

AN ASSESSMENT OF THE EFFECTS OF AEROSPACE
EDUCATION WORKSHOPS UPON THE TEACHING
OF AEROSPACE EDUCATION CONCEPTS
IN SELECTED SCHOOLS
IN OKLAHOMA

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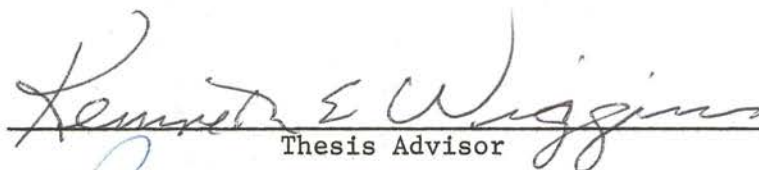
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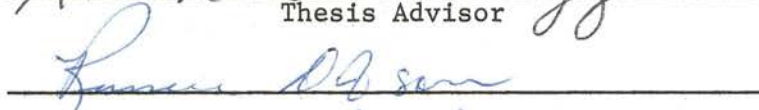
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PREFACE

The successful inclusion of new curricula into the school program depends largely upon the success of the inservice activities that accompany such ventures. This study was designed to examine the inservice workshops that prepared Oklahoma teachers in the field of Aerospace Education.

To the following people who have contributed greatly to the completion of this study, I would like to express my sincere appreciation.

To Dr. Kenneth E. Wiggins, Chairman of my committee, for his interest, enthusiasm, support and patient counsel from the inception to the completion of this study.

To Dr. Russell Dobson, committee member, whose scholarly examples inspired me through my entire graduate program and whose sincere concern and advice smoothed out many problems.

To the other members of my committee, Dr. L. Herbert Bruneau, Dr. Kenneth St. Clair and Dr. Sue Hawkins for their expertise and guidance.

To Roy and Minnie Lee Miller, my parents, who at all times lived an example for me to follow.

To the members of the Oklahoma Aeronautics Commission, who offered much support and enthusiasm for this study.

To my wife, Elayne, without whose devotion, encouragement and hard work this study could not have been completed.

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CHAPTER I

NATURE OF THE PROBLEM

Introduction

Inservice education is defined in the Encyclopedia of Educational Research¹ as consisting of "all school-personnel activities which are designed to increase professional competence." Blosser and Howe make the assumption that science educators have felt that the prime concern of preservice programs should be that of producing an effective, competent teacher who can help children learn.² This same concern carries over into the inservice programs and activities. It has been suggested that no sharp distinction be made between preservice education and inservice education. Instead the two should merge as "continuing education."³ The fact that preservice education can provide the teacher with only the basic tools and skills of teaching means that inservice education is of primary importance in attaining the goal of producing individuals who can provide maximum learning opportunities for students.

The major emphasis in inservice education for teachers has been on improving the teacher's background in content and/or updating existing educational information and skills. There are other problems in addition to the rapid obsolescence of subject matter and skills. These might be enumerated as the proliferation of educational hardware, the fluid but apparently evolving state of learning and instructional

theory, the advent of new educational tasks and a growing awareness of need for global understanding.⁴ All these problems carry implications for a broader perspective of inservice educational activities for the educational community.

In many instances workshop participants may travel to a field-studies center, a university or to some location other than that of the school in which they teach. A different approach to the problem of inservice education was reported in a study by Kerns.⁵ This program was an attempt to upgrade the quality of instruction in junior high school science in Alabama through the use of the statewide educational network. The program was initiated and developed by personnel in the school of education at Auburn University.

The program was designed to serve five major functions:

1. To be a demonstration program for teachers
2. To show the teacher how his needs could be met in his own classroom
3. To provide practical suggestions that the teacher could follow up
4. To suggest ways by which the teacher could enrich his classroom work
5. To teach the teacher while in the classroom

Kerns reported that the teachers who were relatively highly qualified in terms of formal preparation and with more experience in science laboratory work considered the time spent viewing less valuable than other teacher-selected and directed activities.

There are other types of inservice educational programs that reach or attempt to reach the same goals as reported by Kerns. During

the summers of 1969 and 1970 teachers from all areas of the State of Oklahoma and from all subject matter areas were invited to Oklahoma State University to participate in a three week statewide aerospace education workshop. These teachers took part in a workshop that included lectures, demonstrations, activity sessions, visits to aerospace industries and visits to military air bases and NASA installations such as the Manned Spacecraft Center in Houston, Texas, and the Spaceflight Center at Cape Kennedy, Florida. These two workshops were funded by the Oklahoma State Legislature and were sponsored by the Oklahoma Aeronautics Commission and the Oklahoma State Department of Education. In a later chapter this writer will present an indepth discussion of the formation and operation of the two workshops.

Statement of the Problem

During the summers of 1969 and 1970, the Oklahoma Aeronautics Commission and Oklahoma State University in cooperation with the Oklahoma State Department of Education sponsored a three week workshop in the curriculum area of aerospace education.

The Aeronautics Commission had six stated goals in mind when the workshops were initiated. Those goals were as follows: (1) to stimulate a widespread awareness of aerospace education at all levels of instruction, (2) to develop means to stimulate the teachers' interest in aerospace education, (3) to train teachers and administrators in the application of aerospace education in schools, (4) to make aerospace education available to all grade levels of Oklahoma students, (5) to encourage closer affiliation between educational institutions and the aviation and aerospace industries, (6) to train teachers

for a specialized course in aviation at the high school level.

The purpose of this study is to determine to what extent the stated goals of the Aeronautics Commission were met by the nearly two hundred teachers that were present at the two workshops,

Through the use of a questionnaire an attempt was made to determine how effective the workshops were in reaching the stated goals.

Comparisons were made between elementary and high school teachers, teachers in rural or urban school systems, male and female teachers and teachers with varied years of teaching experience to ascertain where the greatest impact of the workshops were made.

Assumptions of the Study

1. The sample was representative of the population.
2. The questionnaire as constructed gave the needed and desired information.
3. The returned questionnaires had usable information

General Procedures

The listing of all teachers who applied for the 1969 and the 1970 summer aerospace education workshops was obtained from the Oklahoma Aeronautics Commission. All of the teachers who were participants were sent a questionnaire to obtain desired data. From the returned questionnaires data were tabulated and analyzed to gain desired information concerning the two groups of teachers.

Timing

The questionnaire was constructed during November, 1970. It was field tested during the latter part of November and December of 1970.

Field testing was completed by December 25, 1970, and the final questionnaire organized for data collection by the first of February, 1971. The tabulation and analysis of data and the writing of the dissertation was completed by August of 1971.

Statistical Application

After data from questionnaires had been returned and tabulated, the appropriate statistical treatment was administered to ascertain significance of the workshops.

Significance of Study

It is anticipated that this study will enable the Oklahoma State Department of Education and the Oklahoma Aeronautics Commission to analyze the effectiveness of the two workshops and to infer value judgments to other types of inservice attempts.

Limitations of the Study

The subjects of the study will be limited to the two hundred teachers who attended the two consecutive aerospace education workshops held on the campus of Oklahoma State University during the summers of 1969 and 1970.

Research Questions

1. Do workshop participants feel that aerospace education should be a vital part of the total educational plan in the state of Oklahoma? All subject areas K-12?
2. Do workshop participants feel that aerospace education is relevant in schools at this time?
3. Do workshop participants feel that aerospace education workshops are necessary in providing proper educational experiences?
4. Having attended aerospace education workshops, do participants feel competent to teach courses in aerospace education?
5. Has there been a significant increase in the number of students in the state of Oklahoma that has been exposed to aerospace education as a result of the workshops?
6. Do workshop participants feel that visits to aviation and aerospace industries and installations should be a vital part of the workshops?
7. Do workshop participants feel that exposure to various aviation agencies be considered a vital part of workshop experiences?
8. Do participants feel that future efforts need to be made to insure more inservice experience for teachers in the field of aerospace education?
9. What areas of the aerospace education workshops do participants feel to be the most effective in preparing teachers for aerospace education?
10. What are the attitudes of teachers concerning the inclusion of curriculum planning in workshop activities?

11. Do workshop participants feel that the Legislature of the State of Oklahoma should continue to provide allocations to support future aerospace education workshops?

Clarification of Terms

1. Attitudes Toward Aerospace Education:

Attitudes toward aerospace education refers to how an individual feels about aerospace education--an emotionalized feeling for or against aerospace education as exhibited through the behavior of the individual.

2. Confidence Toward Teaching Aerospace Education:

Confidence toward teaching aerospace education refers to how an individual feels about teaching aerospace education--a consciousness of feeling sure that he can adequately employ various learning activities such as experimentation, observation, discussion and reading.

3. Aerospace Education:

Aerospace education is that branch of general education concerned with communicating knowledge, skills and attitudes about aerospace activities and the total impact of air and space vehicles upon society. It must be distinguished from those branches of special education known as aeronautical and/or astronautical education which are concerned with training specialized aerospace workers.

4. Workshop

Experienced teachers do post graduate work as a group to upgrade themselves in their professional field.

FOOTNOTES

¹C. W. Harris, *Encyclopedia of Educational Research* (Third Ed., New York, 1960), p. 128.

²P. E. Blosser and R. W. Howe, "An Analysis of Research Related to the Education of Secondary School Teachers," The Science Teacher, Vol. 36, January, 1969, p. 87.

³Ibid., p. 92.

⁴R. H. Reno, "Inservice Teacher Training," Education Age, December, 1968, p. 4.

⁵H. V. Kerns, "A Descriptive Study of the Development and Presentation of an In-School Television Program for the Inservice Education of Junior High School Science Teachers," University Microfilms, Ann Arbor, Michigan, 1962, p. 218.

CHAPTER II

REVIEW OF SELECTED LITERATURE

The review of related literature summarized in this chapter includes studies in both aviation education and aerospace education. This survey of the literature yielded six doctoral dissertations and five masters theses in the area of aerospace education; all of which are summarized in this chapter. They are presented herein in a chronological order, based on the year the study was completed.

Hackett¹ made a survey of aviation education in the high schools of the United States in the school year 1943-1944. The purpose of her study was to analyze what was being done in the way of aviation education in the high schools of the United States,² specifically: (1) the need for aviation education, (2) the amount of aviation taught in schools before 1942, (3) how aviation classes were actually conducted as shown in a detailed study of fifteen high school aeronautics classes during 1943-1944, (4) how state aviation programs function, (5) the content of high school aviation textbooks and (6) some changes in aviation.

Data for this study came from aviation textbooks, pamphlets and from seven different states having flight programs. She sent a questionnaire to fifteen high schools in the states of California, Connecticut, Illinois, Pennsylvania, Tennessee, Texas and Wisconsin to determine: (1) prerequisites for admission to aviation education courses,

(2) characteristics of students enrolled in these courses from the standpoint of sex, age, class size, science and math backgrounds and special aeronautics experiences; and (3) characteristics of teachers of aviation education in these schools such as: undergraduate and graduate educational backgrounds, degrees earned, special educational experiences and special aeronautics training.

Her findings and conclusions are as follows:

The greatest need for aviation, when it was first offered in the high schools, was as an aid in defending the nation. When the army transferred partly trained airmen to the infantry, general education became the most important need for aviation education. Other reasons for teaching aviation education were preparation for private flying and vocations.

Aviation education has entered the school curriculum in two main forms (1) in aeronautics courses and (2) as supplementary aviation subject matter in established courses. Prior to 1942 only a few schools offered aviation courses and they were mostly of a vocational or technical nature. Now, over 14,000 schools have aviation courses, a number of which give four hours flight experience. One of the outstanding characteristics of the state planning programs has been the universal recommendations of flight experience as laboratory work in connection with high school aviation classes. Course of study for flight experience have been prepared and have been tested in enough schools to prove that this is aviation education at its best. The committee on Aviation Education in the Wisconsin schools say flight experience is the most dynamic part of aviation education.

Aviation education in our public schools has shown a far greater

expansion than ever experienced by any other school subject. World events have fully justified this expansion and problems of future economic development and national security warrant even greater extension of education in this field.

In nearly all cases it was recommended that there be offered at least a one-year course in either the eleventh or twelfth grades. Sharply prescribed prerequisites would serve to defeat the objectives, so they should be kept flexible and at a minimum commensurate with worthwhile outcomes. Evidence seems to indicate that the pupil's interest and desire to achieve may be better indicators for selection than his past record. Minimum requirements in some cases were listed as one year of science and one year of mathematics. A few schools require three or four years of science and mathematics.

The majority of aviation teachers have a science and mathematics background. Most of the teachers enriched their background by taking additional courses in aviation and attending lectures and meetings.

The courses are open to both girls and boys, however, a larger percentage of boys enroll. The median age of aeronautic students were eleventh and twelfth graders. Aeronautic students have been found to excel in science and mathematics and are at least of average ability in other subjects.

Many aviation clubs and model contests have been started which proved very successful.

