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The labor force in the 1970's and 1980's will call for proportionately more service workers, clerical personnel, and professional and technical workers. Increasing percentages of women in the labor force will continue during the last half of the 20th century. Implications for junior colleges are inherent in such developments. Along with the demand for additional post-secondary training has come a rapid increase in college enrollments--too rapid for many existing colleges and fostering the establishment of new ones. Typically, community college students are less bookish and read less than do university students, are from lower income families, and tend to make vocational and educational decisions later than those who attend 4-year institutions. With the sudden growth of post-secondary institutions, a critical and growing shortage of professional personnel has appeared--particularly in engineering, business education, psychology, and vocational subjects. Not only must more teachers be recruited, but more teachers must be obtained who understand the characteristics of the students they are to teach, the institution's functions, and the teacher's adjustments necessary for effective functioning within the organization's milieu. The author lists some of the more pressing needs of community colleges and suggests appropriate responses. (DG)

DEVELOPMENT OF SCIENTIFIC MANPOWER BY COMMUNITY COLLEGES

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Conference On

SCIENCE EDUCATION AND THE JUNIOR COLLEGE

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While the title of this paper seems to narrow the range of discussion to science and mathematics the author has chosen to discuss, in a somewhat broader context, some of the potentials and problems which are a part of two-year colleges today. It seemed to him that a non-critical description of the production of trained manpower would be less meaningful than an analysis of this sector of higher education. Many issues have been touched upon here, and it is hoped that this paper will provide a limited, coherent, and rational discussion which will, in turn, stimulate a thoughtful response by the reader.

Before considering the five questions which constitute the essence of this paper, the writer feels compelled to state the philosophical bases from which he speaks. Implicit in all considerations of social issues and social institutions is the philosophical stance of the writer and his fundamental assumptions about social issues and resulting institutional responses.

The most prestigious and pervasive philosophic position undergirding American higher education is Platonic in origin, as

adapted and applied by German and British universities. Although significant inroads have been made upon the conservative position, based upon the necessity for gradual change in government by an intellectual aristocracy, the Platonic ideal continues as a major determinant of higher education, either openly stated or through more subtle disguises. The author's view is that the Platonic tradition does not and cannot continue effectively to serve American institutions of higher education functioning in the latter half of the 20th century and, at least hopefully, planning to react effectively to the challenges of the 21st century.

It is the author's belief that an effective base for higher education involves an acceptance of utilitarianism as a respectable objective of education. Recognizing the limitations of a doctrinaire acceptance of utilitarianism, the author agrees with Beck in the viewpoint he defines as Promethean humanism. Beck states:

> "Promethean humanism allies both science and the humanities. Prometheus spoke of both, for human intelligence understood as science-technology-and as human sensibility, expressed in the feelings of men, and even in their art and their love."[1]

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[1]Robert H. Beck, A Social History of Education. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965. P.6.

> "In direct contrast with Plato, the Elder Sophists' view of anthropology held that society was evolving and could progress if men learned to guide their affairs effectively. Politics, democracy=the form of government in which the Rhetorical Sophists had such confidence= called for men able to point up relevant data in complex issues, men capable of stating all sides of the argument, able to help a group attain consensus in discussion leading to decisions."[2]

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[2] Ibid., P.14.

The author contends that utilitarianism is a necessary component of an effective philosophy of education, for man (including the intellectuals of former years) has generally been unable to understand and project the utilitarian aspects of new knowledge. For example, who in American higher education would have predicted in 1850 that the study of medicine would constitute one of the major functions of American universities within sixty years? Who, in 1900, insisted that business administration would become one of the larger areas of concern in American colleges and universities by 1940? Indeed, American higher education has experienced evolutionary changes in spite of the firm grip of the traditionalists and conservatives who, even today, wistfully look upon the liberal arts college as the model for the Golden Age.

Consistent with this position is the belief of the author that a primary function of all institutions of higher education is to develop manpower adequate to current socioeconomic and scientific needs. Generally, the functions of colleges and universities are defined as including three general areas: teaching, research, and service. But, because it most directly affects the attainment of the utilitarian goal of "the greatest good for the greatest number", the most important of the areas is teaching. If the teaching function becomes the least important interest of institutions of higher education, other organizations will be set up to perform this function.

The Purpose of This Paper

The purpose of this exposition is to explore five areas of interest: (1) a consideration of the social and economic conditions which stimulated the development of two-year colleges, (2) description of students, (3) description of college faculties, (4) types of programs, and (5) university services needed by community colleges.

Economic and Social Developments

The pattern of the labor force anticipated in the 1970's and 1980's is, at least in general terms, clearly discernible at this time. It is anticipated that major increases will take place

among service workers, clerical personnel, and professional and technical workers. By 1975, 14.3 percent of the labor force will be in the service industries; this increase involving the employment of 15 million additional workers between 1960 and 1975. Air transportation, trucking, warehousing, trade, government, finance, insurance, real estate, accounting, and auditing will expand markedly in the immediate future.

