically greater than "between-college" differences. Between-college effects are differences in gains in

learning related to the kind of institution attended whereas within-college effects represent changes attributable to differences in the experiences of students on any given campus (Pascarella & Terenzini, 1991). Gains in learning and personal development tend to be specific (e.g., intellectual development influenced by classroom involvement, changes in values linked to interactions with peers). However, students who take advantage of a variety of campus resources (e.g., library, laboratories, recreational facilities, theater, and so on) usually benefit more than their counterparts who do not, especially when these activities "are mutually supporting and relevant to a particular educational outcome" (Pascarella & Terenzini, 1991, p. 626). This suggests that the contextual conditions of an institution are more important in encouraging learning than organizational structures or specific programs. Equally important, student learning is a function of the amount of contact with such influential agents of socialization as faculty and peers (Pascarella & Terenzini, 1991). Compared with their counterparts at residential colleges, students at metropolitan universities generally do not interact as much with their institution's socialization agents (e.g., faculty, peers).

It is not clear, then, if the models derived from studying traditional students are appropriate for examining learning and personal development of new majority students at non-residential institutions such as metropolitan universities. By studying a sample of students at four metropolitan universities this study

hopes to fill some of the gaps. Specifically, this study was undertaken for three reasons:

1. To test with data on students at metropolitan universities a version of Pascarella's (1985) general causal model for assessing the effects of differential college environments on student learning and cognitive development (a model developed primarily for traditional students). Our model, described in Figure 1, is a sub-model in that we did not explicitly use certain types of institutional demographic characteristics, but rather considered four institutions of the same general type, metropolitan. We make no claim that the institutions are identical on many measurable institutional characteristics (e.g., enrollment, selectivity, or faculty-student ratios) used in the general causal model, but only that the context of learning at each institution is similar (e.g., Kuh et al., 1991). Indeed, Pascarella and Terenzini have indicated that the institutional characteristics included in the general causal model, given a reasonable set of ranges, might only influence student outcomes at the margin.

Our approach deviates from the general model also in that we included student characteristics that differ from many of the variables typically used to determine student outcomes but which are more appropriate for new majority students at metropolitan universities. These include age, marital status, full or part time enrollment status, and residency (on or off campus). Including these variables is only an incremental change in the

usual approaches.

2. In the context of our metropolitan model, derived from and based on traditional approaches to studying student outcomes, we wished to test the appropriateness of the variables and their relations in this setting. That is, the general structural model might be appropriate for metropolitan students but our measures using the College Student Experience Questionnaire (Pace, 1988) might not be. On the other hand, the CSEQ approach to asking questions about outcomes might be appropriate but the structure defined by the model might not be. If the model resulted in a poor fit, of course, we would be unable to determine if new approaches were needed. As it turns out, the model and variables give very sensible results. Thus our approach might be a guide to future studies.

3. If the measurement and structural parts of the model are sensible, what conclusions can be drawn that would be of interest to students, faculty and administrators regarding possible intervention strategies to enhance student learning and personal development? That is, can we describe in sufficient detail variables that can be manipulated by academic and student affairs officers at metropolitan universities that can lead to enhanced student gains?

A Caveat

It is possible to study non-traditional institutions (metropolitans) using assumptions and methods developed primarily

for residential colleges that attract primarily full-time, traditional-age students. However, metropolitan institutions, and the students who attend them, might be different in essential ways. By choosing a model and measures based on traditional students we are in effect emphasizing the similarities among, rather than the differences between student behavior associated with learning and personal development at different types of institutions. We want to inform the practice of dealing with metropolitan students. Thus we must first determine if the concepts and approaches of the research literature that have emphasized traditional students in traditional institutions, concepts that are familiar to many academic affairs and student affairs officers, adequately describe the student experiences at metropolitan universities.

Methods

The survey data on which this study was based was gathered during the College Experiences Study, a year-long investigation of the institutional conditions associated with student involvement in out-of-class and in-class learning opportunities at 14 colleges and universities (Kuh, et al, 1991)[1]. Although the general qualitative approach of the College Experience Study enabled us to choose the four metropolitan institutions for concentrated study, our quantitative approach dictated we use only the CSEQ survey data in this investigation.

Data Sources

The sample is composed of 1043 students who completed the CSEQ from the four metropolitan institutions: University of Alabama at Birmingham, University of Louisville, University of North Carolina at Charlotte, and Wichita State University. These four institutions have relatively short histories as metropolitan universities although two are quite old. UNCC and UAB are products of the expansion of higher education in their states following World War II. Wichita State and Louisville were established many decades ago as private colleges. However, it is only within the past 25 years that they have evolved into public, metropolitan institutions with a tradition of providing service to their region; moreover, both had been identified as their state's "urban institution". That is, the missions of these institutions are relatively clear: they exist to serve the needs of the people in the nearby community.

These institutions differ from the traditional residential universities in that they are best described as open-systems rather than closed-systems. That is, metropolitans cannot isolate students from their environment nor from interactions with significant others not on the campus (e.g., family, old friends). But they also have characteristics in common with more traditional institutions, so that it is not obvious if their differences influence student outcomes in meaningful ways.

