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ABSTRACT

This report is an investigation of the validity of the conclusions reached in the first phase of this study (see JC 720 106 above). Three questionnaires were designed to collect information on the attitudes, backgrounds, and opinions of: (1) faculty in the mathematics, science and engineering-related occupational divisions of selected Illinois junior colleges; (2) students in transfer and engineering-related occupational programs in these same colleges; and (3) faculty in selected technical institutes. Conclusions reached from the results of these questionnaires include indications that transfer and engineering-related occupational instructors differ in their educational background, the number of advanced degrees held, their evaluation of the importance of application in technical physics courses, and their opinion of the ability and motivation of occupational students. Differences were also found between transfer and engineering-related occupational students. A greater proportion of the transfer students hope to obtain education beyond the Associate degree; their attitude toward work is more idealistic as opposed to the pragmatic attitude of the occupational students; they were less sure of their reasons for choosing their program than the occupational students; and their education is more often financed by assistance than by employment. (AL)

AN ANALYSIS OF THE PRACTICES IN THE TEACHING OF TECHNICAL MATHEMATICS AND TECHNICAL PHYSICS

Phase Two

A Report Presented to

Dr. John E. Dalton

In Fulfillment

of the Course Requirements of

Education 550

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by

Betty Doversberger

January, 1971

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CHAPTER I

THE SCOPE OF THE STUDY

This report is a continuation of the previous study, "Analysis of the Practices in the Teaching of Technical Mathematics and Technical Physics in Illinois Junior Colleges." In the original study, the opinions of experts in the field of technical education toward the teaching of these subjects were explored, the practices in the Illinois Junior Colleges in this area were investigated by the use of questionnaires, and the mathematics and physics courses in the Mathematics and Science Division and in the Engineering and Industrial Occupations Division at Illinois Central College were examined.

I. PROCEDURES IN THE SECOND PHASE OF THE STUDY

The second phase of this study involved an investigation of the validity of the conclusions reached in the preceding phase, and an exploration of the attitudes, background and opinions of faculty members and of students in transfer programs and in occupational programs.

In order to determine the validity of the conclusions previously reached, copies of those conclusions were sent to four recognized experts in the field of technical education for their examination and comment. Four members of the American Association for the Advancement of Science, all of whom have been involved in this organization's study of the teaching of technical mathematics and technical physics, were consulted. These men were Dr. John R. Mayor, Director of Education for the Association; Dr. Louis Dunham, mathematician, Director of the Franklin Institute of Boston; Dr. Maurice W. Roney Executive Vice President, Texas State Technical Institute, Waco, Texas; and Dr. Arnold Strassenburg, Director of the Office of Education and Manpower of the American Institute of Physics.

Questionnaires were used to explore the attitudes of faculty and students in transfer and occupational programs. Three sets of questionnaires were designed. The first set was sent to faculty in the Mathematics, Science and engineering related Occupational Divisions of selected Illinois Junior Colleges; the second set was distribeted to students in transfer and engineering related occupational programs in these same schools. The third set, very similar in content to the first, was sent to faculty members in selected Technical Institutes, and was intended to provide a comparison of the opinions, attitudes and backgrounds of technical institute faculties with those of the two types of programs being investigated in the junior colleges.

The junior colleges selected for this study were chosen from those identified in the course of the original study by Dobrovolny as having outstanding engineering related technical programs. His selection was verified by two other leading experts in the field of technical education in Illinois; those schools agreed upon by all three experts were contacted for the study. Of eight schools contacted, seven agreed to participate in the study. These schools are Belleville Junior College, Black Hawk College, Illinois Central College, Lake Land College, Thornton Community College, Triton College, and the Vocational Technical Institute of Southern Illinois University. All are schools with full-time enrollments of over 1200.

The technical institutes contacted were selected by consulting a directory to find those schools with comparable enrollments which had ECPD accredited technical programs. Thirteen technical institutes were contacted; ten have returned the questionnaires to date. These schools include

Cogswell Polytechnical College, San Francisco, California; Erie County Technical Institute, Buffalo, New York; Fayetteville Technical Institute, Fayetteville, North Carolina; Hartford State Technical College, Hartford, Connecticut; Ohio Technical College, Columbus, Ohio; Southern Technical Institute of Georgia, Marietta, Georgia; Texas State Technical Institute, Waco, Texas; Thames Valley State Technical College, Norwich, Connecticut; and the University of Akron Community and Technical College, Akron, Ohio. In addition, Sinclair Community College, Dayton, Ohio has responded to the questionnaires; however, since this school was incorrectly identified as a technical institute, the forms sent to them did not request identification of the department in which faculty members were teaching, and it was therefore not possible to incorporate these questionnaires in the study.

II. METHODS USED IN TABULATING THE QUESTIONNAIRES

Separate tabulations were made of the questionnaires received from each school. Responses of faculty members in mathematics and science departments in the junior colleges were kept separate from those in occupational departments, as were the responses of students in transfer and occupational programs. Responses of technical institute faculty were not identified by department since it was felt that all faculty in a technical institute are involved in technical education, regardless of their academic area, and would therefore subscribe to the same philosophies. Comments made on a few of the questionnaires by faculty members who did identify their teaching areas led to the conclusion, however, that it would have been

profitable to separate the responses of technical institute faculty by department in the same way as for the Junior Colleges. As an example, the need for industrial experience is different for an English teacher in a technical institute than for a mathematics or physics teacher.

Once tabulations had been completed for each school, the data were combined into a total for each type of respondent; junior college mathematics and science faculty, junior college engineering related occupational faculty, junior college transfer students, junior college engineering related occupational students, and technical institute faculty. Since the number of respondents was different in each category, the figures were then reduced to percentages, in order that a meaningful comparison might be made. Some respondents did not reply to each question, and some gave multiple answers on some questions; the total number of responses does not always correspond with the total number of respondents.

For all questions except one, the percentages were figured on the basis of the total number of respondents in that category, since all had equal opportunity and were presumably equally qualified to answer each question. The one exception is the item requesting faculty members to rank the various mathematics courses in the order of their teaching preference. A number of faculty members in both categories responded that they are not qualified to teach mathematics, and therefore have no preference. For this reason, percentages on this question were figured only on the total number in each type of department who teach mathematics and did express a preference.

Several questions required the respondents to rank a number of items

in order of importance or preference. The number of items in individual questions ranged from five to twelve. The difficulty in interpreting data spread between so many choices led to the decision to group these data according to the relative emphasis they indicate. Thus, on questions involving the ranking of nine or more items, responses of 1, 2 or 3 were taken to indicate primary emphasis on this item on the part of the respondent, responses of 4, 5 or 6 were taken to indicate moderate importance attached to that item, and responses higher than 6 were taken to mean little importance for that item. These data, along with the total raw data and the total percentages, are available in the tables included in the report.

The comments which have been received concerning the conclusions of the first phase of this study and the responses to the questionnaires are discussed in the succeeding chapters.

CHAPTER II

COMMENTS ON THE CONCLUSIONS OF THE PREVIOUS STUDY

Responses have been received to date from two of the men who were asked to comment on the conclusions of the previous study, Dr. Strassenburg and Dr. Mayor. It is expected that a reply will eventually be received also from Dr. Roney. Dr. Mayor conferred with several members of the staff of the American Association for the Advancement of Science before replying; his comments, therefore, represent the opinions of several people.

The conclusions sent to these men, which were taken verbatim from the previous report, appear on the next page, followed by copies of the letters received from Dr. Strassenburg and Dr. Mayor. The letters requesting their participation can be found in Appendix A.

As can be seen from an examination of Dr. Mayor's letter, he recommends that two of the original conclusions be made more comprehensive. He suggests that conclusions 4, "Careful coordination of the mathematics and the technical specialties is necessary," should be expanded to include coordination also with the technical physics. And he suggests that conclusion 8, "Industrial experience in a related occupation is considered to be a prerequisite for teaching in technology curricula," should be reworded to include the mathematics and science instructors in the technical education programs. He further suggests that the wording in the second sentence of conclusion 6, "Those with a background in mathematics only are considered to be too theoretical in their approach to make the best instructors for technology courses," be made less sweeping be stating, "Those with a background in

A study of the literature led to the following conclusions:

1. Technical mathematics for technology curricula should be taught in separate courses from the mathematics offered for other curricula.

2. Topics selected for inclusion in the technical mathematics courses should be those necessary in the technical specialties.

3. There should be strict avoidance of too theoretical an approach in teaching technical mathematics. The courses should be kept on an applied level, with many illustrations from industry.

4. Careful coordination of the mathematics and the technical specialties is necessary.

5. Technical physics courses require the same care in selection of topics avoidance of too much theory, and coordination with the technical specialties as is needed in the mathematics courses.

6. Experts in the field of technical education feel that instructors for technology curricula, including the basic sciences, should be engineering or science majors. Those with a background in mathematics only are considered to be too theoretical in their approach to make the best instructors for technology courses.

7. A thorough understanding of and sympathy for technology programs should be a prerequisite for teaching courses in technology curricula, including the related sciences.

8. Industrial experience in a related occupation is considered to be a prerequisite for teaching in technology curricula.

9. Teachers in technology programs should have knowledge of their subjects of greater depth and breadth than they are required to teach.

American Association
for the Advancement of Science

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Phone: 387-7171 (Area Code 202) Cable Address: Advancesci, Washington, D. C.

November 11, 1970

Miss Elizabeth J. Doversberger
Engineering and Industrial
Occupations Division
Illinois Central College
P. O. Box 2400
East Peoria, Illinois 61611

Dear Miss Doversperger:

The statements on the teaching of technical mathematics and technical physics sent in your letter of October 20 have been read with great interest by several members of our staff. We think you are making some very important recommendations and have little difficulty in endorsing them.

Modifications of three of the statements are suggested by members of our staff. These refer to items 4, 6, and 8.

4. This statement should be expanded to emphasize the need to coordinate mathematics with technical physics as well as other technical specialities.

6. You are little too critical of those with mathematics specialization. Why not say "Those with a background in mathematics only are more apt to be, etc."

8. This item should include science and mathematics instructors in technical education programs.

Thank you for giving us this opportunity to comment and congratulations on your good work.

Sincerely yours,

John R. Mayor

John R. Mayor
Director of Education

JRM: jfh

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OFFICE OF
EDUCATION AND MANPOWER
A. A. STRASSENBURG, *Director*

Reply to:
STATE UNIVERSITY OF NEW YORK
STONY BROOK, NEW YORK 11790
516-751-8300

November 16, 1970

Dr. Elizabeth J. Doversberger
Engineering and Industrial Occupations Div.
Illinois Central College
P. O. Box 2400
East Peoria, Illinois 61611

Dear Dr. Doversberger:

I received your letter of October 20 requesting my comments on your conclusions based on a study of the literature on the teaching of technical mathematics and physics. I am happy to provide you with the comments you request.

Concerning your first conclusion, I do agree that mathematics courses taught by mathematics departments will not necessarily provide technician students with the mathematical techniques they will need in their science and technology courses. I would not, however, provide a separate set of mathematics courses to teach these mathematical techniques, but instead would systematically teach these techniques in the science and technology courses as they are needed.

I certainly agree with conclusions number two, three and four. I also agree with conclusion number five, but I wish to point out that it is rather difficult at present to organize an appropriate physics course because of limitations in available text-books and other teaching materials. A project in which I am involved is attempting to produce a new array of teaching materials for such courses which we hope will solve this problem.

I am not sure it is appropriate to make the kind of generalization contained in conclusion number six. I think instructors' credentials have to be evaluated individually to determine whether they are appropriate instructors for courses in science, mathematics, and technology for future technicians. I do agree that some mathematics instructors will fail to understand the technicians. This is also true for many physics instructors. I believe the conclusion should simply state that one must examine each instructor's credentials to be certain that he has had appropriate experiences which would enable him to understand the needs of technology students. I certainly agree

with conclusion number seven. I would regard industrial experience as extremely desirable for teachers of technology curricula, but to make it an absolute requirement may eliminate some individuals whose credentials are otherwise very strong. I do agree with conclusion number nine.

I hope these comments are helpful.

Sincerely yours,

A A Strassenburg

AAS/kv

A. A. Strassenburg

mathematics only are apt to be too theoretical in their approach to make the best instructors for technology courses."

It is felt that all of these suggestions help to clarify the intent and conclusions of the original study.

Dr. Strassenburg also suggests that the wording in conclusion 6 should be less general, so as to distinguish between those who are too theoretical in their approach and those who are not. He further suggests that the basic mathematical skills may be taught in the regular mathematics courses if the specialized techniques required by technician students are carefully provided in their science and technology courses. He feels that in some circumstances industrial experience might be waived for individuals who present other very strong qualifications, although he feels such experience is extremely desirable if at all possible. And he comments on the difficulty of obtaining physics texts and materials which are not too theoretical for technical physics courses, and indicates that he is now involved in developing such materials.

CHAPTER III

AN ANALYSIS OF THE RESPONSES TO THE QUESTIONNAIRES

All of the junior colleges contacted have returned the questionnaires with the exception of Lake Land College. This set of questionnaires was expected to be returned by mid-January, but has not yet been received. Questionnaires have been returned from the occupational department only of Belleville, and the mathematics and science department only of Triton. These remaining questionnaires are still expected to be returned, but it was not possible to include them in this report. In addition, the questionnaires from the Vocational Technical Institute of Southern Illinois University were all from occupational students and faculty, since this institution does not offer programs designed for transfer.

The total number of respondents in the junior colleges was 45 faculty members from mathematics and science departments, 30 faculty from engineering related occupational departments, 79 transfer students and 92 occupational students from engineering related curricula. Responses were received from 93 technical institute faculty members. Copies of the questionnaires sent out can be found in Appendix B.

The total tabulated data for each type of respondent in all schools combined begin on the next page. Data for each type of respondent are given first as total tabulated raw data, followed in the next set of forms by the conversion of these data to percentages, as explained in Chapter I. A discussion of the answers to each question follows the presentation of the data, beginning on page 53.

Tabulation of Questionnaire for Community College Faculty Members

Total Tabulation, Raw Data

Transfer faculty, N = 45
Occupational faculty, N = 30

1. In my opinion, the most important function of the Community College is:

	RANK ASSIGNED				
	1	2	3	4	5
a) transfer program	T - 31 O - 5	T - 9 O - 6	T - 2 O - 9	T - 0 O - 8	T- 0 O- 0
b) occupational program	T - 12 O - 23	T - 21 O - 5	T - 5 O - 1	T - 2 O - 0	T- 0 O- 0
c) continuing education	T - 9 O - 3	T - 6 O - 11	T - 19 O - 10	T - 5 O - 3	T- 0 O- 0
d) community service programs	T - 6 O - 2	T - 3 O - 6	T - 6 O - 6	T - 23 O - 13	T - 1 O - 0
e) other					T - 1 O - 2

2. Occupational programs should:

T - 1
O - 0 a) parallel the first two years of baccalaureate programs in four-year institutions

T - 3
O - 1 b) prepare the student to enter a four-year institution at the junior level

T - 2
O - 4 c) offer the same subject matter as baccalaureate program, but at a lower level of difficulty

T - 33
O - 21 d) offer specialized training not available at four-year institutions

T - 0
O - 5 e) other _____

3. Transfer programs should:

T - 19
O - 12 a) parallel the first two years of baccalaureate programs in four-year institutions

T - 23
O - 15 b) prepare the student to enter a four-year institution at the junior level

T - 1
O - 1 c) offer the same subject matter as baccalaureate programs, but at a lower level of difficulty

T - 0
O - 1 d) offer specialized training not available at four-year institutions

T - 0
O - 1 e) other _____

. The most important criteria for the selection of those instructors who are to teach in transfer programs are:

	RANK ASSIGNED									
	1	2	3	4	5	6	7	8	9	10
a) baccalaureate degree in subject matter area	T - 7 O - 6	T - 4 O - 2	T - 2 O - 3	T - 4 O - 2	T - 1 O - 4	T - 2 O - 3	T - 0 O - 1	T - 1 O - 0	T - 1 O - 0	T- 0 O- 0
b) masters degree in subject matter area	T - 29 O - 11	T - 9 O - 4	T - 2 O - 2	T - 1 O - 3	T - 1 O - 1	T - 2 O - 1	T - 0 O - 1	T - 0 O - 0	T - 0 O - 0	0 0
c) doctorate degree in subject matter	T - 2 O - 0	T - 10 O - 3	T - 5 O - 1	T - 3 O - 4	T - 1 O - 1	T - 5 O - 1	T - 1 O - 1	T - 2 O - 0	T - 0 O - 5	0 O- 0
d) baccalaureate degree in education	T - 0 O - 1	T - 2 O - 1	T - 0 O - 0	T - 1 O - 1	T - 1 O - 3	T - 1 O - 0	T - 2 O - 2	T - 3 O - 11	T - 3 O - 1	T -10 O - 4
e) masters degree in education	T - 0 O - 1	T - 3 O - 3	T - 0 O - 2	T - 1 O - 2	T - 1 O - 0	T - 2 O - 5	T - 1 O - 0	T - 3 O - 0	T - 7 O - 4	T - 4 O - 1
f) doctorate in education	T - 0 O - 0	T - 2 O - 0	T - 0 O - 0	T - 2 O - 0	T - 0 O - 2	T - 2 O - 0	T - 2 O - 1	T - 2 O - 4	T - 4 O - 0	T - 5 O - [illegible]
g) industrial experience related to subject matter area	T - 0 O - 5	T - 4 O - 8	T - 6 O - 3	T - 3 O - 2	T - 9 O - 1	T - 2 O - 1	T - 3 O - 2	T - 2 O - 0	T - 1 T - 1	T - 1 O - 0
h) teaching experience	T - 7 O - 0	T - 14 O - 1	T - 11 O - 13	T - 8 O - 1	T - 1 O - 1	T - 0 O - 2	T - 1 O - 1	T - 0 O - 1	T - 1 O - 0	T- 0 O- 0
i) understanding of overall program of community college	T - 3 O - 3	T - 0 O - 5	T - 4 O - 1	T - 9 O - 2	T - 4 O - 2	T - 1 O - 1	T - 7 O - 0	O - 2 O - 4	T - 1 O - 1	T - 1 O - 1
j) understanding of transfer program of community college	T - 1 O - 2	T - 5 O - 2	T - 8 O - 0	T - 5 O - 3	T - 5 O - 2	T - 7 O - 1	T - 0 O - 5	T - 2 O - 1	T - 2 O - 1	T - 0 O - 1
k) other T - 4 O - 3										

