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TECHNICAL EDUCATION IN THE SMALL COMMUNITY COLLEGE.

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DECISIONS TO TRAIN TECHNICIANS IN COMMUNITY COLLEGES MAY HAVE TO DEPEND MORE ON FEASIBILITY THAN DESIRABILITY. ALTHOUGH LOCAL INDUSTRIAL NEEDS CAN USUALLY BE DETERMINED WITH EASE, THE COLLEGE MAY NOT HAVE THE FUNDS TO INTRODUCE AND MAINTAIN PROGRAMS OF SUFFICIENTLY HIGH QUALITY TO MEET THEM. EVEN WITH INCREASING FEDERAL AID, THE NEW OR SMALL INSTITUTION HAS TROUBLE MEETING THE HIGH COST OF FACILITIES AND EQUIPMENT. IT MUST ALSO PAY MORE FOR QUALIFIED TEACHERS, WHO UNDERSTANDABLY PREFER THE LARGER CITY COLLEGES BECAUSE OF PRESTIGE, FRINGE BENEFITS, AND SUCH URBAN AMENITIES AS HOUSING, RECREATION, GRADUATE STUDY, AND CONSULTANT WORK. THE COST OF BOTH PLANT AND FACULTY WILL CONTINUE TO GROW AND ADMINISTRATORS CONCERNED WITH QUALITY MUST KEEP THIS IN MIND WHILE CONSIDERING NEW PROGRAMS. AN INNOVATION IN THE MINERAL AREA TECHNICAL LABORATORIES HAS BEEN A 3-LEVEL STAGING OF THE WORK--INSTRUCTIVE, INVESTIGATIVE, AND INVENTIVE. THE FIRST PHASE IS TRADITIONALLY DIDACTIC AND CONCERNED WITH SCIENTIFIC PROCEDURE, THE SECOND OR PROBLEM-SOLVING LEVEL PRESENTS THE STUDENT WITH EXPERIMENTS OF VARYING DEGREES OF COMPLEXITY TO SOLVE, AND THE THIRD STAGE OFFERS HIM PROBLEMS WITH NO KNOWN OR COMPLETE ANSWERS. HIS SUCCESS AT THIS POINT IS JUDGED BY HIS APPROACH TO AND INVOLVEMENT IN THE PROBLEM. THE TECHNICAL PROGRAM AS A WHOLE IS JUDGED BY THE SUCCESS OF ITS GRADUATES IN GETTING AND ADVANCING IN APPROPRIATE JOBS. THIS ARTICLE IS PUBLISHED IN "SCHOOL SHOP," VOLUME 27, NUMBER 4, DECEMBER 1967. (HH)

A discussion* of the problems and growing pains shared by scores of new institutions

Technical Education in the Small Community College

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THE community-college movement is one of the most dynamic developments of the times. Comprehensive junior colleges, which provide both general and occupational education, are being built at the rate of 60 a year. While this represents an all-time record in college building, the rate is likely to climb still higher in the years immediately ahead. Plans now being developed throughout the various states call for nearly 200 additional two-year institutions by the year 1970.

