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AUTHOR Baran, Anna DeSantis; Gilli, Angelo C., Sr.
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ABSTRACT

The collection of selected papers of Joseph T. Impellitteri reprints in full, or excerpts from, 46 unpublished position and conference papers, research and program proposals, and project reports, and from 20 published articles, chapters from edited collections, bulletins and special studies which Impellitteri authored or co-authored. The papers are presented chronologically for the years 1963 to 1972. The papers deal generally with the following subjects: vocational development, occupational guidance (especially that which is computer assisted), occupational competency assessments, instructional media, self-concepts of vocational students, graduate vocational education at Pennsylvania State University, vocational education research, and professional teacher education. (JR)

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THE
PENNSYLVANIA
STATE
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DEPARTMENT
OF
VOCATIONAL
EDUCATION

SELECTED PAPERS OF
JOSEPH T. IMPELLITTERI

ANNA DESANTIS BARAN
AND
ANGELO C. GILLI, SR.



DEPARTMENT OF VOCATIONAL EDUCATION
UNIVERSITY PARK, PENNSYLVANIA

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Preface

This is a special report of the Department of Vocational Education of The Pennsylvania State University. The authors mutually decided to embark on this activity for several reasons. The task included searching for relevant materials and then sorting through them for those items which would be most appropriate for inclusion. As indicated, the reasons for preparing this manuscript are numerous, they include (1) to preserve in one volume the most significant writings of the late Professor Joseph T. Impellitteri; (2) to provide documentation of his writings and professional thoughts for faculty and students of the department, as well as selected national leaders in vocational education; and (3) to maximize the effect of Professor Impellitteri's works and thoughts upon the profession of vocational education.

The authors were not disinterested researchers, each had known and worked with Professor Impellitteri for a number of years before his death. While the passing of time does soften the trauma and distress associated with sudden and unexpected death, it is our hope that the prolific writings of Dr. Impellitteri would remain in circulation among vocational educators long enough for professionals to derive maximum benefit from his efforts.

Professor Impellitteri was, in our opinion, one of the first to recognize the importance of professionalizing vocational education. A point of view that was extant throughout his works with regard to this matter was that vocational education must be based upon sound theoretical constructs. He worked hard at attempts to help develop such constructs in a number of areas, including career development, counseling

activities, occupational competency assessments, use of media, and self-concepts of vocational students. The Vocational Developmental Study, designed and inaugurated by Professor Impellitteri continues to this day, and is now considered an ongoing departmental research activity. His early revelations regarding occupational competency testing were based on principles that endure and continue to apply. His many publications in scholarly journals carried his name and that of this department to professionals all over the country. Those of us who remain behind are deeply appreciative of that fact.

The authors believe that perhaps the major contribution made by Professor Impellitteri was the establishment of the research-oriented direction of the graduate studies portion of the department. The momentum established by him through his initiative and by serving as a model for colleagues continues to this day. Many of us hope to see it continue this way well into the future.

As a final comment, the authors wish to express their appreciation to the many persons who helped us find all papers, presentations, and proposals that emerged from the pen of this distinguished vocational educator. A special sense of appreciation is extended to Barbara Impellitteri for permitting us to look through her files of his works. The authors assume responsibility for any errors that may appear in this manuscript.

Anna DeSanti's Baran
Angelo C. Gilli, Sr.
University Park, Pennsylvania
July, 1975

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Chapter I

1963 to 1965

During the years 1963 through 1965, which marked the start of his professional career, Dr. Impellitteri, was involved in the production of nine works worthy of note in this publication. The central focus of these writing efforts are described in this chapter.

In 1963, he co-authored a paper entitled "Measured Changes in Student Teacher Behavior." The introductory page of this paper succinctly describes the scope of the study from which this paper was derived:

The student teaching experience is generally regarded as one of the most important elements in any program for training teachers; as a matter of fact, it seems to be the only part of the professional program that nobody wants to throw out. Yet very little objective information is available about exactly what happens to students during this experience. The present paper is designed to add something to this little store by presenting the results of objective observations of a sample of teacher trainees made at the beginning and end of their student teaching experience.

The opportunity to do this was provided by a larger study conducted cooperatively by the education department of Hunter College and the Division of Teacher Education of the City University of New York. The general aim of the larger study was to investigate a number of ways in which closed-circuit television might be used to improve teacher education. One phase of the study focused on the use of kinescopes of student teachers in supervision, and was designed to do two things: to compare the relative effectiveness of supervision with and without kinescope recordings, and to develop objective measures of classroom behavior based on direct observation.

A full report of this study has been made to the United States Office of Education, who supported the project. Subsequent to the publication of this report, the data were subjected to a more searching analysis, the results of which will be presented herein (1, p. 1).

The above was, in its totality, a 20-page paper which described three methods incorporated by student teachers during their periods of practice teaching. The summary and conclusions presented in this paper are as follows:

Four films were made of each of 54 student teachers assigned to classes in the Hunter Elementary School, two while they were teaching their first (or almost their first) lessons, and two during two of the last lessons they taught. In the interim between the first and last pairs of films, one third of the students were supervised by each of three "methods": one method used kinescope films to replace the five supervisory visits, one did not, and one used both the visits and the films.

Each of the four films--two "pre" and two "post"--was scored on eight orthogonal dimensions of behavior based on a factor analysis of objective behavior records; and both overall changes in the average level on all eight dimensions and relative changes in different dimensions were studied.

About a fourth of the changes in behavior observed were attributable to effects of the student-teaching experience which were uniform for all students; about half of them appeared to result from individualized reactions to the experience; the remaining changes in part were the effect either of characteristics of the class in which the experience was gained or of the methods of supervision used, and in part represented differences in the experiences of group studies during different semesters. Conditions unique to the first semester, tentatively attributed to the effects of "shake-down problems", distorted the results to such an extent that it was decided that the most accurate picture could be obtained by studying the second and third semester groups separately; variations between these two groups were negligible.

In terms of the aspects of teacher behavior studied, the following conclusions about the effects of student teaching on the classroom behavior of the student teachers were indicated:

1. The student teachers tended to exhibit more of all the behaviors measured at the end of the semester. This tendency could be described as growth toward generally more acceptable classroom behavior equivalent to moving a T-score of 48.1 to one of 51.9--i.e., from a percentile rank of 43 to one of 57 in terms of norms for their own population.

2. Within this overall upward shift there was a tendency for the relative amounts of behaviors of different types to change as follows:
- (a) with respect to teaching behavior there was a sharp increase (5.2 T-score points) on such things as information giving, stating of objectives, relating the lesson to pupil needs and past learnings, and a decrease in such things as making provision for individual differences, using apt, creative, and interest-arousing examples, methods and devices. In a word, the teaching behavior of the student teachers became more informative and less imaginative.
 - (b) with respect to the way student teachers structured pupil role, there was a much greater increase in Pupil Activity--number of questions asked and answered, etc., (7.4 T-score points) than in Pupil Initiative--encouragement of pupils to respond in various ways, relaxation of the rigidity of the structure of the lesson (0.7 points).
 - (c) with respect to emotional climate, there was a substantial increase over the semester in behaviors indicating awareness of pupil feelings and needs--such as the asking of affective-imaginative questions, making of encouraging statements, and generally courteous behavior toward pupils (4.2 points); but relatively little change in the amount or kind of emotional response to the pupils, either in the amount of praise and support or in the amount of reproof and criticism (1.2 points).
3. Teachers supervised by Method K, in which kinescope films made by remote control were used in the supervisory conferences and took the place of actual visits by the supervisor to the classroom showed a larger overall rise in all behaviors measured (5.7 T-score points) than those supervised by Method O, in which the supervisor visited the classroom before each supervisory conference and in which no kinescopes were used (2.8 points); or those supervised by a combination of the two procedures in which a visit preceded each conference and a kinescope of the same lesson was used during it (3.0 points). No difference in the changes in pattern of behavior were found between the methods.
4. No evidence was found that it made any difference which supervisor worked with which student (1, pp. 16, 18, 19).

The work described and quoted above represents Professor Impellitteri's first known publication efforts in the field of education. Worthy of note is the fact that this paper was prepared prior to the completion of his doctoral dissertation.

His ability to work on a full-time research endeavor at the time he was also engrossed in his doctoral dissertation was a characteristic of Professor Impellitteri's capabilities for managing several complex matters at one time. While at Fordham University, Professor Impellitteri was a research assistant, research consultant, and data processing programmer in conjunction with his graduate program responsibilities. This was verified by Dr. Medley, with whom Dr. Impellitteri worked during his tenure at the Office of Education at City University of New York. Dr. Medley, in May, 1964, said:

He has been able to work on several projects simultaneously, switching his attention from one to the other without difficulty and making his own contribution to each. All this has gone on simultaneously with his conduct of his dissertation which he has apparently brought to a successful completion on time.

As is reflected in the review of his sundry writing efforts during his years at The Pennsylvania State University, Professor Impellitteri continued this practice for the remainder of his life.

The following year, June, 1964, Dr. Impellitteri was awarded the Ph.D. degree (in Educational Psychology) by the faculty of Fordham University. The title of his dissertation was "A Study of the Prediction of Final Grades for a Sample of Ninth Grade Males Undertaking an Academic Program in 10 High Schools of the Diocese of Philadelphia."

Overlapping his graduate studies effort at Fordham was his association with the Office of Research and Evaluation in the Division of Teacher Education of the City University of New York. This relationship

extended for a three-year period from February, 1962 through February, 1965. Immediately upon completion of his degree he taught two graduate courses at Fordham University, which was during the summer of 1964. The course titles are indicative of Impellitteri's interest that were already evident at this point in his career: "Introductory Statistics" and "Research Methods." This was followed by his teaching of a course entitled "Measurement and Evaluation for Teachers" during the Fall semester, 1964, at Queens College of the City University of New York. During his service at C.U.N.Y. he worked with a number of research oriented educators including Dr. Harold Mitzel, who presently is Associate Dean for Research, College of Education at The Pennsylvania State University, and Donald Medley, presently Chairman of Methodology at the University of Virginia.

During the academic year 1964-65, the Department of Vocational Education of The Pennsylvania State University initiated a search for a research professor in Vocational Education. The result of this search was the appointment of Dr. Impellitteri to the position of Assistant Professor for Graduate Studies and Research in the Department of Vocational Education at The Pennsylvania State University. Professor Impellitteri's official employment at The Pennsylvania State University began on February 1, 1965. Because of his graduate studies background, he was granted a joint appointment with the Department of Educational Psychology. As was (and is) the policy with the University, Dr. Impellitteri made application to the graduate faculty for associate membership. Such an appointment is made on the basis of demonstrated expertise in graduate studies and research, and his application for associate member of the Graduate Faculty of the University was approved.

He was on the job less than two months when he prepared a proposal concerned with the assessment of occupational competencies of vocational teachers. The first draft of this proposal, entitled "A Proposed Program for the Assessment of Occupational Competency in Industrial Technical Occupations," was completed on March 15, 1965. In this document, Dr. Impellitteri succinctly described one of the most crucial but vexatious problems confronting vocational educators: that of preparing teachers to be competent in the occupational skills that they are required to teach. Regarding this issue, he got to the heart of the issue when he said:

Industrial-technical teacher educators thus find themselves in a unique situation concerning public education. Their job is not, as is the case in most other teacher training situations, to provide a youngster just graduating from high school with four or five years of subject matter courses in what to teach, methods courses in how to teach, and a variety of other education courses concerned with the nature of their pupils. No, in the industrial-technical field the teacher trainee is a mature person of at least 25-30 years of age who has acquired his "subject matter" knowledge on the job. Thus, part of the teacher trainer's job has been done for him (2, p. 1).

In this same document Dr. Impellitteri indicated that checking the preparation acquired by accumulation of work experience by a teacher applicant involves a complex array of variables that make the task almost insurmountable. He suggested an approach to help in alleviating the dilemma. With regard to this matter, he said:

The solution to this problem may be found in a well-organized, effective program of evaluation--well-constructed paper-and-pencil tests of knowledge of an occupation, appropriate manipulative-performance tasks of skills in an occupation, and an over-all well planned system of rating an individual's occupational competency.

When a high-quality evaluation system of occupational competency is developed, what will be its advantages? First, it will allow the industrial-technical teacher educator to state with confidence that an applicant for a teaching position either is or is not knowledgeable or skillful enough in his occupation to be able to teach the occupation to others. He can then be said either to be adequately or inadequately prepared to teach. Secondly, there will be some basis for granting college credit for experience in an occupation. If, on the basis of valid test results, an individual can be said to have mastered the plumbing trade sufficiently to be able to teach the trade, how can we not grant him as much college credit as the French teacher earned from his French courses? (2, p. 2, 3)¹

The objectives of the proposal described above were:

1. To develop an objective system for evaluating occupational competency in those Industrial-Technical occupations where such a need exists;
2. To provide a foundation of objective evidence upon which . . . a realistic plan for meeting the future [occupational competency] needs for industrial-technical teachers in a changing world of work [could be developed].
3. To provide a system of occupational competency evaluation in the industrial-technical field which may be applied in [some of the] other vocational [areas] . . . supported by Public Law [88] 210, as well as services supported by the Manpower Development and Training Act [of 1962, Public Law 87-415], the Economic Opportunities Act [of 1964, Public Law 92-320], the Appalachian [Regional Development] Act [of 1965, Public Law 90-65], and the Elementary-Secondary School [Education] Act [of 1965, Public Law 89-10] (2; p. 4-5).

The procedures suggested by Dr. Impellitteri in this proposal include:

1. development and evaluation of occupational competency tests;
2. development and review of a manipulative and/or skilled performance activities associated within each of the occupations to be considered in the investigation;

¹At the present time, the Department offers up to 15 university credits for work experience previously earned or currently being earned as part of the requirements for Baccalaureate degree program in Vocational Industrial Education.

3. Examination of each applicant's background in order to attempt identification of the contribution of that person's work experience to his (her) occupational competency.

Professor Impellitteri's discussion relative to the program proposed by him in this document describes the intent of this effort in a forthright manner:

The testing program for selecting qualified persons to teach courses in a specialized occupation should integrate all phases of evaluation of occupational competency that may be considered to be useful including: 1. experience in the occupation; 2. general educational achievement; 3. specific formal training in the occupation; 4. knowledge of the occupation; 5. actual performance of manipulative and skilled activities that may be expected of a skilled individual in that occupation; and 6. an interview with each candidate.

An adequate evaluation of the occupational competency testing program can be undertaken only through unified planning. And unified planning results only from a pooling of ideas and efforts toward common objectives.

Objective evidence is needed upon which reasonable policy changes or support for existing policies may be based. The nature of such evidence would result from the proposed program in the form of:

1. relationships between number of years of specific occupational experience and score on a paper-and-pencil occupational competency test;
2. relationship between manipulative-performance achievement and score on a paper-and-pencil occupational competency test;
3. difference in manipulative-performance achievement of those with relatively short-term diversified experience in an occupation, and those with a relatively long-term, narrowly defined experience in the same occupation . . . (2, p. 16).

Dr. Impellitteri then went on to point out several implications for policy-making that could be supported by such findings. He said:

1. The paper-and-pencil test of occupational knowledge should be used only as a screening device, and the manipulative-performance test should be used as the sole criterion of occupational competency. (This probably would be found to vary from occupation to occupation.)

2. For certain occupations at least 6 years of diverse experience is necessary for an applicant to qualify as competent in that occupation.
3. Each person who applied for a certification of competency in an occupation should be allowed to undergo the entire evaluative process, with weights being assigned to each of the pertinent variables. An empirically determined global minimum score could be assigned as a minimum for passing, and each applicant could then be objectively certificated as competent in the occupation or not, depending upon whether he equally or surpassed the minimum cutoff score.

Summary and Recommendations

Within the Department of Vocational Education of The Pennsylvania State University there is recognized a critical need for the establishment of an effective program to evaluate the occupational competency of individuals interested in teaching an occupation to others in the State of Pennsylvania.

It is also recognized with the Department that in order to establish an effective program of evaluation, leadership and coordination of efforts are needed. In the current structure of this department, such leadership and coordination of efforts cannot be provided. Those currently employed on the staff do not have the time nor the technical capabilities and experience necessary to successfully carry out such a program. A half-hearted, half-staffed attempt will not provide the needed results.

It is hereby recommended that the program of evaluation of occupational competency as described herein be accepted as proposed in terms of staffing, responsibilities and budget. No less comprehensive, less expensive effort would be worth considering (2, p. 17-18).

Dr. Impellitteri's interest in occupational competency testing of pre-service and in-service vocational teachers went beyond this proposal, as evidenced by another paper on the same subject written in the fall of 1965. This paper was entitled, "An Analysis of the Occupational Competency Evaluation Program at The Pennsylvania State University from 1944 to 1965." He described the highlights of this period regarding activities related to Occupational Competency in the Department of Vocational Education of The Pennsylvania State University.

During the summer of 1975 the trade competency evaluation data gathered in the Penn State area from May 26, 1944 to March 20, 1965 was analyzed. Included in the sample for the analysis were 718 persons who had taken trade competency examinations in the Penn State area during that period. It was found that the average IQ of the group was 107 as measured by the Otis Self-Administering Test of Mental Ability. In addition, it was found that:

1. When he took the trade competency examination, the average individual was 37 years old and had twelve and one-half years of industrial experience.
2. The number of years of industrial experience possessed by an individual was not indicative of his success on either the performance or written portions of the trade tests.
3. During the 20-year period covered by the present study, thirty or more competency examinations were administered in only four occupations--151 in Machine Shop, 90 in Automechanics, 79 in Carpentry and 36 in Mechanical Drafting.
4. The mechanical draftsmen were younger (average age 34.9), had fewer years of industrial experience (8.9), and measured higher on the intelligence test (112) than those in the other three occupations.
5. Adequate data was not available to conduct a needed evaluation of the existing trade competency examinations.
6. No positive statement could be made in determining the value of the current occupational competency evaluation program at Penn State (3, p. 1).

Later in this document, apparently in the interest of emphasis, he again stated that major problems existed in attempts to accurately assess the competencies of vocational teachers, especially with regard to the relevance of previous work experience to future teaching assignments. Professor Impellitteri's doubts about the accuracy of this approach for assessing vocational teacher qualifications turned out to be a harbinger of queries raised by a few other vocational education leaders later in the sixties.

Recognizing the limitations of the approach, he suggested how a system of occupational competency examinations can be established at institutions such as The Pennsylvania State University. These

suggestions were based upon the outcomes of the investigation he conducted. He carefully pointed out that the analysis of data was to be performed in three phases: First, for the entire group; second, an analysis based on two groups divided on the basis of their years of work experience; and third, for individuals grouped according to occupation.

The results of the investigation alluded to above were described in this paper. Dr. Impellitteri reported his findings in terms of 12 variables (performance test score, written test score) OTIS IQ, English test, part I, English test, part II, age at time of examination, years in occupation, appearance rating, determination rating, initiative rating, voice rating, and command of language rating.

Professor Impellitteri made the following recommendations with regard to altering the occupational competency testing program at The Pennsylvania State University as it existed at that time:

1. Administer each of the competency examinations whether in carpentry, plumbing, auto-mechanics or electronics to a number of individuals (regardless of their years of industrial experience) presently employed in those corresponding occupations. By doing this evidence will be collected which would help to answer the following questions:
 - a) Are each of the occupational competency examinations (both performance and written parts) of comparable difficulty? Some evidence based on data collected over a 20-year period had been provided in the present investigation to suggest that the degree of difficulty varies from test to test. This evidence, however, is not adequate to answer this question since the data were based on more than one competency examination per occupation. The competency examinations currently being utilized in the Penn State area could possibly result in the following situation. An individual working in the electronics field must be outstanding as compared to other workers in that field in order to pass the competency examination in electronics, whereas the carpenter may possess

only average knowledge and skill in that occupation and may be able to pass the competency examination.

- b) Are there included in the examination unfair, misleading, or ambiguous items that when eliminated would result in an increase of test validity and reliability?
 - c) What score does the average worker in an occupation achieve on the competency examination utilized for selection of teachers in that occupation? There currently exists no evidence to indicate the relative occupational competency of the individuals who do well on the competency exams as compared to the typical workers in those occupations. The construction of norms is essential when test results are utilized for selection.
 - d) Does the number of years of industrial experience an individual has had affect his performance (either by increasing or decreasing his score) on any portion of the competency examination? The findings related in the present investigation tend to support the contention that experience (beyond the required six years) makes no difference. It may well be that an analysis of the items that make up a test reveals that certain items are positively related to the variable, and others are not related at all. Knowledge of this type would provide for this insight in establishing some framework for the construction of additional competency examinations and revision of existing ones.
2. Eliminate the practice of interviewers rating the individuals on five separate characteristics. Based on the analysis of the current data, one global rating would be more appropriate and revealing.

This investigation was conducted in order to uncover certain facts that may be of future use in assessing the occupational competency evaluation effort in the Penn State region. To the investigator, its primary value has been to discover that a greatly expanded effort is needed. More data must be collected and analyzed in order to justify the use of the current testing and evaluation program.

It was found that during the period between 1944 and 1965 competency examinations were administered to 718 applicants for teacher certification in fifty-nine different occupations. Of these 718 applicants over half were employed in four occupations: automechanics, machine shop practice, mechanical drafting, and carpentry. Thus, fifty-five difference

occupation examinations were administered to under 350 individuals over a 20-year period, an average of less than one every three years.

The high cost involved in constructing occupational competency examinations of proven worth is prohibitive for those occupations for which applicants are few.

It is thereby additionally recommended that a decision be made as to which occupations warrant the cost of the procedure suggested above (#1), and which do not. For those that do not justify the expenditure because of limited use the current practice of administering a competency examination in those occupations should be ceased. An examination of questionable value leads only to the selection of questionable personnel. Some other means of evaluation of applicants should be utilized.

In those occupations where the cost is justified in terms of frequent use, the recommended steps should be taken to establish the value of the examinations.

There appears to be no other alternative if we are to be honest to our profession and fair with those that seek entry to it (3, pp. 17-19).²

Professor Impellitteri's interest in occupational competency testing continued, as evidenced by other writings related to this subject in the following year.

Several months after arriving at The Pennsylvania State University (i.e., April 5, 1965) Dr. Impellitteri devised a scheme for inaugurating future research activities by the Department of Vocational Education. His plan, although an ambitious one, was realistic in nature and was probably intended to serve as a research strategy for the Department for a decade or more. The plan encompassed five major areas of research

²In 1969, the Department of Vocational Education eliminates the interview process entirely as part of the Occupational Competency Evaluation Program. A proposal has been funded by Pennsylvania Department of Education and work is currently being done on the Revision and Revamping in many occupational competency examinations.

within the broad rubric of vocational education, and also sought to identify major basic and applied research topics in the trade and industrial area of vocational education. The taxonomy of this plan, which is displayed in Figure 1, revealed a total of 24 possible research topics in vocational education.

It is interesting to note, in retrospect, that most of the topics listed by Professor Impellitteri in that document are still considered to be critical topics in which research should be continued at the present and into the foreseeable future. Therefore, this young professor's research plan for the Department of Vocational Education was indeed a farsighted strategy for the research thrust of the Department of Vocational Education.

In May of 1965, four months after his appointment to the faculty of the Department of Vocational Education at The Pennsylvania State University, the report of a study in which Dr. Impellitteri was in charge of the data collection and statistical analysis and which was authored by him was published by the Office of Research and Evaluation (Division of Teacher Education) C.U.N.Y. The report was entitled, "Teacher Education Graduates of 1954: Their Careers Ten Years After Graduation." This study surveyed graduates of the 1953-54 teacher education programs of the senior colleges of C.U.N.Y.

The actual nature of this study, its scope, as well as its findings and conclusions derived therein are described below:

This 1964 survey, the fourth follow-up study, was designed to examine the careers of the 1953-54 student teachers of the municipal colleges, and to investigate the relationship of several factors to persistence in teaching. The purpose of the investigation was to provide some basic facts concerning teacher persistence which might be useful in plans to meet the growing demand for teachers.

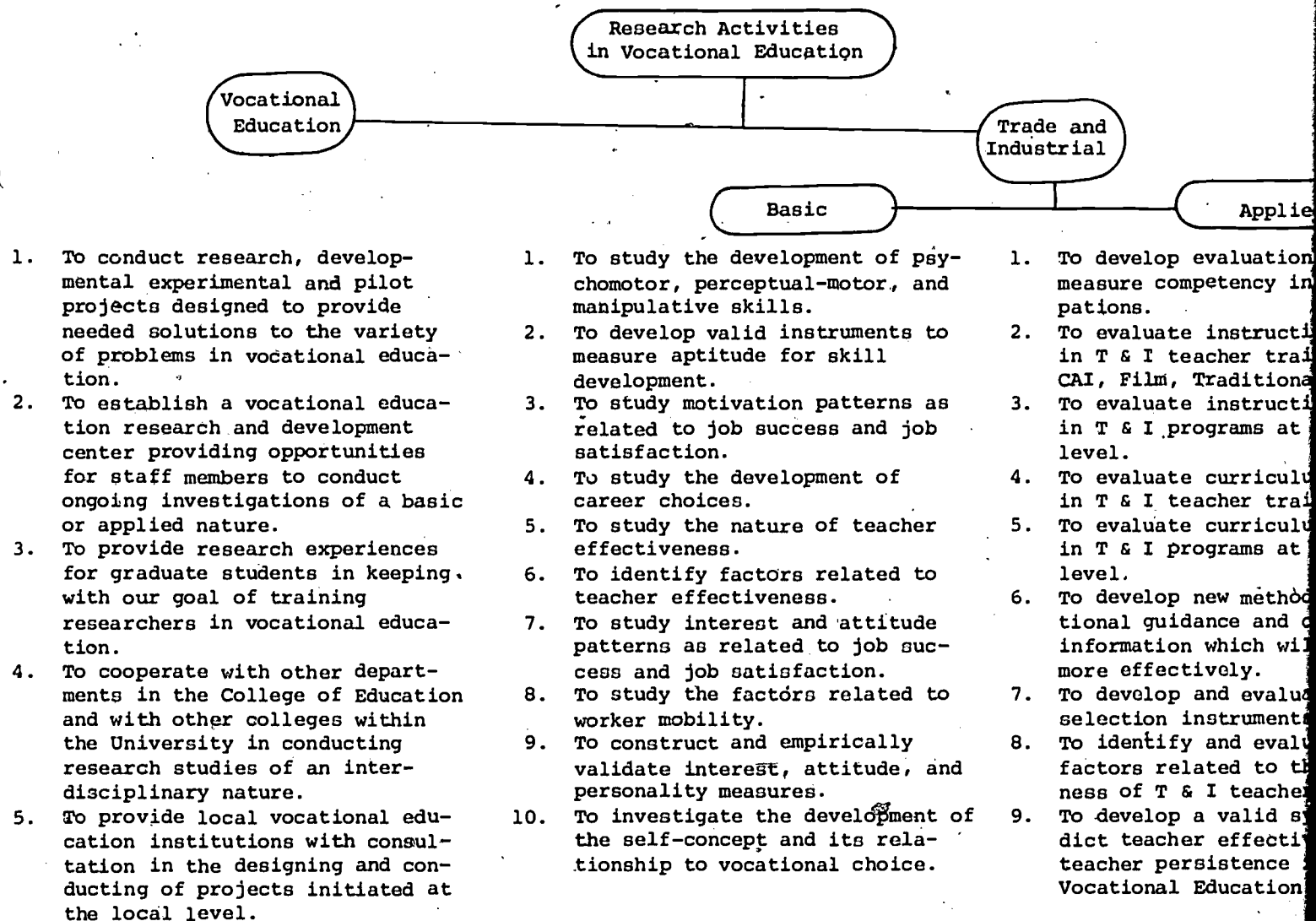
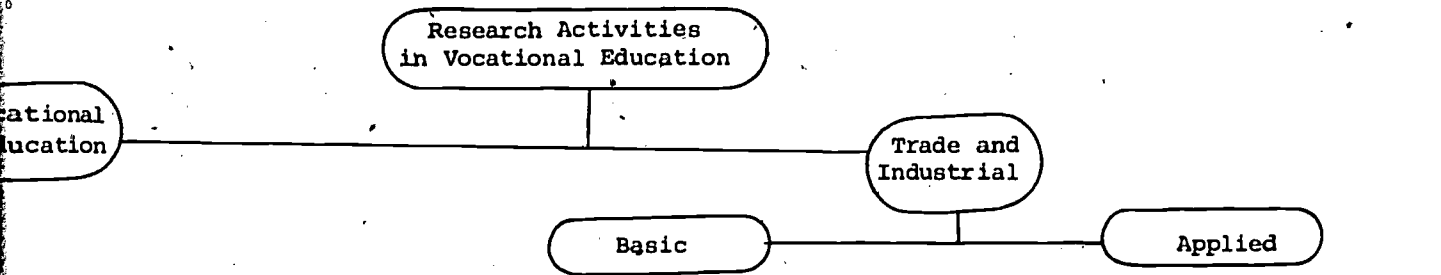


Figure 1. Impellitteri Strategy for Future Research Activities in the Department of Vocational Education, April 5, 1965 (4, p. 1)



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1. To study the development of psychomotor, perceptual-motor, and manipulative skills.
2. To develop valid instruments to measure aptitude for skill development.
3. To study motivation patterns as related to job success and job satisfaction.
4. To study the development of career choices.
5. To study the nature of teacher effectiveness.
6. To identify factors related to teacher effectiveness.
7. To study interest and attitude patterns as related to job success and job satisfaction.
8. To study the factors related to worker mobility.
9. To construct and empirically validate interest, attitude, and personality measures.
10. To investigate the development of the self-concept and its relationship to vocational choice.

1. To develop evaluation systems to measure competency in T & I occupations.
2. To evaluate instructional methods in T & I teacher training. (TV, CAI, Film, Traditional.)
3. To evaluate instructional methods in T & I programs at the local level.
4. To evaluate curriculum materials in T & I teacher training.
5. To evaluate curriculum materials in T & I programs at the local level.
6. To develop new methods in vocational guidance and occupational information which will operate more effectively.
7. To develop and evaluate objective selection instruments.
8. To identify and evaluate those factors related to the effectiveness of T & I teachers.
9. To develop a valid system to predict teacher effectiveness and teacher persistence in T & I Vocational Education.

15

eri Strategy for Future Research Activities in the
 t of Vocational Education, April 5, 1965 (4, p. 1)



In interpreting the findings it is important to take note of some of the limitations of the survey. The current study was based on data collected on one class of student teachers graduated from the four New York City municipal colleges. Although there is no reason to believe that these graduates differ significantly from municipal college graduates of other years, we must acknowledge the possibility that factors of which we are unaware may have been operative. The degree to which the results may be generalized to graduates from other colleges and universities is uncertain.

Identifying non-respondents is a source of concern in all survey studies; although some of the evidence indicated that there was no difference between respondents and non-respondents on certain selected factors, the possibility exists that the groups differ on other factors and that the findings might be significantly altered if replies to the questionnaire were received from the entire population.

The results of all the four surveys are similar. The overwhelming majority of student teachers are females who are prepared for teaching at the elementary school level as compared with the small number of males, who tend to prepare for secondary school teaching. Males are more likely to be persistent teachers, provided they enter the profession soon after graduation. It is quite clear that virtually all those leaving teaching are women, and that they leave because of marital and maternal obligations.

The difference between the group that returns to teaching and the group who at the time of the survey have not yet returned, seems largely due to the presence of children of pre-school age. Another contributing factor to persistence is the annual income of the spouse.

The trends are directly related to sex differences. For example, a consistent finding is that the older respondents tend to be more persistent; with increasing age there is a decrease in the marriage probability for females.

In order to meet the problem of attracting more persistent teachers what measures can be taken? It is apparent that active recruiting of males to engage in teaching, with particular attention to teaching at the elementary levels should be encouraged. It also appears that recruitment procedures should focus on the older group of students, those who are at least 27 years old at the time of graduation, who tend to be the more persistent teachers.

However, the largest number of people trained for teaching are young women who tend to leave the profession. In terms of present and future needs for trained teachers, whatever can be done to encourage these women to return to the classroom will help improve the present supply and demand situation. Firstly, it must be expected that about 80 percent of those trained women who actually have taught will leave the profession at least once for the reason

of maternity. Secondly, while it is most likely that they will stay away from the classroom until their children reach school age, this period of time may be reduced. Rabinowitz and Crawford (5) . . . suggested the following measures designed to shorten this period of non-employment: (1) the establishment of tuition-free nursery schools close to the schools in which the returnees are to be employed; and (2) permission for teachers to teach on a part-time basis. Support for the advisability of the second suggestion comes from the sharp increase in percentage of day-to-day substitutes noted earlier.

Finally, more effort may be desirable to attract back to the classroom those women with grown children who state that they intend to return to teaching and whose teaching experiences have been fairly satisfying, but who have not yet returned to the profession.

In conclusion:

1. There has been a decrease in the total number of 1954 teacher education graduates employed as teachers from 1953-54 to 1964.
 - a. There has been a small increase in the number of persons in school-related but non-classroom teaching positions.
 - b. While the percentage of teachers holding regular licenses has tended to remain fairly constant since 1956-57, there has been a decrease in the number and percentage of permanent substitutes. The number and percentage of day-to-day substitute teachers has increased from 1956-57 to 1964.
 - c. Seventy-five percent of the present teachers state that they plan to teach until retirement. This represents a large increase in the percentage of respondents intending to remain in the profession. This is largely attributable to the females, who, as time increases, become more certain of their future plans.
 - d. Another potential source of teacher supply may be those females currently not employed as teachers. Sixty-four percent of these trained teachers state that they plan to return to teaching. There is some evidence to indicate that approximately one-third of these may actually return.
2. The largest percent decrease was among elementary school teachers. The senior high school, college, and special class teacher categories have increased.
3. A smaller percentage of teachers are currently teaching in New York City than in 1959 and 1956-57. A larger percent are now teaching within the state than was noted in 1956.

4. Persistence in teaching was found to be significantly related to several factors:
- a. Sex: Men are more persistent as teachers than women.
 - b. Age: The older the subject at the time of graduation from college, the more persistent he will tend to be.
 - c. Marital Status: For women, persistence is related to marital and family status. The most persistent women are the unmarried ones, followed by the married ones without children. Marriage or family responsibilities are not factors in the persistent teaching history of male subjects.
 - d. Income: The income of the spouse is important in persistence. Women whose husbands earn more than \$10,000 are not likely to persist in teaching. There is a tendency for women whose husbands earn less than \$10,000 to remain in teaching.
 - e. Level of Preparation: There is a tendency for persons trained to teach at the secondary level to persist in the profession, but this is intertwined with the sex variable.
 - f. Degree of Satisfaction with Teaching: There is a tendency for persons more satisfied with their teaching experiences to persist in teaching (5, pp. 29-32).

Professor Impellitteri (in cooperation with two others) assisted in the development of a coding system for the verbal behavior of student teachers. The results of this effort were published in the form of a report by the Office of Research and Evaluation (Division of Teacher Education) of C.U.N.Y. in 1965 and was entitled, "Coding Teachers' Verbal Behavior in the Classroom: A Manual for Users of OSCAR 4V."

This report was in actuality a sort of instruction for the use of the instrument devised by the authors. The instrument, OSCAR 4V (Observation Schedule and Record Form No. 4, Verbal) was described as follows:

. . . the latest in a series of instruments designed to derive objective, quantitative descriptions of classroom behavior from structured observations. . . . In the construction of each OSCAR, an effort has been made to devise a recording scheme which would yield information about important aspects of classroom behavior. . . .

However, there seem to be a number of people interested in studying teachers' classroom behavior who would rather use an existing instrument, even one not particularly adapted to their needs, than attempt to build a new one themselves, or even undertake to revise one to fit their requirements. It is to meet such requests that we are publishing OSCAR 4V and this brief manual of instructions for its use (6, p. 1).

A proposal entitled "The Development and Evaluation of a Pilot Computer Assisted Vocational Guidance Program" written by Dr. Impellitteri in June, 1965, was initially funded for \$27,880,³ and the Project began on January 1, 1966 (7)... This was one of the earliest attempts to combine the computer and vocational guidance in the nation. An overview of the project was described by Professor Impellitteri as follows:

The purpose of this project is to develop and evaluate a computerized system of transmitting selected occupation information individually to ninth and tenth grade boys prior to their selection of a specific trade or technical occupational training program.

The hardware to be utilized in the project is currently being used as an instructional aid in the Computer Assisted Instruction (CAI) Laboratory headed by Harold E. Mitzel at The Pennsylvania State University. It involves four components: an IBM 1410 computer, an IBM terminal typewriter, a slide projector and a tape recorder, the latter three components under computer control. Although the COURSEWRITER programming language developed at the IBM Thomas J. Watson Research Center is adequate for current CAI usage, it may be that minor revisions may be needed for the development of the proposed occupation information system.

The Specific Functions of the Computer Components

A. The Typewriter

To provide a record of pertinent information which the subject may take with him--the particular job/s described, a list of apparent discrepancies between specific job requirements and the individual's qualifications, books which may be read, and other references.

To provide an input to the system.

³ This project was again funded for \$73,880 during the fiscal year and \$92,770 for the fiscal year 1967-68.

B. The Tape Recorder

To introduce a more personal kind of communication by narration.

To provide a 5-minute narrative orientation to the system and its purpose, and to establish the need for occupational information.

To more nearly simulate the counseling situation.

To provide information about jobs in a more attractive manner than typing such information.

To provide actual sounds typically indigenous to the environment for certain jobs (in phase with slides).

To present actual workers' comments on the advantages and disadvantages of specific occupations.

C. The Slide Projector

To present the worker performing typical tasks in the job situation.

To present graphically, employment outlook projections.

To present blueprints, electronic circuitry, and other diagrams which are pertinent to particular occupations.

The major concern of this project is not hardware manipulation, however, but the development of the software, the programming of the occupational information itself in such a way as to: 1) excite the interests of the subjects; 2) make the information meaningful to the subjects; 3) relate the information to the subjects' abilities and interests; 4) allow counselors, teachers and others easy access to the information; and 5) allow the stored information to be easily up-dated.

Unlike courses on occupational information taught in various schools at a variety of levels, this system individualizes the occupational information. Thus, from pupil to pupil the information provided may vary considerably. This flexibility is to be built into the system in two ways corresponding to the two types of entry to the system the pupils will possess. The first entry may be made by the pupil by typing a job number corresponding to a specific job he wishes to be described (see Appendix B of the proposal for a hypothetical example of this type of entry). The flexibility built in here not only allows for any one of the 300 to 400 jobs for which descriptions will be stored to be called up from storage, but for each job there will be included a diagnostic statement at the conclusion (see last page of Appendix B). In this statement will be included mention of discrepancies to be found between pupil answer aptitude profile and job requirements extracted from 1965 revision of the D.O.T.

The second type of entry allowed the pupil (after each of the specific jobs he wishes to have descriptions of have been covered) is one in which the computer compares job requirements with pupil qualifications (on the basis of GATB and other selected variables) and first presents descriptions of those jobs for which the pupil is most qualified. Then, at the discretion and control of the pupil jobs will be presented for which he is less and less qualified. Again, a diagnostic statement is made after each description is completed. At all times the pupil has control over whether he is to be presented with another description or not. In fact, he may sit at the computer terminal and type STOP five minutes after he begins. Or, he may spend 20 sessions of 30 minutes each.

The purpose of this system is not to force information about the world of work upon pupils, nor is it to direct pupils toward certain occupations. Its purpose is to provide pupils with up-to-date, meaningful job information presented in an interesting and hopefully captivating manner--to inform them about job opportunities, advantages and disadvantages before they choose a specific training program.

Since our youngsters are forced to choose a suitable program from a number of training programs offered at the eleventh and twelfth grade level to prepare them for entry into an occupation for many years in the future, they should at least be informed about not only the training programs themselves but the jobs for which the programs are designed.

As a pilot study, the proposed project will involve only 300-400 occupations in the trade and technical field. Based on the evaluation of this study, however, many implications are visualized. The final two pages of this brief description serve to summarize these implications (8, pp. 1-4).

The final report of this research project is described in a later chapter.

During the years 1963 through 1964, Dr. Impellitteri, through his various responsibilities at Fordham University and the City University of New York developed considerable expertise in the areas of measurement, evaluation and statistics as evidenced by his publication to this time. Upon arrival at The Pennsylvania State University in 1965, he immediately applied these experiences and acquired expertise in the publications which are outlined in this chapter. In spite of the fact that he was among the youngest in his field he was already achieving

recognition as a leader in the field of research. Especially noteworthy was his early design of a research strategy still considered applicable in the broad-based field of vocational education today. As will be shown in succeeding chapters through descriptions of his publications, Professor Impellitteri was an innovator in his field, and was the major factor in the development of research and graduate studies in the Department of Vocational Education.

Chapter II

1966

There was increasing concern during 1966 about the low enrollments and the graduate program output of the Department of Vocational Education. Professor Impéllitteri wrote a position paper regarding this matter, which is quoted in its entirety below:

PART I.

The Current Vocational Industrial Graduate, Undergraduate, and Teacher Certification Program at Penn State and their Implications

The presently fruitless search for qualified persons to staff the current graduate assistant vacancies in the Department (5 one-quarter and 5 one-half time) indicates that changes in our program are needed. Staff shortages in vocational industrial education are not unique to that field alone, but the severity of the shortage is certainly unique. Before we discuss possible changes, however, we must determine our current status.

Recently I visited the placement office set up at the American Education Research Association meeting in Chicago, Illinois and browsed through the papers of hundreds of persons who are about to receive doctorate degrees or who have recently obtained them, and who are seeking positions. They were all interested in engaging in research in the area of their specialty which ranged from elementary education, secondary education, special education and administration, to measurement, information retrieval, decision making processes, learning theory, and personality characteristics. In fact, every specialty within the field of education was sampled including industrial education where one solitary individual was listed. This person was a woman who was looking for a part-time research position in the metropolitan Pittsburgh area only.

Not only in the area of research do we find a scarcity of individuals but in the areas of teacher training, curriculum development, state leadership positions, and federal leadership positions as well.

The lack of professionals in the field of vocational industrial education has been ascribed to the types of program and types of persons attracted to these programs during the last 50 years. The programs have been designed to meet the immediate needs for vocational-industrial teachers, supervisors and administrators. These needs have not changed except in terms of numbers, thus the programs have remained the same.

The typical teacher trainee has been the individual with a number of years of work experience in a certain occupation (12 years in the Penn State area) and is usually quite a bit older than other teacher trainees (37 years old in the Penn State area). Because of these facts, it is argued, the teacher training program in vocational industrial education must be different than other teacher training programs. The programs have been designed to meet the needs of the students.

But what has happened to the Profession as a result? We have a Profession with relatively few "professionals." We have teachers who generally are interested only in meeting the minimum requirements for certification as teachers, coordinators or directors. They are "professionals" only by accident.

The majority of vocational-industrial teachers today have taken few if any courses on a college campus, have had contact with few if any permanent university staff members, would not know where to look for book number one in the university library, and are not particularly bothered about it. These persons I'll call group #1, those who are certified as teachers, but certainly are not interested in following up their teacher certification courses with a baccalaureate degree.

This part-time, piecemeal indoctrination to formal education has been the typical vocational industrial teacher's, supervisor's or administrator's introduction to professional training. "Earn while you learn" has been the cry of the teacher training institution since time immemorial. Is it any wonder then that this cry has been heard from the lips of graduate students in the field? This leads me to a discussion of group #2, the "part-time professionals."

This group is composed of persons who, despite the spoon-feeding tactics undergone during their certification course taking days, decide to go on for a baccalaureate degree in industrial education. Of course, the additional course-work is done on a part-time or part-time plus summers basis.

These persons in group #2, after receiving baccalaureate degrees are then in a position to take graduate work if they so desire. At this point they have typically been working full-time continually since they began their apprenticeships. Thus, the only way which they would consider taking graduate work is on a part-time or part-time plus summers basis. And who can blame them? This is their orientation and this is what they expect to do.

Thus we find ourselves in a position where graduate assistantships paying up to \$4,000 annually are vacant. I imagine that even if we were to offer \$5,000 for the positions we still would get no takers. Why do we get no takers? Because of two factors: first, our procedure of coddling students on a part-time basis has produced students who are fearful of greater involvement; and secondly, the type of person who qualifies for a position is neither able nor willing to take any salary deduction. We have been so busy catering to the needs of the students, who are in turn led by the certification requirements of the DPI that we haven't stopped to consider the consequences.

