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ABSTRACT

The development and use of the College Student Experiences Questionnaire to assess the quality of students' effort and the attainment of college-related goals are discussed. The questionnaire covers college facilities (e.g., educational, cultural, and recreational), and personal/interpersonal experiences at college. Responses to 14 scales covering 142 activities produce a measure of the quality of effort invested in each of the topics or aspects of college life. Also covered are student background characteristics, including grades, aspirations, and financial arrangements. Additional scales allow students to rate the college's emphasis on the development of scholarly, creative, and analytical qualities, occupational competence, and the practical value of courses. Also covered are student views of personal relationships, the extent of student reading and writing during the current school year, and student satisfaction with college. Finally, students indicate the extent of progress concerning typical objectives. In addition to discussing the reliability of the instrument, findings are analyzed, with consideration to the prediction of achievement, satisfaction with college, and the diagnostic value and significance of quality of effort. Appended are 16 technical tables reflecting statistical results and a 4-page bibliography. (SW)

MEASURING THE QUALITY OF COLLEGE STUDENT EXPERIENCES

An Account of the Development and Use of the College Student Experiences Questionnaire

by

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CONTENTS

Acknowledgements

For two years, beginning in January 1978, a grant from the Spencer Foundation enabled me to explore the possibility of measuring a concept I called "quality of effort," to determine whether the measures that might be produced would be reliable and valid, and to find out what such measures would contribute to understanding and explaining student learning and development in college. What I proposed to do had not previously been done. I am indebted to the Spencer Foundation for its willingness to risk the investment. As it turned out, quality of effort can be measured; valid and reliable scales for measuring it were devised; and the use of these measures has added a great deal to understanding and explaining college student learning and development.

Advice, assistance, and cooperation from many people contributed to this activity. At the outset of work on the research grant I met with an advisory committee consisting of Robert Birney, Arthur Chickering, and Joseph Katz. Just prior to deciding on the exact content for the final questionnaire I met with another advisory group consisting of James Maxey, Jack Rossmann, and Jonathan Warren. In the process of inventing the various measures, item ideas were submitted, discussed, and tried out by several colleagues who were, at that time, doctoral students in the higher education program at UCLA--Nancy Mattice, Jack Friedlander, Jon Shaver, Patricia Cross, and Miriam Beckwith. In the period from 1978 to 1983, the individuals I employed as research assistants to work with me on matters related to what has become a major research program were, successively: Jon Shaver, Jack Friedlander, Mary

Beth Snyder, and Oscar Porter, a[illegible] whom subsequently obtained their doctorate degree. For the past year, and currently at the time of writing, my research assistant is Karen Lefever.

Also in this period from 1978 to 1983 much has been written about these new measures. There have been five doctoral dissertations at UCLA--by Jon Shaver, Jack Friedlander, Oscar Porter, Juan Lara, and Daniel Brown. Research papers have been read at annual meetings of the American Educational Research Association, the Association for Institutional Research, the National Association of Student Personnel Administrators, the American Association for Higher Education, and the Association for the Study of Higher Education. The main document up to now has been my report to the Spencer Foundation in October 1979. Colleges and universities that have used the questionnaire, College Student Experiences, have also received normative reports of results for different types of institutions. Many of these reports however, are not readily available. A few are in ERIC. One is in Research in Higher Education, and one is in the Current Issues series published by the American Association for Higher Education. In May 1982 I wrote a report, "Achievement and the Quality of Student Effort," for the National Commission on Excellence in Education; and that report is available from ERIC. But nowhere is there a single report about the technical and psychometric properties of the quality of effort scales, the rationale for their construction, and major results from their use at various colleges and universities. Some of that information was put in the report for the National Commission on Excellence in Education; but the present monograph

contains more statistical data and more examples of results from research, as well as more recent analyses.

Since previous writings about this instrument have not been readily available I am assuming that most readers of the present report are not familiar with those prior reports. Consequently, some of what I have written before is repeated here, but without attaching quotation marks and footnotes to every previously written sentence or paragraph.

Beyond my obvious indebtedness to and appreciation for the various analyses made by doctoral students and research assistants at UCLA, and on their ability to talk to a computer (a skill I have not acquired), my appreciation extends especially to the administrators and other staff members at more than 100 colleges and universities who chose to use the College Student Experiences questionnaire and to the thousands of college students who chose to answer it.

C. Robert Pace

December 1983

RATIONALE

The College Student Experiences questionnaire, first published in 1979, and slightly revised in a second edition published in 1983, is a unique instrument for assessing the quality of undergraduate student education and examining the sources of student progress toward the attainment of important goals of college education. The intellectual origins of this instrument come from a variety of views and concepts about the nature of higher education, about accountability, about student learning and development, and about the need for new measures in the evaluation of higher education programs.

The Concept of Quality

Education is both a process and a product. When we evaluate educational programs, however, we have typically viewed education as a product -- knowledge acquired, skills improved, attitudes and values modified, personal traits developed. We have typically thought of educational processes in terms of what they contribute to the product--with some processes or methods judged as better than others because they produce more learning, higher test scores, or whatever the intended outcome may be. We readily agree that some products are inherently better than others -- knowledge is better than ignorance, tolerance is better than bigotry, however they may be attained. Is it not also true that some processes are inherently better than others, regardless of whether they produce more learning? The process or experience of trying to see how things fit together, as in making an outline, is a better educational experience than the process of memorizing dates in a history book.

The intellectual level of the former is higher than the intellectual level of the latter, and that is so whether or not it leads to a higher score on some achievement test. The experience of seeing the Grand Canyon in Arizona is qualitatively different from the experience of seeing pictures of it in the National Geographic. The value of the experience is inherent in the experience itself. Whether it leads to a higher score on a geology test is irrelevant. So, in thinking about how we evaluate educational programs it seemed to me that the quality of the educational experience or process should somehow be taken into account. We need ways to measure the quality of the process as well as the quality of the product.

Another line of thinking stems from the following basic fact: all learning and development require an investment of time and effort by the student. Time is a frequency dimension. Effort is a quality dimension in the sense that some educational processes require more effort than others. It's fairly easy to look up a given reference in the library. It's more difficult, takes more effort, to develop a set of references for a report. It doesn't take much effort to look up a word in the dictionary. It takes more effort, more initiative, to ask other people to read something you have written to see if it is clear to them. In both of these examples the activity requiring the greater effort is also potentially more educative. It takes more effort to get to the Grand Canyon than it takes to get to the library! Quality of experience and quality of effort are similar concepts, connected with one another in that the likelihood of having high quality experience

depends on investing high quality effort. By measuring "effort" we may have the key to judging the quality of the educational process.

Still another line of argument influenced my feeling that quality of effort was an important and timely concept. Much of the current rhetoric about institutional accountability and consumerism in higher education is onesided. If students don't graduate, the institution is accountable. If students don't learn, the teacher is accountable. If the graduates don't get good jobs, the institution is to blame.

There are many questionable assumptions in this common rhetoric. It assumes that leaving college before getting a degree is a sign of failure when in many cases it may be a prudent and well-informed decision. It assumes that professors produce learning. It assumes that the college, not the national economy, controls the job market. It assumes that if students don't benefit from going to college, it's the college's fault. It assumes that the student is buying a product when actually the student, at a later point in time, is the product.

Colleges are, of course, accountable for a lot of things. They are accountable for the resources and facilities, the programs and procedures, the stimuli and standards they provide for student learning and development. But surely the students are also accountable for the amount, scope, and quality of effort they invest in their own learning and development, and specifically in using the facilities and opportunities that are available in the college setting. Accountability for achievement and related student

outcomes must consider both what the institution offers and what the students do with those offerings.

Students know that they are accountable. Asked their opinion about the following statement ("If students expect to benefit from what this college or university has to offer, they have to take the initiative") about 95 percent of undergraduates from all over the country said they agreed with that statement. They know that what they get out of college will depend, to a considerable degree, on what they put into it.

Determining the Content

Granted the importance of "quality of effort," one next faces the question "Effort at what?" There are a great many experiences in different aspects of college life that contribute to student learning and development. How does one decide what aspects of college life to look at? And how does one decide on the underlying quality dimension in each of these aspects? There should be some theoretical or conceptual backing for the way one answers those questions.

The college experience consists of the events that occur in the college environment. Many of these experiences stem from events and conditions which the college makes possible and which at least in some respect are intended to facilitate student learning and development. The most salient of these events and experiences are clustered around a number of fairly common facilities -- classrooms, libraries, laboratories, residence units, student unions, chapels, athletic spaces, studios, galleries, theatres, auditoriums and others. Each facility has a particular purpose

and there are characteristic activities that occur in them. Other events and experiences, not associated with any particular physical setting, are also of major importance in college life. These would include contacts with faculty members, involvement in student clubs and organizations, student friendships, informal conversations, and a great variety of relationships. We decided that the topics about which we would construct quality of effort measures should include major facilities and major types of opportunities that commonly exist in the college setting. The total number of topics should provide reasonable coverage of important kinds of events and experiences.

Since the focus of the measures would be on student learning and development, the selection of content within each measure would be guided by basic concepts of learning and development. With respect to classroom learning we had already determined that the quality dimension would be one of increasingly higher cognitive levels. For other topics, concepts about personality development would be more relevant. Personality develops as it encounters new experiences which require new modes of response. One does not grow without having something to grow on. There must, in other words, be some contact, some encounter, some set of events and experiences which theoretically reflect increasing levels of involvement, challenge, and effort. For still other topics, concepts of learning or personality development might not provide an appropriate underlying structure. For example, in some aspects of the college experience, the concern would be in the way students used a particular physical facility. Here the underlying quality

dimension might be simply an educational one which holds that quality of effort is suggested by the extent to which students use the potential inherent in the facility. In the very broadest sense, and probably with respect to all of the quality of effort measures, one could say that the underlying quality dimension or concept was that of capitalizing on the potential for learning and development inherent in the nature of the particular category of experience.

We made four other decisions about the content. We decided that we would not consider facilities or experiences off-campus. Our focus would be on facilities which the college provides, and on experiences or opportunities that exist within the college environment. Secondly, we would limit our scope to major facilities found on all or most campuses and that all or most students would or could readily use. Consequently, we would exclude chapels, art studios, shop facilities, etc. Third, in our consideration of student activities we would include only activities that are presumed to be desirable in fostering learning and personal development in directions intended by the college. Thus, we would exclude interesting but inappropriate activities such as slept in class, cheated on a test, drank beer, smoked marijuana, etc., regardless of how much effort students may devote to such matters. And fourth, we would not be concerned with attitudes, feelings, traumas, identity crises, frustrations, or similar matters of clinical interest. We would focus, as far as possible, on activities and objectively observable behavior.

In short, the content of the quality of effort measures would be "up front," and would focus on how students use the major resources and opportunities for learning and personal growth that are provided by the college for that purpose.

The topics, or aspects of college, included in the subsequently developed measures include the following facilities: classroom (courses), library, science facilities, cultural facilities (art, music, theater) student union, athletic and recreational facilities, and residence facilities (dormitory or fraternity/sorority); and the following other opportunities for personal and interpersonal experiences: experience with faculty, clubs and organizations, experiences in writing, personal experiences (related to self-understanding), student acquaintances, topics of conversation, and information in conversations.

The Method of Measurement

We have already indicated that quality of effort would be judged by the activities students engaged in, that some activities would require more effort than others, and that some activities would have a higher quality (greater potential for influencing learning or personal growth, or be inherently "better") than others.

The format for translating these ideas into a measure is a list of activities, ranging from ones that are easy to do to ones that require more effort, with students asked to report about how often they have engaged in each of the activities during the current school year by checking "never," "occasionally," "often," or "very often". By giving one point for "never," two points for

"occasionally," three points for "often," and four points for "very often," one can get a score for the category. Since a high score can only be attained by engaging with some frequency in the higher quality activiites, the score reflects "quality of effort." Most of the check-lists devised for each topic consisted of ten activities, so a student's score could range from 10 to 40, with 10 meaning that the student had never engaged in any of the activities, and 40 meaning that the student had engaged "very often" in all of the activities.

This style of measurement can be called a scale. The definition of a scale as used here is as follows: 1) the activities within it are a coherent universe of content--that is, if the scale purports to measure quality of effort in using the library, then all items or activities would refer to using the library, 2) the activities, in so far as possible, would reflect a unidimensional hierarchy, meaning that they are interdependent, in the sense that engagement in the higher quality or most difficult activities subsumes engagement in the lower quality or easier activities. When these conditions are met, the result is a very reliable score which also has a very explicit meaning. In this way, it is possible to have reliable measures with a relatively small number of items. This type of measurement was originally devised by Louis Guttman in the 1940s. I have previously used the model in constructing scales to measure the involvement of college graduates in various activities--political, civic, cultural, etc. It seemed a natural and suitable solution for a way to measure the quality of effort students were investing in using the resources and opportunities for their education in college.

The topics, previously noted, are listed below with an indication of the underlying quality dimension for each topic:

Classroom (course learning scale) (10 activities)

From: relatively simple cognitive activities--such as taking notes, underlining, etc.

To: higher level cognitive activities--such as efforts to explain and organize

Library (10 activities)

From: routine, moderately exploratory use--such as using the card catalogue

To: increased amount of independent exploration and focused activity--as in browsing in the stacks, developing a bibliography

Facilities related to the Arts (Art, Music, Theater scale) (12 activities)

From: talking about and attending

To: efforts toward greater understanding (seeking the views of experts and critics) and personal involvement

Facilities related to Science/Technology (principles, procedures, and computers) (12 activities)

From: memorizing, watching, reading

To: efforts to explain, experiment, and develop skills

Student Union (10 activities)

From: casual and informal use--had snacks, met friends, etc.

To: programmatic use--attended events, held meetings, etc.

Athletic and Recreation Facilities (10 activities)

From: generally informal use--exercise, games

To: greater efforts toward improvement and skilled performance

Dormitory or Fraternity/Sorority (10 activities)

From: general socializing

To: more personal exchanges--helping, sharing, studying together, working on projects

Experiences with Faculty (10 activities)

From: routine and causal

To: more serious contacts--such as discussing careers, inviting criticisms, seeking counsel

Clubs and Organizations (10 activities)

From: awareness of events and organizations

To: attending events, discussing programs, working in organizations

Experiences in Writing (10 activities)

From: general concern with words, grammar, revisions

To: seeking criticism from others, greater concern with clarity and style

Personal Experiences (10 activities)

From: general curiosity about understanding one's own behavior, and others--talked with friends, etc.

To: more focused and expertly informed sources of self-understanding--as in reading, taking a test, talking with a counselor

Student Acquaintances (10 activities)

From: making friends with different kinds of people--breadth

To: serious conversations with people who differ from you--depth

Topics of Conversation (12 items)

From: personal and interpersonal topics of immediate experience--jobs, movies, social events

To: intellectual and cultural topics concerning values and social issues

Information in Conversations (6 activities)

From: conversations in which information about the topic is relatively casual and infrequently introduced

To: conversations that typically have expertise, knowledge, and persuasiveness brought to bear on the topic

These are the topics in the revised second edition 1983. With one exception these are also the topics initially included in the 1979 edition. In that earlier edition there was a scale labeled Science Laboratory, but it was subsequently replaced by the scale labeled Science/Technology. Many students had been unable to answer the items in the Science Laboratory scale because they had not had a "laboratory" course. Also in the Conversation Topics scale, the 1983 edition has two additional subjects. The overall content of the instrument is nearly the same as the 1979 edition, and most items are identical.

In summary, we devised 14 scales (lists of activities which reflect increasing levels of effort and potential value), seven addressed to students' use of major campus facilities and seven addressed to other opportunities for experience in the college environment. The responses to these scales can be scored, producing a measure of the quality of effort invested in each of the topics or aspects of college life. While the measures are not perfect scales in the literal definition of a scale by Guttman, and need not be so, the idea of a scale influenced the selection of activities, and the result, as the section on RELIABILITY will report, is a series of measures that are "similar to" Guttman's concept of a scale.

Viewed in another way, the 142 activities in the 14 quality of effort scales provide a systematic inventory of the campus experiences of undergraduates. These activities comprise half of

the content of the College Student Experiences questionnaire--3½ pages out of 7 pages of questionnaire items.

The Larger Scope of Inquiry

The total content of the questionnaire is designed to provide additional information about the significance of quality of effort in the evaluation of higher education. How, for example, is it related to the characteristics of students, to their particular status in college, to characteristics of the college environment, to student satisfaction and progress toward important goals of undergraduate education?

The first part of the complete questionnaire consists of a series of items under the heading "Background Information." There are two types of information in this section--first, information about the individual: namely, age, sex, marital status, racial or ethnic identification, educational level of the parents and, in the 1983 edition, citizenship and foreign student identification; and second, information about the student's status in college: year in school, where one lives (dormitory, etc.), whether one is a transfer student, grades, major field, expectations about continuing for an advanced degree, full-time or part-time attendance, amount of time spent studying, amount of time if any spent working on a job, and proportion of college expenses paid by parents or family. These items enable one to determine the relationship between quality of effort and important personal characteristics and various conditions in college (major field, residence, grades, etc.).