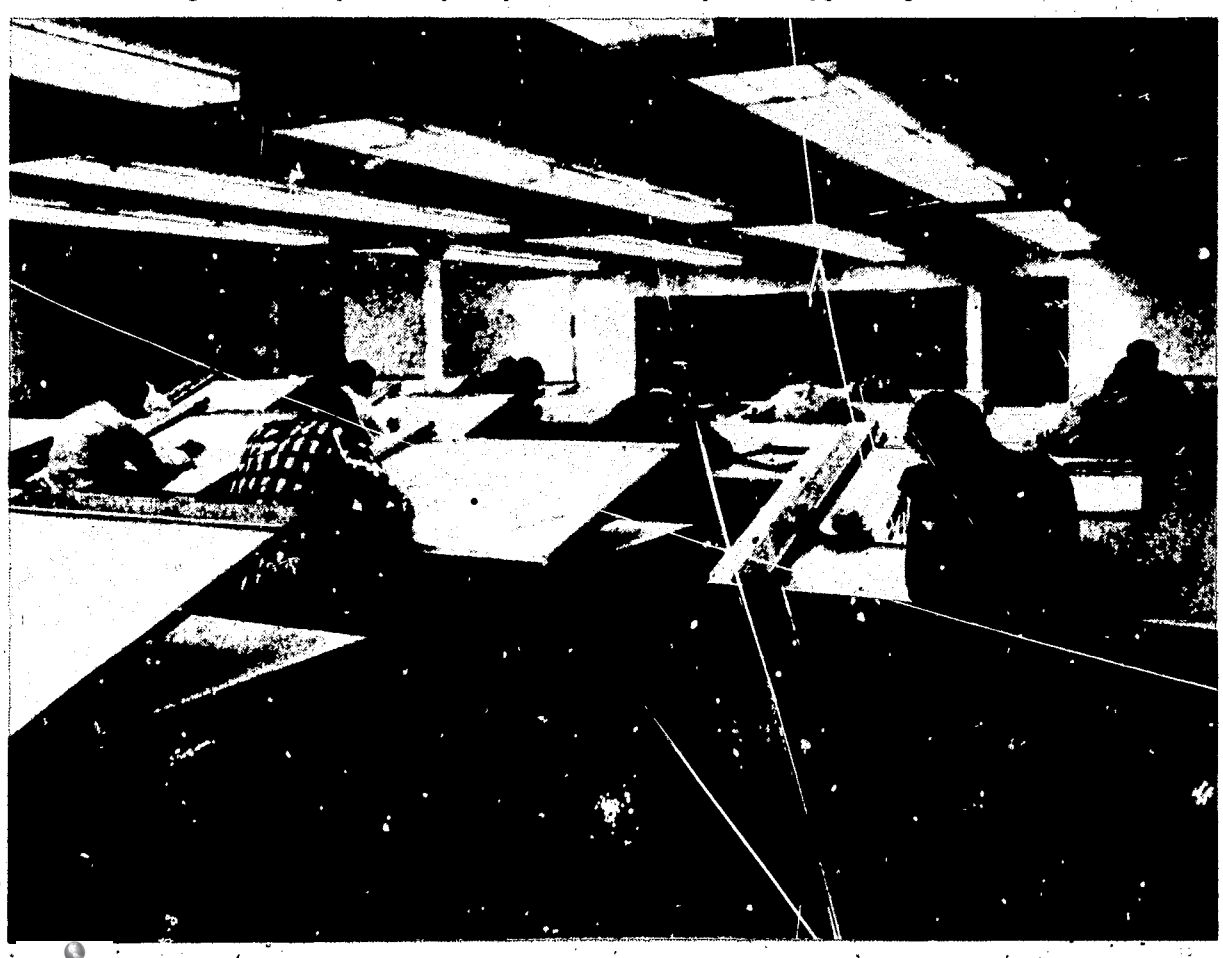
As the movement grows, the problems relating to technical education will increase substantially. Many of the new institutions will be dedicated in some measure to easing pronounced demands for technicians. The persistence of this practice, along with the trend toward technical education in the four-year colleges and universities, will contribute increasingly in the future to the difficulties of expanding the offerings in established junior colleges. For the institution of limited size and capability, the problems involved in securing competent faculty, equipping costly laboratories, and maintaining an effective educational setting might become practically insurmountable.

In the next several years, decisions with respect to training technicians in community colleges will have to relate more to feasibility than to desirability. Local interest and the need for industrial and engineering technicians will be easily ascertained in most instances, but the big question will be one of institutional capability for graduating persons with the technical, conceptual, and creative skills required by industry.

Administrators in the small two-year colleges will have reason for utmost concern. While some will be able to procure funds in adequate amounts for new programs, the wisdom of investing in a technical program will remain subject to serious questioning wherever limitations in enrolment and instruction prohibit the achievement of quality.

*Reprinted from TECHNICIAN EDUCATION YEARBOOK 1967-1968. Ann Arbor, Mich.: Prakken Publications, Inc., 1967.

New community colleges are sometimes housed in renovated facilities. Author stresses that even in temporary quarters it is important to provide an environment that contributes effectively to learning. Provisions for adequate lighting, space, and instructional attachments are apparent in this view of a drafting classroom at Mineral Area College. The same is true of the MAC concrete-testing laboratory facility depicted in the photo appearing on this issue's cover.