Clerical and kindred workers are expected to increase from 9.8 million to 14.2 million between 1960 and 1975; and professional and technical workers will increase by approximately 5 million during the same period. Managerial personnel is expected to increase by 2.3 million.

On the other hand, there will be marked declines in the number of farmers, as well as relative declines in the number of required unskilled and semi-skilled workers.

A trend toward a higher percentage of women in the labor force will continue at a steady rate in the future. In 1950, 33.1 percent of women between the ages of 14 and 70 were in the active labor force. It is anticipated that this number will increase to 40.6 percent or 36.4 million by 1980.[3]

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[3] Emma S. Woytinsky, Profile of the U. S. Economy: A Survey of Growth and Change. New York: Frederick A. Praeger, 1967. Pp. 127-129.

The changing composition of and technical requirements for the labor force in the years ahead have immediate and significant implications for higher education. The introduction of sophisticated equipment and commensurate complexity of procedures and uses points to the need for the education of the labor force to a level substantially higher than that represented by high school graduation. An example will suffice to illustrate this need.

Currently there is emerging the concept of the "medical team"; the members of which will contribute to the eradication, prevention, or treatment of disease. The distribution of personnel in numbers will resemble a triangle in which semi-professionals and skilled personnel make up the lower portion. Kinsinger illustrates the level of education of the members of the team.[4]

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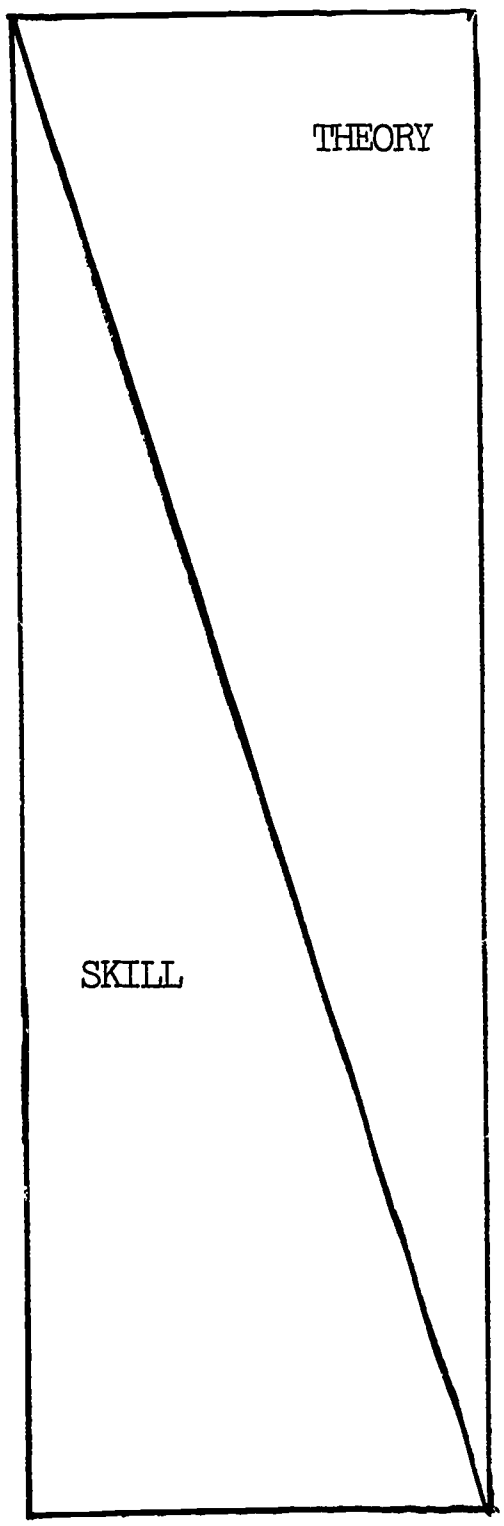
[4] Robert E. Kinsinger, Education for Health Technicians - An Overview. Washington, D. C.: American Association of Junior Colleges, 1965. P.9.

At present some of these medical and paramedical fields can claim barely enough practitioners to say that they exist beyond the drawing board. Yet, it is many of these very fields which cluster near the bottom of the triangle and which will need to be among the most heavily populated if the medical team is to gain ground in the 1970's. It will be necessary to train persons beyond high school

THEORY-SKILL SPECTRUM IN THE HEALTH FIELDS



RESEARCH SCIENTIST

PHYSICIAN AND DENTIST PRACTITIONERS

PARAMEDICAL-PARADENTAL:

- R.N. (B.S.)
- Dietician
- Pharmacist
- Medical Record Librarian
- Occupational Therapist
- Physiotherapist

TECHNICAL ASSISTANT:

- X-Ray Technician
- R.N. (A.D.N.)
- Medical Record Technician
- Dispensing Optician
- Occupational Therapy Assistant
- Inhalation Therapy Technician

PRACTICAL ASSISTANT:

- Licensed Practical Nurse
- Psychiatric Aide

AIDE:

- Orderly-Nurse Aide
- Dietary Aide
- Housekeeping Aide

in order to meet the technical requirements of these jobs. Four years of post-high education will by no means be necessary for all fields, however.