Generally speaking, the approach we took and the questions we asked were guided by an understanding of four aspects of these universities: institutional culture, campus environment, policies

and practices, and student characteristics. These might, in addition to their urban location, constitute a useful way to distinguish metropolitans from other institutions.

Institutional Culture. As a result of their short histories as higher education institutions, they have few long-standing traditions. Therefore, the events, ceremonies, and traditions that are part of the culture of an institution with a long history tend to not to be prominent at these institutions. Stories, myths, and sagas are fewer in number on campuses with only a 20 or 30 year history. Therefore, activities, ceremonies or other events that might tend to attract students, faculty and others in order to celebrate the history and culture of an institution do not exist. Another reason why these institutions tend to have fewer traditions is that they have fewer full-time students of traditional-age to support or create new traditions. Thus the institutional environment of the metropolitans might be less cohesive and less influential on student outcomes than at other institutional types.

Campus environment. One of the interesting qualities of these institutions is that they are two contradictory things at once: connected to the city in which they are located, and "a place apart." They have attempted to, through architecture and green space, clearly separate themselves from their environs to symbolize the life of the mind. Yet, they are linked programmatically, economically, and politically with the surrounding community. Because most students commute from their

homes to attend classes, the physical appearance of the campus is important to create a feeling that the campus is different and thus requires different behaviors for success than, home, work and church (Kuh et al., 1991).

Each of the four institution studied uses the properties of its location to educational advantage. Their physical plants are well maintained yet not over-powering and opportunities for meaningful involvement in the life of the community are in ample supply. For example, the relationship with local community are very important as is evidenced by links with government, business, industry and civic groups. Cooperative education or internship experiences and other forms of employment are common and many students take advantage of institution-sponsored activities in this regard. However, given that there might not be clear distinctions between school, work, and home, these institutions might differ in significant ways from residential colleges in the attitudes and contexts that affect student outcomes.

Policies and practices. In general, the policies and practices at these metropolitan universities are consistent with the institution's mission and values. For example, they make a concerted effort to help new students feel welcome and allocate resources in ways consistent with their educational purposes. Residential colleges do similar things, but perhaps in an environment in which it is assumed that the student is significantly separated from the world of work and family. That

is, in an environment in which the institution has minimal competition for the student's attention. At metropolitans there might be much competition for student attention and this might affect outcomes.

Data Collection

In the larger study, the College Student Experience Questionnaire (CSEQ) was administered to 9445 randomly selected undergraduate students at 13 of the 14 institutions. Because students of color often participate in surveys at lower rates than white students (Amos, 1990), oversampling was requested in order to increase the number of students of color among respondents.

Usable CSEQs in the general study were returned by 3601 students. The response rate of 38% was not unusual for a survey instrument of this type. Only 31% of the students at the metropolitan universities responded. This rate of return can be attributed in part to the fact that many of the students at these institutions live off campus, are older than 25, attend college part time, commute to class, and have many other activities (e.g., job, family, community responsibilities) that compete with responding to surveys. Of the 1043 surveys completed by students at the metropolitan sub-sample, 738 (70.8%) completed all the responses on the 15 variables of interest in this study.

Data Analysis

Table 1 summarizes the variables used in this study (Appendices A through C contain more detailed descriptions of variables). As indicated in Figure 1, variables can be considered exogenous and endogenous to our model. The variables are discussed in the following order: dependent outcome variables, independent exogenous variables, and endogenous variables.

Dependent Variables. These variables included ten of the 21 Estimate of Gains, four-point rating scales from the CSEQ consisting of student ratings of progress toward important educational goals (Appendix C). According to Pace (1988), these goals are frequently mentioned in the higher education literature and have been used in national surveys over the past several decades. The questions in this section require that the students think about how much they have learned and how their intellectual skills have changed because of their college experiences.

For this study, we concentrated on two combined scales that form gains in intellectual skills and in interpersonal skills (GNINTEL and GNPERSOC). Each outcome was estimated in a separate structural equation model. These variables are reflective of a student's ability to "learn to learn" and interact with others in a complex information based society, both which are useful to the individual and the society as a whole (c.f., Huber, 1984; Berleur & others, 1990, on the information society; and Pascarella & Terenzini, 1991, and Leslie & Brinkman, 1988, on the advantages of education to personal, social and economic factors).

Independent Endogenous Variables. Five independent variables were used, three corresponding to the categories of student involvement or effort (QEACAD, QEINTPER, QESCI), and two measures of the college environment (ENVREL, ENVOTH). The Quality of Effort scales of the CSEQ reflect student involvement by measuring how often students engage in such aspects of college life as academics, use of group facilities, and informal personal experiences (Appendix A). There are 14 such scales, based on multiple items each with a four-point rating (see Table 1), and each focusing on a specific aspect of undergraduate life. The scale for dormitory and fraternity-sorority life has been omitted from this study since not all undergraduates share these experiences (Pace, 1987), but demographics for residency was included.

The two assessments of institutional environment are quantitative measures of student perceptions produced by the CSEQ College Environment Scales (Appendix B). There are 8 seven-point rating scales; five of the rating scales refer to the extent to which the institutional environment emphasizes certain aspects of student learning (scholarship, aestheticism, critical thinking, vocational competence, practical relevance of courses) and the remaining three scales refer to agents of socialization (i.e., relationships among students, faculty, and administrators).