Some Common Problems

The problems of introducing and maintaining effective technical programs in the small community college are somewhat evident in the characteristics of the institution itself. Besides the widely publicized generalities about all community colleges—that most ascribe to a policy of open admissions, are coeducational, charge a small amount for tuition, and provide both occupational and transfer courses—there are other pertinent generalizations to be considered. Some additional ones (with several relating solely to comprehensive institutions of less than a thousand enrolment) are:

- Small public junior colleges often

serve districts that consist of diversified-business, residential, moderately industrial, and rural areas.

- They are relatively new (approximately one-half of the small public institutions having been established in the last six years), and they are often housed initially in temporary facilities.
- By and large about two-thirds of all students in community colleges select a transfer objective, with attrition as high as 40 to 50 percent among the freshmen in all programs.
- Institutions engaged in developing technical curriculums generally record a doubling of enrolment in the courses during the first several years.
- As few as one in every 12 male students choose the technologies when such courses are first introduced in an institution which for many years has offered only the transfer programs.
- Where other occupational courses are provided, as many as one-fifth to one-fourth of the total student body eventually enrol in the industrial and engineering technologies.
- The students often select a technical program on the basis of interest or peer influence rather than ability, the advice of a counselor, or availability of jobs within the community.
- Many of the institutions offer a variety of technical courses in the evening, with enrolment in such classes about two times that in similar day courses.

There are other features, applicable more or less to individual institutions, which can seriously affect a program of technical education. In general, however, the difficulties stem largely from conditions identifiable in the preceding list.

The location of the institution, the composition of the district, and the general concept of inadequacy that is associated with small junior colleges are among the contributory conditions. These and other interrelated factors give rise to limitations in funding, staffing, and enrolment.

Funding

The financing of technical education in the comprehensive community college is not as difficult as it once was. The provision of federal funds, covering a possible 50 percent of the total cost of instruction, equipment, and facilities, plus state reimbursement at the current level of $200 to $400 per student per semester, is somewhat indicative of this. When these amounts are combined with tuition payments in a public junior college (normally between $100 and $200 per individual per academic year), there remains a comparatively small amount of the total cost to be obtained directly through local taxation.

It is, nevertheless, true that small institutions are not as financially able as the large ones. While the latter may readily maintain a dozen or more technical programs, those of limited size are sometimes incapable of supporting one or two adequately. The relative valuation of taxable property within the districts is the underlying reason.

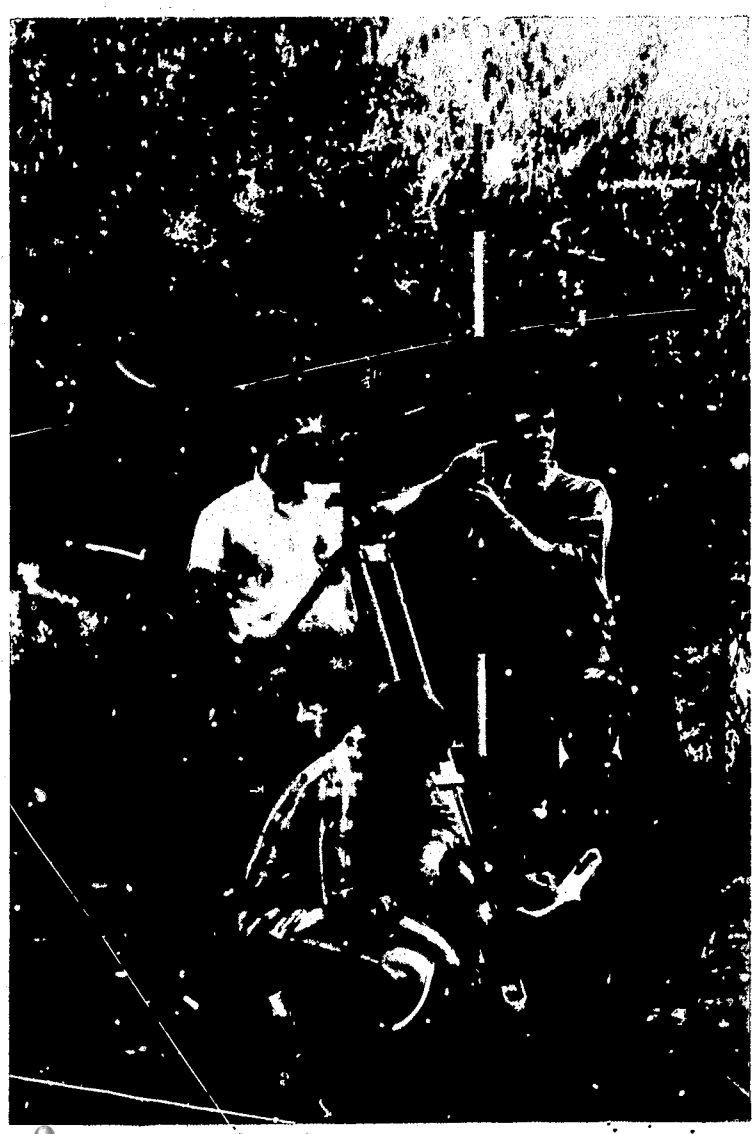
In light of the high cost of providing excellent facilities, equipment, supplies, and instruction for the technologies, there is little justification for attempting to offer a wide variety of such curriculums in the small institution in the first place. The added encumbrance to the taxpayer is not the only consideration, however. Local demands for technicians and shortages of qualified faculty or capable students are equally important in the determination of an appropriate limit.