The rapid expansion of enrollments in higher education can be explained only in part by economic developments. The increase in enrollments to more than 10 million students by 1975, as predicted by Thompson, is also rooted in the history and current attitudes of the American people.[5]

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[5] R. B. Thompson, "Enrollment Projections for Higher Education, 1961-1978," Columbus: The Ohio State University, September, 1961. P.6.

The ground of American social history and Americans' changing aspirations has been plowed many times and cultivated with varying degrees of success. Such cultivation has made it apparent to most literate men that the American dream envisions the utilization of science, technology, and the institutions of government and public service, as well as the "private sector" of the economy for the achievement of social justice and equality. This social history underlies Americans' desires for higher education, and higher education makes possible a measure of fulfillment of their changed aspirations.

Rather than divert the reader into an extended dissertation on these issues, two references are recommended for those interested in a thorough exploration of the subject.[6] [7]

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[6] Goals for Americans. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1960

[7] Gerald Holton (ed.), Science and Culture. Boston: Beacon Press, 1965.

How, then, have these economic and social forces encouraged the development of two-year colleges? We have seen that Americans have always viewed education as a means to fulfilling their socio-economic desires. With high school education having already become a bench mark and the starting point for meaningful entry into the labor market, ever-rising aspirations dictated that college-level education should now become the goal. The result has been rapidly increasing college enrollments; increasing too rapidly for many existing colleges and fostering the establishment of new ones.

The high cost of many four-year colleges, coupled with a scarcity relative to the demand of grants and loans to students from low income families, called for the founding of public low-cost institutions of higher learning.

And further, a growing need has been felt by employers for people trained beyond the high school in technical, business, and

social service curricula, curricula that have been unavailable at tradition-bound four-year centers for higher learning.

The two-year college is a logical extension of long-time historical trends underlying the growth of higher education in the United States. In some respects it is analogous to the development of land-grant colleges and universities which were originally organized to provide training for mechanics and farmers. The development of land-grant colleges during the last hundred years made available appropriate and low-cost higher education to an ever-expanding segment of the population. As these institutions redefined their educational responsibilities and programs, a vacuum was created which has since been filled by public community colleges. Thus, society reacting to a need produced this unique institutional form.

Students

The most definitive recent study of students entering various types of colleges is that done by Medsker and Trent.[8] Their

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[8] Leland L. Medsker and James W. Trent, The Influence of Different Types of Public Higher Institutions on College Attendance from Varying Socioeconomic and Ability Levels. University of California, Berkeley, The Center for Research and Development in Higher Education, Cooperative Reserach Project No. 438, 1965. 110 pp.

monograph contains a follow-up and analysis of 9,778 high school graduates in 16 different communities distributed nationally. These communities were chosen to obtain a typical representative sample of students. They were also chosen because they had or did not have a private two-year college, a private four-year or five-year institution, a private university; a public two-year college, an extension center, a public four-year or five-year institution, a public university; two or more of the above types of institutions, or no institution of higher education.

Two types of information in the study are of interest to us here. First, the authors define and describe psycho-social characteristics in these students, thus making possible the comparison of the types of students who enter public community colleges with those entering baccalaureate degree institutions. Although there was a great overlap among the two populations there were, nonetheless, significant differences identified in the study. Thirty-three percent of the students entering public two-year institutions were in the two lowest quintiles obtained on the SCAT test; while 44 percent were in the top two quintiles. In contrast, 69 percent of the freshmen entering public universities were in the top two quintiles; and only 12 percent were in the lowest quintiles.

Other differences appeared when the two groups were compared on the basis of quintile rank in high schools. Forty-two percent of the public two-year college students were in the highest two quintiles; and 26 were in the lowest. In the public university, 72 percent were in the highest two quintiles; and only 11 percent were in the lowest. The public two-year college attracted a relatively small percentage of students from families classified as professional or managerial, namely, 16 percent. These freshmen included 10 percent from families in which the head of the family was in an occupation classified as unskilled; 11 percent from semi-skilled; 34 percent from skilled. The public university attracted 35 percent from professional and managerial backgrounds; 3 percent from unskilled; 6 percent from semi-skilled; and 23 percent from skilled.

Community college freshmen tended to exceed the educational levels of their fathers. In this group, 37 percent of the fathers had not completed high school; and 25 percent had a high school diploma. Only 9 percent of the fathers had completed the baccalaureate degree; and only 5 percent had attended graduate school. The public university drew students whose fathers had substantially more education, 18 percent having some college; 16 percent a baccalaureate degree; and 15 percent having graduate school experience. Twenty-three percent of these fathers had not finished high school.

Two-year college students tended to be less bookish, to read less, and to read magazines of lower quality than freshmen entering four-year institutions. Their vocational choices were more modest than those found in the public university. Forty-four percent had ambitions for professional employment in contrast to 70 percent of the freshmen in the university.