: most important criteria for the selection of those teaching in engineering related occupational programs are:

	RANK ASSIGNED									
	1	2	3	4	5	6	7	8	9	10
a) baccalaureate degree in subject matter area	T -10 O - 2	T - 3 O - 9	T - 5 O - 3	T - 1 O - 3	T - 1 O - 3	T - 2 O - 1	T - 0 O - 2	T - 1 O - 1	T - 1 O - 0	T- 0 O- 0
b) masters degree in subject matter area	T -15 O - 3	T - 13 O - 5	T - 8 O - 5	T - 1 O - 4	T - 1 O - 1	T - 2 O - 4	T - 1 O - 2	T - 0 O - 0	T - 0 O - 0	T- 0 O- 0
c) doctorate in subject matter area	T - 3 O - 0	T - 6 O - 3	T - 2 O - 0	T - 2 O - 1	T - 2 O - 2	T - 5 O - 4	T - 2 O - 2	T - 3 O - 0	T - 0 O - 4	T - 0 O - 2
d) baccalaureate degree in education	T - 0 O - 0	T - 1 O - 2	T - 0 O - 2	T - 0 O - 1	T - 1 O - 3	T - 2 O - 0	T - 2 O - 4	T - 4 O - 3	T - 2 O - 2	T - 7 O - 2
e) masters degree in education	T - 0 O - 1	T - 1 O - 3	T - 0 O - 3	T - 0 O - 4	T - 1 O - 2	T - 2 O - 3	T - 2 O - 2	T - 3 O - 3	T - 8 O - 7	3 O - 1
f) doctorate in education	T - 0 O - 0	T - 1 O - 0	T - 1 O - 0	T - 0 O - 1	T - 1 O - 1	T - 2 O - 1	T - 1 O - 2	T - 5 O - 5	T - 2 O - 1	T - 4 O - 7
g) industrial experience related to subject matter area	T - 8 O -18	T - 10 O - 5	T - 10 O - 4	T - 6 O - 2	T - 3 O - 0	T - 2 O - 0	T - 0 O - 0	T - 0 O - 0	T - 0 O - 0	T- 0 O- 0
h) teaching experience	T - 6 O - 1	T - 8 O - 2	T - 8 O - 6	T - 10 O - 5	T - 5 O - 2	T - 0 O - 2	T - 0 O - 1	T - 0 O - 2	T - 0 O - 0	T - 1 O - 0
i) understanding of overall program of community college	T - 2 O - 3	T - 2 O - 4	T - 0 O - 2	T - 4 O - 2	T - 7 O - 3	T - 4 O - 2	T - 6 O - 0	T - 1 O - 1	T - 1 O - 1	T - 1 O - 0
j) understanding of occupational program of community college	T - 2 O - 2	T - 3 O - 2	T - 4 O - 3	T - 8 O - 2	T - 5 O - 3	T - 4 O - 2	T - 3 O - 0	T - 1 O - 0	T - 0 O - 2	T - 0 O - 1
k) other T - 6 O - 4										

6. Mathematics courses for transfer programs should be:

T-13, O- 6 a) taught as "pure" mathematics
T-12, O-10 b) taught with a strong emphasis on applications
T-20, O-14 c) taught with a strong emphasis on theory
T- 2, O- 0 d) other _____

7. Mathematics courses for engineering related occupational programs should be:

T- 2, O- 0 a) taught as "pure" mathematics
T-36, O-26 b) taught with a strong emphasis on applications
T- 3, O- 2 c) taught with a strong emphasis on theory
T- 2, O- 0 d) other _____

8. Physics courses for transfer programs should be:

T-13, O- 5 a) taught as "pure" science
T-10, O- 8 b) taught with a strong emphasis on applications
T-19, O-16 c) taught with a strong emphasis on theory
T- 3, O- 0 d) other _____

9. Physics courses for engineering related occupational programs should be:

T- 0, O- 0 a) taught as "pure" science
T-31, O-26 b) taught with a strong emphasis on applications
T- 9, O- 2 c) taught with a strong emphasis on theory
T- 3, O- 3 d) other _____

10. Mathematics courses for engineering related occupational programs should

T- 4, O- 1 a) be taught the same as for transfer programs
T- 1, O- 1 b) be taught with the same degree of theory, but in less detail than for transfer programs
T-25, O-15 c) be taught at the same level of difficulty but with more applications than for transfer programs
T- 2, O- 2 d) cover the same material as transfer courses but in less depth
T-10, O- 5 e) be more selective in subject matter than transfer courses but be taught at the same level of difficulty
T- 3, O- 4 f) other _____

11. Mathematics courses for transfer and engineering related occupational programs should:

T- 6, O- 3 a) be taught in the same manner
T- 3, O- 2 b) cover the same material, but differ in degree of difficulty
T- 4, O- 6 c) cover the same material but differ in level of theory
T-18, O- 7 d) cover the same material but differ in type of applications used
T-13, O- 6 e) cover different material in different way
T- 0, O- 3 f) other _____

The mathematics courses I would prefer to teach are:

	RANK ASSIGNED								
	1	2	3	4	5	6	7	8	9
a) remedial algebra	T - 1 O - 0	T - 1 O - 4	T - 2 O - 1	T - 2 O - 1	T - 1 O - 0	T - 2 O - 1	T - 7 O - 5	T - 3 O - 3	T - 1 O - 0
b) remedial geometry	T - 0 O - 3	T - 0 O - 0	T - 1 O - 1	T - 2 O - 0	T - 1 O - 0	T - 3 O - 0	T - 4 O - 5	T - 8 O - 5	T - 2 O - 0
c) intermediate algebra	T - 1 O - 0	T - 6 O - 6	T - 2 O - 4	T - 5 O - 4	T - 9 O - 2	T - 2 O - 1	T - 1 O - 0	T - 0 O - 0	T - 0 O - 0
d) college algebra	T - 14 O - 1	T - 6 O - 4	T - 6 O - 7	T - 4 O - 2	T - 0 O - 5	T - 0 O - 0	T - 0 O - 0	T - 0 O - 0	T - 0 O - 0
e) analytic geometry	T - 4 O - 0	T - 5 O - 1	T - 8 O - 4	T - 3 O - 7	T - 4 O - 1	T - 0 O - 1	T - 0 O - 0	T - 1 O - 2	T - 0 O - 0
f) calculus	T - 8 O - 0	T - 10 O - 4	T - 5 O - 1	T - 2 O - 1	T - 1 O - 7	T - 3 O - 1	T - 0 O - 1	T - 0 O - 2	T - 0 O - 0
g) differential equations	T - 1 O - 1	T - 2 O - 1	T - 3 O - 1	T - 4 O - 1	T - 2 O - 1	T - 5 O - 8	T - 4 O - 2	T - 0 O - 1	T - 0 O - 0
h) technical mathematics	T - 2 O - 19	T - 2 O - 0	T - 1 O - 0	T - 1 O - 1	T - 3 O - 0	T - 5 O - 2	T - 2 O - 0	T - 6 O - 1	T - 1 O - 0
i) other T - 4 O - 0									

T - 32, O - 24 Number expressing preference of math courses.

T - 19, O - 2 Number of those expressing preference of math courses who did not include technical math among their preferences.

13. Students in transfer programs in community colleges should:

T-15, O- 7 a) be selected on the basis of satisfactory high school record and ACT scores
T- 9, O-12 b) be admitted as space is available on a first-come, first-served basis
T- 5, O- 6 c) be selected from the top applicants available
T-12, O- 2 d) meet the same requirements as in four-year institutions
T- 5, O- 3 e) other _____

14. Students in occupational programs should:

T- 7, O- 7 a) be selected on the basis of satisfactory high school record and ACT scores
T-19, O-13 b) be admitted as space is available on a first-come, first-served basis
T- 5, O- 6 c) be selected from the top applicants available
T- 2, O- 0 d) meet the same requirements as in four-year institutions
T- 5, O- 4 e) other _____

15. In my opinion, applicants for transfer programs in community colleges are generally:

T- 2, O- 2 a) in the top quartile of their high school graduating class
T-24, O-14 b) in the second quartile of their high school graduating class
T-13, O- 6 c) in the third quartile of their high school gradating class
T- 0, O- 3 d) in the fourth quartile of their high school graduating class

16. In my opinion, applicants for transfer programs in community colleges:

T- 2, O- 4 a) are generally equal in ability to applicants for four-year institutions
T- 8, O- 7 b) are generally of lower ability than applicants for four-year institutions
T- 0, O- 1 c) are generally superior in ability to applicants for four-year institutions
T-31, O-15 d) vary more in ability than applicants for four-year institutions

17. In my opinion, applicants for engineering related occupational programs in community colleges are generally

T- 0, O- 1 a) in the top quartile of their high school graduating class
T-13, O- 9 b) in the second quartile of their high school graduating class
T-26, O-12 c) in the third quartile of their high school graduating class
T- 3, O- 5 d) in the fourth quartile of their high school graduating class

18. In my opinion, applicants for engineering related occupational programs in community colleges

T- 2, O- 2 a) are generally equal in ability to applicants for four-year institutions
T-17, O-14 b) are generally of lower ability than applicants for four-year institutions
T- 0, O- 0 c) are generally superior in ability to applicants for four-year institutions
T-20, O-10 d) vary more in ability than applicants for four-year institutions

19. Students in transfer and engineering related occupational programs in community colleges (Mark one or more)

T- 8, O- 5 a) are alike in most respects
T-22, O-12 b) differ in ability
T-16, O-11 c) differ in degree of motivation
T- 9, O- 8 d) differ in socioeconomic background
T-32, O-17 e) differ in goals
T- 1, O- 1 f) other _____

20. Please indicate whether in your opinion, students with:

_____ a) greater ability choose — transfer curricula T-40, O-24; occupational curricula T- 0, O- 3

_____ b) greater motivation choose — transfer curricula T-30, O-17; occupational curricula T- 4, O- 7

_____ c) higher socioeconomic background choose — transfer curricula T-38, O-24; occupational curricula T- 1, O- 0

_____ d) higher aspirations choose — transfer curricula T-38, O-25; occupational curricula T- 0, O- 1

21. Students in engineering related occupational programs who consistently make good grades should:

T- 9, O- 2 a) be encouraged to change to transfer curricula
T- 4, O-14 b) continue on to the Associate degree
T- 6, O- 2 c) be helped to find employment after graduation
T-24, O-11 d) be encouraged to go on to four-year technology programs granting the baccalaureate degree
T- 5, O- 3 e) other _____

22. I am teaching:

T-44, O-29 a) full-time
T- 1, O- 1 b) part-time

23. My rank is

T-21, O-15 a) instructor
T-12, O- 9 b) assistant professor
T- 4, O- 4 c) associate professor
T- 0, O- 0 d) professor
T- 6, O- 0 e) none
T- 1, O- 2 f) other _____

24. My highest earned degree is

T- 0, O- 1 a) certificate
_____ b) associate degree
T- 1, O-13 c) baccalaureate degree
T-37, O-13 d) masters degree
T- 1, O- 1 e) specialist degree
T- 5, O- 1 f) doctorate
1 O- 1 g) other _____

25. The department in which I am teaching is

T-12, O- 0	a) Mathematics
T-10, O- 0	b) Science
T-23, O- 0	c) Mathematics and Science combined
T- 0, O-30	d) Occupational (Engineering related)
_____	e) other _____

26. Teaching experience

Averages

T- 11.0 yr.

O- 8.3 yr.

Occupational faculty			Transfer faculty			
(1) 1	(11) 1	(21) 1.5	(1) 6	(11) 2	(21) 8	(31) 10
(2) 14	(12) 19	(22) 0	(2) 21	(12) 14	(22) 5	(32) 2
(3) 4	(13) 5	(23) 1	(3) 37	(13) 7	(23) 12	(33) 9
(4) 21	(14) 13	(24) 10.2	(4) 13	(14) 9.5	(24) 14	(34) 3
(5) 11	(15) 0		(5) 20	(15) 7	(25) 10	(35) 15
(6) 2	(16) 13		(6) 25	(16) 7	(26) 10	(36) 16
(7) 10	(17) 15		(7) 42	(17) 2.5	(27) 1	(37) 6
(8) 12	(18) 2		(8) 12	(18) 13	(28) 5	(38) 4
(9) 26	(19) 2		(9) 4.5	(19) 12	(29) 10	(39) 2
(10) 18	(20) 7		(10) 12	(20) 13	(30) 6	(40) 11
					(43) 7	(41) 10
					(44) 18	(42) 10

27. Industrial experience

Averages

T- 2.6 yr.

O-13.4 yr.

Occupational faculty			Transfer faculty			
(1) 20	(11) 25	(21) 5				
(2) 15	(12) 0.3	(22) 10	(1) 10	(10) 1	(19) 0	(28) 9
(3) 27	(13) 5	(23) 29	(2) 0	(11) 0	(20) 3	(29) 0
(4) 23	(14) 13	(24) 1	(3) 1	(12) 0	(21) 0	(30) 0
(5) 2	(15) 3	(25) 4	(4) 0	(13) 4	(22) 0	(31) 0
(6) 5	(16) 10		(5) 4	(14) 0	(23) 1.8	(32) 0
(7) 34	(17) 19		(6) 0	(15) 0	(24) 15	
(8) 22	(18) 6		(7) 5	(16) 0	(25) 0	
(9) 16	(19) 30		(8) 1	(17) 3	(26) 25	
(10) 6	(20) 5		(9) 5	(18) 0	(27) 0.5	

Tabulation of Questionnaire for Community College Faculty Members

Total Tabulation, Percentages

Transfer faculty, N = 45
Occupational faculty N = 30

1. In my opinion, the most important function of the Community College is:

	RANK ASSIGNED				
	1	2	3	4	5
a) transfer program	T - 68.9 O - 16.7	T - 20.1 O - 20.0	T - 4.4 O - 30.0	T - 0 O - 26.6	T - 0 O - 0
b) occupational program	T - 26.6 O - 76.6	T - 46.7 O - 16.7	T - 11.1 O - 3.3	T - 4.4 O - 0	T - 0 O - 0
c) continuing education	T - 20.1 O - 10.0	T - 13.3 O - 36.6	T - 42.2 O - 33.3	T - 11.1 O - 10.0	T - 0 O - 0
d) community service programs	T - 13.3 O - 6.7	T - 6.7 O - 20.0	T - 13.3 O - 20.0	T - 51.2 O - 43.3	T - 2.2 O - 0
e) other	T - [illegible] O - [illegible]				T - 2.2 O - 6.7

2. Occupational programs should:

T - 2.2
O - 0 a) parallel the first two years of baccalaureate programs in four-year institutions

T - 6.7
O - 3.3 b) prepare the student to enter a four-year institution at the junior level

T - 4.5
O - 13.4 c) offer the same subject matter as baccalaureate program, but at a lower level of difficulty

T - 73.4
O - 70.0 d) offer specialized training not available at four-year institutions

T - 0
O - 16.7 e) other _____

3. Transfer programs should:

T - 42.2
O - 40.0 a) parallel the first two years of baccalaureate programs in four-year institutions

T - 51.2
O - 50.0 b) prepare the student to enter a four-year institution at the junior level

T - 2.2
O - 3.3 c) offer the same subject matter as baccalaureate programs, but at a lower level of difficulty

T - 0
O - 3.3 d) offer specialized training not available at four-year institutions