The important question is "Can we live with what we've got, or must changes be made?" My answer is, we cannot function as we have in the past. We cannot continue to meet only the needs of the students. Our responsibility includes the needs of our profession. We must accept our responsibility by changing our program. Although change does not necessarily result in progress, one cannot progress without it.

But what changes are indicated? Where do we start? How do we fulfill our obligations to the DPI if we alter our program? How do we work with certification requirements and still create flexibility in our program?

First, let me tackle the DPI since many of our problems in designing for change would start there. They are so tied up with federal programs and dollars and cents activities that they have no time to plan for the future. They must take things day by day. We can expect no leadership from them. Neither can we expect any leadership from either of the other two industrial teacher training institutions in the state. Let's not cry about the lack of leadership, though, but take the leadership ourselves.

We must come up with a plan for the future, and by the future I don't mean five years from now, but tomorrow. This "plan" should not be one which incorporates the dictates of the DPI, nor of the State Board, but should be one which is satisfactory to us as a department within the Pennsylvania State University. We no longer can be satisfied with the tenets as set down by Harrisburg. Nor can we be satisfied with our current program of training teachers, administrative personnel or others. If we wish the requirements to be changed, let's propose such changes. Inflexibility of programs breeds sterility, and sterility breeds nothing at all.

I think we should be asking ourselves, "Are we doing the best possible job?" not, "Are we doing as good a job as possible under DPI restrictions?" Answering "yes" to the latter question is not really being honest with one's self.

How should the plan be presented to the DPI? Should it be presented as a rigid plan, or be presented with alternatives? I think that desirable alternatives should be presented along with a final alternative. The final alternative would be something like, "It has been decided that this program NAMED SPECIFICALLY no longer meets departmental objectives. Thus the changes suggested above should be incorporated. It is recommended that the existing program without adequate revisions should be dropped as soon as practically possible."

Comments may be forthcoming that including a statement like that would be putting our heads on a chopping block. My answer is, "WE HAVE NO CHOICE." If we are to improve our programs, if we are to fulfill our potential as a department and meet our obligations, WE HAVE NO CHOICE. We all can visualize the substantial contributions which we should be making in the future, so why not strive for the opportunity to do so.

Part II.

A Proposed Plan

I. Teacher Training

What changes may be effective in meeting some of the problems discussed?

- A. The development of a cooperative work-study program for:
 1. The 2-year associate degree person with little or no industrial experience.
 2. The recent high school graduate (either vocational or general high school program) with little or no industrial experience.
 3. The Industrial Arts Education graduate.
- B. The establishment of an adequate occupational competency evaluation and student selection procedure. This will eliminate the necessity for the rather fruitless procedure of evaluating trade experience by examining employers' affidavits. Neither would the six year requirement be needed. A charge for taking the test should be instituted to discourage those who might apply before they feel they are ready.
- C. The elimination of the emergency certificate. The existence of which represents a real disservice to the students.

- D. The substitution of the current standard permanent certificate as a temporary certificate. Only after qualifying for the temporary certificate would an individual be allowed to teach. He would then be given a maximum of five years from that time to obtain his permanent certificate. One of the requirements of which should be to obtain a baccalaureate degree.
- E. The establishment of a ruling that in order to qualify for the temporary certificate one must have spent at least 2 full-time terms on a college campus--and for the permanent certificate a minimum of 4 full-time terms on a college campus.

II. Graduate programs

What changes may be effective in improving the quality of our graduate programs?

- A. To initiate a requirement that all master's degree people should spend at least three full-time terms on campus as graduate assistants in research, teaching, curriculum development, test construction, or other departmental activities.
- B. To require doctoral people to spend at least six full-time terms on campus as graduate assistants involved in one or more of the activities listed in "A" above.
- C. For those master's and doctoral candidates who are planning to go on to supervisory or administrative positions an internship program should be required in lieu of the other graduate assistant type activities listed in "A" above (9, pp. 1-6).

Dr. Impellitteri was also continuing his involvement with a Computer Assisted Guidance Program. Evidence of this is provided by submission of the first progress report for the "Development and Evaluation of a Pilot Computer Assisted Vocational Guidance Program." The report covered activity from January through March 15, 1966, and was submitted on April 1, 1966. The major focus of the report described was a description of progress made relative to selection of project personnel, and system development. In addition, the report predicted work to be completed for the remainder of the fiscal year 1965-66 as well as projected work plans for fiscal year 1966-67 (10).

In July of 1966 Dr. Impellitteri prepared a paper entitled "Computer Assisted Occupational Guidance," which was based upon the research effort just described. In this paper he provided background information and a description of the system contained within the project. These are best described in the following quotation from his paper:

1. BACKGROUND

Because of the increasing complexity of the work world in which we live it becomes essential to take a hard look at the guidance program found in our schools. The school counselor is the person whom we rely upon to help our young people understand the world of work and to help them explore their places in it. The great importance of occupational information as a means of aiding the counselor in this task has been acknowledged (Hoyt, 1964; Baer and Roeber, 1964; Hoppock, 1963).

In relying upon the counselor as the primary resource to gather, sort, validate and transmit the tons of literature covering thousands of occupations we are not being realistic. We are asking counselors to accomplish an impossible task, one that is ill suited to his nature and capabilities. But what other, more effective ways are available to do the job?

Many efforts have been made to provide pupils with occupational information utilizing more effective, more attractive, and novel methods. Kenyon (1952) has reported the results of a community effort in this area using tape recordings of occupational descriptions, requirements for entry into the occupation, and local employment opportunities. Another example of the use of tape recorders in transmitting occupational information is reported by Rundquist (1958). In this latter instance recordings were made of actual workers in occupations answering questions about their jobs.

Closed circuit television has been utilized in Washington County, Maryland in an attempt to convey occupational information to a large number (8000) junior and senior high school pupils (Beachley, 1959). A combination of two methods of presentation, colored slides of fifty local occupations, synchronized with a taped commentary describing the duties, training, and working description of these occupations has been reported by Meagher (1955).

All of the methods described above have at least one major limitation. That is, the same occupational or career information is presented to all of the pupils involved. Thus, the pupil with low academic ability and potential, and possessing little interest in mathematics and the sciences must submit to a period of boredom when the occupations of surgeon, engineer or research chemist are being described.

The computer-based occupational information system has been designed to overcome the limitations of these various methods through selective presentation of the material to individual pupils. It is the result of the refinement and integration of two prior approaches to improve vocational guidance.

The first approach is exemplified by the novel methods of presentation described above. The value of the novel presentation of occupational information to pupils has been thoroughly acknowledged and has consequently been fully utilized in the current system. The refinement of this approach has been attained by capitalizing on the flexibility of the computer system. First, the system is designed to allow a goodly amount of pupil participation in the interactive process. Secondly, not only are colored slides and tape recordings utilized, but also a typed record of the content of the session is obtained to which the pupil may refer at any future time. The third refinement is to permit an unlimited increase in the number of occupational descriptions in computer storage.

The second approach which has contributed to the development of the system was that devised by Hull (1925). At that time Hull reported a "comprehensive system of vocational prognosis" (Hull, 1925). His system involved: (1) the categorization of all occupations into 40 vocational groups or "type aptitudes"; (2) the administration of 30-40 distinct tests which would comprise a "universal battery" to great numbers of workers; (3) the development of 40 regression equations utilizing the test measures as predictors, and success in the 40 occupations as the criteria; (4) the use of machine to solve the 40 regression equations for each individual based on his aptitude test scores--" . . . the machine will solve in immediate succession a large number of different equations each yielding a forecast for a different vocational aptitude, all equations being based upon one and the same battery of tests" (Hull, 1925); (5) the individual finally examines his predicted scores on each of the 40 occupations to determine which occupations provide both his least chance of success, and greatest chance of success; (6) "The three or four most promising vocations thus emerging may be given further investigation" (Hull, 1928); and (7) from this information the individual may choose his life's work.

Hull foresaw the difficulties involved in promoting his system in stating, "It scarcely needs to be pointed out that the program of vocational guidance thus briefly sketched is a revolutionary departure from the current development of aptitude testing. This being the case, there will no doubt be considerable inertia and resistance from conservative quarters" (Hull, 1928).

Prophetically, though, he added the following, "But the logic of the situation is certain to triumph in the end. We may look forward with confidence to a day not far distant when some such

system as that sketched above will be operating in every large school system. Then, and not until then, will there be possible a genuine vocational guidance for the masses of the people" (Hull, 1928).

Hull's approach was refined in the current system by utilizing current computer advancements, and by dependence upon a less empirical approach to occupational exploration. The use of equations based on test scores to predict success in specific occupations is a desirable goal, but at present is not feasible. The data needed for developing such equations are not available--reliable criterion measures of job success, the actual relationship between scores on a variety of interest and personality dimensions and degree of job success, and the relationship between measured aptitudes and job success, for each of the occupations and their groupings.

The data that are available, and consequently have been planned for use in the present system, are minimum scores required on each of the subtests of the General Aptitude Test Battery and other minimum worker trait requirements essential to minimal success within the occupational grouping listed in the 1965 revision of the Dictionary of Occupational Titles. Generally, the computer is programmed to compare minimal aptitude requirements for the occupational grouping (intelligence, verbal, numerical, spatial, form, clerical, motor coordination, finger dexterity and manual dexterity) with an individual's scores on these subtests. The "G" aptitude or intelligence as measured on the GATB is compared first, and descriptions of occupational groupings which require the greatest degree of that specific aptitude for which the individual qualifies are presented.

Over thirty years ago Bingham proposed the importance of the information function of the counselor.

It is not a function of counseling to decide for what calling a youth shall prepare. That is his own responsibility and his right. It is the counselor's responsibility to place at the young man's disposal the best information available, including the most reliable estimates of future opportunities it is possible to assemble (Bingham, 1934).

Three decades later Hoyt has reiterated the same theme.

It seems to me that the time is here for a rededication to the information function in guidance. Because information has been shown as not sufficient for meeting the counseling and guidance needs of students does not mean that it is not necessary. Because students in high school today are apt to change occupations more than once in their adult life does not mean that there is no need for them to make some specific occupational plans now. Because it takes a great deal of counselor time to keep up to date on occupational and educational information does not mean this function should be

abandoned nor greatly neglected. . . . Because providing information to students is not exciting does not mean it is not a worthy counselor function. If service to students is to take precedence over satisfaction of status as a counselor need, then this re-emphasis must take place (Hoyt, 1964).

In accepting the necessity and importance of occupational information, and looking ahead a bit to a time when such information can be effectively stored and utilized, Baer and Roeber have commented:

Computer technology may have a significant impact on counseling and placement. With the aid of computers, counselors and personnel workers will be able to interpret great quantities of data concerning an individual's aptitudes and interests and other aspects of his background in relation to a wide range of occupational possibilities. Such computers will not take the place of the counselor's judgment in guidance and placement. They will digest, analyze, and array information upon which a proper judgment can be based (Baer and Roeber, 1964).

A DESCRIPTION OF THE SYSTEM

The purpose of this study is to develop and evaluate a system of presenting occupational information to ninth grade pupils, utilizing the computer-assisted instruction facility currently in operation at The Pennsylvania State University. The purpose of the system is to provide a model for a more extensive, extremely flexible, easily updated information-giving function.

One of the most unique features of this system is that of selective presentation of occupational information. The selection of the materials to be presented to the individual student will be based on that student's General Aptitude Test Battery (GATB) profile which is to be stored in the computer memory. Another of its unique features is the manner of presentation of the materials. Not only will materials be typed out at the console where the student is to be seated, but also will be presented on sound recordings and slide projections, all integrated under computer control.

This system is visualized not as a substitute for the counselor, but as an effective complement to the counselor. It can provide the function of information-giving, that portion of the vocational guidance process which counselors are admittedly less adept to handle, and more willing to delegate. The role of the counselor in vocational guidance as presented here in conjunction with this occupational information system is thus revised. His responsibilities no longer include knowledge of specific facts about particular jobs, but instead involve the understanding of the world of work, its relation to individual goals and aspirations, and the ability

to communicate effectively with the student in these terms. "Matching persons and jobs successfully requires not only information but also a high degree of interviewing skill and a respect for the individual's ability to guide himself" (Strang, 1950).

The computer-based occupational information system may be thought of as a powerful tool of the school counselor in the vocational guidance process. The school counselor must become actively involved if this "tool" is to be effective. Outside of the vocational guidance process the system has little utility. The system thus will function effectively only in a school where the guidance counselor acknowledges the value of vocational guidance for ninth grade pupils and recognizes the need for them to acquire knowledge about occupations.

The Interactive Situation

From Figure 2 it is apparent that the only pupil interaction occurs at the typewriter. Thus, any request the pupil makes is by typing

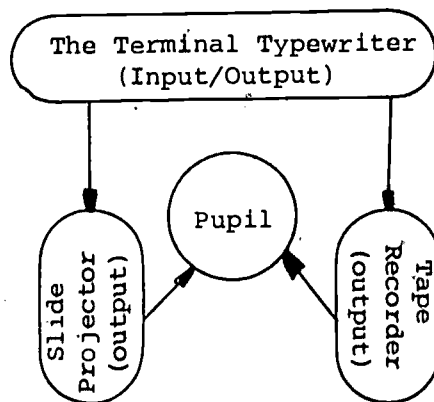


Figure 2. The Interactive Situation

such a request. The computer responds to a valid request in any one of the combinations of the three output devices: by typing the requested information, by projecting selected slides, or by activating the tape recorder.

The Specific Functions of the Computer Components

A. The Typewriter

To provide a record of pertinent information which the subject may take with him--the particular job/s described, a list of apparent discrepancies between specific job requirements and the individual's qualifications, books which may be read and other references.

To provide an input to the system.

B. The Tape Recorder

To introduce a more personal kind of communication by narration.

To provide a 5-minute narrative orientation to the system and its purpose, and to establish the need for occupational information.

To more nearly simulate the counseling situation.

To provide information about jobs in a more attractive manner than typing such information.

To provide actual sounds typically indigenous to the environment for certain jobs (in phase with slides).

To present actual workers' comments on the advantages and disadvantages of specific occupations.

C. The Slide Projector

To present the worker performing typical tasks in the job situation.

To present graphically, employment outlook projections.

To present blueprints, electronic circuitry, and other diagrams which are pertinent to particular occupations.

ADVANTAGES OVER CURRENT SYSTEMS

The unique advantages of the Computer Assisted Occupational Guidance system are its flexibility and its storage capacity. Its flexibility allows for innumerable changes in the existing system--changes in certain aspects of existing job descriptions such as educational requirements, employment outlooks, or work hours per week; the addition of new job descriptions; or the deletion of certain jobs which are being phased out of existence.

The practically limitless storage capacity of the system allows for many job descriptions to be stored in addition to innumerable characteristic student profiles. Any changes that occur in jobs and employment opportunities can be immediately entered into computer storage.

In what ways will the computer-based occupational information system more adequately meet the needs of ninth and tenth grade pupils? First, since the interaction is with the student, independent of counselor involvement, all students will be offered the opportunity to obtain occupational information, not only those selected students for whom the counselor has time available.

Second, the occupational information that is presented to the students will be accurate and up-to-date, resulting in the more realistic transmission of opportunities in the world of work. Third, the manner of presentation of the occupational materials via typewriter, tape recordings and slide projections will instill greater pupil interest, and consequently greater pupil growth in knowledge of the world of work. Finally, the selective nature of presentation of the occupational information will result in pupil acquisition of a more adequate picture of himself in relation to the world of work.

SUMMARY

Through the development of the system including only a limited number of occupational groupings and specific vocational trade and industrial job descriptions to be presented to ninth grade pupils, it is expected to establish a prototype for a more comprehensive system in the future. Each pupil using the system is allowed to cover as many occupational groups, and as many specific jobs within the groups as he has the time and inclination. Each grouping and specific job he does review, however, will be presented in relation to his own aptitudes and interests. The material presented is thus not mere occupational information, but pertinent, meaningful occupational information.

The result that is expected is the more realistic, intelligent choice of a vocational goal to give some meaning and direction to the rigorous training and/or rigorous educational pursuits involved in attaining such a goal (11, pp. 1-11).

A paper entitled, "New Trends in Vocational Guidance" was prepared and presented by Professor Impellitteri on October 19, 1966 at the Annual Meeting of the Pennsylvania Vocational-Technical Administrators. His presentation dealt with two major topics: 1) counselor aides which have been developed for use in presenting occupational information; 2) description of programs for upgrading school counselors in the areas of vocational guidance. The following quotation succinctly summarized his message:

One of the objectives of vocational guidance is to familiarize students with occupational opportunities in this complex society of ours. As students arrive at series of decisions that tend to grow increasingly realistic with experience and maturity, information that provides a basis for this planning and decision-making needs to be presented in a variety of ways.

Schools are trying and have tried for years to fulfill this broad objective of the communication of occupational information in many ways. For example, they have tried the career brief series of a number of commercial outfits; they have tried courses in occupations; they have tried films and filmstrips, industrial visitation. They have invited representatives of businesses and industries to talk with their students about vocational opportunities; they have held career days, college days, steamfitter's days, waitresses' days, and clerks' days.

I think that we all agree that each of these attempts to meaningfully convey occupational information to youngsters leaves much to be desired (12, pp. 2, 3).

As indicated in the preceding chapter, Dr. Impellitteri's concern with occupational competency examinations continued. He prepared concern with this topic on December 16, 1966 at Rutgers--The State University. The seminar theme was "Feasibility of Providing Trade Competency Examinations for Teachers on a National Basis" and his presentation was entitled "Constructing Valid Occupational Competency Examinations."

His own words best describe its contents:

This paper focuses on three questions related to the current effort to examine the feasibility of establishing a nationwide occupational competency examination program.

1. What consideration should be given to reliability and validity in constructing nationwide occupational competency examinations?
2. How may valid and reliable occupational competency examinations be constructed?
3. How may the validity and reliability of an occupational competency examination be measured? (13, p. 1)

In establishing relationships between validity and reliability;

Professor Impellitteri went on to say:

A test that is valid must also be reliable. Micheels and Karnes have stated: "It can be immediately seen that reliability is closely connected with the validity of a test. If a test is valid, it must be reliable. That is, if a test measures effectively what it is supposed to measure, then presumably it does this accurately and consistently. At the same time it must be remembered that a test might be highly reliable and still not be valid"

A reliability coefficient indicates the extent to which the scores obtained by individuals taking the test are representative of their "true" scores. These "true" scores I'm talking about are the scores these individuals would obtain if we were to give them a test including all the items in the universe. But we all know this is an impossible task. We must deal only with sampling of items from the universe. How well these individuals' obtained scores represent their "true" scores is dependent upon the degree to which the selected items in this test represent the universe of items.

Thus, when we talk of the bases, in measurement terms, for validity and reliability of a test, we're talking about the same thing--the extent to which the items on a test represent the universe of items.

What I'm trying to stress at this point in the discussion is the construction of tests with high validity, for if you have high validity you have everything. Conversely, if you have high reliability, you might just have nothing

. . . . The item writing must be well done. Ambiguous or confusing items lower both the reliability and validity of a test. At this point I should stress that no amount of statistical manipulation can introduce into the test anything that has not been written into the items; and any validity written into the items will forever plague the efforts of the investigator to analyze the source of discrepancies.

Of what utility then is the concept of reliability? For our purposes, I can think of two ways in which estimation of reliability would be beneficial. First, if the measured reliability were low one could be assured that the validity of the test was low. Secondly, if one were reasonably sure that the test had high content validity the reliability coefficient could then be used to interpret the scores in terms of the confidence one can have in the test results.

The Types of Validity

There are essentially three types of validity: content validity, construct validity, and criterion-related validity. I think we need focus on the first two only. Criterion related validity is appropriate for tests which are designed to be used to forecast consequent behavior, as exemplified by aptitude tests. In these occupational competency tests we wish only to identify what knowledge and skills has an individual acquired in this occupational area.

Because I have taken a stand at this point on eliminating criterion related validity from the scope of this discussion I feel I must now justify it. Many of you might be saying to yourselves at this point, "I wish we could use the results of this test to accurately predict the extent of an individual's teaching effectiveness. I think predictive validity is important to consider." I must make

a plea at this point to confine ourselves strictly to a discussion of measuring occupational competency. That particular job is quite extensive and complex enough without considering a broader focus. Ask Mr. Lofgren particularly, and several others in this room if they think we have a big enough job to do. Predicting teaching performance is most certainly a highly significant problem in considering the entire task that must be done. I do submit, however, that we've taken a giant stride already in undertaking only the occupational competency measurement. The exclusion of criterion-related validity from the discussion does not appear to be disastrous at this time.

What about construct and content validity? What implications do these two concepts have in considering occupational competency testing?

In my discussion of the universe of items and the necessity of an adequate sampling of these items to insure validity I was referring to content validity. That is, given a table of specifications which describe some framework of pertinent behaviors, content validity is concerned with the adequate sampling of these behaviors in a test designed to measure these behaviors. Content validity, in other words, tells us something about the adequacy of the test as representing a domain of behaviors such as occupational competency in electronics.

Construct validity, on the other hand, tells us little about the validity of the test itself. The focus of construct validity is upon the validity of the table of specifications itself. Is the domain of behaviors I have outlined psychologically meaningful? That is, if I wish to measure occupational competency in electronics have I adequately defined the behaviors which would be exhibited by a highly competent electronics expert in my table of specifications? Construct validity is focused on the process whereby the pertinent trait or characteristic such as occupational competency in electronics is defined in terms of specific behavioral objectives.

Validating the Written vs. Performance Tests

In discussing the validation of occupational competency examinations it must be decided whether to look at the written and manipulative parts separately or to consider them together.

In establishing the content validity of both parts of the exam the decision is irrelevant. That is, content validity is neither improved nor lessened by separating the two parts as opposed to considering them together as a whole

The focus of content validity is on representative sampling of the universe of items. Thus, whether we work with "knowledge of terms" and "understanding of physical principles" together with or separate from "ability to work within specified tolerance" is irrelevant. The representativeness of the selected items should be the same. Since unique measurement problems enter into the assessment of manipulative-performance tasks it probably would be most beneficial to consider the two parts separately. One example of these unique problems is degree of sampling. With a well-constructed paper and pencil test it is possible to measure 200 to 300 relatively independent items of behavior in a three to four hour testing period. During the same time period, however, only 10 to 20 manipulative-performance behaviors may be observed and measured. Cronbach has stated that:

Low reliability is characteristic of worksamples where one error may disturb the entire sequence of performance, and several samples of performance must therefore be obtained. The more successful . . . tests usually include a large number of short, similar items, rather than a few complex sequences of performances

Evidence of construct validity. What should be the magnitude of a correlation between a paper and pencil test and a manipulative-performance test in the same occupation? Let us first examine the extremes. If the correlation approached the limit of 1.00 there would be no necessity for using both tests. They would both be measuring the same thing.

Suppose, on the other hand, the correlation was found to approach .00? Is this the ideal situation? One certainly could say, on the basis of this finding, that the two parts of the test were measuring different aspects of competency in the trade. I would, however, question such a finding. I would suspect the written test, the performance test, or both parts as possessing low content validity.

My rationale for such a suspicion would be that one must possess some knowledge and understanding of principles involved in the occupation in order to be able to adequately perform tasks representative of that occupation. A plumber need not, perhaps, know the temperature at which solder melts, but he should know that heat must be applied to a certain area of a copper fitting in order that the solder applied will be drawn and make a tight joint with the copper pipe.

Somewhat arbitrarily I would choose as an acceptable correlation some magnitude in the range of .30 to .60

The Establishment of Norms

In itself a raw score obtained on a test is essentially meaningless. If an individual obtains 140 right out of a total of 200 items on a written carpentry test what can we say of this individual's competency in carpentry? We can interpret the raw score as a percentage of the total items correctly answered--in this case, 70 per cent. Is this percentage passing or failing, good or bad? In fact, is a score of 50 per cent bad, or might it be good?

I contend that there is no way of discriminating the passing score from the failing score, the good score from the bad score, no matter what the individual score may be, except through the establishment of norm data. No individual is a completely competent carpenter or a totally incompetent carpenter. A person's degree of competence in an occupation should be based upon relative positioning.

The establishment of norms will allow for the meaningful interpretation of exam scores. Cutoff scores for passing or failing could be assigned in terms of percentiles instead of percentage of total items correctly answered. One could arbitrarily set the 50th percentile as the cutoff for passing. That is, an individual must be of at least average competency in his occupation to pass. Another person with a different orientation and background could establish a cutoff for passing at the 75th percentile. In the latter case an examinee must fall within the top one-quarter of workers in a specific occupation in order to pass. The standard could vary widely between states and between institutions, but at least there would be some uniformity in the meaning of the obtained scores when reported as percentiles.*

The norm group

In establishing norms primary consideration must be given to the manner of selection of the individuals who are to be included in the norm group. A decision must be made as to the nature of the persons in this norm group. The basis for this decision lies in the answer to the question, "With whom do we want our prospective candidates to be compared?" This answer is not an easy one. Consideration must be given to a variety of factors.

*There is some opposition in the tests and measurement literature to the practice of establishing percentile norms. Some standard score system like T scores could be used. For the sake of this discussion, the author has used the more commonly known percentile norms.

Geographical factors. Do we desire to have scores attained by prospective examinees in carpentry living in Altoona, Pennsylvania to be compared with scores attained on the same examination by carpenters in the same general locality, by carpenters across the state, the region, or the nation? Is there enough variability in this occupation to eliminate nationwide comparison or even, perhaps, statewide comparison? What about other occupation such as mechanical drafting, computer programming, or chemical technician? Does the variability from state to state diminish, or increase.

I won't even attempt a partial answer to either of these questions or to the hundreds of related questions that might arise. The important implication is that this is at least one factor which must be taken into consideration in building norms. The same factor must be taken into consideration before any one specific competency test is ever built.

Experiential and training factors. In addition to the geographical representation of the norm-group, its level of training and experience must be in some manner decided upon. Again the crucial question is, "With whom should potential examinees in an occupation be compared?" Should their test scores be compared with test scores attained by a representative sampling of journeymen only? What about non-apprenticable occupations--those with at least six years of experience in the occupation? Should apprentices also be included in the norm group, or trainees? What kind of representation should there be in a norm group for an occupation? . . .

A Plan for Constructing Quality Occupational Competency Examinations

The plan to be described has been set up in the belief that any test construction program has to be planned as an integral unit. This means that the definition of the domain of skills and knowledges to be tested, the sampling of that domain, the construction of items, the design for administration and scoring, and plans for establishing validity, reliability and item difficulty of the test must all be considered together. No single step or phase can be planned in isolation. Unless these problems are all attacked together from the outset of the project, no scientific measuring device can result.

Consideration was given to the publication Standards for Educational and Psychological Tests and Manuals . . . in devising the proposed plan as presented below

Construction of the test

When the need for an occupational competence examination in a specific occupation has been established by a representative committee the following steps should be taken.

1. An occupational committee consisting of from five to nine recognized experts in the occupation representing interested geographical regions will be employed to meet with an occupational specialist and a test construction expert for a period of time. The efforts of the committee should be directed toward the determination of those skills, knowledges, understandings, and other abilities which should be possessed by a competent worker in the occupation, and the construction of a suggested plan for evaluating those abilities.
2. When the domain of pertinent occupational behaviors has been decided upon, each regional representative of the committee should make available a copy of the document containing the agreed upon description of the domain to the responsible vocational-technical administrator/s in each of the states he is representing. An additional meeting of the occupational committee will be necessary in order to communicate the extent of agreement or non-agreement. Once the table of specification as described above has been accepted the major job has been accomplished.
3. At least three of the committee members in cooperation with the test construction expert should write items sampling the accepted domain of behaviors. At least three times the number of items that will eventually be used should be written—probably 500 to 1,000 items. This group should be responsible for constructing representative manipulative performance tasks as well as paper and pencil items.
4. An acceptable scoring key for the written items should be devised. The scoring of the manipulative-performance tasks should be devised in as objective a manner as possible. A scoring scheme similar to the one proposed by Fleming and Hankin . . . should be constructed. The importance of objectivity in performance testing has been stressed by Fatter and Medley They state that, "Objectivity is necessary because only to the degree that a test is objective can it measure anything that is a trait of the individual being measured. If two scorers score the same individual in two different ways, the test is to a degree measuring the observer instead of the man being tested."

Objectivity is gained by breaking down a complex task into specific components of that task. The more the scoring scheme focuses on specific observable behavior, the less likely is subjectivity to be of concern as a source of significant error.

5. Two parallel 300 item tests as well as two performance tests should then be administered to a group of representative workers in the occupation as well as to teachers of the occupation as suggested by Kazanas and Kieft Critical comments of the examinees should be encouraged. The group of selected trial

- examinees should represent the geographical regions in accordance with the occupation committee's representation. Some logical scheme for deriving part scores should also be constructed.
6. On the basis of an empirical analysis of the test data (see next section for further description) and critical comments of the examinees the item writing committee as described in step #3 should evaluate the results, and revise the examinations (also described in the next section of this report). The final forms of the written test should include no more than 200 items.
 7. The next step would be the collection of norm data. At least 500 to 700 workers in an occupation would compose the standardization sample the final number depends upon: 1) the variability of the occupation from region to region; and 2) the range of regions to be represented. Regional norms and nationwide norms should be constructed for each part and the total score of each form of the exam.
 8. A test manual should finally be developed including: directions for administering and scoring both forms of the written and performance exams; the table of specifications constructed for the examinations; the regional and nationwide norms; a description of the standardization sample; and suggested interpretation of the test scores.

Obviously, strict security of these exams must be maintained, or else the test results would be worthless. There are many acceptable procedures for insuring security of exams, but it is outside of the scope of this paper to undertake a discussion of them.

Recommended Procedures for Measuring the Validity and Reliability of Occupational Competency Examinations

Content Validity

Much of the discussion in this report has dealt with the necessity of establishing the content validity of occupational competency examinations. The procedure which has been described for building content validity into these examinations has been in constructing items representing a domain of skill and knowledges in an occupation. The objective was to determine the extent to which an individual possessed the knowledges and skills necessary for competent performance in the occupation. This procedure may be described as a logical keying procedure. This approach is exemplified by identifying what an individual needs to know, and what he needs to do in an occupation and then develop an instrument for measuring these knowledges and performances.

Statistical procedures for measuring content validity are non-existent. The process is one of critical examination and judgment.

Construct Validity

There are several analyses which can be conducted which will provide evidence as to the construct validity of an occupational competency examination. The process of examining construct validity involves systematic investigation of the numerous variables which are related to occupational competency. . . .

Reliability

Since it has been decided that a reliability coefficient would be useful to calculate the recommended method is presented here. If one of the preceding recommendations of this report were to be utilized, that of constructing parallel forms of the examination, both written and performance, then calculation of reliability is both simple and appropriate. The two forms of the examination are administered to the same group. Correlations are then calculated between the corresponding part-scores in the two forms as well as the total scores. The correlations are the reliability coefficients of the test itself and of the part-scores.

How, then would the reliability of the performance exams on the two forms be calculated? A recommended procedure would be to follow Hoyt's* methodology of determining reliability through an analysis of variance. The three sources of variation would be differences between the mean scores of individuals in the group, differences between the mean of the two forms, and an error component. The formula which could be utilized is: (13, pp. 2, 4-7, 10-17, 19)

$$\text{reliability} = \frac{A - B}{A}$$

where: A = mean square, differences between individuals

B = mean square, error

During the year 1966, Professor Impellitteri, recognizing the need for the Department of Vocational Education to increase the quality of its graduate program, prepared a position paper on the subject. As a result of this paper and its catalytic effect upon subsequent actions,

*Hoyt, C. T. "Test reliability estimated by analysis of variance," *Psychometrika*, VI(1941), pp. 153-160.

graduate student enrollment in the Department of Vocational Education has increased 400 percent since 1966. During that same year, Dr. Impellitteri also embarked on the funded research project entitled, "The Development and Evaluation of a Pilot Computer Assisted Vocational Guidance Program" and generated the first publications from this project in the form of a progress report, a paper and an interim report. A publication indirectly resulting from this project was his paper entitled "New Trends in Vocational Guidance" which was presented to the Pennsylvania Vocational Technical Administrators at an annual conference in 1966. The year 1966 also saw the continuation of Professor Impellitteri's interest in Occupational Competency testing with a paper presented at Rutgers--The State University (referred to earlier in this chapter). This paper was one of the factors which set in motion the Educational Testing Service's National Occupational Competency Testing Program.

Chapter III

1967

Professor Impellitteri's achievements for the year 1967 included two efforts that were of considerable significance: the development of a blueprint for initiation and conduct of departmental sponsored research, and continuation of his involvement with the computer assistance vocational guidance system.

A position paper which, in effect, established a framework for the conduct of research in the Department of Vocational Education was coauthored by Dr. Impellitteri. It is believed by some individuals familiar with the operation of the Department of Vocational Education during the early and mid-seventies that the philosophy expoused in this document served as an important guide in the conduct of department research since that time. Because of the importance attached to this document, it is quoted in its entirety below:

Recently in the Department of Vocational Education an organizational structure was adopted in which the primary departmental activities were designated as teacher education, field supervision, curriculum, research[,] and leadership development. This structure is basically sound, and provides an operational framework for departmental efforts.

Because each of these activities represents a highly specialized area each is obviously best undertaken by staff personnel whose interests, training and experience are most highly related to the particular specialty. Indeed, one finds with few exceptions that the primary responsibility of each of the staff members in the department falls within one of the five areas. Moreover, due to the developments being made in each of the five areas it is likely that specialties within those areas will probably arise.

The trend necessarily has been, and will most likely continue toward increased specialization. Two possible outcomes of this trend must be guarded against: the specialist protecting his niche as an exclusive domain, into which no other staff member may enter;

and the staff member perceiving that his primary responsibility in the department is his only responsibility. The resulting isolation of most staff members under such conditions would probably result in the loss of focus on the department's efforts.

In organizing the framework for departmental research which is presented in the following pages the foundation was established with a view toward overcoming the possibility of such outcomes.

It was assumed that:

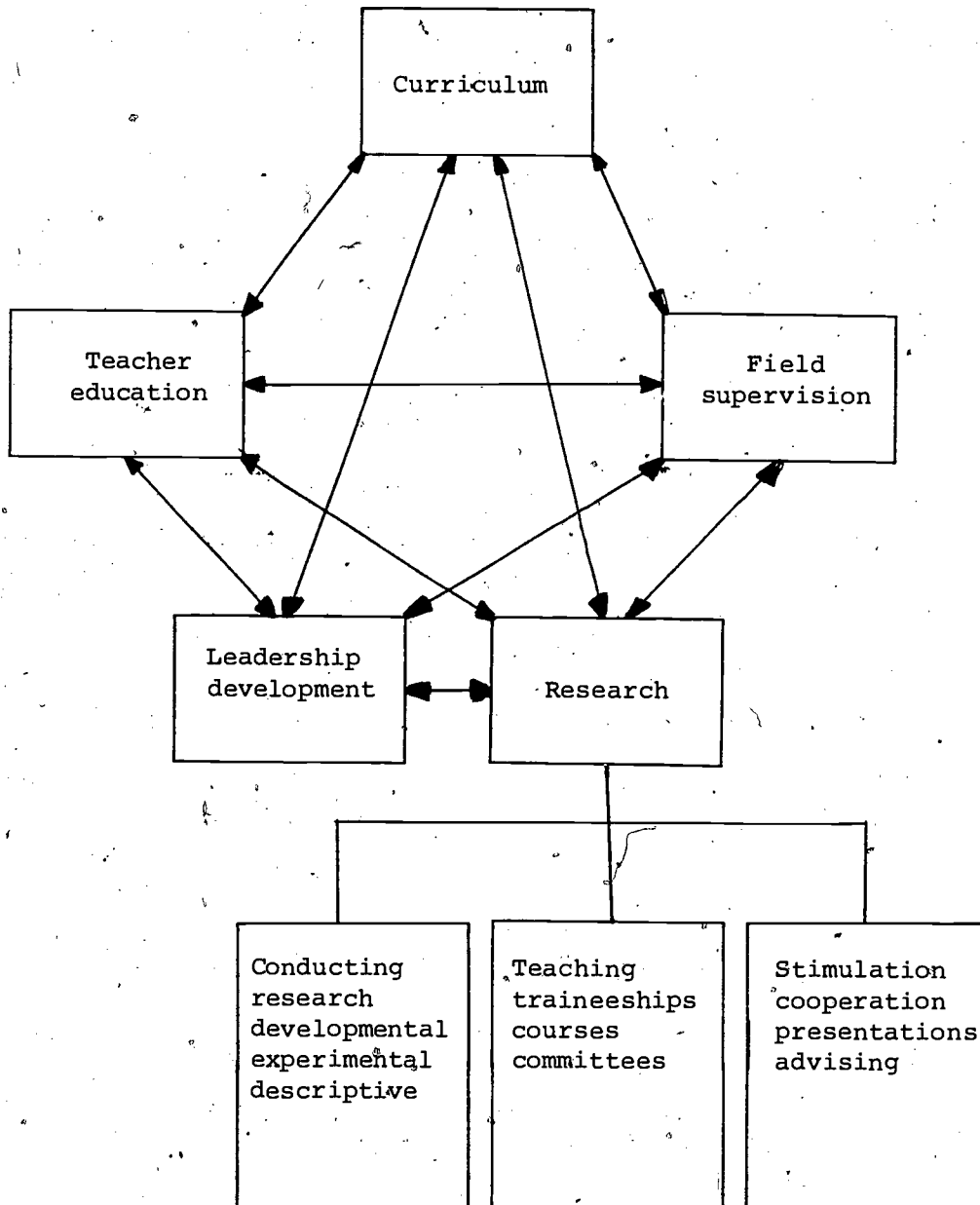
1. Faculty members of the department should participate in some phase of research due to its complementary value to their major area of concern and to their personal effectiveness in that area.
2. The efforts of the staff members in the department whose primary responsibility is research should contribute to a body of knowledge which may be utilized in the activities of other department members.
3. The distinction between the researchers in the department and other faculty members is in the degree of involvement in research.
4. In order for the researchers in the department to maintain a sensitivity to the important problems in the field it will be necessary for them to participate in other activities in the department.

With these assumptions in mind the following is submitted as a framework not merely for the researchers in the department but for the total departmental research effort.

Objectives of the Departmental Research Effort

- I. To improve the quality of preparation and inservice development of occupational education teachers, supervisors, guidance counselors, and other personnel through research.
- II. To meet the growing need for occupational educators who can conduct research and intelligently apply research findings by providing appropriate training at the graduate and undergraduate levels.
- III. To stimulate research planning and activity on the part of local school personnel, and cooperate with them in implementing their research plans.

DEPARTMENT OF VOCATIONAL EDUCATION



Toward Fulfilling the Objectives

I. To improve the quality of:

A. occupational teacher education

1. through developmental and evaluative activities such as:
 - a. self-evaluative techniques including adaptations of micro-teaching as combined with the use of objective observation instruments.
 - b. computer assisted instruction as applied in teacher training and as part of occupational education programs.
 - c. novel approaches to instructional methods and materials in the teacher education program as well as in occupational education programs.
 - d. determining the behavioral outcomes of participants attending workshops, institutes, and conferences.
 - e. evaluation of teacher education courses and programs like Professor Brantner's "Teacher Education Analysis."
 - f. evaluation of occupational education programs like the OE Tech Retraining project.
2. through experimental activities such as:
 - a. simulation as compared to live situations in training teachers as well as in occupational education training programs.
 - b. comparison of the various techniques and approaches developed in "1" above with other approaches in terms of outcomes, cost and time.
 - c. comparison of training for specific occupations with training for families of occupations in terms of trainee work progression.
3. through descriptive research activities such as:
 - a. identification of teacher behavior related to optimum student learning.
 - b. determining the extent to which an individual's interests, aptitudes, attitudes, work experience and other characteristics relate to his effectiveness as an occupational teacher.
 - c. developing predictions of success in teacher training and teaching based on patterns of knowledge, aptitudes and personality factors.
 - d. efforts within the total frame of vocational students' experiences--i.e. how are the input variables (student ability, family background, pre-vocational school experiences, self concept, interests, attitudes and perceptions) related to the vocational training process variables (the teacher, his training experiences, and ability, knowledges and personality; the guidance counselor and his characteristics; other students and their

characteristics; and the administrative structure of the school), and to the outcome variables (degree of success in training, job success, job satisfaction, and degree of attainment of responsible adult life)?

- e. an analysis of the perceptions of academic and vocational teachers of their roles in the school.
- f. determination of the extent to which the vocational programs reflect the needs of students, the needs of industry and the needs of society.
- g. what effect do vocational programs at the secondary level have on the motivation and achievement of vocational students in academic areas?
- h. identification of the generalizable dimensions of work experiences.

B. leadership personnel

1. through developmental and evaluative activities such as:
 - a. developing and evaluating instructional methods and materials to teach decision making as illustrated by computer gaming techniques.
 - b. evaluation of seminars, workshops, and short courses in terms of outcome variables.
 - c. determination of the effects of supervision of beginning teachers on improvement of instruction.
 - d. development and evaluation of instructional methods and materials in the teaching of conference leadership, group dynamics, and affecting change in education.
2. through experimental activities such as:
 - a. comparison of the approaches developed in "1" above with other approaches in terms of terminal outcomes.
 - b. comparison of simulated versus live experiences.
3. through descriptive research activities such as:
 - a. identification of the dimensions of leadership.
 - b. determining the extent to which certain variables are related to leadership.
 - c. an analysis of the effects of leadership.
 - d. development of a prediction of leadership success on the basis of individual characteristics.

C. guidance

1. through developmental and evaluative activities such as:
 - a. the computer assisted occupational guidance project.
 - b. evaluation of other systems of organizing and disseminating occupational information.
 - c. development and evaluation of novel approaches to the training of counselors for specific needs.

2. through experimental activities such as:
 - a. the comparison of approaches and techniques developed in "1" above with other approaches in terms of specified outcomes.
 - b. determination of the effects of work experience on a counselor's effectiveness in working with vocational students.
3. through descriptive research and activities such as:
 - a. longitudinal studies of the predictive validity of the GATB, the DAT and other measures in forecasting success in training and quality of job performance.
 - b. extended follow-up studies of graduates in various curriculums in vocational education as compared to academic and general curriculum graduates.
 - c. determination of those factors important in identifying a student's readiness to enter a vocational education program?

II. To meet the growing need for occupational educators who can conduct research and intelligently apply research findings in their work by providing appropriate training at the graduate and undergraduate levels

- A. by increased participation of graduate students in departmental research
 1. as full-time staff members either in research or in one of the other areas.
 2. as graduate assistants on departmental research efforts.
 3. as non-paid interns in research efforts for which credit is received.
- B. by instruction in research through formal courses
 1. a basic research methodology course at the "400" level.
 2. an advanced non-credit seminar for doctoral candidates prior to submission of thesis proposal.
 3. a "500" level course focused on the critical evaluation of research in vocational education.
 4. all other courses at the graduate level in the department which utilize the findings of research as part of the focus of the course.
- C. by faculty contributions to graduate student's research either on a formal committee relationship or on an informal advisory relationship.

III. To stimulate research planning and activity on the part of local school personnel, and cooperate with them in implementing their research plans

- A. by developing cooperative relationships with schools, governmental agencies and other organizations or institutions in the Penn State service area.

- B. by presenting the findings of research being conducted in the department to groups of persons representing such agencies and institutions.
- C. by making staff members available to persons requesting their aid either in the planning or implementing stages (14, pp. 1-5).

In 1967 four distinct achievements were noted relative to the Pilot Computer Assisted Occupational Guidance Program. In an interim report dated April (1967) Professor Impellitteri reported progress on the program in terms of: a) development of a system; b) dissemination activities associated with the program; c) development of instruments; and d) several other less major activities associated with this effort. It was apparent from review of this document that considerable progress had been made in this project since the last interim report including several written materials. Also of interest is the fact that Dr. Impellitteri (with several others) developed three inventories and an occupational information test. He indicated that future activities would include a field trial of the program and a conference for vocational directors and guidance counselors for the purpose of providing feedback information on the progress of the program (15).

