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ESTABLISHMENT OF A STATE OCCUPATIONAL RESEARCH AND
DEVELOPMENT COORDINATING UNIT.

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AN OCCUPATIONAL RESEARCH AND DEVELOPMENT COORDINATION
UNIT WAS ESTABLISHED TO STIMULATE VOCATIONAL RESEARCH, TO
INITIATE AND COORDINATE INSTITUTIONAL RESEARCH, TO PROVIDE
TECHNICAL ASSISTANCE IN PROPOSAL DESIGN, TO WRITE PROPOSALS,
AND TO ACT AS LIAISON BETWEEN FEDERAL AND OTHER FUNDING
AGENCIES. THE IMPLEMENTATION OF THIS PROGRAM OF ACTIVITIES
RESULTED IN THE PROCESSING OF 200 RESEARCH SUGGESTIONS. THE
UNIT'S STAFF ASSISTED WITH THE WRITING OF 19 VOCATIONAL
RESEARCH PROPOSALS, 12 OF WHICH WERE APPROVED AND FUNDED.
ALTHOUGH PROBLEMS WERE YET TO BE SOLVED IN THE DEVELOPMENT OF
AN ONGOING PROGRAM OF RESEARCH IN VOCATIONAL EDUCATION, THESE
PROBLEMS APPEARED TO BE RESOLVABLE DURING THE REMAINING
PERIOD OF FEDERAL SUPPORT. (GD)

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FINAL REPORT
Project No. ERD-327-65 5-0136
Contract No. OE 5-85-132

NDA

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U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

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December 1966

**U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE**

**Office of Education
Bureau of Research**

**ESTABLISHMENT OF A STATE OCCUPATIONAL RESEARCH
AND DEVELOPMENT COORDINATING UNIT**

**Project No. ERD-327-65
Contract No. OE 5-85-132**

Dr. Arthur M. Lee

December 1966

The research reported herein was performed pursuant to a contract with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

Northern Arizona University

Flagstaff, Arizona

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INTRODUCTION

The Arizona Occupational Research and Development Coordinating Unit is one of 24 established in 1965 for the purpose of "stimulating and encouraging occupational education research and development activities in state departments, local school districts, colleges, and universities, and non-profit organizations, [and] coordinating occupational research activities." (1) The objectives of this Unit, its efforts to achieve those objectives, and the results obtained are described in the following report. The conclusions, implications, and recommendations presented here are made with particular reference to the State of Arizona and to the circumstances prevailing both here and in the nation at this time. The specific objectives of the Arizona Unit were:

To plan, implement and coordinate occupational research in the educational institutions and departments of the State of Arizona, to locate research personnel and assist them in developing occupational research projects, to train students and vocational education personnel in research methods, and to perform other functions of research development, evaluation, and coordination that contribute to the progress of vocational education. (2)

In Arizona 83% of the working force are employed in occupations requiring vocational or technical education, yet only 20% of Arizona high school students are enrolled in courses developing basic occupational skills and knowledge. Scientific and technical progress is forcing changes in the patterns of vocational education, and these changes will increase. Educators must anticipate and prepare for new needs of the future; must develop new curricula; must search for new and better ways to train more students for the world of work.

In 1962 the Governor of Arizona appointed 28 outstanding civic leaders to a State-wide Committee on Technical-Vocational Education. The Committee was asked to make an inventory of existing technical and vocational work in Arizona to determine the needs of youth in acquiring marketable skills and the needs of our rapidly changing business and industrial economy for properly trained personnel. Guidelines were requested for the future development of technical and vocational education which could be presented to the Legislature. The State Department of Vocational Education assisted in this comprehensive study, and a full year was spent gathering the information and preparing a program of action. This became the basis for House Bill 139 passed by the Legislature in 1964, and from this Act and the Committee's recommendations have come the main thrust of vocational-technical education in Arizona since that time.

Two converging forces were setting the stage for vocational progress in Arizona in 1963. The Federal Vocational Education Act was passed by Congress in that year, and this provided greatly needed additional resources for expanding educational programs. Also provided in this act were substantially increased funds for vocational-technical research. The role of research in training youth for the world of work has long been recognized but often neglected. Previous Federal legislation in vocational education had stressed the importance of research but had not provided adequately for its support. In the Consultants' Report, "Education for a Changing World of Work," which became the basis of the Act of 1963, an urgent need was expressed for "an overall comprehensive research program in vocational education [which] would entail large studies and small ones [covering] all the fields of vocational education." (4) Congress responded by setting aside 10% of the appropriations under the Act to be spent on research. Some of the states had already made similar provisions. Arizona had not.