T - 0
O - 3.3 e) other _____

4. The most important criteria for the selection of those instructors who are to teach in transfer programs are:

	RANK ASSIGNED									
	1	2	3	4	5	6	7	8	9	10
a) baccalaureate degree in subject matter area	T-15.6 O-20.0	T- 8.9 O- 6.7	T- 4.4 O-10.0	T- 8.9 O- 6.7	T- 2.2 O-13.3	T- 4.4 O-10.0	T- 0 O- 3.3	T- 2.2 O- 0	T- 2.2 O- 0	T- 0 O- 0
b) masters degree in subject matter area	T-64.5 O- 36.6	T-20.1 O-13.3	T- 4.4 O- 6.7	T- 2.2 O-10.0	T- 2.2 O- 3.3	T- 4.4 O- 3.3	T- 0 O- 3.3	T- 2.2 O- 0	T- 2.2 O- 0	T- 0 O- 0
c) doctorate degree in subject matter	T- 4.4 O- 0	T-22.2 O-10.0	T-11.1 O- 3.3	T- 6.7 O-13.3	T- 2.2 O- 3.3	T-11.1 O- 3.3	T- 2.2 O- 0	T- 4.4 O- 0	T- 0 O- 0	T- 0 O- 0
d) baccalaureate degree in education	T- 0 O- 3.3	T- 4.4 O- 3.3	T- 0 O- 0	T- 2.2 O- 3.3	T- 2.2 O-10.0	T- 2.2 O- 0	T- 4.4 O- 6.7	T- 6.7 O-26.6	T-16.7 O- 3.3	T-22. O-13.
e) masters degree in education	T- 0 O- 3.3	T- 6.7 O-10.0	T- 0 O- 6.7	T- 2.2 O- 6.7	T- 2.2 O-10.7	T-14.4 O-16.7	T- 2.2 O- 0	T- 6.7 O- 0	T-15.6 O- 0	T- 8. O- 0
f) doctorate in education	T- 0 O- 0	T- 4.4 O- 0	T- 0 O- 0	T- 4.4 O- 0	T- 0 O- 6.7	T- 4.4 O- 0	T- 4.4 O- 3.3	T- 4.4 O-13.3	T- 8.9 O- 0	T-11. O-20.
g) industrial experience related to subject matter area	T- 0 O-16.7	T- 8.9 O-26.6	T-13.3 O-10.0	T- 6.7 O- 6.7	T-20.1 O- 3.3	T- 4.4 O- 3.3	T- 6.7 O- 6.7	T- 4.4 O- 0	T- 2.2 O- 3.3	T- 2. O- 0
h) teaching experience	T-15.6 O- 0	T-31.2 O- 3.3	T-24.4 O-43.3	T-17.8 O- 3.3	T- 2.2 O- 3.3	T- 0 O- 6.7	T- 2.2 O- 3.3	T- 0 O- 3.3	T- 2.2 O- 0	T- 0 O- 0
i) understanding of overall program of community college	T- 6.7 O-10.0	T- 0 O-16.7	T- 8.9 O- 3.3	T-20.1 O- 6.7	T- 8.9 O- 6.7	T- 2.2 O- 3.3	T-15.6 O- 0	T- 4.4 O-13.3	T- 2.2 O- 3.3	T- 2. O- 3.
j) understanding of transfer program of community college	T- 2.2 O- 6.7	T-11.1 O- 6.7	T-17.8 O- 0	T-11.1 O-10.0	T-11.1 O- 6.7	T-15.6 O-3.3	T- 0 O-16.7	T- 4.4 O- 3.3	T- 0 O- 3.3	T- 0 O- 3.
k) other T- 8.9 O-10.0										

5. most important criteria for the selection of those teaching in engineering related occupational programs are:

	RANK ASSIGNED									
	1	2	3	4	5	6	7	8	9	10
a) baccalaureate degree in subject matter area	T-22.2 O- 6.7	T- 6.7 O-30.0	T-11.1 O-10.0	T- 2.2 O-10.0	T- 2.2 O-10.0	T- 4.4 O- 3.3	T- 0 O- 6.7	T- 2.2 O- 3.3	T- 2.2 O- 0	T- 0 O- 0
b) masters degree in subject matter area	T-33.4 O-10.0	T-28.9 O-16.7	T-17.8 O-16.7	T- 2.2 O-13.3	T- 2.2 O- 3.3	T- 2.2 O-13.3	T- 2.2 O- 6.7	T- 0 O- 0	T- 0 O- 0	T- 0 O- 0
c) doctorate in subject matter area	T- 6.7 O- 0	T-13.3 O-10.0	T- 4.4 O- 0	T- 4.4 O- 3.3	T- 4.4 O- 6.7	T-11.1 O-13.3	T- 4.4 O- 6.7	T- 6.7 O- 0	T- 0 O-13.3	T- 0 O- 0
d) baccalaureate degree in education	T- 0 O- 0	T- 2.2 O- 6.7	T- 0 O- 6.7	T- 0 O- 3.3	T- 2.2 O-10.0	T- 4.4 O- 0	T- 4.4 O-13.3	T- 8.9 O-10.0	T- 4.4 O- 6.7	T-15.6 O- 6.7
e) masters degree in education	T- 0 O- 3.3	T- 2.2 O-10.0	T- 0 O-10.0	T- 0 O-13.3	T- 2.2 O- 6.7	T- 4.4 O-10.0	T- 4.4 O- 6.7	T- 6.7 O-10.0	T-17.8 O-13.3	T- 6.7 O- 3.3
f) doctorate in education	T- 0. O- 0	T- 2.2 O- 0	T- 2.2 O- 0	T- 0 O- 3.3	T- 2.2 O- 3.3	T- 4.4 O- 3.3	T- 2.2 O- 6.7	T-11.1 O-16.7	T-11.1 O- 3.3	T- 8.9 O-23.3
g) industrial experience related to subject matter area	T-17.8 O-60.0	T-22.2 O-16.7	T-22.2 O-13.3	T-13.3 O- 6.7	T- 6.7 O- 0	T- 4.4 O- 0	T- 0 O- 0	T- 0 O- 0	T- 0 O- 0	T- 0 O- 0
h) teaching experience	T-13.3 O- 3.3	T-17.8 O- 6.7	T-17.8 O-20.0	T-22.2 O-16.7	T-11.1 O- 6.7	T- 0 O- 6.7	T- 0 O- 3.3	T- 0 O- 6.7	T- 0 O- 0	T- 2.2 O- 0
i) understanding of overall program of community college	T- 4.4 O-10.0	T- 4.4 O-13.3	T- 0 O- 6.7	T- 8.9 O- 6.7	T-15.6 O-10.0	T- 8.9 O- 6.7	T-13.3 O- 0	T- 2.2 O- 3.3	T- 2.2 O- 3.3	T- 2.2 O- 0
j) understanding of occupational program of community college	T- 4.4 O- 6.7	T- 6.7 O- 6.7	T- 8.9 O-10.0	T-17.8 O- 6.7	T-11.1 O-10.0	T- 8.9 O- 6.7	T- 6.7 O- 0	T- 2.2 O- 0	T- 0 O- 6.7	T- 0 O- 3.3
k) other T-13.3 O-13.3										

6. Mathematics courses for transfer programs should be:

T-28.9, O-43.3 a) taught as "pure" mathematics
T-26.6, O-40.0 b) taught with a strong emphasis on applications
T-44.4, O-46.7 c) taught with a strong emphasis on theory
T- 4.4, O- 0 d) other _____

7. Mathematics courses for engineering related occupational programs should be:

T- 4.4, O- 0 a) taught as "pure" mathematics
T-80.1, O-86.6 b) taught with a strong emphasis on applications
T- 6.7, O- 6.7 c) taught with a strong emphasis on theory
T- 4.4, O- 0 d) other _____

8. Physics courses for transfer programs should be:

T-28.9, O-16.7 a) taught as "pure" science
T-22.2, O-26.6 b) taught with a strong emphasis on applications
T-42.2, O-53.3 c) taught with a strong emphasis on theory
T- 6.7, O- 0 d) other _____

9. Physics courses for engineering related occupational programs should be:

T- 0, O- 0 a) taught as "pure" science
T-68.9, O-86.6 b) taught with a strong emphasis on applications
T-20.1, O- 6.7 c) taught with a strong emphasis on theory
T- 6.7, O-10.0 d) other _____

10. Mathematics courses for engineering related occupational programs should

T- 8.9, O- 3.3 a) be taught the same as for transfer programs
T- 2.2, O- 3.3 b) be taught with the same degree of theory, but in less detail than for transfer programs
T-55.6, O-50.0 c) be taught at the same level of difficulty but with more applications than for transfer programs
T- 4.4, O- 6.7 d) cover the same material as transfer courses but in less depth
T-22.2, O-16.7 e) be more selective in subject matter than transfer courses but be taught at the same level of difficulty
T- 6.7, O-13.3 f) other _____

11. Mathematics courses for transfer and engineering related occupational programs should:

T-13.3, O-10.0 a) be taught in the same manner
T- 6.7, O- 6.7 b) cover the same material, but differ in degree of difficulty
T- 8.9, O-20.0 c) cover the same material but differ in level of theory
T-40.1, O-23.3 d) cover the same material but differ in type of applications used
T-28.9, O-20.0 e) cover different material in different way
T- 0, O-10.0 f) other _____

The mathematics courses I would prefer to teach are:

	RANK ASSIGNED								
	1	2	3	4	5	6	7	8	9
a) remedial algebra	T- 3.1 O- 0	T- 3.1 O-16.7	T- 6.3 O- 4.2	T- 6.3 O- 4.2	T- 3.1 O- 0	T- 6.3 O- 4.2	T-[illegible].8 O-[illegible].8	T- 9.4 O-12.5	T- [illegible].1 O- [illegible]
b) remedial geometry	T- 0 O-12.5	T- 0 O- 0	T- 3.1 O- 4.2	T- 6.3 O- 0	T -3.1 O- 0	T- 9.4 O- 0	T-12.5 O-[illegible]	T-25.0 O-20.8	T- 6.3 O- 0
c) intermediate algebra	T- 3.1 O- 0	T-18.7 O-25.0	T- 6.3 O-16.7	T-15.6 O-16.7	T-28.1 O- 8.3	T- 6.3 O- 4.2	T- 3.1 O- 0	T- 0 O- 0	T- 0 O- 0
d) college algebra	T-43.8 O-42.2	T-18.7 O-16.7	T-18.7 O-29.2	T-12.5 O- 8.3	T- 0 O-20.8	T- 0 O- 0	T- 0 O- 0	T- 0 O- 0	T- 0 O- 0
e) analytic geometry	T-12.5 O- 0	T-15.6 O- 4.2	T-25.0 O-16.7	T- 9.4 O-29.2	T-12.5 O- 4.2	T- 0 O- 4.2	T- 0 O- 0	T- 3.1 O- 8.3	T- 0 O- 0
f) calculus	T-25.0 O- 0	T-31.2 O-16.7	T-15.6 O- 4.2	T- 6.3 O- 4.2	T- 3.1 O-29.2	T- 9.4 O- 4.2	T- 0 O- 4.2	T- 0 O- 8.3	T- 0 O- 0
g) differential equations	T- 3.1 O- 4.2	T- 6.3 O- 4.2	T- 9.4 O- 4.2	T-12.5 O- 4.2	T- 6.3 O- 4.2	T-15.6 O-33.3	T-12.5 O- 8.3	T- 0 O- 4.2	T- 0 O- 0
h) technical mathematics	T- 6.3 O-79.2	T- 6.3 O- 0	T- 3.1 O- 0	T- 3.1 O- 4.2	T- 9.4 O- 0	T-15.6 O- 8.3	T- 6.3 O- 0	T-18.7 O- 4.2	T- 3.1 O- 0
i) other T- 8.9 O-10.0									

T-32.1 O-24 Number expressing preference of math courses.

T-59.4%
O- 8.3% Number of those expressing preference of math courses who did not include technical math among their preferences.

13. Students in transfer programs in community colleges should:

T-33.4, 0-23.3 a) be selected on the basis of satisfactory high school record and ACT scores
T-20.1, 0-40.0 b) be admitted as space is available on a first-come, first-served basis
T-11.1, 0-20.0 c) be selected from the top applicants available
T-26.7, 0- 6.7 d) meet the same requirements as in four-year institutions
T-11.1, 0-10.0 e) other _____

14. Students in occupational programs should:

T-15.6, 0-23.3 a) be selected on the basis of satisfactory high school record and ACT scores
T-42.2, 0-43.3 b) be admitted as space is available on a first-come, first-served basis
T-11.1, 0-20.0 c) be selected from the top applicants available
T- 4.4, 0- 0 d) meet the same requirements as in four-year institutions
T-11.1, 0-13.3 e) other _____

15. In my opinion, applicants for transfer programs in community colleges are generally:

T- 4.4, 0- 6.7 a) in the top quartile of their high school graduating class
T-53.3, 0-46.6 b) in the second quartile of their high school graduating class
T-28.9, 0-20.0 c) in the third quartile of their high school gradating class
T- 0, 0-10.0 d) in the fourth quartile of their high school graduating class

16. In my opinion, applicants for transfer programs in community colleges:

T- 4.4, 0-13.3 a) are generally equal in ability to applicants for four-year institutions
T-17.8, 0-23.3 b) are generally of lower ability than applicants for four-year institutions
T- 0, 0- 3.3 c) are generally superior in ability to applicants for four-year institutions
T-68.9, 0-50.0 d) vary more in ability than applicants for four-year institutions

17. In my opinion, applicants for engineering related occupational programs in community colleges are generally

T- 0 0- 3.3 a) in the top quartile of their high school graduating class
T-28.9, 0-30.0 b) in the second quartile of their high school graduating class
T-57.8, 0-40.0 c) in the third quartile of their high school graduating class
T- 6.7, 0-16.7 d) in the fourth quartile of their high school graduating class

18. In my opinion, applicants for engineering related occupational programs in community colleges

T- 4.4, 0- 3.3 a) are generally equal in ability to applicants for four-year institutions
T-37.8, 0-30.0 b) are generally of lower ability than applicants for four-year institutions
T- 0, 0-40.0 c) are generally superior in ability to applicants for four-year institutions
T-44.4, 0-16.7 d) vary more in ability than applicants for four-year institutions

19. Students in transfer and engineering related occupational programs in community colleges (Mark one or more)

T-17.8, O- 6.7 a) are alike in most respects
T-48.9, O-46.6 b) differ in ability
T-35.6, O-43.3 c) differ in degree of motivation
T-20.1, O-26.6 d) differ in socioeconomic background
T-71.2, O-56.6 e) differ in goals
T- 2.2, O- 3.3 f) other _____

20. Please indicate whether in your opinion, students with:

_____ a) greater ability choose
transfer curricula T-89.0, O-
occupational curricula T- 0, O-

_____ b) greater motivation choose
transfer curricula T-67.7, O-
occupational curricula T- 8.9, O-

_____ c) higher socioeconomic background choose
transfer curricula T-84.5, O-8
occupational curricula T- 2.2, O-

_____ d) higher aspirations choose
transfer curricula T-84.5, O-8
occupational curricula T- 0, O-

21. Students in engineering related occupational programs who consistently make good grades should:

T-20.1, O- 6.7 a) be encouraged to change to transfer curricula
T- 8.9, O-46.6 b) continue on to the Associate degree
T-13.3, O- 6.7 c) be helped to find employment after graduation
T-53.3, O-33.3 d) be encouraged to go on to four-year technology programs granting the baccalaureate degree
T-11.1, O- 6.7 e) other _____

22. I am teaching:

T-97.8, O-96.6 a) full-time
T- 2.2, O- 3.3 b) part-time

23. My rank is

T-46.7, O-50.0 a) instructor
T-26.7, O-30.0 b) assistant professor
T- 8.9, O-13.3 c) associate professor
T- 0, O- 0 d) professor
T-17.3, O- 0 e) none
T- 2.2, O- 6.7 f) other _____

24. My highest earned degree is

T- 0, O- 3.3 a) certificate
T- 0 O- 0 b) associate degree
T- 2.2, O-43.3 c) baccalaureate degree
T-82.[illegible], O-43.3 d) masters degree
T- 2.2, O- 3.3 e) specialist degree
T-11.1, O- 3.3 f) doctorate
O- 6.7 g) other _____

25. The department in which I am teaching is

T-26.7, O- 0	a) Mathematics
T-22.2, O- 0	b) Science
T-51.0, O- 0	c) Mathematics and Science combined
T- 0, O-100	d) Occupational (Engineering related)
	e) other

26. Teaching experience

Averages: Transfer faculty - 11.0 years

Occupational faculty- 8.3 years

27. Industrial experience

Averages: Transfer faculty - 2.6 years

Occupational faculty - 13.4 years

Tabulation of questionnaire for Technical Institute Faculty Members

Total Tabulation, Raw Data N = 93

1. In my opinion, the programs of the Technical Institute should

5 a) parallel the first two years of baccalaureate programs in four-year institutions
9 b) prepare the student to enter a four-year institution at the junior level
12 c) offer the same subject matter as baccalaureate programs, but at a lower level of difficulty
65 d) offer specialized training not available at four-year institutions
17 e) other

2. next page

3. next page

4. Mathematics courses for technical institute programs should be

4 a) taught as "pure" mathematics
81 b) taught with a strong emphasis on applications
4 c) taught with a strong emphasis on theory
7 d) other

5. Mathematics courses for baccalaureate degree programs should be

12 a) taught as "pure" mathematics
38 b) taught with a strong emphasis on applications
44 c) taught with a strong emphasis on theory
12 d) other

6. Physics courses for technical institute programs should be

9 a) taught as "pure" science
71 b) taught with a strong emphasis on applications
8 c) taught with a strong emphasis on theory
8 d) other

7. Physics courses for baccalaureate degree programs should be

11 a) taught as "pure" science
38 b) taught with a strong emphasis on application
42 c) taught with a strong emphasis on theory
12 d) other

2 ie most important criteria for the selection of instructors to teach in technical institutes are:

	RANK ASSIGNED										
	1	2	3	4	5	6	7	8	9	10	11
a) baccalaureate degree in subject matter area	37	14	12	5	9	1	0	1	1	0	0
b) master's degree in subject matter area	14	12	10	10	6	14	3	1	0	0	3
c) doctorate in subject matter area	2	1	2	4	2	5	13	8	7	8	1
d) baccalaureate degree in education	0	0	0	3	4	3	9	8	18	2	3
e) master's degree in education	1	0	2	2	1	3	3	8	[illegible]	19	2
f) doctorate in education	0	2	[illegible]	0	1	2	2	2	3	11	27
g) industrial experience related to subject matter area	20	27	16	10	6	6	0	2	1	0	0
h) teaching experience	7	18	31	10	9	2	5	3	1	2	0
i) understanding of philosophy of higher education	1	2	2	0	5	6	7	11	2	3	8

(continued next page)

. Continued)