A paper entitled, "A Computerized Occupational Information System" was published in the June, 1967, issue of the Vocational Guidance Quarterly. In his concluding statements, Professor Impellitteri cited the advantages of the system which he was designing in the following manner:

The advantages of the computer assisted occupational guidance system are in its flexibility and storage capacity. Its flexibility allows for innumerable changes in the existing system--changes in certain aspects of existing job descriptions such as educational

requirements, employment outlooks, or work hours per week; the addition of new job descriptions; or the deletion of certain jobs which are being phased out of existence.

The practically limitless storage capacity of the system allows for many job descriptions to be stored in addition to innumerable student profiles. Any changes that occur in jobs and employment opportunities can be immediately entered into computer storage.

Each pupil using the system is allowed to cover as many occupational groups, and as many specific jobs within the groups as he has the time and the inclination. Each grouping and specific job he does review, however, will be presented in relating to his own aptitudes and interests. The material presented is thus pertinent, meaningful occupational information (16, p. 264).

Not long after that (i.e., August 8, 1967) Professor Impellitteri presented a paper on that same topic at The Ohio State University. In that presentation a description of the program under design at The Pennsylvania State University served as the major theme. His description included the following:

At Pehn State our purpose is to develop and evaluate a system of presenting occupational information to ninth grade pupils, utilizing the computer-assisted instruction facility currently in operation there. This system will provide a model for a more extensive, extremely flexible, easily updated information-giving system.

One of the most unique features of this system is that of selective presentation of occupational information. The selection of the materials to be presented to the individual student is based on that student's General Aptitude Test Battery (GATB) profile which is stored in the computer memory. Another of its unique features is the manner of presentation of the materials. Not only are materials typed out at the console where the student is to be seated, but also is presented on sound recordings and slide projections, all integrated under computer control.

This system is visualized not as a substitute for the counselor, but as an effective complement to the counselor. It provides the function of information-giving, that portion of the vocational guidance process which counselors are admittedly less adept to handle, and more willing to delegate: The role of the counselor in vocational guidance as presented here in conjunction with this occupational information system is thus revised. His responsibilities no longer include knowledge of specific facts about particular jobs, but instead involve the understanding of the world of work, its relation to individual goals and aspirations, and the ability to communicate effectively with the student in these terms.

The computerized occupational information system may be thought of as a powerful tool of the school counselor in the vocational guidance process. The school counselor must become actively involved if this "tool" is to be effective. Outside of the vocational guidance process the system has little utility. The system thus will function effectively only in a school where the guidance counselor acknowledges the value of vocational guidance for ninth grade pupils and recognizes the need for them to acquire knowledge about occupations.

The unique advantages of the Computer Assisted Occupational Guidance system are its flexibility and its storage capacity. Its flexibility allows for innumerable changes in the existing system--changes in certain aspects of existing job descriptions such as educational requirements, employment outlooks, or work hours per week; the addition of new job descriptions; or the deletion of certain jobs which are being phased out of existence.

The practically limitless storage capacity of the system allows for many job descriptions to be stored in addition to innumerable characteristic student profiles. Any changes that occur in jobs and employment opportunities as well as up-dated student information can be immediately entered into computer storage.

In what ways will the computer-based occupational information system more adequately meet the needs of ninth and tenth grade pupils? First, since the interaction is with the student, independent of counselor involvement, all students will be offered the opportunity to obtain occupational information, not only those selected students for whom the counselor has time available. Second, the occupational information that is presented to the students will be accurate and up-to-date, resulting in the more realistic transmission of opportunities in the world of work. Third, the manner of presentation of the occupational materials via typewriter, tape recordings and slide projections will instill greater pupil interest, and consequently greater pupil growth in knowledge of the world of work. Finally, the selective nature of presentation of the occupational information will result in pupil acquisition of a more adequate picture of himself in relation to the world of work.

Through the development of the system including only a limited number of occupational groupings and specific vocational trade and industrial job descriptions to be presented to ninth grade pupils, it is expected to establish a prototype for a more comprehensive system in the future. Each pupil using the system is allowed to cover as many specific occupations as he has the time and the inclination. Each grouping and specific job he does review, however, will be presented in relation to his own aptitudes and interests. The materials presented is thus pertinent, meaningful occupational information.

The result that is expected is the more realistic, intelligent choice of a vocational goal to give some meaning and direction to the rigorous training and/or rigorous educational pursuits involved in attaining such a goal (17, p. 4, 5, 6).

Dr. Impellitteri's final paper relative to Computer Assisted Occupational Guidance in 1967 was presented at Cornell University (November 8-10, 1967). Included in that paper was his perception of the results of research in this area. He said:

Computer-assisted guidance efforts are still primarily in the developmental stages. It is thus apparent that little research data exists. The data from our spring pilot project in Altoona appears to be, in fact, the only such data available. That data does at least indicate that our efforts are perceived as beneficial, and the CAOG program experience does result in changes in students' occupational attitudes and values.

In searching through the literature I did locate an interesting piece of research conducted by Gilbert and Ewing at the University of Illinois It has some definite implications for our work in computer-assisted guidance. One of the stated objectives of the study was "to discover whether the personal relationship factor present in normal face-to-face counseling situations and absent, to a very high degree, in a counseling book is an important variable." It was stated in the summary of the report that,

While it cannot be concluded that the personal relationship factor is totally unimportant, it can be concluded that the personal relationship factor has been overemphasized in teaching, counseling, and probably psychotherapy. Consequently, teaching machine procedures are feasible in these situations where the personal relationship factor has been considered necessary.

Part of the Penn State study to develop four college CAI courses . . . involved field trials. Data is presented in the final report on the speech pathology and audiology course segment and the engineering economics course segment. Each of the two field trials was conducted in the same manner. Twenty-one students were randomly assigned to one of three treatment groups -- the CAI method and the lecture method or the self-study method. No significant differences in learning nor retention was found in either trial between the methods. With only seven students within a treatment group the results reported are not surprising.

Generally favorable student reactions to CAI were reported in the study Slightly negative reactions of students to CAI were expressed in terms of its inflexibility, the lack of opportunity for discussion and its tension arousing tendency.

It was also reported in the study that students with poorer Scholastic Aptitude Test (SAT) scores performed more poorly than those students with higher SAT scores, and displayed more of a negative attitude toward the method. From correlational data which

was computed it appears to be likely that the poorer attitude of the low SAT students was the result of their poor performance rather than the result of their lower ability.

Strum and Ward . . . attempted to evaluate over a six month period the potentialities of CAI in the environment of engineering education. The authors concluded that "CAI has little to offer in the environment of the engineering classroom that is both real and superior to parallel techniques" (18, pp. 16, 17, 18).

Also included in that paper was a projection into the future role of Computer-Assisted Instruction and Guidance:

The current role of computer-assisted instruction and guidance is that of an experimental tool. It is useful to the researcher who is interested in exploring strategies of instruction and learning. This would still be its primary role even if the tremendous problems of cost, author time involved, and shortcomings in its capability to communicate meaningfully with the student were overcome. The fact is we do not know enough about the computer as an aid or an obstacle to learning. There is currently little evidence available to indicate the effectiveness of the CAI approach with X kind of student learning subject matter Y in situation Z. Perhaps we will be in a better position to evaluate the many CAI efforts currently underway across the country.

As mentioned in the introductory comments in this paper I believe that CAI has the potential to contribute to humanizing rather than dehumanizing education. It theoretically can provide a means to move pupil-teacher interchanges past information exchange. Students who come to the teacher already equipped with the pertinent information can more readily deal with complex concepts and relationships between them. The role of the teacher is then revised. He becomes more of a catalyst or sounding board than an information giver. Freed from the drudgery of routine repetition teachers may be able to become true stimulators of ideas.

One last comment about the future of computer-assisted instruction and guidance. I visualize both of these applications as fitting into a total instruction program or guidance program respectively. Those functions of instruction and guidance which these systems will have been found can handle most affectively will be delegated to them. In accomplishing these ends, then, the teacher, counselor, and curriculum director must actively participate. In order for them to become involved, however, they must be trained in the capabilities of the available techniques and their mode of operation. A new breed of teachers must emerge from our teacher education institutions -- a breed that can deal effectively with the complex problems inherent in such a process.

Though I feel very strongly that the future of these computerized methods is in their value as aids to instruction and guidance rather than as independent entities, I feel just as strongly that

there will be a place for them in the future of education. The notion that the one to one ratio of student to teacher or student to counselor is the ideal goal is not acceptable to me. I believe there are some major functions which can only be handled by computer-assisted devices whether a teacher or counselor is responsible for one student or one hundred students. Whether I am proven right or wrong about these projections is relatively unimportant to me. What is important to me is that others are stimulated to fight as hard as I for an opportunity to find out (18, pp. 18, 19, 20).

A paper originating from data obtained during his dissertation studies entitled, "Predicting Academic Achievement with the High School Placement Test" was published in the October, 1967 issue of the Personnel and Guidance Journal. An abstract of this study was presented in the paper, which stated:

The study reported here investigated the use of the High School Placement Test as a predictor of 9th grade academic achievement as measured by school grades. The sample was composed of 3,194 boys who were enrolled in an academic curriculum at 1 of the 10 randomly selected Diocesan high schools in Philadelphia. A multiple regression analysis and a canonical correlation analysis were performed using the subtest scores of the High School Placement Test as independent variables, and final 9th grade average, grades in English, social studies, Latin, general science, and algebra as the dependent variables. It was found that the Composite score of the High School Placement Test individually would have been as useful a predictor of final grades as either of the empirically determined predictor composites computed in performing the multiple regression analysis and the canonical correlation analysis (19, p 140).

Dr. Impellitteri, with others, prepared and presented a paper at the Ohio State University, which was entitled, "Trade and Industrial Education Research in Teacher Education and Certification Since 1963." The purpose of this paper was to "summarize research in trade and industrial education (excluding technical education) related intimately to teacher education and certification since 1963" (20, p. 1). In this presentation Professor Impellitteri developed a discussion which led up to a presentation of his earlier cited position paper entitled, "A

Framework for Departmental Research Activities." This presentation was probably one of the earliest attempts to justify departmental research in vocational education in a deliberate manner. The emphasis upon the importance of research for continued improvements in all aspects of vocational education, in the opinion of several who knew him best, was an integral part of Dr. Impellitteri's philosophy regarding vocational education. This was manifested with increasing frequency in many of his professional activities for the remainder of his life.

Chapter IV

1968

The year 1968 was Dr. Impellitteri's most productive publication year, with a total of 13 efforts. A number of these writings created significant impacts in vocational education, some of which are still felt as of the time of this writing. This chapter briefly describes these efforts, particularly those writings that the editors feel have the greatest significance for the profession.

Professor Impellitteri's first publication for 1968 was entitled, "A Computer-Assisted Career Exploration System," which was published in the Winter 1968 issue of the National Business Education Quarterly. In the introduction of this article he said:

It would appear that given the greatly increased opportunity for vocational training and retraining throughout one's life, the problem of tentative career choice for the early adolescent would be lessened in importance. The fact is, however, that with increased specialization in the world of work realistic career choices are expected to be made at an early stage in one's life.

Based on the findings of several research studies, it is apparent that this early emphasis on a career choice is not psychologically sound. This inconsistency, however, is what the youth of today must adjust to in their striving for adulthood. It must be one of the problems they overcome in their development (21, p. 47).

The later sections of the paper carefully reviewed past efforts, the present status, and projected future developments in the field. Professor Impellitteri's conclusions included a summary of progress made up to that time in the computer-assisted program at The Pennsylvania State University. Included in that summary were the following statements:

Based upon the tentative evaluation of the second field trial, major changes have been recommended for incorporation into a future revision of the system. The basically heuristic approach will be retained, but the amount of pupil participation in the interaction will increase. The loose organization of the information previously deemed desirable will be more highly structured, providing for increased focus of the students upon important elements in the career exploration process. With these revisions it is hypothesized that a more effective system for meeting the future needs of our youth will result (21, p. 51).

Also during the winter of 1968 (March), Dr. Impellitteri was involved (with several other department faculty members) in the preparation of a departmental report entitled "Trade and Industrial Teacher Education: A Research Critique and Model for Action." Professor Impellitteri described the nature of the report in the following way:

. . . involves a search for research direction. More specifically, however, the paper outlines a position which serves as a foundation for the study of trade and industrial education; and from the statement of position develops a framework upon which a continuing research program may be built (22, p. 1).

In his critique of the studies referred to in this report, several conclusions were made by Dr. Impellitteri:

1. A sizable number of the research reports have been conducted by students as part of a doctoral program.
2. Recent increases in federal funding have not seemed to greatly improve the sophistication of research which has been directed specifically toward trade and industrial teacher education.
3. The majority of the studies were concerned with either the teacher education "process" or the teacher education "product." In only a very few cases were attempts made to investigate the linkages between a teacher's development and his eventual teaching performance and effectiveness.

Two additional conclusions based on this review are worthy of more thorough consideration for their implications. First, very few of the studies cited seem to have grown out of theoretical framework. Too few attempts have been made to build on the previous work of other researchers, or to accommodate a piece of research into a greater montage. The work of the philosopher is not contrary to that of the researcher, and the best ideas of both should meet in the planning of research studies.

Secondly, it can be readily concluded that research in trade and industrial teacher education is still in an embryonic state. This is indicated by the volume of "social bookkeeping" research on the one hand, and the scarcity of research designed to open new vistas of education on the other. Social bookkeeping research will always be needed, and as such it can be a basis upon which meaningful studies can be produced. A fair generalization of our position in the present state of the art suggests that we have to know where we are in order to establish direction and degree of thrust, but an excessive proportion of our present research is concerned with where we are (22, p. 3-4).

In proposing a model for action, Dr. Impellitteri made the following point:

Lacking a theoretical framework to guide research efforts, individual research projects become entities or closed systems, bearing no identifiable relationship to other scholarly work. As such, research in trade and industrial teacher education suffers from lack of generalizability and acceptability. It is not unlikely that research being conducted at University X enjoys little appreciation from teacher educators in College Y. In fact, it may well be that research being conducted by a teacher educator at University X may not be appreciated by other members of the teacher education staff at the same institution.

The purpose of this paper is to describe a point of departure and to advocate the acceptance of a common operational framework by researchers and teacher educators in trade and industrial education. It is certainly not proposed that all researchers and all teacher educators accept the same framework, but that all researchers and teacher educators in trade and industrial education accept some framework which will serve as communications medium and point of reference (22, p. 5-6).

Professor Impellitteri then added

What is desperately needed in trade and industrial teacher education is a model, paradigm, or framework to which not only the researcher but the teacher educator as well can relate and understand. Working in the broader framework of this type of model, the researcher can develop those research paradigms which he finds useful. The teacher educator, on the other hand, can relate his problems in terms of the framework so as to provide a researcher with a point of focus. Communications between researchers and teacher educators would thus be vastly improved

The trade and industrial teacher education model may, in many respects, be viewed as a general teacher educational model. As a general model the diagram conveys that: a number of persons with certain characteristics who are interested in teaching undertake some type of teacher preparation; of those, some succeed and obtain a teaching job, and eventually have some short-term and long-term

effects on their students by performing in certain ways; and the way they perform as well as the short and long-term effects on students become bases upon which to revise the available pool of potential teachers, the process of preparing them, and the qualifications and competencies they must have to teach

An additional contribution of the model is to superimpose the broader frame upon the specific area under study and to demonstrate the major contingencies within the frame. Thus, if one were interested in the general objective of improving the teacher education program he could work within the frame and account for contingencies between:

1. The number, type and availability of potential trade and industrial teachers and their effect on the teacher education program.
2. The teacher education program and its effect on the population of trade and industrial teachers.
3. The teacher education program and its effect on teacher performance and the resulting feedback of teacher performance to the program.
4. The teacher education program and its effect through teacher performance on the behavior of students in school and out of school.

The teacher education program viewed in this way does not exist in isolation. It exists as one aspect in the whole process outlined in the model. One of the outstanding shortcomings of research in trade and industrial teacher education has been a focus upon isolated aspects of the process to the exclusion of the essential dependencies between these aspects.

The utility of the particular model presented is that:

1. It allows for the identification of contingencies involved in the educative process.
2. The teacher education program is placed within the larger context of the educative process.
3. It ties together the direct and indirect effects of teacher education by way of feedback to the teacher preparation process.
4. It provides a common reference for both the researcher and the teacher educator (22, pp. 8-11).

The report, from which the preceding statements were extracted was a significant contribution to efforts at improvement of research in vocational education, both at that time as well as in the years immediately following its completion.

Professor Impellitteri produced another paper, at this time, which was presented in March, 1968 to the American Institute for Research at Palo Alto, California. The title of this paper was "Implementation Problems: Counselor Acceptance of Systems." Dr. Impellitteri posed the following question in that paper, "Is it the implementation of the experimental prototypes in which we're primarily interested, or the eventual highly developed models of the future?" (23, p. 1). In referring to the implementation of the experimental prototypes, he said:

1. Development of first generation prototype--acceptance by general population of counselors extremely limited (no trial data nor counselor-student feedback available); counselors who would be willing to assist in trials are those who have had prior relationship with support systems designers and who possess a high degree of acceptance of any new approach.
2. Counselors identified in the first stage become involved in planning of trial.
3. Trial undertaken and completed.
4. Feedback obtained from both students and counselors involved in field trial.
5. Prototype system revised and/or expanded based on feedback or in fact abandoned.
6. Development of second generation prototype--acceptance [sic] by general population of counselors increases but limited to those who are most highly acceptable to any new approach; some generation of interest among remainder of counselors.
7. The planning of trial, actual trial, feedback and revision is repeated with a somewhat larger group of counselors involved.

8. Future generations of prototypes proceed, each resulting in a higher degree of counselor acceptance. This acceptance is limited only by the occurrences in stages four and five, the feedback and further revision stages--the feedback upon which the revisions are based always proceed from an atypical environment. At each stage of development the increased counselor acceptance is probably due merely to the demonstration of additional activity rather than that the revised models become suitable to a greater proportion of the general population of counselors (23, p. 2-3).

Dr. Impellitteri went on to add that such an approach would

. . . end up by producing a finely honed guidance support system which can and will be actually used only by those counselors attuned to this razor sharpness. If there were a greater number of these counselors around today or if I could foresee greater numbers of them in the next twenty years I would not perceive this as a problem. I do not, however, see many encouraging signs (23, p. 3-4).

In response to these shortcomings Professor Impellitteri formulated four propositions, whose implications he discussed in the following manner:

1. Since the total guidance program in a school unit is a part of the total education system of the community which it serves each guidance program (from school unit to school unit across the country) is unique.

IMPLICATIONS . . .

Widespread counselor acceptance of a guidance support system is possible only to the degree to which the support system is directed toward the communalities between one guidance program and the next. A very broad-gauged [sic] guidance support system is limited in counselor acceptability precisely because it attempts comprehensiveness.

2. The degree of counselor acceptance of a guidance support system is inversely related to the portion of the schools' total guidance program of which the support system has been designed to include.

IMPLICATIONS . . .

The more numerous the roles and function of a counselor which the system has been designed to handle the more threatened most counselors would feel. There appears to be a continuum of alternatives available to the systems designer. The extremes of the continuum are representative of quite diverse

strategies. At the one extreme the strategy calls for quite gradual introduction into the guidance program of guidance support system with limited scope. The other extreme represents the all-or-nothing strategy. Obviously implementation problems will be more acute with the latter kind of strategy than with the former. What is involved, however, as the primary consideration to choice of strategy is the determination of the best means to reach the accepted objective (if, in fact, such an objective has been formulated).

3. Schools in which counselors are least likely to accept a guidance system approach need most improvement, and conversely, schools in which counselors are most likely to accept a guidance system approach need least improvement.

IMPLICATIONS

If, indeed, we wish to make the greatest impact on guidance is there not a choice between developing approaches suitable to counselors who need the most help as opposed to developing an approach acceptable to only those counselors who are "most capable"? It appears that we are currently leaning toward this all-or-nothing approach.

4. Since the counselor's role is affected by the introduction of a guidance system approach the counselor should be aware of the function of the system in the total guidance program.

IMPLICATIONS

Counselors must be involved in the planning and developmental stages in order that implementation problems be minimized. The counselor must satisfy himself both that the guidance system fits into the total guidance program and that it fits in what he perceives as a proper place (23, p. 4-6).

One of the concluding remarks in this paper, which was illustrative of Dr. Impellitteri's always present sense of humor, was:

There are many types of counselors as there are types of schools and types of kids. There appear to be that many problems involved in implementation of systems as well. Because of this, I don't believe there will be a guidance support system developed in the next 10,000 years which will be acceptable to even a majority of counselors, and I'm both highly optimistic and highly thankful for that (23, p. 6).

At the conclusion of this presentation, Professor Impellitteri made his major recommendation, which was

. . . for counselor involvement in our efforts at all stages-- planning, trial, evaluation and revision within the framework of what he sees himself best doing in his particular school system with his particular youngsters. I think that the counselors themselves must become capable of developing their own guidance support systems to suit their own particular needs. There [sic] involvement in our efforts would provide them with an impetus to direct their own activities. I am convinced that the future of guidance will depend upon the ability of counselors to do this job for themselves, perhaps with the help of people like yourselves (23, p. 6-7).

A month later (April, 1968), Dr. Impellitteri presented a paper entitled, "Future Experimentation with Computer-Assisted Occupational Guidance at Penn State" at the annual meeting of the American Personnel and Guidance Association Convention in Detroit. In the early paragraphs of this paper Professor Impellitteri described the project from its inception in 1965 into its first active initial efforts in 1966 on to the time of the presentation. He clearly emphasized that the overall purpose of the project was to develop and evaluate a prototype computer assisted information system. Dr. Impellitteri succinctly pointed to the weakest link in the project--"it takes a going guidance program to make the system effective" (24, p. 2).

Professor Impellitteri's closing comments in this paper are particularly relevant as well as interesting:

With the increased number of computer-assisted guidance projects currently underway the reaction from the general counselor population seems to be one of reluctant optimism. I'm not one of the most perceptive guys around, but I do think I detect a note of tentative approval from most counselor groups. Their general attitude is one of, "Show me more."

I think this is quite revealing. It indicates to me that counselors in general are cautious enough not to wildly approve any new scheme to be developed. Yet, they neither are overly cautious in rejecting the idea that a computer can assist them in performing their job before they hear more. This most promising reaction demonstrates a level of sophistication among our counselors which forecasts a bright future for guidance in our schools (24, p. 8).

"Exploring the Potential of Computer-Assisted Vocational Guidance" was Professor Impellitteri's next publication and it appeared in the April, 1968 issue of School Shop. This paper was devoted to describing the system designed and developed at The Pennsylvania State University, as well as an explanation of its field trial and results, and was concluded by his commentary on current and future activities within that system (25).

A modification of a paper earlier presented at the Ohio State University, which also was the basis for a departmental report, was developed by Professor Impellitteri and a coauthor into an article entitled, "Toward a Framework for Research in Trade and Industrial Teacher Education," and was published in the Spring, 1968 issue of the Journal of Industrial Teacher Education.

The closing statements of this article were of considerable significance:

... the model presented is not a research model, but a trade and industrial teacher education model. Essentially its purpose is to improve communications in the field--within the speciality areas of teacher education and research, and between the specialists in those areas as well. Adoption of such a model provides a starting point from which research models can be developed (26, p. 38).

Professor Impellitteri was continuing his efforts relating to the computer assisted guidance program and prepared a report (with others) that was entitled, "The Development of a Computer-Assisted Occupational Guidance Program." The program, in this report, was described as having a four-fold purpose:

1. to describe the initial computer-assisted occupational guidance (CAOG) program developed in the Department of Vocational Education at Penn State;
2. to present the results of two field trials in which the program was utilized;
3. to describe the second generation version of the program developed in the CAI Laboratory; and
4. to present a planned third generation program and the rationale upon which it is based. The efforts described herein were initiated in April, 1965 and represent a continuing involvement since that time. The goal of developing a computer-assisted occupational guidance system for use by ninth graders in occupational exploration was formulated at a time when there was a renewal of interest in the urgency of quality vocational guidance for our youth. What was in 1965 an emerging concern about the degree to which vocational guidance was meeting the needs of youth, has burgeoned into one of the foremost priority issues in education across the country today (27, p. 6/8).

Also in this report, the objectives of the original project were carefully spelled out to be as follows:

- a. to develop a pilot occupational information retrieval and transmission system which would stimulate a selected segment of the ninth grade population to explore occupations on their own;
- b. to structure the occupational information transmission and the procedures by which the information is retrieved in such a way as to develop in the boys who are exposed to the system the acquisition of strategies for career exploration; and
- c. to develop a vocational guidance support system focusing upon occupational information which represents an integral part of the total guidance services in a school (27, p. 6/8-6/9).

During the years 1967 and 1968, the computer assisted guidance program was field tested in two Altoona Pennsylvania Junior High Schools, and one of these middle schools served as the site for the pilot study. The field trials resulted in a collection of a considerable array of data which included:

- 1) amount of time voluntarily spent by each student with the terminal (Roosevelt sample only).
- 2) number and type of occupational descriptions requested by each student.
- 3) reaction of each student to the equipment, the content, and procedures as measured by a 44 item inventory.

- 4) students, expectations of the experience, their changes in awareness of self as related to work, the degree to which their horizons of occupational opportunities increased or decreased, the degree to which students developed an exploration strategy, and the degree to which students were stimulated to seek additional information regarding occupational opportunities--all collected by way of a 30-minute interview immediately following the terminal experience (Roosevelt sample only).
- 5) change in expressed tentative occupational choice between September and March for the group having the terminal experience as compared to a similar group of vocational-technical bound boys not having the experience and a group of non-vocational-technical bound boys (Roosevelt sample only).
- 6) selection of tenth grade course of study as compared to previous two years selections at the same school (Roosevelt sample only).
- 7) changes in occupational values as measured by a 35-item inventory.
- 8) changes in the students' general knowledge about occupations as measured by a 149-item test (Keith sample only) [27, pp. 7/3-7/4].

Students participating in the project, were provided opportunities to have several sessions with a computer terminal. The students reactions to these experiences were of considerable interest to Professor Impellitteri. He had the following to say about that:

- 1) The students perceived the terminal system as providing an interesting as well as a useful and valuable way to learn about occupations.
- 2) When compared to other ways of learning about occupations to which they had been exposed, the terminal system was greatly preferred.
- 3) As a result of their experiences on the system the students: were stimulated to explore occupations on their own; were considering more rather than fewer occupational choices; and were better able to relate their abilities, values and interests to occupations.
- 4) A major portion of the boys missed the opportunity to discuss problems in their sessions with the terminal.
- 5) The boys felt the equipment was easy to operate and the material presented was easy to understand.

- 6) Although most of the boys were at least slightly tense during their first terminal sessions, almost all of them were relaxed during their final terminal session.
- 7) Although a majority of both groups felt they had enough control of the operation in the terminal sessions, a substantial portion of the boys desired greater control.
- 8) The occupational information presented was generally felt to be adequate in terms of amount and variety, as well as being presented in a logical manner.
- 9) Most boys from both Keith and Roosevelt felt that they were kept active enough in the terminal sessions as well as being given enough time to think between the stages of the sequence.
- 10) They would have preferred sessions of at least an hour in length, rather than the 40-minute sessions allowed.
- 11) The computer typeouts were perceived by both samples of boys to be the most enjoyable, helpful and beneficial component of the terminal configuration.
- 12) The slides were perceived to be the least enjoyable and least valuable component of the system.
- 13) The tape recordings were perceived to be somewhat interesting and valuable to the Roosevelt group and of little or no value to the Keith group (27, pp. 7/4-7/5).

Dr. Impellitteri described the effects of these experiences upon expressed tentative occupational choices of the sample in the following manner:

- 1) The non-vocational-bound boys were more likely than the vocational-bound boys to reduce the number of tentative occupational choices listed between September and March.
- 2) The non-vocational-bound boys were more likely than the vocational-bound boys to list their first occupational choice in March that was at a lower level than their first choice they indicated in September.
- 3) It was more likely for the non-vocational-bound group than the vocational-bound group that the first occupational choices indicated in March were more specific than those they indicated in September.
- 4) The vocational-bound students indicated more occupational choices in September than the non-vocational-bound group (27, p. 7/6).

Included among the conclusions of the project were the following:

- 1) The computer-assisted occupational information program was found to be a feasible and effective device in assisting youth to explore occupational opportunities.
- 2) The youngsters utilized in the trials for the most part did not develop their own individualized frameworks of the occupational structure.
- 3) Neither the perceived nor demonstrated abilities of the boys involved in the trials to relate their aptitudes and interests to occupational opportunities was affected by their experience with the CAOG program (27, p. 7/7).

Using the findings of the initial two field trials utilizing the computer assisted occupational guidance program, along with a theoretical rationale, Professor Impellitteri revised the earlier approaches into a more highly structured program. He indicated:

The first phase of the computer terminal experience for a student requires him to select three occupations from a list of 144 occupations representing a reasonable sampling of opportunities in the world of work. The three occupations the student is required to select from the list represent three tentative occupational choices. The computer has access to 288 other occupations, some of which may be presented during the student's terminal experience. The student, however, must select from the list of 144. This has merely been conceived as a convenient starting point. The numbers of selections, and stored occupations have been set rather arbitrarily.

The next step in the program is to check on whether any meaning can be translated from these three choices (elementary level of occtaly to psychtalk). This check has been built into the program as a five-item test with feedback on each of the three occupations. Each of the five multiple choice test items have been designed to measure a student's knowledge about one of the following aspects of each of the three selected occupations: 1) duties and typical tasks; 2) educational requirements; 3) training requirements; 4) working conditions; and 5) opportunities for advancement. The feedback for each item is essential in that it either crystallizes the perception of the youngster about an occupation, or it clarifies his perception

The final stage in analyzing each of the three occupations is to give the youngster an opportunity to replace the occupation in question with another which might appear to be more appealing to

- 1) Any one, two or three of the nine aptitudes of the GATB, listed by statements like, "Ability to deal accurately and quickly with numbers," etc. Each of these aptitudes, if selected, by the student is verified in accordance with the same procedures utilized in the verification of perceived interests.
- 2) Four areas of school achievement (mathematics, language, science, social studies). These also are verified in accordance with previously described procedures.
- 3) Educational level--college vs. non-college.
- 4) Amount of physical activity involved in the work--much vs. some vs. none.
- 5) Primarily indoor or outdoor work.
- 6) Salary level.

For each of the 432 occupations in storage each of the characteristics above are coded in some way. This allows the computer to access, based upon the student's stated restrictions, to 429 occupations minus the number of occupational replacements made by the student

The final phase of the program orients the student to focus upon the characteristics he selected

Through the kind of experiences provided for the student in this revised program, it is hypothesized that he will develop a unique framework of the world of work as well as an operational strategy in exploring his place in it. For ninth graders, whose entry into the exploratory stage is imminent, it seems that such an objective is essential, and should be an important determinant in the planning and development of the total ninth grade program (27, pp. 8/4-8/7).

The final report for "The Development and Evaluation of a Pilot Computer Assisted Occupational Guidance Program" was published as a departmental research report in July, 1968. It included, in addition to the body of the report itself, separate volumes (five) for Appendices A through E. The conclusions and recommendations of this report were as follows:

There is an important distinction to be made in summarizing the results of the study reported in this paper. A vast amount of data collected in the interview sessions as well as with the paper-and-pencil reaction inventory represent the perception of

him after finding out something about the originally listed occupation. Replacement then requires the student to go through the same process of questioning with the new occupation on the list

The procedure continues after the student has reached the stage when he is relatively satisfied with the three occupations finally listed. The computer then presents the following message via the cathode ray tube.

When a ninth grade boy states what he thinks are possible occupations which he might enter in the future, he may be indirectly indicating something about those kind of activities he likes to do. Let us examine if you have shown something about yourself in selecting the choices you listed.

The computer proceeds to compare an interest profile developed for each of the three occupations listed based on a dichotomous scale (Significant/Non-significant) of each of the ten Kuder Interest Inventory dimensions. Only those coincidences of three occupations having the same significant dimension are noted for further consideration. If there are no coincidences of three occupations, the computer searches for two of three on any of the dimensions.

On the basis of its search the computer then presents the following kind of message:

In selecting the three occupations which you have listed you have indicated that you may have a preference for working with numbers and a preference for working with machines and tools.

The student is then asked about each of the areas of interest which were underlined in the message, one at a time. He is asked, "Do you think you have a preference for working with numbers?" After the student answers "yes" or "no," the computer then verifies this answer on the basis of the student's coded (Significant/Non-significant) Kuder scores which have been stored. It then feeds back information on the accuracy of the student's perception. When each of the interest areas have been presented, the student is then asked, "Would you like to examine other occupations which might be in line with the preferences you have expressed?"

If the student answers "no" to that question he is asked to consult a list of the ten preference statements of the Kuder, and to indicate his major preferences. These then are verified in the same manner as previously described. All students should, whether they have answered "yes" or "no" to the question, reach the next step of the program. That step requires the student to consult another list which allows him to specify further those characteristics, if any, he wishes to impose on the following selection. Those possible characteristics include:

students-self-reports regarding their feelings toward thoughts about or reactions to their terminal experiences. To go beyond the student perception level to the level of actual behavioral or attitudinal change necessitates the focus on other sources of data. The self-report data, if taken alone, would be vastly misleading, for it only accounts for a portion of the total picture.

The remaining portion, that which deals with directly observed phenomena (statement of pre-post tentative occupational choices, actual numbers of boys to inquire as to additional information about occupations, the ability of the boys to verbalize an exploratory stratagem) provides for a somewhat different interpretation. The author attempts to maintain the distinction within this concluding section, however, lest some overlap occur, the reader is forewarned.

The students involved in both field trials conducted in Altoona, Pennsylvania reacted very favorably to the terminal experience. The impersonal nature of the interaction did not appear to present any problem. In fact, many of the boys indicated that they felt that the privacy created was more to their liking. At least one-half of the boys taking part in the trials indicated though that they did miss the opportunity to discuss problems. Some ideal mix of terminal experience and counselor involvement in the total process appears to be indicated here.

Much of the data collected in the interview as well as through the administration of the Reaction Inventory is pertinent only to the particular system described in this report. The limited generalizability of much of this data argues against interpreting it as if it applied to other systems, circumstances and students. The obvious discrepancy in the students' reaction toward the typeouts of descriptions as opposed to the other components of the terminal configuration may be of more general applicability.

Although the boys taking part in the field trials indicated that they generally felt they were considering more rather than fewer occupations as a result of the terminal experience, the data on tentative occupational choice does not support this conclusion. On the basis of the findings of the Knowledge Test, the boys were more likely to select occupational descriptions for those occupations with which they were more familiar. It would seem that the contention that a broadening of occupational opportunities took place is highly unlikely.

The terminal experience also had little or no effect on the boys' choices of tenth grade course of study, ability to relate their abilities and interest to the world of work, their stated tentative occupational goals, or their ability to explore occupations according to a conscious strategy. Though the experience did result in their increased knowledge about selected occupations, the usefulness of the newly acquired knowledge appeared to be lost. The important role of occupational information in the vocational

guidance process should go far beyond the information itself at the ninth grade level. The inability of the boys taking part in the field trials to integrate the information acquired into a useful framework appears to shed some doubt on the effectiveness of the Computer-Assisted Career Exploration System.

The finding that 26 per cent of the boys in the Roosevelt trial were stimulated to search for more information seems to be encouraging. Many youngsters implied in the interview that though they did not request more information from the school counselor, they went to other sources outside the school environment for information. The 26 per cent figure then is definitely a minimum. The question remains as to what percentage of the group would have actively sought information if they had not been exposed to the terminal experience.

It would seem that two general conclusions may be drawn. First, it appears that the computer-assisted career exploration system is perceived as useful, helpful and enjoyable by the students for whom it was designed. The terminal equipment, as a medium of communication, was perceived as an effective instrument of communication.

The second conclusion is that the computer-assisted career exploration system has not promoted observable behavior or attitude changes in the students who had an opportunity to work with it. Whether or not such changes are desirable has not been adequately dealt with during the course of this project. It has been assumed that changes, if observed, would be at least indicative of an effect other than as perceived by the students themselves. Such effects could then be related to some theoretical framework in the vocational development literature.

This project has been based upon the firm conviction that the future of computer-assisted guidance support systems is in their value as guidance tools rather than as independent self-supporting entities. Just as strong a conviction has been adhered to in carving out a place for these systems for the future.

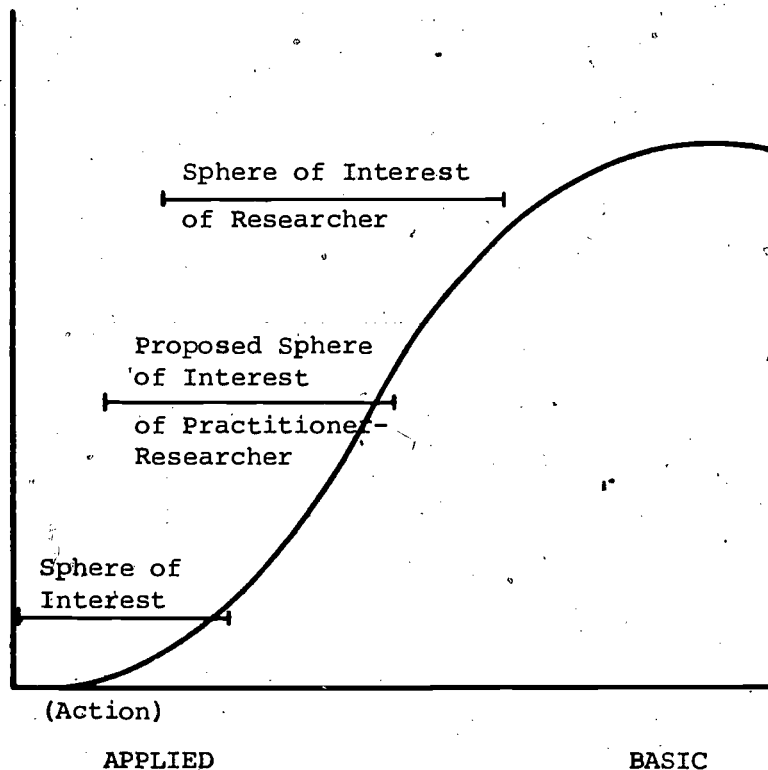
The purpose of the project staff from its inception has been to uncover evidence regarding the effectiveness of this approach in the guidance program. Future efforts are planned with a vastly revised system. The revisions to be used commencing Winter, 1969 are based upon many of the observations made by the project staff during the field trials at Altoona. It is expected that by the conclusion of the next field trial, there will be other operational efforts of a similar kind against which results may be compared (28, pp. 59, 60, 61).

An article entitled, "Response to Mr. Wimer: The Role of the Program Operator" was published in the Fall, 1968 issue of the Journal of Industrial Teacher Education. In this article, Professor Impellitteri responded to what he perceived as three central concerns in a previous paper written by Mr. Frank H. Wimer. They were:

1. What kind of research is appropriate?
2. Who is to conduct the research?
3. What implementation should be made of the research results?

(29, p. 19)

Dr. Impellitteri utilized a diagrammatic approach in an attempt to describe the continuum that could be made to exist between applied and basic research. As illustrated in Figure 1 of his paper, Professor Impellitteri indicated some disagreement with several of the points made in the Wimer paper. Dr. Impellitteri stressed that it was his belief that the sphere of the researcher's interest should extend well into the general areas of interest of the practitioner-researcher, as displayed in Figure 3. Professor Impellitteri went on to emphasize that in his opinion dichotomy between the practitioner and the researcher does not exist in fact. Another point raised by Professor Impellitteri had to do with the nature of vocational education research. He expressed the belief that research would need to deal with solutions addressed to both immediate and more distant needs, rather than merely the here and now wants of the profession. Dr. Impellitteri went on to say that the only area where the researcher and the practitioner would need to cooperate would be where there existed a common research interest. Furthermore, "close cooperation in the area outside of the overlap may, in fact, interfere with the proper and valid objectives and



(The Continuum* from "action" research to "basic" research.)

Figure 3. The range of research interest of the practitioner and researcher as projected against the types of research and their degree of generalizability (29, p. 20).

*This is meant to convey a true continuum. The dotted vertical lines have been included to convey the notion that we speak of types of research as if they were discrete.

conduct of the research" (29, p. 21). Professor Impellitteri also disagreed with Wimer's claim that if research findings are not implemented the fault would rest with the research. He did point out that a considerable amount of misunderstanding exists between practitioners and researchers. Professor Impellitteri elaborated on this point:

A common misconception in our field is that the person typically called a researcher is perceived to be a technician, equipped with his bag of research tools, who goes hopping from problem to problem, troubleshooting his way through a maze of the practitioner's problems. This distorted view of the researcher does not acknowledge the importance of scholarly research to the discipline. . . . I maintain that the proper domain of the researcher in vocational and practical arts education is in the area of scholarly research^r described previously as contributing to the discipline rather than to the solution of immediate problems (29, p. 24).

Later in this paper, Professor Impellitteri added:

The researcher as viewed in this framework is primarily a content specialist and secondarily a competent conductor of research. His conception of the content may be more abstract than that of the practitioner. However, his primary strength must lie in his knowledge and understanding of the discipline in which he is operating (29, p. 24-25).

In October, Dr. Impellitteri presented a paper at the Four State Conference on Vocational and Technical Leadership Development in Hancock, Maryland. His paper was entitled, "A Review of Research in Vocational and Technical Leadership Development." In an early statement in this presentation, he remarked that there is "a lot more activity in vocational and technical leadership development than there is research" (30, p.1). Professor Impellitteri defined leadership as "a form of behavior (acting) by a person or group of persons in a situation which influences the behavior of another person or group of persons in a desired direction (30, p. 2).

According to Dr. Impellitteri, only two research studies dealing with vocational and technical leadership development in vocational education were found in the literature at this point in time (i.e., 1968). He noted, however, that considerable research on leadership has been conducted outside the field of vocational education. Professor Impellitteri proposed:

the adoption of some framework or model which would help to isolate the significant variables in the vocational and technical leadership process, as well as to serve as a categorization of research in the field. The model [displayed in Figure 4] I would propose as an example only is not dissimilar to conception to a teacher education model which an associate and myself constructed, and which may be found in the spring 1968 issue of the Journal of Industrial Teacher Education (30, p. 7).

Professor Impellitteri's interests in vocational education continued to expand during this year, and for the first time, his views on career development in a longitudinal manner appears in writing. This began with an unpublished paper entitled, "A Longitudinal Study of Career Development," which provided a description of a total plan for conducting such a study. This paper is quoted in its entirety below:

During the past decade there has been increasing agreement that both formal and semi-formal educational opportunities should be made available to all the members of our society. The concept of so-called terminal educational programs is thus becoming obsolete. Education is now generally conceived to be a lifelong, birth to death process. A significant factor in bringing about this situation is the rapidly changing nature of our highly technological society. First, the persons in the society have a greater need for more education in order to adjust to the society. Second, in order to make progress the society itself produces an ever greater demand for persons with increasingly complex skills and understandings derived through educational programs.

The young adolescent in our public schools today will be faced in a few short years with this reality. In recent years a considerable amount of research has been conducted in an effort to increase our understanding of how to prepare a youngster to face this reality. In general, however, we are still considerably ignorant of the nature of the developing interaction between the student and his environment.

PROSPECTIVE VOC & TECH LEADERS	VOC & TECH LEADERSHIP DEVELOPMENT PROCESS	VOCATIONAL AND TECHNICAL LEADERS	VOC & TECH LEADERS' BEHAVIORS	SITUATIONAL VARIABLES	AFF FOLL BEH
<u>Variables</u>		<u>Variables</u>			
1. Personality traits	1. Formal undergrad. and graduate programs	1. Position	What does he do to encourage the behavior he desires?	1. Organization or School structure	To wh does behav repre
2. Knowledge		2. Approach		2. Personality traits of "followers"	"desi behav
3. Quality of Interpersonal Relationships	2. In-service institutes, workshops, special programs	3. Attitude		3. Nature of the "desirable" behaviors	
4. Background of experiences	3. On-the-job experience	4. Perceptions of problems		4. Degree of support	
5. Image in the field	4. Informal course work at institutions of higher learning	5. Objectives and goals			

Figure 4: A Proposed Model for the Study of Leadership Development in Vocational and Technical Education (30, p. 8).