There are no questions about high school activities, personality, or college aptitude scores. The main focus of the questionnaire is on what students do in college, and on what conditions in college influence what they do and what they achieve. It is in this place and time period that college faculty and administrators operate. It is possible, although not very probable, that quality of effort is determined by the chromosomes; but how does one ask about that in a questionnaire! As to personality, a recent study found no relationship between quality of effort and any of the personality traits measured by the Meyers-Briggs Type Indicator (the Jungian typology of extroversion-introversion; thinking-feeling; judging-perceiving; sensing-intuiting). In any case, the College Student Experiences questionnaire is not a clinical instrument. There is also no question about student's SAT scores, because some students don't know the answer, some students regard the question as an invasion of privacy, and it's unnecessary because three questions in the background section provide information that correlates well with SAT scores--namely, college grades, parents' education, and educational plans to continue beyond college for an advanced degree.

Following these "Background Information" items, and following the fourteen quality of effort scales, there are two or three items of special interest. In the 1979 edition, one of these items was designed to see what students really meant when they had answered the quality of effort items by checking "never," occasionally," "often," and "very often." Seven items from the quality of effort scales, representing quite different content, were repeated,

with students now asked to indicate the number of times they had engaged in that activity; the options now being "never," "once or twice during the year," "about three to six times during the year," "about once or twice a month," "about once a week," "more than once a week." These questions obviously were meant to clarify the meaning of the response categories. This content was introduced because of my personal interest in the psychology of comparative judgments, and because the information would have practical bearing on inter-institution comparisons if "often" at Amherst doesn't mean the same as "often" at UCLA. The research on this topic has been reported in a journal article by Pace and Friedlander, showing that the meaning of the response categories was mainly related to the topic or content, and slightly related to the school. Having satisfied the basic research purpose of asking the question, the revised second edition of 1983 did not include that item. Instead, a new and very timely set of questions was introduced about the extent of reading and writing students had done during the current school year.

Also, in both the 1979 and 1983 editions, there were two questions that in combination produce an index of students' satisfaction with college: How well do you like college? If you could start over again would you go to the same college you are now attending? Finally, the third question in this brief section was the one quoted previously which had shown that students agree (95% or so) that "if students expect to benefit from what this college or university has to offer, they have to take the initiative." Their response to this question validates the importance of measuring "quality of effort."

The next major section of the questionnaire focuses on characteristics of the college environment. A great deal of research over the past twenty years has documented the importance of the college environment in facilitating students learning and development. Much of this documentation was made possible by the invention of new measures to characterize the environment--especially the College Characteristics Index by Pace and Stern, 1958, and the College and University Environment Scales (CUES) by Pace, 1963, and 1969. These measures sought to characterize the "psychological climate" of the campus. There have been, and still are, studies concluding that the college environment has little impact on student achievement, but those studies have usually considered the physical and economic environment (size, library holdings, physical plant, endowment, tuition, faculty-student ratio, etc.), not the psychological environment. Learning and personal development are psychological phenomena, not physical or economic phenomena.

My own studies of college environments, based on results from the College and University Environment Scales, had identified five major dimensions along which environments differed, dimensions labeled Scholarship, Awareness, Community, Propriety, and Practicality. Other researchers, using other measures, have always identified dimensions very similar to these, sometimes using different labels, sometimes describing environments in greater detail, but with results that basically confirm the importance of several common dimensions.

One of the most prolific and careful researchers in the study of environments has been Rudolph Moos at Stanford. Whether studying

the environments of college residence halls, high school classrooms, hospital wards, military units, work environments, etc., he found that there were always three types of elements: personal development or goal elements (aspects that support that main purpose of the environment--such as morale in the military, learning in the classroom, etc.); interpersonal relations (especially the extent to which people in the environment are supportive of one another); and organizational elements (flexible, adaptive, vs. rigid, rule-bound, etc.).

Nearly all of the creative research about environments over the past 20 years has been based on "collective perception" as the source of knowledge about the "psychological climate." This remains, in my opinion, the most valid way to characterize an environment psychologically. For the College Student Experiences questionnaire, however, I felt that the collective perception method would require too many items to reach satisfactory reliability. My compromise was to ask students to rate the college environment, based on their experience in it, along a set of characteristics that represented my own past research and the extensive research of Rudolph Moos.

In the 1979 edition there were eight rating scales. The first four ask students to indicate how much emphasis they feel is given at the college to certain aspects of student development. Those aspects are emphasis on the development of academic, scholarly, and intellectual qualities; emphasis on the development of esthetic, expressive, and creative qualities; emphasis on being critical, evaluative, and analytical; and emphasis on the development of

vocational and occupational competence. In the 1983 edition a fifth rating was introduced regarding emphasis on the personal relevance and practical value of the courses. For each of these emphases there is a seven-point rating scale, ranging from strong emphasis at one end to weak emphasis at the other. Then there are three rating scales that refer to personal relationships within the college environment--relationships with other students, relationships with faculty members, and relationships with administrative offices and officials. Here again, on a seven-point scale, the student is asked to characterize the nature of those relationships at his or her college. The relationships with students range at one end from friendly and supportive, to uninvolved and alienated at the other end. The relationships with faculty members range from approachable, helpful, understanding, and encouraging at one end of the scale to remote, discouraging, unsympathetic at the other end. The relationships with administrative offices and officials range from approachable, helpful, open-minded at one end of the scale to rigid, resistant, bound by regulations at the opposite end. In the 1979 edition, but not in the 1983 edition, there was a scale referring to the general style of operation as an organization. One end of that rating scale was described as flexible, open, adaptive; the other end of the scale was described as remote, difficult, impersonal. These rating scales are intended to capture in a brief fashion important qualities of the college environment: the extent to which it emphasizes certain objectives or goals, the nature and quality of personal relationships within the environment and particularly the supportiveness of those

relationships, and the general flexibility of the organization and administration as students perceive it.

The final section of the questionnaire is called "Estimate of Gains." This consists, in the 1979 edition, of eighteen statements of fairly typical and important objectives, such as vocational training, a broad general education, writing clearly and effectively, ability to think analytically and logically, and so forth. For each of these eighteen statements, the student is asked: To what extent do you feel you have gained or made progress (in college up to now?) The student could answer by indicating "very little," "some," "quite a bit," or "very much." These self-reported gains can be regarded as an indication of the extent to which students believe they are achieving important objectives of college education; and one can then determine the extent to which high quality effort contributes to high attainment or progress toward related goals. In the 1983 edition there are 21 goal statements--two added ones and one edited one.

Summary of Rationale

1. Education is both a process and a product.
2. All learning and development requires an investment of time and effort by the students.
3. Students are accountable for what they put into using the facilities and opportunities provided by the college for their learning and development.
4. The amount, scope, and quality of students' effort is a key to identifying the quality of the educational process.
5. It is this "student activities" element of education as a process that has not been well represented in previous evaluations of higher education.

6. The topics, or aspects of college life, represented in the College Student Experiences questionnaire consist of major facilities and major opportunities found on nearly all college campuses.

7. The inventory of student activities is limited to facilities provided by the college and opportunities that exist within the college environment--thus excluding off-campus activities, activities not intended by the college, and aspects of experience that are primarily internal or clinical rather than external and objectively observable.

8. Within each topic or aspect of college experience, the activities are intended to form a scale ranging from activities requiring relatively little effort to ones requiring much more effort and initiative.

9. The form of response is for students to indicate the frequency of their participation in each of the activities during the current school year.

10. The complete College Student Experiences questionnaire also includes information about student characteristics, about their particular position or status in college, their satisfaction with college, ratings of characteristics of the college environment, and estimates of gain or progress toward important objectives of higher education.

11. The fourteen quality of effort scales can be viewed as a battery of tests, a set of reliable measures of student activities intended to promote learning and personal growth. The reliability and other properties of these measures are the subject of the next section in this report.

RELIABILITY

Since we have repeatedly referred to all the quality of effort activities in the questionnaire as forming a set of measures or scales, a battery of tests rather than some unstructured assortment of student behavior, we are obliged to examine and report their properties as tests so one may judge whether they are good tests. The quality of effort measures are somewhat analogous to achievement tests. Each measure or test deals with a specific topic or aspect of college life; students' responses to the items produce a distribution of scores ranging from high to low; the reliability of these scores can be estimated by statistical methods; and these and other measurement properties, following classical test construction theory, are reported in this section. What we will consider under the heading of reliability is, however, broader than the usual textbook definition of test reliability. In a larger sense, our concern is with confidence. Are the results on the measures congruent with what one might expect from prior research and theory? How much credibility can one reasonably attribute to students' responses to the questionnaire items?

Basic Psychometric Data

Before the College Student Experiences questionnaire was initially available in 1979, preliminary versions of the various measures had been pre-tested and subjected to careful psychometric analysis and several revisions had been made to improve them. In the spring of 1979 the questionnaire was given to samples of students at 13 colleges and universities and new psychometric

studies of the finished or final scales were made. The 13 institutions included two community colleges. Since the tests were intended for undergraduates in four-year baccalaureate degree-granting institutions, the responses from the community colleges and from students who had classified themselves as fifth-year or graduate students were eliminated, leaving somewhat over 3,000 cases to be analyzed--from 3 doctoral granting universities, 3 comprehensive universities, and 5 liberal arts colleges.

A good test is discriminating, reliable, and valid. Table I provides evidence related to discrimination and reliability. The items comprising a test should have a positive relation to one another, indicating that they "go together." The item intercorrelations in the table are all positive, albeit some are a bit too low and others are a bit too high. On balance, indicated by the median of the intercorrelations of items in each scale, the relationships are close to the ideal one seeks in a group of test items. The next group of numbers in the table show that, within each scale, every item makes a significant and positive contribution to the scale score. The scale scores, it will be recalled, are obtained by giving 4 points to each activity marked "very often," 3 points for "often," 2 for "occasionally," and 1 for "never," so, on a ten-item scale the scores could range from 10 to 40, The means and standard deviations of scores on each scale, shown in the table, indicate that there are indeed, individual differences in students quality of effort. Since the possible range of scores on the 10 item scales is 30 points (10 to 40), and since the obtained standard deviations are typically between 5 and

7 points, and since, in a normal distribution, two sigmas from the mean would encompass 95% of all the scores, the fact that the obtained scores range from two-thirds to nine-tenths of this theoretical territory indicates a very good spread of individual differences. The reliability estimates shown in the tables are "Coefficient Alpha," an index that is based partly on the variance of scores. These reliability coefficients, unusually high for such short tests, indicate that the scores are discriminating and dependable.

The other two headings in Table 1, showing the results of factor analyses and Guttman scale analysis, are concerned with test content. A factor analysis was made of the items in each scale. If the item content is totally coherent and interrelated, then all the variance in the test scores would be accounted for by a single, totally dominant factor. In two of the quality of effort scales this is true; in eight of the other scales, more than 80% of the variance is accounted for by one dominant factor; and in three scales the percent accounted for is 70% or better. Factor analysis and reproducibility data are not shown for the art, music, theatre scale because the activities refer separately to the three topics, and no single hierarchial element was sought. On the whole, one can regard the content coherence of the activities in each scale as very high. The coefficient of reproducibility indicates how well the scale scores meet one definition of a "scale." In his early work, Guttman suggested that a coefficient of 85% would be a good criterion to use. It means that, knowing individual's scores on the test, one could reproduce 85% of all

TABLE 1

QUALITY OF EFFORT SCALES BASIC PSYCHOMETRIC DATA

Scales 1979 Edition	Number of Items	Item Intercorrelations Range	Item Intercorrelations Median	Item-scale Correlations Range	Item-scale Correlations Median	Distribution of Scores Mean	Distribution of Scores Sigma	Reliability Estimate	Percent Variance First Factor	Coefficient of Reproducibility
Library	10	04 to 61	26	16 to 62	51	19.2	4.9	79	88	83
Faculty	10	18 to 63	44	36 to 71	64	19.1	5.4	82	100	91
Course Learning	10	08 to 59	27	36 to 58	47	29.7	5.0	79	70	84
Arts, Music, Theater	12	06 to 66	26	32 to 66	46	20.1	6.2	83	--	--
Student Union	10	12 to 77	30	24 to 71	51	20.9	5.9	83	80	86
Athletic Facilities	10	25 to 69	46	48 to 73	66	17.5	6.9	89	88	88
Clubs	10	20 to 69	46	41 to 75	67	19.2	6.8	90	89	88
Writing	10	08 to 70	33	19 to 61	57	24.3	5.9	84	82	86
Personal Experiences	10	08 to 63	26	24 to 60	51	21.8	5.8	82*	82	81
Student Acquaintances	10	13 to 67	36	44 to 66	58	23.9	6.3	87	74	81
Dormitory F/S	10	22 to 65	44	50 to 70	64	25.1	6.8	89	86	83
Science Lab	10	20 to 66	47	48 to 76	67	23.7	6.8	90	88	82
Conversation Topics	10	05 to 59	25	36 to 49	48	25.6	5.4	80	74	78
Conversation Information	6	20 to 55	36	45 to 64	58	14.7	3.1	81	100	84
Scales - 1983 Edition										
Science/Technology	12	14 to 80	30	47 to 68	56	21.8	7.1	88	--	--
Conversation Topics	12	00 to 66	26	27 to 61	49	29.6	5.4	81	62	80

*Note: Decimal points have been omitted from all correlations.

their responses accurately. Put another way, if one knew that a student "engaged frequently" in four of the activities, one would also know, given a perfect scale, exactly which four activities they were. A scale, defined in this way, means that there is a coherent and hierarchial universe of content. The reproducibility coefficients in the table indicate that the quality of effort measures are close to the criterion for a good scale. It is partly because the activities in each measure have properties similar to a "scale" that the reliability of scores is so satisfactory.

The 1983 revised edition of the College Student Experiences questionnaire no longer included the Science Laboratory scale, and in the Conversation Topics scale one item was modified and two new ones were added. Psychometric data for the new Science/Technology scale, and the revised Conversation Topics scale have been added to Table 1. For these 1983 scales N=2299. No factor analysis and reproducibility data are shown for the Science/Technology scale because it, by intent, consists of three different topics--science principles, science laboratory activities, and computers--and no single hierarchy was sought. The revised Conversation Topics scale has some item intercorrelations that are too low, and also now shows only 62% of the variance in the first factor. This factor consists of the topics related to major social issues and intellectual subjects.

Table 2 shows the distribution of scores on each of the quality of effort scales of approximately 10,000 students from 40 colleges, obtained during the three-year period 1979 through 1981.

TABLE 2

DISTRIBUTION OF SCORES ON THE QUALITY OF EFFORT SCALES
(N = 10,156 students in 40 colleges, accumulated from 1979 through 1981)

SCORES	LIB	FAC	COURSE	UNION	ATH	CLUBS
36-40	1	1	12	2	3	5
31-35	3	4	30	5	5	6
26-30	11	11	36	14	9	11
21-25	24	24	19	27	15	19
16-20	38	39	3	31	25	29
11-15	18	20	0	19	31	27
10 (never)	2	1	0	2	12	3
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
Mean	19.9	20.1	29.4	20.8	18.3	20.2
Sigma	5.1	5.5	5.0	6.1	7.1	7.3

SCORES	WRITE	PERS EXP	ST ACQ	DORM F/S	SCI LAB	CONV TPS
36-40	4	2	6	7	4	5
31-35	13	7	12	13	10	13
26-30	26	17	24	25	20	32
21-25	32	30	29	29	28	34
16-20	20	32	23	19	21	13
11-15	5	13	5	5	6	3
10 (never)	0	1	1	2	11	0
	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)
Mean	24.7	21.8	24.6	24.8	22.6	25.7
Sigma	5.8	5.8	6.3	6.5	7.3	5.4

See Appendix for key to abbreviation of scale titles.

TABLE 2 (continued)

SCORES	AMT	SCORES	CONV INFO
43-48	0	22-24	3
37-42	2	19-21	8
31-36	6	16-18	26
25-30	15	13-15	36
19-24	32	10-12	23
13-18	39	7-9	3
12 (never)	6	6 (never)	1
	(100%)	(100%)	(100%)
Mean	20.3	Mean	14.7
Sigma	6.2	Sigma	3.2

1983 data for new or revised scales
(N = 2,299 from 8 colleges)

SCORES	SCI/TECH	CONV TPS
43-49	1	2
37-42	3	9
31-36	8	30
25-30	17	38
19-24	29	18
13-18	37	3
12 (never)	5	0
	(100%)	(100%)
Mean	21.6	29.1
Sigma	7.2	5.8

When data for eleven colleges in 1982 were added, no percentage at any point in the distributions was changed by more than two points, and nearly two-thirds of the new percents were identical with the ones shown in Table 2. The 40 colleges included 8 large doctoral granting universities, 14 comprehensive colleges and universities about equally divided between public and private, and 18 liberal arts colleges about equally divided between Types I and II in the Carnegie Commission's classification system. Apparently, by the end of the three-year period the distribution of scores had become quite stable.

Two of the distributions (Athletic and Recreational Facilities, and Art, Music, Theater) show scores concentrated at the low end of the scale, owing mainly to the fact that many students have little or no contact with those facilities. One distribution (Course Learning) has its scores concentrated toward the high end of the scale, indicating that many students engage frequently in most of the course learning activities. The other scales have distributions of more normal shape.

The score distributions on the new scales for the 1983 second edition are based on 2,299 students from 2 doctoral universities, 1 comprehensive college, and 5 liberal arts colleges. These distributions may well change when a larger and more eclectic data base has been attained. The scores at the low end of the Science/ Technology scale are owing mainly to the lack of student activities involving use of computers, and the fact that some students have not had experience in a science laboratory.

Internal Relationships

Another way to judge the confidence one might put in the various measures in the College Student Experiences questionnaire is to examine whether their relationship with other variables "makes sense."