(Continued)	RANK ASSIGNED										
	1	2	3	4	5	6	7	8	9	10	11
i) understanding of philosophy of technical education	6	11	12	16	11	13	4	1	2	1	0
j) understanding of the programs of own institution	5	5	12	17	16	8	3	1	2	0	0
k) other 5											

e most important criteria for the selection of instructors to teach in four-year baccalaureate degree ograms are:

	RANK ASSIGNED										
	1	2	3	4	5	6	7	8	9	10	11
a) baccalaureate egree in subject atter	26	6	12	6	3	3	2	2	0	2	0
b) master's degree m subject matter area	26	36	7	2	5	3	2	0	0	0	0
c) doctorate in subject matter area	21	6	7	6	5	12	7	3	1	0	0
d) baccalaureate degree in education	0	0	1	0	3	5	8	18	8	5	0
e) master's degree in education	2	2	0	5	2	3	4	10	19	5	0
f) doctorate in education	1	1	1	2	1	2	3	3	9	14	3
g) industrial experience related to subject matter area	10	12	16	14	1	5	6	3	0	4	1
h) teaching experience	5	16	25	11	10	4	4	1	1	1	0
i) understanding of philosophy of higher education	4	4	11	8	11	9	7	3	3	3	1
j) understanding of the programs of own institution	2	7	8	13	16	9	3	0	2	3	0
k) other											

6

8. Mathematics courses for engineering-related technical education programs should

5 a) be taught the same as for baccalaureate degree programs
5 b) be taught with the same degree of theory, but in less detail than for baccalaureate degree programs
38 c) be taught at the same level of difficulty, but with more applications than for baccalaureate degree programs
7 d) cover the same material as baccalaureate degree courses, but in less depth
27 e) be more selective in subject matter than baccalaureate degree courses, but be taught at the same level of difficulty.
9 f) other _____

9. Mathematics courses for baccalaureate degree and engineering-related technical education programs should

12 a) be taught in the same manner
9 b) cover the same material, but differ in degree of difficulty
17 c) cover the same material, but differ in level of theory
31 d) cover the same material, but differ in type of applications used
9 e) cover different material in a different way
10 f) other _____

10. next page

11. Students in engineering-related programs in technical institutes should

39 a) be selected on the basis of satisfactory high school record and ACT scores
14 b) be admitted as space is available on a first-come, first-served basis
20 c) be selected from the top applicants available
6 d) meet the same requirements as in four-year institutions
9 e) other _____

12. Students in baccalaureate degree programs should

46 a) be selected on the basis of satisfactory high school record and ACT scores
8 b) be admitted as space is available on a first-come, first-served basis
32 c) be selected from the top applicants available
7 d) other _____

13. In my opinion, applicants for engineering-related programs in technical institutes are generally

4 a) in the top quartile of their high school graduating class
39 b) in the second quartile of their high school graduating class
48 c) in the third quartile of their high school graduating class
4 d) in the fourth quartile of their high school graduating class

1. The mathematics course I would prefer to teach are:

	RANK ASSIGNED								
	1	2	3	4	5	6	7	8	9
a) Remedial algebra	6	3	3	6	3	10	17	13	1
b) Remedial geometry	0	2	1	1	8	3	20	19	3
c) Intermediate algebra	4	4	12	5	19	13	2	7	0
d) College algebra	17	16	12	22	8	5	0	0	0
e) Analytic geometry	6	12	25	11	8	7	2	0	0
f) Calculus	28	18	13	9	2	3	6	0	0
g) Differential equations	13	16	7	7	5	3	3	10	0
h) Technical mathematics	17	10	5	10	11	12	2	1	0
i) other 9									

86 Number expressing preference of math courses.

23 Number of those expressing preference of math courses who did not include technical math among their preferences.

14. In my opinion, applicants for engineering-related programs in technical institutes

11 a) are generally equal in ability to applicants for four-year institutions
45 b) are generally of lower ability than applicants for four year institutions
1 c) are generally superior in ability to applicants for four-year institutions
31 d) vary more in ability than applicants for four-year institutions

15. In my opinion, applicants for baccalaureate degree programs are generally

53 a) in the top quartile of their high school graduating class
44 b) in the second quartile of their high school graduating class
11 c) in the third quartile of their high school graduating class
1 d) in the fourth quartile of their high school graduating class

16. Students in baccalaureate dgree programs and those in engineering-related technical institute programs

18 a) are alike in most respects
41 b) differ in ability
43 c) differ in degree of motivation
36 d) differ in socioeconomic background
46 e) differ in goals
2 f) other _____

17. Please indicate whether in your opinion, students with

a) greater ability choose — baccalaureate degree programs 82; technical institute programs 6

b) greater motivation choose — baccalaureate degree programs 63; technical institute programs 18

c) higher socioeconomic background choose — baccalaureate degree programs 83; technical institute programs 1

d) higher aspirations choose — baccalaureate degree programs 78; technical institute programs 3

18. Students in engineering-related technical institute programs who consistently make good grades should

7 a) be encouraged to change to transfer curricula
29 b) continue on to the Associate degree
17 c) be helped to find employment after graduation
60 d) be encouraged to go on to four-year technology programs granting the baccalaureate degree
7 e) other _____

19. I am teaching

89	a) full-time
3	b) part-time

20. My rank is

51	a) instructor
20	b) assistant professor
14	c) associate professor
1	d) professor
2	e) none
4	f) other _____

21. My highest earned degree is

1	a) certificate
5	b) associate degree
28	c) baccalaureate degree
57	d) master's degree
	e) specialist degree
1	f) doctorate
11	g) other _____

22. Teaching experience

Average 8.1 years

(1)	13	(13)	4	(25)	3	(37)	27	(49)	10	(61)	6	(73)	23	(85)	4
(2)	3	(14)	1.2	(26)	7	(38)	15	(50)	10	(62)	8	(74)	10	(86)	4
(3)	5	(15)	2	(27)	9	(39)	40	(51)	20	(63)	7	(75)	13	(87)	2
(4)	8	(16)	1	(28)	7	(40)	19	(52)	2	(64)	7	(76)	2	(88)	4
(5)	13	(17)	1	(29)	3	(41)	10	(53)	6	(65)	11	(77)	15	(89)	3
(6)	11	(18)	0.5	(30)	4	(42)	17	(54)	5	(66)	23	(78)	5	(90)	20
(7)	15	(19)	6	(31)	6	(43)	15	(55)	4	(67)	21	(79)	10		
(8)	8	(20)	3	(32)	8	(44)	20	(56)	0.3	(68)	11	(80)	2.5		
(9)	24	(21)	0.5	(33)	5	(45)	24	(57)	6	(69)	8	(81)	0.5		
(10)	4	(22)	0.8	(34)	3	(46)	7	(58)	4	(70)	5	(82)	5.5		
(11)	2	(23)	1	(35)	3.5	(47)	3	(59)	12	(71)	7	(83)	1.5		
(12)	0.3	(24)	2	(36)	1	(48)	11	(60)	4	(72)	7	(84)	1		

23. Industrial experience

Average 5.9 years

(1)	19	(13)	6.5	(25)	9.2	(37)	7	(49)	0	(61)	0	(73)	6
(2)	2	(14)	0	(26)	35.3	(38)	2	(50)	0	(62)	0	(74)	7
(3)	3	(15)	1.5	(27)	6	(39)	4	(51)	0	(63)	5	(75)	3
(4)	0	(16)	0	(28)	5	(40)	26	(52)	0	(64)	10		
(5)	0	(17)	0	(29)	0	(41)	5	(53)	8	(65)	0		
(6)	35	(18)	27	(30)	11	(42)	5	(54)	0	(66)	0		
(7)	6	(19)	35.2	(31)	3	(43)	6	(55)	0	(67)	0		
(8)	4	(20)	1.3	(32)	23	(44)	5	(56)	0	(68)	0		
(9)	8	(21)	3	(33)	0	(45)	1	(57)	17	(69)	16		
(10)	3	(22)	3	(34)	20	(46)	2	(58)	2	(70)	0		
(11)	3	(23)	2	(35)	28	(47)	0	(59)	0	(71)	0		
(12)	0.3	(24)	0	(36)	0	(48)	0	(60)	0	(72)	5		

Tabulation of questionnaire for Technical Institute Faculty Members

Total Tabulation, Percentages N=93

1. In my opinion, the programs of the Technical Institute should

5.4 a) parallel the first two years of baccalaureate programs in four-year institutions
9.7 b) prepare the student to enter a four-year institution at the junior level
12.9 c) offer the same subject matter as baccalaureate programs, but at a lower level of difficulty
69.9 d) offer specialized training not available at four-year institutions
18.3 e) other _____

2. next page

3. next page

4. Mathematics courses for technical institute programs should be

4.3 a) taught as "pure" mathematics
87.1 b) taught with a strong emphasis on applications
4.3 c) taught with a strong emphasis on theory
7.5 d) other _____

5. Mathematics courses for baccalaureate degree programs should be

12.9 a) taught as "pure" mathematics
40.8 b) taught with a strong emphasis on applications
47.3 c) taught with a strong emphasis on theory
12.9 d) other _____

6. Physics courses for technical institute programs should be

9.7 a) taught as "pure" science
76.2 b) taught with a strong emphasis on applications
8.6 c) taught with a strong emphasis on theory
8.6 d) other _____

7. Physics courses for baccalaureate degree programs should be

11.8 a) taught as "pure" science
40.8 b) taught with a strong emphasis on application
45.2 c) taught with a strong emphasis on theory
12.9 d) other _____

2. The most important criteria for the selection of instructors to teach in technical institutes are:

	RANK ASSIGNED										
	1	2	3	4	5	6	7	8	9	10	11
a) baccalaureate degree in subject matter area	39.8	15.1	12.9	5.4	9.7	1.1	0	1.1	1.1	0	0
b) master's degree in subject matter area	15.1	12.9	10.8	10.8	6.5	15.1	3.2	1.1	0	0	3.2
c) doctorate in subject matter area	2.1	1.1	2.1	4.3	2.1	5.4	14.0	8.6	7.5	8.6	1.1
d) baccalaureate degree in education	0	0	0	3.2	4.3	3.2	9.7	8.[illegible]	19.4	2.[illegible]	3.2
e) master's degree in education	1.1	0	2.1	2.1	1.1	3.2	3.2	8.6	11.8	20.4	2.1
f) doctorate in education	0	2.1	0	0	1.1	2.1	2.1	2.1	3.2	11.8	29.0
g) industrial experience related to subject matter area	21.5	29.0	17.2	10.8	6.5	6.5	0	2.1	1.1	0	0
h) teaching experience	7.5	19.4	33.4	10.8	9.7	2.1	5.4	3.2	1.1	2.1	0
i) understanding of philosophy of higher education	1.1	2.1	2.1	0	5.4	6.5	7.5	11.8	2.1	3.2	8.6

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tinued)

	RANK ASSIGNED										
Continued)	1	2	3	4	5	6	7	8	9	10	11
j) understanding of the philosophy of technical education	6.5	11.8	12.9	17.2	11.8	14.0	4.3	1.1	2.1	1.1	0
k) understanding of the programs of own institution	5.4	5.4	12.9	18.3	17.2	8.6	3.2	1.1	2.1	0	0
l) other 5.4											

3 The most important criteria for the selection of instructors to teach in four-year baccalaureate degree programs are:

	RANK ASSIGNED										
	1	2	3	4	5	6	7	8	9	10	11
a) baccalaureate degree in subject matter	28.0	6.5	12.9	6.5	3.2	3.2	2.1	2.1	0	2.1	0
b) master's degree in subject matter area	28.0	38.7	7.5	2.1	5.4	3.2	2.1	0	0	0	0
c) doctorate in subject matter area	22.6	6.5	7.5	6.5	5.4	12.9	7.5	3.2	1.1	0	0
d) baccalaureate degree in education	0	0	1.1	0	3.2	5.4	8.6	19.4	8.6	5.4	0
e) master's degree in education	2.1	2.1	0	5.4	2.1	3.2	4.3	10.8	20.4	3.2	0
f) doctorate in education	1.1	1.1	1.1	2.1	1.1	2.1	3.2	3.2	9.7	15.1	3.2
g) industrial experience related to subject matter area	10.8	12.9	17.2	15.1	1.1	5.4	6.5	3.2	0	4.3	1.1
h) teaching experience	5.4	17.2	26.9	11.8	10.8	4.3	4.3	1.1	1.1	1.1	0
i) understanding of philosophy of higher education	4.3	4.3	11.8	8.6	11.8	9.7	7.5	3.2	3.2	3.2	1.1
j) understanding of the programs of own institution	2.1	7.5	8.6	14.0	17.2	9.7	3.2	0	2.1	3.2	0
k) other 6.5											

8. Mathematics courses for engineering-related technical education programs should

5.4 a) be taught the same as for baccalaureate degree programs
5.4 b) be taught with the same degree of theory, but in less detail than for baccalaureate degree programs
40.8 c) be taught at the same level of difficulty, but with more applications than for baccalaureate degree programs
7.5 d) cover the same material as baccalaureate degree courses, but in less depth
29.1 e) be more selective in subject matter than baccalaureate degree courses, but be taught at the same level of difficulty.
9.7 f) other _____

9. Mathematics courses for baccalaureate degree and engineering-related technical education programs should

12.9 a) be taught in the same manner
9.7 b) cover the same material, but differ in degree of difficulty
18.3 c) cover the same material, but differ in level of theory
33.3 d) cover the same material, but differ in type of applications used
9.7 e) cover different material in a different way
10.8 f) other _____

10. next page

11. Students in engineering-related programs in technical institutes should

41.9 a) be selected on the basis of satisfactory high school record and ACT scores
15.1 b) be admitted as space is available on a first-come, first-served basis
21.5 c) be selected from the top applicants available
6.5 d) meet the same requirements as in four-year institutions
9.7 e) other _____

12. Students in baccalaureate degree programs should

49.5 a) be selected on the basis of satisfactory high school record and ACT scores
8.6 b) be admitted as space is available on a first-come, first-served basis
34.4 c) be selected from the top applicants available
7.5 d) other _____

13. In my opinion, applicants for engineering-related programs in technical institutes are generally

4.3 a) in the top quartile of their high school graduating class
41.9 b) in the second quartile of their high school graduating class
51.6 c) in the third quartile of their high school graduating class
4.3 d) in the fourth quartile of their high school graduating class

10. The mathematics course I would prefer to teach are:

	RANK ASSIGNED								
	1	2	3	4	5	6	7	8	9
a) Remedial algebra	8.0	3.5	3.5	8.0	3.5	11.6	19.8	15.1	1.2
b) Remedial geometry	0	2.3	1.2	1.2	9.3	3.5	23.2	22.1	3.5
c) Intermediate algebra	4.7	4.7	13.9	5.8	22.1	15.1	2.3	8.1	0
d) College algebra	19.8	18.6	13.9	25.6	9.3	5.8	0	0	0
e) Analytic geometry	8.0	13.9	29.1	12.8	9.3	8.1	2.3	0	0
f) Calculus	32.6	20.9	15.1	10.4	2.3	3.5	8.0	0	0
g) Differential equations	15.1	18.6	8.1	8.1	5.8	3.5	3.5	11.6	0
h) Technical mathematics	19.8	11.6	5.8	11.6	12.8	13.9	2.3	1.2	0
i) other 10.4									

86 Number expressing preference of math courses.

26.7% Number of those expressing preference of math courses who did not include technical math among their preferences.