VOC & TECH LEADERSHIP DEVELOPMENT PROCESS	VOCATIONAL AND TECHNICAL LEADERS	VOC & TECH LEADERS' BEHAVIORS	SITUATIONAL VARIABLES	AFFECT ON FOLLOWERS' BEHAVIORS
1. Formal undergrad. and graduate programs 2. In-service institutes, workshops, special programs 3. On-the-job experience 4. Informal course work at institutions of higher learning	<u>Variables</u> 1. Position 2. Approach 3. Attitude 4. Perceptions of problems 5. Objectives and goals	What does he do to encourage the behavior he desires?	1. Organization or School structure 2. Personality traits of "followers" 3. Nature of the "desirable" behaviors 4. Degree of support	To what degree does this behavior represent the "desired" behavior?

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Figure 4: A Proposed Model for the Study of Leadership Development in Vocational and Technical Education (30, p. 8).

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Since one of the prime realities a youngster must face is obtaining a job, whether it be immediately following high school graduation, or four years later, a significant aspect of his being is his vocational self, and its interaction in the world of work. Although considerable work in the area of vocational development has been done by Super, Tiedeman, the Project Talent group and others, there still remains much disagreement and uncertainty as to the nature of the vocational development process and the factors influencing it.

In order to make some impact upon our knowledge in this area, the Department of Vocational Education at The Pennsylvania State University proposes to initiate a ten-year longitudinal study of the current group of ninth graders in the Altoona School District. The proposed study will represent a programmatic effort involving many of the staff in the Department as well as selected personnel from the Altoona School District. As part of the total plan for the study, efforts will be made to focus upon a comparable group of ninth graders during the 1969-1970 academic year in a different location.

Close cooperation between school personnel from the Altoona School District and participating faculty from Penn State is deemed essential not only to the success of the study itself, but to the eventual use of the findings which are uncovered by the school personnel. My previous experience with the professional staff of the Altoona schools has led me to believe that the potential benefits accruing to both parties concerned will most likely be realized.

The final section of this brief proposal provides some specific notions of the types of data, and resulting involvements currently anticipated during the course of the study. It is entirely possible that either party request that certain other variables of interest be added to the existing list. If the altered arrangement were mutually agreeable there would be no reason that additional areas could not be investigated. At this time, however, from my point of view, the following represent the significant areas of concern.

PROPOSED DATA TO BE COLLECTED

1. From school records or other existing sources (if available)
 - A. Current data (may be collected now).
 1. Sex
 2. Age
 3. Father's occupation
 4. Mother's occupation
 5. Father's educational level
 6. Mother's educational level
 7. Family income
 8. Number of siblings
 9. Eighth grade GPA
 10. APT and CTMM results

- B. Course of study in which enrolled at tenth grade and twelfth grade.
 - C. Grades - tenth, eleventh and twelfth years for each subject.
 - D. Tenth grade mid-year grades for vocational students.
 - E. Dropout data - tenth through twelfth grades.
 - F. Standardized test results such as CEEB, etc., during senior year.
 - G. Interest inventory data? If not available, then to be administered.
2. Data to be generated
- A. During ninth grade year.
 - 1. Administration of GATB (3 hours)
 - 2. Occupational Values Inventory (1 hour)
 - 3. Vocational Development Inventory (30 minutes)
 - 4. Occupational aspiration.
 - a. Idealistic
 - b. Realistic
 - c. Perceived cause of discrepancy, if any
 - 5. Educational aspiration
 - a. High School course of study
 - i. Idealistic
 - ii. Realistic
 - iii. Perceived cause of discrepancy, if any
 - b. Post-high school plans
 - i. Idealistic
 - ii. Realistic
 - iii. Perceived cause of discrepancy, if any
 - 6. Hobbies and other extrinsic interests
 - B. During tenth grade year.
 - 1. Occupational Values Inventory re-test
 - 2. Vocational Development Inventory re-test
 - 3. Occupational aspirations, etc.
 - 4. Educational aspirations, post-high school only.
 - C. During twelfth grade year.
 - 1. GATB re-test (alternate form)
 - 2. OVI re-test
 - 3. VDI re-test
 - 4. Occupational aspirations, etc.
 - 5. Educational aspirations, post-high school only
 - D. Five year out-of-school follow-up to focus upon occupational status and aspirations (31, pp. 1-4).

Professor Impellitteri, already well known by persons active in the American Vocational Association Conventions, presented two papers at the December, 1968 event in Dallas, Texas. The first of these was entitled, "Research Policy: Should it be Determined by State Directors or by the Bureau of Research? --A POSITION--". His presentation was as follows:

The role that I perceived myself filling in this session today was in providing some middle ground in this concern over research policy in vocational education. In writing this paper I attempted to fulfill that role in a similar fashion as I had in my younger football playing days as a defensive middle guard. In that role all I did was put my head down and churn forward. I usually kicked up a heck of a lot of dust, but very rarely tackled anyone. So it was with this paper. I plunged ahead, not knowing where my left tackle and right tackle were heading, and hoping I was staying between them.

My position, of course, has its advantages. In not knowing the positions represented at the so-called extremes, I can carve out for myself a comfortable middle ground, and accuse Arnold or Tuckman or both for either going too far or not going far enough. Resolving any of the issues confronting us in this session then becomes secondary to the gamemanship involved. I have thus chosen to plunge ahead like in the old days. I'll try to keep the dust down, but I won't promise a thing.

My remarks have been organized under four main headings: 1. "Setting the stage"; 2. "Let's take a look at the extremes"; 3. "Where is the middle ground?" and 4. "Some recommendations." Generally, what I've tried to do is to proceed from the question of, "Where have we been?" to "Where are we now?" to that of "Where can we go?" and finally to answer the question, "Where should we be going?"

It is not necessary for me to go into a prolonged discussion of vocational education's history. Most of you are well acquainted with it, and many of you are probably better acquainted with it than I. There are a few points I'd like to make regarding the implications of that history to our situation today.

First I'd like to focus on the traditional concept of vocational education as it has evolved. If I asked any of you if you are a vocational educator, you'd in all probability say, "Yes." Was not your educational and training background, however, either in an industry program, or an agriculture program, or a distributive program, or another one of the specialized service areas? Very few of us could answer no to that particular question. The reason is that vocational education has traditionally been organized and administered under that pattern at the state level and within university structures. Vocational education as a complex discipline within the educational system has, as a consequence, neither been acknowledged nor accepted. The effort of the graduate program at Rutgers (Professor Tuckman's institution) is one of the few encouraging exceptions to this pattern. We have been so occupied with feeding heavy doses of specialization to our students, that the substance included within the discipline of vocational education has been bypassed.

Within the last five years we have been encouraged in our research efforts to utilize interdisciplinary approaches. In doing so, in attracting the sociologist, psychologist or economist to work with us, how many have had to throw up their hands with frustration? "They just don't understand our field," is a typical comment. The fact is that interdisciplinary approaches which assume that a psychologist and a sociologist who know nothing about vocational education can work with a vocational educator who knows little about psychology or sociology are doomed to failure. What I hope this lesson has taught us is that we can no longer afford to neglect building breadth into our vocational education programs, breadth in the discipline, breadth in education and breadth in the related disciplines. With the encouraging passage of the Vocational Amendments recently, and its accompanying bet that vocational education will be a partial cure to many of our major societal problems, how can we ignore what this implies?

The view of research in vocational education prior to the passage of the VEA of 1963 was primarily a social bookkeeping chore. The need for research was synonymous with the need for information. Research was perceived as a fact-gathering process. If a State director wanted to know what the graduates of secondary level reimbursed programs in the state were doing a year after graduation, he had somebody do some research. If a teacher educator felt it would be nice to know what the states were doing about certification for trade and industrial teachers, he sent out questionnaires to all the state directors.

When, in 1964 funds for problem-oriented research became available, where were the vocational educators who had the training and background to conduct such research? The AVA's research committee immediately became active in initiating a number of seminars designed to provide vocational educators with some minimal research competencies. When are we going to learn that we must build into our graduate programs experiences which make it possible for our students to acquire these competencies initially?

A common misconception which was evolved in our field is that the person typically called a researcher is perceived to be a technician, equipped with his bag of research tools, who goes hopping from problem to problem, trouble-shooting his way through a maze of the practitioner's problems. This distorted view of the researcher does not acknowledge the importance of scholarly research to the discipline. It presupposes that the only important research in the field is research of the social bookkeeping type described previously. I maintain that the proper domain of the researcher in vocational education is in the area of scholarly research which contributes to the discipline rather than to the solution of immediate problems. As Benfater (1) has indicated, ". . . in allowing problems to determine research we skip over the vital step without which research is meaningless. Problems may motivate one to search for ideas, but it is the ideas which should determine the research." This position is also consistent with Travers' statement:

Educational research conducted within an institution for solving local problems usually contributes little to the development of a body of knowledge of broad significance to education as a whole. The pressure to solve one local problem after another prevents the development of a broad program consisting of a series of related studies. (2).

The researcher as viewed in this framework is primarily a content specialist and secondarily a competent conductor of research. His conception of the content may be more abstract than that of the practitioner. However, his primary strength must lie in his knowledge and understanding of the discipline in which he is operating.

In discussing the determination of research policy I am assuming that such policy will affect only that research which is supported by federal dollars appropriated for research in vocational education. Let us examine the alternate possibilities for determining policy.

First, I'd like to discuss the Bureau of Research as a policy setting body. Most of you have either been involved with or at least are familiar with some of the interdisciplinary projects funded by the Bureau under the '63 act. Many of these projects allowed for only a nominal involvement of a vocational educator. Others showed no practical involvement at all. These studies were funded on behalf of vocational education apparently as a medicinal agent. That is, this might not taste too good to you now, but you'll later be thankful we gave it to you. Well, it's now later, and I don't see any great vote of confidence being offered by vocational educators yet. Maybe we should wait a while longer for the fruit bearing stage.

Actually I have no quarrel with the Bureau of Research. They placed their big bets on the proven performers rather than go with the longshots. It just so happens that the proven research performers were not vocational educators. More are now. Many more will be in the days to come. But we have awakened a little late. I truly believe that given a substantial number of vocational educators with sophisticated research competencies, the Bureau of Research would support their scholarly efforts. As I have already indicated, I see this as an area of desperate need in our field.

The State Director, on the other hand, undoubtedly perceives a different set of research problems and priorities. Necessity dictates the focus of research interest of the director. Since he deals with day-to-day, recurring educational and administrative problems he becomes attuned to the here and now, and feels strongly about the need for immediate answers. Although directors' need for research differ from that of the discipline, the former is extremely crucial. I thus propose that we can no longer refer to a global need for research in vocational education. The need, to me, seems to be two-fold: the need for research focusing upon immediate solutions to practical problems of the practitioner; and

the need for research to focus upon the understanding of the underlying principles and theories upon which this complex is based. Therefore, there must be a share in the determination of research policy. In practice such a division of responsibility is accomplished by dividing the funds to be distributed for research.

References

1. Bereiter, Carl. "Issues and Dilemmas in Developing Training Programs for Educational Researchers," Ch. V in The Training and Nurture of Educational Researchers, Bloomington, Indiana: Phi Delta Kappa, 1965, pp. 95-110.
2. Travers, Robert M. W. An Introduction to Educational Research (Second Edition). New York: The MacMillan Company, 1964 (32, pp. 1-5).

A second presentation at the AVA conference in Dallas provided Dr. Impellitteri with an opportunity to further describe the Computer Assisted Occupational Information System designed by him during the previous several years at The Pennsylvania State University (33). This presentation capped off a busy year of scholarship and research for Professor Impellitteri, who continued at a very active pace the following year.

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Chapter V

1969

The year 1969 marked a continuation of a high rate of production of publications on the part of Professor Impellitteri. One of his publications that year was entitled, "Implementation Problems: Counselor Acceptance of Systems" which appeared in Computer Based Vocational Guidance Systems published by the United States Government Printing Office (OE 25053). This paper was addressed to answering several concerns, primarily the following: "Is it the implementation of the experimental prototypes in which we are primarily interested, or the eventual highly developed models of the future?" (34, p. 116). This question referred to the utilization of computer based materials in guidance. In response to the concern expressed by him, he proposed eight stages for the development and evaluation of the degree to which counselors accept the experimental models. Dr. Impellitteri described them as follows:

1. Development of first generation prototype--acceptance by the general population of counselors is extremely limited (no trial data nor counselor-student feedback available); counselors who would be willing to assist in trials are those who have had prior relationship with support systems designers and who possess a high degree of acceptance of any new approach.
2. Counselors identified in the first stage become involved in planning of trial.
3. Trial undertaken and completed.
4. Feedback obtained from both students and counselors involved in field trial.
5. Prototype system revised and/or expanded based on feedback, or in fact abandoned.

doctoral fellowships through the Educational Professional Development Act would be provided to the University and the three departments associated with vocational education (i.e., Agricultural Education, Home Economics Education, and Vocational Education). This proposal was subsequently rejected (37).

A paper entitled, "An Heuristic Approach to the Exploration of Self in the World of Work" was presented by Professor Impellitteri in Las Vegas at the annual meeting of the American Personnel and Guidance Association in April. This paper was devoted primarily to a description of the Computer Assisted Occupational Information Program designed and tested by him over a four-year period at The Pennsylvania State University. Based on that experience, he concluded that:

1. the computer-assisted occupational information program was a feasible and effective device in assisting youth to explore occupational opportunities.
2. the youngsters utilized in our trials for the most part did not develop their own individualized frameworks of the occupational structure.
3. neither the perceived nor demonstrated abilities of the boys involved in the trials to relate their aptitudes and interests to occupational opportunities was affected by their experience with our program (38, pp. 1-2).

After a very thorough description of the process through which a student passes in his program, he concluded his presentation with the following brief statement:

Through the kind of experiences provided for the student in the program, it is hypothesized that he will develop a unique framework of the world of work as well as an operation strategy in exploring his place in it. For ninth graders, whose entry into the exploratory stage is imminent, it seems that such an objective is essential (38, p. 10).

helpful in making a future occupational choice . . . are probably the most enjoyable . . . of the three elements of the system. . . . eighty-seven per cent of . . . the . . . boys felt that if given a choice they would favor obtaining occupational information by way of the computer terminal than any other means (35, pp. 6-9).

Professor Impellitteri's publications regarding the Computer Assisted Occupational Guidance System continued with a paper entitled, "Exploration with a Computer-Assisted Occupational Information System" published in the March, 1969 issue of Educational Technology. Early in this paper, Dr. Impellitteri described the purpose of the system as follows:

The purpose of the system is threefold: to provide and easily updated, individualized occupational information retrieval system; to develop through an essentially heuristic approach a process whereby youth could develop their own individualized frameworks of the occupational structure, and to provide experiences for youth to acquire operational strategies in relating their abilities and interests to occupational opportunities (36, p. 37).

A considerable portion of this paper was devoted to reviewing the history of his exploratory project. He skillfully described the difference between his approach and other approaches to occupational guidance being developed at that time in the following manner:

. . . it starts a youngster at a point where he is able to attach some concrete notions to some rather abstract concepts. We assume that youngsters have some personalized information gained through their previous experiences of who the policeman, the nurse or the teacher is, and what he does. It would appear that these rather concrete bits of information, regardless of the degree of their accuracy, would provide a sound basis upon which to proceed. The primary purpose of providing him with an experience on the computer-assisted program is to help him in more adequately dealing with the realities which will face him at each of the stages in his vocational development (36, p. 38).

Also in 1969 Dr. Impellitteri devoted considerable attention to matters related to the graduate studies and research aspects of the Department of Vocational Education. With regard to that interest, he prepared and submitted through the University a proposal by which

Guidance Program. He indicated the data were collected in eight broad categories, which were described by him as follows:

1. Amount of time voluntarily spent by each student with the terminal.
2. Number and type of occupational descriptions requested by each student.
3. Reaction of each student to the equipment, the content and procedures utilized as measured by a 44 item inventory.
4. Students' expectations of the experience; their changes in awareness of self as related to work; the degree to which their horizons of occupational opportunities increased or decreased; the degree to which students developed an exploration strategy; and the degree to which students were stimulated to seek additional information regarding occupational opportunities--all collected by way of a 30-minute interview immediately following the terminal experience.
5. Change in expressed tentative occupational choice between September and March for the group having the terminal experience as compared to a similar group of vocational technical bound boys not having the experience and a group of non-vocational-technical bound boys.
6. Selection of tenth grade course of study as compared to previous two years selections at the same school.
7. Changes in occupational values as measured by a 35-item inventory.
8. Changes in the students' general knowledge about occupations as measured by a 149-item test (35, pp. 3-4).

The remainder of his paper was primarily devoted to describing the reactions of the students to their terminal experiences. Several of the more salient points were as follows:

Over 80 percent of both groups indicated that learning to use the terminal equipment was a simple task, and that they were given adequate time to learn its use. . . . Approximately 25 per cent of both groups indicated that they would have preferred at least slightly more control of the terminal system. . . . Over 70 per cent of both groups felt that there was an adequate amount of information presented about each occupation. . . . Over 75 per cent of both groups indicated that they were encouraged by the experience to explore occupations on their own. . . . Boys in both groups generally agreed that the typeouts as well as being

6. Development of second generation prototype--acceptance by the general population of counselors increases but is limited mainly to those who are most highly accepting of any new approach; some generation of interest among remainder of counselors.
7. The planning of trial, actual trial, feedback and revision is repeated with a somewhat larger group of counselors.
8. Future generations of prototypes proceed, each resulting in a higher degree of counselor acceptance. This acceptance is limited only by the occurrences in stages 4 and 5, the feedback and further revision stages. (The feedback upon which the revisions are based always proceeds from an atypical environment.) At each stage of development the increased counselor acceptance is probably due merely to the demonstration of additional activity rather than that the revised models become suitable to a greater proportion of the general population of counselors (34, pp. 116-117).

Professor Impellitteri predicted that not more than 1/5 of practicing guidance counselors would be willing to implement a computer based vocational guidance system at the time of his presentation. He suggested that many problems existed in implementing such systems and felt that a guidance support system acceptable to a majority of counselors would likely not be developed.

His concluding remarks were:

The major recommendation I would make is for counselor involvement in our efforts at all stages--planning, trial, evaluation and revision within the framework of what he sees himself best doing in his particular school system with his particular youngsters. Counselors must become capable of developing their own guidance support systems to suit their own particular needs. Their involvement in our efforts would provide them with an impetus to direct their own activities. The future of guidance will depend upon the ability of counselors to do this job for themselves, perhaps with the help of people like ourselves (34, p. 119).

A paper entitled, "Exploration with a Computer-Assisted Occupational Guidance Program" was presented by Dr. Impellitteri at the annual meeting of the American Educational Research Association in February in Los Angeles. The purpose of this paper was to describe the outcomes of the field trials related to the exploratory Computer Assisted Occupational

Dr. Impellitteri had a paper published in the Summer 1969 issue of the Journal of Industrial Teacher Education. The title of this paper was "The Development of a Computer-Assisted Occupational Guidance Program." In addition to describing the initial program developed and the results of two field trials associated with it, this paper described the second generation version of the effort and the rationale upon which it was based.

Based upon the findings of the two field trials and the new rationale evolving out of those experiences, a revised and more highly structured heuristic approach was designed by Dr. Impellitteri. It was described by him as follows:

The first phase of the computer terminal experience for a student requires him to select three occupations from a list of 144 occupations representing a reasonable sampling of opportunities in the world of work. The three occupations the student is required to select from the list represent three tentative occupational choices. The computer has access to 288 other occupations, some of which may be presented during the student's terminal experience. The student, however, must select from the list of 144. This has merely been conceived as a convenient starting point. The numbers of selections and the number of stored occupations have been set rather arbitrarily.

The next step in the program is to check on whether any meaning can be translated from these three choices (elementary level of occtalk to psychtalk). This check has been built into the program as a five-item test with feedback on each of the three occupations. Each of the five multiple choice test items have been designed to measure a student's knowledge about one of the following aspects of each of the three selected occupations: a) duties and typical tasks; b) educational requirements; c) training requirements; d) working conditions; and e) opportunities for advancement. The feedback for each item is essential in that it either crystallizes the perception of the youngster about an occupation, or it clarifies his perception. The nature of the feedback takes the form of either; "Good! Your answer is correct. _____."; or "Incorrect _____." In either case "_____" represents a one or two sentence description of the particular aspect of the occupation in question.

The final stage in analyzing each of the three occupations is to give the youngster an opportunity to replace the occupation in question with another which might appear to be more appealing to him after finding out something about the originally listed occupation. Replacement then requires the student to go through the same process of questioning with the new occupation on the list. The student's score on each five-item test, his total score, his score on each of the five areas across the three occupations, and the number of replacements he chooses to use are stored in computer counters for use later in the program.

The procedure continues after the student has reached the stage when he is relatively satisfied with the three occupations finally listed. The computer then presents the following message via the cathode ray tube.

When a ninth grade boy states what he thinks are possible occupations which he might enter in the future, he may be indirectly indicating something about those kind of activities he likes to do. Let us examine if you have shown something about yourself in selecting the choices you listed.

The computer proceeds to compare an interest profile developed for each of the three occupations listed based on a dichotomous scale (Significant/Non-significant) of each of the ten Kuder Interest Inventory dimensions. Only those coincidences of three occupations having the same significant dimension are noted for further consideration. If there are no coincidences of three occupations, the computer searches for two of three on any of the dimensions.

On the basis of its search the computer then presents the following kind of message:

In selecting the three occupations which you have listed you have indicated that you may have a preference for working with numbers and a preference for working with machines and tools.

The student is then asked about each of the areas of interest which were underlined in the message, one at a time. He is asked, "Do you think you have a preference for working with numbers?" After the student answers "yes" or "no" the computer then verifies this answer on the basis of the student's coded (Significant/Non-significant) Kuder scores which have been stored. It then feeds back information on the accuracy of the student's perception. When each of the interest areas have been presented, the student is then asked, "Would you like to examine other occupations which might be in line with the preferences you have expressed?"

If the student answers "no" to that question he is asked to consult a list of the ten preference statements of the Kuder, and to indicate his major preferences. These then are verified in the same manner as previously described. All students should, whether they have answered "yes" or "no" to the question, reach the next step of

the program. That step requires the student to consult another list which allows them to specify further those characteristics, if any, they wish to impose on the following selection. Those possible characteristics include:

1. Any one, two or three of the nine aptitudes of the GATB, listed by statements like, "Ability to deal accurately and quickly with numbers," etc. Each of these aptitudes, if selected, by the student, is verified in accordance with the same procedures utilized in the verification of perceived interests.
2. Four areas of school achievement (mathematics, language, science, social studies). These also are verified in accordance with previously described procedures.
3. Educational level--college vs. non-college.
4. Amount of physical activity involved in the work--much vs. some vs. none.
5. Primarily indoor or outdoor work.
6. Salary level.

For each of the 432 occupations in storage each of the characteristics above are coded in some way. This allows the computer to access, based upon the student's stated restrictions, to 429 occupations minus the number of occupational replacements made by the student. Each of the 429-R occupations which are identified by the computer are presented via the cathode ray tube to the student. If five or fewer occupations are identified in accordance with the student's restrictions, the computer will suggest that the student pick out the least important characteristic he chose, and eliminate it. At the point where five or more occupations have been presented to the student (plus the three originally selected by the student) it is suggested that the student may wish to visit the library-counselor's office--etc., to uncover more information about these or other occupations.

The final phase of the program orients the student to focus upon the characteristics he selected. For instance, if he indicated no aptitude area as being important, he will be asked to select what he feels is the most important of the nine abilities and to note the differences between the original list of occupations and the new list. He is asked to make some comment about the difference from a list of five statements presented to him. This technique is also used for the achievement area as well as educational plans.

Through the kind of experiences provided for the student in this revised program, it is hypothesized that he will develop a unique framework of the world of work as well as an operational strategy in exploring his place in it. For ninth graders, whose entry into the exploratory stage is imminent, it seems that such an objective is essential, and should be an important determinant in the planning and development of the total ninth grade program (39, p. 25-27).

Continuing with the concern about the quality and type of research conducted in the Department of Vocational Education, Professor Impellitteri prepared a position paper in Spring, 1969, which was presented to the graduate faculty. The paper in its entirety is presented below:

The most essential element lacking in the quality conduct of research in vocational education today is the availability of significant numbers of competent research personnel in the field-- those whose knowledge and understanding of vocational education is equal to their research capabilities, or vice versa. Ample evidence exists to support this contention. One merely needs to scan the qualifications of persons holding responsible vocational education research positions within the U.S. Office of Education and within most Research Coordination [sic] Units across the country. To my knowledge those persons fall into one of three relatively independent categories. The first category made up of about one-half of the total is composed of those persons who possess a broad understanding and wide experience in vocational education while lacking in a fundamental understanding of the social science research process. The second category, made up of about one-sixth of the total group, is composed of persons who have established themselves as researchers, usually in the broad educational realm, yet are almost totally ignorant of the unique processes, basic issues and goals of vocational education. The remainder of the group, or about one-third of the responsible decision-makers in vocational education research lack both understanding and experience in vocational education and any significant research competency.

The most undesirable and destructive effects have occurred as a result of this situation. The incompetent researcher possessing an understanding and broad experience in vocational education demands to know, "What practical results do these research studies have?" The competent researcher who knows little about vocational education responds, "I must not be limited by issues pertaining to significance and implications of the research I conduct. I must be free to inquire." Those unfortunates (usually with doctorates, sad to say) who possess neither research competency nor an understanding of vocational education neither ask questions nor respond directly to them. They merely try not to make waves. The effect of this unimaginable mess has been to shed serious doubts upon the worth of any research conducted in vocational education. The problem is that these "decision-makers," as described previously, have no real grasp of what constitutes a valid evaluation of research in vocational education, nor have they the proper perspectives to carve out valid priorities and directions for research in the field.

Although I have to this point singled out a specific group for critical analysis it is not my intention to limit the evidence presented in support of my initial contention to this particular group. The most pressing need for competent researchers in vocational education is in those university programs who prepare the vocational education leadership personnel in the field. Since we look to the universities' doctoral programs for supposedly competent research personnel who do have an understanding of vocational education, its processes and goals, how many faculty on these university staffs are competent to direct and advise these students? The answer to this question is unfortunately frightening. There are not more than 20 persons in universities across the country who are competent to fulfill this function. To add to the bleakness, at least six of these individuals, to my knowledge, are not currently in a position to advise and direct doctoral students.

The inevitable solution to these many problems regarding vocational education research and its role in improving vocational education appears obvious. The priority need is for more highly qualified leadership personnel-administrators, supervisors, teacher educators, instructional and curriculum specialists who have a broad grasp of the research process, and for researchers who have a broad grasp and understanding of vocational education, its unique process, issues and goals. The solution is to produce more.

Where would these rather unique individuals be prepared? Let's review the possibilities. Would one expect these individuals to be prepared in one of the bureau-type vocational education research units as exemplified by the centers and research coordinating units which have been established? Hardly, since the combination of relatively incompetent personnel and a research-production priority would negate the effects of the research experience upon students. Would then one expect to find competent vocational education researchers prepared in a quality general education research department in a major university? No, since the primary prerequisite of a vocational education researcher is his knowledge and understanding of vocational education.

The only reasonable alternative is in a university department of vocational education. In particular, the department should be staffed by experienced vocational teacher educators, experienced vocational administrators, experienced vocational education researchers, and experienced vocational instructional and curriculum specialists. The learning environment provided within the department should be one including a contemporary philosophy of vocational education, a quality record of research publications, and a healthy attitude toward inquiry. The role of research activities undertaken by faculty within the department should be primarily one of support for the graduate program, and secondarily one of contributing to the field. Research conducted by a faculty member in isolation from graduate students is unlikely to yield the maximum gain, for maximum gain in this environment is measured by the effects which the research has on the graduate students in the program.

THE ROLE OF RESEARCH IN VOCATIONAL EDUCATION AT PENN STATE

In the Department of Vocational Education at Penn State research activities are primarily perceived to be vehicles whereby doctoral students are exposed to and become involved with these efforts. In doing so, they are being provided with invaluable educational experiences which alter their approach to problems, and their whole way of thinking. Not only through the direct experience of working on a research project do students benefit from research activity within the department. They also reap substantial benefits from their coursework and advisement in that the professor who has become, through his research efforts, more knowledgeable about the crucial variables affecting vocational education can much more readily discuss the pertinent issues and current evidence related to them.

The outcomes of the research experiences of the departmental faculty member then may be multiplied by the number of students whom he teaches or advises. Only in this manner will we in vocational education see a day in which the supply of competent vocational leadership personnel come even within range of the demand. Until our primary job at the University becomes one of replacing those who die or retire with equally competent people, we are forced into the situation where the research which is conducted actually does have this multiple effect.

The problem of how vocational education research conducted at the university should be evaluated, however, becomes a perplex one. That is, if the primary objective of the research conducted in the Department is in its effect upon its graduate students, can it be validly evaluated upon the basis of its implications for practice?

This latter criterion certainly can be imposed as the primary basis upon which such research can be evaluated, the reason being that those providing the financial support for these activities actually do enforce such a criterion. It is indeed unfortunate that the question which is posed by the evaluator to the person conducting the research is, "What implications do the results of your research have for the practitioner?" I say that it is unfortunate because such a question stems from a misguided concept of the role of research in vocational education. Research in vocational education cannot be equated to research in engineering and the hard sciences. The answer to, "how long will this particular tire last under certain specific laboratory conditions?" may be quite precise in predicting actual road mileage. The answer to, "how will John Jones react to Mr. White's presentation on the operation of a lathe in the machine shop?" is an entirely different matter. It may take many years to isolate the crucial variables in such a learning process, not taking into consideration the maximal mixing of these variables as they pertain to John Jones and Mr. White.

There does not now exist, nor do I suspect there may ever exist a particular research study the findings of which in itself, would justify an actual change in educational practice. And, I think that at the stage of development we are now at in vocational education research do I consider this condition unhealthy. The only role that I see for research in vocational education at any level, under any conditions, conducted by and [sic] individual or group is in stimulating and suggesting further research. The point is, the crucial question that may be validly asked of the researcher is, "What implications do the results of your study have?" rather than, "What implications do your results have for the practitioner?" In answering the former question the possible area impact is widened

If one were to accept the generalization that the only role for research in vocational education is in stimulating and suggesting further research what particular implications might one necessarily need to consider? As a teacher I could not accept the findings of a study investigating effective learning styles, and change the way I teach my class. I would necessarily, if it seemed appropriate based upon the findings of the study in question, be encouraged to design an action research study utilizing my shop, laboratory or classroom facilities to test whether under these particular conditions the results are comparable.

It seems that following this argument the only kind of research that will have an effect upon practice is action research performed by the practitioner himself. The responsibilities of the university researchers in vocational education is to investigate those crucial areas which may guide the practitioner to performing the kind of research which may yield a high probability of success. The process as described, however, is not unidirectional. It may well be that a series of action research studies performed by a group of teachers may, taken together, suggest to the university researcher a possible area for further study.

The valid evaluation of research undertaken in the Department of Vocational Education at the Pennsylvania State University must take into consideration two primary questions: 1) to what extent has the research activity resulted in preparing a more research-competent body of graduate students? and 2) what further research has been stimulated by the research conducted in the Department? The remainder of this paper will focus specifically upon answers to these two questions (40, pp. 1-6).

A paper entitled, "The Use of the GATB in a Computer-Assisted Occupational Guidance Program" was presented by Professor Impellitteri at the June 18-19 meeting of the advisory committee on the United States Employment Service Tests in Baltimore. One of the elements

dealt with in this paper concerned the validity of the GATB for ninth grade students. Dr. Impellitteri then went on to say:

This indirect argument became less convincing to me the more I thought about it. In searching through the literature what we found were a half-dozen studies relating ninth and tenth grade GATB scores and training success as measured by an instructor's rating, but found no studies relating those scores and occupational success (41, pp. 1-2).

Based on the uncertainty expressed above Dr. Impellitteri decided to initiate a longitudinal study designed "to uncover the extent to which success in various occupations could be predicted from ninth grade GATB scores" (41, p. 2). This study was initiated in Spring of 1967. It should be pointed out to the reader that several aspects of this study continue to this day (i.e., 1975). Professor Impellitteri then proceeded to describe how this 10-year longitudinal study was replicated in two other Pennsylvania locations (the three locations were Altoona, Hazleton and Williamsport)..

A discussion paper entitled, "The Current Needs of Vocational Education and Their Implications for Graduate Study in the Department of Vocational Education at Penn State" was prepared and presented to graduate faculty in the Department of Vocational Education in July, 1969. The paper is quoted in its entirety on the following pages.

In its broadest sense, vocational education has been conceived to be education to fit persons for useful employment at all levels of work. In this sense vocational education is conceived to be not solely a part of the enterprise of education, but of life itself. The vocational education program as it exists today took on its more formal definition with the passage of the Smith-Hughes Act in 1917. Throughout the period since 1917 many other Federal vocational education acts have been passed which have affected its scope and size. Generally, vocational education is considered to be part of a program of studies aimed at developing competent workers, recognizing that the American worker should not only be occupationally competent, but be competent economically, socially, emotionally, intellectually, and in a civic sense as well.

Vocational education's primary role then, is as the occupationally oriented phase of public as well as private education through the fourteenth grade. As such it has often incorrectly been identified with job training. The same persons who adopt this notion also see vocational education's prime objective as meeting the needs of industry. Although hopefully responsive to the changes in the demand for skilled and technical manpower, the primary objective of vocational education is to meet the needs of youth and adults for entry into, progression in, and adjustment to gainful employment.

Vocational education thus finds itself being the bridge between 80 per cent of our school population who will not complete college and the complex, ever changing world of work. The nature of the bridge determines what choices are available for those who wish to cross. Traditionally, vocational education has structured several bridges, each leading to distinct destinations in the world of work. A student either crosses the Trade and Technical bridge, the Agricultural Education bridge, the Distributive Education bridge, or one of the other three or four bridges designed to provide a path to the world of work. Recently this traditional view has been under attack by many critics, both outside and within the field.

With a relatively recent commitment to equal educational and occupational opportunities for all, the role of vocational education has come under close scrutiny. Quality vocational education programs are perceived as a partial solution to the many problems of those "neglected 50 per cent" of our school population who neither finish college nor elect a specific occupational education program. But the vocational education scheme as structured in the traditional manner is not really capable of fulfilling its potential in this respect.

The shortcomings of this scheme are:

1. The increasing complexity of the world of work can no longer be simply structured as in the traditional service area breakdown. For instance, agricultural occupations may generally be broken down into six areas, only one of which (farm production) falls into the exclusive agriculture domain. Similar overlap in the other categories is the rule rather than the exception. Thus the separate bridges are irrelevant.
2. There are no paths leading from bridge to bridge. Thus, there can be no change of path. One must go back to the beginning again to change bridges. A student's decision to travel via one of the bridges is quite final if continual progress is to be made.

3. Research in the area of vocational development indicates that youngsters below the twelfth grade are not ready to make a specific occupational choice. Although this finding is quite widely accepted, a decision point in the traditional scheme is usually forced upon a ninth grader.

The U.S. Office of Education has reacted to these shortcomings by eliminating its separate bureaus corresponding to the separate bridges. There now are no distinctions made in the Division of Adult and Vocational Education as to specialty areas. In their funding agreements as well the Office of Education has attempted to stimulate the obliteration of the traditional barriers between the services. The National Advisory Council on Vocational Education, appointed by President Johnson in 1964 to prepare a five year evaluation of vocational education have recently submitted their report. In it they too call for elimination of the over-specialization of vocational educators as caused by this division by services. In addition, the recently passed Vocational Amendments of 1968 make no specific mention of the service areas, with one minor exception.

Vocational education as conceived by Congress to be a partial solution to many of our current social and economic problems does not appear to be the same vocational education as I see in evidence today. In some way the new vocational education as a conglomerate application in education of a number of disciplines has surpassed the understanding and grasp of the majority of today's vocational educators. The new vocational education has a great contribution to make, yet we find that there are extremely few of the new breed of vocational educators who are prepared to help fulfill its potential. And fewer still are the graduate programs in which these potential leaders are being trained.

Vocational education which has attempted to maintain its responsiveness to the demand for skilled manpower for the past 50 years finds itself in desperate need of qualified leadership personnel, both professional and academic. Unless something drastic is done the situation is certainly going to get progressively worse.

Vocational Education Graduate Programs at Penn State

There are currently four approved, vocationally related graduate programs within the University, each of which offers the Ph.D., D.Ed., M.S. and M.Ed. These are Agricultural Education, Business Education, Home Economics Education, and Vocational Industrial Education.

Although the statement of purposes and course listings for each of the programs in the Graduate Catalog are not the most appropriate data in determining the degree to which certain needs are being met, they do at least provide some information. It is apparent that the need of vocational education for academically oriented persons is not being met by any of the four graduate programs.

The lack of substantive courses in vocational education is obvious. This finding, taken together with the fact that such courses are not available in other graduate programs in the University, is quite revealing.

Further, each of the graduate programs mentioned offers the Ph.D. and M.S. Degrees, supposedly academic in nature. In these programs, as well as in other graduate programs which offer professionally oriented degrees, the adjective "academic" in some way becomes overridden by the descriptive term "research-oriented." This transferral would not be as serious if "research-oriented" were not loosely translated to mean solely, "understanding of research techniques," rather than taking on the additional meaning of "a depth of understanding in the field of study." The conclusion is not that these programs are failing to make important contributions. Rather, the conclusion is that the programs as currently structured are not making a substantive contribution to vocational education's current need for academically oriented individuals.

Each of the programs appears to have a relatively solid list of offerings for persons who desire a professional orientation in the particular specialization. The communalities which should exist from program to program are, to a great extent, absent. Each of the programs, for instance, offers a course in "supervision and administration of. . . ." Each of the programs also offers a course called "research in. . . ." This overspecialization will serve merely to accentuate and promote existing conditions, rather than improving [sic] them.

Even in their professional oriented emphases there appears to be a lack of emphasis upon the foundations of vocational education. Each of the programs is structured to stand alone, to make its own contribution. Needless to say, the profession, as well as the discipline of vocational education, is suffering because of this condition.

It is obvious, to me at least, that graduate program changes must be made in order for Penn State to make a substantial contribution to vocational education. Toward this end I recommend that the following program be adopted and implemented by the graduate faculty of the Department of Vocational Education. The following discussion focuses on the nature of the program and potential students to be accepted in the program, and is based upon the assumption that vocational education leaders must be primarily educators, and secondarily must be vocationally oriented.

The purpose of setting forth such a proposal at this time is to provide a focus for our thoughts and discussion in looking toward the future of graduate studies in the Department. The proposal has not been designed to answer all the questions which may arise in carving out a detailed plan. It is rather to be viewed as a vehicle toward that goal. If we are to continue with graduate studies in vocational education in the Department, then we will only do so with the highest quality, most highly defensible (in

terms of both academic and professional criteria) program which this faculty can devise. This proposal is merely to serve as a starting point.

A Proposed Graduate Program in Vocational Education

Graduate work toward the Ph.D., D.Ed., and M.S. is offered in the general field of vocational education. Students may specialize at the secondary level or post-secondary level in administration; curriculum construction, design and development; research; supervision; or teacher education. Specialization within the general field of vocational education is available: for doctoral students in the Home Economics Education program and the Agricultural Education program; and for masters students in Vocational Industrial Education, Business Education, Agricultural Education and Home Economics Education.

Ph.D. Program

The Ph.D. program in vocational education is designed to provide students with a broad understanding of vocational education and its role in contemporary American education, economic development and social progress. The program emphasizes the preparation of researchers, teacher educators and curriculum development and design specialists within the broad field of vocational education. Students will select the majority of their courses from three areas:

1. Vocational Education: 18-24 credits
2. Educational Foundations: 15-21 credits
3. Block of Psych-Soc-Econ: 12-15 credits (courses from at least 2 of the 3 areas to be chosen).

In addition, Ph.D. students will be required to devote at least one-half time during three consecutive terms in the successful completion of a supervised internship experience in research, teacher education or curriculum design and development. This internship may not be arranged before a student completes his third term in residence.

To be accepted in the Ph.D. program a student must have completed a masters degree program, and have a major or minor emphasis in some phase of secondary level or adult level education in his undergraduate or graduate program.

D.Ed. Program

The D.Ed. in vocational education is designed to provide students with a broad understanding of vocational education. The program emphasizes the preparation of administrators, supervisors and teacher educators in vocational education. The student must choose the majority of his courses from three areas:

1. Vocational Education: 18-24 credits
2. Educational Foundations: 12-15 credits
3. A minor area of study: 15-18 credits (The student shall select a minor which will enhance his future professional role in vocational education.)

In addition, D.Ed. students will be required to complete a supervised internship experience in their area of specialization (administration, supervision or teacher education). This experience must be arranged shortly after completion of the third term in residence, and will require at least one-half time involvement for three terms.

To be accepted in the D.Ed. program a student must have at least two years of vocational teaching experience and possess a masters degree in one of the service areas within vocational education.

M.S. Program

The M.S. in vocational education is designed to provide students with a broad understanding of vocational education and its role in contemporary American education. The program emphasizes preparation in vocational education research, curriculum design and development, administration and supervision. Students will select the major portion of their courses from three areas:

1. Vocational Education: 15-18 credits
2. Educational Foundations: 8-12 credits
3. Psychology-Sociology-Economics: 6-9 credits.

In addition, M.S. students must devote at least one-half time for one term or one-quarter time for 2 terms in an internship in their area of specialization.

To be accepted in the program a student must have successfully completed his undergraduate program and either majored or minored in some phase of secondary or adult level education.

General Comment

The figure on the following page provides some further specification of the general recommendations proposed for each of the degrees within the vocational education graduate program.

Effects Upon Current Graduate Programs in the Department of Vocational Education

If this department is to realize its potential in providing the highest possible quality of vocational education leadership preparation, then it can support only one program at the doctoral level. If, in fact, there are among the majority of the departmental graduate faculty other objectives which hold higher priorities then this proposal must be taken in an entirely different perspective.

Ph.D.

D.Ed.

M.S.

1. Foundations of Vocational Education* (3) 2. The Evaluation of Vocational Education* (3) 3. Introductory Statistics (2)		4. Introduction to Learning (3) (11)
1. Dissertation Seminar in Voc. Ed.* (600 cr.) 2. Internship (at least three terms, (6) one-half time, in area of specialization).* (9)		1. Internship (at least one term at one-half time or two terms at 1/4 time, in area of spec. (2) 2. Ed. Psych. 406 or 450 (3) 3. At least 3 cr. in Voc Ed Res Sem (3-6)
1. 6 cr. of Res. 2 Sem.* 2. Ed Psy 406 3. Ed Psy 450 4. Ed Psy 475 (15)	Res. Techniques in Voc. Ed.* (3) Ed Psy 406 or 450 6 cr. of Sem. in specialty* (12)	
Psychology-Sociology-Economics 9-12 credits	Minor--15 cr. minimum	Psychology-Sociology-Econ. (At least 6 cr.)