The first set of explorations that should "make sense" are ones between certain quality of effort scores and characteristics of the students' status in college. For example, some quality of effort scales are clearly concerned with academic and intellectual activities--use of the library, contacts with faculty members, course learning, writing, and science laboratory. One would surely expect or at least hope that these intellectual efforts would be greater among seniors than freshmen, would pay off in higher grades, be greater among students who aspired to continue their education beyond college, and who spent more time on their studies. Table 3 shows that these expectations are amply confirmed. Any difference between mean scores of 1.0 or more is statistically significant. On the scale measuring experience in writing there are no differences related to year in school, but there are the expected differences related to grades, aspirations, and time spent on academic work. Table 4 shows that on the various quality of effort scales related to the use of non-academic facilities on the campus and to the opportunities for students interpersonal relations and self-understanding--namely, the scales concerned with cultural facilities, clubs and organizations, the student union, athletic and recreation facilities, personal experiences, and student acquaintances--there are significant differences

TABLE 3

COLLEGE STATUS CHARACTERISTICS
RELATED TO ACADEMIC EFFORT

College Status	Quality of Effort Mean Scores				
	LIB	FAC	COURSE	WRITE	SCI LAB
Year in College					
Freshman	17.9	17.8	29.0	24.7	22.6
Sophomore	19.1	18.6	29.6	24.5	23.7
Junior	19.4	19.2	29.9	24.0	23.9
Senior	20.5	20.3	29.9	24.6	23.6
Grades					
B- or lower	18.5	17.5	28.1	23.6	22.3
B	19.3	19.0	29.7	24.6	23.3
B+ or higher	19.8	20.2	30.7	24.7	24.7
Aspire to Adv. Degree					
No	18.0	17.9	28.2	23.3	21.9
Yes	19.8	19.5	30.1	24.8	24.2
Hours on School-Related Activities					
20 or less	17.8	17.7	27.8	23.1	20.9
30	19.1	18.6	29.8	24.2	23.0
40 or more	20.4	20.3	30.8	25.3	25.5

TABLE 4

COLLEGE STATUS CHARACTERISTICS
RELATED TO USE OF NON-ACADEMIC FACILITIES AND
OPPORTUNITIES FOR PERSONAL AND INTERPERSONAL ASSOCIATION

College Status	Quality of Effort Mean Scores					
	AMT	CLUBS	UNION	ATH	PERS EXP	ST ACQ
Have Lived on Campus						
No	18.3	15.9	18.7	15.4	20.5	21.9
Yes	21.4	21.3	22.0	19.4	22.8	25.5
Where Live Now						
With parents	18.3	16.4	19.4	16.0	20.7	21.8
Apt. away from campus	18.9	16.6	18.6	15.4	20.7	22.5
Apt. near campus	20.5	19.0	21.5	18.0	22.0	24.1
College housing	21.7	21.8	22.0	19.8	22.8	25.9
Enrollment						
Part-time	16.9	14.0	16.0	14.1	19.6	20.3
Full-time	20.1	19.0	20.6	17.6	21.8	23.9

between students who have lived on campus at some time and those who have never lived on campus, between those who now live in campus housing or near the campus and ones who live farther away or with parents, and between full-time students and part-time students. Another comparison, in Table 5, shows the very sharp contrasts that are found between science majors and humanities/arts majors in the quality of effort scales related to those fields. Science majors are strikingly much more involved in the Science Lab scale activities than are the Humanities/Arts majors; and precisely the opposite is true of the activities related to cultural facilties and writing where the Humanities/Arts majors have much higher scores. These three tables present findings that are fully supportive of what some people in the field of measurement might call the concurrent or construct validity of the quality of effort scales. The results are congruent with prior research showing that residents are much more involved in campus activities than are commuters. We also know from prior research that people who aspire to advanced degrees and who get high grades are usually more committed to taking advantage of the opportunities for learning and study and intellectual contact that college provides. And we would most surely expect to find the differences between science and humanities/arts majors that are reported. All these relationships "make sense" and in that respect add confidence to what is being measured.

The Credibility of Self-Reports

All questionnaire surveys are based on self-reports. What evidence is there that students' responses to the various items in

TABLE 5

CONTRASTS IN QUALITY OF EFFORT BY MAJOR FIELDS

	Quality of Effort Mean Score		
Major Field	SCI LAB	AMT	WRITE
Sciences	27.6	19.1	23.7
Humanities/Art	20.4	25.0	26.0

the College Student Experiences questionnaire are credible? Can we believe what they say about their activities, their progress, their status in college, and about themselves?

In survey research generally, the accuracy of answers depend on the clarity of questions, on whether the respondents have a good base in experience for answering the questions, on whether the form in which the answers are to be given is appropriate, and on whether the respondents regard the questions themselves as meriting a serious and thoughtful response.

Several facts about the questionnaire lead us to the belief that all of the above conditions are met. In pre-testing many of the activities in the quality of effort scales we informally asked some students whether they had any trouble responding to them because of any lack of clarity. They said no. We tried to limit the activities to ones that were quite specific so that students would immediately know whether they had done them, and we asked them only to recall what they had done "during the current school year."

The form of response for the activities scales gave them a choice of indicating "never," "occasionally," "often," and "very often." The meaning of "never" is self-evident. What one student means by "often" is not necessarily the same as what another student means. But for any individual student there is no doubt that "often" is more frequent than "occasionally," and that "very often" is more frequent that "often."

The items under the Estimate of Gains section of the questionnaire are not so obviously explicit and specific as the activities items, and students are asked to consider how much gain or progress they believe they have made "in college up to now." At the same time, the topics are ones that are surely familiar to college students--topics such as writing well, thinking logically, the ability to find information they need, etc. Credibility in this crucial part of the questionnaire rests on whether their responses match what we know from other sources about student achievement, and on certain internal consistencies in the responses. We have already noted the sharp differences in quality of effort scores between science and humanities majors. We know from decades of data on objective achievement tests such as the Area Tests of the Graduate Record Examination, the advanced subject-matter tests of the GRE, and the major field tests of the Educational Testing Service that students make their highest scores on those tests, or parts of tests, that are most closely related to their major field, or to their "area of interest." Since we know this is objectively and extensively documented, the students' self-estimate of gains in the questionnaire should reflect that truth.

They do. Students whose major field is science report the most gain in science-related goals. For example, toward the objective "understanding the nature of science and experimentation," 84% of the science majors reported substantial progress, compared to 11% and 15% respectively for fine arts and humanities majors. Toward the objective "developing an understanding and enjoyment of art, music, and drama," 85% of the majors in fine arts reported substantial gains. This percentage is three times greater than the percentage for science majors or social science majors. Toward the objective "broadening your acquaintance and enjoyment of literature," three-fourths of the humanities majors reported substantial gains compared with one-fourth of the science majors.

For other objectives--such as "understanding other people"--all sources of external evidence are subjective. By analogy with the correspondence between major fields and both reported gains and objectively measured gains, we can look for correspondence between reported experience and reported progress that "makes sense." For example, students who make the most use of athletic and recreational facilities also report the most gain in "developing good health habits and physical fitness." Students who have the highest scores on the "Student Acquaintances" scale, and students who live in college housing, report the most progress toward the objective of "understanding other people and the ability to get along with different kinds of people." There are many other examples in the questionnaire responses of congruent or validating relationships between activities and achievement. Consequently, we can accept the self-reports of activities and the self-estimates of progress as broadly credible, valid, and true to the facts.

Other observations also lend support for the belief that students' responses should be accepted as reliable and valid. This is evidence that they responded conscientiously to the questions. The instructions for answering the questionnaire are to use a soft black lead pencil, to fill in the circles carefully, and to fill in an I.D. number that is printed at the end of the questionnaire. Our estimates, from inspecting many questionnaires as they were turned in, are that 95% of the students filled out the entire questionnaire carefully and neatly. Also, we have examined the computer print-out for every item response in the 1983 second edition and have found that, with a couple of very small exceptions, never more than 2% of the students left an item blank. On the activity scales, and any other part of the questionnaire that produces a "score," the computer instructions are to compute a score only for those students who answered all the items in the scale. Again, with very minor exceptions, no more than 2% of the cases were left unscored. In short, in 95% to 98% and more of the students' responses we found no cause for concern about the care with which their answers were reported.

Finally, we have been told by administrators at several colleges that quite a few students said they liked the questionnaire, enjoyed filling it out, and felt they had learned something about themselves. Given the usual student attitudes toward questionnaires, these favorable student comments suggest that they regarded the content of this questionnaire as meriting a serious and thoughtful response.

RESULTS

Over the last few years, since the College Student Experiences questionnaire was first made available, many studies have been made of the questionnaire results. Perhaps the most important line of inquiry has been to assess what connections there may be between students' quality of effort and their attainment of important goals of education toward which their efforts were presumably directed. In the first section we noted that process variables were usually evaluated by the contribution they made to outcome or product variables. So, we begin this section on results by reporting those connections. Having then documented the overall significance of quality of effort, we turn to some studies of the diagnostic and differential significance of quality of effort--the insight it gives to explaining and modifying the presumed benefits of "time on task;" of living on campus; of identifying the elements that contribute to the success or failure of community college transfer students; of the significance of reading and writing activities in college education today; and of the very different activities and achievements associated with the students' major field of study. These capabilities of the quality of effort measures are further examined in a larger context--noting, for example, differences between types of institutions, differences among colleges that on most surface aspects appear to be very similar, and evidence of the uniqueness of a hitherto unstudied segment of higher education, namely, Bible colleges. And finally we propose, and give evidence to support, an index of the quality of undergraduate education, or more specifically the quality and

vitality of undergraduate student experience. Along the way, we shall indulge in comments about the popular concept of "value added," about the relations between gains and initial status, about the use of the College Student Experiences questionnaire in institutional research and in the self-study aspect of accreditation review, and ultimately try to "add up" what we have learned about the quality and effectiveness of undergraduate education. We can say, in a preview of these results that quality of effort is a concept whose value is predictive, diagnostic, and pervasive in understanding student learning and development in the college environment.

The Prediction of Achievement

The first set of results, based on an analysis of 3,006 student responses at 11 colleges and universities in 1979, is, in many respects, the most dramatic. Subsequent analyses have merely confirmed these results. The question to be answered is this: given all the elements in the questionnaire--students background characteristics, their status in college, their satisfaction with college, their assessment of the college environment, and their scores on the various quality of effort (QE) scales--what best predicts their achievement with respect to the list of goals of higher education? In the 1979 edition of the questionnaire there was a list of 18 goals. A factor analysis of these goals indicated that they could be grouped into four broad clusters as follows:

1. Personal/Social Development

   Developing your own values and ethical standards

   Understanding yourself--your abilities, interests, and personality

Understanding other people and the ability to get along with different kinds of people

Ability to function as a team member

Developing good health habits and physical fitness

2. General Education, Literature and Arts

Gaining a broad general education about different fields of knowledge

Developing an understanding and enjoyment of art, music, and drama

Broadening your acquaintence and enjoyment of literature

Writing clearly and effectively

Becoming aware of different philosophies, cultures, and ways of life

3. Intellectual Skills

Ability to think analytically and logically

Ability to put ideas together, to see relationships, similarities, and differences between ideas

Ability to learn on your own, pursue ideas, and find information you need

Acquiring background and specialization for further education in some professional, scientific, or scholarly field

4. Understanding Science

Understanding the nature of science and experimentation

Understanding scientific and technical developments and their applications in society

Quantitative thinking--understanding probabilities, proportions, etc.

Students reported progress toward each of the objectives in these four groupings were added up to give an estimate of progress toward the more general objective defined by the group category. These four categories of achievement were then used as criteria of

attainment, to be predicted or explained by all the information we have about students, environments, and quality of effort. The statistical procedure is called stepwise multiple regression. This simply means that the computer program first identifies the variable that has the largest relationship with the criterion, then the variable that has the next largest relationship, etc., until adding more variables contributes little or nothing more (less than 1%) toward accounting for the performance on the criterion.

Technical tables giving the results of the factor analysis, and of the regressions are in the Appendix--Appendix Tables 1 and 2.

What the figures in those tables show is quite clear. In relation to every one of the four main categories of achievement, one or more of the quality of effort scales (QE) makes the greatest contribution toward explaining that achievement. The numbers under the column labelled R^2 are really percentages--that is, they show the percent of the variance on the criterion that is "accounted for," or more simply, "when you know these things this is how much of the result you have been able to explain or predict."

The best predictors of students' progress toward personal/social development objectives are the quality of effort scales dealing with activities intended to promote self-understanding and with the use of athletic and recreation facilties. The best predictor of students' progress in acquiring intellectual skills is the quality of effort they devote to course learning activities. The best predictors of progress toward goals related to general education, literature and arts are the quality of effort students invest in

using the cultural facilities on campus for art, music, and drama, and the quality of effort they put into writing activities. The best predictor of students' progress in understanding science is the quality of effort they put into using science laboratory facilities.

Another way to highlight the contribution that quality of effort makes in predicting achievement is to put all the variables into the computer in a predetermined sequence: first, put in all the students' background or status variables; second, put in all the college status variables; third, put in all the environment ratings; and finally, after all these commonly utilized variables have contributed as much as they can to explaining achievement, put in the quality of effort variables to see whether they add anything to explaining the achievement. These results are shown in Appendix Table 3.

Before entering the quality of effort measures, one can account for somewhere between 24% and 36% of the result on the criterion. This is almost exactly what many past studies have shown. When the quality of effort measures are added, one can now explain from 39% to 47% of the performance on the criterion--a substantial increase in our understanding, from 10 to 15 percentage points better than past research has typically been able to explain.

The results just described lead to a very significant conclusion, one that differs from much prior research which has held that student characteristics and family background are the most important determinants of achievement. The new conclusion is this: granted the importance of all the elements that influence who goes where

to college, once the students get there what counts most is not who they are or where they are but what they do. Prior research has not included what turns out to be the most influential variable--the quality of effort that students themselves invest in using the facilities and opportunities for learning and development that exist in the college setting. Now that "quality of effort" has been included, better explanations and new conclusions emerge.

The Prediction of Achievement Reaffirmed

Because the introduction of qualify of effort into equations for predicting achievement has clearly modified the generalizations made from prior research, one needs to be sure that the new generalizations are reasonably stable. When the revised second edition questionnaires from 2299 students at 8 colleges had been filled out, we repeated all of the analyses we have just reported--results obtained from different students, at different colleges, at a different time, and with a questionnaire that contained a few slightly different items. Do we still get the same results? The answer is yes, with a few minor adjustments. These analyses were made by Karen Lefever. The previous analyses of the 1979 data had been made by Jack Friedlander.

The first analysis we had made, shown in Appendix Table 1, was a factor analysis of the estimate of gains. In the second edition of the questionnaire there were 21 statements of objectives. One of the original 18 objectives, "Vocational training--acquiring knowledge and skills applicable to a career," was now divided into two objectives, one focused on specific job training, and one

focused on broader career relevance. Another of the objectives listed in the 1979 edition was now also split into two more clearly defined statements: the goal "understanding scientific and technical developments and their applications in society" was expanded in the 1983 edition into two goals--one focused on understanding new developments, and one focused on awareness of the consequences of new applications. Also, in the 1983 edition there was a new objective: "Acquiring familiarity with the use of computers."

The factor analysis of the 21 items included in the Estimate of Gains section of the revised questionnaire is reported in Appendix Table 4. There now emerges a factor we have called "Vocation" consisting of three items. In the 1979 questionnaire there had only been one goal statement about vocation and it did not fit into any of the four goal categories in the 1979 factor analysis. Except for this new factor, which we had hoped would emerge, the factor analysis results of the new data are nearly identical with the previous analysis. For the revised second edition questionnaire, the major categories of goals are as follows:

1. Personal and Social Development

   Understanding other people and the ability to get along with different kinds of people

   Understanding yourself--your abilities, interests, and personality

   Developing your own values and ethical standards

   Ability to function as a team member

   Developing good health habits and physical fitness

2. General Education, Literature and Arts

   Broadening your acquaintance and enjoyment of literature.

Writing clearly and effectively

Developing an understanding and enjoyment of art, music, and drama

Becoming aware of different philosophies, cultures, and ways of life

Gaining a broad general education about different fields of knowledge

3. Intellectual Skills

Ability to think analytically and logically

Ability to put ideas together, to see relationships, similarities, and differences between ideas

Quantitative thinking--understanding probabilities, proportions, etc.

Ability to learn on your own, pursue ideas, and find information you need

4. Understanding Science/Technology

Understanding new scientific and technical developments

Understanding the nature of science and experimentation

Becoming aware of the consequences (benefits/hazards/dangers/values) of new applications in science and technology

Acquiring familiarity with the use of computers

5. Vocation

Vocational training--acquiring knowledge and skills applicable to a specific job or type of work

Gaining a range of information that may be relevant to a career

Acquiring background and specialization for further education in some professional, scientific, or scholarly field

Results of the step-wise multiple regression analysis of all variables in the questionnaire in relation to each of the above five categories of goals are in Appendix Tables 5 and 6. Again,

scores on various quality of effort scales emerge as major contributors to students' achievement. For example, toward the broad goal of personal/ social development, students' quality of effort on the Dormitory, Fraternity/Sorority scale makes the largest contribution, with the quality of effort scales related to Athletic and Recreation facilities, and to Personal Experiences also being influential. Toward the cluster of goals related to general education, literature and arts, the biggest contribution comes from students' scores on the quality of effort scale in using the campus facilities of art, music, and theatre. The top contributor to students' progress toward understanding science and technology is the quality of effort scale labeled Science/Technology. In the developrent of intellectual skills, having an environment characterized by a strong emphasis on being critical, evaluative, and analytical, heads the list of influential variables, followed by the quality of effort scales regarding Science/Technology, and the informational and persuasive levels of student conversations. For the outcome labeled vocation, no specifically related quality of effort scale had been developed. For this outcome the most influential variables were an environment with strong emphasis on the development of vocational and occupational competence and a strong emphasis on the personel relevance and practical value of the students courses.