There are six aviation textbooks used in the high schools in the United States. Only four topics were common to all books, namely-- aerodynamics, meteorology, navigation and engines. All books included topics not common in the others, such as communications, learning to

fly, living in the Air Age and research and training.

Aviation falls within the framework of good general education as set up by the Educational Policies Commission, namely, (1) self realization, (2) human relationship, (3) economic efficiency and (4) civic responsibility. Aviation is also an answer to some of the Cardinal Principles of Secondary Education such as, (1) citizenship, (2) vocation and (3) worthy use of leisure time.³

Hackett recommended⁴ people be trained to live effectively in a drastically changed era. In order to do this, all schools should offer at least one course in aviation. Subjects such as physics, biology, math and social studies may be made richer by incorporating aviation into them. Therefore, teachers of these subjects should have studied at least one course in aviation.

More aviation clubs and model contests would add additional interest to the program.

One learns by doing; therefore, more laboratory work would be valuable. Flight experience offers a much better understanding of the principles of flight.

The prerequisites should be flexible so as not to bar interested students.

The social implications of aviation should be stressed in history to a greater degree than it is at present.

One of the most important single improvements that can be made regarding aviation textbooks is to keep them up-to-date. At this time most aviation texts are obsolete.

Another study in the field of aviation education was that presented by Cornwell⁵ in 1947. This was basically a curriculum study

which had as its major purpose the development of a resource unit in aviation education for secondary school social studies teachers. In this work, Cornwell explained the place of air-age education in the social studies as follows:⁶

Since the necessity for world citizenship is greatly increased by the advent of aviation, it follows that modern citizenship for world living should include an understanding of aviation and its basic foundation.

Turning to the problem of organization of aviation subject matter and social studies curricula, one may note that social studies usually occur in one of three main types of organization: (1) separate subject course are given, such as geography, history, civics, economics, etc.; (2) courses are built around the unit plan, including materials from the various subjects and being especially administered to give pupils the relationships in whole fields of understandings; or (3) correlated or integrated curricula are developed into which social studies are absorbed, with or without the preservation of their identity.

In the specific case of aviation, air-age education is a broad enough and important enough field to be taught in a comprehensive subject course; however, material might be included which is not significant to social studies understandings and take up time to the neglect of appreciation of and participation in developmental social concepts. In the third case given above, although aviation is a force in human living--it covers all ramifications of teaching areas. Its significant implications could easily be lost if spread too thin over a correlated curriculum.

Probably the most intelligible way of including air-age material in the social studies is through its inclusion in a general course, built up on the unit system. In such a case, the total unit, "The Impact of the Air Age on the Community," might follow a unit on "Community Problems" showing how such problems are altered, created, supplemented, or solved through the use of aviation. Or, to avoid overlapping, for example, a unit on "Communication and Trade" could probably make the best use of aviation material by incorporating parts of an air-age unit to enrich its scope and understanding. In a third instance, the total unit, "The Impact of the Air Age on the Community," might provide a central unit to which materials from other units in the social studies could be added; this would focus attention on the aviation aspect of social problems.⁷

Cornwell emphasized the following: (1) knowledges and understandings resulted from the study of aviation and its impact on the community, (2) the community can promote world peace by understanding the implications of aviation education and (3) a knowledge of air-age education can further improve community safety and health.

Lewis⁸ in 1948, through documentary research, personal investigation and use of a check list to state departments of education, reached some interesting conclusions regarding air-age education:

1. Courses in aviation for teachers were revised to include the objectives advocated by the Civil Aeronautics Administration and posed by leading educators.

2. Certification of teachers for teaching aviation in the general curriculum is not required. Requirements for the certification of teachers in the Preflight Aeronautics Course include courses

emphasizing global concepts as well as technical aviation content.

3. Increased awareness of the political, social and economic implications of aviation has been accomplished through the medium of aviation education.

4. The theory of social dynamics is the underlying educational philosophy of aviation education.

Neuthardt,⁹ in 1949, completed a statewide study of New York State, in which he set out to determine: (1) what the public school elementary teachers and teachers college faculty members were doing with air-age education; (2) what they believed they should be doing; (3) what they were willing to do to facilitate the development of peace-time air education. At the completion of his survey, 1,000 public school elementary teachers, for a 100% return, had filed completed questionnaires; ten New York State colleges for teachers had been visited and 100 college faculty members had been interviewed and had participated in this study, resulting in 100% participation.

The teachers of elementary schools and of teachers' colleges surveyed expressed an interest in learning about air education and aviation literature; however, they indicated participation in relatively few air education activities or organizations. Lack of courses in aviation education was in evidence. But, these elementary teachers and college instructors did recognize their deficiencies in this area and expressed desire for additional preparation. Air education courses for teachers on an in-service, summer session and regular session basis were recommended.

More than fifty per cent of the teachers said they would elect these courses if offered. College faculty members also expressed a

desire for workshops to assist them in meeting their responsibilities in the area of aviation education. It was recommended by Neuthardt that New York State University and the State Education Department offer their assistance in air education preparation for teachers and faculty.

The Neuthardt study indicated that the future of aviation education in New York State was rich in promise, provided full cooperation could be secured for a program designed to meet the needs, interests and abilities of the students of the state.

A comprehensive canvass of general and special literature in air-age education instruction was made by Pawelek,¹⁰ in 1950. Letters of inquiry as to activities and availability of materials were sent to various groups, some of which were state departments of education, commercial firms and agencies and men in strategic positions.

The problem of "Air-Age Education at the College for Teacher-Education Level" presented itself as three distinct questions: (1) what had been done, (2) what is being done and (3) what can and should be done?

Only the 258 member colleges of the American Association of Colleges for Teacher Education were included in this study.

Pawelek concluded,¹¹ on the basis of the evidence brought forth by the investigations included in this study, the following:

1. There is a definite nationwide interest in aviation education at all levels of instruction.

2. Many eminent educators are concerned with the problem of aviation as it pertains to teacher training institutions.

3. There is an abundance of vocational literature concerning aviation but relatively little of professional kind in the realm of

teacher education.

4. The government, industries and state departments of education are active in the publication of air-age education materials.

5. The American Association of Colleges for Teacher Education has displayed a great interest in and is attempting to assist member colleges with the problem of air-age education.

6. Career possibilities in aviation are many and varied with great possibilities for the future.

7. Being able to pilot a plane is a desirable qualification for teachers of aviation education.

8. Having ridden in an airplane is a necessity for aviation teachers.

9. The best method of offering aviation education to teachers in-service is through the workshop approach.

10. Technical aspects should be minimized in favor of the general education aspects.

In a study completed in 1951, Strickler¹² proposed to establish an operational definition of aviation education and to describe in detail one of the agencies of aviation education, the air center.¹²

An analysis of a number of definitions and statements about aviation education, aeronautical education and air-age education led to the following definition of aviation education by Strickler:

Aviation education is that branch of general education concerned with communicating knowledge, skills and attitudes about aviation and its impact upon society. It must be distinguished from that branch of special education known as aeronautical education, which is concerned with training specialized aviation workers.¹³

A review of the history of commercial airlines and of aviation

manufacturers as they related to aviation education was also made by Strickler. He considered the aviation education programs of these organizations of great importance in the development of aviation education. One of these agencies of aviation education, the air center, was selected for detailed study by Strickler in terms of its role in implementing aviation education. He reported on the services rendered and groups served by air centers along with the steps necessary for establishing an air center. Strickler noted that:

The air center in aviation is primarily a tool, it is a means of furthering the educational use of aviation content in general education. Otherwise expressed, it facilitates the dissemination of appropriate knowledge in aviation education. The air center, in short, may be described as an educational instrument or facility.¹⁴

Anderson¹⁵ in 1955, surveyed selected secondary schools in the United States having aviation education programs. The main purpose of his study was to determine the status of certain aspects of aviation education among some selected secondary schools in the United States. Involved were the following six problems:

1. To secure the main points of the historical background of the local program in each responding school so as to determine the method of introducing aviation education into the curriculum.
2. To show the organizational and administrative aspects of aviation education in the selected secondary schools.
3. To determine the professional background and the training of the individuals teaching aviation education in the selected schools.
4. To reveal the instructional materials and project activities used in the aviation education courses in these schools.
5. To present a picture of the financial support of aviation education in the various schools selected.

6. To obtain and evaluate suggestions on the promotional policy of aviation education.

Eight Regional Aviation Educationists and several Civil Air Patrol Wing Headquarters were contacted by letter requesting their aid in selecting the secondary schools to be used in this study. One hundred and twenty secondary schools known to have aviation education programs were selected.¹⁶

One hundred, or 84 per cent, of the Survey Information Blanks were returned. Eighty-four, or 70 per cent, of the Information Blanks were considered usable.

Some of the important findings of the Anderson study are as follows:¹⁷

1. The Information Blanks revealed that 59, or 70 per cent, of the aviation education programs were an immediate responsibility of the principals of the schools.

2. It was revealed that the Civil Air Patrol had given most help to the aviation education programs. Colleges and universities and the state aeronautics departments gave the least help.

3. Twenty-nine, or 35 per cent, of the schools indicated that the Regional Aviation Educationist had made arrangements for textbooks or the Civil Air Patrol Aviation Study Manual.

4. Seventeen, or 20 per cent, of the schools reported the United States Air Force had provided film service to the aviation education course. Twenty-seven, or 33 per cent, reported they had received no service from the United States Air Force.

5. It was revealed that the Civil Air Patrol had contributed more service and more types of service than other selected organizations.

Forty-six, or 54 per cent, reported that airlines had contributed instructional material to the program.

6. Thirty-six, or 43 per cent, of the schools indicated that sufficient service had been provided to them, while 48, or 57 per cent, of the schools indicated that sufficient service had not been provided.

7. Seventy-six schools had offered aviation education as a regular class and eight schools reported the course as an extra-class activity.

8. Seventy-one, or 72 per cent, of the schools reported they had no prerequisite for the course.

9. Sixty-one, or 72 per cent, of the schools reported they had no laboratory facilities. Eight, or 9 per cent, of the schools reported they were equipped with the Link Trainer.

10. It was revealed that chalk boards had been used more frequently than other types of audio-visual aids and the monthly use of all audio-visual aids had been more common daily or weekly use of them.

11. Ninety-five per cent of the schools taught aviation education in the twelfth grade. Five per cent of the schools indicated scheduling difficulties had interfered with twelfth grade enrollment.

12. The Information Blanks revealed the school administrators had been considerably higher in cooperation with aviation education than other selected groups. Townspeople and Parent and Teachers Associations showed a below the midpoint rating as far as cooperation was concerned.

13. Sixty-five, or 77 per cent, of the schools indicated aviation education should be an integral part of education for all secondary

schools.

14. Forty-eight, or 57 per cent, of the schools indicated aviation education could be taught successfully in one or more other courses as a separate unit.

15. Twenty-one, or 25 per cent, of the schools reported an enrollment of more than 1,000 students.

Anderson summarized his findings relative to the professional background and training of the individuals teaching aviation education in the schools surveyed as follows:¹⁸

1. Thirty-eight, or 47 per cent, of the instructors had completed grade seventeen.

2. All but one instructor held at least the bachelor's degree. Forty-four, or 52 per cent, held the master's degree. Two doctor's degrees were revealed in the responses.

3. Twenty-six, or 31 per cent, of the instructors reported they held a major in education. Twenty-one, or 25 per cent, indicated they held a major in mathematics.

4. Fifteen, or 18 per cent, of the instructors indicated they had taught from one to five years at the elementary level. Twenty-eight, or 33 per cent, reported they had taught from one to five years at the secondary level. Twenty-six, or 31 per cent, reported they had taught from six to ten years at the secondary level. Sixteen, or 19 per cent, of the instructors indicated they had taught more than fifteen years at the secondary level. Fifteen, or 18 per cent, of the instructors reported they had taught from one to five years at the college level.

5. Twenty-five, or 29 per cent, of the instructors stated that

the United States Air Force had been the greatest influence in arousing their interest in aviation education. Fourteen, or 17 per cent, indicated that pilot training had aroused their interest. Four, or 5 per cent, indicated that the National Aviation Education Workshop had aroused their interest in aviation education.

6. Twenty-four, or 29 per cent, of the instructors indicated they had taught aviation education one year. Fifteen, or 18 per cent, indicated they had taught the course more than five years. Twenty-three, or 27 per cent, indicated they had taught the course more than five years.

7. Nineteen, or 23 per cent, of the instructors indicated they had completed from two to twelve semester hours, or two to six quarter hours in college credit courses.

8. Twenty-seven, or 32 per cent, of the instructors indicated they had completed from two to twelve semester hours, or from four to fifteen quarter hours at aviation education workshops.

9. Sixty, or 71 per cent, indicated they had not attended noncredit workshops or conferences dealing with aviation education. Twenty-four, or 29 per cent of the instructors indicated they had attended one or more noncredit workshops or conferences dealing with aviation education.

