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Liberal Studies and College Environments in Engineering Education--What Aims, What Effect?

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The complexities involved in combining generalized and specialized studies are discussed in a descriptive analysis of the Harvey Mudd College (HMC), which has a campus environment typical of US institutions offering undergraduate engineering programs. Of 7 environmental characteristics at HMC student personalities and the socio-psychological culture (created by students, faculty and curricula), contribute most to academic surroundings. The majority of the engineering students were found to be self-reliant, free from dogmatic religious thought, and considered their vocational training as the prime reason for going to college. Their lack of commitment to social, political or scholarly causes, however, results in a stable though unexciting college environment. It is felt that humanities and social science programs contribute to the development of certain student characteristics that broaden professional and social roles. Liberal studies should be included in engineering programs to motivate critical thinking and social commitment, and to expand the limited outlook currently held by engineering students. (WM)

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LIBERAL STUDIES AND COLLEGE ENVIRONMENTS IN ENGINEERING EDUCATION--

WHAT AIMS, WHAT EFFECT?

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Abstract

The aims of liberal studies in engineering education are compelling and vital for society, students, and the engineering profession. Descriptive analysis of college environments provides some clues to the difficulties faced by humanities and social science programs. Of seven factors in the environment, student characteristics and the socio-psychological culture, as created by student, faculty, and curricular influences, have a great impact on the academic climate. Non-intellectural, socially uncommitted students and an apathetic milieu which provides little challenge are detrimental to the aims of liberal studies. A potential, positive contribution can be made by faculty who have not only the responsibility of conveying subject matter but of influence as socially conscious, intellectually alive mentors both in and outside the classroom.

Liberal Studies and College Environments in Engineering Education--
What Aims, What Effect?

There is a current and growing concern in many sectors of society about what's going on in college campuses. The walls of the ivory tower are no longer impervious as parents, legislators, researchers, educators, and even students voice their respective interests in the educational climate. Social scientists conducting research in higher education, who have traditionally had at least a nominal interest in student life, are increasingly concentrating their attention on the educational climate outside the classroom, describing the socio-psychological environment *per se* and continuing beyond to investigate the *effect* of the environment and culture on students' thinking, as well as their academic pursuits and achievement. Concurrently, public awareness and concern has sharply increased as student discontent within the academic community was made physically manifest in demonstrations and as the consequences have extended into our society. Educators are realizing that there is an urgent and important need to recognize and analyze the totality of campus influences, ranging far beyond the classroom, which contribute to a student's education.

Research and analysis of the learner's environment is not only a legitimate concern in itself, but also promises to provide important clues to the learning process which might help resolve difficulties in educational programs. For example, in recent years teachers at the primary level have become acutely aware that children coming from impoverished

home environments do not learn at the same rates as their more fortunate classmates. The Head Start and other environment-enriching programs have been shown to provide valuable prerequisites for learning. Along with research on student backgrounds and the attributes they bring to school, research focusing on the college milieu in which students live and learn during these four years, how students perceive this environment, and the effect of perception on the assimilation of knowledge may help generate more efficient means to achieve educational goals.

The environmental analysis to be presented here will focus on the undergraduate engineering student and the aspects of his world which have implications for the problems facing liberal studies programs in engineering education.

Before turning to the topic of environments, it will be helpful to review some of the purposes and responsibilities of humanities-social science programs in technological education. One goal is that of effecting a synthesis of values for our society. This involves arranging for a happy marriage between two cultures, of providing a useful balance and integration between the scientific and nonscientific spheres. Although it may be argued that the separation of the cultures is not as severe as Snow presents it, (see Taylor, 1965), the intellectual community must meet the challenge of modeling, and preserving, an effective coalition to ensure the viability of both values in our society.

A challenge facing humanities-social science programs in engineering is the conflict which seems to be inherent in all professional schools--that is generalized versus specialized education, the liberal arts tradition which does not prepare students for any particular career as

opposed to the professional requirement for thorough vocational training. Whereas programs in engineering technology education leading to an associate degree, according to the American Society for Engineering Education (1962), assume only the obligation "to acquaint the student with the resources of humanistic-social studies at least sufficiently to whet his interest in personal development in these areas after graduation, [p. 31], " the force of the liberal arts tradition in institutions granting a bachelor's degree cannot be escaped. Nor should it be. The value of academic studies in the humanities and social sciences goes beyond insuring that the educated man will have at least a modicum of interest in the finer things of life. Including substantial humanistic-social studies in the curriculum has been suggested as essential for the nurturance of creativity in professional students.