14. In my opinion, applicants for engineering-related programs in technical institutes

11.8 a) are generally equal in ability to applicants for four-year institutions
48.4 b) are generally of lower ability than applicants for four year institutions
1.1 c) are generally superior in ability to applicants for four-year institutions
33.3 d) vary more in ability than applicants for four-year institutions

15. In my opinion, applicants for baccalaureate degree programs are generally

57.0 a) in the top quartile of their high school graduating class
47.4 b) in the second quartile of their high school graduating class
11.8 c) in the third quartile of their high school graduating class
31.1 d) in the fourth quartile of their high school graduating class

16. Students in baccalaureate dgree programs and those in engineering-related technical institute programs

19.1 a) are alike in most respects
44.2 b) differ in ability
46.3 c) differ in degree of motivation
38.8 d) differ in socioeconomic background
49.5 e) differ in goals
2.2 f) other _____

17. Please indicate whether in your opinion, students with

a) greater ability choose	baccalaureate degree programs	88.2
	technical institute programs	6.5
b) greater motivation choose	baccalaureate degree programs	67.8
	technical institute programs	19.4
c) higher socioeconomic background choose	baccalaureate degree programs	89.3
	technical institute programs	1.1
d) higher aspirations choose	baccalaureate degree programs	83.9
	technical institute programs	3.2

18. Students in engineering-related technical institute programs who consistently make good grades should

7.5 a) be encouraged to change to transfer curricula
31.2 b) continue on to the Associate degree
18.3 c) be helped to find employment after graduation
64.5 d) be encouraged to go on to four-year technology programs granting the baccalaureate degree
7.5 e) other _____

19. I am teaching

95.7	a) full-time
5.2	b) part-time

20. My rank is

54.8	a) instructor
21.5	b) assistant professor
15.1	c) associate professor
1.1	d) professor
2.2	e) none
4.3	f) other _____

21. My highest earned degree is

1.1	a) certificate
5.4	b) associate degree
30.1	c) baccalaureate degree
61.3	d) master's degree
	e) specialist degree
1.1	f) doctorate
1.1	g) other _____

22. Teaching experience

Average: 8.1 years

23. Industrial experience

Average: 5.9 years

Tabulation of Student Questionnaires

Total Tabulation, Raw Data

Transfer stucents N= 79
Occupational students N= 92

1. After completion of my Associate degree, I would like if possible to

T-72, O-20	a) continue my college education
T- 0, O-21	b) find employment
T- 5, O-10	c) work for a while and return to school later
T- 4, O-22	d) work full-time and continue to school part-time
T- 0, O- 3	e) other _____

2. After completion of my college education, I hope to find employment as

T-13, O- 0	a) medical field	T- 0, O- 1	h) farming
T- 0, O- 3	b) para-medical field	T- 2, O- 0	i) law
T-22, O- 2	c) engineering	T- 9, O- 3	j) teaching
T- 0, O-45	d) technician	T- 7, O- 0	k) science
T- 2, O- 3	e) sales	T- 1, O- 0	l) management
T- 0, O- 5	f) service	T- 1, O- 7	m) undecided
T- 0, O- 3	g) draftsman	T- 6, O- 2	n) other

3. At the present time, the highest degree I hope to hold is

T- 1, O- 3	a) certificate
T- 0, O-48	b) associate degree
T-49, O-33	c) bachelor's degree
T-17, O- 3	d) master's degree
T-15, O- 0	e) doctorate
_____	f) other
T- 1, O- 1	g) undecided

4. Members of my immediate family who have attended or are attending college include

T-18, O-18	a) father
T-10, O-13	b) mother
T-14, O-34	c) sister (s)
T-30, O-35	d) brother (s)
T-57, O-26	e) neither parent attended college
T-16, O-19	f) one parent attended college
T- 6, O- 6	g) both parents attended college
T-31, O-27	h) none

5. The next page

6. The most important goal in my life at present is:

Education	T-61, O-53	Family	T- 2, O-11
Job	T-14, O-26	Avoid draft	T- 1, O- 4
Happiness	T- 4, O- 2	Security	T- 1, O- 6
Self-fulfillment	T- 4, O- 5	Undecided	T- 0, O- 1
Money	T- 2, O- 1	Other	T- 3, O- 6
Fame	T- 1, O- 0		
Finish military obligation	T- 0, O- 1		

5. The most important things to me in choosing a job would be:

	RANK ASSIGNED						
	1	2	3	4	5	6	7
a) money	T-15 O-18	T-30 O-24	T-14 O-21	T- 9 O-11	T- 2 O- 5	T- 2 O- 4	T- 1 O- 0
b) job security	T-16 O-14	T-13 O-22	T-13 O-19	T-10 O-10	T-13 O-12	T- 5 O- 6	T- 2 O- 1
c) working conditions	T- 9 O-10	T-21 O-10	T-16 O-20	T-13 O-24	T-10 O- 7	T- 8 O- 6	T- 2 O- 1
d) opportunity for advancement	T-14 O-27	T-13 O-14	T-11 O-17	T-11 O-17	T- 4 O-10	T- 7 O- 4	T- 7 O- 0
e) variety	T-11 O- 7	T- 5 O- 9	T- 5 O- 3	T-11 O- 9	T-22 O-25	T- 7 O-18	T- 6 O- 8
f) opportunity to serve humanity	T- 7 O- 4	T- 2 O- 1	T- 4 O- 1	T- 9 O- 3	T- 5 O- 8	T-10 O-16	T-27 O-41
g) opportunity to create new ideas	T-12 O- 8	T- 6 O- 6	T- 7 O- 4	T- 6 O- 8	T- 4 O-11	T-18 O-24	T- 9 O-12
h) other T- 3 O- 8							

7. The most important goal in my life ten years from now will probably be:

Job	T-31, O-21	Home	T- 3, O- 6
Education	T- 7, O- 7	Self-fulfillment	T- 7, O- 2
Family	T-15, O-24	Community responsibility	T- 3, O- 1
Security	T- 7, O-18	Advancement	T- 4, O- 6
Avoid draft	T- 1, O- 1	Success	T- 8, O- 0
Money	T- 6, O- 3	Other	T- 2, O- 1
Happiness	T- 3, O- 0	Undecided	T- 1, O- 9

8. The program I am enrolled is:

Math	T- 4, O- 0	Automotive Technology	T- 0, O-22
Pre-Engineering	T-36, O- 0	Architectural Drafting	T- 0, O- 2
Education	T- 3, O- 0	Medical (transfer)	T-11, O- 0
Electrical Technology	T- 0, O-20	Science (transfer)	T-12, O- 0
Mechanical Technology	T- 0, O-25	Other	T- 6, O- 0
Chemical Technology	T- 0, O- 1		

9. I selected this program because:

Like the field	T-44, O-66
Promising field	T- 5, O-10
Prior experience	T- 3, O- 8
Family pressure	T- 2, O- 0
Develops the mind	T- 1, O- 0
G.I. Bill money	T- 0, O- 0
Counselling	T- 1, O- 1
Don't know	T- 2, O- 0
Other	

10. Age: 17 T-2 O-0; 18 T- 3 O-18; 19 T-36 O-30; 20 T-11 O-13; 21 T- 5 O- 4; 22 T- 4 O- 5; 23 T- 3 O- 3; 24 T2, O-5; 25 O-5; 26 O-1; 27 T3, O-2; 28 O-2; 29 T-1; 30 O-1; 31 O-1; 32 O-1; 41 T-1; 42; 47 O-1

11. Marital status S T-66, O-74 M T-11, O-16

12. My education is being financed by

T-10, O-12	a) full-time employment
T-38, O-47	b) part-time employment
T- 6, O-15	c) G.I. Bill
T-24, O-32	d) parents
T- 2, O- 4	e) loan
T-11, O-15	f) scholarship
T- 5, O- 1	g) State grants
T- 1, O- 7	h) Summer employment
T- 1, O- 2	i) Social security
T- 1, O- 3	j) Savings
T- 2, O- 2	k) Working wife (or Husband)
T- 1, T- 1	l) other

Tabulation of Student Questionnaires

Total Tabulation, Raw Data

Transfer students N=79
Occupational students N=92

1. After completion of my Associate degree, I would like if possible to

T-91.0, O-31.5	a) continue my college education
T- 0, O-22.8	b) find employment
T- 6.3, O-10.9	c) work for a while and return to school later
T- 5.1, O-23.9	d) work full-time and continue to school part-time
T- 0, O- 3.3	e) other _____

2. After completion of my college education, I hope to find employment as

T-16.5, O- 0	a) medical field	T- 0, O- 1.1	h) farming
T- 0 O- 3.3	b) para-medical field	T- 2.5, O- 0	i) law
T-27.9, O- 2.2	c) engineering	T-11.4, O- 3.3	j) teaching
T- 0, O-48.9	d) technician	T- 8.9, O- 0	k) science
T- 2.5, O- 3.3	e) sales	T- 1.4, O- 0	l) management
T- 0, O- 5.4	f) service	T- 1.4, O- 7.6	m) undecided
T- 0 O- 3.3	g) draftsman	T- 7.6, O- 2.2	n) other

3. At the present time, the highest degree I hope to hold is

T- 1.3, O- 3.3	a) certificate
T- 0, O-52.2	b) associate degree
T-62.0, O-35.8	c) bachelor's degree
T-21.5, O- 3.3	d) master's degree
T-18.9, O- 1.1	e) doctorate
	f) other
T- 1.3, O- 1.1	g) undecided

4. Members of my immediate family who have attended or are attending college include

T-22.8, O-19.5	a) father
T-12.6, O-14.1	b) mother
T-17.7, O-36.9	c) sister (s)
T-37.9, O-38.0	d) brother (s)
T-72.3, O-71.8	e) neither parent attended college
T-20.2, O-20.6	f) one parent attended college
T- 7.6, O- 6.5	g) both parents attended college
T-34.2, O-33.7	h) none

5. The next page

6. The most important goal in my life at present is:

Education	T-77.2, O-57.4	Family	T- 2.5, O-11.9
Job	T-17.7, O-28.2	Avoid draft	T- 1.3, O- 4.3
Happiness	T- 5.1, O- 1.1	Security	T- 1.3, O- 6.5
Self-fulfillment	T- 8.9, O- 6.5	Undecided	T- 0, O- 1.1
Money	T- 2.5, O- 1.1	Other	T- 3.8, O- 6.5
Fame	T- 1.3, O- 0		

Finish military obligation T- 0, O- 1.1

5. The most important things to me in choosing a job would be:

	RANK ASSIGNED						
	1	2	3	4	5	6	7
a) money	T-18.9 O-19.5	T-27.9 O-26.1	T-17.7 O-22.8	T-11.3 O-11.9	T- 2.5 O- 5.4	T- 2.5 O- 4.3	T- 1.3 O- 0
b) job security	T-20.2 O-15.2	T-16.4 O-23.9	T-16.4 O-20.6	T-12.6 O-10.9	T-16.4 O-13.0	T- 6.3 O- 6.5	T- 2.5 O- 1.1
c) working conditions	T-11.3 O-10.9	T-26.6 O-10.9	T-20.2 O-21.7	T-16.4 O-26.1	T-12.6 O- 7.6	T-10.1 O- 6.5	T- 2.5 O- 1.1
d) opportunity for advancement	T-17.7 O-29.3	T-16.4 O-15.2	T-13.9 O-18.5	T-13.9 O-18.5	T- 5.1 O-10.9	T- 8.9 O- 4.3	T- 8.9 O- 0
e) variety	T-13.9 O- 7.6	T- 5.3 O- 9.8	T- 6.3 O- 3.3	T-13.9 O- 9.8	T-27.8 O-27.2	T- 8.9 O-19.5	T- 7.6 O- 8.7
f) opportunity to serve humanity	T- 8.9 O- 4.3	T- 2.5 O- 1.1	T- 5.1 O- 1.1	T-11.3 O- 3.3	T- 6.3 O- 8.7	T-12.6 O-17.4	T-34.2 O-44.5
g) opportunity to create new ideas	T-15.2 O- 8.7	T- 7.6 O- 6.5	T- 8.9 O- 4.3	T- 7.6 O- 8.7	T- 5.1 O-11.9	T-22.8 O-26.1	T-11.3 O-13.1
h) other T- 3.8 O- 8.7							

7. The most important goal in my life ten years from now will probably be:

Job T-39.2, O-22.8
Education T-18.9, O-17.6
Family T-19.0, O- 26.1
Security T- 8.9, O-19.6
Avoid draft T- 1.3, O- 1.1
Money T- 7.6, O- 3.3
Happiness T- 3.8, O- 0

Home T- 3.8, O- 6.5
Self-fulfillment T- 8.9, O- 2.2
Community responsibility T- 3.8, O- 1
Advancement T- 5.1, O- 6.5
Success T- 10.1, O- 0
Other T- 2.5, O- 1.1
Undecided T- 1.3, O- 9.8

8. The program I am enrolled is:

Math T- 5.1, O- 0
Pre-Engineering T- 45.6, O- 0
Education T- 3.8, O- 0
Electrical Technology T- 0, O-21.8
Mechanical Technology T- 0, O-27.2
Chemical Technology T- 0, O- 1.1

Automotive Technology T- 0, O- 23.9
Architectural Drafting T- 0, O- 2.2
Medical (transfer) T-13.9, O- 0
Science (transfer) T-15.2, O- 0
Other T- 7.6, O- 0

9. I selected this program because:

Like the field T-55.7, O-71.8
Promising field T- 6.3, O-10.9
Prior experience T- 3.8, O- 8.7
Family pressure T- 2.5, O- 0
Develops the mind T- 1.3, O- 0
G.I. Bill money T- 0, O- 1.1
Counselling T- 1.3, O- 1.1
Don't know T- 2.5, O- 0
Other

10. Age: 17 T-2.5 O-0, 18 T-3.8 O-19.5, 19 T-45.5 O-32.6, 20 T-12.6 O-14.1, 21 T-6.3 O-4.3, 22 T-5.1 O-5.4, 23 T-3.8 O-3.3
*24 T2, O-5, 25 O-5.4, 26 O-1.1, 27 T4, O-2, 28 O-2.2, 29 T-1.3, 30 O-1.1
31 O-1.1, 32 T-1.3, 41 T-1.3, 42, 47 O-1.1

11. Marital status S T-83.5 O-80.5, M T-13.9 O-17.4

12. My education is being financed by

T-12.6, O-13.1 a) full-time employment
T-48.2, O-52.3 b) part-time employment
T- 7.6, O- 5.5 c) G.I. Bill
T-30.3, O-26.1 d) parents
T- 2.5, O- 2.2 e) loan
T-13.9, O-11.9 f) scholarship
T- 3.8, O- 1.2 g) State grants
T- 1.3, O- 7.6 h) Summer employment
T- 1.3, O- 2.2 i) Social security
T- 1.3, O- 3.2 j) Savings
T- 2.5, O- 2.2 k) Working wife (or Husband)
T- 1.3, O- 1.2 l) other

* Because of the limited space on the form, some of these percentages are rounded off to the nearest whole number

I. DISCUSSION OF THE QUESTIONNAIRES FOR FACULTY MEMBERS

1. The most important function of the Community College. Faculty members in transfer and occupational curricula showed an understandable preference for the programs of their own departments. The transfer program of the community college was considered its most important program by 68.9 per cent of the mathematics and science teachers, and the occupational program was rated number one in importance by 76.6 per cent of the occupational teachers. The occupational program was rated second in importance by 46.7 per cent of the transfer faculty; however, 36.6 per cent of the occupational faculty rated continuing education as second in importance, and 20.0 per cent of this group considered the transfer program to be second in importance.

This question was not asked of the technical institute faculty, since it was felt that they might not be particularly knowledgeable in this area.

2. The proper function of occupational programs. Responses to this question were very similar from both groups of junior college faculty, and from the technical institute faculty, who were given the same choices with regard to the programs of the technical institute. Item (d), "Occupational programs [or technical institute programs] should offer specialized training not available at four-year institutions," was selected by 73.4 per cent of the transfer faculty, 70.0 per cent of the occupational faculty, and 69.9 per cent of the technical institute faculty. Qualified answers were given by 16.7 per cent of the occupational faculty and 18.3 per cent of the technical institute faculty, with typical comments being that these programs should prepare the student for immediate employment and that they should not be a toned-down engineering program.

3. The proper function of transfer programs. Responses to this question were almost identical from the two groups of faculty. Item (b), "Transfer programs should prepare the student to enter a four-year institution at the junior level" was the selection of 51.2 per cent of the transfer faculty and 50.0 per cent of the occupational faculty. Item (a), "Transfer programs should parallel the first two years of baccalaureate programs in four-year institutions," was selected by 42.2 per cent of the transfer faculty and 40.0 per cent of the occupational faculty. With the relatively small number of respondents in each category, these differences are not large enough to be significant.

This question was not asked of the technical institute faculty, since transfer programs are not offered at these schools.

4. Criteria for the selection of instructors in transfer programs. Junior college faculty members were asked to rank nine criteria for the selection of faculty members in transfer programs in order of importance. Faculty in technical institutes were asked a comparable question about the criteria for selection of faculty to teach in four-year baccalaureate degree programs. For easier interpretation, these data have been grouped as discussed in Chapter I, and appear on the next page. For the sake of clarity only the percentages giving primary emphasis to each item (ranks of 1, 2 or 3) or moderate emphasis (ranks of 4, 5 or 6) are shown in this table. A complete tabulation of percentages has been given on page 22.

An examination of the table shows that transfer faculty place very strong emphasis on the master's degree in the subject matter area. This criterion received primary emphasis from 89.0 percent of the transfer faculty.

Table 1. Criteria for Selection of Instructors in Transfer Programs
Question 4 on Community College questionnaire,
Question 3 on Technical Institute questionnaire

	RANK ASSIGNED			
	1, 2 or 3		4, 5 or 6	
a) baccalaureate degree in subject matter area	Transfer Occupational Tech. Inst.	28.9 36.6 47.3	Transfer Occupational Tech. Inst.	15.5 30.0 16.1
b) master's degree in subject matter area	Transfer Occupational Tech. Inst.	89.0 56.6 74.2	Transfer Occupational Tech. Inst.	8.8 16.7 10.8
c) doctorate in subject matter area	Transfer Occupational Tech. Inst.	37.7 13.3 36.6	Transfer Occupational Tech. Inst.	20.0 20.0 24.7
d) baccalaureate degree in education	Transfer Occupational Tech. Inst.	4.4 6.7 1.1	Transfer Occupational Tech. Inst.	6.6 13.3 8.6
e) master's degree in education	Transfer Occupational Tech. Inst.	6.7 20.0 3.2	Transfer Occupational Tech. Inst.	8.8 23.3 10.8
f) doctorate in education	Transfer Occupational Tech. Inst.	4.4 0 3.2	Transfer Occupational Tech. Inst.	8.8 6.7 5.4
g) industrial experience related to subject matter area	Transfer Occupational Tech. Inst.	22.2 53.3 40.8	Transfer Occupational Tech. Inst.	31.2 13.3 21.5
h) teaching experience	Transfer Occupational Tech. Inst.	71.2 46.7 49.5	Transfer Occupational Tech. Inst.	20.0 13.3 26.9
i) understanding of overall program of community college	Transfer Occupational	15.6 23.3	Transfer Occupational	13.2 16.7
*i) understanding of philosophy of higher education	Tech. Inst.	20.4	Tech. Inst.	30.1
j) understanding of transfer program of community college	Transfer Occupational	31.1 13.3	Transfer Occupational	37.8 20.0
*j) understanding of programs of own institution	Tech. Inst.	18.3	Tech. Inst.	40.8
k) other	Transfer Occupational Tech. Inst.	8.9 10.8 6.5		

*Phraseology used in technical institute questionnaire.

his item was also considered very important by the technical institute aculty, with 74.2 per cent giving it primary importance. It was considered ess important by the occupational faculty, among whom 56.6 per cent ranked his item 1, 2 or 3.