Independent Exogenous Variables. These nine control variables were divided into two general groups: (a) academic readiness and (b) personal-contextual characteristics. The

academic readiness variables include college GRADES as a indicator of academic ability, motivation, perseverance and study skills (Pascarella & Terenzini, 1991) which the student might bring to the institution. Whether or not the student intended to seek an advanced degree, ADVDEG, might be one indicator of the student's commitment to academic achievement and their interaction with faculty as an environmental factor (Baird, 1976). Because parent's education (PARGRAD affects educational aspirations (Sewell & Hauser, 1980; Stage & Hossler, 1989), it is included here as a possible influence on learning.

Personal-contextual characteristics included: (a) age (AGE) because age, one of the more obvious ways in which metropolitan students differ from residential students, and because of its unclear (Pascarella & Terenzini, 1991) yet possibly important influence on gains; (b) ethnicity (RACE) and (c) student gender (SEX) in order to examine possible differential effects on the two gain variables; (d) marital status (MARITAL); (e) full or part-time enrollment status (FULLPART); and (f) on/off campus living arrangements (LIVENOW). Although the latter three variables are not often considered to be influential in determining gains in college, they are among the most descriptive biographical characteristics of students at metropolitan institutions.

Factor analysis. The 14 Quality of Effort, 8 College Environment, and 21 Estimates of Gains scales were too numerous to meaningfully examine and interpret separately. By using the

results of a factor analysis (Kuh, Arnold & Vesper, 1991; Pace, 1987) applied to the sample, the 43 possible exogenous independent variables were reduced to 12 factors, 7 of which we considered: all environmental measures summed in two factors, all effort variables summed in three factors, but only ten of the gains variables, five summed each into two factors. In addition to having been empirically established, these factors also appear conceptually and intuitively valid. That is, those scales expected a priori to be highly associated, do, indeed, group together in sensible ways. Factor definitions studied and their component variables follow (the capitalized names refer to the descriptions in the appendices).

The two Estimate of Gains scales considered are:

GNPERSOC	personal and social development	
	SELF+OTHERS+VALUES+TEAM+HEALTH	
GNINTEL	intellectual/cognitive skills	
	ANALY+SYNTH+QUANT+INQ+CMPTS	

The Quality of Effort scales in three factors are:

QEACAD	academic activities	
	LIB+FAC+COURSE+WRITE+CONINF	
QEINTPER	informal personal activities	
	AMT+PERS+STACQ+CONTPS+UNION+ATHL+CLUBS	
QESCI	activities related to science	
	SCI	

The ratings of College Environment reduced to two environmental factors:

ENVREL	supportive socializing relationships
	STU+FAC+ADM
ENVOTH	scholarly, intellectual, practical
	emphasis
	SCH+ESTH+CRIT+VOC+PRAC

Path analysis. The 5 endogenous and 9 exogenous variables were combined with each gain variable as one of the endogenous measures and analyzed using the structural equation modelling technique implemented in LISREL VI (Joreskog & Sorbom, 1984). The two path models tested, one for each gain variable, are both described in Figure 1, which is a variant of the general causal model of Pascarella (1985).

LISREL is an appropriate method for the purposes of this study because it allows the specification of a measurement model as described by the CSEQ variables, and a structural model that relates the gain variables to the direct effects of the endogenous variables, the exogenous variables, and effects of the latter as mediated through the endogenous variables. Moreover, LISREL can be used to constrain model coefficients, diagnose problems with a model, set correlations and error terms, and test the goodness of fit of a model specified a priori (Hayduk, 1987; Stage, 1990).

Although LISREL is often the technique of choice to use on longitudinal data (where causality might be a reasonable assumption), its use is not limited to such data, nor for that

matter exclusively to causal structure modelling (Joreskog & Sorbom, 1984, p. I.3). Indeed, the relationships among the variables we are considering can be described as causal in the following sense (Hayduk, 1987, p. 125, Note 1):

> By "cause" we mean no more than that we are imagining a system in which the values of a dependent variable are derivable from, or determined by, the values of the other concepts...Thus causation is part of our abstract conceptual system and is not necessarily a property of the real world.

Because we are interested in obtaining, and understanding, the influences of various variables on student gains, it seemed reasonable to treat our model as a tentative exploration of an influence model rather than a causal model.

Model Parameters

In the interests of parsimony and clarity of model use for practitioners we did not use multiple measures of latent constructs; rather, each of the 15 variables was assumed to describe a single construct. Moreover, the ability to constrain model coefficients as part of the measurement model meant we could specify, a priori, correlations among the exogenous variables, and also make reasonable assumptions about the error terms of the measurement models of the endogenous and exogenous indicators (Terenzini & Wright, 1987). We made a reasonable set of assumptions about correlations of many the exogenous variables among themselves and let LISREL estimate these numbers and their

significance. The numbers and (therefore the assumptions of the relationships) are listed in Table 2.