> "Generally speaking, the university student presented a picture which differed quite markedly from the two-year college student. The syndrome may be described by the term "academic concern". The university student was more likely to have been thinking about college since the days of elementary school, to have discussed it with his teachers and parents, and to have received advice and encouragement from them. He was also more intellectually oriented than the students entering two-year colleges as indicated by scores on personality scales. In addition the university student may have decided while still in elementary school upon the type and size of college he would attend. His early choice of a vocation is often another aspect of the syndrome."[9]

[9] Ibid., P.91.

A second conclusion drawn from these data was that physical accessibility of an institution stimulates college attendance. The study found that the greatest loss of talent among students in the top three quintiles (test scores and high school record) occurred

in communities without some type of institution of higher education. It also revealed that the least effective type of institution, with regard to stimulating college attendance, was the extension center. The public two-year community college attracted the largest percentage of high school graduates.

Community college students tend to make vocational and educational decisions later than those who attend four-year institutions. They also tend to have a part-time job while attending school, and demonstrate an instability of vocational objectives to a greater degree than students in other institutions.

The Faculty

There is a critical and growing shortage of adequate professional personnel to meet the needs of higher education. The lack of effective massive responses on the part of federal and state governments, and of most universities, has simply compounded the problem.

The dimensions of the problem become clear when one examines the increase in the number of community colleges in recent years, and the collateral expansion of student enrollments. The American Association of Junior Colleges listed 663 institutions enrolling 816,071 students in 1959-60, and 912 colleges enrolling 1,671,440 in 1967. During this period, 249 new colleges were organized. The number of professionals

employed increased from 25,105 in 1959 to 85,894 in 1966-67. Seventy-two new colleges were set up in 1967, and 50 were organized in each of the preceding two years.[10] [11]

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[10] E. J. Gleazer, Jr. (ed.), Junior College Directory. Washington, D. C.: American Association of Junior Colleges, 1961. P.36.

[11] W. A. Harper (ed.), Junior College Directory Washington, D. C.: American Association of Junior Colleges, 1968. P.68.

The staffing problem was studied by Rogers, whose statistical results give even the most optimistic observer a shiver of apprehension. He found in his survey of 1,809 collegiate institutions that two-year colleges alone would require 43,971 full-time faculty and administrative additions and replacements between October 1963 and October 1969. This is an annual input of 7,829 individuals. The complete picture of faculty needs includes the liberal arts colleges and teachers colleges who anticipate needing an additional 72,063, and the universities and technological schools requiring an input of 83,104 by 1969.[12]

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[12] James F. Rogers, Staffing American Colleges and Universities. Washington, D. C.: U. S. Office of Education, 1967. Pp. 44-45, 62-63, 80-81.

These estimates do not include additional needs for part-time administrative and teaching personnel.

The balance between supply and demand in specific subject matter areas must also claim our attention. Brown found that there were shortages in: the physical sciences, mathematics, engineering, business education, psychology, religion-philosophy-law, and vocational subjects. There was an ample supply in: physical education, business, the biological sciences, English, foreign languages, the social sciences, fine arts, and history.[13]

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[13] David G. Brown, The Instructor Exchange: Staffing Junior Colleges. Raleigh, N. C.: North Carolina State University, August 1966.

In addition to the categories of personnel cited above, there has recently developed a shortage of sociologists, economists, men's physical education and recreation specialists. The available supply of social scientists has been strained by mushrooming Federal anti-proverty programs.

Of particular interest to two-year colleges has been the persistent shortage of remedial reading specialists, nurse educators, engineers qualified and willing to direct and teach in the engineering technologies, teachers in other paramedical fields, librarians, and computer specialists.

Perhaps of greater importance, however, are qualitative considerations of the problem. The obvious oftentimes escapes our

our attention. In addition to the quantitative shortages in personnel, colleges have had to deal with problems of the individual effectiveness of teachers and counselors in the work situation. It is not difficult to assemble a long list of names of prospective faculty members who, on paper, seem well qualified for institutional membership and assignment. There is more here, however, than reaches the eye. How many of these individuals understand and are in sympathy with the educational philosophy and objectives of the two-year college? How many of them understand the significance of diversity of students and its effect upon teaching methods? Course content? Curriculum? The need for extensive and intensive guidance service? How many have had marginal subject matter preparation? How many have personal psychological problems which will impede their effectiveness with students? Are they prepared and willing to participate in faculty governance of the college? These questions are not only relevant to two-year institutions but beg for serious scrutiny by four-year colleges and universities as well.

We are logically led to a consideration of the roles of professionals in two-year colleges. Although there is room for a variety of different personalities and competencies among college personnel, most college administrators are deeply concerned with finding a proper mix of individuals which give the institution both

stability and the ability to adjust effectively to changing educational needs, subject matter content, and educational procedures. The general shortage of personnel in most fields makes this task difficult.