> . . . the creative potential of students perhaps can be fostered best by broadening their experience in fields far beyond their specialities. Instead of viewing such wanderings as distractions, we would do better to think of them as providing the student with that variety and richness of experience without which the highest levels of creative achievement are unlikely to be reached. [MacKinnon, 1967, pp. 17-18]

A related challenge to humanities-social sciences programs is that of meeting the intellectual needs of a variety of students, diverse in their interests, motivations, and inclinations toward nontechnical learning. This is a very real concern, not generally recognized in that institutions must accommodate a range of student types--from those who would completely reject humanities and social science to those who drop out of engineering entirely because they can find little sustenance for their artistic, literary and socialistic (small "s") appetites. Unfortunately,

this later type includes a significant proportion of students identified as potentially creative and constitutes the largest percentage of students dropping out of all scientific programs (Heist, 1967).

A fourth charge to humanities-social science programs is that of preparing engineers to exercise a higher level of responsibility in social problem solving than they have to date. Professor Davis has pointed out that most engineers and scientists have dealt with social housekeeping, i.e., roads, sewers, smog, etc. (Davis, 1965). Too often the engineer has viewed human needs as secondary to technical (design and cost) requirements, has dealt with objective variables in preference to subjective, value-oriented ones. Humanities-social science programs in engineering education must help in producing professionals who "have both the will and ability to contribute to the solution of social problems" or "they may be derogated to the role of technicians in the social problem area [Davis, 1965, p.27]." It is in the immediate interest of technological professions to be assured that their younger members are equipped with a concept of social needs, that they view service to humanity as an integral part of their work, and that they are socially conscious in devising solutions to man's problems.

In summary, the humanities-social science programs in engineering education are challenged to:

1. provide a synthesis of values for society
2. provide generalized studies in specialized education
3. meet the needs of the variety of students in engineering
4. supply a frame of reference appropriate to the engineering professional's role in social planning.

With these in mind, we proceed to the descriptive analysis of undergraduate environments in engineering programs and the implications for enlightenment and potential resolution of some quandries.

The Academic Environment

In approaching the topic of college environments, perhaps the most obvious quality to be recognized is that we are addressing ourselves to a topic of uncommon dimensions. In a very real sense knowing one environment is far from knowing all. Each appears to be specific to a particular student body, a certain campus, and even a period of time. It also must be noted that environments are both objective and subjective in nature with the latter probably having more impact. For example, a classroom is perceived differently depending upon whether the subject is a student or an instructor. In addition, environments are not really a collection of discrete entities, but must be viewed as systems, each with different balances and degrees of stability. However, any analysis requires that some factors be isolated.

I will discuss some functionally operational properties common to most educational environments, using Harvey Mudd College as an example. The study of this campus by the Center for Research and Development in Higher Education has continued over the past six years and includes information on two classes from freshman to senior years, and samples of withdrawals and graduates of the institution. To indicate the probable degree of commonness versus uniqueness of this situation, wherever possible I will refer to other research findings from various Center studies relevant to engineering programs. Finally, it is important to discuss the potential contribution, or impact, of each aspect to the total

environment and to relate our findings and their implications for humanities-social science programs.

Environmental Properties

The following seven categories encompass most of the properties of educational environments which can be considered to be included in all institutions. They are listed, not necessarily in terms of importance, but rather, on a loose continuum of conspicuousness, from obvious to abstruse.

1. Physical properties - including such diverse elements as size, location, physical appearance of the institution, residential accommodations, and the like.

2. Students - composition of the student body, social-biographical backgrounds, and psychological characteristics, attitudes, and aspirations.

3. Administrations - presidents, deans, other campus officials and the bureaucratic structure in which they function to keep the institution running.

4. Faculties - the influence of the teaching staff in and out of the classroom and characteristics of faculty members.

5. Curriculum - the plan of course work as proposed in the catalog, that is, the formal curriculum, and what might be termed the "informal" curriculum the less tangible modes in which knowledge is transmitted.

6. Socio-psychological culture - forces existant in all groups, including attitudes and mores, and their particular contributions to an academic climate.

7. Institutional characteristics - including a wide gamut of

intangible influences such as reputations, policies, inertia, implicit in all institutions, educational or otherwise.