Setting error terms of the measurement model to zero or letting LISREL estimate them seems inappropriate (Hayduk, 1987); hence, we made reasonable estimates of such terms as a percentage of the measured variables variance. Error terms can be specified for one or all of three reasons (Hayduk, 1987). First, some of the variance of the measured variables might be due to coding errors; for the CSEQ data we assumed these errors to be trivial. Second, error might be due to the student's inability to accurately answer a question. For example, some students might not know their parents' educational levels, or they might not accurately report their college GPA. Finally, the measurement variable might not fully capture the underlying latent construct; that is, if the latent construct is "ability" it might not be fully captured by the measure of "grades." Our estimates of these errors for each of the 15 variables were based on a familiarity with the institutions and the CSEQ data for our sample. In no case did the error estimates exceed 10% of the variance of the model variables over our sample of 738 students.

We assumed that each of the exogenous background variables had direct effects on each of the gains variables, and on each of the environmental and effort variables. Moreover, we assumed that each of the intervening environmental and effort variables had direct effects on gains. These assumptions are consistent with the Pascarella (1985) model.

Because we were not using the Quality of Effort variables (QEACAD, QEINTPER, and QESCI) as multiple measures of single construct "Effort", specifying the paths between them was a challenging part of model set-up. That these three variables would re-enforce each other is a reasonable assumption because effort in one area is not independent of effort in other areas (Kuh, 1991; Pascarella & Terenzini, 1991). Hence we decided that if any order of re-enforcement was reasonable and defensible[2], we would choose the one that emphasized academic context as the "first among equals"; that is, academic effort influences interpersonal effort, which in turn influences effort at science. The "Effort" box in Figure 1 indicates our choice of the order (QEACAD to QEINTPER to QESCI). Because of simplicity in specifying the model and ease of use for practitioners, we made the paths non-recursive, that is, uni-directional (Stage, 1990).

Results

T-tests were used to compare the 16 variables (including both gains variables) of the 738 students in the analysis with those of the 1043 in the overall metropolitan sample. The only statistically significant difference ($p < .05$) was with the variable SEX. There were 7.7% more females in the analyzed sample than in the overall metropolitan sample.

Path Analysis We made one estimate of each of the models. Tables

2,3, and 4 present the results of the model estimates and the model specifications. Table 2 also contains our assumptions about the relationships of the exogenous variables.

Defined elements and residuals. All elements in each model were defined and the Q-plot for each model was an acceptable measure of the residuals: A very flat nearly straight s-curve moderately above the 45-degree line.

Goodness of fit. For the **GNINTEL** model, the Chi-square with 13 df is 10.62 (LISREL computed p = 0.642), the adjusted goodness of fit index is 0.982, the total coefficient of determination for the structural equations is 0.833, and the squared multiple correlation for GNINTEL is 0.465. For the **GNPERSOC** model, the Chi-square with 13 df is 10.62 (LISREL computed p = 0.642), the adjusted goodness of fit index is 0.982, the total coefficient of determination for the structural equations is 0.833, and the squared multiple correlation for GNPERSOC is 0.447.

That these two sets of descriptive statistics of the models are so close is not surprising. The models, except for the outcome variables, were identical, and the outcome variables themselves are reasonably related. However, the model coefficients (Table 3 and Table 4) were not identical.

Covariances. Our assumptions about the non-zero covariances of the exogenous variables held in both models (Table 2). However, many of the coefficients are very small (e.g., RACE and ADVDEG, FULLPART and GRADES, and MARITAL and SEX). Thus the student's race did not appear to be associated with educational

aspirations beyond college, and enrollment status (part-time or full-time) was not associated with grades. A relationship between marital status and gender was hypothesized because we thought there might be measurement effects of the older students being married and female.

Path coefficients. All coefficients reported are standardized. None of the exogenous variables had significant, direct effects on the gains variables (Tables 3 and 4). For the environmental variables, GRADES had a small direct positive effect .106 on ENVOTH, and MARITAL had a small direct negative effect -.115 on ENVREL; otherwise, the exogenous variables did not have effects on the environmental variables.

The background variables had the most number of effects on QEINTPER and the least number on QESCI for both models. For QESCI, only SEX had an effect and it is a negative (-.316). Only ADVDEG, GRADES, and FULLPART had significant effects on QEACAD. All background variables except RACE and ADVDEG influenced QEINTPER, although some of the significant effects were quite small (GRADES, PARGRAD, and SEX all less than .10). In fact, PARGRAD had effects only on QEINTPER in both models. LIVENOW only affected on QEINTPER, and in both models it was a negative (-.155). AGE also had a significant negative effect (-.193) on QEINTPER in both models; this was its only direct effect.

Intervening variables. For the **GNINTEL** model the effort variable QEINTPER did not have significant direct effects on the gain but it did for the **GNPERSOC** model (.392). In both cases

QEACAD had positive effects on the gains (.221 and .183 for intellectual and personal-social skills respectively); in each case the effects were larger than those of the environment. The effort variable QESCI had different effects on the gains: a substantial and positive coefficient of .406 for **GNINTEL** and a smaller and negative -.113 on **GNINTPER**. What underlying construct QESCI measures is unclear; nevertheless its effect must be considered in any discussion of gains, because encouraging effort in science while increasing intellectual skills appears to suppress gains in personal-social areas.