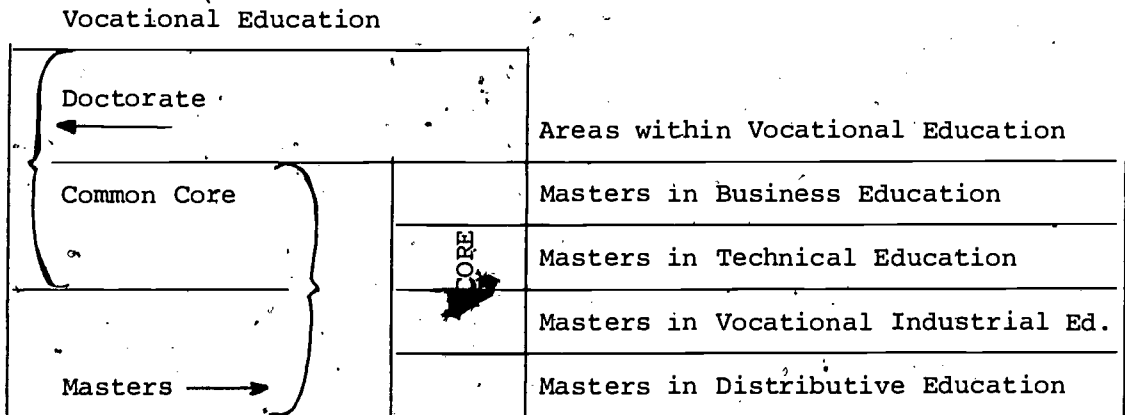
- Seminar in Vocational Technical Education (3-6)
 - Seminar in Vocational Cur. Dev. & Des. (3-6)
 - Seminar in Vocational Administration (3-6)
 - Seminar in Vocational Education Research (3-6)
 - Seminar in Vocational Supv. and Instr. (3-6)
- } Seminar in Voc. Ed. (3-9)
- Educational Technology in Voc. Education
 - Vocational Development Theories (co-listed with Counselor Education)
 - Current Issues in Cooperative Vocational Education
 - Current Issues in Post-Secondary Vocational Education (3-6)
 - Vocational Education to Meet Special Needs
 - The Development and Measurement and Psycho-Motor Skills
 - Implications of Economic, Psychological and Sociological Theories to Vocational Education (3-6)

*Courses within the major

Figure 5: Suggested Coursework for Each Degree Program in Vocational Education

I have assumed the obvious in developing this proposal--that the primary mission of a vocational education department within a university is in the preparation of high quality leadership personnel for the field of vocational education. Only through our discussions will we be able to explore these priorities, and establish direction for the future graduate programs in the Department.

The next logical point of discussion regards the masters programs currently in operation. I would view the current programs and those additional programs which might possibly evolve in the Department as integrated with the Vocational Education major in the following manner:



The integration provided for within the core areas allows for a possible strengthening in both directions--from the specific to the general, and vice versa. Such a plan allows for providing the in-service teacher with additional specific skills and knowledges in his specific teaching area, yet incorporates the commonality of areas within vocational education into each of the programs.

The Question of Implementation

In order for a program of the type described to become operational as of Fall Term, 1970 it will be necessary that we have a firm proposal in the hands of the College of Education's Academic Affairs Committee by the end of Fall Term, 1969. It becomes imperative, therefore, that we agree upon some specific direction prior to the beginning of Fall Term, 1969.

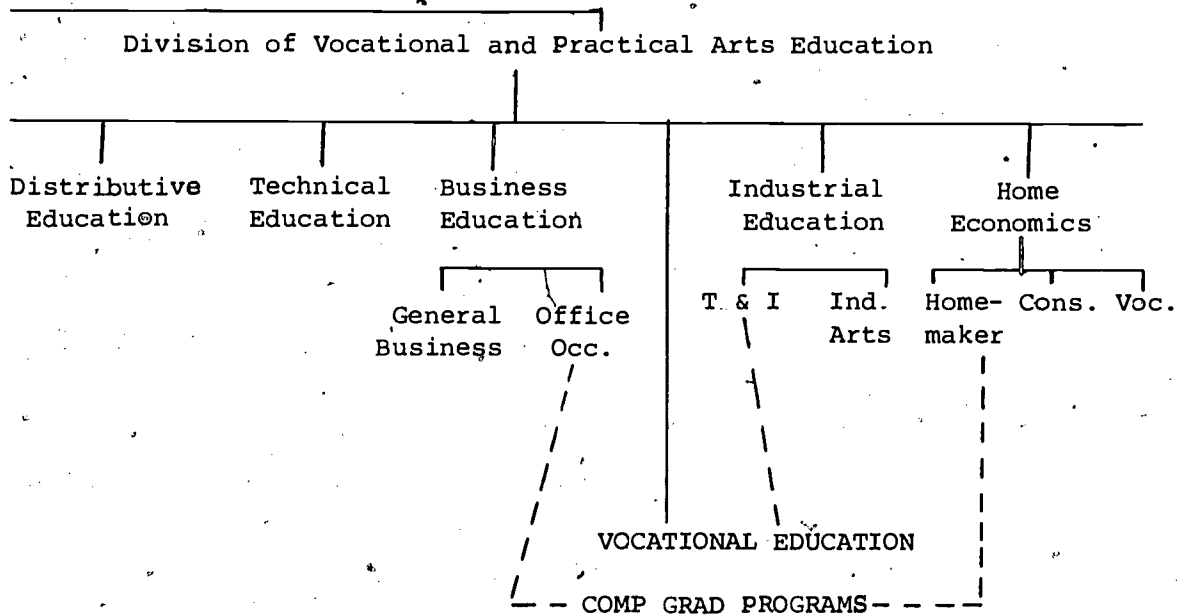
Depending upon the progress of our work as of Winter Term 1970 we may be able to recruit graduate students for the program as early as February 1970 and admit them to either of the existing doctoral programs in the Department. Transfer to the vocational education program could be easily accomplished when that program becomes operational as long as courses are selected in an appropriate manner.

Students in the existing doctoral programs must be assured the continuance of those programs until their programs are completed. They may elect, if they have not progressed too far in their programs, to request transfer from their current programs. The implication is that if the decision of the departmental graduate faculty is to discontinue either or both of the current doctoral programs, it is possible that the discontinued program/s will need to remain active for as long as seven years. The maintenance of operational masters programs in those area/s thus becomes facilitating with respect to this eventuality (42, pp. 1-11).

Dr. Impellitteri was co-author of a paper published in the Vocational Guidance Quarterly (September, 1969 issue), which was entitled "Using the GATB with Vocational or Technical Bound Ninth Grade Boys." The paper describes a study conducted with just under 100 secondary school males. The problem, procedure and results were presented in that paper. Professor Impellitteri's conclusions included the following: . . . the GATB is more valid for predicting achievement in certain specific areas of vocational and technical training rather than in the broad range of vocational and technical education" (43, p. 63).

A discussion paper entitled, "Notes on the Future Vocational Education Organization at Penn State" was prepared by Professor Impellitteri for consideration and discussion by the several persons involved with these programs. That paper is included below in its entirety.

College of Education



(Also to serve grads and upper-level undergrads with voc. found courses.)

Figure 6. Notes on the Future Vocational Education Organization at Penn State

Points of Departure

1. Ag Ed would be administratively placed as previously. Funding would remain as before with one major exception. The director of the division (RLL) who would also be director of vocational teacher education, would file one budget for x vocational teacher education activities with the Department of Education. He should then play a stronger role in determining what activities of Ag Ed, as well as the other programs in the College of Education merit dollar support. The stronger role would hopefully include requests for justifications of expenditures on vocational activities before a budget request to Department of Education was submitted.
2. Each of the programs within the division would be administered by a chairman. Each chairman would be encouraged to make use of the vocational education core for their vocational-oriented studies (programs within the College could be urged by \$ contingencies).
3. Within five years what should emerge is a division with one major vocational graduate program and one major vocational undergraduate program. I don't know about general business, industrial arts and homemaker education.
4. One major problem: number of staff. The Department of Vocational Education faculty numbers 14 (not counting coordinators) added to Home Ec Education must be about 25.

5. Suggestion: We must move toward divisional status or fold up if we're to assume that the current Department of Vocational Education cannot develop a comprehensive program.

Problems in Department of Vocational Education
in making Vocational Graduate Program Interdisciplinary

1. If I were to follow up on my recent efforts to fold up the graduate programs in Business Education and Vocational Industrial we would be left with no graduate programs in the department. We have five faculty (Finch, Gillie, Impellitteri, Long and Nelson) who are qualified and committed to the comprehensive vocational graduate program concept. We also have 2 faculty (Brantner and House) who are committed to their own areas at the graduate level. Gillie and Long were recently added to the staff on the strength of their potential contributions to a comprehensive program, not on the basis of their industrial backgrounds. Yet to what extent can the other programs (Bus, Home Ec and Ag) justify any of their faculty as making a primary contribution to a comprehensive program. They look for the specialty [sic] area first. The question remains whether our sacrificing of Industrial Education faculty for Comprehensive Vocational Education faculty was wise if the programs are to share equally in the program (44, pp. 1-5).

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UNDERGRADUATE OPTIONS

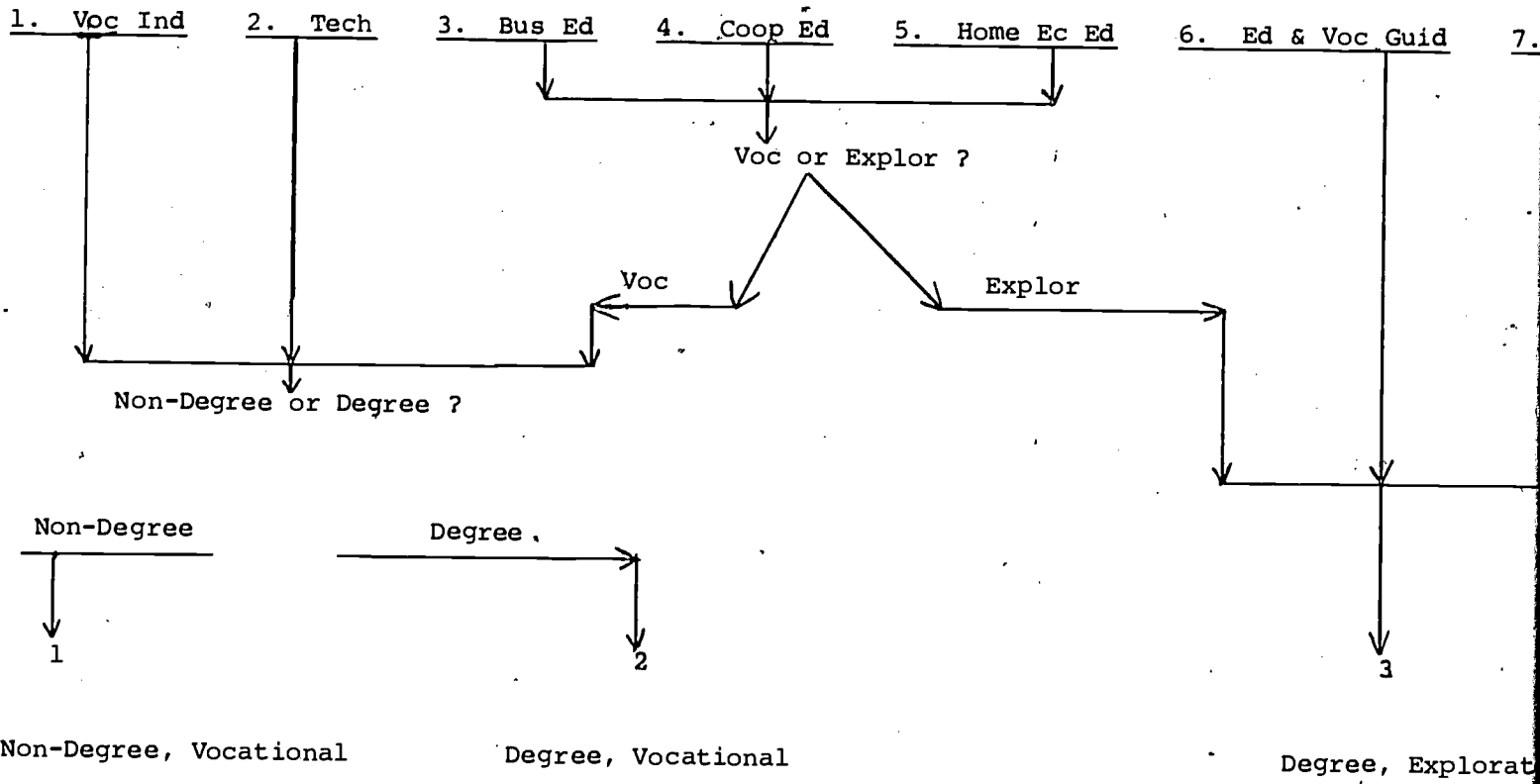
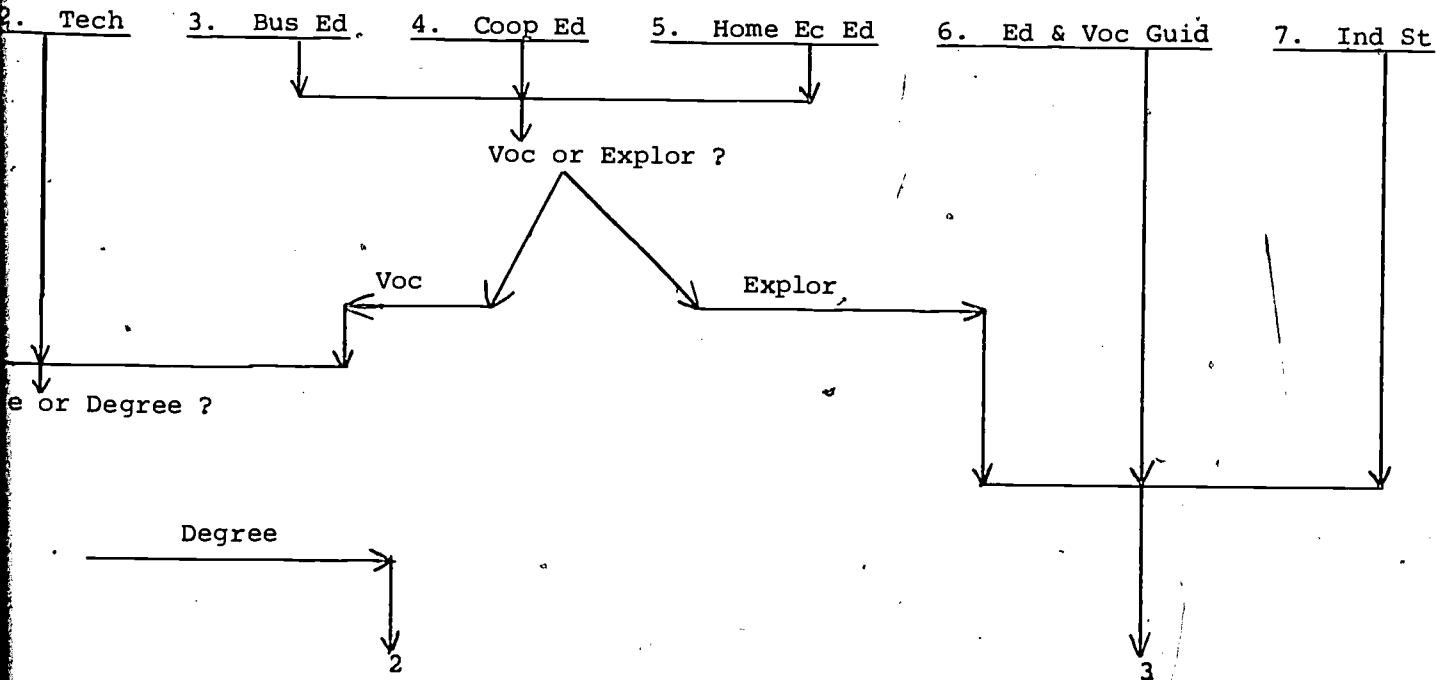


Figure 7: Division of Exploratory and Vocational Education.

UNDERGRADUATE OPTIONS



ional

Degree, Vocational

Degree, Exploratory

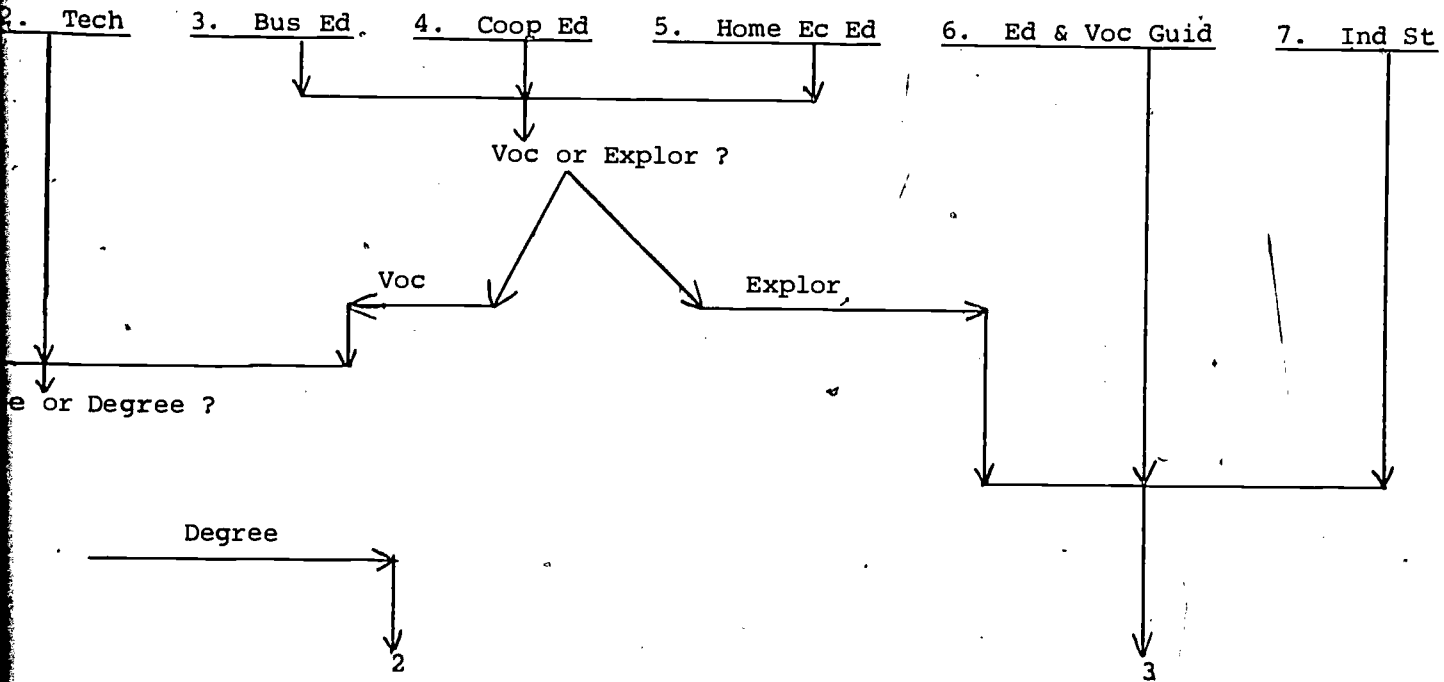
on of Exploratory and Vocational Education.

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UNDERGRADUATE OPTIONS



ional Degree, Vocational Degree, Exploratory

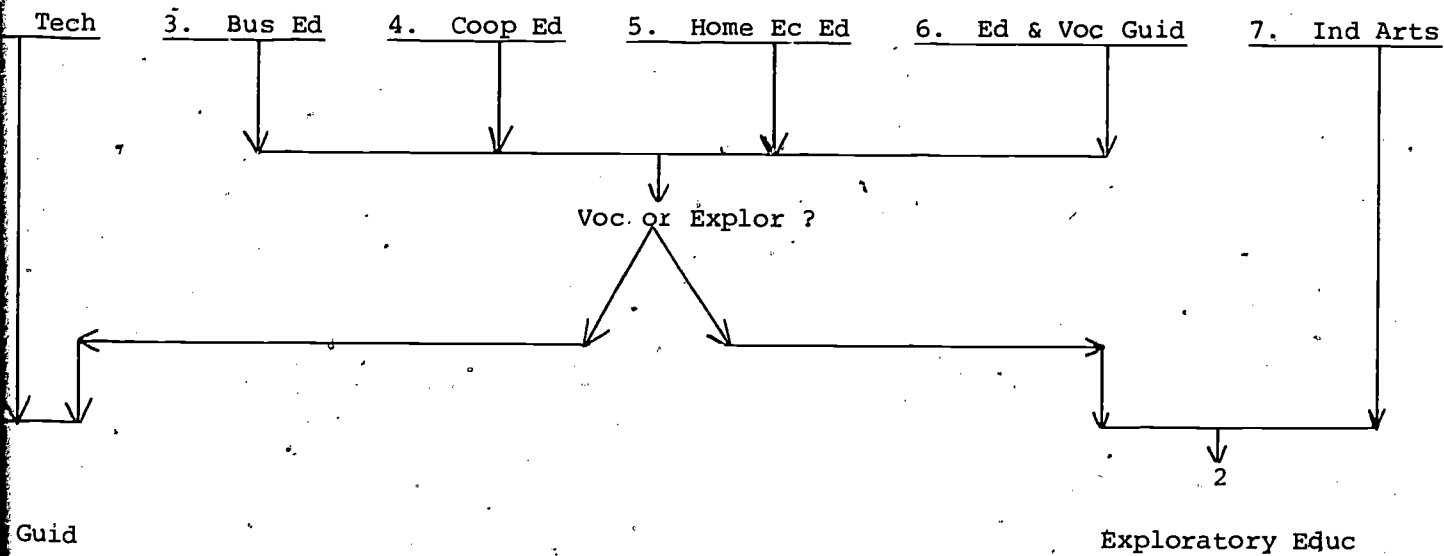
on of Exploratory and Vocational Education.

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GRADUATE OPTIONS



on of Exploratory and Vocational Education.

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Professor Impellitteri and others presented a paper entitled, "Factors Related to the Occupational Values and Vocational Maturity of a Selected Sample of Ninth Graders" at the annual American Vocational Association Convention in Boston on December 9, 1969. This paper, devoted primarily to a discussion of the first stages of the ten-year longitudinal study alluded to in an earlier paragraph (45), was his last publication for 1969.

CHAPTER VI

1970

Included among his writing activities Professor Impellitteri's writing took several directions during the year 1970. One of his concerns was reflected in a position paper in which he sought to more clearly identify the differences and similarities between the Ph.D. and D.Ed. degrees in Vocational Education, in general and the department of vocational education at The Pennsylvania State University specifically. The entire position paper is quoted below:

Education as a focus for doctoral study depends heavily upon the supporting disciplines of philosophy, psychology, sociology, economics, political science, and anthropology. As an applied discipline, education must draw from these other areas to establish its foundations and to develop its organization patterns, its processes, and its techniques. The range of cognitive behaviors essential in the translation of the theories and principles from the aforementioned disciplines to the actual process of educating the entire population of youth and adults who must be served is necessarily vast, and constantly widening. Within education itself must be found the resulting range of competent personnel from: its corps of university and college "educationists"; its federal and state educational specialists; and its local administrators, teachers and other supporting personnel.

Vocational education is the occupationally oriented phase of education and is designed to serve the career preparation needs of all our youth, and adults with educational experiences at a level of less than a baccalaureate degree. As a vital and unique part of education, it must also provide competent personnel to accomplish the aforementioned wide range of cognitive behaviors. From a wide variety of theories and conceptual frameworks of varying validities developed to explain among other constructs--vocational behavior; the development and measurement of cognitive and perceptual-motor skills; the measurement of work performance; and the development and measurement of worker adjustment--must be carefully selected those tentative principles to be applied and tested within vocational education programs.

It is proposed herein that vocational education in order to accomplish the task for which it has been designed, will need a wide diversity in the nature of its leadership. The primary objective of doctoral programs, which prepare the higher level vocational education leadership must therefore be to provide that essential diversity. The only means by which this objective may be accomplished is in the development of clearly distinct D.Ed. and Ph.D. programs.

The distinction between these two doctoral programs must of necessity be defined in terms of the degree of focus upon the theoretical versus the practical. Since knowledge described in these terms lies on a continuum it would be impossible to categorically differentiate the D.Ed. from the Ph.D. Drawing a clear distinction between their primary goals, the nature of their prescribed program experiences, and the nature of their doctoral theses appears to be the only alternative. The following discussion is designed to provide that distinction.

Basic Considerations

The perennial gap that lies between theory and practice in all fields including vocational education exists not because the researchers don't attempt to communicate with the practitioners, nor because the practitioners don't attempt to communicate with the researchers, but because they do not truly understand one another. One speaks in English and the other understands only French. An example of this dilemma in vocational education is the attempt of certain economists to encourage the use of selected cost-benefit models to evaluate vocational education programs. The economist is unaware of the myriad of practical implications which the vocational educator must consider and the latter is unaware of the myriad of theoretical assumptions that must be made in the valid application of such a model. What then is a possible resolution of this dilemma?

First, what is needed is an interpreter, an individual who can translate the model to the practical vocational education setting. His major competence is in his understanding of that setting and its objectives. His secondary qualification is his knowledge and understanding of the major aspects of a discipline such as economics. His communication is directly with the practitioner--the administrator or the teacher. They talk the same language and can understand one another. Yet, that communication is only one-half of the interpreter's task. With whom must he communicate in order to uncover those conceptual models and frameworks which validly apply to his field? Because he does not have a firm grasp of economics, and the underlying assumptions of its theoretical formulations, he cannot derive much benefit from communicating directly with the economist. What is needed to close the "gap" is an individual who will be called a "tester" for the purposes of this paper. He is the final link to the system, that person whose communications are with the economist in the one direction and the "interpreter" in the other direction.

The tester's major competence is in his broad grasp of economics and its underlying theoretical assumptions. His major activity is in the application of various economic models to vocational education and the testing of their validity in that setting. He has a knowledge of and commitment to vocational education and its improvement, yet his primary strength is in economics.

From the above discussion it is obvious that the "interpreter" is meant to be a product of the D.Ed. program, and the "tester" a product of the Ph.D. program in vocational education. Each has a vital role in the total system and requires a distinct doctoral program for his preparation. The nature of that distinction is clarified in the final three subsections of this paper.

Distinct Goals

The Ph.D. program should be designed to develop a "tester," an individual who is basically a social scientist yet whose commitment to and understanding of vocational education provides him a constant setting in which conceptual models may be tested. Such a program must develop a high degree of research competence in its students, since their major contributions will be the exploration and testing of conceptual models. Their employment will most likely be in a university or research institute.

The D.Ed. program should also be expected to develop research competence in its students. Their research focus is likely to be, however, of a narrower, problem-oriented nature. This aspect of the D.Ed. program is to supplement its major focus upon the development in its students of a broad understanding of the nature, scope, organization, processes, techniques, and major issues facing vocational education.

Common to each of the programs is an emphasis upon two-way communication. For the Ph.D. student such communication is with the discipline and the interpreter. For the D.Ed. student communications are with the practitioner and the "tester." It is only in this two-way feedback system that the theory-practice gap may be closed. (The impression that is usually conveyed is that the only relevant direction is from the theoretical to the practical, a deductive process. The starting point in this frame is the theory from which we deduce hypotheses. The reverse direction, from the practical to the theoretical, an inductive process, is also essential to the vitality of the total system. In a step by step manner, with communication in both of the above directions, the practitioner, interpreter, tester, and theorist provide a continuous feedback loop (see figure below).

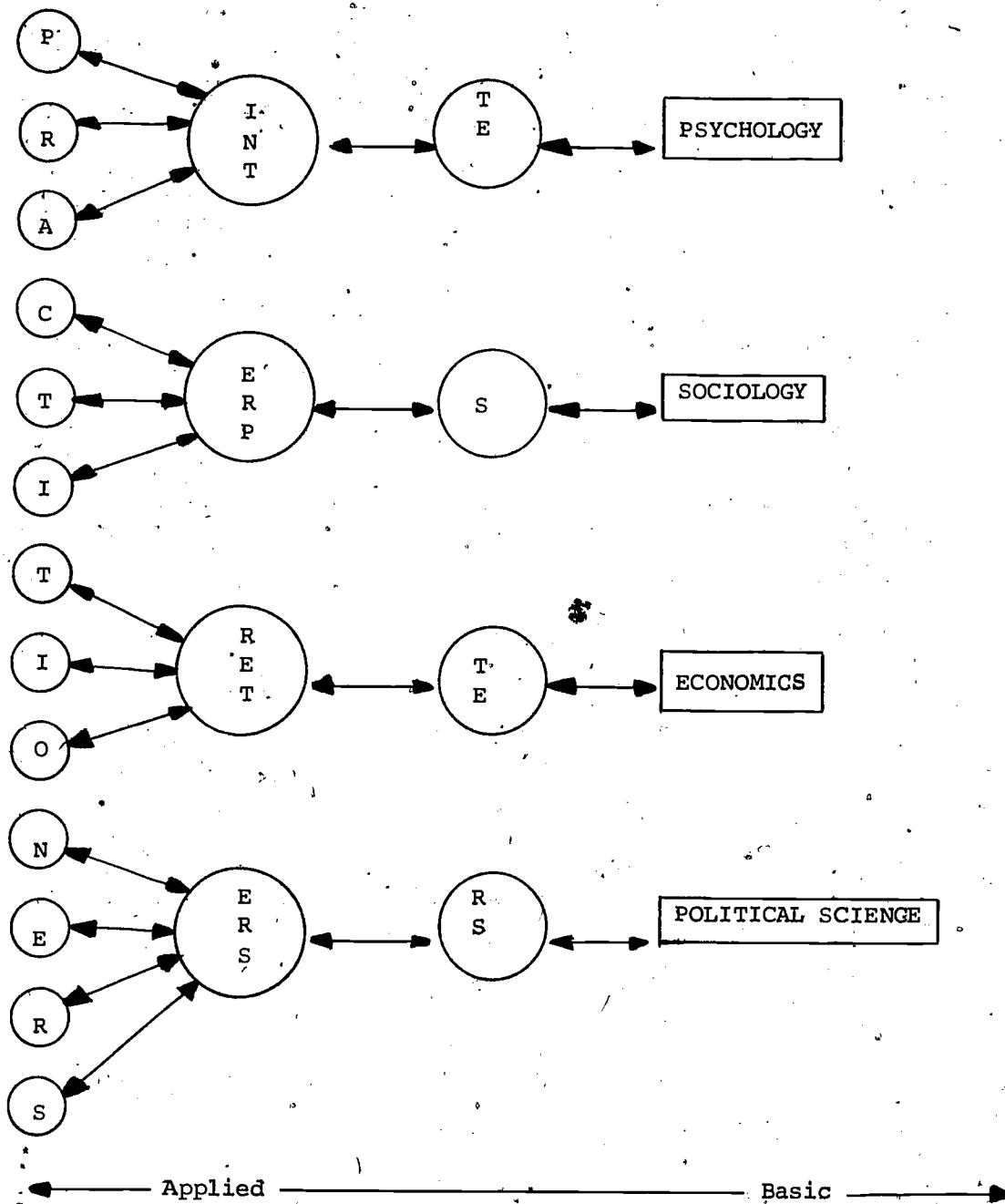


Figure 9: Knowledge Continuum.

Distinct Programs

Because of their diversity in goals the D.Ed. and Ph.D. programs themselves are clearly differentiable. Given the high degree of emphasis upon the practical in the former and upon the theoretical in the latter the difference rests upon the prescribed experiences.

What are the experiences designed to develop an individual who: understands vocational education; has a firm grasp of the underlying principles upon which the practice of vocational education is based; is solidly founded in one or more of its supporting disciplines; yet . . . [prefers not to have to] perform effectively as a practitioner in the field? Four major areas of emphasis are proposed: 1) strong concentration upon social and behavioral science research courses; 2) significant involvement in applied research in vocational education either as an intern or as a graduate assistant; 3) sufficient coursework to develop a firm grasp of the theoretical frameworks within one or more [of] vocational education's supporting disciplines; and 4) sufficient coursework to develop an understanding of the breadth of theoretical issues relevant to vocational education, its foundations, and education in general.

The D.Ed. program, on the other hand, must be composed of four contrasting areas of emphasis: 1) sufficient coursework in the social and behavioral sciences to develop an intelligent research consumer and an action researcher; 2) significant involvement as an intern or graduate assistant in a professional role such as administrator, teacher educator, or curriculum developer; 3) sufficient coursework to develop a familiarity with and understanding of the major aspects of one or more of vocational education's supporting disciplines; and 4) strong concentration upon the development of understanding of the techniques, procedures, and issues underlying vocational education and education in general from the point of view of its development and operation.

Distinct Thesis Expectations

In order to qualify as appropriate for the Ph.D. a research problem must be of significant theoretical concern. That is its primary obligation. Secondly, the problem must demonstrate some applicability to the ultimate solution of some practical problem in vocational education.

The major criterion upon which the suitability of a D.Ed. thesis is judged is its practical significance within vocational education. Its focus must also proceed from a theoretically sound framework, yet may only be of tangential theoretical concern (46, pp. 1-7).

Another publication of Dr. Impellitteri appeared as Chapter 6 of the publication entitled, Computer-Assisted Counseling (edited by Donald E. Super), "A Computerized Occupational Information System." This paper was adapted by permission from his article that appeared in the Vocational Guidance Quarterly, 1967, 15, pages 262-264.

After a brief review of the literature, Dr. Impellitteri went on to describe the computerized occupational information system as a prototype for what could become a more comprehensive system to be developed.

He continued to say:

One unique feature of the system is selective presentation of occupational information. The selection of the materials to be presented to a student is based on his General Aptitude Test Battery (GATB) profile, which is stored in the computer memory unit. Another feature is the manner of presentation of the materials. Not only are materials typed out at the console where the student is seated, but they are also presented on tape recordings and slide projections, all integrated under computer control.

This system is visualized not as a substitute for the counselor, but as an effective complement to him. It can carry out the function of information-giving, that portion of the vocational guidance process which counselors are admittedly less adept at handling and more willing to delegate. The role of the counselor in vocational guidance as presented here in conjunction with this occupational information system is, thus, revised. His responsibilities no longer include knowledge of specific facts about particular jobs, but instead involve understanding the world of work and its relation to individual goals and aspirations, and the ability to communicate effectively with the student in these terms. "Matching persons and jobs successfully requires not only information, but also a high degree of interviewing skill and a respect for the individuals ability to guide himself"¹ (47, p. 62).

As a conclusion to this paper, he described the advantages to this system in the following manner:

The advantages of the Computerized Occupational Information System are in its flexibility and storage capacity. Its flexibility allows for innumerable changes in the existing system--changes in certain aspects of existing job descriptions, such as educational requirements, employment outlooks, or work hours per week; the addition

¹Strang, 1950.

of new job descriptions; or the deletion of certain jobs which are being phased out of existence. Any changes that occur in jobs and employment opportunities can be immediately entered into computer storage. The practically limitless storage capacity of the system allows for many job descriptions to be stored in addition to innumerable student profiles.

Each pupil using the system is allowed to cover as many occupational groups, and as many specific jobs within the groups, as he has the time and the inclination to do. Each grouping and specific job he does review, however, will be presented in relation to his own aptitudes and interests. The material presented is thus pertinent, meaningful occupational information (47, p. 63).

Professor Impellitteri's next presentation at the American Vocational Association annual conference was in New Orleans during December 5-8, 1970. It was a co-authored presentation in which he attempted to close the gap between work performance and what test developers need to know in terms of practical guidelines.

Figure 10 represents the decision making process related to the selection of appropriate work performance measurement strategies. Dr. Impellitteri made the point that the first step in this process is to determine whether or not a selected work performance objective has occupational validity (i.e., the extent to which it specifies a competency deemed essential to that occupation). Then, according to this process that objective should be examined with regard to its educational validity (i.e., the extent to which it fits meaningfully into the school situation). Then, he stated,

the objective should be examined to determine what behaviors are present within it The next logical decision involves determining what the objective is actually measuring After determination has been made of what the objective is measuring . . . it is then appropriate to identify the general way in which performance information is to be gathered. This requires an examination of the various types of work performance measures These include operational performance measures, work samples, and ratings (48, pp. 4-5).

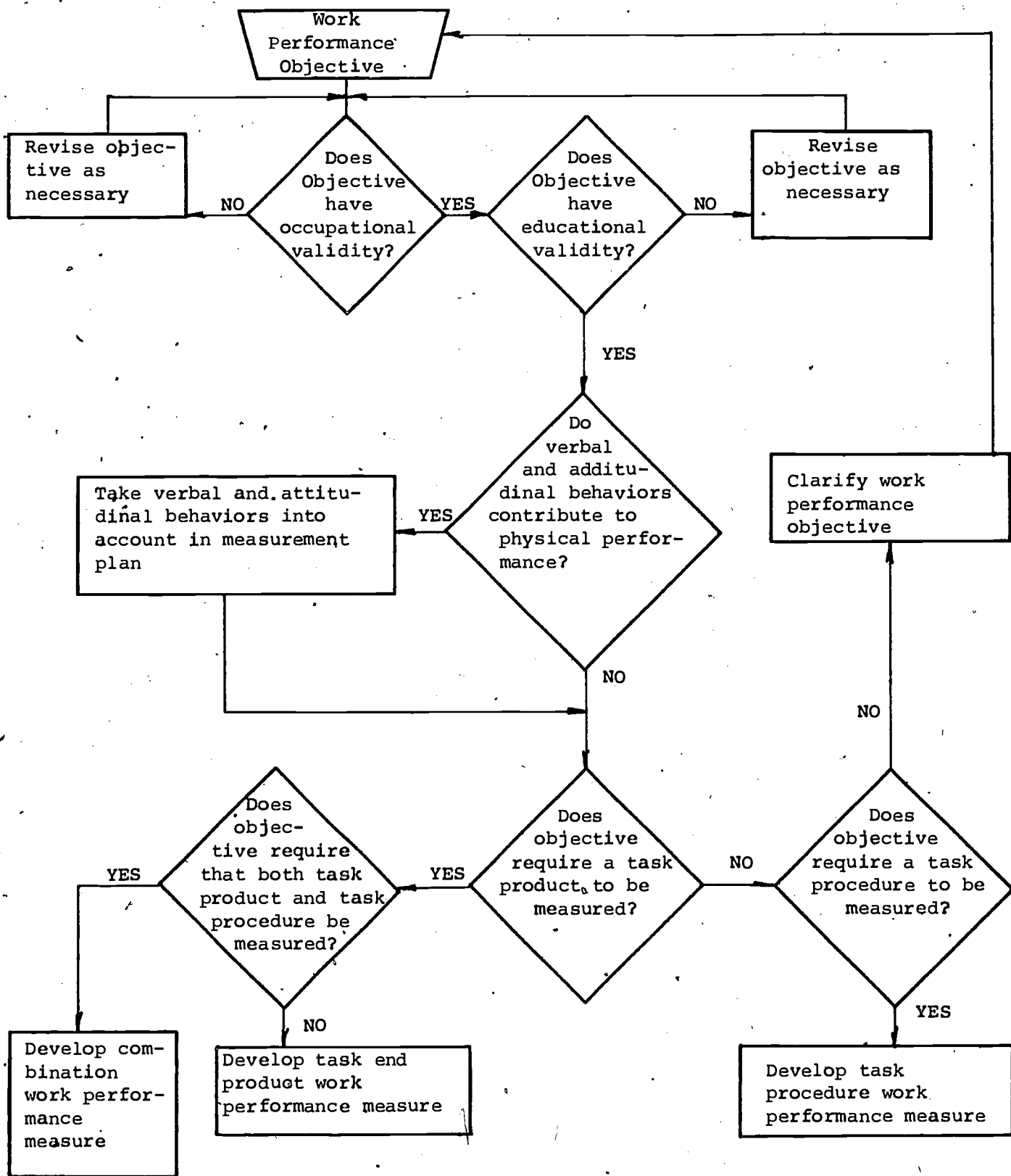


Figure 10. Selecting Appropriate Work Performance Measurement Strategies (48, p. 3)

With regard to validity of work performance measures, Professor

Impellitteri said:

1. In the construction of work performance measures content validity is of sole importance.
2. In the assessment and refinement of these measures face validity (a type of content validity) and several quasi-construct validity approaches may be found useful (48, p. 10).

Later in the paper he expressed concern about reliability of work performance measures. He said that

. . . some of the primary sources of measurement error that might affect the reliability of a work performance measure . . . include: (1) environmental influences, (2) situational influences, (3) test instrumentation, (4) sampling, (5) behavior complexity, and (6) examinee reactive effects . . . (48, p. 13).

He then went on to elaborate on each of these sources:

. . . in environmental conditions there is a point at which certain conditions may have an adverse effect upon the reliability of a measure of work performance. . . . Situational influences such as system or equipment instability may also contribute to the unreliability of a work performance measure Test instrumentation [includes mechanisms that] . . . must be examined in terms of their objectivity the sampling process [is the way] . . . specific tasks are selected for inclusion in an instrument It is important . . . to sample a wide enough range of behavior so that potential variability will be maximized complexity of the behavior [is a source of measurement that] . . . the developer should give thought as to whether or not the behavior is to be measured along different dimensions reactive effects [include] . . . such factors as lack of motivation, illness, fatigue, and the pressure associated with a performance test [These] may all contribute to low performance, when the student otherwise might be able to perform satisfactorily (48, pp. 13-15).

The next step in this endeavor, as indicated by Dr. Impellitteri, was ". . . the establishment of indices of reliability by empirical means" (48, p. 16). The procedure described in this paper was then exemplified by describing a study then in progress related to evaluating a student's ability to troubleshoot an automotive engine.

CHAPTER VII

1971

Professor Impellitteri's last full year before his untimely death was his most productive one in terms of scholarly achievements. One of Dr. Impellitteri's major contributions in 1971 dealt with the development of a proposal for a new doctoral major to be entitled vocational education. The overall intent of this program was to provide a broad-based terminal degree that would bridge three existing departments in the university that dealt with vocational teacher education and research (i.e., Department of Agricultural Education, Department of Home Economics Education, and the Department of Vocational Education). The program was well conceived, but not unexpectedly, concern for its implications for existing programs were expressed in several quarters. The proposal was submitted to the Graduate School in mid-1971 and was tabled for further consideration.*

The early part of this proposal responded to 14 broad questions posed by the Graduate School, and these responses were as follows:

*This proposal lay dormant for approximately one year, but was revived after Professor Impellitteri's death. After further revision and reactions from the three departments concerned, it was again submitted and accepted by the Graduate School. It is currently being implemented.

1. a. Is the proposed major field commonly recognized as one appropriate for the doctorate? Give evidence.

There are two significant sources to document the recognition of vocational education as an appropriate field of doctoral study. The first is the existence of doctoral programs in vocational education at the following institutions: New York University, University of Missouri, Florida State University, Temple University, University of Wisconsin, University of California (Los Angeles), Colorado State University, University of Connecticut, University of Georgia, University of Illinois, University of Minnesota, University of North Carolina, Ohio State University and Rutgers University. Each of these programs has emerged since passage of the Vocational Education Act of 1963 (PL 88-210). The second source of support in recognition of vocational education as an appropriate field of doctoral study is the support of doctoral fellows available through appropriations enacted with the passage of the Vocational Education Amendments of 1968 (PL 90-576). Monies through Title II of this act are currently supporting over 150 doctoral fellows in "comprehensive vocational education" programs across the country. Groups of ten to twenty of these fellows are attending each of the last eleven institutions listed previously.

- b. What are its subfields?

Doctoral degrees have been granted in numerous programs throughout the United States (including those at Penn State) in Vocational Industrial Education, Agricultural Education, Business Education, and Home Economics Education, each of which have been considered subfields within the total scope of Vocational Education. This has been the traditional breakdown of Vocational Education as it emerged through the legislation and concurrent manpower needs. A more contemporary breakdown of Vocational Education into its subfields reaches beyond the components as described above. This breakdown focuses upon the specialty role of the doctoral student and may be divided into four areas: research, teacher education, curriculum development and design, and administration/supervision.

- c. In which of these (subfields) does the department (division) consider itself to be competent to prepare doctoral candidates?

Based upon the design of the proposed doctoral program and the broad range of competencies represented by the faculty who will teach courses and advise doctoral students within it, the division proposes to offer preparation in each of the four listed subfields.

2. a. What fields are considered to be the most important supporting fields?

Those fields considered to be the most important in support of doctoral study in vocational education may be divided into two major divisions: (1) the social and behavioral sciences (psychology, sociology, economics, political science and anthropology); and (2) selected specialty areas within education (educational administration, higher education, educational research, guidance and counseling, and curriculum and instruction).

- b. Are the departments in these fields sufficiently strong to give adequate support in instruction and research? Give evidence.

Each of the supporting fields listed are currently operating vital doctoral programs at Penn State. In addition, each of the fields have lent strong support to the existing doctoral programs within the broad spectrum of vocational education (Agricultural Education, Business Education, Home Economics Education and Vocational Industrial Education). Their support of the doctoral program proposed herein is anticipated, and deemed to be essential to its success.

3. a. What are the reasons why this University should offer the doctorate in this field?