10. Sixty-eight, or 81 per cent, of the instructors indicated they had been members of some branch of the armed forces. Thirty-five, or 51 per cent, of these instructors indicated they had served in the Air Force and twelve of these instructors had had four years experience in the Air Force. Twenty-three, or 33 per cent, of the instructors with service experience had had four years experience in some branch

of military service.

11. Twenty-four, or 35 per cent, indicated they had been pilots while in the service. Twenty additional instructors indicated they had completed military duty directly related to aviation education.

12. Forty-seven, or 56 per cent, of the instructors did not hold a current pilot's rating. Thirty-seven, or 44 per cent, did hold a current pilot's rating.

13. Forty-eight, or 57 per cent, indicated they had flown as pilots at one time or another. One instructor indicated he had begun to fly in 1921. Ten, or 21 per cent, of the instructors indicated they had logged from 1001 to 1500 hours flying time. Nine, or 18 per cent, indicated they had logged over 2001 hours flying time.

14. Seventy-four, or 88 per cent, of the instructors did not hold other Civil Aeronautics ratings, excluding pilot ratings. Ten, or 12 per cent, indicated they held other Civil Aeronautics ratings. Nine, or 90 per cent, of these indicated they held the ground instructor's rating.

15. Forty-eight, or 57 per cent, of the instructors indicated they had been members of Civil Air Patrol. Eleven, or 31 per cent, of the instructors who were members of Civil Air Patrol indicated they had had duty as instructors.

16. Sixty-six, or 82 per cent, of the instructors indicated they were in need of more help in teaching aviation education. The type of help indicated as most needed were materials for study and more group conferences. There was a feeling for the need of more aid of all types.

17. Thirty-two, or 38 per cent, of the instructors found

experience with the United States Air Force the most valuable in preparing for teaching aviation education. Twelve, or 14 per cent, indicated they had found aviation education workshops to be the most valuable experience in preparing to teach aviation education.

In 1959 Zaharevitz made a study to develop suggested curricula experiences for a summer aviation education workshop.¹⁹ "A review of previous research and related literature indicated that there is a definite need for aviation education in our schools and that aviation does have a proper place in our schools' curricula."²⁰

An open-form questionnaire survey of 59 individuals (eleven by interview and 48 by mail) was made. Four of the mailed questionnaires were returned as "unable to locate," eleven persons did not reply and six individuals indicated limited or no experience. The 27 usable mail replies plus the 11 interviews resulted in a total of 38 usable replies. Five aviation education specialists were selected to validate the data.

Respondents made recommendations for the optimum length of a workshop which ranged from one to eight weeks, the greatest percentage (27 per cent) of the answers were for four weeks' duration. A duration of five weeks ranked second (with 22 per cent of the answers) and three weeks ranked third (with 18 per cent). The specialists felt that there could be no one period of time for an aviation education workshop and that this was a determination which can only be made by individual directors and institutional administrators.

The most important "essential" activity or experience reported was that of basic fundamentals of aviation and astronautics; in the respondents' listing, this received 139 points out of a possible 185

maximum points. The item ranking second in this category, with 86 points, was curriculum planning or individual preparation of aviation curriculum materials (or a plan of action) for personal use. Orientation flight (81 points) was third and field trips or tours (78 points) was fourth. The specialists agreed in general with the reported "essential" activities and experiences but not in the respondents' order of importance. Three of the five specialists felt that flight instruction (pilot training) should be an "essential activity." They were unanimous in placing basic fundamentals of aviation and astronautics on top of the list. The first five items in the specialists' order of importance were: (1) basic fundamentals of aviation and astronautics (with 70 points out of a possible 70 maximum points); (2) orientation flights (59 points); (3) field trips (59 points); and (4) the use, effects and problems of aviation (53 points); and (5) curriculum planning or individual preparation of aviation curriculum materials; a written plan of action for personal use (51 points).²¹

Zaharevitz made the following recommendations:²²

A. The workshop shall serve all teachers, school administrators, laymen interested in aviation and mature students preparing to become teachers.

B. The aviation education workshop shall provide each participant with:

1. An adequate reading and speaking vocabulary of aviation and astronautics.

2. The importance of weather and climate to successful aviation.

3. A general knowledge and understanding of airplane

structure.

4. A general knowledge and understanding of the simple scientific principles of flight.
5. An understanding of the place of aviation in peace and war.
6. An understanding of the effects of air transportation on various levels of international relationships.
7. An introduction to the social, economic and political implications of current and future aviation development.
8. An appreciation of the services rendered by airports and their associated personnel.
9. Familiarity with existing and needed basic governmental services.
10. A knowledge of available aviation education resources in materials, personnel and equipment for instructional purposes.
11. A realization of the growing interdependence of people through aviation.
12. A realization of how the airplane has changed geographic relationships--particularly in terms of mankind's concepts of time, place and distance.

In 1965, Butler's study had three chief purposes: (1) to define the aerospace dimension within the secondary curriculum, (2) to provide an aerospace science course of study for college preparatory students in the twelfth grade and (3) to present recommendations for aerospace education.²³

Over a period of three years, Butler developed an aerospace science course for college bound twelfth grade students at Marion

Center Joint High School in Indiana, Pennsylvania. He summarized the course as follows:²⁴

This preliminary course of study in aerospace science attempted to bridge the gap between geography and natural science courses presently developed for the high school student in Pennsylvania and the vast technological knowledge needed by the modern student who stands on the brink of space.

In an era when technology engulfs the mind of youth, a sense of realism and value must be incorporated into aerospace science teaching and student activities. Participation in a science fair strengthens the aerospace learnings since it is a means for student expression, practical cooperation among many disciplines, and a concrete method for students to aid the process of adult education. A safe rewarding extension is found by delegating a division within a science club to study the use of rockets.

In his recommendations he stated: to establish aerospace science teacher certification, it is recommended that the requirements for the certification of earth and space science teachers previously established in Pennsylvania be employed with the following adaptations: (1) twenty-four semester hours in biology, chemistry and physics with a minimum of twelve hours in physics, eight in chemistry and four in biology; (2) nine semester hours in mathematics to include analytical geometry, statistics and integral calculus; and (3) twenty-one semester hours in physical geography to include a minimum of six hours in astronomy and three hours each in cartography, physiogeography, geology, meteorology and climatology.

He further recommended that more investigation be done to create a laboratory manual based on the suggested exercises; since an adequate manual is not now available. A textbook based on proposed aerospace science course of study should include a condensed reference section for classroom and laboratory use. An organized formal series of supplemental books should be written for aerospace science.²⁵

Johnson,²⁶ in 1966 made a study of aerospace principles desirable for inclusion in fifth or sixth grade science programs. Subsidiary considerations were the selection of applications for each of the established principles and the determination from a random sampling, the extent to which current textbooks include these principles.

The reviewed literature indicated that, although teacher interest in aerospace study at the elementary school level existed, most studies were concerned with aerospace education at the collegiate level.

In this study aerospace is defined as the earth's envelope of air and the space above it. The term principle was defined as a comprehensive generalization describing a fundamental process of aerospace which can be verified by demonstration or observation of natural phenomena. The principle must be scientifically true without exception within the limits stated and it must not be a definition.

A preliminary list of aerospace principles was formulated by Johnson and submitted to the National Center for Atmospheric Research and the National Bureau of Standards for further clarification, alteration or deletion. The received list was then forwarded to a jury consisting of 25 science educators and 25 elementary science specialists. The responses of the jury were used as the basis for determining the suitability of aerospace principles for use in the fifth or sixth grade science curriculum.

Johnson concluded: (1) there are a great number of scientific principles suitable for inclusion in aerospace studies at the fifth or sixth grade level, (2) agreement was lacking between individual elementary science specialists and science educators as to the relative value of each individual aerospace principle to be included in the

elementary curriculum at the fifth or sixth grade level, (3) the fact that the principles were derived from more than one field of science emphasized the difficulty of providing a plan of study which would include all phases of aerospace, (4) current elementary textbooks are not suited for use as resource material for study of aerospace at the fifth or sixth grade level.

Sanders²⁷ in 1967 made a study to determine content for a college program that would provide elementary and secondary school teachers with a general knowledge of aerospace based on the guidance of selected aviation and space industries. It was also concerned with ways the teachers could keep up-to-date with the new aerospace developments and cooperate with industry for mutual benefits.

An open-end opinionnaire rating scale developed in two parts was sent in separate mailings to member companies of the Aerospace Industries Association of America. The first part was concerned with: (1) evaluation of fourteen direct experiences between industry and education, (2) a value rating of six indirect experiences, (3) a determination of the extent to which industry contributed articles to and subscribed to school journals and related publications, (4) the most beneficial means through which teachers could help industry bring about an understanding, enlightened public, (5) the number of companies that had instructional materials of value to teachers. Part two presented 103 units of instruction relating to aviation, space and general impact to representatives of the industry for evaluation. Each unit was rated according to four value categories.

Some of the important findings are as follows: (1) of the direct industry-education experiences, planned industrial tours by

teachers, advisory council meetings between representatives of industry and education and directed field study of industry by teachers were highly favored; (2) indirect experiences that received the most value were periodical sources, teacher membership in professional organizations devoted to aerospace education and daily newspapers; (3) less than 50 per cent of the aerospace companies wrote articles for school journals and related publications or subscribed to them. The given value for this means of industry-education communications was low; (4) career guidance was rated the highest of the teacher contributions to a better understanding of the industry; (5) free and inexpensive materials of value to teachers were available from 30 per cent of the companies; (6) aerospace education for elementary teachers was determined to be of value with the emphasis on space developments. Aviation and space education were rated with definite and great value, respectively, for secondary teachers.

Sanders concluded: teachers should make frequent preplanned tours of aerospace industries; children's fieldtrips require special thought and caution; resource speakers and part-time industrial instructors provide important services and liaison with the schools; teacher membership in selected aerospace education associations is encouraged; periodicals published by both industry and education can provide needed two-way communications; and all teachers should be versed in matters pertaining to career guidance. Three college courses are suggested: Aerospace Education for Elementary Teachers, (2) Aviation Education for Secondary Teachers and (3) Space Education for Secondary Teachers.

A part of upgrading teachers in the space age was to make the

teachers capable of handling the space science concepts that could be taught at their level and, secondly, to make the teacher aware of more recent examples of these concepts. Characteristically, the lag time had been approximately four years from discovery of knowledge to its being taught.

The aerospace workshop, an outgrowth of aviation education workshops that have been conducted on campuses since the late 40's, took on new emphasis. In workshops up to 1962, The Aviation Education Committee of the American Association of Colleges for Teacher Education recommended the following objectives.

1. An adequate reading and speaking vocabulary of aviation.
2. Knowledge of the importance of weather and climate to successful aviation.
3. General knowledge and understanding of the simple scientific principles of flight.
4. Understanding the place of aviation in peace and war.
5. Understanding the effects of air transportation on various levels of international relationships.
6. Introduction of the social, economic and political implications of current and future aviation development; a realization of the growing interdependence of people through aviation.
7. Appreciation of the services rendered by airports and their associated personnel.
8. Knowledge of available aviation education resources in materials, personnel and equipment for instructional purposes.
9. The know-how for organizing units of aviation education and providing resulting learning experience for children through student or directed teaching.²⁸

The concepts of space science began to permeate ~~the~~ aviation education workshops and by 1963 the name of aviation education had been supplanted by the term aerospace. The National Aeronautics and Space Administration created the Office of Technical Information and

Educational Programs within its organization to support educational institutions in the following areas.²⁹

1. Assisting schools and colleges in structuring courses, seminars and institutes in space science, and providing resource people, visual aids, and space-science demonstrations.
2. Developing and making available pamphlets, booklets, brochures and instructional materials to assist educators in their timely space-education efforts.
3. Developing and distributing to educational groups films, slides, charts and exhibits designed to promote better understanding of space science, related technology and the many implications of space exploration.
4. Developing "Spacemobiles" to bring to school and college groups a mobile space-science unit, utilizing special equipment to demonstrate basic principles of rocketry, launching and orbiting of satellites, deep-space probes, and examples of significant space experiments achieved by spacecraft such as Tiros, the weather satellite; Echo, the communication satellite and Pioneer V; the sun satellite.
5. Cooperating with national, state and local educational organizations and with aerospace industries to engender programs in space education and participating in the programs of many educational organizations.
6. Cooperating with educational television and commercial TV stations and networks in production and presentation of space programs.

James Webb, administrator of the National Aeronautics and Space Administration in 1962 made the following comments concerning part of NASA's contributions to education:

Our Office of Educational Programs and Services is working closely with many of the National Education Association affiliates, with the U. S. Office of Education, with the National Science Foundation and with other national organizations and groups having an interest in and responsibility for education.

We are utilizing NASA's scientific and technical sources of space information to develop materials for books, booklets, pamphlets and educational publications, in cooperation with practicing educators. We are making available to the public in useful form much of the exciting motion picture footage

on our rocket launches, on the work of our scientific satellites, and on many other unusual and intriguing technological developments. We are working diligently to make as much as possible of this type of information available to classroom teachers and to adult groups across the Nation and around the world.