When all the variables were put into the regression equation in a predetermined order--first, student characteristics; second, college status variables; third, ratings of the college environment; and finally, quality of effort--the results again show that quality

of effort makes a significant added contribution to explaining the outcomes. For the personal/social development goals, R^2 increases from .34 to .46 when quality of effort is added to the predictors; for the general education goals, the increase in R^2 is from .48 to .55; for intellectual skills the increase is from .37 to .46; for science goals the increase is from .34 to .59; and for vocation the increase in R^2 is from .45 to .50.

For the second edition 1983 results, we have also summarized the simple and direct correlations of all variables with each of the clusters of gains. This information, of course, overlaps with the regression analysis results; but it provides a little different and more detailed understanding of how the data fit together. In the lists below, all correlation of .30 or higher are shown. (See Appendix for an explanation of the abbreviations.)

Correlations with Personal/Social Development Gains

QE:Dorm F/S	.40
QE:Conv Tps	.39
QE:Pers Exp	.38
QE:Conv Info	.34
QE:Clubs	.33
QE:St Acq	.32
ENV:Student	.32
ENV:Rel	.31
QE:Athl	.31
QE:Course	.31

Correlations with Intellectual Skills Gains

ENV:Crit	.43
QE:Course	.40
QE:Conv Info	.38
QE:Sci/Tech	.36
ENV:Schol	.31

Correlations with General Education, Literature and Arts Gains

QE:AMT	.49
QE:Conv Tps	.41
ENV:Crit	.38
Read Texts	.36
QE:St Acq	.36
QE:Conv Info	.35
QE:Fac	.35
QE:Write	.34
QE:Course	.33
ENV:Esth	.33
Write papers	.30

Correlations with Understanding Science/Technology Gains

QE:Sci/Tec	.71

Correlations with Vocation Gains

ENV:Voc	.43
ENV:Rel	.41

The frequency with which QE measures appear in these lists is very obvious. In addition to the 29 correlations identified

above, there are 44 others that fall between the range of .20 and .29, making a total of 73. When all of these are classified as to their origin or type, the results are as follows:

None are Student Characteristics variables

15 are College Status variables

22 are College Environment variables

and 36 are Quality of Effort variables.

This again reinforces the conclusion that, in the prediction of achievement in college, what counts most is not who you are (student characteristics variables), or where you are (college status and college environment variables), but what you do (quality of effort variables).

The Prediction of Satisfaction with College

If students don't like what they are doing, and would rather be somewhere else than in the college they are presently attending, the chances are that they are wasting their time and not taking advantage of the opportunities available to them. Enthusiasm, satisfaction, and a sense of worthwhileness are personal feelings that contribute to productivity and accomplishment. Fortunately, most students in most colleges like being there. The College Student Experiences questionnaire produces an index of satisfaction based on responses to the following questions:

How well do you like college?

I am enthusiastic about it

I like it

I am more or less neutral about it

I don't like it

If you could start over again, would you go to the same college you are now attending?

Yes, definitely

Probably yes

Probably no

No, definitely

By giving 4 points to the most favorable response to each question, 3 points to the next most favorable response, etc. and adding the points, one gets a score, or satisfaction index, ranging from 2 to 8. The meaning of scores 8 or 7 at the most favorable end of the scale, and of scores of 2 or 3 at the most unfavorable end are clear. A score of 6 is nearly always obtained by students who said "I like it" to the first question, and "Probably yes" to the second question. Anyone getting a score of 5 or lower must have answered at least one question negatively or neutrally.

An analysis of responses from a cross-section of UCLA undergraduates in 1979 produced the following distribution.

Satisfaction score		
8 points	22%	very satisfied
7 points	27%	
6 points	28%	satisfied
5 points	13%	
4 points	7%	neutral to negative
3 points	2%	
2 points	1%	

In the UCLA study of satisfaction we divided the students into three groups, as defined above--very satisfied, satisfied,

and neutral to negative--and then compared the responses of these three groups with respect to the quality of effort scores on all 14 aspects of the college experience, their characterizations of the college environment on all of the environment ratings, and their ratings of progress toward all of the objectives. On every quality of effort scale, and on every characterization of the environment, and on reported progress toward every objective, the highest (most favorable) mean scores were made by the students who were "very satisfied" with UCLA, the next best scores were made by students who were "satisfied," and the lowest scores were made by those who were "neutral to negative." There were no exceptions to this pattern.

Students who are most satisfied with college put the most into it and get the most out of it. Using satisfaction with college as the criterion, and then determining which variables of all the ones included in the questionnaire have the highest relationship to that criterion (best predict or best explain it), the two most influential variables were as follows: first, students' gains in the group of objectives we have described as intellectual skills, and second, environment in which relationships among students were characterized as friendly and supportive. So, when students are very satisfied they believe they are developing their intellectual powers, and find the environment to be friendly and supportive. Since we don't really know the direction of these relationships we can also state the generalization another way: when students are making progress in the development of their intellectual powers, and when their experience in the environment

is characterized by friendly and supportive relationships with other students, they are very satisfied with college.

Since having "satisfied" students is surely a desirable condition, further exploration of what contributes to satisfaction more generally, not just at UCLA, was conducted. It is possible, for example, that student satisfaction at research oriented universities may result from a different combination of conditions than at other types of colleges and universities.

To examine this possibility, Oscar Porter ran stepwise multiple regression analyses of all the questionnaire elements against the criterion of satisfaction (the satisfaction index score) separately for five different types of institutions--doctoral universities, public comprehensives, private comprehensives, liberal arts type I, and liberal arts type II. The result of these regression analyses are shown in Appendix Table 7. In all types of colleges, the single most important contributor to students' satisfaction was an environment described as friendly, supportive, helpful etc.--most commonly the supportive relations among students, but also in some cases the helpful, encouraging relationships with faculty members, or the flexible, considerate style of the college's operations. Also contributing to satisfaction was an environment strong in its emphasis on intellectual qualities--whether academic, scholarly, or critical, analytical. Parallel to this intellectual emphasis are the students' belief that they have gained in acquiring a broad general education, and, in all types of institutions that they are making good grades or at least not making poor ones.

The only quality of effort scales that entered into the regression equations were ones that involved personal/social relationships--Dormitory, Fraternity/Sorority, Student Acquaintences, Clubs and Organizations, Athletic and Recreation Facilities, Student Union, Conversation Topics, and, the one exception to this list, Library.

By noting all the variables in the regressions that had a simple direct correlation with the Satisfaction Index of .20 or higher, we can see with additional clarity the common sources of student satisfaction with college. Of the 55 variables listed in Appendix Table 7, 32 had correlations of .20 or higher with the Satisfaction Index. These 32 correlations are identified in Appendix Table 8. The categories or sources of these elements throw further light on what contributes to satisfaction. Of the 32 correlations listed, 17 are ratings of the ENVIRONMENT (with 12 of those referring to the supportiveness of personal relationships within the environment); 9 are estimates of GAIN or progress toward important goals (acquiring background and specialization for advanced education, breadth of knowledge, and self-understanding); and 6 are QUALITY OF EFFORT topics (all related to group facilities and interpersonal relationships). None of the 32 elements came from the College Status, or the Student Characteristics categories.

The Diagnostic Value of Quality of Effort

Quality of effort, introduced into equations in predicting students success in college, has significantly modified previous generalizations about what best accounts for achievement. The predictive value of quality of effort is more powerful than the

predictive value of family background, racial or ethnic identification, age, sex, marital status, or various characteristics of the college environment. There is, in addition to this predictive significance, a diagnostic value in measuring quality of effort which also leads to some modifications in the conclusions from prior research. Examples of these refinements are described next.

One of the variables that has been widely introduced in educational research, especially as related to achievement in elementary and secondary school, is variable called "time on task." For example, a high school math course may be scheduled for one hour a day, five days a week, for 15 weeks; but from observations of what really occurs during the class period one discovers that the actual time spent on the task (math work) has not been 75 hours, but, in some cases, no more than 50 hours, owing to various interruptions, digressions, etc., whereas in other cases as much as 90% of the time was actually spent "on task." Time on task is a much better predictor of students' achievement than time allocated to the subject in the curriculum.

In our research with the College Student Experiences questionnaire we do not have any literal (direct observation) counterpart to time on task, but we have made comparisons between time spent and quality of time spent. These comparisons have been made by Jack Friedlander. For these comparisons, two definitions are similar to the idea of time on task. One is how long the students have been in college; the other is how many hours a week the students usually spend on activities related their school work. The analyses confirm the importance of time, but also the greater

importance of effort. It's true, for example, that gains on the outcome measures related to intellectual skills and to general education are related to how long one has been in college--the gains reported by seniors are significantly greater than the gains reported by freshmen. But the whole truth is that freshmen whose quality of effort scores with respect to intellectual/ academic experiences (course learning, library, contacts with faculty, and writing) are above average report greater gains in intellectual skills and in general education than juniors or seniors whose quality of effort scores are below average. It is also true that sheer time spent on academic work (number of hours a week) is related to progress toward objectives related to general education, to intellectual skills, and to grades. But the whole truth is that students who spend a lot of time at a low (below average) level of quality make less progress than students who spend fewer hours at a high (above average) level of quality; and students who spend about 40 hours a week of high quality effort get better grades than students who spend 50 or more hours of low quality of effort. Compared to quality effort, time spent (years in college) and time on task (hours spent on academic work) are relatively weak explanations.

These relationships between time, quality of effort, grades, and gains are documented in Tables 6 and 7, based on students from 30 colleges and universities.

Living on campus has been found by many researchers to be positively related to satisfaction, retention, and benefits of various kinds (both intellectual and social). In a study of

TABLE 6

LENGTH OF TIME IN COLLEGE RELATED TO GRADES AND GAINS
AS MODIFIED BY QUALITY OF EFFORT

Year in College and Quality of Academic/Intellectual in Effort	Grades	Gains in Intellectual Skills	Gains in General Education
Freshmen	2.9	10.6	11.7
Low QE	2.8	9.8	10.8
High QE	3.1	11.5	12.9
Sophomores	3.1	11.5	12.3
Low QE	3.0	10.7	11.1
High QE	3.2	12.3	13.5
Juniors	3.2	11.8	12.3
Low QE	3.0	10.9	11.3
High QE	3.4	12.5	13.2
Seniors	3.3	12.1	12.5
Low QE	3.1	11.3	11.4
High QE	3.4	12.7	13.3

N = 7700

Note: Grade point averages are 2.0 = C; 3.0 = B; 4.0 =A. Mean scores on the Intellectual Skills and General Education objectives that are different from one another by .3 or more are statistically significant.

TABLE 7

HOURS PER WEEK ON ACADEMIC ACTIVITIES RELATED TO GRADES AND GAINS AS MODIFIED BY QUALITY OF EFFORT

Year in College and Quality of Academic/Intellectual in Effort	Grades	Gains in Intellectual Skills	Gains in General Education
About 20 hours or less	2.9	10.6	11.2
Low QE	2.8	10.0	10.5
High QE	3.0	11.8	12.6
About 30 Hours	3.0	11.3	12.2
Low QE	2.9	10.6	11.3
High QE	3.1	12.1	13.2
About 40 hours	3.3	11.9	12.7
Low QE	3.2	11.1	11.6
High QE	3.4	12.4	13.4
About 50 hours or more	3.5	12.3	12.6
Low QE	3.3	11.5	11.2
High QE	3.6	12.8	13.3

campus vs off-campus residents at four large doctoral granting universities, as well as a special study of UCLA students, the data from the College Student Experiences questionnaire are generally supportive of prior research on this topic--but with one diagnostic refinement when quality of effort is considered. The analyses of these data were made by Mary Beth Snyder. The student respondents from the four universities differed in several ways--such as the proportion of freshmen vs upperclassmen, etc., but the differences between those who lived on campus (dormitory or fraternity/sorority) and those who did not were so large along certain dimensions that other variations between the groups could not have reversed the conclusions. Moreover, with respect to the quality of effort students invested in using group facilities and opportunities for personal and social development and with gains related to personal and social development, and with overall satisfaction with college, the differences are totally consistent in all four institutions, except for one item at one institution.

The biggest differences between campus and off-campus groups were in the estimated gains in personal and social development as shown in Table 8.

The much higher proportion of campus residents claiming substantial gain in these respects is parallel to the much higher percentage of campus residents who score above a certain level in the quality of effort scales related to those gains as shown in Table 9.

The other main difference between campus and off-campus residents is in the former's perception of the environment as

TABLE 8

COMPARISONS BETWEEN CAMPUS AND OFF-CAMPUS RESIDENTS IN GAINS RELATED TO PERSONAL AND SOCIAL DEVELOPMENT

	Percent Reporting Substantial Gain									
	Values, Ethics		Und Self		Und Others		Team		Health	
	Campus	Off-Campus	Campus	Off-Campus	Campus	Off-Campus	Campus	Off-Campus	Campus	Off-Campus
University A	57	51	73	67	82	60	52	32	54	26
University B	79	5[illegible]	82	69	87	51	59	26	43	32
University C	66	55	73	59	79	62	39	21	35	29
University D	71	59	77	65	82	68	60	42	56	35

TABLE 9

COMPARISONS BETWEEN CAMPUS AND OFF-CAMPUS RESIDENTS IN QUALITY OF EFFORT RELATED TO PERSONAL AND SOCIAL ACTIVITIES

	Percent Scoring Above a Defined Level of QE									
	QE: PERS EXP		QE: ST ACQ		QE: CLUBS		QE: ATHL		QE: CONV TPS	
	Campus	Off-Campus	Campus	Off-Campus	Campus	Off-Campus	Campus	Off-Campus	Campus	Off-Campus
University A	62	47	44	24	36	22	34	15	54	44
University B	62	43	48	23	33	11	38	28	57	42
University C	55	45	45	30	25	26	34	30	59	45
University D	55	43	40	26	47	16	46	22	56	46

having a supportive and friendly relationship among students to a much greater extent.

Other variables--such as quality of effort in academic, intellectual topics, and gains with respect to intellectual skills and general education, and in other characterizations of the environment--did not show consistently large differences between campus and off-campus groups; and, in fact, residence seemed to be neutral rather than positive in its influence.

The mere fact of living on campus has some influence on students' progress toward goals of personal and social development and the quality of effort they put into various opportunities for group associations. But this is not the whole truth. On the scale measuring the quality of effort students who live in a group setting on campus (QE: Dorm, F/S) put into using those opportunities, some students have very high scores and others have very low scores. Some students, despite living in a group setting take little advantage of it. On those objectives most related to personal and social development, students whose participation in the residence unit activities ranked them in the lowest third of the scores on that scale gained no more than students living at home with their parents. These relatively uninvolved campus residents might as well have stayed at home. In this respect, the quality of effort scale permits a more refined and diagnostic understanding of the general value of living on campus, for the whole truth is that the benefit depends partly on what they do, not merely on where they live.

A third special study illustrating the diagnostic value of quality of effort was a local study at UCLA by Juan Lara of community college transfer students, comparing the quality of effort at UCLA of transfer students who had persisted and those who had dropped out, and also the quality of effort of these two groups when they were in community college. The academic quality of effort scales were used in this study--course learning, library, writing, and faculty contacts. The population included all community college transfers to UCLA in the fall of 1977. Sixty one percent of them were located and responded to a questionnaire in the spring of 1979--824 respondents were still enrolled at UCLA and 312 had dropped out. The students indicated how often they had engaged in the various activities at UCLA and also how often they had engaged in those same activities when they were in community college. Other parts of the questionnaire asked about some environment characteristics at community colleges and at UCLA, and progress toward certain objectives at community college and at UCLA. On the quality of effort scales for library, writing, and course learning, the scores of both the dropouts and the persisters were higher at UCLA than they had been at the community college; but the difference was much greater for persisters than for dropouts. In other words, the dropouts had increased their quality of effort somewhat, but not nearly enough and not nearly as high as the persisters. For example, on the Course Learning scale, the percent scoring 26 or higher on the scale was 55% at UCLA for those who had dropped out compared with 37% when they were in community college. In contrast, the corresponding percentages for those who

were persisters at UCLA was 50% when they were in community college, increasing to 80% at UCLA. On the library scale the persisters had 65% scoring 21 points or above at UCLA, compared with 31% for the dropouts. For both groups the percentages represented an increase over what their quality of effort in library use had been at the community college--the dropouts having increased from 16% to 31% and the persisters increasing from 28% to 65%.

These differences between community college and the university are also reflected in students' ratings of progress toward important objectives. In community college, less than a third of the transfer students felt they had made very much or quite a bit of progress toward the objective of ability to think analytically and logically (34% among those who subsequently persisted at UCLA and 27% among those who subsequently dropped out). At UCLA, among those who persisted, 85% claimed very much or quite a bit of gain, compared with 46% among those who had dropped out.