Penn State University should offer the doctorate in Vocational Education for at least three reasons. First, the importance of vocational education as a potent contributor in curing many of the economic and social ills which currently plague this nation is being acknowledged. The needs of this Commonwealth and the nation in general are such that quality programs must be initiated to prepare capable leadership in the field. Secondly, Penn State has, through the four currently operating graduate programs listed previously, been a leader in preparing high quality doctoral graduates within the field. Offering the doctorate in a comprehensive vocational education program would be an extension of this leadership role for the University in meeting the contemporary demand. Thirdly, as recognized by many other universities throughout the country, if vocational education leadership personnel are to be prepared through a university doctoral program then the most effective program to fulfill this objective is one that focuses upon comprehensive conception of vocational education.

- b. To what extent is the need and demand for doctors not now being met adequately by other institutions?

One substantial piece of evidence to support the need for additional doctorates in vocational education is the current fellowship program to which reference has been made previously. Given the relatively tight fiscal situation for federally supported programs of all types, the U.S. Office of Education has been able to commit approximately one and one-half million dollars each year for Fiscal Years 1970 through 1972 to a fellowship program in vocational education. An interesting sidelight is that this program represents the first federal level attempt at graduate study support in vocational education.

4. a. Discuss the strengths and weaknesses of the departmental faculty relative to graduate work--in terms of (a) its size, (b) its training, (c) its academic origins (not overlooking "faculty inbreeding"), (d) its research output, (e) its interest in the problems of graduate instruction, (f) evidence of its professional reputation nationally.

Fifteen Penn State faculty members are committed to the comprehensive vocational education program as proposed herein, and will be available for teaching divisional courses and advising doctoral students. The director of the proposed division graduate program (Robert L. Lathrop) is employed as an associate dean in the College of Education, five of the faculty are employed in the Department of Vocational Education, five in the Department of Agricultural Education and four in the Department of Home Economics Education. Of the fifteen faculty only five are Penn State doctorates, the remainder holding the Ph.D. or the Ed.D. from one of nine other institutions (Cornell, Minnesota, Ohio State, Pittsburgh, Fordham, Columbia Teachers College, Michigan State, Iowa State, and S.U.N.Y. at Buffalo). Eight of the faculty hold Ph.D.'s and seven hold a D.Ed. or Ed.D. Fields in which the faculty earned doctorates include: educational psychology (2); higher education (1); counselor education (1); agricultural education (4); home economics education (3); vocational industrial education (2); and horticulture (1). The research output of this faculty is adequately demonstrated by the list of research publications included later in this section. The combined interest and competency of this faculty in graduate instruction is sufficiently supported by the fact that seven are currently senior members of Penn State's graduate faculty and seven are associate members, and one is a lecturer. . . .

5. a. What facilities are available at present to the department and how adequate are they?
 - 1) Research facilities in libraries and/or laboratories
Each department has a "working collection" provided by Pattee library consisting of current issues of journals and other serial publications and some standard reference books. All departments have access to the College

of Education curriculum library and Pattee Library. The Department libraries include many modern texts in the various fields of specialization in agriculture, home economics, and vocational industrial education; bound copies of all masters theses and papers and doctoral theses of graduates; current and recent issues of professional journals and magazines in education and agriculture, home economics and vocational industrial education.

- 2) Space for instruction in courses and seminars
Adequate classroom space is assigned to all departments. The Department of Home Economics Education has a small conference room for committee meetings. Department of Agricultural Education has a large, equipped classroom for class and laboratory work. Department of Vocational Education arranges for use of a conference room through the College of Education.
- 3) Desk Space
The Department of Agricultural Education has reasonably adequate office space for nine staff members and six secretary-typists. The department can provide fair office and study space for up to 14 graduate assistants. The Department of Home Economics Education has small, noisy and crowded offices for each graduate faculty member. The department has desk space for five graduate assistants in one small room. The department has at present 9 graduate assistants and 3 other graduate students on part-time wages. The Department is severely handicapped in this area. It has no usable space for graduate students not on assistantships. The Department of Vocational Education has small private offices for each graduate faculty member. The Department has 11 graduate assistants. There is desk space for six graduate assistants in two areas. One area for four is small and poorly ventilated. The other area for two is shared with two full-time research assistants. Graduate students not on assistantships have no space to work in the Department. Additional space for graduate assistants is required at this time.

Other Pertinent Items

Each department has an adequate number of typewriters. The Department of Agricultural Education has two Monroe calculators and the Department of Home Economics Education has a Friden desk calculator for graduate student and faculty use. The Departments of Agricultural Education, Home Economics Education and Vocational Education each have audio-visual instructional media equipment pertinent to their needs. Each department has access to additional audio-visual equipment through the University Division of Instructional Services.

6. a. Are budgetary provisions for instruction and research adequate to insure proper provision for both graduate work and undergraduate work? Explain

At present all departments budgeting provisions are adequate. All departments feel that increased vocational funds will be available to cover the operational and staffing costs incurred through anticipated increased enrollment.

- b. Would additional staff be required if doctoral programs in this field were authorized?

Each department feels that the existing graduate faculty staff could absorb its share of the addition of new courses and seminars planned.

- c. Would additional courses and seminars be proposed in the near future to insure adequate doctoral programs?

Core Courses for the Proposed Doctorate in Vocational Education

- 1) Outlined for:

501v Administration and Supervision of Vocational and Technical Education (2-3 crs.)
 570v Internship in Vocational Education (2-8 crs.)
 (See following pages for descriptions)

- 2) Courses in Planning State

500v History and Philosophy of Vocational and Technical Education (2-3 crs.)

- 3) Courses Yet to be Planned

502v Occupational Analysis, Exploration and Guidance (2-3 crs.)

503v Review and Critique of Research in Vocational-Technical Education (2-3 crs.)

504v Seminar in Vocational and Technical Education (1-3 crs.)

(See following pages for course descriptions)

- d. Would additional library appropriations be required? To what extent?

It is felt by all departments that additional library appropriations would be needed; however, vocational funds should be available to cover needs.

7. a. What teaching loads are prevalent in the Department? What practices prevail in recognizing graduate instruction and thesis supervision in those loads?

All departments' graduate faculty teaching loads are commonly one three-credit class per term plus thesis students. Staff with heavier teaching loads are given fewer graduate students to advise and vice versa. However, all staff devote a portion of their work to research. Research responsibilities vary from 10 to 50 percent of staff time.

8. a. How large a graduate student enrollment has the department in recent years?

All departments have an approximate total of 82-86 students admitted and working toward the doctorate.

Doctorate Breakdown

Agricultural Education -- approximately 30
 Home Economics Education -- approximately 28
 Vocational Education -- approximately 24-28

All departments have an approximate total of 274* students admitted and working for a masters degree.

Masters Breakdown*

Agricultural Education -- 80
 Home Economics Education -- 134
 Vocational Education -- 60

9. a. Describe the practices and standards prevailing in the department with respect to graduate work.

What are the departments' concept of graduate work? What criteria does it use in considering some courses to be 400-level courses and other 500-level courses? In what sense does the department use the term seminar? To what extent are there formal provisions for individual study by doctoral candidates? What are the practices of the department relative to maintaining the integrity of 500-level courses as courses operated exclusively for graduate students?

- b. What are the departments' standards and practices with respect to the admission of graduate students, to the counseling of graduate students, to theses and comprehensive examinations?

The graduate faculty considers its mission as the preparation of professional educators. At the master's level we are educating competent teachers who have some

*A portion of the master degree candidates are in-service teachers who attend intermittently during the summer terms.

understanding of the theoretical bases and the research which explain and guide their professional roles.

Masters degree students are accepted providing they meet a grade point average of 2.5 in their last two years of undergraduate study, have had an acceptable undergraduate major recognized by the department to which they have made application or are meeting such deficiencies.

The masters degree will be offered by each department in their respective areas of specialization: agricultural education, business education, home economics education, and vocational industrial education.

At the doctoral level we are educating leadership personnel in vocational education. The doctoral program in vocational education as described herein has been designed to provide the maximum of flexibility for both the Ph.D. and D.Ed. option. The doctoral candidate will have the latitude to do his or her doctoral degree with major emphasis in vocational education, agricultural education, or home economics education.

Our 400-level classes are planned to bring to prospective and active teachers the newest and best of specific information on such professional concerns as curriculum development, evaluation of student progress, instructional strategies and media. Our 500-level classes examine relevant and alternative theories which may explain, predict, and illuminate current professional concerns.

Each department has at least one graduate seminar per semester. The content and methods of presentation is dependent upon the topic explored. Any graduate student may choose to pursue individual study through special problems courses offered by each department.

In addition to the general requirements for admission to the Graduate School the departments examine each applicant carefully, noting letters of recommendation and experiences of the applicants who are unknown to the staff.

Masters candidates are assigned advisors by the department chairman after consulting each candidate as to the staff person under whom he would like to work.

Doctoral candidates choose their committee chairman and with his help, select the remaining committee members. Since the number of doctoral students is relatively small, each student is able to work intensively with the faculty and to know the other graduate students well. Each program of study is individually tailored to suit the student's inadequacies, interests, and strengths.

The masters advisor or chairman of the doctoral committee has the major responsibility in following through with a candidate's research and thesis. The candidate's graduate committee assists when needed.

For the doctorate, comprehensive examinations (both written and oral) are given at the time most course work is completed. The candidate then is examined.

10. a. List the courses at the 400 and 500 course level offered by the major department. Indicate how frequently the courses have actually been taught in recent years and size of classes.

Vocational Industrial Education 1968-1970 School Years

	<u>68-69</u>	<u>69-70</u>	<u>70-71</u>
402v	1	-	1
403v	4	4	4
408v	-	2	-
409v	-	1	-
412v	4	4	4
415v	-	-	1
420v	-	1	-
427v	1	-	-
446v	1	2	2
450v	2	3	4
506v	1	1	-
510v	1	-	-
550v	1	3	4
556v	1	-	1
557v	1	2	2

558v	1	-	-
559v	1	1	2
560v	-	2	1

At the 400-level the average class size is 15 students per class. The 500-level courses average eight students per course.

Home Economics Education 1968-70 School Years

	<u>68-69</u>	<u>69-70</u>	<u>70-71</u>
400v	3	3	3
406v	3	2	2
410v	2	-	-
427v	3	2	3
443v	3	2	
463v	2	3	3
466v	2	3	3
477v	3	2	3
478v		1	3
479v	2	1	
480v	2	4	2
481v		1	
502v			1
503v	-	-	-
504v		1	
510v	1	1	1
511v	2	1	1
518v	2		1
521v	3	4	3
530v	3	3	3

At the 400-level the average class size is 18 students. The 500-level courses average eight students per course.

Agricultural Education 1968-70 School Years

	<u>68-69</u>	<u>69-70</u>	<u>70-71</u>
400v	1	1	2
418v	3	4	4
420v	2	1	1
422v	3	4	4
424v	1	1	-
426v	-	1	2
434v	24	20	23
501v	4	3	3
502v	-	1	1
503v	4	4	4
504v	3	2	1
508v	1	1	1
509v	-	-	1
520v	2	1	1
521v	1	1	1

524v	2	-	-
530v	1	1	-
600v	4	4	3
601v	2	4	3
610v	4	4	3
611v	-	-	2

At the 400-level the average class size is 16 students. The 500-level courses average nine students per course.

11. a. What experience has the department had with graduate (500 series) seminars? Indicate those actually scheduled during recent years and the enrollment.

Each department offers a seminar course each term. The departments feel the seminar has been relevant in each of their areas. Under the new program yet to be planned is the 504v course--Seminar in Vocational and Technical Education.

12. a. Outline in detail several typical programs of study that would be available to doctoral candidates. Please differentiate clearly between those components of these programs that are now available and those that are planned for the future.

The doctoral program in vocational education as described herein has been designed to provide the maximum of flexibility for both the Ph.D. and D.Ed. options. The basic assumption in building in this flexibility was that in attracting a wide diversity of talented students the program would need to provide a diversity of experiences in order for there to be attained uniformly high level outcomes.

This program represents an effort to fully utilize the combined capabilities of existing programs (Agricultural Education, Business Education, Home Economics Education and Vocational Industrial Education) in a unified direction. Through the vehicle of this program, developed specifically for the purpose of preparing high quality leadership in vocational education, these combined efforts will result in a highly competent, productive, and visionary output.

Options within Program

1. A student may elect to work toward either the Ph.D. or D.Ed. degree, providing he meets the qualifications for both alternatives as described in a later section of this paper. The Ph.D. is an academic degree, and emphasizes the study of vocational education as an applied discipline, and as an applied setting for research. Application of theoretical frameworks from the social sciences to vocational education represents a significant element in the Ph.D. degree program. The D.Ed. program is a professional degree program and attempts to develop a focus upon the application

of the knowledge and understanding of the student to the solution of administrative or instructional problems. Depending upon the nature of the future students who are attracted by this program it is anticipated that the D.Ed. students will outnumber the Ph.D. students by at least two to one. Based upon a student's desire as well as the selection committee's judgment, a student when admitted will be admitted into one program or the other. For justifiable reasons transferrals may be approved. At the time he is declared a candidate, however, transferrals are not recommended.

2. Immediately after a student is accepted as a candidate for either the Ph.D. or D.Ed. degree he must select an area of primary emphasis in this program from among the four possibilities: administration/supervision; curriculum development and design; research; or teacher education. It will also be possible for each student to select a composite of any two of the four areas.

3. Students will have options in selecting courses within the blocks described later in this section. The internship experience will be optional for some persons and mandatory for others, dependent upon the judgment of the faculty committee. The courses selected and the internship will focus on the selected area of primary emphasis.

Course Blocks within the Total Program

The program of each of the candidates will be based upon experiences within three blocks. The first of these is represented by courses in comprehensive vocational education. For the purposes of this proposal selected seminar experiences and independent study courses within each of the four existing programs will focus upon general vocational education, in addition to the suggested courses listed below.

- *1. Organization and Administration of Vocational Education
- *2. Foundations of Vocational Education (3)
- *3. Vocational Education Internship (2-12)
- 4. Research in Vocational Education (3)
- 5. Issues in Post-secondary Vocational Education (3)
- 6. Seminar in Vocational Education (6)
- 7. Cooperative Vocational Education (3)

Another block in which the students will take courses is that of General Professional Education. Represented in this block will be courses in: educational psychology (statistics, measurement, learning and research methods); educational administration

*Courses currently under development by committees representing the three cooperating departments.

(principles of supervision and administration); higher education (curriculum, student personnel programs, and administration in higher education); cultural foundations of education (history, philosophy and sociology of education); and counselor education (counseling strategies in vocational guidance and rehabilitation counseling).

The final block of courses encompasses the social and behavioral sciences (psychology, sociology, anthropology, economics, and political science). Whether a student develops a minor within one of the five areas, or structures a minor consisting of two or more of the areas will be dependent upon his needs within the total program, and his degree goal (Ph.D. or D.Ed.).

It is planned that Ph.D. students will structure a program of approximately 20 credits within each of the three blocks, and complete in addition the internship and thesis writing experiences. This program will include work taken for the masters degree whether completed within the program or prior to admission.

The D.Ed. program will place heavier emphasis on vocational education and general professional education with less emphasis on social sciences.

Candidacy Evaluation

A candidacy examination for all doctoral students in the proposed program will be administered. It is proposed that the examination consist of: 1) a three-hour written essay examination; 2) a two-hour, 120-item, multiple-choice examination (composed of 40 items each from the areas of: educational foundations; economics, sociology, psychology, and political science; and vocational education); 3) and a two-hour oral examination. Based on the assessment of a student's performance in each phase of the examination by a three-member candidacy committee, an overall recommendation is made either to accept or reject the student as a candidate. If declared a doctoral candidate, a student's profile on the examination as a whole is used as an aid in directing the student's remaining program. If a student is rejected it may be with the recommendation for re-take of the examination. For the sake of the student and the program, this latter alternative is used infrequently. If, however, a re-take is recommended the student is presented with a report of his performance in terms of his strong and weak areas.

Sequence of Experiences

The general sequence of experiences for all students in the program will be quite similar up to the point of candidacy evaluation. For those who are approved as candidates, differentiation of experiences will commence. It is envisioned that the relatively common first two to three terms of coursework will be necessary for all students. During this period they will be able to decide upon a major focus

within their programs. The feedback derived from the candidacy evaluation will be quite useful in counseling students regarding the nature of the remainder of their programs.

Based upon a preliminary assessment by a divisional faculty committee the approved candidate will select an advisor from the faculty who would most appropriately reflect the background and competencies necessary to effectively direct his program. A doctoral committee is also appointed at that time consisting of the advisor as committee chairman, another representative of the major, an appropriate graduate faculty member representing educational foundations and a fourth member representing the social sciences.

Criteria for Eligibility of Doctoral Students in the Program

Although a student who plans to work for an advanced degree at Penn State must apply for admission to a specific graduate program, initial screening of all applicants is done in the Graduate School. For unqualified admission to the Graduate School an applicant must have earned a baccalaureate degree from an accredited institution with residence and credit conditions substantially equivalent to those at Penn State. In addition, he must have maintained during his junior and senior years a minimum grade-point-average of 2.5 on a 4-point grading scale, although if other substantial evidence of probable success in the program is provided, he may be accepted with a lower GPA.

The application papers of those fellows who meet the general requirements of the Graduate School will be forwarded to a four-member vocational education program admission committee made up of a member of each of the three cooperating departments plus the director. This committee will review the applications forwarded by the Graduate School and make, in each case, a recommendation that the student either be admitted, or not. Three of the four members must vote favorably upon an applicant if he is to be admitted. The deliberation of the committee will be guided by several considerations: (1) those candidates with less than a 3.0 average in undergraduate study will be admitted only when other substantial evidence of probable success in the program is available; (2) the applicant must provide at least two statements of recommendation from faculty members who are acquainted with his prior academic work; (3) the applicant must submit a three-page paper on his conception of vocational education, his commitment to the field, and his future personal goals; (4) the applicant must have academic and vocational plans that are consistent with the concept of comprehensive vocational education as formulated in this program proposal.

13. a. What experience and success has the department had with respect to candidacies for the masters degree? How many such degrees have been conferred by the department?

Department of Agricultural Education

111 M.S.
133 M.Ed.
50 D.Ed.
29 Ph.D.

Department of Home Economics Education

75 M.S.
99 M.Ed.
14 Ph.D.
32 D.Ed.

Department of Vocational Education

1 M.S.
68 M.Ed.
15 D.Ed.
2 Ph.D.

- b. How many of the departments masters have continued graduate work elsewhere?

It is estimated that approximately 20 percent of the graduates in Agricultural Education, percent in Home Economics Education, and 40 percent in Vocational Education continue their education beyond the masters degree level.

14. a. What are the departments' long-range plans or hopes for future development?

The goal to which this department would assign highest priority is the establishment of a comprehensive vocational technical education program at the graduate level for the preparation of vocational technical leadership personnel. The consequent effects if this goal were to be attained are presented below.

1) Positive effects within University

- a) Would result in Penn State becoming eligible for institutional support (\$3500 per graduate student per annum enrolled in program) under section 552 ("Leadership Development Awards") of the Vocational Education Amendments Act of 1968. In order to be eligible, an institution must offer a "comprehensive program in vocational education."

- b) Would result in Penn State becoming at least one of the top five, if not the best program in vocational-technical education.
- c) Would provide an excellent environment for interdisciplinary efforts including persons from the departments of psychology, sociology, and economics, as well as the Institute for Research in Human Resources, the Community Services Division of the College of Human Development, and the Higher Education program in the College of Education.

2) Positive effects on area outside University

- a) Fulfill a desperate need for quality leadership personnel in vocational-technical education on the part of Federal, State and local agencies, industry and universities across the country. The almost negligible supply of these persons today cannot make an impact on the numerous problems in the field.
- b) Would provide a model for other colleges and universities to pattern their program.
- c) Would create a limited supply of high quality persons who would be able to function as innovators in adapting to the changing vocational needs of our youth and adult population.

- b. In which of the following areas would increases be necessary to carry doctoral work adequately: additional courses, faculty, laboratory facilities, library holdings, and space?

It is felt that faculty and graduate assistant needs will be fulfilled through other departments within the program. Additional office space, office equipment, and supporting services will be needed. It is anticipated that funds will be made available through the U.S. Office of Education to fund additional needs (49, pp. 1-5, pp. 51-69).

One of the major contributions made by Professor Impellitteri to the Department of Vocational Education, and for that matter to vocational education in general, was the design and implementation of a 10-year longitudinal study which he entitled, "A Longitudinal Study of Vocational Development: Implications for Vocational Education and Guidance." As indicated in an earlier chapter the initial planning and early implementation of the study began in 1967, and the intention was

to continue a follow-up of the selected sample from three geographic sites for a total period of ten years. The initial action in this project was necessarily limited because of funding restrictions and significant funding was not forthcoming until 1971. It was at that time that the first monograph in the Vocational Development Series was produced. As of January, 1975, a total of 20 monographs and one final report have been produced in the Vocational Development Study Series. The first monograph, written by Professor Impellitteri, set the stage for the entire study. In that publication he stated the nature of the problem to which the Vocational Development Study project addressed itself in the following manner:

During the decade of the 1960's there has been ample evidence and increasing agreement that both formal and semi-formal educational and training opportunities should be made available to all members of our society. The nature and intent of the federal legislation dealing with support of educational and training programs passed during that period have tended to render obsolete the notion of "terminal education." Some combination of education and training is currently conceived to be a lifelong process for most individuals in all roles of life--the professional, the technician, the skilled craftsman, the housewife, the semi-skilled factory worker, the clerical worker, the businessman, etc. A significant factor in bringing about this condition is the rapidly changing nature of our highly technological society. First, the individuals making up the society have a greater need for more education and training in order to succeed within it, regardless of the criteria utilized in measuring the attainment of that success. Second, in order for it to progress, the society itself produces an ever-increasing demand for persons with higher levels of skills and competencies which are attained only through additional education and training.

Given this condition of the contemporary "adult world" within which the school youngsters of today will eventually find themselves, how can they be better prepared to successfully enter it? What significant implications growing out of the societal condition, as described, may be helpful to those responsible for the preparation of our youth?

The Developmental Framework

The response to the previous questions provide the basis upon which a conceptual framework may be designed for use in studying the problem. The individual in today's society must be primarily visualized as evolving. Given the necessity of continuing education and training during most of his life, he is the sum total of what he is plus what he is becoming. The notion of education, then, as preparing youth for an activity or set of activities with which he will occupy himself for the remainder of his life is unacceptable. Education must prepare a youngster to enter society as a responsible and contributing member, but it also must develop in him the awareness that upon entry into that realm he should be ready and willing to adapt. Such a conception of the individual evolving over time, which may be referred to as the developmental framework, prompts the educator to formulate his educational objectives and consequent programs in the same frame.

The Framework as Applied to Vocational Education

For those educators charged with the responsibility for developing and implementing the career-oriented phase of the total school curriculum, the developmental framework holds particular potential. Support for this contention lies in the fact that an individual's vocational behavior is the most direct manifestation of his total development (Jordaan; Starischevsky; Super; 1963). Yet, so little is known about the process of the vocational development of both youth and adults, and the nature of various factors related to it (Holland and Whitney, 1969) that vocational educators are rightfully dubious about the usefulness of vocational development theory. How are they to devise vocational programs which take vocational development into account, when the conceptual handles from which such programs would proceed are insufficiently established?

Several noteworthy research studies have been conducted to explore the nature of vocational development (Super; Gibbons and Lohnes; Cooley and Lohnes; etc.). In their lack of orientation to vocational education opportunities, however, they have ignored the potential applications to that field. Given their exclusion of the impact of existing vocational education programs, the findings of these investigations have little practical applicability to it.

In an extensive review of selected research and evaluative studies in vocational and technical education Little (1970) has recently recommended that the void which exists must be filled:

One important need is for a comprehensive longitudinal study of the in-school and post-school careers of cohorts of persons who move through the educational system along different paths. It would seem that it is as important to know what happens to the generality of youth in the educational system as to learn about the gifted as seen in the Terman studies of genius, or in the more recent Project TALENT (Little, 1970, p. 37).¹

Interpretation of Little's recommendation leads one to the necessity for studying a significantly large group of pre-vocational students through their experiences in the vocational program, and through their post-school experiences as well. Yet, how does one go about identifying the pre-vocational junior high school student? Given that only 15-20 percent of the youngsters who start senior high school eventually receive four-year college degrees, 80-85 percent of a ninth grade population may be viewed as potential vocational students in the broad sense of the term. The most reasonable procedure which would allow a determination of the effects of vocational education in relative and absolute terms is to start with a sample including the entire cross-section of junior high school students. Utilizing this procedure certain problems such as tracing the movement of youngsters in and out of the vocational program at various times may be surmounted.

The Developmental Framework as an Approach to the Evaluation of Vocational Education

In examining and analyzing the various vocational stages of an individual's development from his junior high school years through the first seven years after his scheduled graduation from high school, information could be obtained that not only provides for description, but also for evaluation. Typical follow-up or evaluative studies in vocational education as exemplified by recent reports by Eninger (1968), Kaufman, et al. (1967), Little (1967), Mallinson (1968), and Kaufman and Lewis (1968), are concerned only with the out-of-school experiences of vocational education graduates. Their failure to provide information regarding the nature of the inputs to the vocational education program (the type of youngster who typically selects such programs) so that valid inferences regarding effects of the program may be made, is of major significance. Knowledge of the type of input into the vocational program takes on added importance given the dictates of the Vocational Amendments of 1968, that vocational education shall be charged with meeting the needs of the "disadvantaged" as well as other sectors of our society. The value of input data and developmental data along a time continuum is thus of primary importance

¹Little, J. Kenneth. Review & Synthesis of Research on the Placement and Follow-up of Vocational Education Student. Columbus: The Center for Vocational and Technical Education, The Ohio State University, February, 1970 (Research Series No. 49, UT-010-175).

when considered in this context. Failure to provide such data within the evaluative model will certainly lead to faulty assessments.

In the developmental model program outcomes in terms of selected affective and achievement variables at one grade level become part of the input in order to assess the outcomes of the experience at the next grade level. At each stage where relevant data are collected, the same data may be viewed as both output and input. This procedure allows not only for the interpretation of the effectiveness of the complex package (say, a three-year auto mechanics program), but also for the evaluation of any portion of the complete package of sufficient importance to be isolated from it (50, pp. 1-5).

Additional detailed information regarding the early and later stages of this project can be obtained through an examination of the Vocational Development Study monographs that have been produced by the Department of Vocational Education since publication of the first one.

Like most outstanding professionals in his field, Professor Impellitteri read widely from professional journals and frequently discussed with his colleagues his appraisal of some of the papers presented in the various journals. One of his strongest reactions was to an article that appeared in the Phi Delta Kappan of February, 1971 ("Vocational Education is Not the Answer" by Eli Ginzberg). He expressed his reaction in writing to the editor of that journal. Although they did not see fit to publish his views on that matter, it is considered sufficiently significant to be quoted in its entirety below:

Under the guise of reviewing Grant Venn's recent book, Men, Education, and Manpower (February, 1971), Eli Ginzberg, Chairman of the President's National Manpower Advisory Committee has chosen to use the opportunity to express his opinion on the shortcomings of vocational education. It's not clear to me whether the PDK editor requested a review of the book or for Ginzberg's opinion of vocational education, using the book review as a vehicle. In either case, the result is an attempt to undermine the role of Education in preparing our youth for work. The title chosen for his article--"Vocational Education is Not the Answer"--is not only meaningless (an answer to what, or to whom?), it is downright insulting.

While he speaks with much self-assurance about vocational education and its shortcomings, Ginzberg demonstrates in this writing that he does not know what vocational education is. He equates it with manual trade preparation--"While a minority will earn their living in manual trades, the vast majority of the coming generation will work with paper and pencil, with typewriters, calculators, computers, and testing equipment." Such a narrow view of vocational education is absolutely inexcusable for a man in Ginzberg's position, a man who is responsible for advising the President on the Nation's manpower. How responsible is the behavior of a person who is so willing to criticize vocational education without possessing any of the facts regarding its nature or intent?

One of Ginzberg's criticisms is that vocational education is primarily aimed at the secondary school population, at which level the cost is too great and the potential pay-off too small. No mention is made of the continually decreasing ratio of secondary students to post-secondary students in vocational programs (14:1 in 1965 to less than 6:1 in 1969), nor that Venn argues strongly for a rapid rate of expansion in post-secondary programs. His argument regarding costs versus pay-off in secondary level vocational programs contradicts most of the findings of the many studies which have examined the costs and benefits of vocational education. As an economist he may find the results of such studies, primarily conducted by other economists extremely enlightening.

Although he sees little benefit in secondary level vocational programs, not even as exploratory opportunities, he apparently has little trouble justifying the usefulness of an aborted junior or senior college experience for a youngster on the basis of its potential for exploration.

Given Ginzberg's apparent influence through his position on the President's Manpower Committee, one can only hope that this committee functions as ineffectively as most advisory committees in helping to carve out national priorities, legislation, and dollar appropriations. With our current need for a thoughtfully conceived comprehensive and cooperative manpower program, Professor Ginzberg has contributed to increasing the divisiveness between education and the other cooperating elements. His slap at Venn's writing as what one could expect from "educationalists," whatever he means by that term, gives another hint of his biases against education

Given the substantial number of inconsistencies, non-sequiturs, and confusing logical chains included in the "review," it does succeed in clarifying at least one major point--that schools have done such a poor job of educating our youth that their participation in a comprehensive manpower effort should be minimal. Educators beware! (51, p. 1-2)

Another fugitive paper prepared by Impellitteri which was considered worthy of preserving is one entitled, "Vocational Education in a Contemporary Society" which this paper was the basis for a presentation to the Blair County Counselors Association in February. The content of this paper follows:

In its broadest sense, vocational education has been conceived to be education to fit persons for useful employment at all levels of work. In this sense vocational education is conceived to be not solely a part of the enterprise of education, but of life itself. The vocational education program as it exists today took on its more formal definition with the passage of the Smith-Hughes Act in 1917. Throughout the period since 1917 many other Federal vocational education acts have been passed which have affected its scope and size. Generally, vocational education is considered to be part of a program of studies aimed at developing competent workers, recognizing that the American worker should not only be occupationally competent, but be competent economically, socially, emotionally, intellectually, and in a civic sense as well.

Vocational education's primary role, then, is as the occupationally oriented phase of public as well as private education through some point less than the baccalaureate level. As such it has often incorrectly been identified with job training. The same persons who adopt this notion also see vocational education's prime objective as meeting the needs of industry. Although hopefully responsive to the changes in the demand for skilled and technical manpower, the primary objective of vocational education is to meet the needs of youth and adults for the exploration of, entry into, progression in, and adjustment to gainful employment.

Vocational education thus finds itself being the bridge between 75 percent of our school population who will not complete college and the complex, ever changing world of work. The nature of the bridge determines what choices are available for those who wish to cross. Traditionally, vocational education has structured several bridges, each leading to distinct destinations in the world of work. A student either crosses the Trade and Technical bridge, the Agricultural Education bridge, the Distributive Education bridge, or one of the other three or four bridges designed to provide a path to the world of work. Recently this traditional view has been under attack by many critics, both outside and within the field.

With a relatively recent commitment to equal education and occupational opportunities for all, the role of vocational education has come under close scrutiny. Quality vocational education programs are perceived as a partial solution to the many problems of those "neglected 50 percent" of our school population who neither finish college nor elect a specific occupational education program. But

the vocational education scheme as structured in the traditional manner is not really capable of fulfilling its potential in this respect.

The shortcomings of this scheme are:

1. The increasing complexity of the world of work can no longer be simply structured as in the traditional service area breakdown. For instance, agricultural occupations may generally be broken down into six areas, only one of which (farm production) falls into the exclusive agriculture domain. Similar overlap in the other categories is the rule rather than the exception. Thus the separate bridges are irrelevant.
2. There are no paths leading from bridge to bridge. Thus, there can be no change of path. One must go back to the beginning again to change bridges. A student's decision to travel via one of the bridges is quite final if continual progress is to be made.
3. Research in the area of vocational development indicates that youngsters below the twelfth grade are not ready to make a specific occupational choice. Although this finding is quite widely accepted, a decision point in the traditional scheme is usually forced upon a ninth grader.

Vocational education as conceived by Congress to be a partial solution to many of our current social and economic problems does not appear to be the same vocational education as I see in evidence today. In some way the new vocational education as a conglomerate application in education of a number of disciplines has surpassed the understanding and grasp of the majority of today's vocational educators. The new vocational education has a great contribution to make, yet we find that there are extremely few of the new breed of vocational educators who are prepared to help fulfill its potential.

One of the reasons for this condition is that vocational education is a schizophrenic field. Its long tradition of fulfilling a manpower training role has led it to identify with the larger area of manpower preparation and utilization. Those responsible for the larger segment of this task, however, view vocational education as a dying stepbrother. They believe that the schools, at least through the secondary level, are no place to prepare youth for gainful employment. To them, education belongs with the educators and training with the trainers.

On the other hand, a substantial portion of vocational educators, particularly in Pennsylvania feel a close kinship to industrial training. Their rationale is that an occupation is an occupation, and training persons for a unique occupation, be they youth or adults, should be similar in the industrial environment or that of the school. Industrial trainers, however, appear to be prone to say, "Give me a bright, eager, and hard working kid, and we'll train him for the job we have." What employer wouldn't like to be able to select the upper ten per cent of our graduates in terms of general abilities, eagerness, and motivation to succeed? But what

about the youth who have special abilities, specified interests which awaken their motivation to success, and specified goals toward which they must be directed in order to feel any meaningfulness or purpose to their lives?

So we're left with the final alternative for the schizoid vocational educator, his identity with education. Without any other visible means of support, with little hope to plow ahead, he leans on the educational enterprise. And what does he find? That he belongs in a separate physical facility; working in a program apart from the total school program, that program being supported primarily by separate funds; working with school personnel who live under differing certification requirements than the other school personnel, differing pay scales and differing professional role expectation; working under superintendents and other school administrators who neither understand the program nor care about their lack of understanding; and finally and pointedly, working with guidance counselors whose view typically is, "if you can't make it in the academic program, see if there's anything in the vocational area you'd like." . . .

The attitude is generally that--it is not that one can't make a success out of his life if he doesn't go to college, but that if he has the ability and opportunity to go to college then he'll be even more successful.

Vocational education has not been, as you may perceive me as inferring, placed in a world apart by a set of uncontrollable external forces. It has, by its own plan and design, set itself apart. In my opinion they have seen the necessity of drawing a distinct line between their activities and other's activities, particularly those in our schools, in order to demonstrate that Federal funds were being spent in keeping with the intent of the vocational legislation. Both the enabling legislation and the funds have been primary contributors to this attitude toward isolationism.

Vocational educators are finding increasing difficulty in maintaining such separation, however. The reasons for this occurrence are rather obvious. First, everyone else wants a piece of the Federal dough; secondly, vocational education has failed to respond to contemporary societal needs; and third, vocational education is slowly losing its identity because of changes in the enabling legislation. It won't be too long before this identity is lost entirely.

I predict that by 1980 there will be no such identifiable program as vocational education within the formal education scheme from what we know of now as grades one to fifteen. There will, however, be segments of a school's curriculum for children and adolescents which focus upon preparation for the world of work. As the other segments of the curriculum will have been structured, the preparation for work segments will be organized in six to eight week modules. There will be no one set pattern for all of the youngsters, since each will choose the modular sequence which is suitable for his stage of readiness.

What we now call the teacher will be more of a counselor who helps these children and adolescents along with their parents plan their modular selections. Modules will be categorized on a two-way grid system. The first dimension of the grid might be divided into: Humanities; Science; Business; Technology; the Arts; and Man at Work. The Second dimension may be structured as: Appreciation; exploration; skills; understanding; information; theory; and application. Objectives would be specifically designed for each of the six to eight week modules and the student must achieve those objectives before qualifying for further exploration. Criterion pre and post tests will be administered for each module, and the student will commence with the material in the segment which he or she has not already mastered. Students need not complete a module which they begin, but may move instead to another module at the same level. Because no diplomas will be awarded, and there will be no graduations from any grade (there won't be any grading system), it is assumed here that reinforcement resulting from personal progress will be adequate to motivate the student.

Modules related to preparation for work may be selected by any youngster (say ages five to 18) at any time when they achieve a readiness level. This readiness level will be measured by a set of performance criteria. Skill modules within the preparation for work category will be structured from quite general to extremely specific in focus. These skill structures may be found either within or outside of the school setting (perhaps in the business or industrial setting). Each skill module (as most of the other modules) will be monitored by a specialist. A student could move in a very specific direction or explore in a horizontal plane at his own discretion. Since employers would have no graduation certificates or grades to go by it would be necessary for them to devise criterion-referenced tests for selection of employees. This would be highly desirable.

This brief description of what I project to be the curriculum of the future reveals my biases regarding where vocational education's primary identity should be--that's as an integrated part of the total school program. I did not mention the term "vocational education" in my description although many of the activities to be included in the curriculum of the future may be categorized under today's umbrella of vocational education. Those same activities viewed as an articulated part of the school program can no longer be called vocational education. The objectives and intent of those activities will be subsumed under a differing hierarchy of goals than that which is in evidence today.

By what crystal ball technique do I base this future projection? What leads me to believe that so radical a change will occur within such a relatively short period of time? I will mention several factors of significance.

- 1) Increasing tendency toward the individualization of instruction. As an outgrowth of several recent trends including the increasing demand for accountability, and the rapid rise in the acceptability of specifying outcomes in terms of behavioral objectives, the grading system and the awarding of diplomas and certificates will be outmoded. The emphasis will be placed upon demonstrated proficiency. Several efforts of this kind are currently being conducted on an experimental basis. These are: Project PLAN, a cooperative effort between the American Institute for Research (AIR) and the Stanford Research Institute; Individually Prescribed Instruction (IPI) at the University of Pittsburgh's Center for the Study of Learning in cooperation with several school systems in the eastern and central portions of the U.S.; several computer-managed instructional systems being developed and tested across the country; and Project ABLE, a vocationally-related effort developed by AIR and tested in Quincy, Massachusetts.
- 2) The inability of vocational education as a separate entity to cope with the problems of the disadvantaged whose needs it has been charged with serving. Traditionally viewed as a secondary and post-secondary program vocational education gets these youngsters at a time when their disadvantagedness has already taken its toll upon their self-perceptions, motivations, desire and inquisitiveness. In what way is a remedial reading program for a youngster enrolled in the auto-mechanics course a vocational activity? If remedial reading for these youth is a vocational task, then the initial reading instruction program may be considered remedial. In either case, whatever the hangups, who cares what is vocational and what is not? A youngster needs to read to survive.
- 3) The necessity of the vocational education of today currently directed toward the efficient allocation of human resources, to redirect its effort toward facilitating the achievement of human potential particularly in regard to level of vocational performance. This task cannot be begun at grade ten, but must be a K-15 effort. With this in mind, what is vocational and what is not?
- 4) Given a particular fact of life, that no more than 25 percent of our student population completes a four-year college degree program it becomes increasingly clear that the needs of those remaining 75 percent of our youth must be better served. Does that mean channeling those 75 percent into our present rigidly controlled system of vocational education? No, there must be a tremendous increase in the flexibility of our efforts to meet the career adjustment and development needs of that group. The educational system is responsible for structuring such programs, not just one segment of it.

- 5) The increasing acceptability of the concept that the whole process of education should be unified around a career development theme. My first introduction to this notion came in the reading of an excellent paper by Ed Herr. At least five independent curriculum efforts throughout the country are being conducted on a trial basis with career development as the focus.
- 6) The inability of vocational education to live down its traditional image. What I'm suggesting here is that any alternative termed "vocational education" will never have as high a desirability to the majority of students as that same alternative not referred to as "vocational education." Learning to troubleshoot an automotive ignition system, for instance, is an essential part of most automotive mechanics programs in our vocational schools. The student engaging in that learning task enrolled in the auto-mechanics program is a vocational student. To be placed in such a category is undesirable in terms of the expectations of our contemporary society. As part of a general curriculum the same activity would not have such a stigma attached to it (52, pp. 1-9).

A review of Dr. Impellitteri's professional activities during his earlier years revealed a continuing concern for the overall direction and purposes of vocational teacher education at The Pennsylvania State University. His thoughts on this matter again surfaced in 1971, which he expressed in a position paper, parts of which are quoted below:

The primary purpose of the vocational teacher education program at Penn State is the training of teachers, coordinators, consultants, supervisors and directors of vocational education for the local school districts of the Commonwealth of Pennsylvania. Secondary purposes include research, instructional materials development, and field service. The overall program is conducted through the Departments of Vocational Education and Home Economics Education in the College of Education, and the Department of Agricultural Education in the College of Agriculture. The chief administrator is the Director of Vocational Teacher Education, who is also serving as the Assistant Dean for Resident Instruction in the College of Education.

Funding

Funds for the program come from two sources--the Federal Vocational Education Act of 1968 (administered through the Pennsylvania State Department of Education, Bureau of Vocational and Technical Education), and the general funds of The Pennsylvania State University (administered through the Colleges of Education and Agriculture)

Services Rendered

Baccalaureate degree programs, leading to a diploma and a teaching certificate, were offered in the vocational areas of agriculture, business, home economics, industry and technology. Non-degree programs, leading to a vocational teaching certificate, were offered mainly in the technical and industrial areas. Graduate degree programs were offered in the broad area of vocational education to meet the needs of in-service and pre-service vocational supervisors, administrators, teacher educators, consultants, and master teachers. Research services were provided by research specialists and by instructional staff members. Instructional materials development services were provided to local school districts by a team of curriculum specialists. Field services were provided to local school districts by a staff of vocational consultants, jointly responsible to a cochairman of the Department of Vocational Education and the State Department of Education's Bureau of Vocational and Technical Education.

Staff

The overall program for 1969-70 was presented by a staff of 36 specially trained vocational education professional personnel who had met the qualifications of the Pennsylvania State Plan for Vocational Education. The staff included 17 such individuals in the Department of Vocational Education, 11 in the Department of Home Economics Education, and 8 in the Department of Agricultural Education.

Students

A total of 1451 students (no duplications in the total) were enrolled in credit courses during the academic year. Of this total 504 were full-time students and 947 were part-time (chiefly adjunct) students

Driver Education

In cooperation with the Institute of Public Safety, the Department of Vocational Education administered an expanding non-vocational program for the training of secondary school driver-education teachers. During the academic year 1969-70 a total of 902 students were enrolled in SAF ED 450, SAF ED 451, SAF ED 452 and HL ED 411.* Enrollments in 1968-69 totaled 633 -- 100 in 1966-67 (53, pp. 1-5).

*These courses are listed and described in The Pennsylvania State University Bulletin: Graduate Degree Programs.

This was followed by an elaboration of the special services offered by the Departments of Vocational Education, Agricultural Education, and Home Economics Education. Dr. Impellitteri then went on to list the involvement of the Department of Vocational Education in occupational competency testing and vocational field services. The remainder of the position paper was devoted to a compilation of research conducted by staff members and professional publications and articles authored by them.

The paper presented at the 1970 American Vocational Association Conference in New Orleans was modified into an article entitled, "The Development of Valid Work Performance Measures," and appeared in the Fall 1971 issue of the Journal of Industrial Teacher Education. He summarized in the following manner:

Some basic issues related to work performance measures have not been discussed in any great detail. For example, what criteria may be meaningfully included within a work performance measure? How do these criteria relate to the personal characteristics of vocational-technical students? These and other questions are currently being examined and will be reported after sufficient data have been gathered.

This paper was started several years ago, and it is freely admitted that the discussion is not complete, and may never reach completion. As more empirical means by which validity and reliability can be established and are made known, this paper then should become more and more comprehensive in scope. It is only hoped that the present information which has been provided will serve as a basic framework for the development of valid work performance evaluation measures (54, p. 48).

The third monograph in the Vocational Development Series was entitled, "The Measurement of Occupational Values" and appeared in September of this year. It was an early effort to . . . "Analyze the reliability and validity of tests and inventories utilized in this longitudinal investigation" (55, p. ii).