We are assisting colleges and universities in organizing and conducting workshops and other programs designed to provide teachers at all age and grade levels with better understanding of space science and technology and of the implications of our push into space.

One of our most successful educational service undertakings has been the spacemobile program. The exhibits and lecturers aboard the spacemobile provide the school, college, or lay audience with accurate, up-to-date information on space science and exploration. A typical demonstration is about 50 minutes long and answers six basic questions: What is a satellite? How does it get into orbit? What keeps it in orbit? What does it do? What good is it? What are NASA's plans for future research and space exploration?³⁰

NASA's support to education via providing assistance to teacher's workshops is carried out primarily by Spacemobile lecturers. These lecturers are specialists in education, being well prepared in teaching techniques as well as space science concepts. Each lecturer's unit contains a set of rocket and satellite models plus audio-visual materials to present lectures to student audiences or teacher workshops. The most often used practice in workshops is the NASA resource person actively participating for three to five days presenting resource materials and space science concepts to the workshop participants.³¹

Surveys reveal that the average length of time that an individual remains in teaching continues to be about five years. This fact, coupled with the reality that preservice programs can provide teachers with only the basic skills of teaching, emphasizes the need for inservice programs. It has been suggested that one of the objectives of an in-service program should be to develop a cadre of "resource teachers."³² Such individuals would be involved in the pilot program

and could later serve as local consultants to new staff members. Presumably they would attain sufficient status and incentive in this role to encourage them to remain longer than the average five year period.

For a number of years educators and lay people in the state of Oklahoma have been concerned about the apparent lack of educational application in the area of aerospace education. In 1967 in Oklahoma, out of the 120,000 high school students, fewer than fifty were enrolled in any type of air education course. There were only three schools in the entire state which offered such a program.

When this unbecoming paradox was called to the attention of Governor Dewey Bartlett, he immediately named an air education committee to investigate this situation and what could be done to stimulate air education in Oklahoma schools. These programs were located at Kingfisher, Poteau and Wagoner, Oklahoma.

In a news release dated Sunday, June 9, 1968, Governor Bartlett stated, "During the past school year, we had only three Oklahoma high schools which had air education classes. There were fewer than 50 students out of 120,000 in the state who were exposed to air education. This does not make sense when one out of six people in Oklahoma City, for example, derives his income from the aerospace industry. It does not make sense when aviation is the fastest growing industry in Oklahoma. This lack of air education must be remedied. I have therefore appointed a number of people who are most concerned with this problem who are daily working with education, aviation and aerospace industry to serve on my committee. I feel confident that through these appointments and through this committee, we can vastly increase the

of public schools in Oklahoma which will offer air education courses in their curricula. This will be our goal. With the help of the committee, we should be able to put Oklahoma at the top of the ladder in this field."³³

The Governor's committee on air education was divided into five subcommittees; they were charged with the following responsibilities.

Curriculum and Materials Committee

This committee shall make comprehensive recommendations concerning the curriculum or curricula which may be adopted by Oklahoma secondary schools. It shall also make recommendations concerning the materials which may be required for use by students taking air education such as plotters, computers and textbooks. The committee shall give consideration to the current requirement for air education courses which specify that such courses will last a full nine months. The committee shall gauge the capacity of students to acquire sufficient knowledge to pass the FAA ground school examination and whether or not this can be done in one semester. If this they believe, they should consider whether or not an aviation history course should be given the first semester to be followed by ground school course leading to FAA examination in the second semester.

Accreditation Committee

This committee shall make recommendations concerning the current standard of accreditation for teachers of air education at the secondary level. It shall ascertain whether or not in its opinion recent acquisition of a private pilot's license or successful completion of the

FAA ground school examination should also result in accreditation if the teacher meets other state standards. It should investigate the question of a policy regarding the waiver of current requirements of air education courses lasting a full nine months or the possible creation of a credit of one-half unit and permitting such courses to last only one semester. It shall also recommend a policy of waivers to allow some schools to permit air education where current standards may work a hardship on the school desiring to teach such courses.

Legislative Committee

This committee shall work with the Governor and the Legislature to propose, compose and seek to pass legislation which shall assist the development of air education interest in Oklahoma. It shall act, where required, in order to implement the recommendations of the various subcommittees by seeking to enact legislation which seems compatible with those recommendations.

Funding Committee

This committee shall have as its primary function the investigation of whether or not state monies may be required for the implementation of recommendations of the various subcommittees. If state monies are deemed necessary, it shall recommend to the Legislative Committee what legislative action may be required. The committee shall also investigate private sources of revenue which may be forthcoming for the purpose of stimulating air education in Oklahoma. It shall also work closely with the Teachers Workshop Committee to ascertain whether or not attendance by teachers at such workshops may or may not work a

financial hardship upon them for such study, whereas study in their chosen field may be remunerative.

Teacher Workshop Committee

This committee shall have as its function, the surveying of current facilities available for qualifying Oklahoma teachers for air education subjects. It shall make a determination as to how long such workshops should last--possible means of financing attendance by teachers at such workshops. It shall make recommendations as to the material to be covered in such workshops and the materials necessary for such workshops. It shall prepare, to the best of its availability, an estimate of the number of teachers which might attend such workshops and prepare such an estimate on a five-year basis to allow for increases in each of those five years. It shall coordinate with the Accreditation and Materials Committee so that an appropriate certificate of accreditation may be issued by the State Department of Education.³⁴

On October 2, 1968, the Legislative Subcommittee of the Governor's Air Education Committee met and discussed the report of the Curriculum Subcommittee and its recommendation of asking \$15,000 from the Legislature to implement the teacher workshop program during the Summer of 1969.

The Chairman of the Governor's Air Education Committee who was also a staff member of the Oklahoma State Department of Education stated that the State Board was desirous of assisting the program in any possible way provided the program was feasible. He pointed out the necessity of materials and guide lines to maintain student interest.

Following a general discussion, funding for such a program was

declared necessary. It was moved that the necessary preparations be made, with the Governor's approval, for the submission to the Legislative Council of a proposed bill which would embrace the following areas:

(a) \$15,000 for teacher workshops in the summer of 1969, with the provision that a like sum or more be raised from private and philanthropic sources.

(b) \$20,000 for preparing and publishing classroom material for air education courses from kindergarten through high school.³⁵

On October 14, 1968, the subcommittee on funding of the Governor's Air Education Committee convened and a discussion ensued of the recommendations by the Legislative Committee to request the Legislature for \$15,000 for the Teacher Workshop Program. The consensus was that the state should bear at least one-half the financial burden of workshops.

A motion was made and passed unanimously that the Legislature be asked to appropriate \$17,500 for the program and that an equal amount of \$17,500 be raised from other sources for the program.

It was suggested that all monies raised be donated to the Oklahoma Economic Development Foundation which in turn would remit these funds to the Oklahoma Aeronautics Commission.

The question of providing an additional stimulus for the teachers attending the workshop was discussed. There was an agreement that an additional incentive could be provided if a trip to Houston to tour the Space Center or a visit to Cape Kennedy could be arranged.

As to the problem of raising money from outside sources, it was agreed that each committee member would provide a list of potential donors.

This list could include major oil companies which sell aviation

products in Oklahoma, some of the larger aviation companies as well as some of the fixed base operators.³⁶

On October 17, 1968, the Teacher Workshop Subcommittee of the Governor's Air Education Committee was called for the purpose of formulating plans for the teacher workshop.

It was moved and seconded that a three-week workshop be planned for the summer of 1969. The workshop would be limited to one-hundred teachers who are residents of Oklahoma. It was also passed that the workshop be held in a central location but that graduate credit and enrollment be permitted at the various colleges in Oklahoma.³⁷

The Teacher Workshop Subcommittee of the Governor's Air Education Committee met for the second time on October 30, 1968. It was reported that the Teacher's Air Education Workshop could be offered at one institution and the credit from the workshop could be transferred to any state college or university. It was decided at this meeting that the workshop would be for a three-week duration and that three hours graduate credit be awarded for this course.

The opinion of the committee was that 15 of the 100 teachers chosen for the workshop be given extra training in order to develop future teachers for workshops.

The committee approved the dates of July 7, 1969 through July 25, 1969 for the workshop, with the tentative program to be as follows:

Monday	July 7	Registration and Orientation
Tuesday	July 8	Lectures and Banquet
Wednesday	July 9	FAA field trip to Center - Aero Commander--FAA GADO
Thursday	July 10	Morning - briefing on NASA Afternoon - trip to Houston

Friday	July 11	NASA Field Trip
Monday	July 14	Full session in the morning Elementary and secondary in the afternoon (Introducing Air Education in the Classroom)
Tuesday	July 15	Tulsa, Ardmore, Durant (combi- nation trips)
Wednesday	July 16	Tulsa, Ardmore, Durant (combi- nation trips)
Thursday	July 17	Industry participation - set stage for work on curriculum - Aviation Representatives: Cessna; Beechcraft; Piper; etc.
Friday	July 18	Tinker AFB and RAPCON field trip
Monday	July 21	Planning actual curriculum's (sic) with the meetings to convene at 10:00 a.m. and adjourn at 2:00 p.m.
thru		
Friday	July 25	Banquet to be held in the evening.

The motion was made and seconded that the workshop be held at Oklahoma State University. The motion was passed unanimously.³⁸

The first meeting of the Executive Committee of the Governor's Air Education Committee was called on November 7, 1968.

It was agreed that the Air Education Program be funded in the amount of \$60,000, \$15,000 of which would come from outside sources and another \$45,000 to be sought by Legislative appropriation.

There was agreement to entitle the course at Oklahoma State University the "Master Teacher Workshop for Air Education."

It was decided that the Master Teacher Workshop in Air Education should have clearly defined dual purposes which shall be:

A. To qualify 100 teachers in the program of instruction of

"Aerospace and You."

B. To prepare a guidance outline and formulate a policy for passing on this information through the conference Teacher Workshops on Air Education.³⁹

During the first session of the 32nd Legislature, Senate Bill Number 56, by McSpadden and Massey of the Senate and Willis and Miskelly of the House was introduced. This bill was for the appropriation of the sum of two hundred fifty-five thousand dollars (\$255,000.00) of which \$45,000 was to be allocated for the Teachers Workshop Program.

On February 19, 1969, the Teacher Workshop Committee convened. It was suggested by the director of the Oklahoma Aeronautics Commission that the committee begin raising the necessary \$15,000 for the workshop from outside sources in order to have some operating capital while waiting on the results of Senate Bill 56.

April 8, was set for the screening committee to meet for the purpose of selecting the 100 elementary and secondary teachers to attend the workshop. It was decided that the screening committee include all members of the workshop committee. Mailing of applications to all teachers were to be accomplished through the mailing list of the Oklahoma State Department of Education.

The selection of the 100 teacher participants will be based on:

- a. Geographic Location
- b. Thirty Elementary Teachers
- c. Thirty Junior High Teachers
- d. Thirty Senior High Teachers
- e. Ten Administrators
- f. Expressed interest of the local administration in establishing Air Education.

There was agreement of the committee that a curriculum guide for Air Education would be one of the outcomes of the first Teacher Education Workshop in Air Education.⁴⁰

On July 9, 1969, the first Oklahoma Aerospace Education began on the campus of Oklahoma State University. In attendance at the workshop were 104 teachers from sixty cities and towns across the state of Oklahoma.

Due to the apparent success of the first workshop and wide spread influence of teachers and school administrators, the Legislature approved funding for a second statewide workshop in aerospace education to be held during the summer of 1970.

Included in this workshop were 20 teachers who were participants in the 1969 workshop. These 20 teachers were given one additional week of intensive training and were awarded the FAA ground school certificate.

The writer has attempted to show that aerospace education has been a part of the educational program in the Nation's schools for many years.

The research shows what happens in the classrooms across the Nation, the recommendations concerning the course content of aerospace education courses and the type of activities that are included. The research does not show an evaluation of the preparation of the teachers and the workshops that prepared them.

An attempt has been made to set the stage for an evaluation of the workshops in aerospace education and their effects on teacher participants.

FOOTNOTES

¹Mildred Lee Hackett, "Aviation Education in the High Schools in the United States," (Unpub. Masters Thesis, George Washington University, 1946), p. 1.

²Ibid., p. 1.

³Ibid., p. 117.

⁴Ibid., pp. 118-119.

⁵John D. Cornwell, "The Impact of the Air Age on the Community," (Unpub. Masters Thesis, The University of Southern California, 1947), p. 2.

⁶Ibid., pp. 15-17.

⁷Ibid., pp. 16-17.

⁸Cecil W. Lewis, "Teacher Training in Aviation Education," (Unpub. Doctoral Dissertation, University of Southern California, 1948), p. 3.

⁹Emerson E. Nevthardt, "A Study of Air Education Views of Staff Members of New York State Elementary Schools and Teachers Colleges," (Unpub. Doctoral Dissertation, University of Buffalo, 1949), p. 3.