From these examples, and from many others like them in the complete study, two generalizations can be made: first, the quality of academic effort needed for persistence at the university was much higher than the quality of effort needed at the community college to become eligible for transfer; and second, compared with the students who later dropped out, the students who were successful at the university had not only made a much larger increase in their prior quality of effort but also had reached a much higher absolute level.

This study had a major influence on the enactment of revised policies for the admission of transfer students; and for the

provision of resources to assist those who may need help to succeed at UCLA.

The Differential Value of Quality of Effort

Colleges differ from one another in many ways--in size, affluence, programs, selectivity, etc.--and the question now raised is whether and how they might also differ from one another in the quality of effort of their students. We do not, at this point, consider whether college A is different from college B, but rather in a broader context whether certain types of colleges differ in some systematic way from other types--not in ways we already know they differ, but in ways revealed by their students' responses to the College Student Experiences questionnaire. Since the unique feature of the College Student Experiences questionnaire is its measurement of students' quality of effort in using various facilities and opportunities for learning and development, the first concern is in what differences there are in that respect.

There are 14 quality of effort scales. Considering the results from 14,615 students at 62 colleges, collected over the four-year period from 1979 through 1982--doctoral granting universities (DU), comprehensive colleges and universities, public (PUB COMP), and private PRI COMP), liberal arts colleges, types I and II based on selectivity (LA I and LA II), and Bible colleges--what differences are there in students' quality of effort at those institutions? The data from Bible colleges will be considered separately. The first comparisons, then, are between the other five types of colleges and universities.

Differences in mean scores on the quality of effort scales of 1.00 or more are always statistically significant, given the large number of cases in the present analyses. But even though statistically significant, such relatively small differences are probably of little practical or visible import. So, we decided to focus mainly on differences in mean scores of 3.00 or greater. Of the 14 quality of effort scales there are eight in which differences between institutional types are of this larger magnitude, and two others which differ by more than 2.00, but less than 3.00. Of the 10 differing by 2.00 or more, three are activities related to academic scholarly efforts, three concern personal and social activities, and four are in the use of various group facilities on the campus. In other words, between the five types of institutions, 10 of the 14 quality of effort scales reveal major differences in student activities. These differences include all the primary aspects of college experience--academic, personal/social, and the use of institutional facilities.

On other quality of effort scales, the differences in scores between institutional types are small. There are apparently few difference in student activities, no matter what sort of school one attends, with respect to Course Learning, Experience in Writing, Information in Conversations, or Personal Experiences.

What emerges with striking clarity in comparing quality of effort differences between institutional types is the remarkable and almost universal superiority of the academically selective liberal arts colleges (LA I). They have the highest mean scores on the scales concerning Library, Experiences with Faculty, and

Science Laboratory; also on the scales concerned with Conversation Topics, Student Acquaintences, and Art, Music, Theater; and further on the activity scales regarding Clubs and Organizations, and Athletic and Recreation Facilities.

These results at the selective liberal arts colleges are consistent with all prior research regarding instititional differences. There are also results on the quality of effort scales that are consistent with all prior research on the characteristics of student life at big schools vs. small schools. For example, the small schools have higher quality of effort scores on Experiences with Faculty, Personal Experiences, Student Acquaintences, Clubs and Organizations, Student Union, and Athletic and Recreation Facilities. So, quality of effort is a variable that, on its own, reveals important institutional differences.

The unique virtue of the selective liberal arts colleges is further documented by strong emphasis in their environment on scholarly qualities, on being analytical and critical, and on students' characterizations of the faculty as approachable, helpful, understanding, and encouraging.

The combined features of high quality effort and the environmental emphasis on intellectuality and personal supportiveness in the selective liberal arts colleges is further enhanced, or perhaps helps to produce, gains toward many important objectives that are significantly greater than in other types of colleges. The unique quality of these liberal arts colleges is in the progress their students report in general education, literature, and arts. In breadth of knowlege, in becoming aware of different philosophies,

cultures, and ways of life, in broadening their acquaintence and enjoyment of literature, and developing an understanding and enjoyment of art, music, and drama, more students in the selective liberal arts colleges report substantial progress than do students in any other type of school. They also report most progress toward developing various intellectual skills.

The objective toward which fewer students in the selective liberal arts colleges than in all other types of colleges report substantial gain is "Vocational training--acquiring knowledge and skills applicable to a career." This finding, from the reports of students in college today, is of particular significance in relation to the frequently expressed belief that todays students are mainly "vocational" in their orientation and, presumably, not much interested in the "liberal arts." However, it is also the students in the selective liberal arts colleges who are most satisfied with college.

In the large doctoral granting universities, most of them strongly research oriented, the relationships among students and between students and faculty shown by the environment ratings are the lowest or least supportive of the five types of institutions. Students at the doctoral universities also have the lowest mean score on the quality of effort scale regarding contacts with faculty members. Nevertheless, the percent of students at the doctoral universities who are "satisfied with college" is high--higher than the percent at the more congenial and supportive liberal arts type II colleges or the private comprehensives. A friendly environment usually contributes to student satisfaction, but it does not assure it.

The basic data showing institutional differences in quality of effort, environment ratings, and estimates of progress are in Appendix Tables 9, 10 and 11.

To test still further the ability of the quality of effort measures to differentiate between colleges, Oscar Porter selected six colleges that appeared to be very similar to one another (all were highly selective liberal arts colleges of roughly similar size and affluence, and all, in their catalogues and brochures had very similar statements about their dedication to "liberal education," and their concern for individual students). Yet colleges typically believe that they offer unique undergraduate experiences. Porter's dissertation research sought, among other things, to see whether variations in student effort might provide a key to understanding institutional uniqueness, whether the assumption of uniqueness can be supported by quantitative data on how the students interact with the institution's facilities and opportunities for their education.

Composite data, as in comparisons between types of institutions, mask whatever differences there may be between individual institutions. On the 14 quality of effort scales there were four which showed large differences between these selective liberal arts colleges. Three were scales involving students' use of group facilities and associations--student union, athletic facilities, clubs and organizations--and the fourth was the library scale. On the activities related to student personal and social development, and most of the activities involving intellectual aspects of college life, differences between the institutions were generally small.

There clearly was some uniqueness which institutions could claim, however.

The activity "met your friends at the student union or student center" was a frequent activity of 86% of the students at one college, and of 36% at another college. At one college 47% of the students said they had frequently played on an intramural team, compared with 5% at another college. At one college 45% of the students said they had frequently attended a meeting of a club, organization, or student government group; but at another college this was a frequent activity for 15% of the students. On the library scale, to take one more example, 42% of the students at one college frequently "ran down leads, looked for further references that were listed in things you read"; at another college it was 15%. These differences suggest the special role that may be played by certain prominent, and perhaps also attractive, physical facilities. In any case, since all six of these colleges described their missions in very similar terms, the fact that some aspects of student life are quite different at the campuses would enable each college to claim, and document, a certain uniqueness. This could be an asset in student recruitment and student retention for the college; and in capturing the attention of students and parents who may be engaged in "comparison shopping" about where to go to college by giving them specific examples of what students do.

A third illustration of the differential value of the quality of effort scales is the very special case of the Bible colleges. Daniel Brown, in his doctoral dissertation, selected a representative group of 14 Bible colleges--representative as to denominational

affiliation, region of the country, etc.--and obtained three sources of data about them: (1) characteristics of their incoming freshmen from the annual freshman surveys conducted by Alexander Astin, (2) characteristics of their environments by administering Pace's College and University Environment Scales, and (3) their responses to Pace's College Student Experiences questionnaire. Apparently, Bible colleges had never been studied empirically in these respects. In some ways they are one segment of America's system of higher education; but in other respects they have regarded themselves as "a breed apart." So Daniel Brown's survey brings to light for the first time the similarities and differences between Bible colleges and other institutions of higher education.

Bible colleges are not liberal arts colleges with a special emphasis on Bible and religion. Rather, their primary mission is in the preparation of ministers and others for Christian service. In student academic selectivity they are generally similar to Liberal Arts, Type II, institutions. Their student bodies are very homogeneous, and the Bible college environments are also very homogeneous. The scholarly emphasis in their environments is a little above the average for Liberal Arts, Type II, colleges.

The quality of effort mean scores for Bible college students are similar to the mean scores at other types of colleges--neither higher nor lower than the highest and lowest mean scores at the other institutions--on most of the scales. The big exception to this is the Science Laboratory scale, the mean at Bible colleges being more than six points lower than at any other type of school. On two other scales the Bible colleges had lower mean scores than

other schools, but the differences were much smaller--1.2 points lower than any other on the Conversation Topics scale, and .8 lower on the Experiences in Writing scale. In general, it is not the quality of students' effort that differentiates the Bible colleges from other sectors of higher education. Indeed, their similarity to liberal arts colleges of moderate selectivity is a major finding in Daniel Brown's study.

Nevertheless, the Bible colleges are clearly differentiated from other institutions in other respects that are measured by the College Student Experiences questionnaire. On all the environment ratings regarding relationships--among students, with faculty, administration, and style of operation--the Bible colleges emerge as very supportive institutions, more so by far in administration and operational style, and also in friendly relations among students and relations with faculty that are described as helpful and encouraging. The other major aspect of the environment which has strong emphasis at the Bible colleges is the vocational emphasis--a result which obviously reflects their major purpose of training people for the ministry or similar Christian service. The Estimate of Gains section of the questionnnaire also shows a much higher percent of students at Bible colleges than at any of the other types reporting substantial gain/progress in vocational training. Other differences in gains reflect the curriculum at the Bible colleges. Very few students report substantial gains related to science objectives; and also, with respect to "gaining a broad general education," 47% of Bible collge students report substantial gain, compared with 63% at the Liberal Arts, Type II, colleges.

In the objectives that refer to personal and social development, the percentage of Bible college students reporting substantial gain is higher than at any other institutional type--specifically the goals of developing values and ethical standards, understanding oneself, understanding others, and the ability to function as a team member.

The Pervasive Significance of Quality of Effort

Not only does quality of effort have a general predictive value, a special diagnostic value, and some differential values, as the results thus far presented have shown, it also has a very pervasive value. By this we mean that the range or scope of high quality effort is related to the range or scope of high achievement. The more aspects of the college experience (use of facilities and opportunities) one participates in at an above average level of quality of effort, the more objectives (different goals of higher education) one makes above average progress toward their attainment. Breadth of involvement and breadth of attainments go hand in hand.

Of the 14 quality of effort scales in the questionnaire, 12 are answered by everyone (not all students live in a campus residence facility and so do not respond to the Residence scale, and not all students have had a science laboratory course and so do not respond to the Science Laboratory scale). Of the 12 scales applicable to everyone, four are mainly concerned with academic/intellectual activities (course learning, library, faculty, and writing), four are primarily personal and interpersonal (personal experiences, student acquaintences, conversation topics, and conversation level), and four are primarily centered around group

facilities and associations (student union, clubs and organizations, athletic and recreational facilities, and cultural facilities related to art, music, and theater). We devised a "breadth index" which is defined as the number of scales (different aspects of campus life) on which a student's score is above the median of some baseline group. This baseline could be the median at one's own institution, or the median of all student responses at all institutions. The baseline we have used consists of the responses from 11,084 students at 41 colleges and universities that obtained their replies from a good cross-section of the students. Scores on the breadth index could range from 0 to 12, and in fact do so. Some students invest above average quality of effort on all 12 of the topics and some students invest above average quality on none of the 12 topics. The distribution of breadth scores for the 11,084 students at these 41 colleges and universities is shown in Table 10. A breadth score of 9 or higher was obtained by 24% of the students; and about the same proportion (27%) had a breadth score of 3 or lower. The other 49% had scores in the middle range of the distribution.

Using a breadth score of 9 or higher (the upper fourth) as a definition of "high breadth," large differences between one college and another were revealed. For example, at one college only 8% of the student body had a breadth score of 9 or higher; whereas at another college 55% of the students had a breadth score of 9 or higher. Clearly at some colleges the vigor and vitality of what students put into the college experience covers a much wider range of activities, is much more pervasive, than is true at other

Table 10

DISTRIBUTION OF BREADTH SCORES

(11,084 students at 41 colleges and universities)

Breadth score	Percentage of all scores	
12	3%	
11	5	
10	7	24% High Breadth
9	9	
8	10%	
7	10	
6	10	49% Medium Breadth
5	10	
4	9	
3	9%	
2	7	
1	7	27% Low Breadth
0	4	

colleges. Indeed, the breadth index for a college may be a very good indicator of the quality of its undergraduate program, or, more explicitly, of the quality of undergraduate student experience at the college.

Evidence that the breadth score might be a very good index of the quality of undergraduate education on the campus is clearly suggested by the strong relationships between breadth scores and outcomes.

In Table 11 the students are divided into the three breadth categories--high, medium, and low; and for each group of students the percentage attributing substantial gain from their college experience with respect to each of the 18 objectives is shown. In every instance the percentage reporting substantial gain is greatest among the high breadth group, and smallest among the low breadth group. With respect to some goals the percentage of high breadth students reporting substantial gains is more than twice as large as the percentage among the low breadth students. So, not only do specific quality of effort scales have a clear relationship to certain specific gains, but quality of effort as a whole has a clear relationship to all gains. The more you put into the college experience, the more you get out of it.

Breadth of high quality effort is also related to students' satisfaction with college. This is true at each major type of institution, as Table 12 shows. The differences are not as large as they were between breadth and gains, but they are nevertheless statistically significant.

TABLE 11

RELATIONS BETWEEN BREADTH OF EFFORT AND GAINS

GAINS	Percentage reporting substantial gains among students with: low breadth scores	medium breadth scores	high breadth scores
VOC	45	50	60
BROAD KNOWL	53	70	80
ARTS	17	34	52
LIT	17	35	58
WRITE	34	53	71
PHILS,CULTS	40	63	78
VALUES,ETHICS	49	71	87
UND SELF	63	81	90
UND OTHERS	60	81	91
TEAM	35	55	70
HEALTH	27	42	56
SPEC ADV ED	51	63	74
ANAL,LOGIC	49	66	79
SYNTH,RELS	55	76	88
IND LRN	63	82	91
SCI/EXP	31	36	42
SCI/TECH	30	35	44
QUANT TH	37	45	55

TABLE 12

RELATIONS BETWEEN BREADTH OF EFFORT AND SATISFACTION WITH COLLEGE

Among Students With High, Medium, and Low Breadth Scores	Percentage Satisfied (scores 6,7,8)
At Doctoral Universities	
High breadth scores	83
Medium breadth scores	76
Low breadth scores	68
At Public Comprehensives	
High breadth scores	76
Medium breadth scores	70
Low breadth scores	62
At Private Comprehensives	
High breadth scores	74
Medium breadth scores	67
Low breadth scores	56
At Liberal Arts, Type I	
High breadth scores	87
Medium breadth scores	81
Low breadth scores	68
At Liberal Arts, Type II	
High breadth scores	76
Medium breadth scores	64
Low breadth scores	66

Breadth of effort also differs by institutional type. The percentage of high breadth students at the selective liberal arts colleges is twice as great as it is at doctoral universities or at the public comprehensives. These latter types of schools are all large schools, whereas all liberal arts colleges are small schools. Table 13 shows these differences. It is apparently easier, or more likely, to be involved in many aspects of the college experience at the relatively small colleges than at the large institutions where, presumably, more opportunities are theoretically available. Perhaps it is easier to drift, or be relatively uninvolved, at large schools; whereas at the smaller places pressures to become involved in campus activities may be stronger.

In an earlier study, based on data from 24 colleges, breadth of effort was found to correlate .80 with breadth of gains. Institutions having the highest breadth index for quality of effort also had the highest percentage of their students reporting gains that were "above average." Put another way, the most lively institutions (breadth of high quality student effort) were also the most productive institutions (breadth of high level achievement).

A somewhat related notion is that of "value added." It has often been assumed that those who start at or near the bottom on some criterion are likely to make the largest gains, and that therefore an investment in the low starting group is especially effective. Unfortunately perhaps, that is not so. Low starting groups can be defined in two ways--low because of low scholastic aptitude as measured by the SAT-Verbal, or low as defined by the gains reported at the end of the freshman year in college. As to

TABLE 13

PERCENTAGE OF STUDENTS AT DIFFERENT TYPES OF INSTITUTIONS WITH HIGH, MEDIUM, AND LOW BREADTH SCORES

	Percentages				
	Doctoral Universities	Public Comprehensive	Private Comprehensive	Liberal Arts I	Liberal Arts II
High breadth	17	15	19	35	25
Medium breadth	50	45	50	49	50
Low breadth	33	40	21	16	25

selectivity, the rank order correlation of 24 schools between selectivity (Freshman SAT) and breadth of gains, was .42. In other words, the schools that had the "best" students to begin with also showed the greatest breadth or scope of gains made by the students. More pertinent, perhaps, is the relation between academic selectivity and academic gains--academic gain defined as the cluster of objectives we have called general education and the cluster called intellectual skills. Between SAT-Verbal and general education gains, at the 24 colleges, the rank order correlation was .57; and between SAT-Verbal and gains in intellectual skills the correlation was .66. In other words, the more academic ability you have to begin with, the more you are likely to gain in academic, intellectual achievement in college.