Staffing

The technical administrator who has had experience in institutions of different sizes soon realizes where the major difficulty lies in recruiting qualified faculty. Prospective faculty often apply to large, established institutions without solicitation, while it is sometimes necessary in other situations to invest the equivalent of $1,000 or more in administrative time, secretarial assistance, automotive and air transportation, local and national advertising, and meals and lodging in an attempt to fill a single position. Moreover, a salary range in excess of that provided in nearby, larger institutions is a virtual necessity in order to attract qualified personnel. Small community colleges are seldom as attractive as the others in terms of prestige, fringe benefits, instructional load, opportunities for teaching in the summer, etc.

Location is a major factor, whether the quest be for full-time or part-time faculty. It is difficult to find fully experienced persons in a small community, just as it is difficult to get some persons to move into and remain in the area. Limited possibilities with respect to housing, recreation, consulting work, or graduate study contribute to the problem. A commuting distance of 60 to 80 miles between the campus and the nearest large cities is also a point of considerable importance in some cases.

Despite the many difficulties, the staffing of a technical program in a small community college can be accomplished with remarkable success at times. The question remains, of course, whether or not the small institution will be able to compete with its larger counterpart in the future. With indications



Technical programs in the small community college should be designed to prepare the students for entry and advancement in broad occupational areas, says the author. Hence, these students at Mineral Area College are receiving instruction in surveying as part of a civil technology program rather than within a curriculum confined to surveying.

that salaries of $1,100 to $1,500 per month will be commonplace in the next several years, there is indeed something for an administrator to think seriously about, especially if he is contemplating new programs for an institution already gripped by growing pains.

Enrolment

Enrolment poses many problems—not the least of which pivots around the ready availability of enrollees for maintaining programs of the level of rigor and quality intended.

The considerations here are many and varied. Some of the ones most applicable in the early stages of the development of a community college are:

- The minimum level of enrolment required to effectively accommodate courses in technical education.
- The requirements for staff, equipment, and facilities as based on an estimate of the numbers of students first entering the program.
- The nature and number of different courses that may be feasibly offered and which the students will elect once such courses are made available.
- The rate of academic attrition in the comprehensive institution.
- The influence of various other factors which may limit enrolment, including transferability, the attitude of counselors, the attitude of the local populace, the past history of the institution, and the amount and effectiveness of supporting publicity.

Due to the variety of local conditions, it is difficult to say just how large a community college should be before introducing technical education. It seems safe to estimate, on the basis of national information, that a total enrolment of about 400 day students (boys and girls) is necessary. An enrolment of twice that number is probably desirable in well established academic institutions. A crucial point in such an estimate, in any case, is the number of sophomores likely to be on hand after the initial year for new programs.