The environmental variable (ENVOTH) had a large positive affect on ENVREL (.509 in both cases). However, it did not have significant effects in either model on the effort variables QEINTPER and QESCI, but it did have direct significant effects on QEACAD in both (.160 for both). ENVREL, on the other hand, has no significant effects on QEACAD and QESCI but it has small positive effects on QEINTPER in both models. ENVOTH has direct effects on both gain variables, .143 for **GNINTEL** and .136 for **GNPERSOC**. ENVREL also has direct effects on gain but for **GNINTEL** it was quite small (.090) whereas for **GNPERSOC** it was larger (.155). Thus the effects of the two environmental variables are comparable in size for the personal-social gain but not so for the intellectual skills gain.

Discussion

Students across the institutions were diverse in age, and

enrollment status. Most new majority students handled numerous role commitments simultaneously including spouse, parent, full-time worker, and so on. In that sense, one can surmise that for many students at these institutions, the student role may not be as central to their lives as it is for traditional-age, residential students. Certainly the time that commuting students have available to them for participation in campus events is limited. As a result, it is probably unrealistic to expect them to participate as fully in such activities and other learning experiences as their counterparts at traditional, residential colleges. Indeed, as Jacoby (1990, p. 63) observed, "commuters select their campus involvements carefully." Thus students at metropolitans might be different from their counterparts at traditional institutions in significant ways, and explanatory models of student outcomes from one institutional type to another might vary in kind and effects.

That the background student variables had no direct effects on the gains variables was surprising and not altogether consistent with the literature on traditional students at traditional institutions (Pascarella & Terenzini, 1991; Pascarella, 1985). However, it does support our general hypothesis that students at metropolitan universities, although similar to traditional students in many ways, also differ in some important ways. Perhaps the essentially "open admissions" policies of these institutions attract students with diverse learning styles and aspirations but at the same time ensure what

is a "level playing field" in which what matters most as far as learning is concerned is a structured environment and individual effort.

On the variables most descriptive of students at metropolitan institutions, the results were mixed. Where students live, on or off campus (LIVENOW), had only negative effects on QEINTPER. Thus students living off campus (including those who were married) devote less effort to interpersonal relations. This is consistent with what one might expect. However, devoting less effort to interpersonal activities did not seem to have a negative effect on gains in intellectual skills (GNINTEL).

It was not surprising that living arrangements had an overall negative effect on gains on the personal-social variables (GNPERSOC), and that full-time enrollment had more of an effect on interpersonal relations than part-time enrollment. Similarly, being married (MARITAL) had a negative effect on ENVREL which in turn might have a negative effect in gains in personal-social skills and intellectual skills, but perhaps only marginally on the latter. However, being married increased QESCI which in turn increases GNINTEL while suppressing gains in GNPERSOC. For science, it might be the case that married students are more familiar with technology from the workplace and use it to greater advantage in honing intellectual skills than unmarried students. Or it might the case that they work harder at science-related activities because those skills are easily transferred to the

workplace.

Thus overall, and in the obvious ways, the student experience at metropolitan universities does not increase interpersonal gains; at the same time, part-time enrollment status does not negatively affect gains in intellectual skills. That is, with the traditional student-based measures on intellectual skills, metropolitan students benefit in significant ways. However, these gains are due mostly to their own effort and the general atmosphere of the institution (ENVOTH).

It might be the case that metropolitan students have no need to increase their social-personal gains with fellow students as those needs are already met by family and friends off campus. Equally, so it might be the case that the metropolitan students do not have the time for such interactions or that the institutions are creating environmental conditions that encourage interactions in ways consistent with the special needs of the students.

Conclusions and Implications

This study was undertaken to test Pascarella's (1985) general causal model for metropolitan students, study the validity of using many traditional student-based measures in a metropolitan setting, and to see if significant variables are of the sort that can inform practice and improve student gains.

Our results show that although the model has appropriate goodness of fit measures, it does not conceptually support the

thrust of the general model, particularly as to the effects of student characteristics on gains. However, it clearly shows that gains are influenced by effort and institutional environment. Thus the model has validity when applied to metropolitan universities, but more work need to be done in selecting variables and relationships to fully capture the special nature of these institutions.

Are models based on traditional residential students useful in understanding new majority students? Yes and no. Clearly it is nice to know that effort matters for all students, and that the environments created at metropolitans do have an appropriate impact on gains. But the traditional models do not, for example, illuminate the nature of the part-time student experience or that of a married student with external--to the institution--obligations. Both enrollment and marital status have indirect effects on gains and direct effects on the relationships of metropolitan students with faculty and administrators. Thus practitioners should understand that models based on traditional students might be misleading in two ways: (1) The models might create in the practitioners mind, and therefore so inform their actions, that what is good for traditional students is also good for metropolitan students. This is not necessarily the case; (2) The models leave out many variables and contexts that <u>are</u> important in understanding student gains at metropolitans institutions, and therefore do not even ask the right questions, and questions not asked, are questions not answered.