Physical Properties

Harvey Mudd College is a small, residential institution located in a quiet, generally conservative community. Although it is one of the complex of schools in Claremont, California it is distinct, in being removed from the community and architecturally. Its classrooms, dorms, student center, and greens pose a consistent and complimentary linearity. Overall, the campus appears clean, new, and simple with an aura of quiet beauty, constrained freedom and relative austerity.

As would be true of almost all institutions of higher education in the United States, the physical properties of Harvey Mudd are essentially unique.

It is difficult to assess the impact of a physical environment. Because Harvey Mudd is small, compact, and lacks internal variety it is more likely to be shared in common by all students, notwithstanding the unique perception of each individual. However, the "campus world" of HMC may be more striking for the first-time visitor than for the resident who has become adapted and perhaps only notices it by contrast to his occasional experiences with the "outside world." On a larger campus, particularly one with contiguous interchange between the school and community, the physical setting is actually a composite of distinct settings for most students; consequently, the physical environment is probably one of quite varied and, therefore, minimal impact.

Students

The engineering students at Harvey Mudd are young (there are no graduate students) and, with rare exception, are all male. The students studied over four years came from lower-middle and middle-middle class backgrounds. The values of the homes can be described most accurately as politically conservative and essentially nonreligious. The families placed a high value on college education, mainly as a means to an end, for they have the traditional upwardly mobile aspirations for their sons to be successful professionals. Interest in artistic, literary, and other intellectual pursuits is not an integral part of the family life in most homes. However, the entering freshmen at Harvey Mudd came with exceptionally good high school records, particularly in math and science, and superior ability scores as measured by the Scholastic Aptitude Test.

The superior mental ability of the students is important, obviously, in that it is the chief factor underlying the homogeneity of any entering class, as well as being basic to doing the work. However, intelligence or ability does not necessarily imply intellectuality or scholarly interests, nor is it a sufficient condition for successful learning. Many with high ability may not have been challenged by the curriculum of their high schools and failed to learn how to learn.

The lack of previous intellectual impact from home or high school experiences, or the lack of intrinsic intellectual interests, is readily apparent in measured personality characteristics at entrance. Briefly, the mean scores obtained on an attitude inventory for engineering majors at Harvey Mudd show them to be less strongly oriented toward all aspects of intellectual endeavor than those who major in science or math at the

same school. This includes areas of preference for thinking in a reflective manner, dealing with abstract, complex, and ambiguous situations, and, particularly, less orientation toward esthetic interests or a perceptual approach to life.

On the positive side, other measures from the same Inventory show these engineering students to be fairly self-reliant and free from dogmatic religious thought. They are, as a group, emotionally stable with a tendency toward social introversion, although not as great as a general stereotype of engineering students would have it. On all personality traits measured, the variation among engineering students at HMC is of the same magnitude as for students in other majors, indicating a variety and overlap of traits among individuals.

What happens to the personality characteristics of engineering students over the four years at Harvey Mudd? An assessment of overall change based on freshman and senior OPI profiles shows that 43 percent changed in ways categorized as positive personality growth, including, both intellectual and socio-emotional traits. But nearly 39 percent changed in a negative direction, using the same criteria, as compared to only 16 percent for other majors. Thus, 57 percent of the engineering students went through this institution without having been "turned on" intellectually, and many were turned off.

A few examples of some attitudes and aspirations of the senior engineering students may show how and where they are "tuned in." Eighty-five percent viewed extracurricular activities, athletics, social life, friendships of college, and their vocational training as the most

salient purposes of their education. Very few ranked the scholarly pursuit of knowledge or a search for meaning in life as vitally important goals for them. Outside of class they only occasionally discussed social, political, or philosophical issues with their friends. None were members of socio-political groups (CORE, Young Republicans, etc.), with only a quarter sympathetic to any such group and most being neutral or unaware of such groups. The absence of scholarly, social- or political-action commitments by students implies a stable, but unexciting environment.

Data from various studies conducted at the Center suggests that many characteristics found in the engineering student at Harvey Mudd are common to engineering students across institutions. The backgrounds of a majority are essentially similar, but those admitted to Harvey Mudd probably have a higher level of ability than the average engineering student. It was a mild surprise when comparing personality profiles of more than 700 engineering students representing five separate studies and involving many campuses to find that as groups they are virtually identical (Farwell, Warren, and McConnell, 1962; Heist and Webster, 1960; Regan, 1967; Trent and Ruyle, 1966; Yonge and Mock, 1968), one exception was that Harvey Mudd engineers were somewhat more autonomous.