Arizona was greatly in need of research of many kinds from fact finding studies and program evaluation to basic investigation into such areas as motivation, methodology, and career selection. When the U. S. Office of Education offered to help establish research coordinating units in each of the states, discussions were initiated in Arizona with several of the former members of the Governor's Committee on Technical-Vocational Education and with other educators and business leaders. Northern Arizona University, working with the State Director of Vocational Education, proposed to establish a unit in Phoenix, the economic and population center of the State. An Advisory Committee was selected from the top administrative levels of vocational education and employment. A professional staff was assembled representing major research experience in social studies and public administration, industrial education, manpower and economics.

METHOD

This Unit's activities have followed the basic outline described in the proposal under which it was established, with special emphasis in five areas: (1) building a climate of vocational research in Arizona; (2) institutional cooperation in vocational research; (3) technical assistance in proposal design; (4) writing proposals for submission to funding agencies; and (5) liaison with Federal and other funding agencies. The implementation of this program of activities has been a team enterprise on the part of the professional staff. Two days of initial planning preceded the first efforts in July and August, 1965. From that time on, regular staff meetings, usually once a week, were held to review the Unit's activities, set production schedules, and agree upon

individual assignments. Policy decisions implementing the procedures contained in the proposal were determined in regular staff meetings, or in frequent information conferences and confirmed in regular staff meetings. The professional capabilities of the full staff were focused on planning the Unit's activities. Specific goals, target dates, deadlines, and operational details were continuously discussed, reviewed, and agreed upon. Individual assignments were carried out under the responsibility of individual staff members in consultation with the rest of the staff.

An inventory of vocational research and research personnel in Arizona was made during the first three months. A State-wide conference of educators, industry representatives, labor leaders, and public officials was held to identify vocational research needs. Information about the Unit and its services was disseminated through personal conferences with administrators and faculty at each of the three State universities, the junior colleges, major high schools, major industries, and public agencies; and through addresses to groups, newspaper articles, a radio panel program, and a periodic newsletter. Technical assistance was provided to educators and researchers in developing research proposals, and research was initiated by the staff in several areas of vocational education where recognized needs existed. The work of the Unit has been reviewed at six month intervals by the Advisory Committee. Members of the Committee were furnished with monthly and quarterly reports, special project reports, and other documents which reflect the direction and progress of the Unit.

RESULTS

Research Development

Extent of Activities

The Arizona RCU has received approximately 200 research suggestions from educators, researchers, employers, public agencies, and other individuals. These cover virtually every subject in vocational-technical education and related fields. They include basic research, action-type studies, experimental projects, and pilot studies. Many are of interest only to small groups. Others represent major concerns on the part of educators or employers.

Some activity has been developed by the Unit in support of 72 of these suggestions. The RCU staff has assisted with or written 19 vocational research proposals submitted to funding agencies. Fourteen of these were written in whole or in major part by members of the staff. Of the 19 proposals submitted, 12 were approved and funded for a total of \$296,520 in grants and contracts. Additional local funds brought the amount of research generated in Arizona by

the RCU to \$371,17. One remaining proposal for \$837,417 in grant funds and \$1,326,500 in total support has been favorably reviewed and is pending action by a funding agency. Second stage research projects are being designed in three areas where initial projects have been completed. Five proposals for individual research have been written by vocational educators in a current course in educational research offered by Northern Arizona University and taught by the RCU staff.

In terms of actual research, six projects and a regional conference initiated by the Arizona RCU have been completed. Reports of five of these have been distributed. Five more are under way. One is ready to begin when funds are available.

Projects Completed

Identification of Common Courses in Paramedical Education.

Principal Investigator: Bill J. Fullerton, Chairman, Department of Secondary Education, College of Education, Arizona State University. Under a USOE grant of \$8,920 to Arizona State University, twenty health career education programs were analyzed. Twelve of these were found to have a high incidence of commonality of general subject classifications. Considerable variations were found to exist in similar programs at different institutions. Further research and experimentation were recommended for the development of common courses and core curricula, and for greater efficiency in health service education programs. Copies of this report have been requested from a number of educational institutions and hospitals throughout the United States for use in curriculum planning and further research. Approximately 100 copies have been distributed. Additional research developed from this study is currently under way.

A Study of Vocational Agriculture in the Phoenix Union High School District. Principal Investigator: William Richard, Special Research Assistant, Northern Arizona University. Grants of \$2,000 each from the Arizona State Department of Vocational Education and the Phoenix Union High School District were made to Northern Arizona University to carry out this project which was conducted jointly by the University and the Arizona State Employment Service. A follow-up study of recent graduates was conducted; employment opportunities were surveyed; and the location and vocational objectives of the program were assessed. As a preparation for high school students to enter agricultural careers, the effectiveness of the present program was found to be quite limited. A small group of students who take vocational agriculture appear to have their ambition stimulated to continue at the college level or pursue another line of work than agriculture. The majority of two-year vocational agriculture graduates from this program do not enter even a related field of employment. A majority of the students enrolled

in vocational agriculture courses have been routed into these courses by their counselors, usually as a result of grade failure in other courses. As a result of this study, the Phoenix Union High School District Administration has prepared recommendations to the Board of Trustees for basic changes in the Vocational Agriculture Program.