An unpublished paper entitled, "The Nature and Measurement of Work Values" was presented by Professor Impellitteri in November at the annual meeting of the Northeastern Educational Research Association. Selected quotations from that paper are presented below:

Katz (1963)¹ has provided a framework interrelating the constructs of needs, values, and interests, and in doing so has helped to clarify the role of values in behavior. "Values may be regarded as characteristic outer expressions and culturally influenced manifestations of needs." Of necessity, according to this view, needs must be regarded as a primary determinant of behavior, motivating an individual's activity toward the satisfaction of those needs. It may be argued, then, that needs may provide the most fruitful area to explore. In Katz's view, however, the worth of values as a construct to investigate is founded upon their nature as outer expressions of motivating forces rather than as an inner drive itself which is often unconscious. What is gained through the focus upon values is the capability to identify a vocationally relevant construct.

In addition to Katz (1963) Beck and Barak (1967)² among others have commented on the essentially ipsative nature of values. Valuing in their terms is to choose among alternatives. The crucial factor is whether John values X more than Y, rather than whether John values X more than Fred does. It naturally follows, then, that the most appropriate measure of values is one which reflects the valuing process described in these terms. The response task required of the individual within such a measurement scheme would force him to respond from among alternatives--a forced-choice framework.

Ipsativity--A Compromise

Having accepted the ipsative format for measuring values it becomes imperative to consider the consequences of such a decision. Beyond the substantial validity problems to be discussed by Dr. Kapes, the next presenter, one buys several additional difficulties. Given an instrument of this type designed to measure several values dimensions, selected groupings of alternatives from which subjects are to choose must be devised. Any format other than a simple ranking of those dimensions will include one or more groupings (dependent upon the total number of groupings) that for an individual subject will prove to be superfluous.

¹Katz, Martin. Decisions and Values: A Rationale for Secondary School Guidance. New York: College Entrance Examination Board, 1963.

²Beck, Carlton E., and Barak, James. "The Place of Values in the Study of Society." School and Society, February, 1967, pp. 122-123.

I offer an example of this situation as an artifact of the method. Take a hypothetical instrument designed to measure three values dimensions--A, B and C. Suppose the instrument were so constructed that the subject must choose the more important statement or phrase from each of 30 pairs of such statements or phrases representing 10 pairs of A and B, 10 pairs of A and C, and 10 pairs of B and C. In an acceptable manner the 20 statements or phrases representing each of the three values dimensions have been validated, with excellent results. Great! We have a real start.

In this form the instrument is administered to a group of 100 subjects to ascertain their values profiles. The results demonstrate that 30 subjects value A extremely high, 30 value B to the same degree, and an equal number value C highly. The remaining 10 demonstrate relatively flat profiles of A, B, and C.

Within the group of 30 A valuers it is likely that their responses to the B-C pairs are more or less equally distributed among B and C. B and C are obviously of secondary importance to that group in the face of A. When they've got A that's all they want! For the B's its the A-C pairs that get the lesser attention. Faced with the necessity to choose between two undesirable options (A or C) it is highly improbable that either A or C will be consistently chosen. The same holds true for the C's. The flat profiles are either the result of equally desirable or equally undesirable options among each of the three values dimensions.

Over the total group, then, what will be our measured reliability estimates? You guessed it--unacceptable! When responding to ten of the pairs of phrases or statements composed of the same two values, 70 percent of our group choose the one value statement five times and the other value statement in the remaining five instances--a highly inconsistent result.

Internal consistency estimates of ipsative instruments, therefore, are likely to be low. Stabilities, when estimated by the correlation between scale scores at time₁ and scale scores at time₂ are not, however, influenced by this same shortcoming. Stability measures are thus preferable estimates of reliability when an instrument is built within the ipsative frame.

Given a slight glimpse of the myriad of problems resulting from an attempt to stimulate the essentially ipsative nature of values in their measurement, one might ask, "How far do you go before abandoning the task?" At this point I'd still rather fight than switch. Since we're in the initial phases of refining our instrument, the day may well come when we throw up our hands in surrender. We still, at this point, lean to the ipsative side of the compromise.

Available Occupational Values Measures

A recent survey of the construct of occupational values and their measurement was conducted by Zytowski (1970).³ This review represented an extremely valuable and time-saving contribution to our exploration of available values measures. Figure 1 as presented herein is a slightly revised version of a similar scheme presented by Zytowski.

Eight instruments which were examined for their suitability were listed. Figure 1 lists those instruments by column, and the specific values identified within each. Zytowski constructed the figure so that reading across any row, common values from instrument to instrument may easily be identified. Center's Job Values and Desires Questionnaire (JVDQ), Gribbons and Lohnes' "Values Indicators," and Dipboye and Anderson's, "List of Values" were added to Zytowski's scheme.

Although there is a natural problem of semantics in discussing common values among the instruments, an attempt has been made to present such an analysis in the figure.

A Description of the OVI Scales

Within the framework of the established need for an occupational values inventory, the essential measurement characteristics it should possess, and the results of the survey of existing instruments presented above, the Occupational Values Inventory (OVI) was developed. The seven occupational values measured by the instrument are:

1. Interest and Satisfaction--One likes the work; enjoys it; is happy at it; fulfills oneself by doing it.
2. Advancement--One perceives the opportunity to get ahead in the work; sees a good future in it; it provides an opportunity to improve oneself
3. Salary--One perceives the financial return resulting from the work; can make a good living at it; sees it as an opportunity for a satisfactory income.
4. Prestige--One is impressed by the respectability attached to the work; can earn recognition from it; desires the feeling of importance that goes with it.
5. Personal Goal--One sees the work as fitting into his way of life; is what one always wanted to do; has been shooting for it; it's the ideal.

³Zytowski, Donald G. "The Concept of Work Values, Vocational Guidance Quarterly, 1970, 18, pp. 176-186.

6. Preparation and Ability--One can succeed in the work; is good at it; it's where one's talents lie; is suited to it.
7. Security--One can obtain employment in this work; perceives that workers are needed in it; there will always be openings in it.

Generally speaking, the OVI was designed so as to include the least possible number of values necessary to adequately sample the occupational values domain relevant especially to young adolescents. Using the 22 different values which appear in at least one of the inventories presented in Figure 1 as a starting point, value categories which did not meet the above criteria were eliminated.

Construction of the OVI

Given the seven value scales to be included in the OVI and given the essentially ipsative nature of the task to which individuals would respond, consideration was given to the format of the OVI. Super's original Work Values Inventory (1962)⁴ which accounted for value intensity and which was framed in an ipsative format was examined. After careful consideration it was decided that the tasks to which the individual were forced to respond in the WVI were too repetitive, and the nature of the specific values was assumed to be too simplistic.

In constructing the OVI it was assumed that each value is relatively complex, and in order to measure the degree to which particular values motivate an individual's behavior, those various aspects of each of the values must be sampled. An analysis of each of the value areas was undertaken and sample phrases and statements which represented those areas were written. An attempt was made to phrase a value in as many different ways as possible while still maintaining the emphasis of that value. Each phrase was written at a reading level which was judged to be approximately average for a seventh grader. The entire set of phrases representing all seven values were then randomly combined and submitted to several judges who indicated for each phrase which value the phrase represented. From the results of this procedure the 15 phrases with the best interrater reliability were selected for inclusion in the OVI.

At the same time it was decided that the most realistic valuing task we could devise was that utilized in the Kuder Preference Record (Kuder, 1964)⁵, with three statements or phrases representing three different values included in an item. Using the 15 different phrases and statements previously selected to represent each

⁴Super, Donald E. "The Structure of Work Values in Relation to Status, Achievement, Interests, and Adjustments," Journal of Applied Psychology, 1962, 46, pp. 231-239.

⁵Kuder, G. Frederic. General Interest Survey Manual, Chicago: Science Research Associates, 1964.

of the seven OVI scales, 35 triads were constructed. This resulted in each value being placed with every possible unique pair of two other values. The task as constructed forced the individual to select the one phrase or statement that was most important to him in choosing a job, as well as the least important. The third statement or phrase was left blank.

Based upon the results of initial field trials of the mimeographed version of the OVI, extensive revisions were made in order to improve the readability and homogeneity of the phrases representing each value. . . .

OVI Current Status and Prospects

Having administered over 5,000 OVI's during the past four years in one or another of its forms, substantial evidence is available regarding its validity and reliability. Although tentatively satisfied with our progress to date, we feel we have merely scratched the surface (56, pp. 1-8)..

The Personnel and Guidance Journal of December, 1971, was a special issue entitled, "Ethical Practice: Preserving Human Dignity" and Professor Impellitteri was one of its guest editors. The "introduction" to that special issue adequately describes his involvement with the topic of ethical practices and the preparation of the publication:

We have brought together these articles to try to increase counselors' awareness and understanding of the legal, ethical, and philosophical issues related to the counseling process. While such awareness and understanding are essential to the counselor who aspires to true professionalism, they are in themselves insufficient. The mere knowledge of society's prohibitions, guides, standards, and sanctions does not guarantee that a counselor behaves responsibly.

We hope this special issue will help counselors to intellectualize these concerns. Our specific editorial tasks in assembling this material often clouded a global view of what the issue was all about. We urge counselors to avoid a similar trap and to attend to the implications of these articles and their effect on counselors' service to clients. In doing this, counselors must individually wrestle with and conceptualize this information to develop practical, moral behaviors that will be in keeping with the expectations of the profession.

Being a counselor is more than being acknowledged as one. Today it means showing a willingness to protect the client from the American public. It means developing a professionalism that is mature. It means becoming an advocate of the client--an advocate whose actions and behaviors are not couched in fear of legal action or professional rebuke. Such a counselor can operate at the gut level as well as the cerebral.

In short, we urge counselors to move out of the ethics gulch and to avoid the practice of ethiscuity, which we define as the promiscuous taking of refuge in ethics to protect oneself from potentially threatening, embarrassing, and anxiety-producing relationships with clients, thereby possibly avoiding service to them.

Regardless of all the considerations raised in this issue, we shall still find every client to be a person with inherent worth. He may appear to be despicable, ill-manner, uncouth, and desolate. He remains, however, a client with inherent worth. The ethical and moral counselor helps him and serves him for this reason, not because it is legal or nice to do so.

We have enjoyed working on this special issue. We appreciate the work of all contributors and the suggestions of the editor and editorial staff of APGA. We also appreciate the assistance of Edwin L. Herr and George R. Hudson, Professors of Counselor Education at Penn State, in the delineation of the articles solicited for the issue (57, p. 248).

Professor Impellitteri's next (and final) appearance at the annual meeting of the American Vocational Association occurred in December of this year in Portland Oregon. His involvement included a total of three presentations which encompassed two papers prepared and presented by him.

The first presentation was entitled, "Research on Individualizing Instruction in Vocational and Technical Education: Status and Prospects."

It's contents are as follows:

As is suggested by the title of this paper we have attempted to extract direction from the numerous research efforts which have explored the individualization of vocational and technical instruction. The manner in which we chose to pursue our objective of deriving future directions for research in this area involved eight steps:

1. Reviewing existing research
2. Critiquing the reviewed research
3. Organizing the acceptable research within a valid individualized instruction framework

4. Synthesizing the research within major categories of that framework
5. Synthesizing the syntheses
6. Recommending future directions for research based on the overall synthesis
7. Specifying the recommended research approaches
8. Exemplifying selected approaches

The completion of each of the steps in this scheme is obviously crucial to the undertaking of the following steps. Since we will be discussing today primarily steps five through eight on the list, let us assure you that one through four have actually been completed and reported. If you haven't seen that report which, by the way, actually includes a description of steps one through six do not feel slighted, for we have not seen the published form either. The final draft was completed in the spring and is scheduled for publication some time within this decade. It will bear the title, Review and Synthesis of Research on Individualizing Instruction in Vocational and Technical Education, one of the Ohio State Center's Series of review and synthesis documents.

This presentation is divided into two sections. The first presenter will discuss the status of research on individualizing instruction in vocational and technical education and the second presenter will speak about the future prospects of research in this area.

Current Status of Individualized Instructional Research

In our efforts to develop the review and synthesis document we reviewed between 500-600 research studies, of which about 200 were reported in the final draft. Through our reviews and critiques of those studies, and our attempts to organize and synthesize those selected for inclusion in the "review and synthesis" in terms of an acceptable instructional framework we made what we think are some interesting observations. After sharing some of these observations with you we will be offering several recommendations regarding future research efforts in this area.

Observation 1. Both the quantity and quality of research examining the individualization of instruction in vocational and technical education have increased considerably each year since 1965, at which time the first significant research efforts of this type were undertaken. By rough estimate it seems that the number of studies reported in this area have approximately doubled each year through 1970. An obvious increase in the quality of these investigations was observed. As evidenced by the proportion of later studies selected for inclusion in the "review and synthesis."

Observation 2. A number of investigations reviewed in this document demonstrated that certain approaches to individualizing instruction were effective in facilitating selected learning outcomes for specific groups of students under particular conditions.

Observation 3. An increasing cognizance of relevant factors influencing the design of individualized instruction is demonstrated in the most recent research and development efforts in vocational and technical education. The specific nature of these factors provide the focus for the following observations.

Observation 4. The samples utilized in much of the research reviewed in this document were not composed of the type of student to which we desire to generalize the results. Given that the primary purpose of individualizing instruction is to meet the educational or training needs of the whole spectrum of our student population, little effort appears to have been made to adequately represent that range.

Observation 5. The emphasis upon the development of actual work performance skills in vocational and technical programs has not been sufficiently recognized in most of the research reviewed. The preponderance of studies posed rather artificial, easily measured criterion variables upon which to measure instructional effectiveness.

Observation 6. An overabundance of studies dealt with the differential effectiveness of one or more experimental treatments and a convention or traditional instructional method. In spite of the considerable criticism leveled upon such research . . . and its failure to provide meaningful and interpretable results, it still seems to persist.

Observation 7. The only significant attempts to replicate research were found in studies conducted for the military. The lack of replication is at least partially due to the failure of most studies to adequately describe the instructional treatments being tested.

Observation 8. The most promising area of individualized instruction research and development in terms of its potential contribution to the improvement of vocational and technical instruction is represented by the instructional systems approach. Because of its global nature the instructional process conceived as a system must take into account the effect of its essential components and their interactions, including cost constraints, nature of instructional objectives, evaluative design, and criteria for modification. The shortcomings of many of the studies reviewed in this document are the results of a restricted conception of the instructional process--an unlikely occurrence in utilizing the systems approach.

Observation 9. Much of the military training research reviewed in this document exemplified the type of programmatic research and development activity necessary to resolve in a systematic fashion the multitude of problems emanating from the individualized approach to instruction. The shortcomings of sporadic efforts conducted by individual investigators have demonstrated the need for more global research efforts. Because of the financial support situation the military have been able to mount such programs of research with substantial success.

Observation 10. The research reviewed was generally simplistic in design, avoiding the examination of interactive effects such as instructional treatment by type of objective, or instructional treatment by level of student ability. Doctoral studies particularly demonstrated this tendency toward the univariate approach.

Observation 11. Several studies were identified which accounted for student characteristics in some way. Most of these, however, accounted for aptitude differences, but avoided affective differences (such as attitudes, motivation, interests, or values).

Future Prospects for Individualized Instructional Research

Based upon these observations individualized instruction is perceived to have a great potential for improving vocational and technical education. Other factors leading to an optimistic view of the future are the relatively short period of time during which the systematic study of individualized instruction has been going on, and the short history of research in vocational and technical education.

In terms of the future of individualized instruction research it appears most logical to focus on those strategies which have the greatest potential to maximize returns on research investments. If the shortcomings as specified in the list of observations are indeed accurate there are at least two strategies which the authors feel will be most beneficial in the search for new knowledge about individualized instruction. The two are: (1) the development of ongoing programmatic research; and (2) the application of multivariate designs to individualized instruction research.

Programmatic Efforts

Cronbach and Suppes (1969)⁶ make a clear distinction between two fundamental kinds of inquiry. They differentiate between decision-oriented and conclusion-oriented investigations by stating that in the former an investigator is asked to provide information wanted by a decision maker while the latter takes its direction from the investigator's commitments and hunches. Additionally, "conclusion-oriented research is intended to have a general significance, whereas decision-oriented research is designed for its relevance to a particular institution at a particular time."

⁶Cronbach, Lee J. and Suppes, Patrick (editors). Research for Tomorrow's Schools. New York: MacMillan, 1969.

Unfortunately, the linkages between these two kinds of inquiry are, at best, weak. While conclusion-oriented studies are highly generalizable, they may not provide answers to those questions posed by the decision-maker (e.g., vocational director, coordinator, teacher). Decision-oriented studies, on the other hand, do not seem to provide a base which is appropriate for making useful generalizations.

Logically, individualized instruction research has to move away from piece-meal types of studies if any great impact on vocational and technical education is to be felt. Research activities must flow logically in such a manner that one study builds upon another, thus producing an empirical base which eventually may be applied to improvement of instruction.

A partial answer to the "generated gap" can be obtained by attacking problems in a more programmatic manner. The proponents of programmatic research and development feel that this approach may well bridge the gap between "hard-core" researcher and "hard-core" practitioner (in addition to those classed as soft-core). Gideonse (1970)⁷ indicates that the term programmatic is generally used "to imply more than a single project, a relatively long time frame and a justification which extends beyond the purposes of individual project components." He proposes that programmatic research and development can be specified on the basis of goals toward which it is aimed. In a paper which focuses upon programmatic research and development in vocational education, Morrison (1970)⁸ also expounds upon the identification of outcomes. He states that the identification of objectives stated in terms of desired outcomes is basic to the programmatic effort. Morrison goes on to indicate that, in order to achieve desired outcomes, a long range plan must be developed which defines the destination and strategy for getting there.

It can be seen that programmatic research and development requires more than merely putting tab A in slot B. Programmatic efforts must be specified in such a way that the end and the means to that end (no matter how complex) form an integrated package. This is of particular importance to research in individualized instruction. Unfortunately, the aforementioned linkages between conclusion and decision-oriented inquiry are very weak in the area of individualized

⁷Gideonse, Henrick D. "Some Conceptions of Programmatic Research and Development." Presented at AVA Convention, New Orleans, Louisiana, 1970.

⁸Morrison, Edward J. "Programmatic Research and Development at The Center for Vocational and Technical Education." Presented at AVA Convention, New Orleans, Louisiana, 1970.

instruction. For example, a conclusion-oriented researcher might be attempting to identify those theory-based variables which can enhance the instructional process. Meanwhile, the decision-maker desires information about how well local teachers may use film-strip X as opposed to movie Y. In the end, neither has actually focused on the ultimate target population (the students).

Programmatic research and development in individualized instruction then may be envisioned as a cooperative effort with team members selected from the ranks of researchers, teachers, administrators, and students. A programmatic plan would include the goals to be attained (which focus on the ultimate target population) and the ways in which research and development should take place in order to attain these goals. Although this may appear to be a monumental undertaking, it is not too huge when one adds up the years of meaningless "wheel-spinning" associated with problematic research activities.

Multivariate Approaches

With regard to designing individualized instruction research the past is certainly not a prologue. An overabundance of studies can be identified which are generally simplistic in design avoiding the examination of interactive effects such as instructional treatment by type of objective, or instructional treatment by level of student ability. Moreover, in only a few cases can studies be identified which examine students' personal (e.g. affective) characteristics as they relate to the instruction process.

This is not to say that univariate research should be abandoned. It must merely be considered as but one weapon in the research arsenal. In addition to the ever popular single-classification designs, opportunities may exist to study the relationships between one dependent variable and two or more independent variables. For example, this might occur when one wants to examine the differential effectiveness of several instructional treatments with youngsters who vary in their reading ability and motivation toward learning. If the criterion were learning success we could, in part, identify what kinds of youngsters (from a motivation toward learning and reading ability standpoint) learn best with certain instructional treatments. A fringe benefit of the multiple-classification approach is that interactions among variables may be examined. For example, it might be found that students with indices of low motivation perform better on treatment A than highly motivated students but perform worse on treatment B. This hypothetical case represents the type of information which is needed if instruction is to be tailored to individual needs.

In fact, before individualized instruction can be developed which is optimally effective we must be able to assess the complex relationships which exist between numerous independent, dependent, and

intervening variables. A promising approach to the conceptualization of these variables is presented by Seidel (1971).⁹ He describes a model which is designed to ultimately take into account "dimensions and elements of the subject matter structure, the individual's personal characteristics and finally, interrelationship between the particular subsets of individual characteristics and the nature of the knowledges and performances required of a student at a moment of instruction." The model proposes to represent teaching-learning combinations as vectors within a sample space. Seidel's strategy, although in a conceptual state at present, is one that may eventually link learning theory and instructional practice. Of course, central to this model's validation is an examination of the many variables which encompass the teaching-learning process. This builds an even stronger case for the use of multivariate analysis.

How then might one go about the arduous task of accounting for a multitude of variables within a research design? Fortunately, with the advent of high speed computers vast amounts of data can now be processed in a relatively short period of time. Likewise, complex and heretofore obscure statistical analyses may be undertaken via computer.

Noteable among the complex approaches to statistical analysis is multiple linear regression. Detailed descriptions of the multiple linear regression technique are provided by Bottenberg and Ward (1963)¹⁰ and Smith (1969),¹¹ however, a brief description of this methodology is given below.

By utilizing multiple linear regression, effects of certain independent variables may be partialled out so that the unique contribution which a particular independent variable makes to a dependent variable may be ascertained. Variables included in the analysis may be continuous or categorical, thus taking into account characteristics such as group membership (e.g., sophomore, junior, senior) and school membership. The general model can be expressed as:

⁹Seidel, Robert J. "Theories and Strategies Related to Measurement in Individualized Instruction." Educational Technology. August, 1971, pp. 40-46.

¹⁰Bottenberg, Robert A. and Ward, Joe H. Applied Multiple Linear Regression, Technical Report PRL-TDR-63-6. Lackland AFB, Texas: Air Force Systems Command, March, 1963.

¹¹Smith, Brandon B. "Applied Linear Regression: A General Research Strategy." Journal of Industrial Teacher Education, Volume 7, No. 1, Fall, 1969, pp. 21-29.

$$Y = a_0 + a_1x_1 + a_2x_2 + \dots + a_nx_n + E$$

where

Y = Dependent variable

x_1, x_2, \dots, x_n = Independent variable

$A_0, A_1, A_2, \dots, A_n$ = Partial regression coefficients

E = Error term

Since the dependent variable (Y) as well as the independent variables (x_1, x_2, \dots, x_n) may be continuous or categorical, there is a great deal of flexibility in research design. For example, Y could specify that all persons attaining criterion are "1" and those who do not attain criterion are "0." Likewise, independent variables might include categorical data: x_1 could indicate that persons assigned to a treatment group are "1" and those assigned to another treatment group are "0." x_2 might include continuous type data on students' abilities (or any other meaningful personal characteristic).

One may easily observe the advantages which multiple linear regression has over many of the "traditional" research methodologies. A wide range of variables may be taken into account with a research design, thus enhancing the validity of a particular study. Since the individualization of instruction suggests that "opportunity for individual mastery of common subject material will exist, as well as the provision of personalized instruction for the student that is unique to his ability, motivation, and interest,"¹² it is only logical that research should account for those characteristics which are basic to the instructional process. Although multiple linear regression is one of many research strategies it exemplifies the means by which answers to complex individualized instruction questions may be obtained.

Accounting for Variables: An Application of Individualized Instruction Research

In order to better describe how multivariate analysis fits into the research process, portions of a recently completed investigation will be presented. This particular study, which focused on the role of dynamic stimulation in teaching complex problem solving skills, utilized multiple linear regression as a means of

¹² Bishop, Lloyd K. Individualizing Educational Systems. New York: Harper and Row, 1971.

analyzing data (Finch, 1971).¹³ It involved a multi-school, multi-teacher, multi-grade sample and included youngsters with a wide range of personal attributes (N=205). The specific equations used in this study were:

$$Y_l = A_0 + A_1x_1 + A_2x_2 + A_3x_3 + A_4x_4 + \dots + A_{15}x_{15} + E$$

$$l = 1, 6$$

WHERE

Y_1 = Troubleshooting proficiency

Y_2 = Troubleshooting efficiency

Y_3 = Troubleshooting redundancy

Y_4 = Troubleshooting search time

Y_5 = Troubleshooting action checks

Y_6 = Troubleshooting information checks

AND

X_1 = treatment

X_2 = school

X_3 = grade level

X_4 = verbal ability

X_5 = non-verbal ability

X_6 = motivation toward learning

X_7 = equipment knowledge

X_8 = occupational knowledge

X_9 = age in months

X_{10} = troubleshooting experience in school

X_{11} = troubleshooting experience outside of school

X_{12} = jobs held related to instructional area

X_{13} = hobbies related to instructional area

X_{14} = living area (employment situation)

X_{15} = father's occupation

In order to assess the effectiveness of dynamic simulation it was necessary to determine what unique relationship the prime independent variable, group membership (treatment vs. non-treatment), might have with the six dependent variables (proficiency, efficiency, redundancy, search time, action checks, and information checks).

¹³ Finch, Curtis R. Troubleshooting Instruction in Vocational-Technical Education Via Dynamic Simulation. Final Report. University Park: Department of Vocational Education, The Pennsylvania State University, August, 1971, 100 pp.

It should first be noted that this independent variable was categorical with the group receiving simulator instruction coded 1 and the control or non-treatment group coded 0. Additionally, proficiency was coded 1, 2, or 3 depending on whether an individual found no troubles, one trouble, or both troubles. The other five dependent variables were continuous and, prior to the analysis, had been derived from raw sub-scores which were first converted to standard scores and then combined.

Initially, a zero-order correlation matrix was generated for the six performance (dependent variables) and all independent variables. Multiple linear regression analysis (MRA) was then conducted to identify the unique contribution which each of the independent variables. As indicated previously, prime concern was with the treatment variables as this differentiated between students receiving and not receiving simulator instruction. Other independent variables were also important to the extent that they made unique contributions to each of the performance variables.

An example of regression analysis for the variable "information checks" using a step-down process is presented in Table 1. As a result of step-down procedure . . . only those variables with significant partial regression coefficients were retained.

In brief, Variable 1 (Group) attained the highest partial regression coefficient and the highest F value (5.02). On the average, students in the treatment group scored 10.65 units higher on the information checks variable than did the non-treatment group. Other variables included in the partial regression model were grade, jobs in automotive area, and equipment knowledge. The grade variable and equipment knowledge variable were positively related to number of information checks made. Jobs in automotive area was negatively related, however, since one was "yes" and two was "no," results should be interpreted accordingly. Persons who held jobs in the instructional area scored on the average, 3.66 units higher on the information checks variable. Likewise, for each unit increase in equipment knowledge test score there was a corresponding .6114 increase in information checks score. With regard to variable 3, a one unit increase in grade (10 to 11 or 11 to 12) reflected a corresponding 3.43 unit increase in information checks score.

This example provides a hasty look at one of the ways multivariate analysis can be used in the research process to account for variables which might affect the instruction. Hopefully, it represents a trend in the direction of increased concern about the many variables which can be identified within the teaching-learning process.

The tangible accomplishments of research on individualizing instruction in vocational and technical education are, at present, extremely difficult to identify and describe explicitly. The past appears to be a precursor of things to come rather than a firm, established gain. However, with a goodly supply of trained individuals, a programmatic research and development effort, and an ample supply of appropriate research strategies, the future seems very bright indeed! (58, pp. 1-15)

Table 1

REGRESSION ANALYSIS BETWEEN FOUR INDEPENDENT
VARIABLES AND THE DEPENDENT VARIABLE
INFORMATION CHECKS

(N = 205)

Variables	Partial Regression Coefficient	Standard Error	Student "T"
3. Grade Level	3.4326	1.4743	2.33*
12. Jobs in Area	-3.6585	1.5246	2.40*
7. Equipment Knowledge Test	.6114	0.1830	3.34**
1. Group	10.6467	2.1215	5.02**
Intercept	50.0214	15.7301	

Standard Error of Estimate = 15.0322

Multiple Correlation (full model) = .5118

Adjusted Coefficient of Determination (full model) = .1948

Multiple Correlation (four independent variables) = .4751

Adjusted Coefficient of Determination (four independent variables) =
.2103

* = P < .05

** = P < .01

The other two presentations at that conference were, the same and were entitled, "Longitudinal Career Development Research and Implementation: A Cooperative Approach." The following is a complete quotation of that paper:

At the time we conceived the notion that vocational educators should systematically study the vocational development of youth over time we each really thought we were on the cutting edge in vocational education. Commissioner Marland's January 1971 statement about career education and the upheaval resulting from it have moved us far from the cutting edge. While we have been taking some initial steps in searching for valid career development frameworks to tentatively apply to vocational programs, such programs are being designed and funded without the slightest reference to such frameworks. While we are waiting for the sample of youth we are investigating to exhibit over a ten-year period--stable or unstable tentative occupational aspirations; increases or decreases in selected occupational values dimensions; degree of satisfaction with a job or selected educational experience; and level of work performance or educational attainment--programs are being designed which assume that we already know what factors are relevant in the vocational development of youth.

To partially assess the impact of Marland's statement upon vocational education one may make a crude comparison of the Abstracts of our 1970 convention with the partial lineup of this 1971 program printed in the November issue of the American Vocational Journal. Closely examining the 1970 Abstracts one finds two sessions reported in the Guidance Division that deal with vocational development. This year at least 50 per cent of the program is devoted to career development or career education, the latter notion based upon the former. In the light of such an extensive impact we view our research efforts as complementing those career education programs currently under development.

Since the nature of this session is apparently an outgrowth of that same emerging emphasis upon vocational development we are pleased to be a part of it. We appreciate this opportunity to describe some of our research efforts in Pennsylvania to you. This is the first time the presenters, as a group, have discussed the longitudinal study with others than those directly participating in the effort.

The three of us have been associated since 1966 at which time we were working together on a computer-assisted occupational guidance program. At the conclusion of that effort in June, 1968, and as a result of mutual benefits derived from it, we sought additional areas of mutual concern. What we agreed upon as a follow-up research effort was the program of research we will describe to you today.

Focus of the Paper

In an attempt to come up with a title for this paper we thought we'd try something entirely different, and we did. We think it was a success. The title actually provides a relatively accurate focus of our remarks. Let's then use it as a starting point.

1. Longitudinal--implying the study of selected individuals over time (for this study, over 10 years).
2. Career Development--the relatively orderly and dynamic process defining the evolution of an individual's vocationally-related characteristics and behaviors over time (for this study that portion of the process occurring between ninth grade and seven years out of high school).
3. Research--the systematic study of that process during the ten-year period identified.
4. Implementation--the application of the research results to actual program modification.
5. Cooperative Approach--the planning and conduct of the research as well as the implementation of the findings involves local school personnel and University faculty.

The first two presenters will direct their remarks primarily to points one through three. The final presenter as a responsible representative of one of the local schools involved in the research program will speak primarily to points four and five.

Nature of the Research

The Vocational Development Study (VDS) has been designed to examine selected aspects of three distinct areas of concern: (1) the impact of specific courses of study upon selected aspects of adolescent development; (2) the use of certain tests and inventories to help ninth graders decide a suitable senior high school course of study; and (3) the testing of several vocational development frameworks as applied to the prediction of relevant vocational behaviors of adolescents and young adults.

In order to judge the impact of courses of study it is planned, for instance, to assess whether vocational students as compared with students in the other programs:

1. exhibit more, less, or equally stable career paths;
2. are more, less, or equally satisfied with their work;
3. perform their jobs better, worse, or as well;
4. receive more, less, or an equal amount of yearly pay for their work;
5. are more, less, or equally mobile;
6. exhibit similar or different changes in work satisfaction between entry and seven years later;
7. demonstrate more, less, or an equal amount of improvement in job performance between entry and seven years later;
8. receive more, less, or an equal amount of pay raise over the projected six-year work period.

In the same manner the differential effects of the specific occupational courses of study within the vocational program upon the eight outcomes listed previously will be assessed. Additional outcomes will be examined, however, in comparing the effects of specific courses of study within the vocational program. These additional outcomes will be: nature of the entry level job; relatedness of the entry level job to the area of training; the length of time needed to obtain first job; and the amount of post high school education and/or training obtained.

The other two aspects of the threefold concern which motivated the investigators to initiate this study were to help youngsters in making a decision at ninth grade as to which senior high school program would be most suitable for them. The initial question to be answered was "Who are the students who enter the various programs, and what happens to them as a result of choosing that program?" An equally important question to be answered in the study is, "What help can be provided to youngsters so that they will make suitable program choices?" This latter question lies primarily in the area of guidance, the two phases of which are investigated herein--an examination of the validity and reliability of five occupationally-relevant tests and inventories for counseling use (GATB, OVI, OVIS, VDI and VPI); and an exploration of the degree to which selected career development frameworks are valid in explaining the vocational behavior of the individuals included in the sample over time.

Each of the tests and inventories utilized as part of the study's data collection phase have shown potential for use in the counseling of students. The specific question to be answered here is, "for a school system with a wide range of vocational offerings, how reliable (stable and internally consistent) and valid within each system are the instruments for use in counseling ninth through twelfth grade students?"

The Sample

The sample selected consists of the total ninth grade enrollment in three medium size Pennsylvania school districts: Altoona (A), Hazleton (H) and Williamsport (W). Initial data on the A sample was collected in the spring and summer of 1969 when that group was completing ninth grade. Additional data on the A sample was gathered in 1970 during the tenth grade year for that group and again in 1971 at eleventh grade. The size of the A sample is approximately 1200 students and the data file is approximately 90 percent complete at this time.

Data on the H and W sample was collected during the 1970-71 school year in the various junior high schools where the students were attending ninth grade. The H sample contained approximately 1200 students and the W sample approximately 900 students. The time schedule to be followed in collecting data from the H and W sample is approximately the same as that indicated for the A sample except for the two-year differences involved at all points.

Figure 11 depicts the relationship between time and the data collection for all three samples. Since data for all three samples will be similar in most cases, the procedure section of this paper will discuss only the Altoona sample which is two years ahead of the Hazleton and Williamsport samples.

Procedures

General Design

The general design for this study is longitudinal and developmental, encompassing the movement of students over time along various paths. Specifically, this means that students involved in many different courses of study will be compared in order to make judgments about effects of those courses of study. A longitudinal design is appropriate and necessary because it is the only way to take into consideration the dynamic nature of the interaction between the students and the curriculum. The significant variables in this study are many and include both student characteristics and program characteristics as well as numerous intervening environmental influences. No simple classification of independent and dependent variables is possible in a study of this nature because a dependent variable at Time₁ can be considered to be an independent variable at Time₂. A graphic representation of the overall design of the study in Altoona is presented in Figures 12 and 13. Figure 12 depicts the movement of all of the students in the Altoona sample over a ten-year period. Figure 13 is an expanded version of the movement of vocational students over the same time period. At each of these points in time information collected at previous times will be examined in order to discover possible relationships with selected student behavior at that time. Student behavior of interest in the study includes both classification data such as curriculum and course selection and dropout vs. non-dropout status as well as measures of various psychological constructs such as abilities, achievement, interests and values.

Essential Data

An effort was made to identify various measures of student behavior at points in time which would provide for the maximum usefulness in answering questions about the vocational development process and program evaluation. Table I provides a description of the data which this project staff decided was necessary along with the points in time the data was to be collected. An effort was made to conserve time and resources by eliminating overlap among instruments and to use measures or data already collected and used within the Altoona School System. In some cases, certain data was included because of a particular need specified by Altoona school personnel, and this resulted in additional information available to the school system. As a final criterion for data selection an attempt was made to gather information which would sample all aspects of a student's overt and covert behavior during the ten-year period in question.

TIME 8. GRADE

YEAR	T ₁ = 9th	T ₂ = 10th	T ₃ = 11th	T ₄ = 12th	T ₅ = +1	T ₆ = +4	T ₇
1968-69	Altoona						
1969-70		Altoona					
1970-71	Williamsport Hazleton		Altoona				
1971-72		Williamsport Hazleton		Altoona			
1972-73			Williamsport Hazleton				
1973-74				Williamsport Hazleton	Altoona		
1974-75							
1975-76					Williamsport Hazleton		
1976-77						Altoona	
1977-78							
1978-79						Williamsport Hazleton	
1979-80							
1980-81							
1981-82							Wi

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Figure 11. Altoona, Hazleton and Williamsport sample overtime

TIME 8. GRADE

T ₁ = 9th	T ₂ = 10th	T ₃ = 11th	T ₄ = 12th	T ₅ = +1	T ₆ = +4	T ₇ = +7
Altoona						
	Altoona					
Williamsport Hazleton		Altoona				
	Williamsport Hazleton		Altoona			
		Williamsport Hazleton				
			Williamsport Hazleton	Altoona		
				Williamsport Hazleton		
					Altoona	
					Williamsport Hazleton	
						Altoona
						Williamsport Hazleton

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a, Hazleton and Williamsport sample overtime

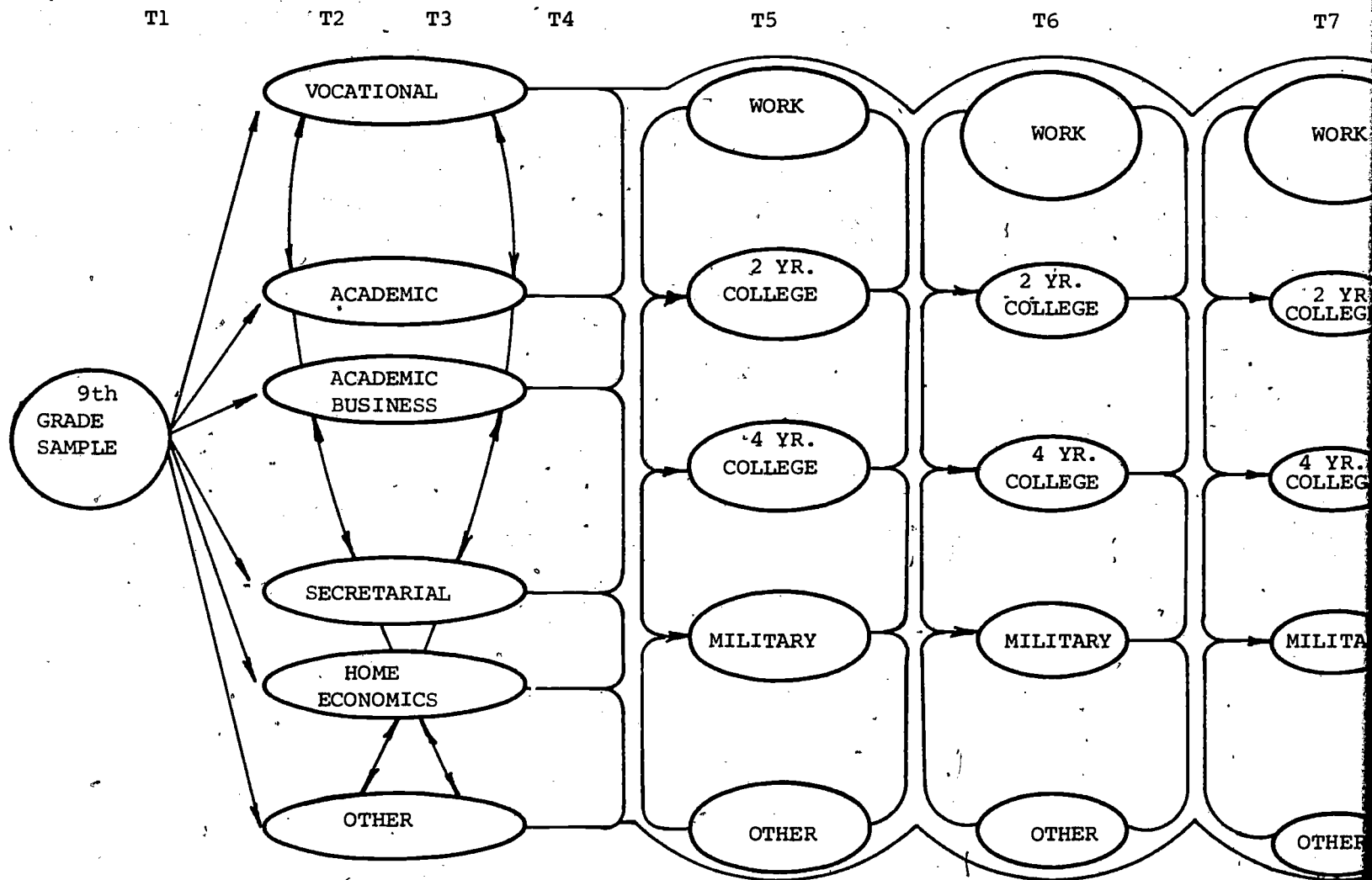


Figure 12. Altoona Sample Over Ten Years

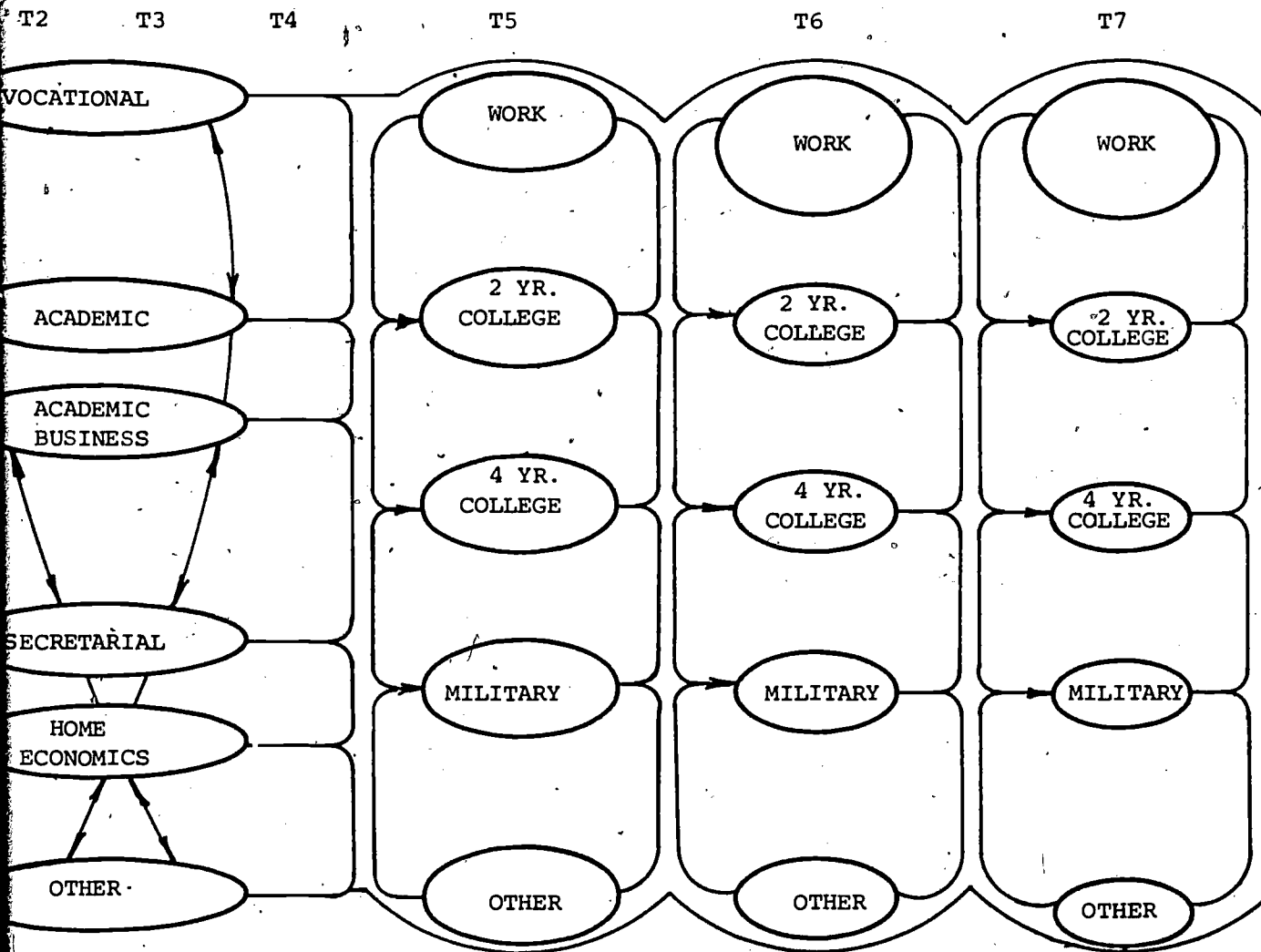
TIME 8. GRADE

T ₁ = 9th	T ₂ = 10th	T ₃ = 11th	T ₄ = 12th	T ₅ = +1	T ₆ = +4	T ₇ = +7
Altoona						
	Altoona					
Williamsport Hazleton		Altoona				
	Williamsport Hazleton		Altoona			
		Williamsport Hazleton				
			Williamsport Hazleton	Altoona		
				Williamsport Hazleton		
					Altoona	
					Williamsport Hazleton	
						Altoona
						Williamsport Hazleton

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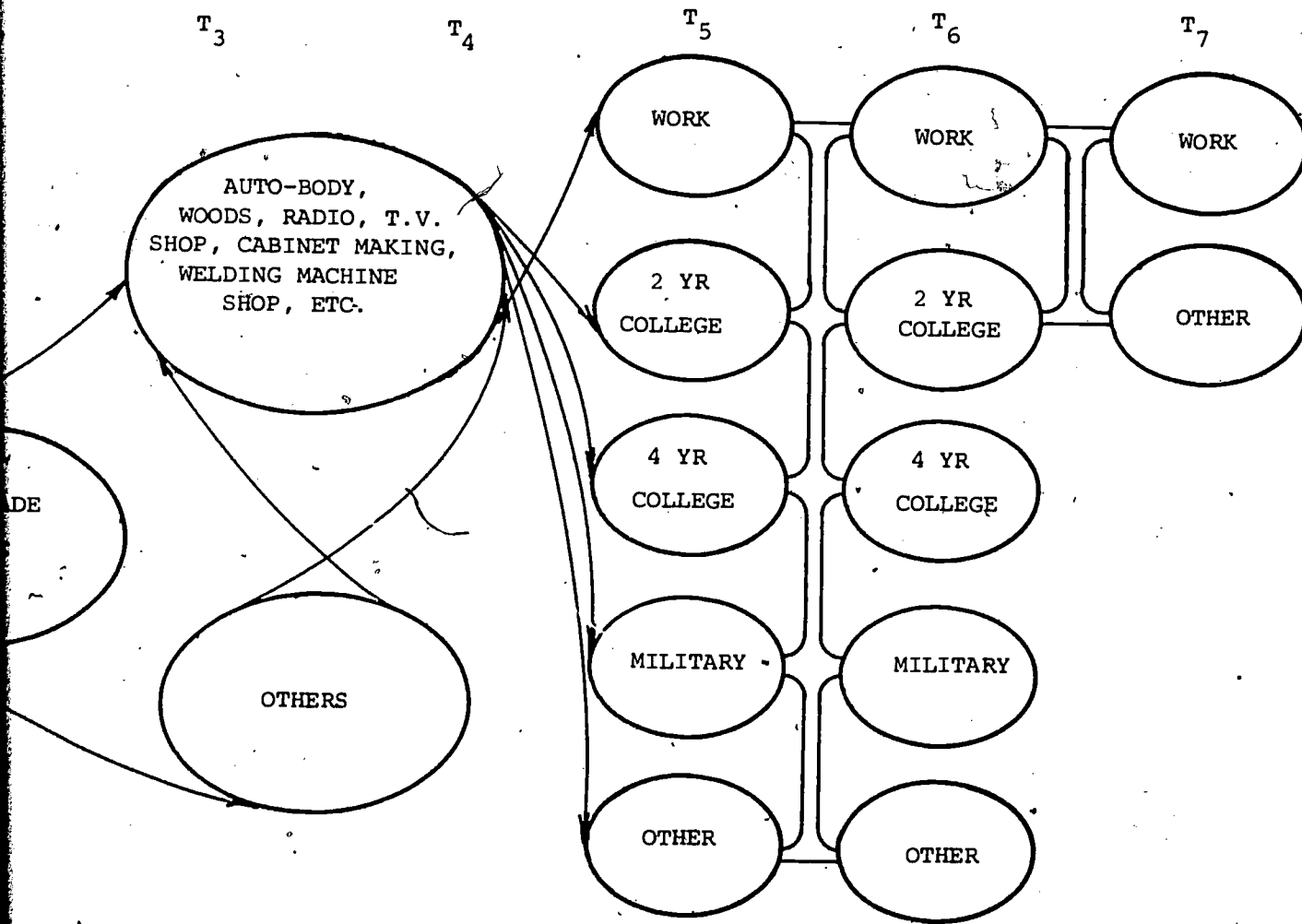
Altoona, Hazleton and Williamsport sample overtime



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Altoona Sample Over Ten Years

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13. Vocational Students Over Ten Years

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Analysis

After reviewing the literature concerning longitudinal studies in both vocational development and curriculum evaluation, it was decided that the most appropriate methodologies for use in this study are those of the multivariate type. The two multivariate statistical methodologies which will be used in conducting most of the analyses proposed in the specification of the problem are multiple regression analysis (MRA) and multiple linear discriminant function analysis (MLDFA).