McKeefery has identified and described three general types of effective teachers: (1) the departmental specialist, (2) the generalist, and (3) the student centered.[14] Each brings unique

[14] William J. McKeefery, "Some Observations of Effective Teaching," Collegiate News and Views. Cincinnati, Ohio: South Western Publishing Co., March, 1959. Pp. 2-4

personality and professional characteristics to the educational process. The problem of recruitment, selection, and retention of effective professional personnel is complicated, however, by the lack of appropriate graduate preparation for college level teaching and the virtual nonexistence of orientation programs for prospective teachers. New teachers in two-year colleges need to understand the characteristics of the students they are to teach, the institution's functions, and the teacher's adjustments necessary for effective functioning within the organization's milieu. In addition, as the thin supply of qualified personnel is mined more completely each year, colleges acquire an increasing number of individuals whose

personalities make adjustment to institutional procedures and requirements a problem of major concern to administrators as well as to students and to professional colleagues.

The problem personality in higher education is a reality well known to experienced administrators, teaching faculty, and counselors. The subject is virtually ignored in the literature of higher education, but it is often the most lively and interesting content of the informal conversations which take place at many professional meetings. Here one finds a very fundamental problem with regard to individuals who are only content when disparaging students; who think they have the only answers to instructional methods; who find only evil in college administrators; who can find no common ground with their colleagues; and who seem to find personal satisfaction only when derogating others. The point is not to introduce slavish conformity but, rather, to be realistic in recognizing that any organization can only stand a limited amount of such negativism and remain a healthy and viable entity.

The definition of professional roles in two-year colleges has been clouded by fortuitous and inaccurate perceptions of the academic responsibilities of two-year personnel. Far too much of the literature attempts to present a one-to-one comparison between community college personnel and university personnel. The fact that teachers

and counselors in two-year colleges serve students in courses traditionally defined as "lower division" is often overlooked. Let me cite two examples.

Rainey polled university personnel to determine their perceptions of the weaknesses of faculties in junior colleges. He found that professors thought junior college faculty members were deficient because:[15]

1. They did not engage in research.
2. They did not write sufficient articles, books, and monographs.
3. They did not have enough training in their specialized field.
4. They did not belong to nor participate in professional societies.

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[15] William G. Rainey, "Analysis of Criticisms of Junior College Teachers by University and Senior College Staffs," Junior College Journal, 30:208-212, December, 1959.

Although a decade has passed since the publication of Rainey's study, the same fallacious comparisons continue to be made. In a statement prepared for the U. S. House of Representatives in 1967, the following quotation appears:

"Table X-1 (p.72) gives some indication of the manner in which junior college recruitment accommodates to the realities of shortage situations. The percentage of faculty newly hired by 2-year and 4-year institutions who held doctorates are presented for those shortage and surplus areas for which statistically significant comparable data are available. Among the shortage fields, the greatest measure of "compromise" is in evidence in engineering and in mathematics. Not one doctorate was found among the engineers newly hired by junior colleges in 1964-65; about two-thirds of the engineers newly hired by 4-year institutions held doctorates. In mathematics the corresponding figures are less than one-fortieth for junior colleges and more than 40 percent for 4-year institutions. The physical sciences and psychology (mainly counseling and guidance) fare considerably better, with a considerable differential in evidence, nonetheless. A considerable differential is also present in the surplus fields of the biological and social sciences. The incidence of doctorates among new hires in the biological sciences was 6.5 percent and 62.6 percent for the 2-year and 4-year institutions, respectively; and for the social sciences, 5.6 percent and 50.3 percent."[16]

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16 The Junior College and Education in the Sciences, Report of the National Science Foundation to the Subcommittee on Science, Research, and Development of the Committee on Science and Astronautics, U. S. House of Representatives, 90th Congress, First Session. Washington, D. C.: U. S. Government Printing Office, 1967.

Lurking in the background of these statements are some questionable assumptions. First, that the requirements for research and teaching by personnel in universities and two-year colleges are equivalent in every respect. Second, that both types of faculties teach on the same level: undergraduate lower division, upper division, and graduate level. Third, the doctorate is an indispensable requirement for teaching on any collegiate level. Fourth, the doctorate is quinta essentia — the ideal preparation for collegiate teaching. Fifth, the activities of university personnel constitute a precise and all-encompassing model for all professional personnel in higher education.

The issue is confused for each of the criticisms of two-year college personnel, for the underlying assumptions listed here contain an element of truth. The seasoning, however, does not make the meal. There is and always will be yearning for the perfect faculty member whose perfection shines forth in all his endeavors. However, few if any members of the profession will attain such unblemished superiority. It is more realistic and meaningful to consider whether college faculties are trained for and are effective in the roles they are asked to fulfill. In the absence of definitive answers based upon exhaustive and reliable data, one can reach the tentative conclusion that, in general, they are.

When comparing the faculty responsible for lower division courses, university and two-year college faculties are quite similar on the degree criterion. In a limited study by the author, the English faculties in fourteen community colleges were compared with a complex university faculty assigned to teach all lower divisions English composition and literature courses. The results are not surprising, in that it has been the long accepted practice for graduate assistants and teaching fellows to assume responsibility for lower division teaching in universities. Of a total of 93 instructors in the university, 20 percent had the Ph.D. and 44 percent the M.A. Eighty-four percent of the 66 English teachers in the fourteen community colleges had the M.A., and 8 percent had the Ph.D.[17]

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[17] Clyde E. Blocker, "Are Our Faculties Competent?" Junior College Journal, 36:12-17, December, 1965.