A still more pertinent comparison is between gains at the end of the freshman year and gains at the end of the senior year. These are, of course, differences between two cross-sections of students, not differences between the same students at a later period of time. But any college would surely hope that its seniors who are about to graduate would report gains on important educational objectives that were greater than the gains reported by its end-of-year freshmen. One technical problem here is how to define the gains--is it merely the difference in percentages between freshmen and seniors who claim substantial gain, or is it the percentage of possible gain that should be used? If 60% of end-of-year freshmen say they have made substantial progress toward some goal, and 80% of seniors say they have made substantial progress, one could report the difference in two ways: first, that there is a differ-

ence of 20 percentage points between freshmen and seniors, or, second, that the gain is 50% of the possible gain (if one starts at 60%, the possible gain to 100% is 40; so if one ends at 80%, the gain is 50% of the possible gain). If one considers just the raw difference in percentages between freshmen and seniors, the rank order correlation at the 24 colleges between freshman and senior status is approximately zero. But if one considers gain as the percentage of possible gain, the rank order correlation is .46. So, relative to possible gains, the more you know or have in the first place, the more you are apt to gain.

Based on a much larger sample, and using students as the unit of analysis, differences in gains reported by freshmen and by seniors are shown for each institutional type in Appendix Tables 12, 13, 14, 15, and 16. Comparing these results with data previously reported on the quality of effort scores at the different types of institutions again illustrates the pervasive significance of quality of effort: for institutions with the highest gains toward the most goals also have the highest scores on most quality of effort scales, and vice versa.

In some aspects of the college experience, quality of effort scores are not successively higher with each year in college. Perhaps the experience tends to occur early, reaching a peak by the end of the freshman or sophomore year. This is often the case with the "non-academic" aspects of college--such as use of the student union and athletic facilities, and also with respect to clubs and organizations and student acquaintances. One would not expect large additional gains when much effort and much progress

had already occurred during the freshman year, or during the first two years. In the "academic" aspects of college--such as use of the library, contacts with faculty members, course learning activities, science laboratory, and, to some extent, the informational level of student conversations--one typically finds quality of effort scores that are higher each year from the freshman to the senior year. It is also progress toward objectives related to intellectual skills that show the greatest difference between the responses of freshmen and seniors.

Reading, Writing, and Computing

The 1983 second edition of the College Student Experiences questionnaire contained new items about the extent of students' reading and writing activities, and about their experiences with computers. Both the first and second editions of the questionnaire included the quality of effort scale labeled Experiences in Writing, and the objective described as "Writing clearly and effectively." Because there has been much concern about the reading and writing skills of college students, the increased enrollments in remedial English, plus the new interest in computers, we have taken a special look at what students report about these aspects of the college experience.

Responses to the new items come only from the eight schools that used the second edition of the questionnaire in the Spring of 1983. Although there were altogether 2299 students, half of them were from two doctoral universities, and one should not, from this composite group of responses, draw any generalizations about the typical activities of today's college students. But one can

report the results for single institutions, unnamed, and note the very large differences that were found.

Unlike other items in the questionnaire, the new item about writing activities asks for a report of what has been required by the college, not a report of student initiative and effort. Two types of writing experiences were asked about, as follows:

> During the current school year, about how many written reports have you made?

Essay Exams in Your Courses	Term Papers or Other Written Reports	
____	____	None
____	____	Fewer than 5
____	____	Between 5 and 10
____	____	Between 10 and 20
____	____	More than 20

At one institution 51% of the students reported that they had either none or fewer than five essay exams in their courses during the year. At another school the corresponding percent was 22%. Also, at the first school 18% reported having had between 10 to 20 or more essay exams during the year; and at the other college the figure was 38%. The college where students had the most essay exams also had the most term papers or other written reports, with 49% of their students writing from 10 to 20 or more term papers or other written reports during the year. At another college only 10% had that much writing required of them. There was one institution where 13% of the students had no essay exams, and 14% had no term papers or other written work during the entire school year.

Practice makes progress, or at least so it seems from the following comparison. At the college where students reported having the most essay exams and the most number of required papers, 79% of the students felt they had made substantial progress in their ability to write clearly and effectively; but at the college where students reported the fewest essay exams and the fewest required papers, 48% felt they had made substantial progress in their ability to write well.

A further analysis of writing activities, based on 13,000 students from 45 institutions using the 1979 edition of the questionnaire, was made by Karen Lefever. Although, as previously reported in Appendix Table 9, differences in mean scores on the Experiences in Writing scale between institutional types were very small, there were nevertheless several differences in certain specific activities. For example, at the selective liberal arts colleges, 81% of the students said that they frequently spent at least five hours or more writing a paper (not counting time spent in reading or at the library); whereas at the other types of schools the corresponding percents ranged from 57% to 66%. Also, students at the selective liberal arts colleges were somewhat more likely to think about grammar and syntax while writing, and to write a rough draft and then revise it before handing it in.

More important than these few differences, however, were the consistent patterns of relationship between writing and other variables, irrespective of institutional type. At each of the five institutional types, scores on the writing activity scale correlated .35 and above with the other academically oriented

scales (library, faculty, and course learning). Also correlations of .30 and above were found consistently between writing activities and two of the personal/social scales (personal experiences and student acquaintances) and both of the conversation scales. Moreover, gains in writing ability were consistently related to other outcomes, irrespective of institutional type. Between progress in writing and gaining a broad general education, the correlations were typically about .30; between progress in writing and gains in various intellectual skills (analysis, synthesis, and independent learning), the correlations were typically about .35; and between writing progress and gains in knowledge and enjoyment of literature, the correlations were typically about .45. From these analyses one might speculate that writing is an activity that helps to integrate the students' educational experience and progress.

The amount of reading students do--assigned and non-assigned--also varied greatly among institutions. The question about reading was as follows:

> During the current school year about how many books have you read?
>
> | Textbooks or Assigned Books | Non-Assigned Books | |
> |---|---|---|
> | ____ | ____ | None |
> | ____ | ____ | F wer than 5 |
> | ____ | ____ | Between 5 and 10 |
> | ____ | ____ | Between 10 and 20 |
> | ____ | ____ | More than 20 |

At one institution 47% of the students reported that they had read at least 20 textbooks during the year. At this particular school about one-third of the students were humanities majors. At another school only 14% had read that many texts. A similar contrast existed for the reading of non-assigned books, with 10% at one school reading 20 or more, and 2% doing so at another school. At most colleges about 60% to 70% of the students said that they had read fewer than five non-assigned books. At colleges where the least amount of reading was required or done voluntarily, many of the students were majors in Business. One might suppose that the school where students read the most textbooks would compensate for this reading load by reading fewer non-assigned books, but that was not the case. Reading seems to be a general habit--the more assigned books you read the more non-assigned books you also read.

With regard to experiences with computers, most students, from half to three-fourths at the eight colleges, reported that they had never worked on a project using a computer, used a computer to assist in course learning, written a program to analyze data, or sought out-of-class instruction in using computers. For about one-third of the students at each of the colleges, "computers and other technologies" were never among their conversation topics; although about one-half occasionally talked about the topic. From these figures about activity it is not surprising to find similar figures about progress. At most of the colleges, from 40% to 60% of the students reported that they had made "very little" gain/ progress in "acquiring familiarity with the use of computers." Progress toward this objective is no doubt dependent on the

availability of equipment at the colleges, and the nature of assignments and probably not attributable primarily to lack of interest or effort among the students. At one college, where many of the students were Business majors, and where computer equipment was surely available, nearly half of the student body claimed substantial progress in acquiring familiarity with the use of computers.

Institutional Research, Self-Study, and Evaluation

Many of the analyses we have made of our inter-institutional data base can also be made within a single institution. The general questions simply become local questions. What are the best predictors of student gains and satisfaction at our school? What are the differences at our school between residents and commuters, or between transfer students and others? What are the differences between freshmen and seniors at our school? What is the breadth of high quality effort among our students?

There are other analyses that may be more appropriate within institutions than between institutions. If one wished to compare the experiences of Hispanic/ Mexican-American students with "majority students, one might in a national sample without suitable statistica controls simply be comparing students in southwestern colleges with those in other parts of the country. If one wished to compare "foreign" students with U.S. citizens, the results might be quite different at different colleges. At UCLA, for example, many foreign students are Oriental/Asian. At some other college the foreign student population may come mainly from Saudi Arabia. Also, in comparing the experiences of foreign students with U.S.

students one needs to take account of the students' major field and other factors which may influence the results. Sensitivity to such factors is mainly a local responsibility for the obvious reason that those who are on the scene are more likely to know about them.

When the College Student Experiences questionnaire was first published in 1979, we obtained responses from a random sample of UCLA undergraduates and subsequently made a number of analyses which we believed would be of interest to the UCLA administration. Earlier, we had distributed a copy of the questionnaire to various administrators and then met with a group of them to ask whether there were any analyses or comparisons that would be particularly useful to them. The group, about a dozen people, included individuals from the chancellor's office, the planning office, the office of the vice chancellor for student affairs, deans of several divisions in the college of letters and science, and other academic personnel. From their discussions, and following their advice that a series of very brief and clearly focused reports would be more useful than a single comprehensive report, we prepared and delivered copies of such reports to the chancellor's office and the planning office where they could then be duplicated and distributed to selected individuals. There were eight topics about which special interest had been expressed--course learning, use of the library, writing experiences, contacts with faculty, students who lived in the dormitories, transfer students, student satisfaction, and minorities. No analysis was made of the educational experiences of minority students because the number of cases was

too small to assure adequate reliability. In addition, we prepared three other reports which we regarded as important--a report on relationships between the data about effort, environment, and attainment; a report about breadth or scope of high quality effort; and a report about predicting students' gains/progress.

In most of these reports roughly similar types of presentation were made: first, the overall percentages of students who responded "never," "occasionally," "often," and "very often" to the activities in the particular scale; second, the correlations, or sometimes differences between high and low participants, between effort and such other variables as year in school, grades, aspirations for further education, sex, race, transfer status, residence, etc. as appropriate to the topic; and third, relationships between effort and gains. Most of the reports were about three pages in length, and were self-contained in the sense that one did not need to read any additional reports in order to understand the results presented.

In 1983 a new opportunity to survey UCLA undergraduates occured. The University was scheduled for its ten-year accreditation review cycle by the Western Association in 1984; and 1983 was to be the time for its self-study. I suggested to the chancellor's office that a survey of undergraduate student life might be appropriate. Research oriented universities such as UCLA have a great deal of external and reasonably objective data about their eminence in research and scholarly productivity; and these external ratings put UCLA among the top three or four universities in the U.S. But what do we, or any other major university, really know about the quality or distinction of the undergraduate program? Ratings of

department chairmen at other universities, of the sort that are used in judging graduate program distinction, are of little value for this purpose because department chairmen know little or nothing about undergraduate programs at other universities. Moreover, the quality of the undergraduate experience is influenced by many elements that are unrelated to the departmental major--elements such as student associations, relations with faculty, clubs and organizations, etc. Institutions that may be eminent in certain respects may not be especially distinctive in others. Institutions that have an excellent undergraduate program may not have any program at all in doctoral level research and training. By taking the initiative to survey the quality of its students' undergraduate experience and education, UCLA could make a special contribution to the value of the accreditation review process, and at the same time obtain data that could stimulate lively and ultimately productive debate within the university, leading, one might hope, to more effective and more distinguished undergraduate programs. The Chancellor's office agreed with the suggestion and provided the support necessary to conduct the survey.

During April and May of 1983, 846 undergraduates responded to the College Student Experiences questionnaire. The number represented a 46% return from a randomly selected sample, and reflected reasonably well what is known about UCLA undergraduates from other sources. Analysis of the results have been made by Karen Lefever. One initial interest was to see whether the new sample of responses differed from the 1979 sample. For the most part the results were very similar, but there were a few changes that were especially

pleasing. The 1983 students had significantly higher mean scores on the quality of effort scales regarding library use, contacts with faculty, and writing; and they also had significantly higher scores on the satisfaction index. In outcomes, the main difference was that a higher percentage now reported substantial gain in writing effectively,a result that may have been facilitated by the increased academic emphasis and resources the university had put into writing programs. Several institutions have now used the questionnaire on more than one occasion in order to study change. When new programs or facilities have been introduced, the questionnaire is apparently sensitive enough to reveal changes in students' experience that were intended by the college; and this is an important element in good evaluation.

Another obvious interest in the self-survey was to see whether the UCLA student responses would in any important ways be different from other doctoral universities. Compared with a composite set of 3500 responses from undergraduates at ten doctoral granting universities the responses from UCLA students were not sharply different in most respects. For example, with respect to the environment ratings, UCLA was a little stronger in its emphasis on esthetic qualities, and on critical and analytical qualities. With respect to student relationships, the percent of UCLA students rating them as friendly and supportive was a little lower (63%) than the percent at other universities (68%). As to scores on the various quality of effort scales, UCLA was significantly higher on the Writing scale and the Student Union scale and significantly lower on the Faculty scale, the Art, Music, Theatre scale and the

Athletic and Recreational Facilities scale. With respect to various outcomes (gains, progress), UCLA had a higher percent reporting substantial gains in writing, and lower percentages on the several objectives related to personal and social development and understanding. There were no differences between UCLA and the composite of doctoral universities with respect to the intellectual emphasis on the environment, the reported gains toward the various goals of intellectual competence, the quality of effort in library use, or in course learning.

In answer to the question "How well do you like college?" 44% of the UCLA students said "I am enthusiastic about it," compared with 34% at other doctoral universities. To the question "If you could start over again, would you go do the same college you are now attending?" 85% of UCLA students said yes, compared with 80% at other doctoral universities.

Here are some other highlights that are reported in the self survey.

The goals toward which the largest number of undergraduates believe they have made substantial progress are ones related to the development of intellectual competencies--analysis and logic, synthesis, capacity for independent learning, and the acquisition of specialized knowledge for advanced work. These same goals are also the ones which show the greatest gains, as inferred from the relative differences between the responses of end-of-year freshmen compared with the responses of end-of-year seniors.

The goals toward which the next largest number of students report substantial progress are those related to self-understanding,

understanding others, the clarification of personal values, and broad general education about different fields of knowledge.

In both of the above categories, the proportion of students indicating substantial gains are generally from two-thirds to more than four-fifths; and almost none of the seniors (from 2% to 5%) report having made "very little" progress in the above directions.

Goals that related to science, on the one hand, and to literature and arts, on the other hand, are apparently so embedded in the respective curricula that substantial progress toward science goals or toward literature and arts is made only by students who major in those fields. Among the total sample of undergraduates roughly 1/3 to 2/5 reported substantial gains in sciences; and roughly 1/3 to 1/4 reported substantial gains in literature and arts. The contrasts are sharp. Among majors in sciences or engineering, 2/3 to 3/4 report substantial gains related to those fields, but generally about 1/10 to 1/5 report substantial gains related to literature and arts. Similarly, among majors in Arts and Humanities, about 2/3 to 4/5 report substantial gains related to those fields, but generally about 1/10 to 1/5 report substantial gains related to the sciences.

In characterizing the UCLA environment, nearly everyone (85% to 90%) regards UCLA as having a "strong emphasis" on the development of a student's academic, scholarly, and intellectual qualities; but generally only 1/3 to 1/2 of the students describe UCLA as having a strong emphasis on the development of a student's vocational and occupational competence. Also, generally about 3/5 to 2/3 of the students consider the relationships among students as friendly

and supportive, and about the same proportions describe relationships with faculty as helpful and encouraging.

Some of these comparisons prompted discussion about general education, especially because the university had recently modified its distribution requirements; yet science and non-science students remain quite far apart in many of their experiences and attainments.

Other results prompted discussion of undergraduate teaching. For example, in some fields the proportion of students rating the faculty as approachable, helpful, understanding, and encouraging was typically 7/10 to 3/4, whereas in other major fields it was about 1/2.

One of the merits in a self-study survey of this kind is in the questions it raises--the results are rarely pleasing to all observers. Specific data help to focus discussion, and raise such questions as: Why? What would happen if? How could this be modified?

During the 1983-84 school year many specially focused analyses of the College Students Experiences results at UCLA will no doubt be made. Those who are particularly concerned with foreign students want to know about the experiences, progress, and satisfaction of foreign students, both immigrants and non-immigrants. Those who administer the residential life programs want to know more about the dormitory residents, about students who live in the fraternities and sororities, etc. Those who plan the orientation programs for freshmen want to know whether the freshmen experience has been a rewarding one for most students. Those who are particularly concerned with personal counseling need to know more about the

"uninvolved" students: these are the opposite of the "high breadth" students. Who are they? Are they also the dissatisfied students? Are they the future dropouts? Can their experience be enriched?

This monograph is not the place to report all the results of the UCLA survey. We mention its existence, and some of its findings, primarily to illustrate the potential value of the College Student Experiences questionnaire in the self-study aspect of accreditation. The accreditation associations want evidence about outcomes as well as about processes, programs, resources, administration, finance, etc. The questionnaire provides data about what students do with the resources and what they get out of them. As more colleges use the questionnaire, more data will be available for normative comparisons. Additional thoughts about research and evaluation in higher education, and about the significance of results so far attained, are the subject of the final section of this monograph.

REFLECTIONS

Quality of effort is a useful and measurable concept. The original thought that measuring students' quality of effort may be the key to evaluating the quality of undergraduate education has been supported by many of the analyses over the past five years. Quality of effort is the best predictor of students' progress toward the attainment of important educational goals. Granted all the elements that account for the selective distribution of who goes where to college, once the students get there what counts most toward their attainment is not who they are or where they are but what they do. It is the quality of effort they put into capitalizing on the resources and opportunities for learning and development that exist in the college setting that makes the difference. Further, the breadth or scope of student effort is clearly related to the breadth of outcomes toward which students make substantial progress, as well as progress on each specific objective. The more students put into their college experience the more they get out of it.