¹⁰Alan R. Pawelek, "Air-Age Education," (Unpub. Doctoral Dissertation, University of Minnesota, 1950), p. 160.

¹¹Ibid., pp. 182-183.

¹²Mervin K. Strickler, Jr., "The Air Center as a Means of Implementing Aviation," (Unpub. Doctoral Dissertation, Stanford University, 1951), p. 162.

¹³Ibid., p. 162.

¹⁴Ibid., p. 80.

¹⁵Kermit Anderson, "A Survey of Certain Aspects of Aviation Education in Selected Schools in the United States," (Unpub. Masters Thesis, North Dakota Agricultural College, 1955), p. 28.

¹⁶Ibid., p. 12.

¹⁷Ibid., pp. 45-47.

- ¹⁸ Ibid., pp. 74-76.
- ¹⁹ Walter Zahare Vitz, "Curricular Experiences for a Summer Aviation Education Workshop," (Unpub. Masters Thesis, Miami University, 1959), p. 26.
- ²⁰ Ibid., p. 80.
- ²¹ Ibid., pp. 81-82.
- ²² Ibid., pp. 86-87.
- ²³ Richard Terry Butler, "Aerospace Science," (Unpub. Masters Thesis, Indiana State College, 1965), pp. 12-18.
- ²⁴ Ibid., pp. 54-57.
- ²⁵ Ibid., pp. 56-58.
- ²⁶ Mervin LeRoy Johnson, "A Determination of Aerospace Principles Desirable for Inclusion in Fifth or Sixth Grade Science Programs," (Unpub. Doctoral Dissertation, 1966), pp. 26-28.
- ²⁷ Leroy John Sanders, "Aerospace Education for Teachers Based on Recommendations of Selected Aviation and Space Industries," (Unpub. Doctoral Dissertation, Colorado State College, 1967), p. 46.
- ²⁸ Wilma M. Dolezal, "Aerospace Comes of Age," The Texas Outlook, July, 1962, pp. 16-17.
- ²⁹ Evan Evans, "NASA's Educational Services Program," Education, Vol. 81, May, 1961, p. 570.
- ³⁰ James E. Webb, "Education and the National Space Program," Higher Education, July 28, 1962, p. 28-30.
- ³¹ Robert S. Schwartz and Ellen Gertz, "Send for the Spacemobile," Educational Screen and Audio Visual Guide, April, 1967, pp. 22-23.
- ³² Ibid., p. 25.
- ³³ Governor Dewey Bartlett, News Release dated Sunday, June 9, 1968.
- ³⁴ Minutes of the Governor's Air Age Education Committee, August 17, 1968.
- ³⁵ Minutes of the Legislative Subcommittee of the Governor's Air Education Committee, October 2, 1968.
- ³⁶ Minutes of the Subcommittee on Funding of the Governor's Air Education Committee, October 14, 1968.

³⁷Minutes of the Teacher Workshop Subcommittee of the Governor's Air Education Committee, October 17, 1968.

³⁸Ibid.

³⁹Minutes of the Executive Committee of the Governor's Air Education Committee, November 7, 1968.

⁴⁰Ibid.

CHAPTER III

DESIGN AND METHODOLOGY

Description of the Sample

The participants in this study were teachers from the state of Oklahoma who were invited and who were in attendance at the first two Oklahoma Aerospace Education Workshops. There were 95 high school teachers, 96 elementary school teachers, 21 junior high school teachers and eight specialists involved in these workshops.

The participants were selected by the Teacher Workshop Committee of the Governor's Air Education Committee. The criteria used for selection were as follows: (1) representation of all geographical sections of the State, (2) close approximation in number between male and female teachers, (3) representation from all grade levels, kindergarten to grade twelve, (4) representation from most curriculum areas in high school, and (5) the endorsement of the participant by the school administrator and assurance that the teacher would receive encouragement and backing in implementing into the curriculum those concepts and activities presented in the workshops.

Thirty teachers who were in attendance at the two Aerospace Education Workshops were eliminated from this study because they were not teaching in the State of Oklahoma during the spring semester of 1971. The elimination of the thirty teachers who are not presently teaching reduced the number of teachers in the sample to 199.

Collection of Data

Construction of the Questionnaire

The questionnaire was the sole source of data. The process of determining the adequacy of information requested in the questionnaire included the compiling of a preliminary list of questions gathered from literature related to the subject and samples of questionnaires provided by the National Aerospace Education Council, the Federal Aviation Agency, the Cessna Aircraft Company and the National Aeronautics and Space Administration.

The questionnaire was then reviewed by individual consultation with doctoral students in science education, the Chairman of the writer's doctoral committee and selected members of the Governor's Air Education Committee. After revisions were made on the basis of suggestions of the previous groups the questionnaire was administered to a doctoral seminar. Responses and verbalization allowed for an indication of validation of the instrument.

Design of the Questionnaire

The approved questionnaire was comprised of four separate sections. The first section was concerned with attitudes toward aerospace education and its relevance in the schools of Oklahoma. This section was composed of thirty items in which the teachers responded on a Likert type scale that ranged from strongly agree to strongly disagree.

The second section of the questionnaire was designed to gather data concerning actual teaching techniques employed by the teachers in the classroom. This section was composed of seventeen items that

dealt specifically with classroom activities.

The third section of the questionnaire concerned itself with an evaluation of the past two Aerospace Education Workshops and recommendations for future efforts in the field of aerospace education. This section was composed of twenty-eight items.

The fourth and last section of the questionnaire was designed to gather biographical data on each teacher.

Each questionnaire was assigned a reference number to make possible the identification of participating teachers. A copy of the questionnaire is found in Appendix A.

Submission of Questionnaire to Teachers

A list of teacher participants in the 1969 and the 1970 Aerospace Education summer workshops was obtained from the Oklahoma Aeronautics Commission. The questionnaire, accompanied by letters of explanation, were mailed to teachers who were enrolled in the workshops. Each questionnaire was designed so as to have a stamped, self-addressed label for the purpose of easy return of the completed instrument.

Follow-Up Letters

In order to insure as large a return as possible, a follow-up letter was mailed to the participants of the workshops three weeks after the mailing of the original questionnaire. A second questionnaire, along with a stamped, self-addressed envelope was also enclosed. Participants were urged to return questionnaires by February 15, 1971.

Method of Analyzing Data

Since the study is concerned with a historical description of the first two Oklahoma Aerospace Education Workshops, no elaborate statistical interpretations were made. Data related to the research questions of this study were tabulated and calculated by means of IBM calculator and presented in terms of numbers and percentages so that significant patterns and relations could be studied.

Analysis was made in terms of comparisons between elementary and high school teachers, male and female teachers and teacher location rural or urban. These comparisons were made in order to ascertain the area of greatest impact.

Summary

The purpose of this chapter has been to give a general description of the design of the study. Major areas discussed were selection of teachers, collection of data, scope and validity of the study and method of analyzing data.

The population to which the questionnaires were sent included one hundred per cent of the population of the workshops; eight-nine per cent of the participants returned usable questionnaires which were then used in the study.

In the next chapter the findings from the questionnaires submitted to participants will be presented.

CHAPTER IV

RESULTS OF THE STUDY

The concern of the first three chapters has been a general introduction to the study, an extensive review of related literature, and a discussion of the design of the study.

In this chapter a presentation of the findings from the questionnaire will be presented. Data obtained from the questionnaire will be tendered and discussed.

Data will be presented according to research questions listed in Chapter II. The data will be compared and analyzed according to the variables of total participant responses; male participant responses; female participant responses; urban participant responses; rural participant responses; B.A. participant responses; M.A. participant responses; participant responses with credit hours above the M.A. degree; participant responses between the ages of thirty and thirty-nine years; participant responses between the ages of forty and forty-nine years; participant responses between the ages of fifty and fifty-nine years; participant responses of elementary teachers and participant responses of high school teachers.

All data presented in this chapter are presented in terms of percentage of participant response to items on the questionnaire that are directly related to each research question.

The collected information is reported on a Likert type scale that ranges from strongly agree, agree, neutral, disagree, strongly disagree.

Information concerning each research question can be found in the tables. The researcher has attempted to assist the reader by explaining data found in total participant response. In addition the response variables that show the greatest divergence between responses has been noted.

Research Question Number One

Do workshop participants feel that aerospace education should be a vital part of the educational plan in the state of Oklahoma?

To obtain supporting data for this question items three, eleven, and eighteen of the questionnaire were used (see Appendix A).

In response to item three found on Table I of the questionnaire, 46.9 per cent of the participants indicate that they strongly agreed with the statement that aerospace education should be taught at all grade levels. Questionnaire data indicates that 42.5 per cent of the teachers agreed with the statement listed on the questionnaire. Total positive response from the teachers involved in the workshops equals to 89.4 per cent of the total population. Findings show that 6.3 per cent of respondents had no strong feeling either positive or negative regarding the statement. Further analysis of the data signifies that only 3.8 per cent of the participants disagree with the statement and 0.5 per cent strongly disagree with the item.

It is interesting to note that there is a 14.0 per cent difference in participant response to the statement between B.A. degree teachers and M.A. degree teachers in the strongly agree column of the scale.

TABLE I
 PER CENT OF PARTICIPANT RESPONSE TO THE STATEMENT:
 AEROSPACE EDUCATION CONCEPTS SHOULD BE
 TAUGHT AT ALL GRADE LEVELS

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	46.9*	45.8	6.3	3.8	.5
All Female Participants	46.8	44.8	6.4	1.0	1.0
All Male Participants	46.2	40.0	6.2	7.6	0.0
All Urban Participants	47.6	42.2	5.1	4.3	.8
All B.A. Degree Participants	51.0	39.9	3.9	3.5	1.7
All M.A. Degree Participants	65.0	35.0	0.0	0.0	0.0
All Participants with hours above M.A. Degree	41.8	45.2	9.5	3.5	0.0
Participants between 20-29 years of age	45.0	42.5	7.5	5.0	0.0
Participants between 30-39 years of age	35.4	56.3	6.3	0.0	2.0
Participants between 40-49 years of age	53.6	32.6	6.9	6.9	0.0
Participants between 50-59 years of age	40.0	60.0	0.0	0.0	0.0
All Elementary Participants	60.0	40.0	0.0	0.0	0.0
All High School Participants	40.0	50.0	10.0	0.0	0.0
All Rural Participants	57.5	37.5	5.0	0.0	0.0

* Figures represent percentage

There were 51.0 per cent of the teachers with B.A. degrees agreeing with the statement on the questionnaire while 65.0 per cent of teachers with M.A. degrees indicated a strong agreement with the statement that aerospace education should be taught at all grade levels.

In response to item eleven found on Table II of the questionnaire 47.5 per cent of respondents strongly agreed with the statement that aerospace education is a must at this time. There were 41.3 per cent of the participants who responded with agreement on the item, while 9.4 per cent were neutral and 1.3 per cent disagreed with the statement. Item eleven shows an 88.8 per cent section of the population who had positive reactions to the statement that aerospace education is a must at this time.

It is noteworthy to observe that there is a 15.0 per cent difference in opinion between participants in the age bracket of twenty and twenty-nine years of age and teachers between thirty and thirty nine years of age. Questionnaire information indicates that 35.0 per cent of the younger teachers strongly agreed with item eleven while 50.0 per cent of the teachers in the age bracket of thirty and thirty-nine agreed with the statement.

The teachers' response to item eighteen (found on Table III) on the questionnaire reveals that participants feel very strongly that aerospace education should not be dropped from the curriculum. Elementary teachers responded most positively to this item. Information found in item eighteen shows that 100.0 per cent of elementary teachers exhibit feelings against dropping aerospace education activities from the state's curriculum plan.