Teaching experience was the second choice of the transfer faculty, ceiving 71.2 per nt of their highest ratings. Technical institute culty rated this item less highly, with 49.5 per cent giving it first portance. Among the occupational faculty, 46.7 per cent considered aching experience to be of primary importance; this was surpassed by the .3 per cent who gave primary importance to industrial experience.

The criteria considered most important by the various faculty groups re, in order of rated importance:

ansfer faculty	Percentages
ster's degree in subject matter area	89.0
aching experience	71.2
torate in subject matter area	37.7
erstanding of transfer program of community college	31.1
calaureate degree in subject matter area	28.9
ustrial experience related to subject matter area	22.2
upational faculty	
ter's degree in subject matter area	56.6
ustrial experience related to subject matter area	53.3
ching experience	46.7
calaureate degree in subject matter area	36.6
orstanding of overall program of community college	23.3
ter's degree in education	20.0

Technical Institute faculty	Percentages
master's degree in subject matter area	74.2
teaching experience	49.5
baccalaureate degree in subject matter area	47.3
industrial experience related to subject matter area	40.8
doctorate in subject matter area	36.6
understanding of philosophy of higher education	20.4

It appears that advanced degrees are considered more important by faculty in transfer programs than by those in the other two groups, and that technical institute faculty value them more highly than faculty members in occupational programs. On the other hand, the occupational faculty place more emphasis on industrial experience than do the technical institute faculty, and the transfer faculty value it least of the three groups. Teaching experience is considered very important by transfer faculty, and is rated about equally by occupational and technical institute faculty.

Advanced degrees are generally considered to be of the utmost importance by experts in the field of higher education, with teaching experience and industrial experience considered to be less important. It appears that faculty members in transfer programs have a better understanding of the needs of their own area than do faculty members in occupational programs, and that technical institute faculty hold opinions that fall between those of the other two groups. Occupational faculty members seem to carry over their opinions of the needs of their own programs into their opinions relating to transfer programs.

Comments made under item (k) suggested that other criteria should be teaching skill, a thorough knowledge of subject matter, and an interest in working with young people.

5. Criteria for the selection of instructors in occupational programs. Faculty members were asked to rate the same criteria used in question 4 as they relate to the selection of teachers in occupational programs. The questionnaire presented to technical institute faculty contained one more item than the question relating to baccalaureate degree programs, the added item being the understanding of the philosophy of technical education. These data, tabulated in the same manner as that used for criteria for transfer programs, are given in the table on the next page.

A master's degree in the subject matter area was considered of prime importance by 80.1 per cent of the transfer faculty. This item placed third among occupational faculty, with 43.3 per cent, and was fourth among technical institute faculty, with 38.7 per cent. Industrial experience was the highest rated item among occupational faculty, being selected as of prime importance by 90.0 per cent. Among technical institute faculty, 67.8 per cent rated industrial experience of prime importance, the same number who selected the baccalaureate degree in the subject matter area. The baccalaureate degree was considered of great importance by 46.7 per cent of the occupational faculty, ranking second among this group. Teaching experience ranked third among transfer and technical institute faculty, with 48.9 per cent and 60.2 per cent respectively, and fourth among occupational faculty, with 30.0 per cent.

Table 2. Criteria for Selection of Instructors in Occupational Programs
Question 5 on Community College questionnaire
Question 2 on Technical Institute questionnaire

	RANK ASSIGNED			
	1, 2 or 3		4, 5 or 6	
a) baccalaureate degree in subject matter area	Transfer Occupational Tech. Inst.	40.0 46.7 67.8	Transfer Occupational Tech. Inst.	8.8 23.3 16.1
b) master's degree in subject matter area	Transfer Occupational Tech. Inst.	80.1 43.3 38.7	Transfer Occupational Tech. Inst.	6.6 30.0 32.2
c) doctorate in subject matter area	Transfer Occupational Tech. Inst.	24.4 10.0 5.4	Transfer Occupational Tech. Inst.	19.9 23.3 11.8
d) baccalaureate degree in education	Transfer Occupational Tech. Inst.	2.2 13.3 0	Transfer Occupational Tech. Inst.	6.6 13.3 10.8
e) master's degree in education	Transfer Occupational Tech. Inst.	2.2 23.3 3.2	Transfer Occupational Tech. Inst.	6.6 30.0 6.5
f) doctorate in education	Transfer Occupational Tech. Inst.	4.4 0 2.1	Transfer Occupational Tech. Inst.	6.6 10.0 5.4
g) industrial experience related to subject matter area	Transfer Occupational Tech. Inst.	62.2 90.0 67.8	Transfer Occupational Tech. Inst.	24.4 6.7 23.6
h) teaching experience	Transfer Occupational Tech. Inst.	48.9 30.0 60.2	Transfer Occupational Tech. Inst.	33.3 30.0 22.6
i) understanding of overall program of community college	Transfer Occupational	8.8 30.0	Transfer Occupational	33.4 23.3
*i) understanding of philosophy of higher education	Tech Inst.	5.4	Tech. Inst.	11.8
j) understanding of occupational program of community college	Transfer Occupational	20.0 23.3	Transfer Occupational	37.8 23.3
*j) understanding of philosophy of technical education	Tech. Inst.	31.2	Tech. Inst.	43.0
*k) understanding of the programs of own institution	Tech. Inst.	23.6	Tech. Inst.	44.2
l) other	Transfer 13.3 Occupational 13.3 Tech. Inst. 5.4			

*Phraseology used in technical institute questionnaire.

The criteria considered most important by the various faculty groups were, in order of rated importance:

Transfer faculty	Percentages
master's degree in subject matter area	80.1
industrial experience related to subject matter area	62.2
teaching experience	48.9
baccalaureate degree in subject matter area	40.0
doctorate in subject matter area	24.4
understanding of occupational program of community college	20.0

Occupational faculty	
industrial experience related to subject matter area	90.0
baccalaureate degree in subject matter area	46.7
master's degree in subject matter area	43.3
teaching experience	30.0
understanding of overall program of community college	30.0
understanding of occupational program of community college	23.3
master's degree in education	23.3

Technical institute faculty	
industrial experience related to subject matter area	67.8
baccalaureate degree in subject matter area	67.8
teaching experience	60.2
master's degree in subject matter area	38.7
understanding of the philosophy of technical education	31.2
understanding of the programs of own institution	23.6

It is apparent that occupational faculty place much more emphasis on industrial experience than do the other two groups. The occupational faculty are more inclined to accept the baccalaureate degree in the subject matter area, accompanied by industrial experience, as adequate preparation, in contrast to the transfer faculty, who place great emphasis on the master's degree. In this matter, the views of the occupational faculty are more in accord with the opinions of experts in the field of technical education, as expressed in the literature, than are those of the transfer faculty. The technical institute faculty appear to share the opinion of the occupational faculty, since they rate industrial experience and the baccalaureate degree equally, with the master's degree placing fourth; however, their emphasis on industrial experience is less than that of the occupational faculty.

Just as the transfer faculty appear to have a better understanding of their field than the other two groups, it appears that the occupational faculty and the technical institute faculty have a better understanding of the needs of technical education than the transfer faculty.

6 and 7. Mathematics teaching methods for transfer and occupational programs. Transfer faculty showed a preference for teaching mathematics in transfer programs with a strong emphasis on theory. This item was chosen by 44.4 per cent of the transfer faculty, with 28.9 per cent choosing item (a), teaching the courses as "pure" mathematics, and 26.6 per cent choosing item (b), teaching with a strong emphasis on application. The occupational faculty were evenly split between the three choices, with 43.3 per cent choosing item (a), 40.0 per cent item (b), and 46.7 per cent item (c). Technical institute faculty were split between emphasis on applications and

on theory, with those two items being chosen by 40.8 per cent and 47.3 per cent respectively. The majority of comments made under item (d) indicated that a combination of theory and applications is desirable.

All three groups were unanimous in selecting emphasis on applications as the best teaching method for mathematics courses in occupational programs. This item was chosen by 80.1 per cent of the transfer faculty, 86.6 per cent of the occupational faculty, and 87.1 per cent of the technical institute faculty.

8 and 9. Physics teaching methods for transfer and occupational programs. Transfer faculty made virtually the same choices for the teaching methods for physics courses in transfer programs as for mathematics courses. Emphasis on theory was the choice of 42.2 per cent, teaching as a "pure" science was the choice of 28.9 per cent, and emphasis on applications was the choice of 22.2 per cent. Occupational faculty placed greater emphasis on theory in transfer program physics than in mathematics, with 53.3 per cent choosing this item, 26.6 per cent choosing emphasis on applications, and 16.7 per cent choosing item (a), teaching it as a "pure" science. Technical institute faculty were again evenly split between emphasis on applications and on theory, with 45.2 per cent and 40.8 per cent respectively.

As with mathematics courses of occupational programs, the occupational faculty and the technical institute faculty were strongly agreed that the best teaching method for physics courses in these programs is with strong emphasis on application. This item was chosen by 86.6 per cent of the occupational faculty and 76.2 per cent of the technical institute faculty. No other item was chosen by a significant number among these two groups.

Among the transfer faculty, however, the number favoring emphasis on applications dropped to 68.9 per cent, as compared to 80.1 per cent who favored emphasis on applications in the mathematics courses for occupational programs. It was felt by 20.1 per cent of the transfer faculty that the emphasis in these physics courses should be on theory. This is a significant difference from the responses of the occupational faculty, who seem to conform more closely to the opinions of the experts in technical education.

10 and 11. Comparison of mathematics teaching methods in occupational and transfer programs. Responses from transfer and occupational faculty were very similar on question 10. Both groups felt that mathematics courses for engineering related occupational courses should be taught at the same level of difficulty but with more applications than for transfer courses; this item was chosen by 55.6 per cent of the transfer faculty and 50.0 per cent of the occupational faculty. Slightly less of the technical institute faculty, 40.8 per cent, made this choice; Their second choice was greater selectivity in subject matter, chosen by 29.1 per cent. This item was the choice of 22.2 per cent of the transfer faculty and 16.7 per cent of the occupational faculty.

In response to question 11, 40.1 per cent of the transfer faculty felt that mathematics courses for the two types of curricula should cover the same material but differ in the type of applications used, and 28.9 per cent felt that they should cover different material in a different way. Responses from occupational faculty were evenly split between these two choices and covering the same material but differing in level of theory, with 23.3 per cent, 20.0 per cent and 20.0 per cent respectively. Technical

institute faculty favored covering the same material with different types of applications, with 33.3 per cent, and covering the same material with a difference in level of theory, with 18.3 per cent.

12. Preference of mathematics courses. Faculty members in all three groups were asked to rate nine mathematics courses in order of their teaching preference. As with the criteria for the selection of instructors, these data have been grouped, with responses of 1, 2 or 3 considered to indicate primary preference, and responses of 4, 5 or 6 indicating secondary preference. These grouped data are given in the table on the next page.

The most highly favored courses among the transfer faculty were college algebra, chosen by 81.3 per cent, and calculus, with 71.9 per cent. Analytic geometry was chosen by 53.2 per cent, and intermediate algebra by 28.1 per cent. Technical mathematics was the sixth choice, with 15.6 per cent. Among the occupational faculty, technical mathematics was the most preferred course, with 79.2 per cent, followed by college algebra with 50.0 per cent and intermediate algebra with 41.6 per cent. First choice for technical institute faculty was calculus, with 68.6 per cent, followed by college algebra with 52.3 per cent, analytic geometry with 50.0 per cent and differential equations with 41.8 per cent. Technical mathematics placed fifth with 37.2 per cent.

It seems of particular significance that in the technical institutes, in which all mathematics courses are given in the same department, technical mathematics appears far down the list of preferences. Although no effort has been made in this report to analyze the data from individual schools, the responses from Thornton Community College are of particular interest on this

Table 3. Preference of Mathematics Courses
Question 12 on Community College questionnaire
Question 10 on Technical Institute questionnaire

	RANK ASSIGNED			
	1, 2 or 3		4, 5 or 6	
a) remedial algebra	Transfer	12.5	Transfer	15.6
	Occupational	20.8	Occupational	18.3
	Tech. Inst.	13.9	Tech. Inst.	22.1
b) remedial geometry	Transfer	3.1	Transfer	18.7
	Occupational	16.7	Occupational	0
	Tech. Inst.	3.5	Tech. Inst.	13.9
c) intermediate algebra	Transfer	28.1	Transfer	10.4
	Occupational	41.6	Occupational	29.2
	Tech. Inst.	10.4	Tech. Inst.	43.0
d) college algebra	Transfer	81.3	Transfer	12.5
	Occupational	50.0	Occupational	29.2
	Tech. Inst.	52.3	Tech. Inst.	40.7
e) analytic geometry	Transfer	53.2	Transfer	21.8
	Occupational	20.8	Occupational	37.4
	Tech. Inst.	50.0	Tech. Inst.	30.2
f) calculus	Transfer	71.9	Transfer	18.7
	Occupational	20.8	Occupational	37.4
	Tech. Inst.	68.6	Tech. Inst.	16.3
g) differential equations	Transfer	18.7	Transfer	34.4
	Occupational	12.5	Occupational	41.6
	Tech. Inst.	41.8	Tech. Inst.	17.4
h) technical mathematics	Transfer	15.6	Transfer	28.1
	Occupational	79.2	Occupational	12.5
	Tech. Inst.	37.2	Tech. Inst.	38.4
i) other	Transfer	12.5		
	Occupational	0		
	Tech. Inst.	10.4		

Transfer 32
Occupational 24
Tech. Inst. 86

Number giving preference of mathematics courses

Transfer 59.4%
Occupational 8.3%
Tech. Inst. 26.7%

Number giving preference who did not inclue technical mathematics among their preferences

particular question, since it is the only junior college included in the study in which technical mathematics is taught in the same department as the mathematics for transfer programs. Among the fourteen members of the transfer faculty at Thornton who responded to this question, only one gave technical mathematics a rank of 1, 2 or 3, and four did not include it among their list of preferences at all. Among technical institute faculty, where technical mathematics is offered in the same department with other mathematics courses, 26.7 per cent of those responding to this question did not include technical mathematics among their preferences. It appears that in departments offering both types of mathematics courses, technical mathematics is not a favored assignment. Of the transfer faculty who responded to this question, 59.4 per cent did not include technical mathematics among their preferences, while only 8.3 per cent of the respondents among the occupational faculty failed to include technical mathematics among their preferences.

The pre-technical, or remedial, mathematics courses were not among the favored courses in any of the three groups, although they were rated more highly by the occupational faculty than by the other two groups. Among the transfer faculty, 12.5 per cent listed remedial algebra and 3.1 per cent remedial geometry. Among occupational faculty, 20.8 per cent listed remedial algebra and 16.7 per cent remedial geometry. And among technical institute faculty, 13.9 per cent expressed a preference for remedial algebra and 3.5 per cent remedial geometry.

The responses of the three faculty groups, in order of listed preference, are given on page 67.

Transfer faculty	Percentages
college algebra	81.3
calculus	71.9
analytic geometry	53.2
intermediate algebra	28.1
differential equations	18.7
Occupational faculty	
technical mathematics	79.2
college algebra	50.0
intermediate algebra	41.6
remedial algebra	20.8
analytic geometry	20.8
calculus	20.8
Technical institute faculty	
calculus	68.6
college algebra	52.3
analytic geometry	50.0
differential equations	41.8
technical mathematics	37.2

13 and 14. Selection of students in transfer and occupational programs. It was felt by 33.4 per cent of the transfer faculty that students in transfer programs should be selected on the basis of high school record and ACT scores, while 26.7 per cent felt they should meet the same requirements as applicants to four-year institutions, and 20.1 per cent favored admitting them as space

is available, on a first-come, first-served basis. This last alternative was the choice of 40.0 per cent of the occupational faculty, while 23.3 per cent favored the use of high school records and ACT scores, and 20.0 per cent felt they should be selected from the top applicants available. There seems to be a lack of familiarity on the part of both groups with the provisions of the Illinois Junior College Act, which specifies that applicants for transfer programs must meet the same requirements as in four-year institutions, and when space is limited, must then be selected on the basis of class rank and the results of ability and achievement tests.

Asked the same question about applicants to four-year baccalaureate degree programs, 49.5 per cent of the technical institute faculty felt they should be selected on the basis of high school record and ACT scores, and 21.5 per cent felt they should be selected from the top applicants available.

In selecting students for occupational programs, 42.2 per cent of the transfer faculty and 43.3 per cent of the occupational faculty felt that admission should be on a first-come, first-served basis, which is in agreement with the provisions of the law. Second choice was selection on the basis of high school record and ACT scores, chosen by 15.6 per cent of the transfer faculty and 23.3 per cent of the occupational faculty, while 11.1 per cent of the transfer faculty and 20.0 per cent of the occupational faculty felt they should be selected from the top applicants available.

When asked the same question about their own programs, 41.9 per cent of the technical institute faculty felt they should be selected on the basis of high school record and ACT scores, 21.5 per cent felt they should be selected from the top applicants available, and 15.1 per cent favored

admission on a first-come, first-served basis.

15 and 16. Qualifications of applicants for transfer programs. Responses to these two questions were very similar from transfer and occupational faculty. The majority of both groups felt that applicants for transfer programs are generally in the second quartile of their high school graduating class; the percentages were 53.3 for transfer faculty and 46.6 for occupational faculty. A smaller number, 28.9 per cent of the transfer faculty and 20.0 per cent of the occupational faculty, felt that they are generally in the third quartile of their graduating class. Applicants for transfer programs in community colleges were considered to vary more in ability than applicants for four-year insitutions by 68.9 per cent of the transfer faculty, and were considered to be of generally lower ability by 17.8 per cent of this group. There were less responses to this question from the occupational faculty; however, their choices ranked in the same order. Greater variability of ability was the choice of 30.0 per cent, and lower ability was the opinion of 23.3 per cent.