The multiple regression model used here is capable of handling both quantitative and categorical variables and is of the following form:

$$Y = A_0 + A_1 x_1 + A_2 x_2 + \dots + A_k x_k + E$$

where

Y = Dependent variable

X_1, X_2, \dots, X_k = Independent variable

$A_0, A_1, A_2, \dots, A_k$ = Partial regression coefficients

E = Error term

Through the use of multiple regression analysis it is possible to partial out the effects of K-1 independent variables which result in the isolation of the unique contribution to the dependent variable made by the Kth independent variable. This unique contribution holds true only for that exact set of K variables included in the equation. The addition or subtraction of variables to this set would result in a redistribution of the explainable variance among the new set of independent variables. The meaningfulness of the partial regression coefficients then are dependent upon the theoretical meaningfulness of the variables included in the equation. With this consideration in mind the variables included in each analysis will be selected. . . .

When the criterion or dependent variable is membership in one of the other of two distinct groups (such as vocational vs. academic) the analysis can be carried out using multiple regression. When more than two groups are to be compared (such as machine shop vs. carpentry vs. printing vs. etc.) MRA is not possible and MLDFA becomes necessary and appropriate.

Table 2

A Description of the Data Essential
In Characterizing the Altoona Sample: 1966-1973

Nature of Data	Year Grade	Collected 68-69			Coll. 69-71			To be Coll.
		66-67 7	67-68 8	68-69 9	69-70 10	70-71 11	71-72 12	72-73 +1 Yr
School Grades		X	X	X	X	X	X	
Personal Traits		X	X	X				
Attendance		X	X	X				
Health Status		X	X	X				
Academic Promise Test (APT)			X					
California Test of Mental Maturity (CTMM)			X					
California Achievement Test (CAT)			X					
General Aptitude Test Battery (GATB)				X			X	
Biographical Information				X			X	
Hobbies and Interests				X			X	
Educational Plans				X	X		X	
Occupational Aspirations				X	X		X	
Occupational Values Inventory (OVI)				X	X		X	
Vocational Development Inventory (VDI)				X	X		X	
H.S. Curriculum					X	X	X	
Vocational Preference Inventory (VPI)						X		
Ohio Trade Achievement Test (OTAT)						X	X	
Ohio Vocational Interest Survey (OVIS)							X	
College Entrance Exam Board (CEEB)							X	

Table 2 (Continued)

Nature of Data	Year Grade	Collected 68-69			Coll. 69-71		To be Coll.	
		66-67	67-68	68-69	69-70	70-71	71-72	72-73
Other Achievement Tests		7	8	9	10	11	12	+1 Yr
Other Ability Tests							X	
Post H.S. Occupational Status							X	
Post H.S. Educational Status								X
School or Job Satisfaction								X
School or Job Success								X

The purpose of ML DFA is to maximize the explainable variance when more than two groups are considered. When using this technique, it is possible to extract K-1 discriminant functions although two discriminant functions are usually sufficient to account for most of the explainable variance. Using these two discriminant functions then it will be possible to plot the groups of interest in two discriminant spaces instead of the original variable space. In this way, both visually and by use of Wilks' Lambda and the Chi Square statistics, differences among groups can be analyzed. . . .

As an example of the use of ML DFA in career development research Figure 14 is included here. This figure represents the spatial relationships among four groups of successful and unsuccessful vocational and academic students in two discriminant spaces. The study was conducted using the available data on ninth grade boys from the Altoona sample with the criterion being collected at the end of tenth grade. Studies similar to this study will be conducted using Hazleton and Williamsport data at the same points in time as well as with the Altoona sample at additional points in time.

The Overall Research Strategy

Interpretation of whatever results are revealed from the individual research efforts as part of the total program will surely provide extremely valuable information to the secondary school personnel within each district sampled. It will also be of potential use to other districts throughout Pennsylvania and beyond with similar characteristics to Altoona, Hazleton, and Williamsport. The generalizability of these findings is made possible because of the three independent replications of these analyses in the three locations. Corroboration of the findings among the three settings

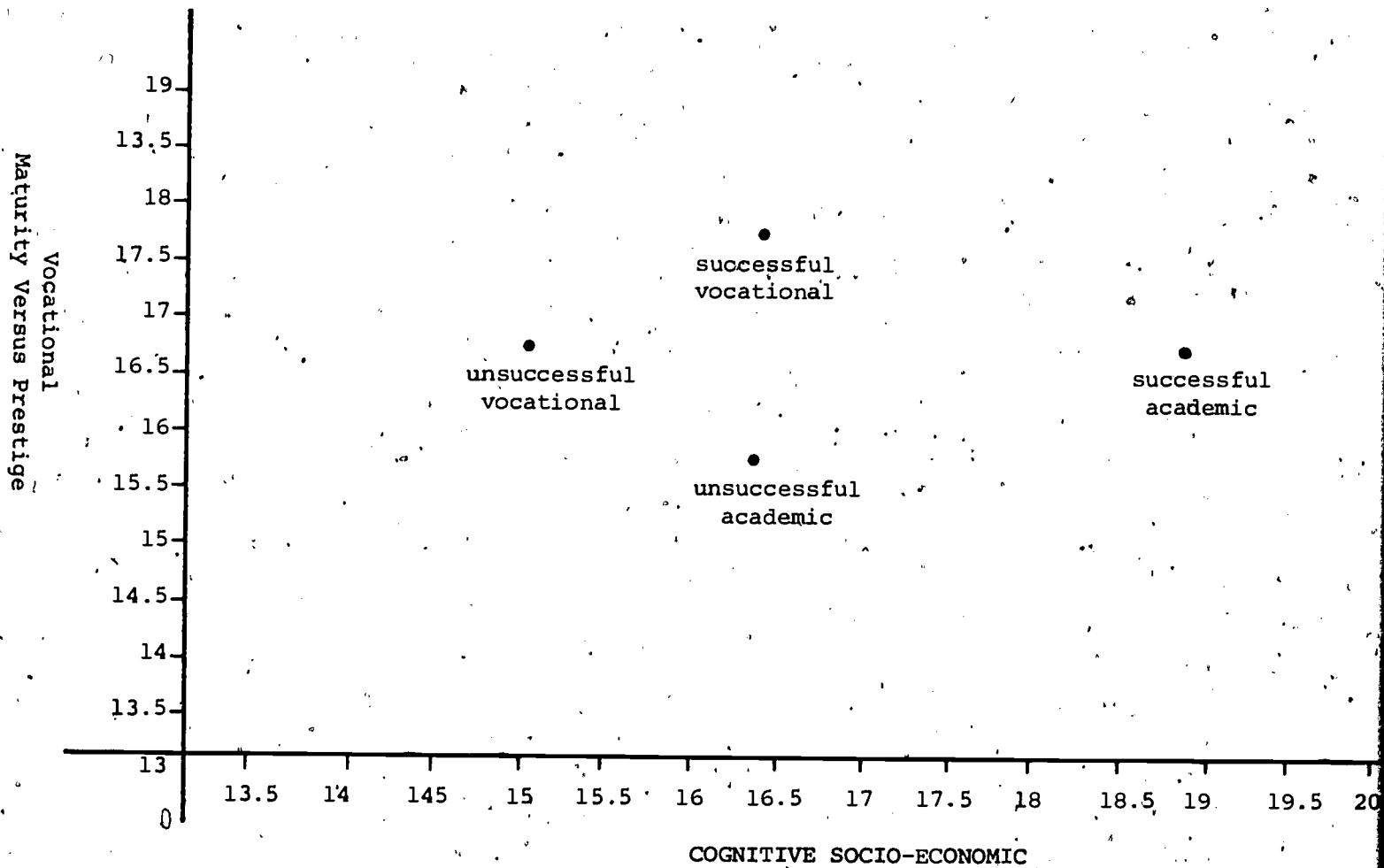


Figure 14. Successful and unsuccessful vocational and academic students in two discriminant spaces

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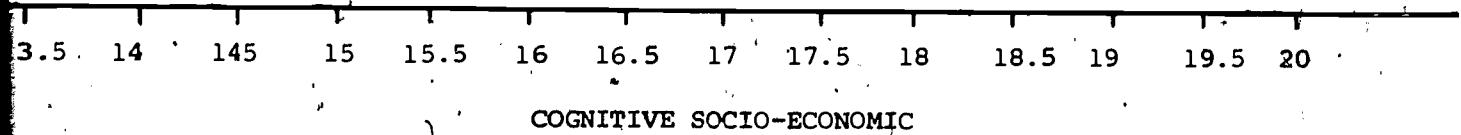
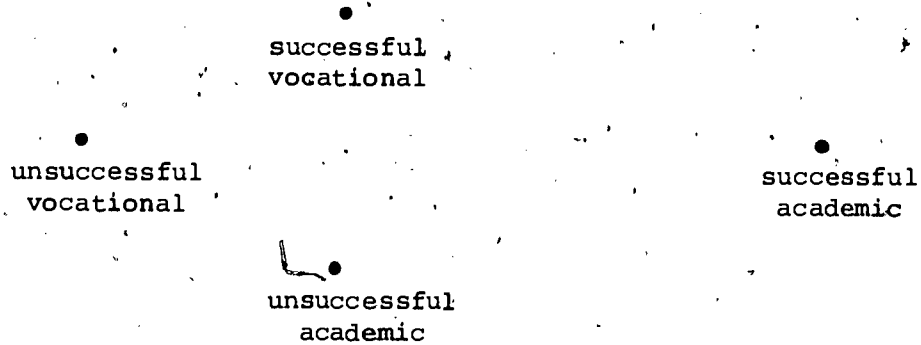


Figure 14. Successful and unsuccessful vocational and academic students in two discriminant spaces

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would be an important condition upon which generalizability will be based. Lack of agreement among the three settings would certainly argue against generalizing with regard to a particular analysis.

Specific implications for the secondary school curriculum coordinator, the vocational director, and the vocational teacher would certainly emerge even if the analyses conducted as part of this study were based merely on follow-up information. The added component introduced within this investigation which will increase the meaningfulness of the results uncovered is in its accounting for differences among the students prior to their entering their senior high school program. As most of us will acknowledge, the youngster who is identified as "most likely to succeed" in ninth grade will probably succeed in senior high school regardless of the particular course of study he chooses to enter. Is his ultimate success, then, primarily a function of the program in which he enrolled, or a function of his own potential prior to entering the program? Controlling for entry characteristics allows for the identification of the unique effect of the program upon the youngster, and is thus an extremely powerful procedure.

The value of any research effort may be measured in terms of any one or more of four criteria: (1) the degree to which its recommendations are actually implemented; (2) the importance of its contribution to our accumulation of knowledge in a field; (3) the degree to which it stimulates other related research efforts; and (4) the impact it has upon the refining of theory in a field of study. The investigation described in this paper has been designed to achieve at least a minimal level of each of these criteria. Its priorities, however, have been arranged as the list of criteria, with the highest listed first. Achieving a significant amount of the latter three, therefore, would not be as essential as attaining the first. Having achieved the first, the presenters would feel their efforts have been of some worth.

Implications of the Project: A Vocational Director's Viewpoint

The city of Altoona is the hub of transportation, business and industry for Blair County, located in Central Pennsylvania. The city has a population of approximately 70,000 with the county having a total population of 139,000. The county has a land area of over 500 sq. miles and is within a 50 mile radius of four major colleges and universities.

The Altoona Area High School consistently has had a student enrollment in excess of 3,000 for grades 10, 11, and 12; while the total educational system meets the needs of over 14,000 students from kindergarten through the 12th grade. This relatively large high school has been known for many years as a full or complete comprehensive high school and, due to the proximity of these colleges, has been the subject of considerable educational research. The professional staff of the Altoona area alone consists of over 600 employees. Individuals possessing a Doctor's degree represent nearly 2 percent of this group; of the remainder, 30 percent have Masters degrees.

Quite often in this unique situation, educational research was done for the sake of research alone, or it was conducted as a special project by selected individuals. It may be helpful to point out two significant factors regarding the Altoona schools to provide a broader context within which the project we are discussing today lies: 1) Some form of Vocational Education has existed in the Altoona system since 1890. Vocational Education has continually received favorable consideration from the community itself; and 2) The general relationship between Vocational Education and General Education has been at a much higher standard than is generally conceived throughout the state and possibly the nation.

When the opportunity for the longitudinal study was afforded the Altoona area, the general consensus of those approached was favorable. So often this school has been guilty, as many, of evaluating success based on immediate job placement or entrance into the world of work by its graduates. For a number of reasons, time and money being high on the list, lengthy follow-up to determine the longer term effects of Vocational Education was not forthcoming. Now, as a result of this study, it is agreed that many types of evaluations may be made, relationships of cause and effects identified, and Vocational Education in itself made aware of its total effect on individuals committed to these specialized programs.

This being the fourth year of the study, one cannot help but be impressed with the cooperative relationships which have evolved, and the dedication of both groups of school and university personnel involved in this research project. It is perceived that current and projected research efforts within this program of research will provide a significant contribution in assisting Vocational Education to more effectively meet the needs of the students.

Numerous benefits have been forthcoming from the Altoona Area Vocational-Technical School's involvement in this vocational research programs. Some key rewards are identified for acknowledgment and consideration at this time:

1. Use of OTAT

As part of the evaluation component built into the longitudinal study as previously discussed it was recommended in 1968-1969 that the Altoona AVTS administer the Ohio Trade and Industrial Education Achievement Tests (OTAT) to eleventh and twelfth graders within selected occupational areas. Since the OTAT provided the only standardized achievement information available for a major portion of the AVTS students it was decided to conduct the initial trial in March, 1969. The results of the initial testing period were sent to Penn State's Department of Vocational Education staff. They took the raw scores as reported by the Instructional Materials Laboratory at Ohio State, and converted them into class profiles for each shop and Laboratory area.

The instructor within each of the eight shop and laboratory areas covered that year was given a profile representing how his students as a group (juniors and seniors separately) achieved on the total test, and on each part of the test as compared with Ohio or national norms. Because the instructors were quite pleased with the feedback that was provided, the OTAT is now administered each year to all juniors and seniors in each area for which a test is available.

This is the third year the OTAT will have been used to measure students' actual performance in an occupational area as compared with a prior estimate of that performance made by the individual trade teacher in the following ten Vocational Education courses:

Machine Trades	Automotive Mechanics
Sheet Metal	Basic Electricity
Printing	Mechanical Drafting
Auto Body	Electronics
Welding	Cosmetology

These tests are specially designed instruments for evaluation and diagnosis of vocational achievement. They are based on a comprehensive course outline of the various courses. The trade tests were developed to measure skills and understanding in specific vocational areas. They are also used to identify strong and weak areas of instruction, and may indicate need for some curriculum reorganization. When effectively administered and properly evaluated, this test can provide constructive answers to such questions as:

1. Why did some individual students score low?
2. What instructional weaknesses are illustrated by the class median?
3. What observed weaknesses are substantiated by the test scores?
4. Is the course outline too extensive, or too limited?
5. How effective are the current related instructional materials?

2. Use of GATB

The General Aptitude Test Battery (GATB) has proved to be a potentially invaluable tool for the guidance counselor as well as for the student; for the results obtained from this test enable the counselor to get a comprehensive picture of the student's abilities to assist him in aiding the student toward a proper choice of occupational-educational program. Evidence has already been uncovered which has prompted the counseling staff of the Altoona schools to incorporate the General Aptitude Test Battery (GATB) as an integral part of our testing program. A by-product of this has been total involvement of the guidance staff in interpreting and effectively utilizing the results of these national test norms. Hopefully,

information will be uncovered within the next two years which will enable us to develop ability profiles of successful workers in selected occupations to be used in counseling students regarding choice of vocational programs.

3. General Benefits

As a result of this research project, the Altoona Area Vocational-Technical School has become more aware of the need and importance of continuous evaluation programs in such areas as: individual student progress, classroom progress relative to national norms, relevancy of individual courses, and self-evaluation of teachers. Furthermore, the following outcomes have emerged:

- A. Instructors have developed an awareness of the importance of quality education, thus motivating them to evaluate their own weaknesses and shortcomings.
- B. Students have been made aware of actual goals or levels of achievement they should strive to attain for competency in the field of their endeavor.
- C. Administrative or supervisory personnel and individual instructors have discovered that in order to make evaluation programs more meaningful and productive it is important that there exist a high degree of rapport between them.

Many other assets, like teacher cooperation and awareness, student interest, and, in general, esprit de corps could be attributed to the participation in this unique research project.

4. Future Benefits

Although there are many benefits which are already being realized from the project, most of the benefits still lie in the future. With the students composing the sample now in the middle of their twelfth grade year it will soon be possible to look at many relationships over a several year period. We are looking forward to examining the relationships between the characteristics of this group as junior high school students and several important outcomes of their high school experience. For instance, can we predict choice of curriculum, success within shop areas, drop-out proneness and success and satisfaction on the job. What relationships exist between each of these outcomes and the GATB aptitudes, students' ninth grade occupational values, junior high school grades, ninth grade occupational and educational aspirations and other background information. As these students are out of high school for a longer period of time we will be able to identify various additional outcomes which may not be apparent in a one year follow-up such as degree of job mobility and job stability.

As a school system which is interested in examining its successes as well as its failures, we are looking forward to the years ahead so that we can be accountable for our programs; more sensitive to students' needs, and make effective changes when it appears necessary to do so (59, pp. 1-22).

Professor Impellitteri was a co-author of Review and Synthesis of Research on Individualizing Instruction in Vocational and Technical Education which was published by the ERIC Clearinghouse on Vocational and Technical Education. The introduction to this document describes the scope of this effort:

This particular review and synthesis document may be of more interest to some readers than to others. Not everyone will agree with the approach which has drawn material from many areas which are not specifically within the field of vocational and technical education. This particular characteristic, however, may make the publication even more meaningful to a larger audience. By identifying reports which deal with individualized instruction from a broad conceptual base, it will help vocational educators to examine their research activities in light of the work conducted in other settings.

In the reporting of individualized instruction research and development activities priority was placed upon investigations which dealt with instructional problems within the general parameters of vocational and technical education. Other studies were discussed outside those parameters when it was perceived to be necessary for a more adequate coverage of the topic under discussion. Individualized instruction efforts in areas highly related to vocational and technical education (military training, industrial training and other areas of education) were thus included. No attempt was made, however, to prepare a thorough review of research in those related areas.

The materials used in this Review and Synthesis were gathered from several places. A number of useful reports were identified through the computer search conducted by the Educational Resources Information Center (ERIC) Clearinghouse at Ohio State University. As a result of contacting state Research Coordination Unit directors, several other meaningful items were obtained. Dissertation Abstracts served as a prime source for relevant doctoral theses. Contacts with key personnel in military training research resulted in the inclusion of many meaningful research efforts from this sector.

Appreciation is expressed to all those persons who contributed materials for inclusion in this review. Space limitations do not allow each person to be listed by name. Specific thanks must be extended to Richard and Cheryl Gumaelius. Their assistance in locating materials for this document is appreciatively acknowledged (60, p. v).

The above is the last publication of Dr. Impellitteri's for the year 1971.

Chapter VIII

1972

During the remaining four months of Professor Impellitteri's life (January through May 7, 1972) he prepared six papers. The first one was in the form of testimony presented at the career education hearings in Pittsburgh during February. Dr. Impellitteri was one of the vocational educators to point to the relationship between career education and vocational education. His testimony is as follows:

Mr. Chairman, members of the committee, colleagues, and other interested Pennsylvanians, I am Joseph T. Impellitteri, Professor and Chairman, Graduate Studies and Research, Department of Vocational Education, The Pennsylvania State University.

I am very pleased to have the opportunity to testify before this committee, particularly in the City of Pittsburgh where, in my mind, many of the first applications of a career education concept took place. With the influences of Dr. Marland in the past, and Drs. Kishkunas and Ohlsen since Dr. Marland's leaving Pittsburgh, this City has had a unique impact on the evolution of career education.

From my title and the position I fill, it is obvious that I represent vocational education. What view of vocational education, however, do I represent? Five years ago I was certain that vocational education was a very broad concept. It was the vocational component of education. I have changed my view in these five years since vocational education as viewed in this way, in fact, could be interpreted to include all of education--that is, because reading skills are essential to the job of a stenographer, is the teaching of reading a vocational education activity? As an activity it obviously is not. It may be, however, that for a tenth grade girl whose career objective includes entering the stenographic field that she views the upgrading of her reading skills as a vocational activity. The intent of the student is certainly as important as the nature of the activity in determining to what category it belongs. Where's the resolution to this apparent conflict? To me, the resolution is in the unnecessary categorizing of such activities. The resolution lies in the structuring or the de-structuring of all school programs as oriented to the students--not to the strengths of the teachers and other school personnel who work in the schools. I think that is exactly what my concept of career education is founded upon--an orientation to people and their needs.

I wish to speak to four points this noon: (1) what I view as the nature and unique strengths of the career education concept; (2) the foundations of the career education concept; (3) what I view as necessary efforts to develop an effective career education system in Pennsylvania; and (4) my views on legislative implications of these thoughts.

The first point I'd like to make is to clarify my position on career education. I've asked myself many times whether I'm favorable toward the career education concept. The answer is still not clear to me because the concept itself currently carries as many meanings as there are those to interpret it. My own particular interpretation of career education is that it's a system of education that includes a valid and significant career-oriented component from kindergarten throughout the educational and training levels. It is based on a view of the individual which holds that: (1) the development of an individual's self-concept is vital to his vocational development, and vice-versa; (2) one's vocational development begins at a very early age, and continues as a dynamic process throughout life; (3) there are certain vocationally related tasks which must be accomplished by individuals at predetermined stages within that process; (4) because of the complexity of the vocational decisions made within that lifelong process, structured learning experiences are necessary to help individuals develop those attitudes, understandings, and competencies essential to their formulation; and (5) the individual is free to choose, and must be provided with alternatives from which to choose. A valid concept of career education, in my view, provides educational opportunities that are structured within the context of individual needs growing out of the aforementioned framework. As such, career education has the potential to break down some very real divisions which exist in education today through the re-structuring of curriculums. Given that unifying substance of career, and the process of career development as the central theme of education, integration of specialty groups in education would be essential.

The second point I wish to make in this testimony is of extreme importance to me personally, and to one of the major focuses of my professional activities. We wouldn't be together today to discuss the potential legislative implications of career education--Dr. Marland would never have introduced the term nor the concept--no discussion would be necessitated to delve into its advantages and disadvantages--if it weren't for the pioneering efforts of a university researcher and theorist named Donald E. Super. The concept of "career" as we're using it today to denote a lifelong process of vocationally related experiences was introduced initially fewer than 25 years ago. During the period since the late forties a substantial amount of evidence has been uncovered to suggest that there are educational experiences which may enhance one's career development. Although career education has been posed as a potential solution to a myriad of educational problems, its major strength does not lie in its replacing an educational system that has many shortcomings. Rather, the evidence suggests that whatever the outcomes of the traditional educational program, career

education will result in positive outcomes. Viewed in any other way, hundreds of alternative replacements for our current educational system would have as good a chance of overcoming the latter's shortcomings. Research has demonstrated that a move to career education would be an improvement. The career education concept thus represents a significant coming together of the theoretical and practical aspects of education in a unique way. Continued support for research and theoretical work is vital for the continued refinement of the career education concept. The significant contributions already made in this area must be acknowledged, and lent additional opportunity for providing direction.

If career education is a unified educational approach a major question may be posed regarding the specific components to be tied together. In my view, in order for career education to be successful in Pennsylvania it must be viewed as a total effort. Tying together the efforts of colleges, universities, and community colleges, for instance, cannot be accomplished at the local educational level. Educational planning at the Commonwealth level must be geared toward that end--educational leadership at that level must provide models which would facilitate the achievement of that end. Another example of unification would be in establishing cooperative plans and relationships among the State Departments of Education, Labor and Industry, Commerce, and Welfare. At the community level there lies the necessity of establishing a cooperative educational system with the schools providing the leadership role. Aspects of the community to be involved in the planning and implementation of such a system must involve: parents; business and industry; organized labor; formal or informal community groups; and the several vested interest groups within the schools (elementary teachers, secondary basic subject teachers, practical arts teachers, vocational teachers, administrators at all levels, and guidance counselors). The first step in the unification process, as I see it, would be to provide a suitable orientation to the general notions of career education for each of the component groups. This step would be absolutely essential in order for the eventual formulation of the curriculum components.

The final point I wish to make is to provide this committee with my perception of the legislative implications of career education. Given the totality of the effort, and its uniqueness as a concept, two vital ingredients are necessary to develop successful career education programs in Pennsylvania--leadership and incentives. This committee has already taken upon itself an extremely important leadership role by arranging this series of public hearings. Additional leadership at the state level is needed. Regarding incentives, it is difficult to imagine a more facilitating influence than a wisely planned program of legislation. Although local schools are responsible for developing programs in keeping with their own community needs, a thoughtful legislative effort could provide incentives sufficient to influence change (61, p. 1-5).

The following month found Professor Impellitteri presenting a paper entitled "Longitudinal Career Development Research and Implementation: A Cooperative Approach" at the annual convention of the Pennsylvania School Counselor's Association in Harrisburg. In this paper he describes what was then a unique effort in tying in longitudinal studies with career development and research, and the implementation of these activities through cooperative efforts between the University and the local schools. This paper is quoted in its entirety in another section of this manuscript.

Also in March Professor Impellitteri presented a paper entitled, "Occupational Values in Adolescent Development" at the annual meeting of the American Personnel and Guidance Association in Chicago. This presentation described some of his efforts relative to the longitudinal study of vocational development (VDS), which was then in its third year. Other material related to this effort is presented in earlier sections of this work and the information presented in the paper considered here is an extension of that presented earlier. Following is the complete content of this paper:

To avoid duplicating background material already developed by the author, and available in a recent monograph⁽²⁾ several assumptions are made at the outset of this presentation.

- (1) "Work values" is a significant construct to explore in an attempt to explain vocational behavior.
- (2) The degree of stability of an adolescent's values hierarchy is relatively unknown since it can only be measured in a longitudinal framework. Longitudinal data is scarce, and that which is available is inconsistent.

(2) Impellitteri, J. T. and J. T. Kapes. The Measurement of Occupational Values. University Park: The Pennsylvania State University, Department of Vocational Education, September, 1971. VDS Monograph Number 3.

- (3) Important sex differences in work values among adolescents have been identified, thus providing evidence that research on work values should account for the sex variable in some way.
- (4) Since "valuing" is a process of choosing, it would appear that the educational experience chosen by the adolescent would have a significant effect upon his values hierarchy.
- (5) The Occupational Values Inventory (OVI) as utilized in this study appears to be a valid and reliable measure of the work values construct. It is an ipsative instrument composed of 35 forced-choice triads, and measures seven values dimensions.
 - (a) Interest and Satisfaction--One likes the work; enjoys it; is happy at it; fulfills oneself by doing it.
 - (b) Advancement--One perceives the opportunity to get ahead in the work; sees a good future in it; it provides an opportunity to improve oneself.
 - (c) Salary--One perceives the financial return resulting from the work; can make a good living at it; sees it as an opportunity for a satisfactory income.
 - (d) Prestige--One is impressed by the respectability attached to the work; can earn recognition from it; desires the feeling of importance that goes with it.
 - (e) Personal Goal--One sees the work as fitting into his way of life; is what one always wanted to do; has been shooting for it; it's the ideal.
 - (f) Preparation and Ability--One can succeed in the work; is good at it; it's where one's talents lie; is suited to it.
 - (g) Security--One can obtain employment in this work; perceives that workers are needed in it; there will always be openings in it.

THE STUDY

The investigation reported to you today is one of several individual efforts being conducted as part of a broad-scale program of research in the Department of Vocational Education at Penn State. The Longitudinal Study of Vocational Development (VDS) was initiated in 1968-69 and is planned to continue for an additional eight years. Although work values is an integral part of the larger effort, it samples only a small portion of the behavior domain of concern in the total picture.

The investigation was designed to answer the following questions:

- (1) What changes in the seven values dimensions measured by the OVI occurred in a selected group of adolescents between ninth grade and tenth grade?
- (2) Did the different curriculums in which the boys were enrolled have a differential effect upon their values changes?
- (3) Did the different curriculums in which the girls were enrolled have a differential effect upon their values changes?

The data reported in this paper were based on the initial testing of 1,079 ninth grade boys and girls in Altoona, Pennsylvania, and a retesting of the same group about a year later as tenth graders. The first testing occurred in January to March of 1969, and the second testing was in about the same months of 1970.

Mean Changes Between Ninth and Tenth Grades

Glancing at Table 1 it is apparent that at both ninth grade and at tenth grade there exist important differences between the values profile of the girls as compared to that of the boys. On a 30-point scale (the QVI ranges from 0 to 30 for each dimension) the girls' mean for the "Interest and Satisfaction" and "Personal Goal" dimensions was at least two points higher than the boys'. The boys tended to value "Salary" and "Advancement" higher than the girls. Over the course of the year, however, an interesting phenomenon occurs.

Looking at the "Total" column (girls and boys combined) of Table 1 we find that over the year the group significantly increased (at the .01 level) their "Interest and Satisfaction" score, their "Salary" score, and their "Preparation and Ability" score. They significantly decreased their "Prestige" and "Security" scores. On the same table we also find that both the girls' means and the boys' means changed on the same scales and in the same directions, without exception. The evidence appears to indicate that though there may exist point-in-time differences in values between the sexes, their development over time appears to be similar. At the conclusion of this school year the twelfth grade data we are now collecting for the same group will be examined to test this tentative conclusion.

Impact of Curriculum on Values Changes

Two separate analyses, one for the girls and one for the boys, were conducted to uncover whether the curriculum in which these youngsters were enrolled had any effect upon their work values. An analysis of covariance procedure was utilized, with the ninth grade scores attained prior to entering the curriculum as the covariate, and the values scores at the end of tenth grade as the criterion. The results are summarized in Table 2.

The girls were enrolled in one of four senior high school programs: academic, stenographic, academic business, or home economics. Three of the seven values dimensions at the end of the tenth grade were found to vary significantly among the four curriculum groups-- (1) the academic business girls' interest and satisfaction mean was significantly lower than the girls' means from the three other areas; (2) the home economics girls valued salary less than the other girls; and (3) the stenographic girls valued security less than the academic girls.

The boys in Altoona were enrolled in either the academic or vocational program. Four of the seven values dimensions were found to significantly differ between the groups--the academic boys valuing "Interest and Satisfaction" and "Personal Goal" higher, and the vocational boys valuing "Advancement" and "Security" higher.

Program in which enrolled affected neither the "Prestige" dimension nor the "Preparation and Ability" dimension for the girls or for the boys. "Interest and Satisfaction" and "Security" were both influenced significantly by program experience for the girls and boys.

SUMMARY

1. Although the work values profiles for ninth and tenth grade girls differs from that of boys, the changes in the profile between ninth and tenth grade is the same for girls as for boys.
2. Even though changes between ninth and tenth grades work values profiles are not related to sex, such changes have been shown to be related to program in which a student is enrolled.
 - a. For boys, the academic program results in students placing higher value on the intrinsic dimensions ("Interest and Satisfaction" and "Personal Goal") than the vocational program. The vocational program results in students placing higher value on selected extrinsic dimensions ("Advancement" and "Security") than the academic program.
 - b. For girls no such clear pattern emerged. In fact, the stenographic program resulted in students placing highest value (than the other three programs) on one extrinsic dimension (salary) and lowest value on another extrinsic dimension (security). For the present the author chooses not to provide an interpretation of the girls' results (63 pp. 1-6).

Table 3

Tenth Grade Adjusted* Means of the Values Dimensions for the Curriculum Groups for Which Significant Differences were Identified, Boys and Girls Analyzed Separately

Values	Girls (N=402)				Boys (N=406)	
	Acad (N=181)	Steno (N=89)	Acad Bus (N=71)	Home Econ (N=61)	Voc (N=240)	Acad (N=166)
**Interest and Satisfaction	21.2	21.2	19.8	21.7	18.7	20.3
Advancement	----	----	----	----	14.4	13.2
**Salary	11.6	12.5	11.8	10.2	----	----
**Prestige	----	----	----	----	----	----
Personal Goal	----	----	----	----	17.4	18.9
**Preparation and Ability	----	----	----	----	----	----
**Security	11.0	9.2	10.4	10.2	10.7	9.5

*Means adjusted on the basis of a covariance analysis with ninth grade score as covariate and tenth grade score as criterion.

**Those dimensions which demonstrated significant changes from ninth to tenth grades.

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Table 3

Tenth Grade Adjusted* Means of the Values Dimensions for the Curriculum Groups for Which Significant Differences were Identified, Boys and Girls Analyzed Separately.

Values	Girls (N=402)				Boys (N=406)	
	Acad (N=181)	Steno (N=89)	Acad Bus (N=71)	Home Econ (N=61)	Voc (N=240)	Acad (N=166)
**Interest and Satisfaction	21.2	21.2	19.8	21.7	18.7	20.3
Advancement	----	----	----	----	14.4	13.2
**Salary	11.6	12.5	11.8	10.2	----	----
**Prestige	----	----	----	----	----	----
Personal Goal	----	----	----	----	17.4	18.9
**Preparation and Ability	----	----	----	----	----	----
**Security	11.0	9.2	10.4	10.2	10.7	9.5

*Means adjusted on the basis of a covariance analysis with ninth grade score as covariate and tenth grade score as criterion.

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Table 3

Tenth Grade Adjusted* Means of the Values Dimensions for the Curriculum Groups for Which Significant Differences were Identified, Boys and Girls Analyzed Separately

Values	Girls (N=402)				Boys (N=406)	
	Acad (N=181)	Steno (N=89)	Acad Bus (N=71)	Home Econ (N=61)	Voc (N=240)	Acad (N=166)
Interest and Satisfaction	21.2	21.2	19.8	21.7	18.7	20.3
Advancement	----	----	----	----	14.4	13.2
Primary	11.6	12.5	11.8	10.2	----	----
Self Esteem	----	----	----	----	----	----
Personal Goal	----	----	----	----	17.4	18.9
Preparation and Ability	----	----	----	----	----	----
Security	11.0	9.2	10.4	10.2	10.7	9.5

*Means adjusted on the basis of a covariance analysis with ninth grade score as covariate and tenth grade score as criterion.

Values are means for these dimensions which demonstrated significant changes from ninth to tenth grades.

In late winter Professor Impellitteri submitted a proposal entitled "A Longitudinal Study of Vocational Development and Program Evaluation: Implications for Curriculum Planning and Vocational Guidance (Phase 2)." The purpose of this proposal was to continue the earlier funded study. He summarized this project in the following manner:

As a proposed continuation of Project No. 19-1013 this study encompasses the fifth year of a longitudinal investigation of over 3,000 boys and girls enrolled in Altoona, Hazleton, and Williamsport senior high school programs. The primary purpose of this research is to uncover the impact of vocational education programs upon the development of youth, as compared with the impact of academic programs and other program alternatives. The major research focus proposed for the 1972-73 effort would be to uncover the relationships for the Altoona sample among input characteristics (measured at ninth grade), program effects (nature of the senior high school program--vocational, academic, stenographic, home economics), and output characteristics (measured at the conclusion of senior high school--achievement, satisfaction, level of vocational maturity, stability of career goals, etc.).

The effectiveness of any research effort in an applied area such as vocational education should primarily be measured by in terms of its impact upon schools in improving their efforts to meet the needs of youth. Already having attained a significant level of impact upon the guidance and vocational education programs in Altoona, it is anticipated that the 1972-73 VDS activities would further extend that impact. The strategy designed to accomplish these more challenging objectives involves constant interpretation of needs, communication, and interaction with the various groups of "targeted" school personnel. Although extremely difficult and time consuming, this area of activity is of primary importance.

The general design of the VDS study is longitudinal and replicative. The development of senior high school youth over time as observed in one setting (Altoona) is compared with those same observations in Hazleton, and again with Williamsport youth. Findings relative to the impact of vocational programs upon the development of youth corroborated in the three locations would be generalizable throughout over 80 percent of the school population in Pennsylvania (64, p. 1).

This project was later funded and was implemented after his death. The VDS longitudinal effort has since become integrated within the continuing efforts of the Department of Vocational Education.

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At the time of his death Professor Impellitteri was also involved in a research project entitled the "Differential Effects of Selected Programs on the Performance, Degree of Satisfaction, and Retention of Community College Women." This project, funded by the United States Office of Education began in September, 1971. Its purpose was:

. . . [to] compare community college women students at three points during a two-year period of time:

- a. when they enter;
- b. end of the freshmen year;
- c. end of the second year.

This proposal deals with phase one, which will be concerned with the first two periods (when they enter and the end of the freshmen year). The three groups to be studied and compared are those in the following types of programs:

1. human services related;
2. business-commercial related;
3. academic.

They will be selected by stratified random sampling. The respondents will be examined in terms of their social, occupational, academic, and personal self-concepts at the point of entry into the programs. Additional demographic and academic information will be obtained from the colleges. A total of about 500 female students will be included in this proposed study. An assessment of their view of themselves and how it has changed over the one-year period will be made. The degree of realism associated with their self-concepts, and how they have changed, will also be examined. Their achievement in and satisfaction with their programs at the end of the first year will also be assessed. Utilizing performance, degree of satisfaction and change in self-concept are controlled. The same independent variables will be utilized in predicting dropout/retention.

These results will provide more empirically derived information that could contribute to increased knowledge on how women students develop socially, occupationally, academically and personally as they proceed through a one-year experience in a community college. Furthermore, it is believed that much of this information will contribute toward improving the counseling of entering community college females in terms of appropriate programs and college experiences.

The original social, occupational, academic, and personal aspects of their self-concepts will be obtained by interviews. Other data on the student's backgrounds will be obtained from college records. Examination of the students at the end of the freshmen year (time two) will be primarily performed by questionnaire. Ten percent of them will be re-interviewed, however, as a validity check.

After preparation of the final report of phase one, this study will then continue into phase two, which will encompass the second year of college experiences. At the end of the second year, comparisons similar to those in phase one will again be made to assess the overall development of these selected women during the two-year community college experience (65, pp. 1-3).

Perhaps the last major contribution Dr. Impellitteri made to vocational education was the preparation of a special issue of the Journal of Industrial Teacher Education (Spring, 1972, Volume 9, Number 3) relating to the subject of career development. During this time Professor Impellitteri was completing a term as associate editor of that Journal and would have become the editor in July of 1972. Reasons for selecting Dr. Impellitteri for editing this special issue, however, were based primarily on his recognized expertise in the area of career development. In his introduction to this special issue, he said:

Since Commissioner Marland introduced the term "career education" in January, 1971 a substantial amount of effort has been mounted toward specifying its components and parameters. Offered as a potential solution to many problems partially caused by our current educational programs, the career education concept is primarily viewed as a deterrent. A more positive approach, however, is that in its orientation to people, career education is to be attuned to the diversity of career-related needs of youth and adults. Within this framework it thus has the potential to provide the specifications for developing educational systems based on an acceptable view of the people it serves.

Career development theory and research, though limited to less than a quarter century of intensive exploration, has provided many of the elements essential to such specification. In this special feature several of those elements are examined (66, p. 4).

Professor Impellitteri had a number of projects relating to research and writing in various stages of development at the time of his death. These aborted efforts also included some emerging long-term plans for the Department of Vocational Education. While those who worked closely with him knew of some of these intentions, it is likely that several important ideas and schemas went with him to the grave. His unique capacity to function at the upper levels of professional excellence without posing a threat to those around him was one of his great strengths. Professor Impellitteri made his mark upon the profession of vocational education and his presence, even though it was for so short a time, did make a positive difference.

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