The author agrees with the Select Committee on Education, Academic Senate, University of California, Berkeley, that:

> "The extreme demand for teachers cannot be met by the present form of doctoral training except at the cost of diluting its quality. At the same time, there is the irony that while many institutions refuse to hire teachers who do not possess the doctorate, the heavy emphasis upon teaching and lack of research prevailing at those institutions inevitably prevents the Ph.D. from conducting research for which he has been trained.

> Such institutions require the doctorate as proof of intellect and learning, not as proof of research potential. The time has come to question the whole system which makes the Ph.D. the only acceptable form of certification for college teaching. Unless this question is raised, there is grave danger that the doctorate will continue to be devaluated and, above all, that serious students wishing to make a career in college teaching will be discouraged because of the research-oriented character of doctoral training."[18]

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[18] Education at Berkeley: Report of the Select Committee on Education. Berkeley: University of California, 1966. Pp. 169-170.

The present quality of two-year college personnel is probably equal to that found in both high schools and universities. This implies immediately that strenuous efforts should be made to improve it. Some suggestions for remediation are set forth in the last section of this paper.

The need for additional administrative personnel is no less striking than that for teaching and counseling personnel. Schultz' study provides the most reliable picture of this need.

His analysis suggested that two-year colleges will need the following number of replacements between 1965 and 1980:[19]

Presidents	Academic Deans	Student Personnel Administrators	Business Officers
1403	1507	956	1041

[19] Raymond E. Schultz, Administrators for America's Colleges: Predictions of Need, 1965-1980. Washington, D. C.: American Association of Junior Colleges, 1965.

Again, mere numbers do not tell the entire story. First, Schultz is probably conservative in his estimate of the number of new colleges which will be organized during the twenty-five year period. He assumes that the number of colleges organized annually will approximate the annual increase during the period 1955-65. It is probable that at least 25 percent more new colleges will come into being each year than was the case in the decade 1955-65. The rate of growth of two-year colleges accelerated rapidly in 1965-67; and it is entirely possible that there will be between 1,200 and 1,500 two-year colleges by 1980. Should this occur, the above estimates would have to be converted into a need at least 75 percent higher.

Second, Schultz did not account for second and third level administrators who will be necessary to help man these colleges. These individuals will make up an indispensable segment of the college staff because of both increased size of institutions and the complexities

of administration. The introduction of technological hardware and procedures for administration will demand more specific and rigorous training of administrators on these levels.

Third, the problem is not simply one of quantity. As the external and internal conditions of colleges become more complex, there is increasing need for professional administrators. All segments of higher education are becoming more closely related to and responsive to current social, economic, and political conditions. In the past, it was possible and even desirable for faculty members to move directly from the classroom to top administrative posts, and although this transition will not become completely archaic, it is probable that future administrators will come from a line of experience which has gradually initiated them into the problems and processes of collegiate administration.

College Transfer Programs

These programs are usually characterized in the literature as lower division, university parallel. They fall generally into three categories: liberal arts, engineering, and business administration. The course patterns and course content found in such programs are virtually identical to that contained in similar programs in four-year colleges. Indeed, these curricula are carefully planned to coincide with those of senior institutions so that students may transfer without difficulty.

As one would expect, the liberal arts program consists of a core of general studies in the basic fields of communications, mathematics, physical and biological sciences, social sciences, and the humanities. There are differences in requirements in various disciplines geared to various professional specializations on the baccalaureate level. Most community colleges provide only a limited number of specialized professional courses during these two years, for most four-year institutions require most specialized study during the junior and senior years. The principle that general education courses should be largely completed by the end of the sophomore year, and that the student narrow his attention to more specialized courses during the last two years largely determines the course requirement for students in preprofessional and liberal arts programs.

The same general pattern applies to engineering and business administration, except for recognition in curriculum structure of these two broad areas of study. Two-year colleges often provide a broader range of entry courses in such fields as mathematics and physical sciences to account for the wide variation in the level of competence of students entering engineering and scientific fields. Thus, it is possible for a student to begin the mathematics sequence on at least four different levels, as indicated by

achievement tests. For example, a student might begin with a review of algebra with college algebra, algebra and trigonometry, or calculus. The primary adjustment in business administration is the requirement of accounting during the freshman year, and two or more business courses during the sophomore year.

Occupational Programs

These are the newest, and most difficult to describe, programs offered in two-year institutions. They cover virtually the entire range of semi-professional and technical occupations now existing in the labor force. Many of the jobs requiring post-high school education have only come into being during the last decade, as the concept and application of the administrative service or production team has gained favor in government, business, and industry. Limitations of space preclude the comprehensive listing of such programs. However, they are generally classified into the following broad categories:

- Agriculture Technologies
- Apparel Design or Fabrication Technologies
- Business Technologies
- Engineering and Industrial Technologies
- Graphic Arts Technologies
- Health Technologies
- Public Service Technologies
- Transportation Technologies

For a complete list, the reader is referred to American Junior Colleges, Seventh Edition.[20]

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[20] Edmund F. Gleazer (ed.), American Junior Colleges. Washington, D. C.: American Council on Education, 1967. P.825.