Quality of effort, and the breadth of high quality effort, are indications of intitiative. Almost all of the activities in the quality of effort scales are voluntary ones. Going to college is in itself a voluntary activity. In college, students don't have to browse in the library stacks, or make outlines from their class notes, or work on a committee, or have serious discussions with students whose religious beliefs are very different from their own. But these activities and all the others in the questionnaire are ones that can and do contribute to learning and

development. They are activities that professors, counselors, and other educators regard as desirable; but they are not required activities. In higher education there is no detailed regulation or monitoring of how students spend their time. As education moves from kindergarten to college there is progressively less supervision and more individual freedom and responsibility. The developmental and educative process from elementary school to secondary school to college is not only one of acquiring more and more knowledge but also one requiring more and more initiative. In this respect one might say that college can't give you an education, but if you to go college and make the effort to use the facilities and opportunities it provides you can get a very good education.

Despite the clear direction of these results emphasizing the importance of student initiative, one should not conclude that what the college does is of minor influence. It is the college that provides the facilities and resources in the first place. It is the college--the administration as well as the professors--that sets the intellectual standards, the quality of performance it expects from students, and exemplifies its values by the quality of the facilities it provides.

There is no doubt a connection between students' quality of effort and the quality of facilities and opportunities that make the effort worthwhile. The quality of effort of students is high in the elite liberal arts colleges that have very good facilities. Although the major research universities probably have the most to offer--the best libraries, the most distinguished research scientists

and scholars, the most well-equipped facilities in the arts, music, and theater, the best athletic and recreational facilties, etc.--the typical student in those universities does not gain as much as the typical student in the elite liberal arts colleges. I suggested earlier that in the big schools it is easier to drift, partly because no one really knows that a student may be drifting; whereas in small schools one cannot hide from one's fellow students or from the faculty. The crucial importance of students' initiative, however, is documented by the fact that, in the big doctoral universities with their rich resources, the students who really make the effort (the top 30% on the "breadth index" for those schools) gain more than the typical student in the best liberal arts colleges. This simply suggest that the quality of outcomes depend not only on the students' quality of effort but also on the quality of the resources and opportunities that are available. In the big schools, high level attainment is especially dependent on high level initiative.

At the beginning of this report I suggested that there was a quality dimension to the educational process as well as to the educational product. If a college hopes to stimulate high level efforts by its students, then the scores of those students on the quality of effort scales are evidence of how well that objective has been achieved. In this sense, the students' quality of effort scores are a measure of the college's success; there is, in other words, a vital and stimulating campus life that permeates the institution. This brings me to some further thoughts about the importance of "process."

The measurement of process is the missing link in past evaluations of higher education. We know a great deal about the characteristics of entering college students. The student questionnaires accompanying the SAT and the ACT, as well as the freshmen surveys initiated by Alexander Astin at the ACE and continuing at UCLA, have given useful information about who goes to college and how the characteristics of entering college students have changed over the years. Moreover, surveys of freshmen have formed the foundation for follow-up studies with respect to such things as changes in occupational interests, changes in major fields, etc. although relatively few of those follow-ups have extended beyond the years of college graduation. In any case, we have had, over the years, a moderately important baseline as to what people were like when they entered college.

We also have a fair amount of information about what students learn in college, based on forty or more years of achievement testing with such instruments as the Area tests of the Graduate Record Examinations, other tests of general education, and the achievement tests in many major fields that have been constructed by the ETS. We have measured students' performance on a good many objective and well constructed achievement tests. These measures have not often been used on a before and after basis, but nevertheless when they have been, particularly the tests in one's major field, the results have uniformly shown substantial gains in test scores. The one thing students do indeed acquire in college is new information about a lot of subjects.

We also know, from a number of studies over the years, what people are like after they leave college. We have inquired about their employment, income, and job satisfaction. We have also inquired about their interests and participation in civic and cultural affairs. In many alumni studies questions about attitudes, values, and opinions have also been included, especially opinions about their college experience and the values they attribute to it.

With respect to the process of education--what occurs between entrance and exit--most of the dimensions in past research have been more or less static or unsystematic: for example, whether students lived on campus, what their major field was, what courses they took, whether they engaged in various extracurricular activities, etc. Some evaluations have focused on what the teachers do. These inquiries have, of course, been valuable and informative. They have not, however, dealt directly or comprehensively with what I believe is the most significant process dimension - the behavior of students. The College Student Experiences questionnaire is a systematic, conceptually based, comprehensive inventory of how college students spend their time in using the facilities and opportunities for learning and development that the college makes possible.

At some future point, just as we now have systematic inventories of students on arrival, and achievement test measures of their subject-matter learning, and periodic surveys of what they are like some years after graduation, we need to introduce on an equally large-scale, systematic basis what has been, until now,

the most significant missing element in understanding the process and effectiveness of higher education--namely, what students themselves do when they are in college.

It would be incorrect to say that researchers have not been interested in students' behavior. Teachers, administrators, counselors, and many researchers have always been interested in and concerned about students behavior--they observe it, deal with it, stimulate it, reward it, day in and day out. There are also many measures of students' behavior if behavior is broadly defined to include attitudes, interests, values, and personality traits.

It is, however, the pragmatic scope of the activities in the College Student Experiences questionnaire that gives it a special value. Many of the activities reveal how students use faciliites on which the college spends a lot of money. Such information is particularly useful to those who manage the facilities; and the specificity of the activities suggests exactly where to focus attempts to stimulate better usage. So too, many of the activities involving interpersonal associations have clear relevance to the concerns of student personnel administrators. For example, if 80% of the students report that they have never talked with a counselor or other specialist about problems of a personal nature, it is because they don't really have any problems?

The fact that the questionnaire is organized around campus facilities and opportunities and in relation to educational goals distinguishes this instrument from other student questionnaires which are usually organized around psychological dimensions.

Quality of effort is not the same as motivation. Motivation is often described as a general psychological phenomenon. Quality of effort is more specifically an educational activity related to specific aspects of educational experience. Nor is quality of effort the same as persistence, for persistence does not include initiative. Nor is quality of effort a personality trait, for scientists and engineers exhibiting high quality of effort in various aspects of their educational experience are quite different in personality from humanists and artists who are also exhibiting high quality of effort. The essence of quality of effort, if it has an essence, may be identified in future research. Meanwhile, we know that it is a practical and powerful concept that can enrich our understanding of student learning and development in college. It is a variable that future research can ill afford to ignore.

There is another aspect of the College Student Experiences questionnaire that is very timely in view of the belief that the effectiveness of college education should be judged on a "value added" basis. My own opinion is that "value added" is an interesting idea, but an idea not yet well defined. It is clearly inappropriate if one uses achievement or other tests on which the brightest and best informed students make such high scores initially that the test is incapable of identifying added value. It is redundant when before and after differences are obvious. Nevertheless, although it may have been fortuitous rather than foresighted on my part, the question in the Estimate of Gains section of the questionnaire is a value added question. It doesn't ask students to

estimate how much they have benefited from college, or how well they can do certain things, or how much they know. It asks how much they have gained, how much they have added to their knowledge, their intellectual skills, and to other abilities and insights as a result of their experiences in college.

What they were like at entrance is self defined, and what progress they claim is also self defined; but the response is a value added judgment. When students fill out the questionnaire they are engaging in recall, introspection, and judgment. We know from both internal and external evidence that their recall of activities and their estimates of gain are credible, and that they respond carefully and perhaps in many cases with personal interest to the content of the questionnaire. Because their responses are congruent with other judgments, and because for some goals the students may well be the only qualified judges of whether they are any different today from what they were when they arrived, we must pay attention to what they say.

Some distinguished educators, Clark Kerr among them, have said that in most respects higher education is a very successful institution, but that general education, or liberal education, is a disaster area. If this means that one cannot find a common curriculum, or any common core of knowledge, in the education of today's students, the judgment has some validity. But if one means that the goals traditionally associated with liberal education are no longer being achieved, the judgment has much less validity. Our evidence shows that most students (3/4 and more) have made substantial progress in sharpening their intellectual skills--the

ability to analyze and be logical, the ability to see relationships and to synthesize, the ability to pursue ideas and find information one needs. Our evidence also shows that most students (3/4 and more) have made substantial progress in understanding themselves and others, and in clarifying their values and ethical standards. Our evidence further shows that most students (2/3 or so) make substantial progress toward gaining a broad general education about different fields of knowledge, and becoming aware of different philosophies, cultures, and ways of life. The approximate percentages (they vary somewhat at different types of institutions) are percentages claiming substantial gains ("quite a bit" or "very much" progress). If one adds those who claim at least "some" progress, rather than "very little," all of the above percentages approach 100%, usually coming to 90% and more.

In the Appendix Tables 12 to 16 where percentages of freshmen and seniors reporting substantial gain are shown for each institutional type, one needs to add a cautionary note. There are a few instances in which the reported gains of seniors are less than the reported gains of end-of-year freshmen. In many institutions there are large numbers of transfer students, and therefore all the seniors are not ones who have spent four years or more at the school. The difference in percents needs to be interpreted in this light. At the public comprehensive universities in our samples, 45% of the respondents were transfer students. In the doctoral universities, the private comprehensive universities, and the liberal arts II colleges, about 1/5 were transfer students. In liberal arts I colleges about 1/8 were transfer students.

In a very real sense, the entire experience of higher education is a value added experience. Every event that occurs in college and that is meant to contribute to student learning and development is a value added event. One could think of value added units as all things that did not exist before and so have been added to one's life--courses taken, exams passed, papers finished, concerts attended, etc., etc., etc.

What our research shows is that this value added element, or in our terms the percent of students who make substantial progress toward the attainment of important goals of higher education, is primarily the result of the quality of effort students put into their education.

APPENDIX

INFORMATION ABOUT OBTAINING AND USING THE QUESTIONNAIRE

Normally, colleges give the questionnaire to samples of their undergraduates in the Spring of the year.

When the questionnaires have been filled out by the students, the college sends the completed questionnaires to Intran Corp., 4555 W. 77th Street, Minneapolis, MN 55435. Intran "processes" the results. The college gets a tape or cards containing all the responses of all its students and all the scores on the various scales. The college can then analyze its results in whatever says it wishes.

The college also gets, from the Higher Education Research Institute, a selective print-out of its own results, and a composite report showing results from different types of colleges and universities that have been accumulated over a period of several years.

All orders, billing, payments, correspondence should be addressed to the Higher Education Research Institute, UCLA Graduate School of Education, 405 Hilgard Avenue, Los Angeles, CA 90024.

Costs are as follows:

- Copies of the questionnaire at 40¢ each
- Processing completed questionnaires at $1.00 each
- Basic institutional participation fee of $175.00

KEY TO ABBREVIATIONS

QE = Quality of Effort

The QE scales are:

LIB = Library Experiences

FAC = Experiences with Faculty

COURSE = Course Learning

AMT = Art, Music, Theatre

UNION = Student Union

ATHL = Athletic and Recreation Facilities

CLUBS = Clubs and Organizations

WRITE = Experience in Writing

PERS EXP = Personal Experience

ST ACQ = Student Acquaintances

SCI LAB = Science Lab Activities

SCI/TECH = Science/Technology

DORM, F/S = Dormitory or Fraternity/Sorority

CONV TPS = Conversation Topics

CONV INFO = Information in Conversations

KEY TO ABBREVIATIONS

ENV = Environment

The ENV ratings are:

SCHOL = Academic, Scholarly, Intellectual Emphasis

ESTH = Esthetic, Expressive, Creative Emphasis

CRIT = Critical, Evaluative, Analytical Emphasis

VOC = Vocational Emphasis

REL = Personal Relevance of Courses

STUDENT = Relationships Among Students--Friendly, Supportive

FACULTY = Relationship with Faculty--Helpful, Encouraging

ADM = Relationship with Administration--Considerate, Flexible

OPER = Operational Style--Open, Adaptive

KEY TO ABBREVIATIONS

GAIN = Gains/Progress

The GAIN topics are:

JOB = Knowledge for specific job or type of work

SPEC ADV ED = Specialization for further education

BROAD KNOWL = General education about different fields of knowledge

CAREER = Information relevant to a career

ARTS = Appreciation and enjoyment of art, music, drama

LIT = Acquaintance and enjoyment of literature

WRITE = Writing clearly and effectively

COMPUTERS = Familiarity with use of computers

PHILS, CULTS = Awareness of different philosophies and cultures

VALUES, ETHICS = Developing values and ethical standards

UND SELF = Understanding self--abilities, interests, personality

UND OTHERS = Understanding other people and ability to get along

TEAM = Ability to function as a team member

HEALTH = Good health habits and physical fitness

SCI/EXP = Understanding nature of science and experimentation

SCI/TECH = Understanding new scientific and technical developments

CONSQ SCI/TECH = Aware of consequences of new application in science and technology

ANAL, LOGIC = Ability to think analytically and logically

QUANT TH = Quantitative thinking

SYNTH, RELS = Ability to put ideas together, see relationships, similarities

IND LRN = Ability to learn on your own, pursue ideas, and find information you need

APPENDIX TABLE 1

FACTOR ANALYSIS OF ESTIMATES OF GAINS
1979 DATA
(N = 3006)

Gains Topics	Factor 1 Personal/Social Development	Factor 2 General Education Literature & Arts	Factor 3 Intellectual Skills	Factor 4 Understanding Science
UND OTHERS	72*	22	17	02
UND SELF	68*	27	21	04
TEAM	64*	06	14	08
VALUES, ETHICS	59*	38	18	03
HEALTH	55*	06	14	08
LIT	03	79*	05	-01
WRITE	09	53*	28	01
PHILS, CULTS	29	53*	13	02
ARTS	16	52*	-05	-02
BROAD KNOWL	11	45*	19	13
SYNTH, RELS	23	33	71*	12
ANAL, LOGIC	17	19	67*	36
IND LRN	35	32	47*	08
SPEC ADV ED	14	13	38*	30
SCI/EXP	10	02	19	86*
SCI/TECH	08	05	24	83*
QUANT TH	14	-06	54	47*
VOC	23	-02	26	15

* Factor loadings--principal components with Varimax rotation

* Decimal points are omitted in Tables 1 - 7

APPENDIX TABLE 2

MAJOR PREDICTORS OF STUDENT GAINS/PROGRESS TOWARD
THE ATTAINMENT OF IMPORTANT COLLEGE OBJECTIVES
(PREDICTOR VARIABLES LISTED IN ORDER OF THEIR IMPORTANCE)
1979 DATA
(N = 3006)

	Multiple R	R^2	Change in R^2
Personal/Social Development			
QE:Pers Exp	38	14	14
QE:Athl	48	23	09
ENV:Student	54	29	06
Satisfaction	56	31	02
QE:Conv Tps	57	33	02
Years in college	58	34	01
ENV:Voc	59	35	01
QE:St Acq	60	36	01
Other variables	62	39	03
Total	62	39	--
Intellectual Skills			
QE:Course	36	13	13
Satisfaction	45	20	07
Year in college	49	24	05
ENV:Crit	54	29	04
QE:Conv Info	56	32	03
QE:Sci Lab	58	34	02
ENV:Faculty	59	35	02
Sex (male)	60	36	01
QE:Lib	61	37	01
Grades	61	38	01
Other variables	63	40	02
Total	63	40	--

APPENDIX TABLE 2 (continued)

	Multiple R	R^2	Change in R^2
General Education, Literature & Arts			
QE:AMT	43	18	18
QE:Write	50	25	07
ENV:Crit	55	30	05
ENV:Faculty	57	33	03
QE:Conv Tps	59	35	02
Major in Fine Arts/Hum.	61	37	02
ENV:Esth	62	38	01
Satisfaction	63	39	01
QE:Lib	63	40	01
Other variables	65	42	02
Total	65	42	--
Understanding Science			
QE:Sci Lab	52	27	27
Major in Sciences	56	31	04
Sex (male)	59	34	03
QE:Course	61	37	03
(neg) Major in Fine Arts/Hum	63	40	03
Satisfaction	64	41	01
Year in college	64	42	01
Major in Engineering	65	43	01
QE:Conv Info	66	44	01
ENV:Crit	66	44	01
(neg) Lived on campus	66	45	01
Other variables	68	46	01
Total	68	46	--

APPENDIX TABLE 3

ADDED CONTRIBUTION OF QUALITY OF EFFORT
TO THE PREDICTION OF STUDENT GAINS/PROGRESS TOWARD
THE ATTAINMENT OF IMPORTANT COLLEGE OBJECTIVES
1979 DATA
(N = 3006)

	Multiple R	R^2	Change in R^2
Personal/Social Development			
Student background	36	13	13
College status	47	22	09
Environment	49	24	02
Quality of Effort	62	39	15
Intellectual Skills			
Student background	10	01	01
College status	53	28	27
Environment	55	30	02
Quality of Effort	63	40	10
General Education, Literature & Arts			
Student background	14	02	02
College status	48	23	21
Environment	55	30	07
Quality of Effort	66	43	13
Understanding Science			
Student background	23	05	05
College status	58	34	29
Environment	60	36	02
Quality of Effort	68	47	11

APPENDIX TABLE 4

FACTOR ANALYSIS OF ESTIMATES OF GAINS
SECOND EDITION, 1983
(N = 2299)