Current Practices Observed in Design and Drafting Occupations.

Principal Investigator: Carl E. Squires, Instructor in Drafting, Glendale Community College. A junior college drafting instructor with a grant of \$2,150 from the State Department of Vocational Education and local support from the Maricopa County Junior College District conducted a series of in-plant observations of current practices in industry. Seven design and drafting occupational areas were studied. Twenty observations were made in 16 companies employing 869 designers and draftsmen. As a result of the study, five recommendations have been made to the Junior College District for modification and updating of the drafting program.

Initiation of Design Studies for a Paramedical Education Center. Principal Investigator: Arthur M. Lee, Director, Arizona Health Services Education Association, and Arizona RCU. A grant of \$22,670 was made to Good Samaritan Hospital by Educational Facilities Laboratories, Inc. to be used by Arizona Health Services Education Association. The Association conducted a comprehensive State-wide study of the employment demand and educational resources in 23 health occupations. This study revealed an educational gap of serious proportions which may become critical. In 1965, the employment demand was for 2,961 graduates. Arizona institutions graduated only 602 who were employed in the occupations for which they were trained. Student enrollment in all health occupation programs in Arizona in 1965 was 2,136, compared to more than 10,000 needed to meet the demand. Hospitals, doctors, and other health care agencies are drawing heavily on out-of-state sources for trained personnel. As a result of this study, the Maricopa County Junior College District is preparing additional programs and other institutions in the State are expanding enrollments and adding new programs. Further action toward the establishment of a Paramedical Education Center has been deferred pending expansion of existing programs.

Projected Training Needs for Health Service Occupations.

Principal Investigator: William A. Langbehn, Assistant Director, Arizona RCU. Supported by \$1,500 by the State Department of Vocational Education and \$500 from the Valley National Bank, Arizona Health Services Education Association projected the needs for health manpower five and ten years in the future. The anticipated effects of Medicare were analyzed; rates of immigration and outmigration of trained personnel were determined; and statistical projections of population and health manpower were developed. By 1975, the demand for registered nurses in Arizona will have increased 55%; for licensed practical nurses, 83%; for medical technologists, 64%; and for several other health service personnel groups, more than 100%.

In the next five years there will be a need for 1700 to 2,000 persons each year completing training in 21 critical occupations, compared with 693 who graduated in 1965 (91 of these did not enter the occupation for which they were trained). The results of this study have served as an added incentive in expanding health occupation training and education in Arizona institutions.

Western States Regional Conference of Occupational Research Coordinating Personnel. Principal Investigator: Bill W. Brown, Assistant Director, Arizona RCU. Under a USOE grant of \$5,377 to Northern Arizona University, a two-day conference of RCU personnel was held five months after most of the units were established. Lines of communication were established; research priorities were discussed; information was exchanged; and research needs of the Western States were explored. As a result of this conference, the RCU's in the Western States have maintained a high degree of coordination and have developed an effective system of information exchange. A major research project was designed and submitted to the USOE by the Utah RCU with assistance from units in other states as a direct result of this conference.

Projects in Progress

The Identification of Needs in Arizona for Engineering Technician Education. Principal Investigator: Bill W. Brown, Assistant Director, Arizona RCU. Northern Arizona University provided \$4,000 for this study which involves interviewing selected technicians and supervisors in all major industries in the State. Field work has been completed, a first draft report has been prepared, and a final report will be available in the near future.

A Functional Analysis of Paramedical Occupations as a Foundation for Curriculum Development. Principal Investigator: John P. Decker, Professor of Industrial Engineering, College of Engineering, Arizona State University. With a grant of \$60,000 to Arizona Health Services Education Association a one-year project is under way which will attempt to develop a new method of occupational analysis and curriculum development and develop a curriculum for training laboratory technicians.

Review of Current Efforts to Establish Paramedical and Allied Health Professions Schools. Principal Investigator: Arthur M. Lee, Director, Arizona RCU. An \$10,000 contract was given to Northern Arizona University to collect current information on allied health professions schools and health occupations centers, and to prepare a national directory of individuals and institutions active in this development.