These programs are generally built in three segments: the general education core (which includes representative courses from the traditional subject matter areas); a basic core in the area of specialization whether it be engineering technology, business, health, or public service programs; and specialized courses in the specific field. The rationale for this structure recognizes that the individual must have occupational competence, knowledge, and skills required by society; and an experiential and educational background necessary for the constructive use of leisure time. In theory, as well as in practice, occupational programs are not thought to be terminal but, rather, are the springboard enabling the individual to move into advanced job training provided by his employer, courses in continuing education programs related to his job and to his expanding interests, or to the completion of the baccalaureate degree. Although reliable statistical data are not available, many students completing occupational programs subsequently transfer to four-year institutions, where many of them complete the four-year degree with little or no loss of academic credit.

Developmental and Remedial Program

Most two-year colleges recognize that a portion of their students will come to the campus with deficiencies in required academic competencies. Many colleges and universities have attempted to eliminate this problem by raising minimum admissions requirements based upon high school achievement and standardized test scores. Comprehensive public community colleges generally accept the responsibility for the remediation of such academic deficiencies.

Community colleges attempt to provide appropriate educational experiences to students having a wide variation in level of academic achievement. Generally, they deal with the problem through two interdependent procedures: differential admissions to curricula, and developmental or remedial courses. For example, a student requesting admission to engineering is required to have at least three years of high school mathematics and two years of science. His standardized test scores, whether they are on the SCAT or the ACT, must be in the higher centile range. In contrast, the student entering an engineering technology program would be subjected to more lenient mathematics and science requirements and lower standardized test scores. With few exceptions, all associate degree programs have minimal entrance requirements, and if a student cannot present satisfactory credentials he is then diverted to a developmental or remedial course sequence.

Remedial programs which, incidentally, were offered by most land-grant universities and state colleges until about 1950, include English, reading, mathematics, science, and college orientation. Students taking this program may transfer to the curriculum of their choice when they can demonstrate competence adequate for minimal admissions requirements. The community college will, undoubtedly, continue to provide such programs in the future. These efforts of remediation are a pragmatic recognition of the need to retain a minimum level of quality in transfer and occupational programs while, at the same time, keeping open the door of opportunity for many students who will eventually achieve their educational goals.

Program Outputs

It would be enlightening if the author could give substantive evidence showing the numbers of students who have completed occupational programs and entered the work force as semi-professionals and technicians or have transferred to four-year colleges. Perhaps it is symptomatic of the limited interest in two-year colleges by federal agencies and universities, ". . .that national data on the flow of students within the junior college sector, in terms of transfer enrollment versus terminal enrollment, and in terms of

attrition, are not available."[21]

[21] Op. cit., The Junior College and Education in the Sciences, P. 85.

Statistical studies of the number of recipients of associate degrees would be relatively easy to execute, but these data would give only a limited and perhaps misleading picture of the role of two-year colleges in the production of trained manpower. The problem is complicated by the fact that many students transfer to four-year colleges before completing the associate degree. Students in occupational programs are very mobile and are difficult to reach in follow-up studies. Needless to say, much would be learned about community colleges if the results of comprehensive follow-up studies of students were available.

The magnitude of the effort to produce semi-professionals and technicians may be understood in a rough way with a sample of a number of programs now in two-year colleges. A small sample includes:[22]

Aeronautical Engineering Technology	15
Air-Conditioning Engineering Technology	30
Architectural and Civil Technology	18
Data Processing	160
Electrical and Electronic Technology	263
Mechanical Engineering Technology	92
Nursing	318
Occupational	178
Transfer	140

[22] E. J. Gleazer, Jr., American Junior Colleges. Washington, D. C.: American Council on Education, 1967. Pp. 825-906.

Essential University Services for Community Colleges

The development of two-year colleges in the past has been quite uneven, marked by substantial qualitative differences in local and state planning, and until very recent years by the absence of any aggressive national interest by educational agencies, foundations, academic and professional groups, and universities. Since 1960, constructive responses to their needs have come from such foundations as W. K. Kellogg, Esso, and the Carnegie Fund. The upsurge of interest and development of state master plans for higher education has also drawn attention to two-year institutions and their essential roles in the scheme of public education. Vigorous leadership of the American Association of Junior Colleges during the last decade has stimulated more positive but admittedly spotty responses from groups and institutions interested in the expansion and improvement of higher education through two-year institutions.

While centering our attention upon effective university responses to community college needs, one must keep in mind that such responses will depend to a certain extent upon correlate responses by state and federal governments, philanthropic foundations, and professional associations. That is to say, universities need the assistance of these agencies if they are to find the resources necessary for effective responses to community college needs.