The case here at Mineral Area College is somewhat indicative of the problem for institutions which have existed as transfer institutions for many years. When technical programs were recently introduced to the day schedule, 41 of 511 students chose either of two associate degree objectives rather than a transfer track. Evening enrolment, on the other hand, was 96 in the occupational courses out of a total of 212 students.

The degrees referred to in this situation were available to both boys and girls, one in technology and one in business and office practice. The technical degree was made available in the civil and the design-and-drafting technologies. The enrolment indicated in each instance was divided about evenly between the several programs. A 60-percent drop in enrolment among freshmen in the day programs left an inadequate number to justify certain sophomore classes (especially in civil technology). During the second year for the programs, the number of freshman applicants doubled, and the limited number of sophomores in some cases were grouped with academic students for their general education and technically related courses. There were obvious difficulties in carrying out an effective program for the proportionately large group of students with limited abilities. This problem has subsequently been eased by the addition of more instructors and by guiding some freshmen into less rigorous one-year certificate programs in technology.

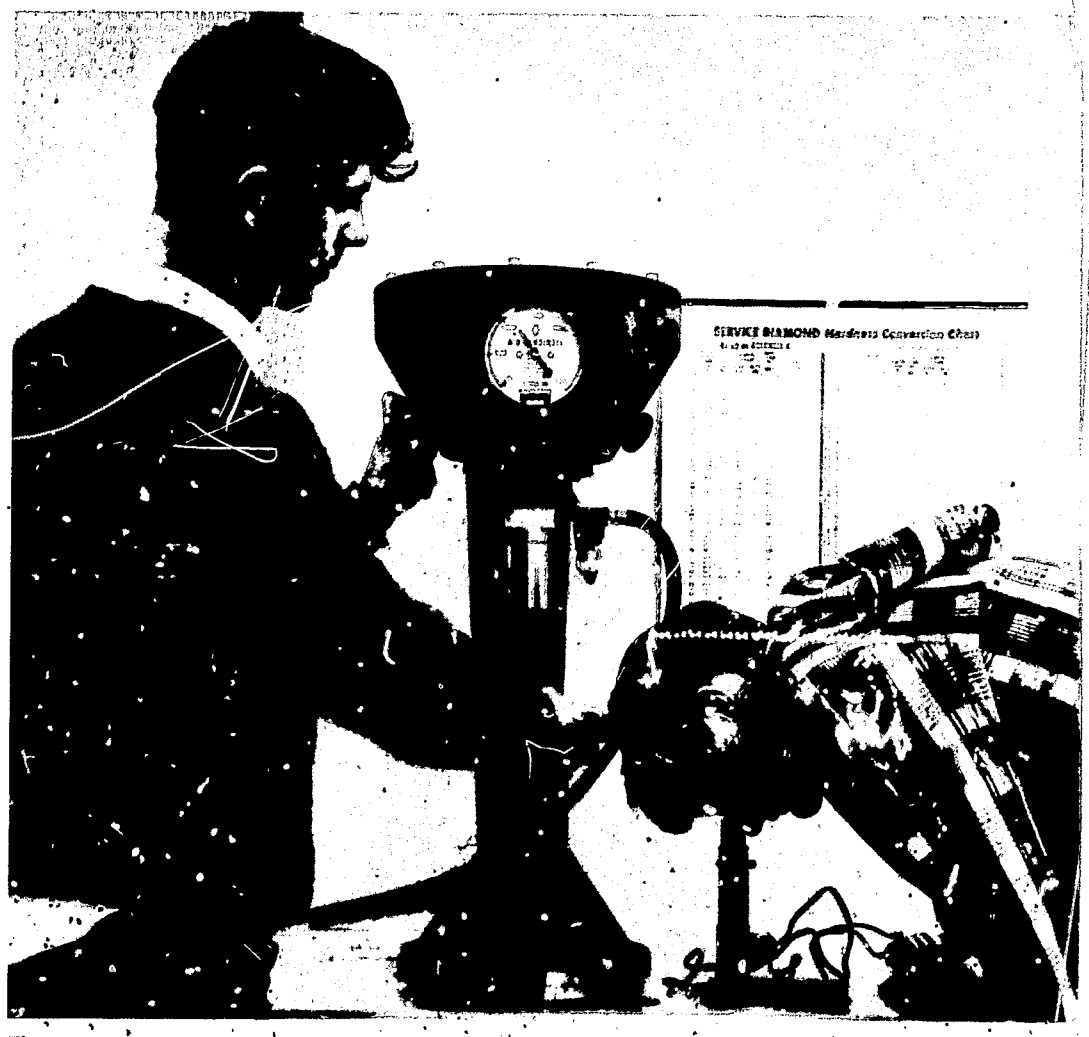
Besides the various suggestions advanced previously, the technical administrator in the small institution should consider several additional points: (1) While there is merit in developing curriculums that have some relation to community needs, it is essential to offer, initially at least, one curriculum that has appeal to the high-school graduate. Electronics and drafting are two that have wide appeal. (2) Some thought should also be given to the transfer function, for two reasons. First, there is considerable evidence that some students avoid a program because it is not designed to transfer; and, second, the growing importance of the four-year technical programs can no longer be ignored.