Finally, what are implications for the policies and practices of metropolitan institutions? This preliminary study only begins to address that question. To begin with, our model might suggest that those charged with influencing the personal and social gains of students direct their energies away from trying to place metropolitan students into a residential mold that tries to replace family and friends; rather those practitioners should use family, friends, and the student's world of work to enhance gains. The study suggests that gains would be increased if married students at metropolitan universities could be made more comfortable in their relations with other students, faculty, and administrators. This might be done by finding ways for married students to spend more time interacting with their institutional colleagues while maintaining their family obligations. This might be done by emphasizing team work and projects in the classroom while providing support for evening meetings such as child-care, or by involving spouses and children in various non-academic collegiate programs. For example, rather than celebrating commencement with a dinner-dance, a picnic or some other event where children, parents and co-workers are invited -- and would feel comfortable -- would be more appropriate.

Metropolitan universities have emerged as a distinctive from in American higher education (Grobman, 1988). New majority students are the fastest growing segment of undergraduates. While several variables that have direct effects on learning and

personal development are similar for both traditional and new majority students -- most notably effort -- there is much more to discover about how postsecondary institutions can create conditions that encourage student effort and foster learning. This study is but one step in that direction.

Notes

1. In the general study, participating institutions were identified with the assistance of 48 experts drawn from higher education scholars (e.g., Alexander Astin, Zelda Gamson, Robert Pace, David Riesman), higher education associations (e.g., American Association for Higher Education, American Council on Education, Council of Independent Colleges), regional accreditation associations, selected college and university presidents, and former presidents of the American College Personnel Association and the National Association of Student Personnel Administrators. The study included large universities (Iowa State University, Miami University, Stanford University, University of California, Davis), small liberal arts colleges (Berea College, Earlham College, Grinnell College, The Evergreen State College), and urban institutions (University of Alabama-Birmingham, University of Louisville, University of North Carolina-Charlotte, Wichita State University). A women's college (Mount Holyoke College) and a historically black college (Xavier University) were also studied.

2. Simon (1981) has noted that given real-world problems of some complexity an appropriate representation that is not outrageous or indefensible might be the best "satisficing" approach we can make: "Numbers are not the name of this game but rather representational structures that permit functional reasoning, however qualitative it may be." (p. 169). Nevertheless, we did estimate other path combinations on the quality of effort variables: in all cases the models differed from each other in trivial and non-significant ways and only among the effort variables themselves.

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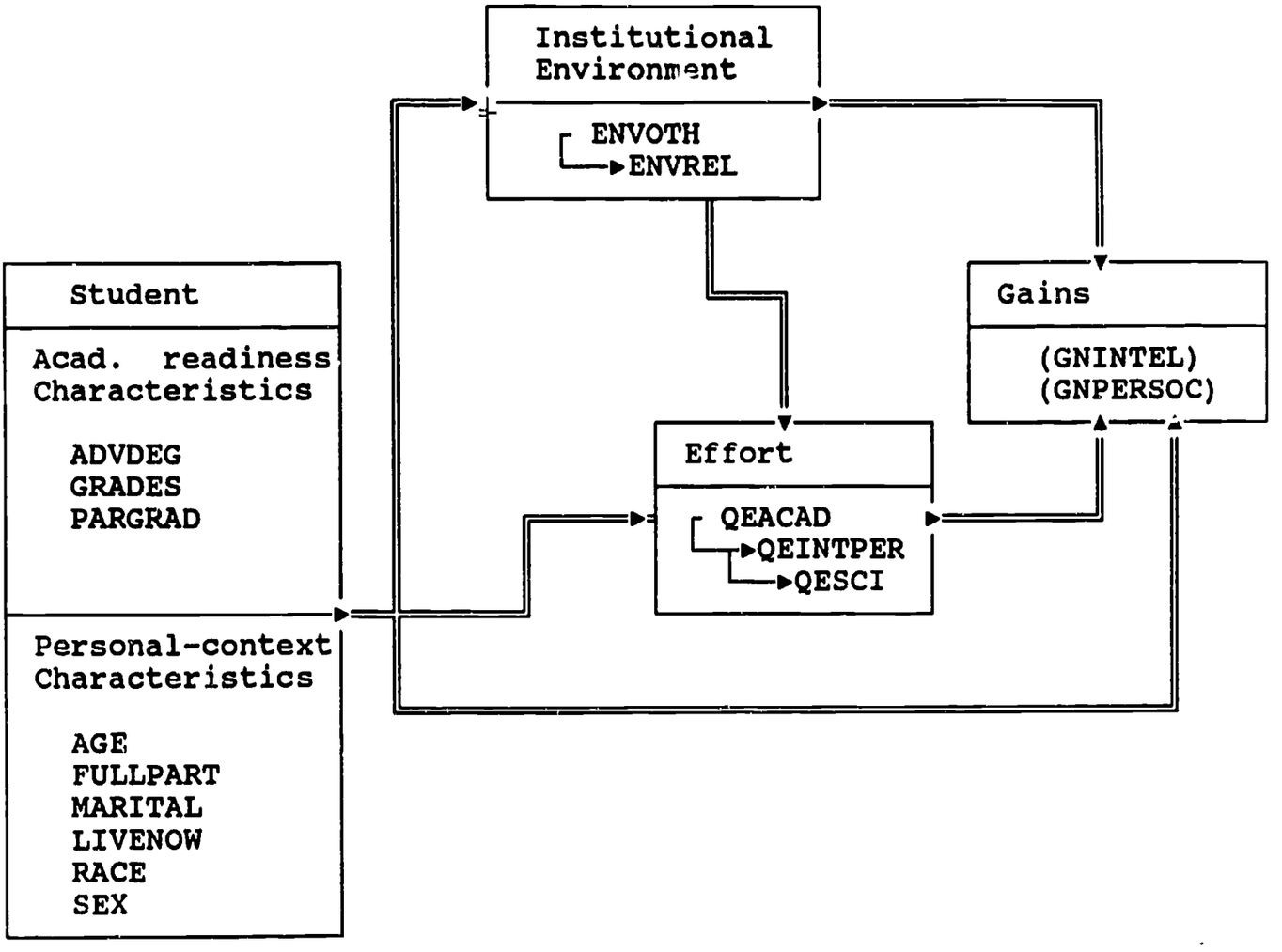
Figure 1