As a summary of this paper, I wish now to present a list of the most pressing needs of community colleges, and to suggest patterns of university responses needed for the amelioration of such needs.

NEED - There is a current and increasingly critical shortage of appropriately trained administrative personnel.

RESPONSE - Universities should seek to recruit and educate larger numbers of experienced persons in administration. Such individuals can be drawn from secondary schools, two-year colleges, and four-year colleges. Graduate students undertaking such advanced study could come from any subject matter discipline and should have some previous teaching, industrial, or business experience. Such programs would range in length from short seminars to the complete doctoral program. There should, of course, be institutional variations in the patterns of preparation set up by individual universities. However, some essential elements of all programs would include exposure of the students to such areas as: the theory of organizations, urban sociology, political science, management, research methods, curriculum development, and instructional media. A variety of models now exist at the University of California (Berkeley and

Los Angeles); The University of Chicago; Michigan State University; Teachers College, Columbia University; and Florida State University.

NEED - There is a rapidly increasing demand for qualified two-year college teachers in virtually all subject matter areas, while at the same time there is a diminishing supply of appropriately trained personnel.

RESPONSE - Generally, community colleges prefer instructors and counselors with some educational or business experience and the minimum of a master's degree in the area of specialization. It should be stressed that these are minimal requirements, in that most institutions prefer teachers who have completed at least 30 hours beyond the master's degree or can substitute a number of years of related industrial or business experience. The recruitment of personnel who can function effectively in the community college setting is further complicated by a general lack of education in and understanding of the objectives and functions of two-year institutions. The content of such programs should include courses which would give knowledge and insight into the junior college as an institution

designed to fulfill educational and societal needs, an understanding of the psychological and sociological characteristics of students being served, the principles of curriculum organization and course structure, instructional media, an understanding of the theory and practice of educational administration in such colleges, and an internship providing guided experiences under the direction of an experienced teacher in the classroom or in counseling situations.

NEED - As with all trained manpower, community college administrators and faculty members are in danger of becoming professionally obsolete at a rapid rate in the absence of massive opportunities for periodic retraining.

RESPONSE - Universities must provide programs, both formal and informal, to community college personnel in the form of directed research programs and seminars for retraining purposes. Universities have extended educational services, particularly in urban areas, to all types of professionals who periodically become students again on either a part-time or full-time basis. A primary reason which deserves special consideration in this context, is that universities have not (for the most

part) recognized the existence and the educational needs of this clientele. Some progress in the area has been made through National Science Foundation seminars and seminars funded by Federal funds in recent years. However, more is needed.

NEED - The transfer of students from two-year to four-year colleges should be facilitated by the application of guidelines relevant to the educational program and students involved.

RESPONSE - A set of guidelines has been developed by the Association of American Colleges, American Association of Junior Colleges, and American Association of Collegiate Registrars and Admissions Officers.[23] These guidelines

[23] Guidelines for Improving Articulation Between Junior and Senior Colleges. Washington, D. C.: American Council on Education, 1966. 17 pp.

should be adopted by all institutions receiving students from two-year colleges. Too often, one finds the admissions procedures and requirements are mechanically applied to individual cases with little flexibility. A more systematic approach to transfer would take into account the relevance of the student's level of competence and the relevance of

the courses completed during the first two years of college. While this is a problem for some students who take the transfer program in a community college, it is much more complicated and difficult for students in occupational programs who later attempt to transfer to four-year colleges.

NEED - The infusion of an ever-increasing percentage of high school graduates into institutions of higher education, rapid changes in course content, and the introduction of sophisticated hardware into the classroom and laboratory has generated the need for meaningful research and development in teaching methods and the learning process.

RESPONSE - Universities should develop cooperative relationships with two-year colleges and within their own junior divisions to study these problems with a view to finding more effective ways to facilitate the learning process. That the process is as important as the content is an assertion accepted by large portions of the academic community. However, there is a dearth of interest and activity with respect to this question. Two progressive institutions -- Miami Dade Community College (Florida), and Oakland Community College (Michigan) -- set out to

develop automated learning centers. They found it necessary to train their own personnel and develop suitable physical facilities. Their primary source of help was from corporations having an interest in audio-visual materials and equipment.

NEED - The ever-increasing flow of students from two-year colleges to four-year colleges requires careful long-range planning so that physical facilities and personnel are expanded to accommodate substantially greater numbers of juniors, seniors and, eventually, graduate students.

RESPONSE - State coordination and planning for higher education ranges from the nonexistence in some states to elaborate systems in others. From the student's point of view New York, California, Florida and Illinois have probably developed the best long-range plan. In these states most high school graduates have the choice of a community college, a state college, or a university. Their progress through the baccalaureate degree or through occupational programs is not seriously inhibited by the lack of either educational programs, professional personnel, or physical facilities.

In some instances, the universities would be well advised to stimulate the organization of regional consortiums, such as the Western Interstate Commission for Higher Education. This arrangement has made available most essential services of higher education to the people in thirteen states. The same type of interchange and cooperation would be useful in other sections of the United States.

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