When asked the same question about applicants for baccalaureate degree programs, 57.0 per cent of the technical institute faculty considered them to be generally in the top quartile of their high school graduating class, and 47.4 per cent considered them to be in the second quartile. However, this was not the same question as was asked of junior college faculty, which inquired about transfer students in community colleges. This question was included in the technical institute questionnaire in order to give a comparison with their responses when asked about students in technical institute curricula.

17 and 18. Qualifications of applicants for occupational programs. When asked about the class rank of occupational applicants, 57.6 per cent of the transfer faculty and 40.0 per cent of the occupational faculty felt that they were generally in the third quartile of their high school graduating class, and 28.9 per cent of the transfer faculty and 30.0 per cent of the occupational faculty felt they were generally in the second quartile. Thus both groups tended to feel that occupational students ranked lower in their high school graduating class than transfer students. When asked to compare the ability of occupational students with those of applicants to four-year institutions, 44.4 per cent of the transfer faculty felt that the applicants for occupational courses varied more in ability, and 37.8 per cent felt they were of lower ability than applicants for four-year institutions. Occupational faculty showed a much higher opinion of the applicants for their programs. In this group, 40.0 per cent considered the applicants for occupational programs to be superior in ability to applicants for four year institutions, as opposed to 30.0 per cent who considered the occupational students to be lower in ability, and 16.7 per cent who felt that they vary more in ability.

Technical institute faculty were asked the same questions about applicants for their programs; 51.6 per cent felt that their high school rank was generally in the third quartile, and 41.9 per cent felt that they were generally in the second quartile, the same order selected by junior college faculty when asked about occupational students. However, in comparing their students with students in baccalaureate degree programs, technical institute faculty displayed a lower opinion of their abilities than

was indicated by the occupational faculty concerning the occupational students. Technical institute applicants were considered to be of lower ability than applicants to four-year institutions by 48.4 per cent of the technical institute faculty, and to vary more in ability by 33.3 per cent. It appears that occupational faculty hold the applicants for occupational programs in higher regard than do either of the other two groups.

19 and 20. Comparisons of transfer and occupational students. The three groups of faculty were asked to compare transfer and occupational students on the basis of ability, motivation, socioeconomic background and aspiration. In response to question 19, all three groups indicated that students in the two types of curricula differ in goals; 71.2 per cent of the transfer faculty, 56.6 per cent of the occupational faculty and 49.5 per cent of the technical institute faculty marked this choice. The second most highly rated item among junior college faculty was difference in ability, with 48.9 per cent of the transfer faculty and 46.6 per cent of the occupational faculty, followed by difference in motivation, with 35.6 per cent and 43.3 per cent respectively. These two items were reversed in rank among technical institute faculty, with 46.3 per cent marking difference in motivation and 44.2 per cent difference in ability; however, the variation in percentages on these items is too small to be significant. Difference in socioeconomic background was the fourth rated item among all three groups, marked by 20.1 per cent of the transfer faculty, 26.6 per cent of the occupational faculty, and 38.8 per cent of the technical institute faculty.

Surprisingly, 17.8 per cent of the transfer faculty and 19.4 per cent of the technical institute faculty considered that transfer and occupational

students are alike in most respects; only 6.7 per cent of the occupational faculty were of this opinion.

The significance of the much higher number of transfer faculty who felt that the two types of students differ in goals is not immediately apparent.

In response to question 20, all three groups of faculty indicated that students of greater ability, higher socioeconomic background, and higher aspirations choose transfer or baccalaureate degree programs. More than 80 per cent of each group marked each of these items. There was less agreement as to which type of student has greater motivation. Students with greater motivation were expected to choose transfer or baccalaureate degree programs by 67.7 per cent of the transfer faculty, 56.6 per cent of the occupational faculty, and 67.5 per cent of the technical institute faculty; however, they were expected to choose occupational programs by 23.3 per cent of the occupational faculty and 19.4 per cent of the technical institute faculty, as opposed to only 8.9 per cent of the transfer faculty.

21. Advising outstanding occupational students. By far the majority of the transfer faculty felt that outstanding occupational students should be encouraged to work toward a four year degree. It was felt by 53.3 per cent of the transfer faculty that such students should enter four year technology programs, and 20.1 per cent felt that they should change to transfer curricula. Only 8.9 per cent of the transfer faculty believed that such students should continue in their programs to the Associate degree. In contrast, 46.6 per cent of the occupational faculty felt that these students should continue in their programs to the Associate degree, and 33.3 per cent felt that they should enter four year technology programs; only 6.7 per cent of the occupational faculty would encourage such students to change

to transfer curricula. Among technical institute faculty, 64.5 per cent felt outstanding students in their programs should enter four year technology programs 31.2 per cent felt they should continue in their programs to the Associate degree, and only 7.5 per cent would encourage them to change to transfer curricula.

The responses to this question were quite disappointing. It appears that the two year occupational curricula are still regarded by many as being lower level programs intended only for those of lower ability. Among the transfer faculty these programs seem to be held in very low regard. Even among the occupational and technical institute faculties there appear to be some who do not consider two year occupational programs to be an acceptable goal for students of higher ability.

22 through 27. Backgrounds of the respondents to the faculty questionnaires. All of the respondents in each group were full-time staff members. Those who indicated that they teach part-time were in administrative capacities. The largest percentage of each group held the rank of instructor; 46.7 per cent of the transfer faculty, 50.0 per cent of the occupational faculty, and 54.8 per cent of the technical institute faculty. The rank of assistant professor was held by 26.7 per cent of the transfer faculty, 30.0 per cent of the occupational faculty, and 21.5 per cent of the technical institute faculty, while 8.9 per cent of the transfer faculty, 13.3 per cent of the occupational faculty and 15.1 per cent of the technical institute faculty held the rank of associate professor. Only one respondent held the rank of professor; a few taught in schools which do not use rank designations.

Master's degrees were held by 82.3 per cent of the transfer faculty,

and 11.1 per cent held the doctorate. Baccalaureate degrees and specialist degrees were the highest degrees held by the remaining transfer faculty. Among occupational faculty, there were an equal number, 43.3 per cent, who held baccalaureate degrees and master's degrees, with only 3.3 per cent holding the doctorate. Among technical institute faculty, 61.3 per cent held master's degrees, 30.1 per cent held baccalaureate degrees, and only 1.1 per cent held the doctorate.

The average number of years of teaching experience among transfer faculty was 11.0 years; the number of years of teaching experience for individual faculty members ranged from less than one year to 26 years. Technical institute faculty averaged 8.1 years teaching experience, with individual experience ranging from less than a year to 40 years.

Transfer faculty averaged 2.6 years industrial experience, with individual experience ranging from none to 25 years. The average for occupational faculty was much higher, 13.4 years, with individual experience ranging from less than a year to 34 years. Technical institute faculty averaged 5.9 years of industrial experience, with individuals varying from no experience to 35 years. It can be seen that transfer faculty average slightly more teaching experience than the other two groups, whose average teaching experience is about equal. However, occupational faculty average far more industrial experience than the other two groups; the average industrial experience of occupational faculty is over five times that of transfer faculty. The average for the technical institute faculty may have been lowered somewhat by the inclusion in the study of faculty from all teaching areas.

II. DISCUSSION OF THE QUESTIONNAIRES FOR STUDENTS

1 and 3. Plans after graduation. As might be expected, 91.0 per cent of the transfer students indicated that they intend to continue their education after they receive their Associate degree. A baccalaureate degree is the aim of 62.0 per cent of the transfer students, 21.5 per cent hope to obtain a master's degree, and 18.9 per cent hope to earn the doctorate. (Note: because of multiple answers from some students, these figures total more than 100 per cent.) It is somewhat surprising that 31.5 per cent of the occupational students indicated that they would like if possible to continue their education immediately. Only 22.8 per cent of the occupational students indicated that they consider employment their ultimate goal; a total of 34.8 per cent of these students indicated that they hope to combine work and further education is some manner. The Associate degree is the aim of 52.2 per cent of the occupational students, 35.8 per cent hope to obtain a baccalaureate degree, and only 4.4 per cent aspire to an advanced degree.

There is some inconsistency in the answers of the occupational students to these two questions. Although over 65 per cent indicated a desire to continue their education beyond the Associate degree, only about 40 per cent aspire to the baccalaureate degree or beyond. The term "terminal" has been discontinued in relation to occupational courses in order that occupational students might not be discouraged from continuing their education. The idea of continuing education certainly fits the philosophy of the occupational curricula. However, the statistics concerning the number of students who successfully accomplish the transfer to a four-year institution and complete a baccalaureate degree make it seem unlikely that all of the transfer students

who aspire to this goal will achieve it, much less all of the occupational students who hold this hope.

2. Employment plans. The answers to this question were write-in answers However, it was found on this, and the other write-in questions, that most of th answers could easily be categorized. Pre-engineering, teaching and the various medical fields were the ultimate goal of the majority of the transfer students surveyed; by far the greatest number of the occupational students in any one category expected to be technicians.

4. College attendance of family members. It was expected that a difference in the socioeconomic backgrounds of transfer and occupational students might be revealed by the answers to this question, but this did not prove to be the case. The statistics were almost identical for the two types of students. Over 70 per cent of each group came from homes in which neither parent attended college; over 30 per cent are the first member of the immediate family to attend college; the remainder have brothers and sisters who are attending or have attended college.

5. Criteria for job selection. Students in both types of curricula were asked to rate seven criteria for the selection of a job in order of importance. As with the questions requiring assignment of rank on the faculty questionnaires, these data have been grouped. In this case, ranks of 1, 2 or 3 are considered to indicate primary importance, and ranks of 4 or 5 are considered to indicate secondary importance. These grouped data are given on the next page.

The responses to several of the items were very similar. Occupational students rated money and job security slightly higher than did the transfer students. Money was considered important by 68.4 per cent of the occupational

Table 4. Criteria for Job Selection

	RANK ASSIGNED			
	1, 2 or 3		4 or 5	
a) money	Transfer Occupational	64.5 68.4	Transfer Occupational	13.8 17.3
b) job security	Transfer Occupational	53.0 59.7	Transfer Occupational	2[illegible].0 23.9
c) working conditions	Transfer Occupational	58.1 43.5	Transfer Occupational	29.0 33.7
d) opportunity for advancement	Transfer Occupational	48.0 63.0	Transfer Occupational	19.0 29.4
e) variety	Transfer Occupational	26.5 20.7	Transfer Occupational	41.7 37.0
f) opportunity to serve humanity	Transfer Occupational	16.5 6.5	Transfer Occupational	17.6 12.0
g) opportunity to create new ideas	Transfer Occupational	31.7 19.5	Transfer Occupational	12.7 20.6
h) other Transfer 13.8 Occupational 8.7				

students and 64.5 per cent of the transfer students; 59.7 per cent of the occupational students and 53.0 per cent of the transfer students valued job security. Variety was slightly more important to the transfer students, among whom 26.5 per cent ranked this item highly, as opposed to 20.7 per cent of the occupational students.

On the remaining items, there was a much greater spread in the responses. The more idealistic criteria were rated significantly higher by the transfer students. Opportunity to serve humanity was selected by 16.5 per cent of the transfer students and 6.5 per cent of the occupational students; opportunity to create new ideas was of prime importance to 31.7 per cent of the transfer students and 19.5 per cent of the occupational students. Another area of difference was that transfer students considered working conditions more important than opportunity for advancement, in direct contrast to the occupational students, who rated these items in the reverse order. Working conditions were considered important by 58.1 per cent of the transfer students and 43.5 per cent of the occupational students; opportunity for advancement was of prime importance to 48.0 per cent of the transfer students and 63.0 per cent of the occupational students.

There seems to be an indication in these figures that occupational students tend to be more pragmatic than transfer students, who tend a bit more to idealism.

6. Present goals. Education appears to be a more pressing immediate goal with transfer students than with occupational students; 77.2 per cent of the transfer students mentioned this item, as against 57.4 per cent of the occupational students. The immediate concerns of the occupational students

which were mentioned more frequently by that group than by the transfer students were their jobs, mentioned by 28.2 per cent of the occupational students and 17.7 per cent of the transfer students, and their families, mentioned by 11.9 per cent and 2.5 per cent respectively. Other items were mentioned with about equal frequency by both groups.

7. Future goals. In discussing their probable goals ten years from now, 39.2 per cent of the transfer students mentioned their jobs, as compared to 22.8 per cent of the occupational students, and success, mentioned by 10.1 per cent of the transfer students and none of the occupational students. Occupational students showed more interest than transfer students in their families, with 26.1 per cent of the occupational students and 19.0 per cent of the transfer students mentioning this item, and in security, mentioned by 19.6 per cent of the occupational students and 8.9 per cent of the transfer students. Other items were mentioned with about equal frequency by both groups.

8. Program enrollment. The programs in which the students were enrolled correlated very closely with their employment plans. These figures are given in the data table on page 52.

9. Reasons for choosing program. The occupational students were very consistent in their reasons for choosing their fields; 71.8 per cent said they liked the field, 10.9 per cent said they considered it a promising field, and 8.7 per cent said they had had some previous experience in that field. These figures compared with 55.7 per cent, 6.3 per cent and 3.6 per cent of the transfer students who gave these responses. There were quite a number of transfer students who did not respond to this question.

10 through 12. Background of students. The ages of the students who responded to the questionnaires ranged from 17 to 47, with the majority being between 18 and 20. The majority were single; 13.9 per cent of the transfer students and 17.4 per cent of the occupational students were married. Slightly more transfer students received financial help from their parents than occupational students; the percentages were 30.3 per cent and 26.1 per cent respectively. On the other hand, slightly more occupational students worked than transfer students; the percentages were 52.3 per cent full-time employment, 13.1 per cent part-time employment and 7.6 per cent summer employment for occupational students, and 48.2 per cent full-time employment, 12.6 per cent part-time employment and 1.3 per cent summer employment for transfer students. This question did seem to show some slight difference in economic backgrounds.

CHAPTER IV

CONCLUSIONS

The responses to the questionnaires led to the following conclusions:

1. Transfer faculty and occupational faculty each seemed to show greater understanding of their own programs than of each others.
2. Transfer faculty placed greater emphasis on advanced degrees as criteria for the selection of faculty in both types of curricula than occupational faculty did; occupational faculty placed greater emphasis on industrial experience than transfer faculty did.
3. Occupational faculty considered the emphasis on applications in technical physics courses to be more important than the transfer faculty did.
4. Transfer faculty showed a decided preference to teach the higher level mathematics courses. Technical mathematics and remedial mathematics were not among the courses they rated highly in preference. Instructors in departments offering technical mathematics and mathematics for transfer programs preferred other courses to the technical mathematics. Remedial mathematics courses were rated more highly in preference by occupational faculty than by transfer or technical institute faculty.
5. Occupational faculty showed a slightly higher opinion of the ability, and more particularly, the motivation, of occupational students than the transfer faculty did.
6. The majority of transfer faculty felt that outstanding students in occupational curricula should be advised to enter four year programs. There seemed to be a lack of acceptance of occupational curricula as

... a worthy goal for students of ability.

7. A greater number of advanced degrees are held by transfer faculty than by occupational faculty. Transfer faculty have a slightly higher average of teaching experience. Occupational faculty have a much higher average of industrial experience.

8. Almost all of the transfer students and about a third of the occupational students hope to obtain education beyond the Associate degree.

9. The majority of both types of students came from families in which neither parent attended college; about a third of each group are the first members of their immediate families to attend college.

10. Security, job advancement and their families were more important to the occupational students than to the transfer students. Working conditions, opportunity to serve humanity, opportunity to create new ideas, and success were more important to the transfer students than to the occupational students.

11. The occupational students seemed a bit more sure of their reasons for choosing their programs than the transfer students did.

12. The occupational students relied a bit more on employment and a bit less on assistance for financing their education than the transfer students did.

Appendix A

The following letter was also sent to:

83-84

Mr. John R. Mayor
Director of Education
American Association for the Advancement of Science
1515 Massachusetts Avenue, N.W.
Washington, D. C. 20005

Mr. Louis J. Dunham, Jr.
Director
Franklin Institute of Boston
Boston, Massachusetts

October 20, 1970

Mr. Arnold Strassenberg
Professor of Physics
New York State University
Stony Brook, New York

Dear Professor Strassenburg:

Illinois Central College is presently reviewing its practices in the teaching of technical mathematics and technical physics. I have been asked to make a study of this subject in connection with my graduate work at Bradley University.

The review which I have made of the literature has led me to some conclusions, based on the opinions of writers who have studied the field of technical education. Professor Dobrovolny has suggested that the opinions of mathematics and physics majors who have participated in the study of technical education undertaken by the American Association for the Advancement of Science would be of particular value to our study, since they would represent a great depth of understanding both in the subject matter field, and in the field of technical education. He particularly recommended that I contact you to inquire whether you feel that the conclusions I have reached are valid, and if not, in what respect they should be changed.

I am enclosing a copy of my conclusions, and would very much appreciate it if you could take the time to look them over and give me your opinion. Your comments would be of great value, both to Illinois Central College and to me personally in my study.

Very truly yours,

Elizabeth J. Doversberger, Instructor
Engineering and Industrial
Occupations Division

EJD:jg
Enclosure

November 17, 1970

Dr. Maurice W. Roney
Texas State Technical Institute
Waco, Texas

Dear Dr. Roney:

I appreciate very much the opportunity to submit the conclusions of my recent study of the teaching of technical mathematics and technical physics for your comment, and your willingness to distribute questionnaires to members of your faculty.