Attitude, Interest, and Personality Patterns of Vocational Education Students and Their Relationship to Early School Leaving or School Completion. Principal Investigator: David Wayne Smith, Director, Rehabilitation Center, College of Education, University of Arizona. An initial grant request of \$61,830 was submitted to the U. S. Office of Education, and subsequently approved with modifications by the Southwestern Regional Laboratory, ESEA, Albuquerque, New Mexico. This is a study in the causes of students dropping out of vocational education with particular attention to Indian students.

A Technique for Evaluating Clinical Training Facilities in Nurse Education. Principal Investigator: Pearl Parvin Coulter, Dean, College of Nursing, University of Arizona. A project initially submitted by the Arizona RCU in behalf of the State Nurses Association to the U. S. Public Health Service for a grant of \$17,760, subsequently undertaken by the University of Arizona, College of Nursing under alternate funding arrangements. It is an attempt to improve the procedures under which clinical facilities are selected and authorized for use in nurse education.

Continuation of Arizona Occupational Research Coordinating Unit. Principal Investigator: Arthur M. Lee, Director, Arizona RCU. A 19 month extension of Federal support in the amount of \$83,813 to Northern Arizona University for the development of a program of research in vocational-technical education in the State of Arizona.

Projects Pending

A Pilot Program (Demonstration Project) of an Experimental Method for Providing Occupational Education to Youth in Small Schools. Principal Investigator: Allan Petersen, Dean of Vocational-Technical Education, Cochise College. This is a project to establish vocational education programs in clusters of small high schools with modules of special equipment, instruction, and guidance rotating annually. It was initially submitted to the Division of Adult and Vocational Research for a grant of \$837,417, and is being resubmitted to USOE under Title III, ESEA on the recommendation of both the Division of Adult and Vocational Research and the Title III Coordinator.

The Relationship of Vocational Education to the Employability of Non-College Bound High School Graduates. Principal Investigator: Bernd Schwarz, Research Analyst, Arizona State Employment Service. This is a project designed in the educational research course conducted by the RCU. It will attempt to measure the effect of vocational education on employment opportunities and advancement.

An Evaluation of the Effectiveness of Food Service Training On Employee Performance. Principal Investigator: Rheinhardt Lukas, Food Service Instructor, Phoenix Union High School. This is a project designed in the educational research course conducted by the RCU.

A Survey of Current Technical Practices in Commercial Art and Closely Related Occupations for Purposes of Planning and Updating Commercial Art Instruction. Principal Investigator: Jimmy Ernest Ihms, Commercial Art Instructor, Phoenix Union High School. Designed in the educational research course conducted by the RCU.

A Study of the Vocational-Technical Training and Experience Received by Prison Inmates Before Confinement. Principal Investigator: Jerry L. Thompson, Assistant Director of Education, Arizona State Prison. Designed in the educational research course conducted by the RCU.

Evaluation of Urban Employment Opportunities for Vocational Agriculture Students. Principal Investigator: John C. Dutton, MDTA Supervisor for Maricopa County. Designed in the educational research course conducted by the RCU.

Research Participation

Individuals

In the files of the Arizona RCU are the names of 411 individuals from all colleges and universities in the State, most of the high schools, many public agencies, and all major employer and labor groups. Each has had a part in the State-wide research effort developed within the past eighteen months. Each came to the RCU or was approached for a definite purpose at a specific time, and many have become involved a number of times in several different ways. Fifty-six of these individuals have worked on vocational research proposals. Fifty-eight have participated in research projects. Twenty-eight have received research training. Many others have provided consulting services and have served on advisory boards, committees, and in conferences. Their institutional and professional classifications are shown in the table below.

	<u>Administration & Supervision</u>	<u>Teaching & Research</u>	<u>TOTAL</u>
Universities	21	35	106
Junior Colleges	14	11	25
High Schools	33	20	53
Government Agencies	69	4	73
Business and Industry	145		145
Agriculture	4		4
Labor	5		5
TOTALS	291	120	411

Groups

In October, 1965, the RCU arranged and sponsored a conference on research needs in Arizona in which 87 persons participated. They were invited individually in order to have a complete cross-section of the best experience and professional judgment in the State. Twenty-three were staff representatives from State and Federal agencies; 30 were college and university administrators and research personnel; 7 were junior college administrators; 12 were high school administrators and vocational education specialists; and 16 were representatives from business, industry, labor, and agriculture.

At the Western Regional Conference of RCU personnel in November, 1965, twenty-nine persons from thirteen states participated. In addition to conferences sponsored by the Arizona RCU, staff members have attended and participated in 26 national and regional meetings, and provided program speakers for five of these. In most cases, the meetings and conferences sponsored and attended by the Arizona RCU have been valuable in concentrating human resources on particular problems or tasks.