Gains Topics	Factor 1 Personal/Social Development	Factor 2 Science/ Technology	Factor 3 General Education, Literature & Arts	Factor 4 Intellectual Skills	Factor 5 Vocation
UND OTHERS	73*	04	18	14	11
UND SELF	70*	04	25	20	09
VALUES, ETHICS	63*	06	31	15	05
TEAM	60*	09	05	07	21
HEALTH	50*	17	09	05	12
SCI/TECH	07	93*	00	13	13
SCI/EXP	14	83*	01	13	05
CONSQ SCI/TECH	12	74*	10	17	13
COMPUTERS	-03	18*	-10	19	19
LIT	08	-02	83*	01	-01
WRITE	12	-03	53*	23	02
ARTS	18	01	52*	-09	02
PHILS, CULTS	34	09	46*	14	03
BROAD KNOWL	16	07	43*	23	09
ANAL, LOGIC	21	35	20	66*	14
SYNTH, RELS	31	14	31	64*	09
QUANT TH	14	44	-05	55*	15
IND LRN	38	07	31	43*	19
JOB	16	04	-09	01	73*
CAREER	25	08	15	12	61*
SPEC ADV ED	12	26	15	21	52*

APPENDIX TABLE 5

MAJOR PREDICTORS OF STUDENT GAINS/PROGRESS TOWARD
THE ATTAINMENT OF IMPORTANT COLLEGE OBJECTIVES
(PREDICTOR VARIABLES LISTED IN ORDER OF THEIR IMPORTANCE)
(SECOND EDITION, 1983)
(N = 2299)

	Multiple R	R^2	Change in R^2
Personal/Social Development			
QE:Dorm F/S	40	16	16
ENV:Relevance	48	23	07
Senior	53	28	05
QE:Athl	56	31	03
QE:Pers Exp	59	35	04
ENV:Student	61	37	02
QE:Course	62	38	01
Major in health fields	63	40	02
ENV:Crit	64	41	01
(neg) Freshman	64	41	01
Other variables	68	46	05
Total	68	46	--
General Education, Literature & Arts			
QE:AMT	49	24	24
ENV:Crit	57	32	08
Read texts	61	37	05
ENV:Esth	64	41	04
ENV:Faculty	65	42	01
Major in Humanities	67	45	03
Senior	68	46	01
QE:St Acq	69	48	02
Major in Social Sciences	70	49	01
(neg) Major in Engineering	70	49	01
Write papers	71	50	01
(neg) Freshman	71	50	01
Other variables	74	55	05
Total	74	55	--

APPENDIX TABLE 5 (continued)

	Multiple R	R^2	Change in R^2
Intellectual Skills			
ENV:Crit	43	19	19
QE:Sci/Tech	52	27	08
QE:Conv Info	57	32	05
(neg) Freshman	60	36	04
ENV:Faculty	61	37	01
QE:Course	62	38	02
Satisfaction	63	40	02
(neg) Sophomore	64	41	01
Other variables	68	46	05
Total	68	46	--
Science/Technology			
QE:Sci/Tech	71	50	50
ENV:Relevant	72	52	02
Senior	73	53	01
QE:Athl	73	53	01
(neg) Major in Business	74	55	02
QE:Write	74	55	01
ENV:Crit	75	56	01
Major in health fields	75	56	01
Other variables	77	59	03
Total	77	59	--
Vocation			
ENV:Voc	43	18	18
(neg) Freshman	51	26	08
ENV:Relevant	55	30	04
QE:Course	58	34	04
(neg) Major in Social Science	60	36	02
(neg) Major in Humanities	62	38	02
QE:Clubs	63	40	02
Major in health fields	64	41	01
Major in Education	65	42	01
Senior	65	42	01
ENV:Students	66	44	02
QE:Athl	66	44	01
(neg) Plan adv. degree	67	45	01
Major in Computer Sci	67	45	01
QE:Faculty	67	45	01
Other variables	70	49	04
Total	70	49	--

APPENDIX TABLE 6

ADDED CONTRIBUTION OF QUALITY OF EFFORT
TO THE PREDICTION OF STUDENT GAINS/PROGRESS TOWARD
THE ATTAINMENT OF IMPORTANT COLLEGE OBJECTIVES
(SECOND EDITION, 1983)
(N = 2299)

	Multiple R	R^2	Change in R^2
Personal/Social Development			
Student background	22	05	05
College status	49	24	19
Environment	58	34	10
Quality of effort	68	46	12
Intellectual Skills			
Student background	12	01	01
College status	51	26	25
Environment	61	37	11
Quality of effort	68	46	09
General Education, Literature & Arts			
Student background	20	04	04
College status	61	37	33
Environment	69	48	11
Quality of effort	74	55	07
Understanding Science			
Student background	15	02	02
College status	54	29	27
Environment	58	34	05
Quality of effort	77	59	25
Vocation			
Student background	17	03	03
College status	56	31	27
Environment	67	45	14
Quality of effort	71	50	05

APPENDIX TABLE 7

MAJOR PREDICTORS OF STUDENTS SATISFACTION WITH
COLLEGE IN FIVE TYPES OF INSTITUTIONS
(N = 12,000, 1979 edition)

	Multiple R	R^2	Change in R^2
Doctoral Granting Universities			
ENV:Student	31	10	10
GAIN:Spec Adv Ed	38	14	04
ENV:Faculty	40	16	02
GAIN:Und Self	43	18	02
ENV:Schol	45	20	02
(neg) Grade mostly C or below	47	22	02
QE:Dorm F/S	48	23	01
Grade mostly A-, B+	48	23	01
GAIN: Broad Knowl	49	24	01
ENV:Oper	49	24	01
QE:Athl	50	25	01
Total all variables	55	30	--
Public Comprehensives			
ENV:Oper	38	14	14
ENV:Schol	46	21	07
QE:Clubs	50	25	04
(neg) Major field undecided	53	28	03
QE:St Acq	55	30	02
(neg) Major in sciences	57	32	02
(neg) Sophomore	58	33	01
GAIN:Spec Adv Ed	59	35	02
GAIN:Values, Ethics	61	37	02
ENV:Voc	62	38	01
Major in Fine Arts	63	40	02
QE:Dorm, F/S	64	41	01
GAIN:Arts	65	42	01
(neg) Grades mostly B-, C+	65	43	01
GAIN:Broad Knowl	66	44	01
(neg) Junior	67	45	01
QE:Athl	67	46	01
Total all variables	75	56	--

APPENDIX TABLE 7 (continued)

	Multiple R	R^2	Change in R^2
Private Comprehensives			
ENV:Student	43	18	18
ENV:Oper	49	24	06
ENV:School	52	27	03
GAIN:Job	53	28	01
GAIN:Lit	54	29	01
(neg) Grades mostly B-, C+	55	30	01
Total all variables	61	37	--
Liberal Arts, Type I			
ENV:Student	41	17	17
ENV:Crit	48	23	06
GAIN:Spec Adv Ed	52	27	04
GAIN:Broad Knowl	55	30	03
ENV:Faculty	56	32	02
QE:Dorm F/S	58	33	01
GAIN:Arts	58	34	01
(neg) Grades mostly B-, C+	59	35	01
ENV:Oper	60	36	01
Total all variables	64	41	--
Liberal Arts, Type II			
ENV:Faculty	44	20	20
ENV:Oper	50	25	05
GAIN:Und Self	53	28	03
GAIN:Broad Knowl	55	31	03
ENV:Student	57	32	01
Grades mostly A	58	33	01
QE:Conv Tps	58	34	01
ENV:Esth	61	37	02
(neg) Grades mostly B-, C+	62	38	01
GAIN:Spec Adv Ed	62	39	01
QE:Lib	63	39	01
Total all variables	66	44	--

APPENDIX TABLE 8

CORRELATES OF STUDENT SATISFACTION WITH COLLEGE

At Doctoral Universities		At Public Comprehensives		At Private Comprehensives		At Liberal Arts, I		At Liberal Arts, II	
ENV:Student	.31	ENV:Oper	.38	ENV:Student	.43	ENV:Student	.41	ENV:Faculty	.44
ENV:Faculty	.27	ENV:Schol	.34	ENV:Oper	.35	ENV:Faculty	.35	ENV:Student	.40
ENV:Oper	.22			ENV:Schol	.25	ENV:Crit	.28	ENV:Oper	.37
ENV:Schol	.20					ENV:Oper	.26	ENV:Esth	.29
GAIN:Sp Adv Ed	.23	GAIN:Sp Adv Ed	.24			GAIN:Sp Adv Ed	.29	GAIN:Und Self	.32
GAIN:Und Self	.23					GAIN:Broad Knowl	.28	GAIN:Broad Knowl	.27
GAIN:Broad Knowl	.22							GAIN:Sp Adv Ed	.25
QE: Dorm, F/S	.23	QE:Clubs	.23			QE:Dorm, F/S	.28	QE:Union	.27
		QE:Dorm, F/S	.23						
		QE:St Acq	.22						

APPENDIX TABLE 9

INSTITUTIONAL DIFFERENCES IN QUALITY OF EFFORT MEAN SCORES
(N = 14,615 at 62 schools)

Quality of Effort Scales	Mean Scores at Types of Institutions: Doctoral Universities	Public Comprehensive	Private Comprehensive	Liberal Arts Type I	Liberal Arts Type II
Academic, Intellectual Effort					
LIB	18.7	19.7	20.3	21.0	20.2
FAC	18.7	19.4	20.8	21.9	21.5
COURSE	29.5	29.3	29.4	29.9	29.2
WRITE	24.2	24.2	25.0	25.1	25.0
SCI LAB	24.1	22.3	21.6	24.9	21.4
Personal, Social Effort					
CONV TPS	25.9	24.9	25.8	26.9	25.4
CONV INFO	14.7	14.5	14.6	15.1	14.6
PERS EXP	21.3	21.5	22.4	22.3	22.6
ST ACQ	24.2	23.2	25.2	26.5	25.3
AMT	19.8	19.1	20.7	22.8	19.8
Group Facilities Effort					
DORM, F/S	25.8	22.1	25.5	25.6	25.6
CLUBS	19.2	17.7	21.6	23.6	21.5
UNION	19.6	19.5	22.3	22.3	22.6
ATHL	18.4	16.1	18.9	20.4	18.8

APPENDIX TABLE 10

INSTITUTIONAL DIFFERENCES IN ENVIRONMENT RATINGS

Environment	Doctoral Universities	Public Comprehensive	Private Comprehensive	Liberal Arts Type I	Liberal Arts Type II
	Percentage with Ratings of 5, 6 or 7 (positive) on the Scale				
Emphasis					
SCHOL	84	70	83	95	82
ESTH	43	51	55	60	59
CRIT	71	57	67	86	62
VOC	50	64	58	36	66
Relationship					
STUDENT	68	68	76	75	80
FACULTY	62	67	78	86	82
ADM	34	36	51	53	61
OPER	38	46	48	56	52

APPENDIX TABLE 11

INSTITUTIONAL DIFFERENCES IN ESTIMATES OF GAINS

Gains	Percentage Reporting Substantial Gains				
	Doctoral Universities	Public Comprehensive	Private Comprehensive	Liberal Arts Type I	Liberal Arts Type II
VOC	47	56	55	36	62
Intellectual Skills					
SPEC ADV ED	64	59	62	71	61
ANAL, LOGIC	66	61	65	71	63
SYNTH, RELS	71	69	75	79	73
IND LRN	76	76	79	81	81
Science					
SCI/EXP	44	36	30	41	29
SCI/TECH	44	39	30	40	28
QUANT TH	48	47	46	43	44
General Education					
BROAD KNOWL	65	63	69	81	63
ARTS	27	30	36	42	30
LIT	30	27	37	39	35
WRITE	46	50	55	57	58
PHILS, CULTS	60	55	57	72	60

APPENDIX TABLE 11 (continued)

Gains	Percentage Reporting Substantial Gains				
	Doctoral Universities	Public Comprehensive	Private Comprehensive	Liberal Arts Type I	Liberal Arts Type II
Personal, Social Development					
VALUES, ETHICS	67	64	69	75	72
UND SELF	76	75	78	80	80
UND OTHERS	76	73	78	79	80
TEAM	49	55	55	45	60
HEALTH	38	43	43	34	44

APPENDIX TABLE 12

PERCENTAGE OF FRESHMEN AND SENIORS REPORTING SUBSTANTIAL GAINS AT DOCTORAL UNIVERSITIES (N = 2376)

GAINS	Percentage Substantial Gain Freshmen	Seniors	Change in Percent	Change as Percentage of Possible Change
Intellectual Skills				
ANAL, LOGIC	53	73	20	43
SYNTH.REL.	63	80	17	46
IND LRN	69	85	16	52
SPEC ADV ED	45	73	28	51
General Education				
BROAD KNOWL	63	68	5	14
ARTS	23	29	6	8
LIT	28	31	3	4
WRITE	45	48	3	5
PHILS.CULTS	54	62	8	17
Personal/Social				
VALUES,ETHICS	61	73	12	31
UND SELF	72	84	12	43
UND OTHERS	79	79	0	0
TEAM	45	62	17	31
HEALTH	37	43	6	10
Science				
SCI/EXP	31	50	19	28
SCI/TECH	28	49	21	29
QUANT TH	34	58	24	36
Vocational				
VOC	32	58	26	38

APPENDIX TABLE 13

PERCENTAGE OF FRESHMEN AND SENIORS REPORTING SUBSTANTIAL GAINS AT PUBLIC COMPREHENSIVES (N = 1377)

GAINS	Percentage Substantial Gain Freshmen	Seniors	Change in Percent	Change as Percentage of Possible Change
Intellectual Skills				
ANAL, LOGIC	40	61	21	35
SYNTH.REL.	45	71	26	47
IND LRN	56	77	21	48
SPEC ADV ED	32	74	42	62
General Education				
BROAD KNOWL	56	62	6	14
ARTS	24	24	0	0
LIT	16	23	7	8
WRITE	41	45	4	7
PHILS.CULTS	44	52	8	14
Personal/Social				
VALUES,ETHICS	49	63	14	27
UND SELF	58	74	16	38
UND OTHERS	60	76	16	40
TEAM	38	51	13	21
HEALTH	29	38	9	13
Science				
SCI/EXP	26	34	8	11
SCI/TECH	28	34	6	8
QUANT TH	27	47	20	27
Vocational				
VOC	29	66	37	52

APPENDIX TABLE 14

PERCENTAGE OF FRESHMEN AND SENIORS REPORTING SUBSTANTIAL GAINS AT PRIVATE COMPREHENSIVES (N = 2542)

GAINS	Percentage Substantial Gain Freshmen	Seniors	Change in Percent	Change as Percentage of Possible Change
Intellectual Skills				
ANAL, LOGIC	54	73	19	41
SYNTH.REL.	66	83	17	50
IND LRN	73	88	15	56
SPEC ADV ED	48	74	26	50
General Education				
BROAD KNOWL	65	77	12	34
ARTS	34	41	7	11
LIT	36	45	9	14
WRITE	51	59	8	16
PHILS,CULTS	54	66	12	26
Personal/Social				
VALUES,ETHICS	64	76	12	33
UND SELF	73	84	11	41
UND OTHERS	80	83	8	15
TEAM	47	59	12	23
HEALTH	42	39	- 3	--
Science				
SCI/EXP	27	34	7	10
SCI/TECH	26	34	8	11
QUANT TH	36	47	11	17
Vocational				
VOC	40	62	22	37

APPENDIX TABLE 15

PERCENTAGE OF FRESHMEN AND SENIORS REPORTING
SUBSTANTIAL GAINS AT LIBERAL ARTS, TYPE I
(N = 1350)

GAINS	Percentage Substantial Gain Freshmen	Seniors	Change in Percent	Change as Percentage of Possible Change
Intellectual Skills				
ANAL, LOGIC	57	77	20	47
SYNTH.REL.	67	84	17	52
IND LRN	68	88	20	63
SPEC ADV ED	54	79	25	54
General Education				
BROAD KNOWL	79	83	4	19
ARTS	37	49	12	19
LIT	43	54	11	19
WRITE	43	64	21	37
PHILS,CULTS	68	75	7	22
Personal/Social				
VALUES,ETHICS	68	79	11	34
UND SELF	76	84	8	33
UND OTHERS	77	79	2	9
TEAM	37	49	12	19
HEALTH	32	33	1	1
Science				
SCI/EXP	34	45	11	17
SCI/TECH	34	44	10	16
QUANT TH	33	44	11	16
Vocational				
VOC	22	40	18	23

APPENDIX TABLE 16

PERCENTAGE OF FRESHMEN AND SENIORS REPORTING SUBSTANTIAL GAINS AT LIBERAL ARTS, TYPE II (N = 1135)

GAINS	Percentage Substantial Gain Freshmen	Seniors	Change in Percent	Change as Percentage of Possible Change
Intellectual Skills				
ANAL, LOGIC	50	65	15	30
SYNTH.REL.	65	80	15	43
IND LRN	75	86	11	44
SPEC ADV ED	47	71	24	45
General Education				
BROAD KNOWL	59	64	5	12
ARTS	26	26	0	0
LIT	35	30	- 5	--
WRITE	56	56	0	0
PHILS,CULTS	58	60	2	5
Personal/Social				
VALUES,ETHICS	67	72	5	15
UND SELF	77	83	6	26
UND OTHERS	78	77	- 1	--
TEAM	55	63	8	18
HEALTH	43	40	- 3	--
Science				
SCI/EXP	24	34	10	13
SCI/TECH	25	37	12	16
QUANT TH	40	48	8	13
Vocational				
VOC	43	72	29	51

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