This figure represents two models.
One with the outcome **GNINTEL**, the other with **GNPERSOC**.

All variables in the **Student** box assumed
to affect all variables to the right, and all
intervening variables to affect **Gains**.
Within the intervening boxes, the arrows indicate
assumed affects and their directions.

Table 1
Variables in the model

Academic readiness

Advanced Degree		
ADVDEG		0=no 1=yes
mean = .67	s.d. = .47	
min = 0	max = 1	
College grades		
GRADES		1=c,c-,lower 2=b-,c+ 3=b 4=a-,b+ 5=a
mean = 3.20	s.d. = 1.19	
min = 1	max = 5	
Parents with college degree		
PARGRAD		0=neither 1=only one 3=both
mean = .57	s.d. = .77	
min = 0	max = 2	

Personal-contextual

Ethnicity		
RACE		0=White 1=Black
mean = .12	s.d. = .32	
min = 0	max = 1	
Gender		
SEX		0=male 1=female
mean = .66	s.d. = .47	
min = 0	max = 1	

Table 1, cont'd
Variables in the model

Age
AGE — 0=22 or less; 1=23 to 27; 2=28 or more

mean = .74 s.d. = .85
min = 0 max = 2

Full or part time
FULLPART — 0=part time; 1=full time

mean = .80 s.d. = .40
min = 0 max = 1

Marital status
MARITAL — 0=single; 1=married

mean = .26 s.d. = .44
min = 0 max = 1

Living arrangements
LIVENOW — 0=on campus; 1=off campus

mean = .86 s.d. = .35
min = 0 max = 1

Institutional environment

Contextual
ENVOTH — Sum of five variables over 1=weak emphasis... 7=strong emphasis

mean = 24.10 s.d. = 5.20
min = 5 max = 35

Socializing agents
ENVREL — Sum of three variables over 1=competitive, rigid, remote 7=friendly, helpful, approachable

mean = 13.92 s.d. = 3.64
min = 4 max = 21

Table 1, cont'd
Variables in the model

Student effort

Academic
QEACAD

mean = 108.5 s.d. = 18.00
min = 56 max = 167

Sum of five variables over
1=never
2=occasionally
3=often
4=very often

Interpersonal
QEINTPER

mean = 137.06 s.d. = 29.17
min = 76 max = 247

Sum of seven variables over
1=never
2=occasionally
3=often
4=very often

Science
QESCI

mean = 22.63 s.d. = 7.56
min = 12 max = 48

Sum of one variable over
1=never
2=occasionally
3=often
4=very often

Gains

Intellectual gains
GNINTEL

mean = 13.47 s.d. = 3.32
min = 5 max = 20

Sum of five variables over
1=very little
2=some
3=quite a bit
4=very much

Interpersonal gains
GNPERSOC

mean = 12.82 s.d. = 3.50
min = 5 max = 20

Sum of five variables over
1=very little
2=some
3=quite a bit
4=very much

Table 2

Correlations of exogenous variables in the model

Same values for both outcome variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)LIVENOW	1.00								
(2)ADVDEG	.x	1.00							
(3)GRADES	.12	.10	1.00						
(4)PARGRAD	.x	.x	.x	1.00					
(5)RACE	-.20	.08	-.33	-.10	1.00				
(6)SEX	.x	.x	.16	-.13	.10	1.00			
(7)AGE	.31	.x	.24	-.23	.x	.x	1.00		
(8)FULLPART	-.18	.x	-.03	.11	.x	.x	-.42	1.00	
(9)MARITAL	.26	.x	.27	-.19	-.10	.08	.61	-.27	1.00

Note: The symbol .x means a correlation set to zero

All numbers significant at $p < .05$

Table 3

Standardized path coefficients--direct effects

Outcome variable **GNINTEL**

	ENVOTH	ENVREL	QEACAD	QEINTPER	QESCI	GNINTEL
LIVENOW	.052n	-.038n	-.011n	-.155***	-.013n	.025n
ADVDEG	-.009n	-.024n	.186***	.017n	-.022n	-.013n
GRADES	.106	.061n	.209***	-.093*	.002n	-.023n
PARGRAD	.056n	-.003n	.037n	.058*	-.024n	-.023n
RACE	.013n	-.016n	.115*	.027n	-.052n	-.031n
SEX	.006n	-.010n	.055n	-.059	-.316***	-.026n
AGE	-.081n	.101n	.063n	-.193***	-.082n	.033n
FULLPART	.001n	.038n	.131*	.102*	-.042n	.017n
MARITAL	.012n	-.115	.028n	-.133**	.102	.015n
ENVOTH	___	.509***	.160**	-.005n	.071n	.143**
ENVREL	___	___	-.002n	.070	-.022n	.090
QEACAD	___	___	___	.612***	.323***	.221***
QEINTPER	___	___	___	___	.132	.068n
QESCI	___	___	___	___	___	.406***