Inter-agency Cooperation

Health Occupations

Vocational-technical education in the health occupations, which is provided in hospitals, universities, junior colleges, high schools, and private agencies, has received considerable attention by the Arizona RCU because locally as well as nationally it is an area of serious underdevelopment. Research requires close cooperation, since there are many institutions involved. The RCU was instrumental in organizing the Arizona Health Services Education Association for this purpose and to assist in an orderly expansion of health occupation programs throughout the State.

The initial Board of Directors of AHSEA consisted of four members of the Maricopa County Health Planning Council; the administrators of the four major hospitals in Phoenix; a designated representative of the Maricopa County Medical Society; the President of Arizona State University; the Superintendent of the Phoenix Union High School District; the State Director of Vocational Education; the Administrator of the State Employment Service; the Director of the State Health Department; and the Director of the RCU. The Association has sponsored three research projects, and is currently engaged in a planning program to expand existing education in priority occupations. Its continuing objectives are: to serve as an inter-agency, inter-institutional, inter-professional catalytic agent for the development of good education programs, research programs, service programs, and clinical facilities, depending on the

future needs of the hospitals and other health care agencies; and to triple the educational output of health service personnel in Arizona in the next ten years. (3)

Manpower and Employment Needs

One of the persistent problems in developing vocational-technical education programs and a critical factor in vocational research is valid and up-to-date manpower information. The Arizona State Employment Service, as the recognized authority in Arizona in this field, is highly capable by both experience and the professional qualifications of its staff to conduct the full range of manpower research, including occupational, job market, and training needs studies. A close working relationship has been established with this agency by the RCU under which the Employment Service will develop research methodologies, conduct manpower studies, and furnish manpower information to fulfill the specific uses and needs for the information in vocational education. Two of the research projects initiated by the RCU have been conducted by the research staff of the Employment Service working with other personnel from the RCU and the universities in joint enterprises. The Employment Service will continue to conduct research projects and portions of research projects, and will participate jointly with other institutions in cooperative research programs, limited only by staff and budget restrictions. From these arrangements it has become possible for educators in Arizona to be provided with highly technical and authoritative information in manpower and employment needs and to have this information when it is needed and in a manner suitable to the special requirements of vocational education.

The Arizona Vocational Research Council was created as a new agency by the RCU for the purpose of identifying and evaluating research needs. It is a staff-level, working group representing every major source of information about vocational-technical education in the State, with membership from the State Department of Vocational Education, the three State universities, the junior colleges, the high schools, the State Employment Service, and major business and industry groups. The Council meets regularly to review all research ideas, suggestions, and needs originating in the schools and elsewhere, and between meetings its members work in subcommittees on proposals of particular value or promise. This is a key feature of the State-wide plan of vocational research in Arizona developed by the RCU. (5)

Coordination and Dissemination

Information about research in progress and the results of completed research has been made available to schools and educators under four procedures:

- 1) A review of related research for each proposal being developed.
- 2) Access to the central clearing house of research materials and reports in the RCU Phoenix office.
- 3) Direct liaison with vocational-technical educators in the State regarding research in progress and research reports of particular significance to them individually.
- 4) Periodic distribution of a vocational-technical research bulletin listing research in progress and completed research reports available.

Arrangements are under way to provide duplications of all significant materials and reports for deposit in special vocational-technical collections at each of the three State university libraries. Coordination of research activities in the health occupations has been developed through Arizona Health Services Education Association. Coordination of research in industrial technology has been developed in a series of efforts to design research proposals at the University of Arizona, Arizona State University, Northern Arizona University, the junior colleges, and the State Department of Vocational Education. Coordination of vocational agriculture research has been developed with the College of Agriculture at the University of Arizona, and in designing research in this area for the Phoenix Union High School District.

Research Training

Limited training has been provided for several graduate students by the Arizona RCU through assignments to research projects developed in this office. Eight Arizona graduate students and faculty from the universities, junior colleges, and a private college were given specialized training in a two-week seminar sponsored by the Utah RCU in June, 1966. A class of 15 graduate students is currently enrolled in a course offered by Northern Arizona University in educational research taught by the RCU staff in the University's Phoenix extension program. This is a graduate level course for the fulfillment of requirements in advanced degrees at the University. Seven of the students at the present time are teachers, administrators, or counselors in vocational-technical education. Five of these have designed and written research proposals in their fields which they will conduct themselves with the support of their respective institutions and the continued assistance of the RCU.