The contrast between engineers and most other students--humanities majors (Yonge and Mock, 1968; Regan, 1967), and physical science majors (Heist and Webster, 1960), potentially creative males (Heist, 1967), and the Free Speech Movement participants (Heist, 1965), to cite only several diverse groups of humanity studied at the Center - are quite marked in that all others are clearly more disposed to intellectuality and scholarly pursuits. It is interesting to note at this point that engineers are rarely found in student activist movements (Keniston, 1967; Trent and Craise, 1967). This fact may possibly be

seen as a blessing to their faculties, administrators, and parents but these factors are indicative of the more limited concerns and commitments of engineering students. They again serve to suggest the climate that these students pose for each other, in that the catalytic effect of the activist philosophy is generally absent in their immediate world.

In comparing 107 engineering students with 376 male liberal arts students, Trent and Ruyle found that "proportionately fewer engineering students. . . . considered themselves intellectuals, liberals, leaders, and non-conformists," that "engineers enter college with a more constricted outlook and are less prone to change during their college years" and, further, "that difference in socioeconomic status failed to account for other differences between the engineering and liberal arts students [Trent and Ruyle, 1966, pp. 15-18]."

A recent survey of Caltech engineering graduates, who completed their undergraduate work six years ago showed that their attitudes and aspirations are similar to recent engineering graduates from Harvey Mudd. Most have completed an advanced degree and are commencing careers in industry rather than academia. They expect to be in higher income brackets than their fellow graduates in the sciences. It was interesting that of these well-educated young men, 63 percent rated their personal potential for making a major contribution in their field as "doubtful" (as compared to 57 percent of the scientists who saw their chances as "excellent or good.") Of these, only one person felt he lacked the opportunity. Most engineers felt they lacked self-discipline and motivation rather than training, ability, creativity, or any other factor.

A provocative impact of engineering students on their academic environment is less visible and dramatic than that of their peers in other nonvocational studies. Their high aspiration level and materialistic values mean that getting a degree is very important; thus, they are more likely to accept the status quo of the educational system rather than challenging it. The disturbances they may initiate are more likely to revolve around intracampus issues (e.g. grading policies) or to result from youthful exuberance rather than to relate to social and moral issues. Although they are equally bright, their motivations and interests are practical, if not narrow, meaning that they seldom seek intellectual stimulation outside scientific areas. Those who do manifest interests other than in engineering find few others who share these interests. Overall, engineering students are a stabilizing, rather than a catalytic, force in their environment.

The implications for humanities-social science programs is somewhat discouraging but certainly challenging. This type of student may, or may not, be an ideal learner for the "training for routine doing" (Trautman, '55, p. 274) of the engineering curricula but they aren't very fertile ground for germinating ideas in humanities, esthetics, or social sciences. Very few authorities argue that humanities and social science are not important to engineering education but quite recently three solutions have been offered. Samuel C. Florman (1968) offers a different tack, suggesting that the social sciences be forgotten (they are "illiberal" and "make the engineer more lopsided rather than less [p. 28]."") and that the engineer undertake self-education in the humanities. (He doesn't specify when the engineer will have time to do this but feels the engineer has enough to do learning his trade while in

school.) A second suggestion, made by Robert Hutchins (1968), is to "stamp out engineering schools [p. 17]," and return to a truly liberal education for all students in an ideally defined university with new philosophical and professional goals. In an editorial discussion of the Florman and Hutchins proposals, Peter Brennan (1968) feels neither will have "appeal" and opts for relying on mass (precollege) education beginning in the home. It may be that Hutchins is closest to the answer but it doesn't seem to be a possible, even probable, solution. From our perspective, I would encourage that the direction should be for all educators, especially those in humanities and social sciences, first to know and understand their students. Many engineering students bring to college certain traits and proclivities toward practical career preparation, no matter what kind of provisions are made for liberally educating them. The vital function is to demonstrate, both in and outside of the classroom, that social, human, moral, esthetic, and intellectual commitments are valuable, challenging, enjoyable, and have relevance to existence--both professional and nonprofessional. Education needs to provide for a reexamination of the inner motivation, which means not just teaching but internalization of different and broader perspectives.