The study, which is being done in connection with my graduate work at Bradley University, was requested by the Chairman of our Engineering and Industrial Occupations Division as part of the re-evaluation of the practices in the teaching of these subjects at Illinois Central College.

The first phase of the study has entailed an examination of the practices in Illinois Junior Colleges, through the use of questionnaires, and a review of the literature. The conclusions reached in this phase of the study are enclosed.

In the second phase of the study, a set of questionnaires has been designed to explore the background and aspirations of junior college students in transfer and occupational curricula, and another set has been designed to explore whether there are differences in the backgrounds and attitudes of faculty members in the two types of curricula.

Since the technical institutes have long been the leaders in technical education, it will be most helpful to compare the backgrounds and opinions of faculty in the technical institutes and in the junior colleges. Questionnaires designed for faculty are therefore being sent to a number of the outstanding technical institutes. It is this set which is being sent to you under separate cover.

Your participation in the study is of particular value to me since your dissertation and your other articles have been my most important source of information. Thank you for agreeing to take part.

Very truly yours,

Mrs. Richard Doversberger, Instructor
Engineering and Industrial
Occupations Division

RD:jg

Appendix B

QUESTIONNAIRE FOR FACULTY MEMBERS 86-87

Please answer all of the following questions. Note that on all questions, it is your opinion that is desired; you need not have detailed information in order to answer.

1. In my opinion, the most important function of the Community College is: (please rank in order of importance - 1 for most important, 2 for next most important, etc.)

_____ a) transfer program
_____ b) occupational program
_____ c) continuing education
_____ d) community service programs
_____ e) other_____

2. Occupational programs should:

_____ a) parallel the first two years of baccalaureate programs in four-year institutions
_____ b) prepare the student to enter a four-year institution at the junior level
_____ c) offer the same subject matter as baccalaureate programs, but at a lower level of difficulty
_____ d) offer specialized training not available at four-year institutions
_____ e) other_____

3. Transfer programs should:

_____ a) parallel the first two years of baccalaureate programs in four-year institutions
_____ b) prepare the student to enter a four-year institution at the junior level
_____ c) offer the same subject matter as baccalaureate programs, but at a lower level of difficulty
_____ d) offer specialized training not available at four-year institutions
_____ e) other_____

4. The most important criteria for the selection of those instructors who are to teach in transfer programs are: (please rank in order of importance - 1 for the most important, 2 for the next most important, etc.)

_____ a) baccalaureate degree in subject matter area
_____ b) masters degree in subject matter area
_____ c) doctorate degree in subject matter area
_____ d) baccalaureate degree in education
_____ e) masters degree in education
_____ f) doctorate in education
_____ g) industrial experience related to subject matter area
_____ h) teaching experience
_____ i) understanding of overall program of community college
_____ j) understanding of transfer program of community college
_____ k) other_____

5. The most important criteria for the selection of those teaching in engineering related occupational programs are: (please rank 1, 2, etc. as above)

_____ a) baccalaureate degree in subject matter area
_____ b) masters degree in subject matter area
_____ c) doctorate in subject matter area
_____ d) baccalaureate degree in education
_____ e) masters degree in education
_____ f) doctorate in education
_____ g) industrial experience related to subject matter area
_____ h) teaching experience
_____ i) understanding of overall program of community college
_____ j) understanding of occupational program of community college
_____ k) other_____

6. Mathematics courses for transfer programs should be:

_____ a) taught as "pure" mathematics
_____ b) taught with a strong emphasis on applications
_____ c) taught with a strong emphasis on theory
_____ d) other_____

7. Mathematics courses for engineering related occupational programs should be:

_____ a) taught as "pure" mathematics
_____ b) taught with a strong emphasis on paplications
_____ c) taught with a strong emphasis on theory
_____ d) other_____

8. Physics courses for transfer programs should be:

_____ a) taught as "pure" science
_____ b) taught with a strong emphasis on applications
_____ c) taught with a strong emphasis on theory
_____ d) other_____

9. Physics courses for engineering related occupational programs should be:

_____ a) taught as "pure" science
_____ b) taught with a strong emphasis on applications
_____ c) taught with a strong emphasis on theory
_____ d) other_____

10. Mathematics courses for engineering related occupational programs should

_____ a) be taught the same as for transfer programs
_____ b) be taught with the same degree of theory, but in less detail than for transfer programs
_____ c) be taught at the same level of difficulty but with more applications than for transfer programs
_____ d) cover the same material as transfer courses but in less depth
_____ e) be more selective in subject matter than transfer courses but be taught at the same level of difficulty
_____ f) other_____

11. Mathematics courses for transfer and engineering related occupational programs should:

_____ a) be taught in the same manner
_____ b) cover the same material, but differ in degree of difficulty
_____ c) cover the same material but differ in level of theory
_____ d) cover the same material but differ in type of applications used.
_____ e) cover different material in a different way
_____ f) other_____

12. The mathematics courses I would prefer to teach are: (please rank in order of preference - 1 for the most preferred, 2 for the next most preferred, etc.)

_____ a) remedial (high school level) algebra
_____ b) remedial (high school level) geometry
_____ c) intermediate algebra
_____ d) college algebra
_____ e) analytic geometry
_____ f) calculus
_____ g) differential equations
_____ h) technical mathematics
_____ i) other_____

13. Students in transfer programs in community colleges should:

_____ a) be selected on the basis of satisfactory high school record and ACT scores
_____ b) be admitted as space is available on a first-come, first-served basis
_____ c) be selected from the top applicants available
_____ d) meet the same requirements as in four-year institutions
_____ e) other_____

14. Students in occupational programs should:

_____ a) be selected on the basis of satisfactory high school record and ACT scores
_____ b) be admitted as space is available on a first-come, first-served basis
_____ c) be selected from the top applicants available
_____ d) meet the same requirements as in four-year institutions
_____ e) other_____

15. In my opinion, applicants for transfer programs in community colleges are generally:

_____ a) in the top quartile of their high school graduating class
_____ b) in the second quartile of their high school graduating class
_____ c) in the third quartile of their high school graudating class
_____ d) in the fourth quartile of their high school graduating class

16. In my opinion, applicants for transfer programs in community colleges:

_____ a) are generally equal in ability to applicants for four-year institutions
_____ b) are generally of lower ability than applicants for four-year institutions
_____ c) are generally superior in ability to applicants for four-year institutions
_____ d) vary more in ability than applicants for four-year institutions

17. In my opinion, applicants for engineering related occupational programs in community colleges are generally

_____ a) in the top quartile of their high school graduating class
_____ b) in the second quartile of their high school graduating class
_____ c) in the third quartile of their high school graduating class
_____ d) in the fourth quartile of their high school graduating class

18. In my opinion, applicants for engineering related occupatioaal programs in community colleges

_____ a) are generally equal in ability to applicants for four-year institutions
_____ b) are generally of lower ability than applicants for four-year institutions
_____ c) are generally superior inability to applicants for four-year institutions
_____ d) vary more in ability than applicants for four-year institutions

19. Students in transfer and engineering related occupational programs in community colleges (mark one or more)

_____ a) are alike in most respects
_____ b) differ in ability
_____ c) differ in degree of motivation
_____ d) differ in socioeconomic background
_____ e) differ in goals
_____ f) other_____

20. Please indicate whether in your opinion, students with:

a) greater ability choose transfer curricula_____
occupational curricula_____

b) greater motivation chosse transfer curricula_____
occupational curricula_____

c) higher socioeconomic background choose
transfer curricula_____
occupational curricula_____

d) higher aspirations choose transfer curricula_____
occupational curricula_____

21. Students in engineering related occupational programs who consistently make good grades should:

_____ a) be encouraged to change to transfer curricula
_____ b) continue on the Associate degree
_____ c) be helped to find employment after graduation
_____ d) be encouraged to go on to four-year technology programs granting the baccalaureate degree
_____ e) other_____

22. I am teaching:

_____ a) full-time
_____ b) part-time

23. My rank is

_____ a) instructor
_____ b) assistant professor
_____ c) associate professor
_____ d) professor
_____ e) none
_____ f) other_____

24. My highest earned degree is

_____ a) certificate
_____ b) assocaite degree
_____ c) baccalaureate degree
_____ d) masters degree
_____ e) specialist degree
_____ f) doctorate
_____ g) other_____

25. The department in which I am teaching is

_____ a) Mathematics
_____ b) Science
_____ c) Mathematics and Science combined
_____ d) Occupational (Engineering related)
_____ e) other_____

26. Teaching experience (please give number of years and level:

_____

_____

_____

27. Industrial experience)please give general type of experience, as mechanical engineering, research laboratory, etc., and number of years)

_____

_____

_____

STUDENT QUESTIONNAIRE

Please complete all of the following questions and return the questionnaire to your instructor.

1. After completion of my Associate degree, I would like if possible to

____ a) continue my college education
____ b) find employment
____ c) work for a while and return to school later
____ d) work full-time and continue to school part-time
e) (other)_____

2. After completion of my college education, I hope to find employment as (please specify)

_____

3. At the present time, the highest degree I hope to hold is

____ a) certificate
____ b) associate degree
____ c) bachelor's degree
d) (other)_____

4. Members of my immediate family who have attended or are attending college include

____ a) father
____ b) mother
____ c) sister(s)
____ d) brother(s)
____ e) none

5. The most important things to me in choosing a job would be: (please rank in order of importance - 1 for most important, 2 for next most important, etc.)

____ a) money
____ b) job security
____ c) working conditions
____ d) opportunity for advancement
____ e) variety
____ f) opportunity to serve humanity
____ g) opportunity to create new ideas
____ h) (other)_____

6. The most important immediate goal in my life at present is _____

_____

7. The most important goal in my life ten years from now will probably be

_____

8. The program I am enrolled in is _____

9. I selected this program because _____

10. Age_____

11. Marital status _____

12. My education is being financed by

_____a) full-time employment
_____b) part-time employment
_____c) G.I. Bill
_____d) parents
_____e) loan
_____f) scholarship
_____g) (other)_____

QUESTIONNAIRE FOR FACULTY MEMBERS

Please answer all of the following questions. Note that on all questions, it is your opinion that is desired; you need not have detailed information in order to answer.

1. In my opinion, the programs of the Technical Institute should

_____ a) parallel the first two years of baccalaureate programs in four-year institutions
_____ b) prepare the student to enter a four-year institution at the junior level
_____ c) offer the same subject matter as baccalaureate programs, but at a lower level of difficulty
_____ d) offer specialized training not available at four-year institutions
_____ e) (other)_____

2. The most important criteria for the selection of instructors to teach in technical institutes are: (please rank in order of importance - 1 for most important, 2 for next most important, etc.)

_____ a) baccalaureate degree in subject matter area
_____ b) master's degree in subject matter area
_____ c) doctorate in subject matter area
_____ d) baccalaureate degree in education
_____ e) master's degree in education
_____ f) doctorate in education
_____ g) industrial experience related to subject matter area
_____ h) teaching experience
_____ i) understanding of philosophy of higher education
_____ j) understanding of the philosophy of technical education
_____ k) understanding of the programs of own institution
_____ l) (other)_____

3. The most important criteria for the selection of instructors to teach in four-year baccalaureate degree programs are: (please rank in order of importance - 1 for most important, 2 for next most important, etc.)

_____ a) baccalaureate degree in subject matter
_____ b) master's degree in subject matter area
_____ c) doctorate in subject matter area
_____ d) baccalaureate degree in education
_____ e) master's degree in education
_____ f) doctorate in education
_____ g) industrial experience related to subject matter area
_____ h) teaching experience
_____ i) understanding of philosophy of higher education
_____ j) understanding of the programs of own institution
_____ k) (other)_____

4. Mathematics courses for technical institute programs should be

_____ a) taught as "pure" mathematics
_____ b) taught with a strong emphasis on applications
_____ c) taught with a strong emphasis on theory
_____ d) (other)_____

5. Mathematics courses for baccalaureate degree programs should be

_____ a) taught as "pure" mathematics
_____ b) taught with a strong emphasis on applications
_____ c) taught with a strong emphasis on theory
_____ d) (other)_____

6. Physics courses for technical institute programs should be

_____ a) taught as "pure" science
_____ b) taught with a strong emphasis on applications
_____ c) taught with a strong emphasis on theory
_____ d) (other)_____

7. Physics courses for baccalaureate degree programs should be

_____ a) taught as "pure" science
_____ b) taught with a strong emphasis on application
_____ c) taught with a strong emphasis on theory
_____ d) (other)_____

8. Mathematics courses for engineering-related technical education programs should

_____ a) be taught the same as for baccalaureate degree programs
_____ b) be taught with the same degree of theory, but in less detail than for baccalaureate degree programs
_____ c) be taught at the same level of difficulty, but with more applications than for baccalaureate degree programs
_____ d) cover the same material as baccalaureate degree courses, but in less depth
_____ e) be more selective in subject matter than baccalaureate degree courses, but be taught at the same level of difficulty.
_____ f) (other)_____

9. Mathematics courses for baccalaureate degree and engineering-related technical education programs should

_____ a) be taught in the same manner
_____ b) cover the same material, but differ in degree of difficulty
_____ c) cover the same material, but differ in level of theory
_____ d) cover the same material, but differ in type of applications used
_____ e) cover different material in a different way
_____ f) (other)_____

10. The mathematics courses I would prefer to teach are: (please rank in order of preference - 1 for the most preferred, 2 for the next most preferred, etc.)

_____ a) remedial (high school level) algebra
_____ b) remedial (high school level) geometry
_____ c) intermediate algebra
_____ d) college algebra
_____ e) analytic geometry
_____ f) calculus
_____ g) differential equations
_____ h) technical mathematics
_____ i) (other)_____

11. Students in engineering-related programs in technical institutes should

_____ a) be selected on the basis of satisfactory high school record and ACT scores
_____ b) be admitted as space is available on a first-come, first-served basis
_____ c) be selected from the top applicants available
_____ d) meet the same requirements as in four-year institutions
_____ e) (other)_____

12. Students in baccalaureate degree programs should

_____ a) be selected on the basis of satisfactory high school record and ACT scores
_____ b) be admitted as space is available on a first-come, first-served basis
_____ c) be sslected from the top applicants available
_____ d) (other)_____

13. In my opinion, applicants for engineering-related programs in technical institutes are generally

_____ a) in the top quartile of their high school graduating class
_____ b) in the second quartile of their high school graduating class
_____ c) in the third quartile of their high school graduating class
_____ d) in the fourth quartile of their high school graduating class

14. In my opinion, applicants for engineering-related programs in technical institutes

_____ a) are generally equal in ability to applicants for four-year institutions
_____ b) are generally of lower ability than applicants for four year institutions
_____ c) are generally superior in ability to applicants for four-year institutions
_____ d) vary more in ability than applicants for four-year institutions

15. In my opinion, applicants for baccalaureate degree programs are generally

_____ a) in the top quartile of their high school graduating class
_____ b) in the second quartile of their high school graduating class
_____ c) in the third quartile of their high school graduating class
_____ d) in the fourth quartile of their high school graduating class

16. Students in baccalaureate degree programs and those in engineering-related technical institute programs (mark one or more)

_____ a) are alike in most respects
_____ b) differ in ability
_____ c) differ in degree of motivation
_____ d) differ in socioeconomic background
_____ e) differ in goals
_____ f) (other)_____

17. Please indicate whether in your opinion, students with

a) greater ability choose
baccalaureate degree programs_____
technical institute programs _____

b) greater motivation choose
baccalaureate degree programs_____
technical institute programs _____

c) higher socioeconomic background choose
baccalaureate degree programs_____
technical institute programs _____

d) higher aspirations choose
baccalaureate degree programs_____
technical institute programs _____

18. Students in engineering-related technical institute programs who consistently make good grades should

_____ a) be encouraged to change to transfer curricula
_____ b) continue on to the Associate degree
_____ c) be helped to find employment after graduation
_____ d) be encouraged to go on to four-year technology programs granting the baccalaureate degree
_____ e) (other)_____

19. I am teaching

_____ a) full-time
_____ b) part-time

20. My rank is

_____ a) instructor
_____ b) assistant professor
_____ c) associate professor
_____ d) professor
_____ e) none
_____ f) (other)_____

21. My highest earned degree is

_____ a) certificate
_____ b) associate degree
_____ c) baccalaureate degree
_____ d) master's degree
_____ e) specialist degree
_____ f) doctorate
_____ g) (other)_____

22. Teaching experience (please give number of years, and level)

_____

_____

_____

23. Industrial experience (please give general type of experience, as mechanical engineering, research laboratory, etc., and number of years)

_____

_____

_____

BRADLEY UNIVERSITY

PEORIA, ILLINOIS 61606

COLLEGE OF EDUCATION

May 2, 1972

Marcia A. Boyer (Mrs.)
Acquisitions Specialist
ERIC CLEARINGHOUSE FOR JUNIOR COLLEGES
96 Powell Library Building
University of California
Los Angeles, California 90024

Mrs. Boyer :

Your communication of March 27, 1972 suggested that your division of ERIC would welcome documents concerning the junior college field.

Under a separate cover I am enclosing two documents or rather one document with two phases. These were prepared by Mrs. Betty Doversberger, then a graduate student at Bradley University, Peoria, Illinois. Both documents concern the teaching of technical mathematics and technical physics in the junior colleges of Illinois. Phase II of the study also included some comparative information from colleges beyond the state boundaries of Illinois.

Without reservations I recommend that this study be included in the ERIC publications for junior colleges.

Sincerely yours,

John E. Dalton

John E. Dalton, Ph.D.
Professor of Education