TABLE II

PER CENT OF PARTICIPANT RESPONSE TO THE STATEMENT:
AEROSPACE EDUCATION IS A MUST AT THIS TIME

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	47.5*	41.3	9.4	1.3	.5
All Female Participants	51.3	42.3	5.3	0.0	1.1
All Male Participants	41.5	40.0	15.4	3.1	0.0
All Urban Participants	44.9	43.1	9.5	1.7	0.8
All B.A. Degree Participants	49.1	43.1	5.9	0.0	1.9
All M.A. Degree Participants	50.0	35.0	5.0	10.0	0.0
All Participants with hours above M.A. Degree	46.4	41.7	11.9	0.0	0.0
Participants between 20-29 years of age	35.0	40.0	20.0	5.0	0.0
Participants between 30-39 years of age	50.0	43.9	4.1	0.0	2.0
Participants between 40-49 years of age	51.2	39.5	9.3	0.0	0.0
Participants between 50-59 years of age	50.0	50.0	0.0	0.0	0.0
All Elementary Participants	53.4	40.2	5.3	0.0	1.1
All High School Participants	51.5	40.0	15.4	3.1	0.0
All Rural Participants	55.0	35.0	10.0	0.0	0.-

* Figures represent percentage

TABLE III

PER CENT OF PARTICIPANT RESPONSE TO THE STATEMENT:
I WOULD LIKE TO SEE AEROSPACE EDUCATION
DROPPED FROM THE CURRICULUM

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	1.2*	0.6	3.7	36.0	58.1
All Female Participants	1.0	1.0	2.1	39.5	56.4
All Male Participants	1.5	0.0	6.1	30.9	61.5
All Urban Participants	1.7	0.8	3.4	34.7	59.4
All B.A. Degree Participants	1.9	1.9	1.9	49.3	45.0
All M.A. Degree Participants	5.0	0.0	20.0	15.0	60.0
All Participants with hours above M.A. Degree	0.0	0.0	1.1	33.3	65.4
Participants between 20-29 years of age	0.0	0.0	7.5	27.5	65.0
Participants between 30-39 years of age	4.1	0.0	0.0	50.0	45.8
Participants between 40-49 years of age	0.0	2.3	6.9	23.3	67.4
Participants between 50-59 years of age	0.0	0.0	0.0	40.0	60.0
All Elementary Participants	0.0	0.0	0.0	20.0	80.0
All High School Participants	0.0	0.0	0.0	50.0	50.0
All Rural Participants	0.0	0.0	5.0	40.0	55.0

* Figures are reported in percentages

Research Question Number Two

Do workshop participants feel that aerospace education is relevant in the schools' curriculum plan at this time?

In order to procure responses from teachers regarding this research question, item fifteen was employed.

Information revealed in Table IV indicated that 94.4 per cent of the workshop participants agree that aerospace education can be related to all areas of the curriculum.

One area of interest that might be pointed out is the almost 18.0 per cent difference in the opinions of teachers with B.A. and M.A. degrees. Teachers with B.A. degrees indicate a higher percentage of strong agreement with the statement that aerospace education can be related to all areas of the curriculum. Another interesting fact to note is that participants with hours above the M.A. degree show 24.1 per cent increase over teachers with the M.A. degree who strongly agree that aerospace education can be related to all areas of the curriculum.

Research Question Number Three

Do participants feel that aerospace education workshops are necessary in providing proper educational experiences?

To secure supporting evidence for this question items sixteen and twenty-eight of the questionnaire were used. An analysis of items sixteen and twenty-eight of the questionnaire provide information concerning this question.

In answering this statement 10.1 per cent of the teacher participants in the aerospace education workshops strongly agreed that methods courses taken in undergraduate school influenced their teaching in the

TABLE IV
 PARTICIPANTS' RESPONSE TO THE STATEMENT: AEROSPACE
 EDUCATION CAN BE RELATED TO ALL AREAS
 OF THE CURRICULUM

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	63.8*	30.6	3.1	2.5	0.0
All Female Participants	61.7	35.1	1.1	2.1	0.0
All Male Participants	66.2	24.6	6.2	3.0	0.0
All Urban Participants	62.1	32.8	3.4	1.7	0.0
All B.A. Degree Participants	62.8	29.4	3.9	3.9	0.0
All M.A. Degree Participants	45.0	40.0	5.0	10.0	0.0
All Participants with hours above M.A. Degree	69.1	28.5	2.4	0.0	0.0
Participants between 20-29 years of age	57.5	32.5	7.5	2.5	0.0
Participants between 30-39 years of age	66.7	27.1	4.1	2.1	0.0
Participants between 40-49 years of age	65.1	30.2	0.0	4.7	0.0
Participants between 50-59 years of age	60.0	40.0	0.0	0.0	0.0
All Elementary Participants	69.1	28.5	0.0	2.4	0.0
All High School Participants	64.2	26.6	6.2	3.0	0.0
All Rural Participants	67.5	25.0	2.5	5.0	0.0

* Figures are reported in percentages

TABLE V
 PARTICIPANTS' RESPONSE TO THE STATEMENT: METHODS
 COURSES I HAVE HAD IN UNDERGRADUATE SCHOOL
 GREATLY INFLUENCE MY TEACHING OF
 AEROSPACE EDUCATION

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	10.1*	4.2	15.9	31.3	38.5
All Female Participants	8.5	4.2	22.3	38.2	26.8
All Male Participants	21.5	4.6	33.8	23.2	16.9
All Urban Participants	11.2	5.1	25.9	31.9	25.9
All B.A. Degree Participants	11.7	7.8	27.5	33.9	19.1
All M.A. Degree Participants	15.0	0.0	25.0	30.0	30.0
All Participants with hours above M.A. Degree	14.3	2.4	28.6	33.3	21.4
Participants between 20-29 years of age	10.0	0.0	22.5	35.0	32.5
Participants between 30-39 years of age	16.6	4.1	31.2	39.8	8.3
Participants between 40-49 years of age	5.9	6.9	32.5	26.8	27.9
Participants between 50-59 years of age	20.0	10.0	10.0	30.0	30.0
All Elementary Participants	4.3	6.7	31.6	48.4	9.0
All High School Participants	14.3	12.6	29.8	31.7	11.6
All Rural Participants	22.5	2.5	30.0	30.0	15.0

* Figures are reported in percentages

area of aerospace education concepts. Of the teachers responding 4.2 per cent indicated that they agreed with item sixteen in the questionnaire. In response of item sixteen on the questionnaire 69.8 per cent of the teachers said that their methods courses taken in undergraduate school did not greatly influence their teaching in the field of aerospace education.

It is very enlightening to discover that only 4.3 per cent of the elementary teachers felt strongly that their undergraduate courses influenced their teaching of aerospace education concepts while 14.3 per cent of high school teachers strongly agreed that their undergraduate background had a great influence on their entering the field of aerospace education.

It is also interesting to note the 13.0 per cent difference between men and women in their assessment of previous background and its influence upon their teaching of aerospace education. In response to item sixteen on the questionnaire there was a 12.7 per cent positive response from female participants while male participants responded with 26.1 per cent positive agreement.

Table VI points out that 26.7 per cent of the enrollees in the workshop strongly agreed that their undergraduate courses provided enough educational background to enable them to teach aerospace education concepts. Only 1.2 per cent agreed with the statement that their background was sufficient. In disagreement with the statement there were 40.8 per cent participant response. In the strongly disagree column in the table there appears 15.0 per cent responses from the teachers.

TABLE VI

PARTICIPANTS' RESPONSE TO THE STATEMENT: COURSES
TAKEN WHILE A STUDENT PROVIDES ME WITH
ENOUGH BACKGROUND TO TEACH AEROSPACE
RELATED CONCEPTS

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	26.7*	1.2	16.3	40.8	15.0
All Female Participants	19.2	1.0	17.0	46.9	15.9
All Male Participants	38.5	1.3	17.1	29.3	13.8
All Urban Participants	23.2	1.7	13.0	46.6	15.5
All B.A. Degree Participants	25.5	1.9	12.6	37.3	17.7
All M.A. Degree Participants	10.0	0.0	15.0	65.0	10.0
All Participants with hours above M.A. Degree	29.8	1.2	17.9	35.7	15.4
Participants between 20-29 years of age	32.5	5.0	10.0	40.0	12.5
Participants between 30-39 years of age	31.3	0.0	14.5	31.3	22.9
Participants between 40-49 years of age	23.3	0.0	16.2	46.6	13.9
Participants between 50-59 years of age	40.0	0.0	10.0	30.0	20.0
All Elementary Participants	16.3	1.8	12.9	39.3	27.0
All High School Participants	37.9	5.6	12.1	37.6	6.8
All Rural Participants	40.0	0.0	25.0	22.5	12.5

As revealed in Table V there is almost a 20% difference between male and female teachers expressing opinions that the courses taken in undergraduate college provided enough content background to teach aerospace education. This same fact is evident if one examines the differences of opinion between elementary and high school teachers.

It also seems to be evident that teachers with a M.A. degree feel more confident to teach aerospace education than teachers who hold only a B.A. degree.

Research Question Number Four

Having attended an aerospace education workshop, do participants feel competent to teach courses in aerospace education?

To gather supporting data dealing with this question, items ten (I am afraid of the thought of having to teach a unit on human factors in space flight), nineteen (I would like to teach my students aerospace education concepts but they are too difficult and confusing), and twenty-nine (I would devote more time to teaching aerospace education but I fear not being able to answer all questions) were utilized.

The data included in Tables VII and IX are concerned with the attitudes of teachers in the workshop about teaching units in aerospace related concepts.

Table VII yields information that gives a positive response from 89.4 per cent of the participants regarding their fear of teaching units on human factors in space flight. These 142 teachers have indicated that they would not be afraid of teaching units concerning the human factors in space flight.

TABLE VII

PARTICIPANTS' RESPONSE TO THE STATEMENT: I AM
AFRAID OF THE THOUGHT OF HAVING TO TEACH
A UNIT ON HUMAN FACTORS IN SPACE FLIGHT

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	3.1*	.6	6.9	66.9	22.5
All Female Participants	3.2	-	5.3	69.2	22.3
All Male Participants	3.1	1.5	9.2	64.7	21.5
All Urban Participants	.9	.9	7.8	65.5	24.9
All B.A. Degree Participants	3.9	-	5.9	76.5	13.7
All M.A. Degree Participants	-	-	10.0	55.0	35.0
All Participants with hours above M.A. Degree	3.6	1.2	7.1	65.5	22.6
Participants between 20-29 years of age	2.5	-	10.0	52.5	35.0
Participants between 30-39 years of age	2.1	2.1	2.1	75.0	18.7
Participants between 40-49 years of age	4.7	-	11.6	62.8	20.9
Participants between 50-59 years of age	10.0	-	-	60.0	30.0
All Elementary Participants	3.2	5.3	-	67.2	24.3
All High School Participants	4.7	-	10.6	63.8	20.9
All Rural Participants	10.0	-	5.0	70.0	15.0

* Figures are reported in percentages

TABLE VIII
 PARTICIPANTS' RESPONSE TO THE STATEMENT: I WOULD
 LIKE TO TEACH MY STUDENTS AEROSPACE EDUCATION
 CONCEPTS BUT THEY ARE TOO DIFFICULT
 AND CONFUSING

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	3.8*	1.3	8.1	63.0	23.8
All Female Participants	5.3	2.1	7.4	67.1	18.1
All Male Participants	1.5	1.6	9.2	56.9	30.8
All Urban Participants	3.4	-	6.0	65.6	25.0
All B.A. Degree Participants	2.0	3.9	7.8	74.5	11.8
All M.A. Degree Participants	5.0	-	10.0	55.0	30.0
All Participants with hours above M.A. Degree	4.8	-	9.5	59.5	26.2
Participants between 20-29 years of age	-	-	15.0	50.0	35.0
Participants between 30-39 years of age	6.3	4.2	4.2	62.4	22.9
Participants between 40-49 years of age	7.0	-	9.3	67.4	16.3
Participants between 50-59 years of age	-	-	10.0	80.0	10.0
All Elementary Participants	5.3	2.1	7.4	67.1	18.1
All High School Participants	1.1	-	9.2	56.9	32.8
All Rural Participants	5.0	5.0	15.0	57.5	17.5

* Figures are reported in percentages

TABLE IX

PARTICIPANTS' RESPONSE TO THE STATEMENT: I WOULD
DEVOTE MORE TIME TO TEACHING AEROSPACE
EDUCATION BUT I FEAR NOT BEING
ABLE TO ANSWER ALL QUESTIONS

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	18.8*	2.5	18.8	48.6	11.3
All Female Participants	22.3	3.2	18.1	47.9	8.5
All Male Participants	13.8	1.5	21.6	47.7	15.4
All Urban Participants	17.2	2.6	18.4	49.4	12.4
All B.A. Degree Participants	29.4	2.0	11.8	49.0	7.8
All M.A. Degree Participants	10.0	-	30.0	35.0	25.0
All Participants with hours above M.A. Degree	15.5	3.6	20.2	50.0	10.7
Participants between 20-29 years of age	12.5	2.5	20.0	45.0	20.0
Participants between 30-39 years of age	12.5	4.2	16.7	58.3	8.3
Participants between 40-49 years of age	20.9	-	32.6	32.5	14.0
Participants between 50-59 years of age	30.0	-	30.0	20.0	20.0
All Elementary Participants	22.5	3.1	18.0	46.8	9.6
All High School Participants	13.8	1.3	23.6	49.1	12.2
All Rural Participants	27.5	-	35.0	20.0	17.5

* Figures are reported in percentages.

Indicated in Table VII is the fact that almost 87.0 per cent of the teachers feel that aerospace education concepts are not too difficult to teach at their own grade level. In fact only 5.1 per cent indicate that they feel these concepts too difficult.

Information found in Table IX shows that 59.9 per cent of the teachers feel that they are not afraid of not being able to answer all questions. There was however, 19.0 per cent who were neutral concerning this item. There was a 21.3 per cent indication from teachers who felt that they could not answer all questions concerning aerospace concepts.

The data in the items listed seem to indicate very clearly that teachers who participated in the workshops feel competent to teach aerospace education concepts.