___ = fixed at zero
n = not significant at p = .05
= significant at p = .05
* = significant at p = .01
** = significant at p = .001
*** = significant at p = .000

Table 4

Standardized path coefficients--direct effects

Outcome variable **GNPERSOC**

	ENVOTH	ENVREL	QEACAD	QEINTPER	QESCI	GNPERSOC
LIVENOW	.052n	-.038n	-.011n	-.155***	-.013n	-.005n
ADVDEG	-.009n	-.024n	.186***	.017n	-.022n	-.017n
GRADES	.106	.061n	.209***	-.093*	.002n	-.017n
PARGRAD	.056n	-.003n	.037n	.058*	-.024n	-.013n
RACE	.013n	-.016n	.115*	.027n	-.052n	-.058n
SEX	.006n	-.010n	.055n	-.059	-.316***	-.061n
AGE	-.081n	.101n	.063n	-.193***	-.082n	.031n
FULLPART	.001n	.038n	.131*	.102*	-.042n	.016n
MARITAL	.012n	-.115	.028n	-.133**	.102	.019n
ENVOTH	___	.509***	.160**	-.005n	.071n	.136*
ENVREL	___	___	-.002n	.070	-.022n	.155**
QEACAD	___	___	___	.612***	.323***	.183*
QEINTPER	___	___	___	___	.132	.392***
QESCI	___	___	___	___	___	-.113***

___ = fixed at zero
n = not significant at p = .05
= significant at p = .05
* = significant at p = .01
** = significant at p = .001
*** = significant at p = .000

Appendix A

CSEQ QUALITY OF EFFORT SCALES

LIB	Library Experiences such as asking the librarian for help or using specialized bibliographies
FAC	Experiences with Faculty such as visiting informally with an instructor or working on a faculty project
COURSE	Course Learning such as listening attentively in class or do additional readings on course topics
AMT	Art, Music, Theater such as visited an art gallery or worked on a theatrical production
UNION	Student Union such as met friends at the union or went to hear a speaker
ATHL	Athletic and Recreation Facilities such as used the gym for individual activities or played on an intramural team
CLUBS	Clubs and Organizations such as attending an event by a student group or committee work
WRITE	Experiences in Writing such as spending five hours writing a paper or submitted an article for publication
PERS	Personal Experiences such as telling your personal reactions to a friend or talking to a counselor
STACQ	Student Acquaintances such as made friends with student of different interests or discussions with international students
SCI	Science/Technology such as memorizing formulas or writing a computer program
CONTPS	Topics of Conversation such as talking about jobs, money, careers or social and ethical issues
CONINFO	Information in Conversations such as explore different ways to think about a topic or persuading a friend to change his or her mind

Appendix B

CSEQ COLLEGE ENVIRONMENT SCALES

SCH	Emphasis on the development of academic, scholarly, and intellectual qualities.
ESTH	Emphasis on the development of aesthetic, expressive, and creative qualities.
CRIT	Emphasis on being critical, evaluative, and analytical.
VOC	Emphasis on the development of vocational and occupational competency.
PRAC	Emphasis on the personal relevance and practical values of your courses.
STU	Relationships with other students, student groups, and student activities.
FAC	Relationships with faculty members.
ADM	Relationships with administration personnel and offices.

Appendix C

CSEQ ESTIMATE OF GAINS SCORES

VOC	Vocational training--acquiring knowledge and skills applicable to a specific job or type of work.
SPEC	Acquiring background and specialization for further education in some professional, scientific, or scholarly field.
GENLED	Gaining a broad general education about different fields of knowledge.
CAREER	Gaining a range of information that may be relevant to a career.
ARTS	Developing an understanding and enjoyment of art, music and drama.
LIT	Broadening your acquaintance and enjoyment of literature.
WRITE	Writing clearly and effectively.
CMPTS	Acquiring familiarity with the use of computers.
PHILS	Becoming aware of different philosophies, cultures, and ways of life.
VALUES	Developing your own values and ethical standards.
SELF	Understanding yourself--your abilities, interests, and personality.
OTHERS	Understanding other people and the ability to get along with different kinds of people.
TEAM	Ability to function as a team member.
HEALTH	Developing good health habits and physical fitness.
SCI	Understanding the nature of science and experimentation.
SCI/TECH	Understanding new scientific and technical developments.
CONSQ	S/T Becoming aware of the consequences (benefits/hazards/ dangers/values) of new applications in science and technology.
ANALY	Ability to think analytically and logically.
QUANT	Quantitative thinking--understanding probabilities, proportions, etc.
SYNTH	Ability to put ideas together, to see relationships, similarities, and differences between ideas.
INQ	Ability to learn on your own, pursue ideas, and find information you need.