DISCUSSION

An Experimental Program

When the Arizona Research Coordinating Unit was established it was an entirely new concept, intended primarily to generate rather than perform research in vocational-technical education. It was organized on the premise that vocational-technical education in this State, as in other states, could benefit most from the results of a national research effort if our own institutions participated in that effort and if it were coordinated in an effective, practical program. The guidelines of the RCU were as broad as its goals. There were of course no precedents to follow and no established criteria by which to measure success or failure. It was generally agreed but never explicitly stated by the agencies responsible for the RCU's establishment that a major purpose, and therefore a measurement of accomplishment, would be to increase substantially the number of research proposals submitted from Arizona institutions and the dollar volume they represented in terms of approved and funded projects.

The means to achieve this goal had to be developed by the RCU staff through trial and error. A probing, searching experimental effort to generate research, hopefully of a kind that would have tangible benefits for vocational-technical education in Arizona, has been the main emphasis of this Unit for the past 18 months. Some of the energy and resources expended have resulted in disappointment and frustration. The accomplishments must be judged entirely on their own merits, but not, it is hoped, as the final result of the investment which this Unit represents. If the Arizona RCU has served its purpose up to this point, the research already generated is only the beginning of an on-going program which will continue to grow and produce increasingly beneficial results.

Among the disappointments and frustrations experienced have been the number of research suggestions brought to the staff's attention but not developed. Even more frustrating have been research proposals begun but not finished. The staff found itself by necessity spending considerable time in writing proposals to the neglect of some of the support and follow-up activity which might have resulted in greater total volume. There were simply too few people available for this kind of time-consuming technical work. Many suggestions and ideas have been received and put aside with serious intentions of following through, but which are still undeveloped.

Too much time and energy have also been devoted by the staff to assisting other individuals in writing proposals which were never finished. Here again, the problem in most cases seems to have been the pressure of other responsibilities on busy educators and researchers. The Arizona RCU staff became convinced early in its attempt to generate research proposals that a critical factor is the time and professional competence required for writing. This is a factor the staff has not been able to supply adequately, although considerable effort has gone into the attempt.

The RCU staff has had valuable cooperation, assistance, and advice from highly competent individuals in various institutions in the State. The Advisory Committee particularly has concentrated a great deal of professional experience and ability toward achieving the RCU's objectives. At its meeting on December 1, 1965 members of the Committee suggested that research of a practical nature is needed most in Arizona at the present time, and the RCU was requested to develop a "position paper" showing each institution's role in vocational research in the years ahead. This resulted in the creation of an ad hoc committee containing additional representatives from the universities and schools working with the Advisory Committee to formulate a State-wide cooperative research plan. (5) At an interim meeting of the Advisory Committee on February 23, 1966, the need for greater cooperation between schools and industry, and for improved communications and public relations were emphasized. At its meeting on May 26, 1966, the Advisory Committee again stressed increasing activity in vocational research publicity, and recommended that the RCU initiate a State-wide survey of the existing vocational-technical education for the purpose of identifying additional needs. The staff has attempted to follow as closely as possible the recommendations of the Advisory Committee and its individual members. Equally valuable have been the frank and constructive criticisms which members of the Committee have offered. The achievements of the Arizona RCU have thus been shared with the Advisory Committee, and the disappointments and failures have been the basis for common efforts to improve the Unit's effectiveness rather than simply to pass judgment upon its shortcomings.

The initial approach of the Arizona RCU to a total research program was first of all to find out where we were and where we had to go. The inventory of research and research personnel and the State-wide conference on research needs served as a beginning. Vocational educators and researchers were encouraged to come to the RCU for assistance in the development of their own proposals. It was very early recognized by the staff and later confirmed by the Advisory Committee that simply offering a service of this kind would not assure either the kinds or extent of research most needed by vocational educators. The RCU therefore

undertook to develop projects in certain areas of a nature that would supply definite needs.

The first of these, for reasons previously indicated, was in the area of health occupations and particularly curriculum development. It was in this area that most of the tangible results of research development by the Arizona RCU have been evident. This was due to several contributing factors. An excellent climate of local support in the health occupations had already been established when the RCU was formed. The need for expansion and development of vocational education in the health occupations was clearly evident and was felt to be a matter of some urgency by several of the educational institutions and the State Department of Vocational Education. With the enactment of Medicare, national attention was focused on the need for more health service personnel, and this no doubt contributed to a strong interest in research in this area by the U. S. Office of Education.

In Arizona the need for research in engineering technology was also considered urgent by many individuals, institutions, and business and industry. The RCU attempted to develop research in this area but has encountered greater difficulty than was anticipated. Ideas and suggestions were made and even urged by several of the leading electronics industries in the State, by the deans of engineering and technology at each of the three State universities, by the State Department of Vocational Education, and by other individuals. Research proposals were initiated by the RCU at each of the three State universities, and one attempt was made to design a joint project with the assistance of a graduate student loaned to the RCU from Arizona State University. Individual ideas of what was needed and how to go about designing projects in engineering technology varied widely. Difficulties were encountered in attempting to design a proposal acceptable for Federal funding which would at the same time provide the specific information needed in Arizona. In the end, Northern Arizona University offered to support a project designed specifically to accomplish State and local objectives. It is expected that from this initial effort additional research can be more easily identified and designed, leading to a full scale on-going research effort in engineering technology.