Administrations

The administration at Harvey Mudd College has participated in our study primarily as an institutional agency posing questions, seeking answers, and providing a concerned impetus for research. This function of dedicated leadership in improving the institution is one aspect of the role administration plays in this environment. The small size of the school allows the administration to do more than operating the

institution and, indeed, the students generally have a personal relationship with the president, dean and other administrators who provide both counseling and encouragement.

On other, usually larger, campuses the administration may not have as much communication with students except when they are required to enforce rules. The visible impact of an administration on a campus environment, in most cases is minimal if it is an effective one.

Faculties

Because faculty members at Harvey Mudd, and in most institutional research, are not approached as research subjects, we have less of essential kinds of information about them than is desirable. In a college such as this one, the faculty are recognized as being very competent in their fields and, generally, concerned with teaching. Most have to meet demands made by their professions (research, publication, consultation) and by families as well as by individual students. For some, this means that their teaching suffers or comes off as second best. The students at HMC rated about half of the faculty as "good" when asked about the quality of instruction at Harvey Mudd, and considered only 15 percent to 25 percent as "excellent." Only one senior engineering major reported that the quality of the department's faculty was a factor in his choice of major, whereas 30 percent to 50 percent of the students in other departments indicated such. The quality of instruction as judged by students is about the same as or somewhat superior to, other schools.

Most students felt that student-faculty relations are amicable, as they should be on such a small campus. Many faculty operate on an open-door policy which gives students opportunity to get together with faculty

outside the classroom, but left the initiative up to the student. A meeting of the minds between students and faculty, on any intellectual level, was far less evident than could be desired and easy communication, as an environmental factor, was more a matter of policy rather than practice. But chiefly because of size, the Harvey Mudd environment includes a potential for better rapport between faculty and students than in large universities. This remains at the level of potentiality in at least two of the five departments.

Although we have no information on personality characteristics of many of the faculty, 61 engineering faculty on one of the University of California campuses were studied by Mary Regan. She found that great similarities exist between engineering students and engineering faculty on a variety of measured personality characteristics. The pattern of intellectual interests is strikingly similar but "differed on 'level' indicating that students have a lot of 'stretching' to do before they fit, if ever, the faculty model [p. 27]." To generalize from this finding it may be assumed that the majority of the faculty encountered by engineering students have the same world view as the students, only on a more mature plane. In other words, the students in engineering have faculty models that are not unlike themselves in their general orientation to learning.

The faculty in most educational institutions have the greatest responsibility for impact on the environment in the sense that their job is to effect cognitive change (i.e. learning) in their students. Actual impact or influence probably is a function of the instructor's personality, teaching ability, dynamism, and other individual qualities. To be

effective, the learning-teaching syndrome must also exist outside the classroom as involvement with students and concern for humanity in general.

The responsibility of faculty in humanities and social sciences who have engineering students should be obvious. As models with broader academic specialities than and qualitatively different personality structures from their colleagues in technology, they are a potential source of diversification and challenge. Their disciplines and their possible influences as human beings are both vital for the engineering student.

Curricula

One-third of the Harvey Mudd curricula is by design devoted to the humanities and social sciences, with upper division students having the option to take course work at the other colleges in the Claremont complex. Included in the offerings at HMC are several courses which attempt to bridge the gap between science and humanities-social science, for example, "History of Technology," and "Science and Man's Goals." Most, however, are specific units of literature, beginning psychology, etc. These are part of the visible curricula. Dr. Ben Snyder in writing about MIT, (1967) has described an "invisible" curricula which, to extend his concept, differentiates humanities and social science programs from engineering as much as the subject matter. This is the difference in modes of presentation (seminars versus lectures and labs), learning activities (interpretive reading versus memorization of facts), symbolism (words versus numbers) not to mention the numbers of pages to be read per semester. These differences may be seldom recognized

but they are inescapable.

The HMC curriculum has a higher proportion of humanities and social science courses than most engineering curricula, which average about 14 percent. Supposedly, the difference in quantity makes or should make a difference in the HMC product. There is insufficient evidence to make a strong statement that a difference does exist except for student feelings, often voiced, that the "HMC man won't be just a tech man." Two-thirds of the seniors reported that their courses in humanities and social sciences had been both interesting and worthwhile.