Research Question Number Five

Has there been a significant increase in the number of students exposed to aerospace education concepts?

In the cover letter sent out to the teachers with the questionnaires the participants were requested to indicate the number of students to whom they had introduced aerospace units. The returns from the questionnaire reveal that 9,301 students had experienced some type of work in the area of aerospace education. These students were in classes that ran from kindergarten to grade twelve and included all subject matter areas in high school. This is an almost thirty-one thousand per cent increase from 1967-68 school year when only 30 students in the State of Oklahoma were being taught aerospace education concepts.

Research Question Number Six

Are visits to aviation and aerospace industries and installations a vital part of workshop experiences?

During the first two Oklahoma Aerospace education workshops field trips were taken to the federal aviation center in Oklahoma City, Oklahoma, various commercial aircraft industries, National Aeronautics and Space Administration centers in Houston, Texas, Huntsville, Alabama, and Cape Kennedy, Florida, military air bases were also a vital part of the workshop field trip schedule. Table X shows the participants' response to the question concerning field trip activities. Item 34, part B of the questionnaire produced the results shown in Table XI.

TABLE X

PARTICIPANTS' RESPONSE TO THE STATEMENT: ARE VISITS
TO AVIATION AND AEROSPACE INDUSTRIES
AND INSTALLATIONS A VITAL PART
OF WORKSHOP EXPERIENCES

Industries	Positive Response		Negative Response	
	Number	Percent	Number	Percent
Federal Aviation Agency	156	97.5	4	2.5
Commercial Aircraft Industries	157	98.1	3	1.9
NASA Installations	160	100.0	0	0.0
Military Air Bases	150	93.7	10	6.3

TABLE XI

PARTICIPANTS' RESPONSE TO THE STATEMENT: SHOULD
RESOURCE PEOPLE BE A VITAL PART OF THE
AEROSPACE EDUCATION WORKSHOPS

Resource Speakers From	Yes		No	
	Number	Percent	Number	Percent
Civil Air Patrol	147	91.8	13	8.2
Federal Aviation Agency	156	97.5	4	2.5
Oklahoma Aeronautics Commission	154	96.2	6	3.8
Oklahoma Air National Guard	147	91.9	13	8.2
NASA	157	98.1	3	1.9
Commercial Aircraft Industries	153	95.6	7	4.4

The data found in Table X clearly indicate the value of field trips to the overall success of the first two Oklahoma Aerospace Education Workshops.

Trips to the various agencies and installations enabled the teachers to view first hand the theories discussed in the workshops being put into actual practice.

Research Question Number Seven

Should resource people be a vital part of the Aerospace Education Workshops?

To gather data to answer this research question, item number thirty-four (Part A) of the questionnaire was used. The results of the tabulation are shown in Table XI.

An analysis of the data in Table XI shows that workshop participants feel outside speakers to be of great value in the workshops. Speakers from the National Aeronautics and Space Administration led all other speakers by receiving 98.1 per cent of "yes" choices by workshop participants.

These speakers present to the participants areas of expertise that would otherwise be left to secondhand information gained by reading.

Research Question Number Eight

Do participants feel that future efforts need to be made to insure more inservice experience for teachers in the field of aerospace education?

In answer to this research question item number twenty-five was used.

Data obtained from item twenty-five indicate that 41.2 per cent of all workshop participants strongly agree that they would positively take part in future workshops if they were offered. Further examination of data shows that 33.1 per cent of the participants agree that they would participate in future workshops if they were available.

It is significant to note that the participants whose age falls between fifty and fifty-nine show a 100.0 per cent agreement that they would participate in future workshops if they were offered.

It seems apparent that teachers feel workshops in the field of aerospace education are very important if future efforts are to be successful in implementing new and broader programs in the field of aerospace education.

TABLE XII

PARTICIPANTS' RESPONSE TO THE STATEMENT: IF
SUCH TRAINING WERE AVAILABLE
I WOULD TAKE PART

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	45.0*	36.3	16.8	1.2	0.6
All Female Participants	47.9	30.8	18.1	2.1	1.0
All Male Participants	41.5	44.6	13.8	0.0	0.0
All Urban Participants	46.5	37.0	13.7	1.7	0.8
All B.A. Degree Participants	45.0	37.2	15.6	0.0	1.9
All M.A. Degree Participants	50.0	30.0	20.0	0.0	0.0
All Participants with hours above M.A. Degree	45.2	36.9	15.4	2.3	0.0
Participants between 20-29 years of age	42.5	40.0	17.5	0.0	0.0
Participants between 30-39 years of age	43.7	43.7	8.3	2.0	2.0
Participants between 40-49 years of age	44.1	25.8	27.9	2.3	0.0
Participants between 50-59 years of age	70.0	30.0	0.0	0.0	0.0
All Elementary Participants	47.9	30.8	18.1	2.1	1.0
All High School Participants	45.0	37.2	14.6	1.0	1.9
All Rural Participants	42.5	35.0	22.5	0.0	0.0

* Figures are reported in percentages

Research Question Number Nine

What areas of the workshops do participants feel to be the most effective in preparing teachers for aerospace education?

To obtain data for this research question item number thirty-four was used.

The information reported in Table XIII indicates that all aspects of workshop activities seemed to be felt important by the participants. In projecting further workshop plans fewer teachers felt that speakers from the State Board of Education from the state of Oklahoma were needed. Only 124 teachers felt that educational department speakers should be a part of future workshops.

Workshop activities should definitely include field trips to various agencies and installations.

Only 127 of the returned 160 questionnaires indicated that building model airplanes would be a good activity to include in future workshop activities.

Large group sessions covering general topics were felt to be important enough to be included by only 123 participants.

Research Question Number Ten

What are the attitudes of teachers concerning the inclusion of curriculum planning in workshop activities?

In response to this research question item 34 (Part D) was used to gather participant response. Out of the 160 returned questionnaires returned by participants in the workshops, only 118 teachers felt that curriculum planning should be included in the activities of such a workshop.

TABLE XIII

PARTICIPANTS' RESPONSE TO THE STATEMENT: IF A WORKSHOP WERE
TO BE OFFERED IN THE FUTURE AND YOU WERE CHOSEN TO
ATTEND WHICH OF THE FOLLOWING ACTIVITIES WOULD
YOU LIKE TO SEE OFFERED

	Yes	No
A. Speakers from the following agencies:		
1. Federal Aviation Agency	156	4
2. Civil Air Patrol	147	13
3. Oklahoma Air National Guard	147	13
4. Commercial Aircraft Industries	153	7
5. Oklahoma Aeronautics Commission	154	6
6. National Aeronautics and Space Administration	157	3
B. Field trips to the following:		
1. Federal Aviation Agency	156	4
2. Commercial Aircraft Industries	157	3
3. NASA installations such as the following:	160	10
a. Cape Kennedy		
b. Manned Space Flight Center		
c. Redstone Arsenal		
4. Military Air Bases such as:	150	10
a. Eglin A.F.B., Fort Walton, Florida		
b. Basic Training Command, San Antonio, Texas		

TABLE XIII (CONTINUED)

	Yes	No
Would you like to fly in the following aircraft.		
1. Light private aircraft	138	22
2. Large Air Force plane	151	9
3. Commercial aircraft	150	10
Which of the following activities would you like to participate in:		
1. Building model airplanes	127	33
2. Building model rockets	142	18
3. Flying model airplanes	139	21
4. Flying model rockets	142	18
5. Producing curriculum guides	118	42
6. Activity sessions for classroom use	148	12
7. General sessions concerning aviation in Oklahoma	146	14
8. Small group working sessions on topics related to your grade or subject interest	153	7
9. Large group sessions covering general topics	123	37

Research Question Number Eleven

Do workshop participants feel that the Legislature of the State of Oklahoma should continue to provide allocations for future aerospace education workshops?

For the purpose of obtaining data for this research question item number twenty-four of the questionnaire was analyzed to gain information concerning the responses of teachers.

It is very enlightening to note that teachers with masters degrees, and teachers who are between fifty and fifty-nine years old both feel very strongly about the legislature providing more allocations to support future efforts in the field of aerospace education. In both categories 100.0 per cent of the teachers strongly agree that future supporting efforts should be made by the legislature.

TABLE XIV

PARTICIPANTS' RESPONSE TO THE STATEMENT: THE
LEGISLATURE SHOULD PROVIDE FUNDS IN ORDER
TO TRAIN AEROSPACE EDUCATION TEACHERS

Schools	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
All Participants	41.3*	33.1	17.5	7.5	0.6
All Female Participants	38.3	30.9	20.2	9.6	1.0
All Male Participants	46.2	36.9	12.3	4.6	0.0
All Urban Participants	42.2	35.3	17.2	4.3	0.2
All B.A. Degree Participants	37.2	35.3	19.6	5.8	1.9
All M.A. Degree Participants	50.0	30.0	10.0	10.0	0.0
All Participants with hours above M.A. Deg.	44.0	33.3	14.2	8.3	0.0
Participants between 20-29 years of age	42.5	30.0	22.5	5.0	0.0
Participants between 30-39 years of age	45.8	33.3	8.3	10.4	2.0
Participants between 40-49 years of age	41.8	30.2	23.2	4.6	0.0
Participants between 50-59 years of age	50.0	50.0	0.0	0.0	0.0
All Elementary Participants	38.3	30.9	21.2	8.6	1.0
All High School Participants	48.2	38.9	10.3	7.6	0.0
All Rural Participants	40.0	27.5	17.5	15.0	0.0

* Figures are reported in percentages

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The major purpose of this study was to determine and analyze the educational impact of the first two Oklahoma aerospace workshops which were sponsored jointly by the Oklahoma State Department of Education and the Oklahoma Aeronautics Commission, Governors Aerospace Education Committee. The following agencies and installations cooperated very closely in providing support and leadership for the workshop; National Aeronautics and Space Administration, Federal Aviation Agency, Civil Air Patrol, General Aviation Manufacturers Association, National Aerospace Education Council, Oklahoma National Guard, and the United States Air Force.

One hundred and ninety public school teachers in the state of Oklahoma who attended the workshops comprised the sample. Questionnaires were sent to these 190 participants to obtain necessary data. One hundred and sixty participants returned questionnaires. Data from all 160 subjects were used to establish that the aerospace education workshops were successful in reaching their stated goals.

The goals being:

1. To stimulate a widespread awareness of aerospace education at all levels of the curriculum.

In 1968 there were fewer than thirty students in the state of

Oklahoma who were enrolled in formal aerospace education courses. Data from the questionnaire revealed that 9,301 students had been enrolled in some form of aerospace education units taught by the 160 participants who returned questionnaires. This is almost a 31 thousand % increase in the number of students who were enrolled in aerospace education courses.

2. To develop means to stimulate the teachers' interest in aerospace education.

This goal is in the process of being met. The first two workshops have trained nearly 200 teachers from kindergarten through grade twelve in space related concepts. A third workshop is planned for the summer of 1971.

3. To train teachers and administrators in the application of aerospace education in schools.

Data indicate that 81.9 per cent of the participants are teaching more aerospace education than they did three years ago.

4. To make aerospace education available to students in all grade levels.

One of the goals of the workshops was to choose teachers from all grade levels from kindergarten through grade twelve and include all subject areas in the high school level. In the workshop there was a fairly equal distribution of representation between high school and elementary school teachers.

5. To encourage closer affiliation between educational institutions and aerospace industries.

Data obtained from the teachers show that there is over a 93.7 per cent positive agreement that field trips and visits to these installations are beneficial to the overall success of the workshops.

6. To train teachers for a specialized course in aviation at the high school level.

During the 1969-1970 summer workshop there were 20 teachers chosen to participate in an intensive workshop in aviation and ground school application. The majority of these teachers are now teaching courses which include at least one flight for their students.

Recommendations

Since this study has been concerned with classroom practices and attitudes concerning aerospace education, an expanded study including observations of classroom practices is suggested.

It is also suggested that this study include teachers who were not participants in the workshops. This would enable the researcher to ascertain the difference in attitudes and classroom practices that the workshops have brought about.

It is important that attention be given to improving the measurement of teacher attitudes regarding aerospace education. In addition, an effort should be made to identify other instruments which would facilitate the gathering of information concerning workshop participants.

In regard to workshop practices, the following recommendations are made:

1. Continue the selection of elementary and high school teachers.
2. Continue visits to aircraft industries and NASA installations.
3. Provide more small group sessions devoted to special interests.
4. Provide special subject matter areas for high school teachers.

For example; a session on how aerospace can be related to the

social studies teacher.

One special recommendation concerns the need for colleges to provide an undergraduate emphasis toward aerospace education concepts in their methods courses. This emphasis should not be left just to the science courses, but should be included in all subject matter methods courses.

It is also recommended that mid-year sessions be provided on a state wide basis to offer support to teachers as they begin their first year of teaching aerospace education courses. These sessions could be held at various central locations across the state to enable teacher participants easy access. The meetings should be on the order of question and answer basis with the specific intent being the solutions to problems met by the teachers.