The need for research in vocational agriculture was recognized by many persons in the schools and by others connected with the industry. The Chairman of the Governor's Committee on Technical and Vocational Education in 1962 was a prominent farmer and member of the State Legislature. The RCU's initial effort in vocational agriculture research was made at the request of the Phoenix Union High School District. The Board of Trustees had requested

administration officials to determine if its vocational-agriculture program should be continued without change, or relocated nearer an agricultural area, or changed to meet the requirements of horticulture or other farm-related industries, or otherwise made more effective in view of changing circumstances. The RCU was asked to design such a project and then to arrange for financial support and personnel to conduct the research. From this project have developed additional research needs in vocational-agriculture in Arizona which are currently being explored. A second-stage project of limited scope was designed and is being carried out by a student in Northern Arizona University's educational research course conducted by the RCU.

The Problem of Funding

In the experience of the Arizona RCU, rather serious unsolved problems exist in financing vocational research. Educators and researchers are expected to invest their own time and money in writing research proposals, but they often have other demands on their time for which they are offered more attractive compensation. Small grants are intended to make funds available for proposal development, but small grants require proposals in the same form and often with the same degree of refinement as large grants. A common feeling among researchers is that proposals for small grants are a waste of time. Proposal writing has become a special skill, often unassociated with the research to follow, and as a special skill it is not usually available except where funds are available. Too often researchers who are genuinely interested in vocational problems have easier access to resources for proposal development in areas other than vocational-technical education.

Added to the problem of uncertain resources for proposal development is the uncertainty of funds available even for good proposals. There are indications that research proposals in areas not directly associated with vocational education have easier access to public funds, particularly when designed to achieve social goals supported by substantial appropriations. The process itself of agency review and approval is uncertain. A proposal into which the Arizona RCU put a great deal of effort was reviewed favorably but came too late in the fiscal year for support. When 4(c) appropriations were reduced for the next fiscal year, this proposal had to be rewritten for another funding agency. Another proposal was developed by the Arizona RCU with the U. S. Public Health Service involving a relatively small contract and a clearly defined six-month project. By the time the grant was made there had been enough time and effort spent in negotiations, delays, and rewriting to raise doubts as to the value of the project compared with its actual cost.

Coordination

The problem of matching research to vocational needs is essentially the problem the RCU was created to solve, and it is one which cannot be solved quickly or easily. Research needs and individual research interests are too often unrelated. Research needs, research personnel, and research funds tend to move in diverse directions. Separate institutions are responsible for the directions they take, and each institution has its own goals and its own program. Complicating the problem further is the comparative inexperience at this time of all the institutions in an on-going program of vocational research. Compared with research in the physical sciences or medicine or agriculture, vocational research has no well-developed system of communications, and no established patterns of acceptance by the practitioners. There are differences of opinion among educators and researchers as to how it should be approached, philosophical differences about what constitutes actual research, and widespread disagreements over the actual value of research results. Much of this confusion may disappear with increasing experience, but today it is a problem which needs to be recognized. It challenges not only the RCU, but each institution that shares some of the responsibility for developing excellence and efficiency in vocational-technical education.

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The Balance Sheet in Arizona

When the Arizona RCU was organized, very little vocational research had been done or was under way in the State except for manpower studies by the State Employment Service, a few feasibility studies by local schools, an occasional graduate thesis, and some informal experimental work by teachers in their classrooms. There were no Federal or State sponsored projects and very little university activity in this field of research. At the conclusion of a three month inventory in 1965, the RCU found that "research into problems of vocational-technical education seems to be an almost entirely neglected field in the State of Arizona."

In the past 18 months a beginning has been made. Three subject areas have been initially developed. Six research proposals have been funded in the health occupations. Six more have been funded in other areas of vocational-technical education. One major project is ready to begin when funds are available, and five small projects are designed for individual research to be carried out with institutional support.

Vocational educators, university faculty, business and industry leaders, and public officials in Arizona are becoming involved in vocational research and conscious of its significance. Institutional and inter-agency cooperation has been achieved in the identification of research needs, planning and development of research, and carrying out comprehensive research projects. Coordination and dissemination have been established on a limited scale, to be expanded as the volume of research increases.