Enrolment data for 1966, as published by the American Association of Junior Colleges in the *1967 Junior College Directory*, indicates that of 837 public and private junior colleges, 491 enrolled less than 1,000 students. The remaining number of institutions, or 346, enrolled 1,000 to 10,000 or more students. Difficulties discussed previously for institutions of limited size would, therefore, seem to be applicable to some extent to a majority of junior colleges.

Curricular Innovation

Small community colleges are becoming very much innovative. This is a natural development in view of the con-

(*Please turn to page 46.*)



The investigation and practical application of theory is an essential part of the education of technicians. Author Seitz cites this scene showing a Brinell hardness test being conducted at MAC in emphasizing that tools and equipment of appropriate variety, quantity, capacity, and quality are required in order to meet the need for an adequate level of laboratory experience.

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venience of incorporating new and sophisticated hardware in the plans for building expansion. Innovation in the instructional program is occurring to an extent, also, and it is through this latter development that the greatest gains are likely to be realized.

Our changing technology requires that technicians be graduated who will accept change and naturally seek better ways of doing things. What is needed, therefore, is increased emphasis on developing habits of inquiry, problem-solving, critical thinking, and inventiveness within the limits of each student's capabilities. At the same time, a corresponding de-emphasis is needed with respect to terminology, classification, and memorization. In short, more consideration must be given the *process* goals as opposed to the traditional *content* goals.

The technical laboratories are especially adaptable to a creative problem-solving approach. This is particularly true where laboratory experiences are scheduled in all four terms of the curriculum. Such is the case at Mineral Area College where the work is staged at three levels—the *instructive*, the *investigative*, and the *inventive*.

Initially, in the instructive phase, the approach is very much didactic. The students are taught to follow a step-by-step, scientific procedure in performing experiments. The instructor works closely with the students, and they are expected to follow his directions carefully.

The investigative—or problem-solving—level is reached during the second and third terms. The students are given a variety of experiments to complete at that point. They are expected to establish parameters, do the necessary research, conduct the experiments as they see fit, analyze the data, and draw conclusions much on their own. As the problems posed are of a sort ordinarily encountered in the routine of a practicing technician, the instructor can make a comparison between known results and those obtained by the students. Perhaps obvious is the need to assign problems of various degrees of complexity.

An inventive approach is applied in the final term of the program. By that time, the student is expected to have acquired basic skill and some knowledge of accepted procedures, as well as an appreciation for independent, orderly problem solving. He is then encouraged to develop an enthusiasm for delving into the new and untried.

The work at this level involves seeking solutions to problems for which there are no known or complete answers. The instructor simply poses a problem, and the students, independently or as a group, attempt to develop workable solutions. The possibilities are virtually unlimited. One such problem for civil technology students might be to develop a superior but economical sub-grade material for the highways of a particular area. Another might be to find a use for large quantities of waste from nearby mines. Perhaps none of them will develop a single improved practical idea or product; but their involvement in the process—thinking, brainstorming, and experimenting—is the point of primary importance.

In the final analysis, the effectiveness of any approach to technical education is to be evaluated on the basis of the relative success of the graduates in appropriate positions of employment. There is good reason to re-evaluate the program if 80 percent or more do not find employment in the area for which they are trained and if they fail to advance at a rate commensurate with their individual abilities. ★

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