BIBLIOGRAPHY

- (1) Anderson, Kermit. "A Survey of Certain Aspects of Aviation Education in Selected Schools in the United States," Unpublished Masters Thesis, North Dakota Agricultural College, Fargo, North Dakota, July, 1955.
- (2) Bartlett, Dewey. News Release, June 9, 1968.
- (3) Blosser, P. E. and R. W. Howe. "An Analysis of Research Related to the Education of Secondary School Teachers," The Science Teacher, 36:87-95, January, 1969.
- (4) Butler, Richard Terry. "Aerospace Science," Unpublished Masters Thesis, Indiana State College, Indiana, Pennsylvania, 1965.
- (5) Cornwell, John D. "The Impact of the Air Age on the Community," Unpublished Masters Thesis, The University of Southern California, 1947.
- (6) Dolezal, Wilma M. "Aerospace Comes of Age," The Texas Outlook, Vol. 46, pp. 16-17, July, 1962.
- (7) Evans, Evan. "NASA's Educational Services Program," Education, Vol. 81, p. 570, May, 1961.
- (8) Hackett, Mildred Lee. "Aviation Education in the High Schools in the United States," Unpublished Masters Thesis, George Washington University, Washington, D. C., 1946.
- (9) Harris, C. W. Ed., Encyclopedia of Educational Research, Third edition, The MacMillian Co., New York, 1960.
- (10) Kerns, H. V. "A Descriptive Study of the Development and Presentation of an In-School Television Program for the In-Service Education of Junior High School Science Teachers," University Microfilms, Ann Arbor, Michigan, 1962.
- (11) Lewis, Cecil W. "Teacher Training in Aviation Education," Unpublished Doctoral dissertation, University of Southern California, 1948.
- (12) Minutes of the Governors Air Age Education Committee, August 17, 1968.
- (13) Minutes of the Executive Committee of the Governor's Air Education Committee, November 7, 1968.

- (14) Minutes of the Legislative Subcommittee of the Governor's Air Education Committee, October 2, 1968.
- (15) Minutes of the Subcommittee on funding of the Governor's Air Education Committee, October 14, 1968.
- (16) Minutes of the Teacher Workshop Subcommittee of the Governor's Air Education Committee, October 17, 1968.
- (17) Neuthardt, Emerson E. "A Study of Air Education Views of Staff Members of New York State Elementary Schools and Teachers Colleges," Unpublished Doctoral dissertation, University of Buffalo, New York, 1949.
- (18) Pawelek, Alan R. "Air-Age Education," Unpublished Doctoral dissertation, University of Minnesota, Minneapolis, Minnesota, 1950.
- (19) Reno, R. H. "In-Service Teacher Training: A Critique Not an Indictment," Education Age, 5:2-5; November-December, 1968.
- (20) Schwartz, Robert S., and Ellen Gertz. "Send for the Spacemobile," Educational Screen and Audio Visual Guide, G46, pp. 22-23, April, 1967.
- (21) Strickler, Marvin K. "The Air Center as a Means of Implementing Aviation Education," Unpublished Doctoral dissertation, Stanford University, Palo Alto, California, 1951.
- (22) Webb, James E. "Education and the National Space Program," Higher Education, Vol. 28, No. 9, July, 1962.
- (23) Zaharevitz, Walter. "Curricular Experiences for a Summer Aviation Education Workshop," Unpublished Masters thesis, Miami University, Oxford, Ohio, 1959.

APPENDIX A
PARTICIPANT QUESTIONNAIRE

QUESTIONNAIRE

Leaders in science education stress the importance of concepts, scientific method and attitudes. While progress has been made in most of these areas, much work must be directed toward the development of positive attitudes toward science. The term "attitude" used in this questionnaire refers to how an individual feels about science--an emotionalized feeling for or against.

This questionnaire is designed to measure how you feel about aerospace education. Please indicate your feelings by marking the response which indicates the degree with which you agree or disagree with each statement.

TABLE

SA - Strongly Agree	D - Disagree
A - Agree	SD - Strongly Disagree
N - Neutral	

Example:	SA	A	N	D	SD
Airline pilots are interesting people.	=	=	=	=	=

Note that "N - Neutral" is marked, indicating neither agreement nor disagreement.

Please complete the following statements in a similar manner.

- | | | | | | |
|--|---|---|---|---|---|
| 1. Field trips to airports and aircraft industries can make subject matter interesting. | = | = | = | = | = |
| 2. Aerospace education is unrelated to life experiences. | = | = | = | = | = |
| 3. Aerospace education concepts should be taught in all levels of public schools. | = | = | = | = | = |
| 4. It is very helpful to know the basic facts about flight. | = | = | = | = | = |
| 5. Aerospace education concepts are too difficult to teach at my grade level. | = | = | = | = | = |
| 6. Possibilities for student participation make aerospace education an interesting topic. | = | = | = | = | = |
| 7. The study of aerospace education does not bore me, but I would never pursue it independently. | = | = | = | = | = |

	SA	A	N	D	SD
8. It is fascinating to study the fundamentals of flight in the classroom.	=	=	=	=	=
9. I am as interested in learning about space flight now as I was three years ago.	=	=	=	=	=
10. I am afraid of the thought of having to teach a unit on human factors in space flight.	=	=	=	=	=
11. Aerospace education is a must at this "time."	=	=	=	=	=
12. Aerospace technology is something that can improve every day living.	=	=	=	=	=
13. Aerospace education is very important in this scientific age in which we live.	=	=	=	=	=
14. Aerospace education should have equal footing with other curriculum areas.	=	=	=	=	=
15. Aerospace education can be related to all areas of the curriculum.	=	=	=	=	=
16. Methods courses I have had in undergraduate school greatly influences my teaching of aerospace education.	=	=	=	=	=
17. I feel that my present background is sufficient for teaching aerospace education.	=	=	=	=	=
18. I would like to see aerospace education dropped from the curriculum.	=	=	=	=	=
19. I would like to teach my students aerospace education concepts but they are too difficult and confusing.	=	=	=	=	=
20. I would like to teach some aerospace education units but am afraid I do not have sufficient background.	=	=	=	=	=
21. Women could teach aerospace education units better than men.	=	=	=	=	=
22. Aerospace education has no place in primary levels of schools.	=	=	=	=	=
23. I am now teaching more aerospace education concepts than I did three years ago.	=	=	=	=	=

	SA	A	N	D	SD
24. The legislature should provide funds in order to train aerospace education teachers.	=	=	=	=	=
25. If such training were available I would take part.	=	=	=	=	=
26. My supervisor or principal shows a decided interest in aerospace education.	=	=	=	=	=
27. If I had assistance from my supervisor, I would be more willing to teach units dealing with aerospace education.	=	=	=	=	=
28. Courses taken while a student provides me with enough background to teach aerospace related concepts.	=	=	=	=	=
29. I would devote more time to teaching aerospace education but I fear not being able to answer all questions.	=	=	=	=	=
30. Men have more aptitude for teaching aerospace related concepts than do women.	=	=	=	=	=

In the following items mark the appropriate column.

	YES	NO
31. I am now using the aerospace education curriculum guide.	=	=
32. I now attempt to teach aerospace education concepts.	=	=

If "yes," then please check appropriate blank.

- _____ 0 - 59 minutes per week
 _____ 60 - 119 minutes per week
 _____ 120 - 179 minutes per week
 _____ 180 - 239 minutes per week

33. I am presently teaching or have taught a unit dealing with aerospace education.	=	=
---	---	---

If your answer is "yes," please mark the following.

a. I have or am planning a field trip in connection with the unit.	=	=
--	---	---

	YES	NO
b. I have had or plan to have a resource person into the classroom.	=	=
c. I have used films or plan to use films.	=	=
d. Students are using resource materials other than the text.	=	=
e. Enough material is in our textbook to teach the unit.	=	=
f. A local airport is a part of field trip activity.	=	=
g. Students have or will be engaged in activity units.	=	=

If your answer to question 33 was "no," please respond to the following statements.

a. Students find aerospace education to be noninteresting.	=	=
b. My building principal does not approve of this type of activity.	=	=
c. I see no sound educational value to such a course.	=	=
d. Time and space are not adequate for such a course.	=	=
e. I do not have enough science background for such a course.	=	=
f. I have enough time and background but am just not interested.	=	=
g. I have attended special courses or workshops in the area of aerospace education.	=	=
h. I would like to attend such a course or workshop.	=	=

34. If a workshop were to be offered in the future and you were chosen to attend which of the following activities would you like to see offered.

A. Speakers from the following agencies:

1. Federal Aviation Agency	=	=
----------------------------	---	---

	YES	NO
2. Civil Air Patrol	=	=
3. Oklahoma Air National Guard	=	=
4. Commercial Aircraft Industries	=	=
5. State Department of Education	=	=
6. Oklahoma Aeronautics Commission	=	=
7. National Aeronautics and Space Administration	=	=
B. Field trips to the following:		
1. Federal Aviation Agency	=	=
2. Commercial Aircraft Industries	=	=
3. NASA installations such as the following:	=	=
a. Cape Kennedy		
b. Manned Space Flight Center		
c. Redstone Arsenal		
4. Military Air Bases such as:	=	=
a. Eglin A.F.B., Fort Walton, Florida		
b. Basic Training Command, San Antonio, Texas		
C. Would you like to fly in the following aircraft?		
1. Light private aircraft	=	=
2. Large Air Force plane	=	=
3. Commercial aircraft	=	=
D. Which of the following activities would you like to participate in:		
1. Building model airplanes	=	=
2. Building model rockets	=	=
3. Flying model airplanes	=	=
4. Flying model rockets	=	=
5. Producing curriculum guides	=	=

	YES	NO
6. Activity sessions for classroom use	=	=
7. General sessions concerning aviation in Oklahoma	=	=
8. Small group working sessions on topics related to your grade or subject interest	=	=
9. Large group sessions covering general topics	=	=

In the following statements, please check the appropriate blanks or fill in the general information as it applies to you.

1. Number of years teaching experience.

_____ Elementary

_____ High School

2. Grade you are now teaching.

_____ 1
 _____ 2
 _____ 3
 _____ 4
 _____ 5
 _____ 6
 _____ 7
 _____ 8
 _____ 9
 _____ 10
 _____ 11
 _____ 12

3. Check the range in which your age falls.

_____ 60 or above
 _____ 50 to 59
 _____ 40 to 49
 _____ 30 to 39
 _____ 20 to 29
 _____ below 20

4. Sex

_____ Male

_____ Female

5. Please indicate level of academic training.

_____ Bachelor's Degree

_____ Master's Degree

_____ hours above Masters

6. Size of school.

_____ Large

_____ Small

7. Location of school

_____ City

_____ Rural

APPENDIX B

COVER LETTER TO PARTICIPANTS

Dear _____:

The Oklahoma Aeronautics Commission in cooperation with the State Department of Education is sponsoring a study of the first two Oklahoma Aerospace Education Workshops.

As a participant in those workshops you are asked to fill out the enclosed questionnaire and return it as soon as possible.

Will you please indicate the number of students that you teach? You might place this information by Item two, page six.

Your help in this study is sincerely appreciated.

Jerry L. Miller

Kenneth E. Wiggins

VITA

Jerry Louis Miller

Candidate for the Degree of

Doctor of Education

Thesis: AN ASSESSMENT OF THE EFFECTS OF AEROSPACE EDUCATION WORKSHOPS UPON THE TEACHING OF AEROSPACE EDUCATION CONCEPTS IN SELECTED SCHOOLS IN OKLAHOMA

Major Field: Elementary Education

Biographical:

Personal Data: Born in Atlanta, Louisiana, November 1, 1935, the son of Roy and Minnie Lee Miller.

Education: Attended public school in Atlanta, Louisiana, and Winnfield, Louisiana; graduated from Winnfield High School, Winnfield, Louisiana in 1954; received the Bachelor of Arts degree from Northwestern State College, Natchitoches, Louisiana in 1960 with a major in sociology; received an elementary teaching certificate in 1960; received the Master of Education degree from Northwestern State College, Natchitoches, Louisiana in 1963 with a major in educational administration; attended Oklahoma State University, Stillwater, Oklahoma, from September, 1969, until July, 1971; completed requirements for the Doctor of Education degree at Oklahoma State University in May, 1972.

Professional Experience: Junior high school teacher at Houma Central School, Terrebonne Parish Schools, 1958; junior high teacher at Alexandria Junior High School, Alexandria, Louisiana, 1960, assistant principal at Rugg Elementary School, Alexandria, Louisiana, 1961-1963; sixth grade teacher at Richmond Elementary at Houston, Texas, 1963; taught sixth grade at Northwestern State College laboratory school, Natchitoches, Louisiana, 1966; named coordinator of elementary school science at the North Louisiana Supplementary Education Center, Natchitoches, Louisiana, 1967-1969; graduate assistant, Research Foundation, Oklahoma State University, Stillwater, Oklahoma, 1969-1971.

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