On the basis of this experience, the Arizona RCU should be able to continue its overall responsibilities of developing, coordinating, and disseminating vocational research with increasing effectiveness. Some of the expectations and assumptions under which it was established have been modified. Federal grants for instance, while highly desirable and of considerable benefit to institutions and individuals performing research, have only limited value in providing local schools and educators with the research they need and can use. The process of channeling research funds into research projects is cumbersome and fraught with uncertainty.

Circumstances affecting vocational research have changed during the past 13 months, and these changes will be felt with increasing significance for the future. The Federal policy of awarding grants largely on the basis of well-designed proposals is being replaced by a policy of directed research administered by the U. S. Office of Education. The administration of small grants, supposedly for research proposal development, is being shifted to the regional offices of the Bureau of Adult and Vocational Education. With the passage of the Elementary and Secondary Education Act in 1965, several additional research programs have become available to vocational educators, notably the experimental programs under Title III and in some cases the regional laboratories under Title IV. At the same time, research funds under section 4(c) of the Vocational Education Act of 1963 have been sharply curtailed. The policy of the Division of Adult Vocational Research now is that RCU's are not to be evaluated on the basis of the Federal grants they are able to secure for their states. An increasingly necessary function of the RCU's is to develop stronger state and local support for vocational research. After another 19 months the RCU's themselves must be supported completely by the states if their functions are to continue.

Recommendations

Continuing research in vocational-technical education is needed to keep abreast with the changing technologies and vocational requirements of the American economy. Basic and highly sophisticated research is necessary in exploring new areas of knowledge and attacking fundamental problems in learning, motivation, methodology, and theory. Fact finding and other informational research is greatly

needed and must be constantly updated in economics, occupational analysis, manpower, and curriculum. Institutional, action-type research is needed also on a continuous basis in the classrooms, in pilot programs, in experimental programs, in field testing, and gathering information of immediate application.

Basic research belongs in the universities and research centers, largely under the initiative and direction of individual scholars. Major informational and applied research can be performed by universities and other research agencies, usually involving a team approach and a considerable degree of inter-agency coordination. Experimental, classroom, and demonstration projects can be carried on in the local schools and in laboratory situations. The RCU is in a position to provide technical assistance and coordination in each of these areas of research activity. Its greatest long-range contribution may be in the organization and maintenance of an overall research program in the State which leaves no important areas neglected.

The most urgent need in Arizona at the present time appears to be for comprehensive informational studies to form the basis of educational planning. The major emphasis of the RCU should be shifted from proposal writing and project development for individual researchers to the design and carrying out of several major projects of this kind. Technical assistance, coordination, and dissemination of a total research program may be continued and expanded at the same time.

SUMMARY

The major activities of the Arizona RCU have been: to assess the State's vocational research needs and resources; to assist researchers and vocational educators in developing proposals for funding; to initiate and write research proposals in several areas of vocational-technical education; to provide liaison with Federal and other funding agencies; to develop a cooperative vocational research effort throughout the State; to coordinate and disseminate vocational research activities in Arizona; and to provide training in vocational research.

These results were obtained:

- 1). Approximately 200 research ideas and suggestions were identified.
- 2). Some assistance was provided on 72 research proposals.

3) Nineteen research proposals were submitted to funding agencies, 14 of which were written in whole or in major part by the RCU staff.

4) Twelve proposals were approved and funded for a total of \$296,520 in grants and contracts. Additional local funds brought the amount of research generated in Arizona by the RCU to \$371,477.

5) Six projects and a regional conference initiated by the Arizona RCU have been completed, and reports of five of these distributed.

6) Five more research projects are under way, and one is ready to begin when funds are available.

7) Five individual projects have been designed by vocational educators to be carried out with institutional support.

8) Four hundred eleven individuals have participated in the Arizona vocational research effort.

9) A State-wide conference was held on research needs in which 87 persons participated, and a Western regional conference of RCU personnel was held with 29 persons from 13 states participating.

10) Inter-agency cooperation was achieved in the health occupations, manpower and employment needs, and vocational research planning.

11) A depository of vocational research materials has been established and a periodic newsletter distributed to vocational educators in the State.

12) A training program in vocational research has been established by Northern Arizona University conducted by the RCU staff.

There are serious problems yet to be solved in developing an on-going program of research in vocational education. Financial support, particularly at the State level, must be further developed. Federal grants are not ideally suited for the kinds of research needed most by local schools and vocational educators. Confusion exists in many institutions responsible for vocational education as to the purposes, procedures, and benefits to be expected from research. These problems are not confined to Arizona. The experience of the past 18 months should enable the RCU to continue developing, coordinating, and disseminating vocational research in the State with greater effectiveness. The most important long-range benefit from this project may be in the organization of an overall vocational research program for the State of Arizona, which is expected to be fully established during the remaining 19 months of Federal support.

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