No matter how many or few humanities-social science courses are in the formal curriculum, the invisible curriculum mentioned above is operational. This is particularly true where the academic press is great. The student needs to learn to cope with, and appreciate, the styles of thinking and learning which are fundamental in the humanities-social sciences. This type of cognitive approach should be learned in high school but isn't by most high school students.

Socio-psychological culture

Campus culture, or climate,is the heart of the nonphysical environment. It is obviously the product of many things, including faculty, students, and curricula. It includes less tangible influences which govern student life. One such characteristic found at Harvey Mudd is the existence of group mores which seem to make it possible for most students to survive under a high degree of academic pressure. This socio-psychological control provides that a student do just an adequate amount of work in a manner that is not too obvious. Incoming freshmen seem to learn that those who focus too much attention on studies and

academic matters are labeled "grubs." All but the most studious are socialized to the extent that they give the appearance of not working very hard. This aspect of the social milieu certainly contributes to a nonintellectual climate as students become seekers of ways to beat the system ("seeing how little work they can do for a passing grade") rather than seekers of knowledge. The pursuit of inquiry is effectively aborted. This negative social control also interferes with academic motivation--63 percent of the seniors indicated their biggest difficulty at HMC was "getting myself to work hard." The "grub phenomenon" does make the atmosphere more relaxed because of the provision that one really shouldn't study all the time, but should become "involved in sports, dances and TGIF's" as one student put it. It also aids in reducing the animosity of competition to a "friendly dog-eat-dog competition" for all except the "grubs" themselves

Another aspect of the local culture is the general apathetic tone of the HMC environment, as compared to many another dynamic, viable campus. Because very few students take a stand on issues (except intra-campus disputes which raise short-lived pros and cons) and very few controversial commitments, most live in a neutral world of quasi-harmonious indifference. Things that matter, such as maintaining respectable grades, having fun, and concern with the quest for affluence are goals shared by almost all students. Social values seldom meet a challenge or require a defense. It is rather telling that 40 percent of the seniors complained of boredom at Harvey Mudd.

Of a more positive nature, an aura of closeness, friendliness, and warmth pervades the HMC campus, which is very supportive to the

socially immature, insecure, but bright student. The institution is "in loco parentis," judging, yet kind to those who meet its standards and conform. This support is of value to those students who would be adrift on a larger, or more vigorous, campus but is detrimental to those whose individual growth potential must be compromised by the system.

These aspects of the culture appear to be somewhat a product of small size and the student body composition. On larger campuses with a more diverse cross-section of humanity, an ingrown culture or set of mores is likely to be balanced by counter influences and, thus, have lesser impact.

The impact of the socio-psychological culture is very strong at Harvey Mudd. Since much of the culture runs counter to effective, creative, learning this situation hardly promotes the best interests of the humanities and social sciences.

Institutional characteristics

The impact of colleges as complex organizations has been described elsewhere and is well known. Aspects of this phenomenon that operate to affect the educational environment are: formal goals and purposes, rules, financial problems, reputation, bureaucratic characteristics, and perhaps most important of these, stability and inertia. The latter perpetuate the existing environment and slow down functional changes.

Summary and conclusion

Seven properties of the educational environment of undergraduate engineering programs have been discussed: physical setting, administration, faculty, students, curricula and the socio-psychological culture, and institutional characteristics. The discussion has been generally

in terms of one particular environment, Harvey Mudd College, but relevant data from other studies suggests that many engineering programs are similar to the degree that they are endeavoring to educate students who have many characteristics in common. It has also been implied that the contributions of the physical setting, administration, faculty, and social-psychological culture may be of a relatively different nature on large campuses than for a small school. The effect of curricula which includes both the technical and humanities-social sciences will depend on how well the subject matter and approaches of the two are integrated.

It is a basic premise of this presentation that an internalization of values examined and critical thinking employed in liberal studies is of great importance to society, schools, students, and the engineering profession. The educational environment of schools committed to providing liberal studies programs must be a climate conducive to effective learning in this area. Students, themselves, make the largest contribution to the environment. Students who come with relatively intellectually impoverished backgrounds and have vocational motivations create a campus culture which is apathetic and indifferent to learning. Thus, it is vital that stimulation of intellectual interest come from some other sector. The faculty has the greatest responsibility and potential for positive impact, particularly those in humanities and social sciences. A congenial spirit, institutional warmth, and open doors are not enough. Rewarding experiences of shared intellectual challenges in and out of the classroom would help.

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