DOCUMENT RESUME

ED 134 413 88 SE 021 430

AUTHOR Goldberg, Isadore
TITLE Evaluation of the Program: Randall Aerospace and Marine Science Program. A Title III Evaluation Project, Final Report.
INSTITUTION District of Columbia Public Schools, Washington, D.C. Dept. of Research and Evaluation.
SPONS AGENCY Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
PUB DATE Aug 76
NOTE 56p.

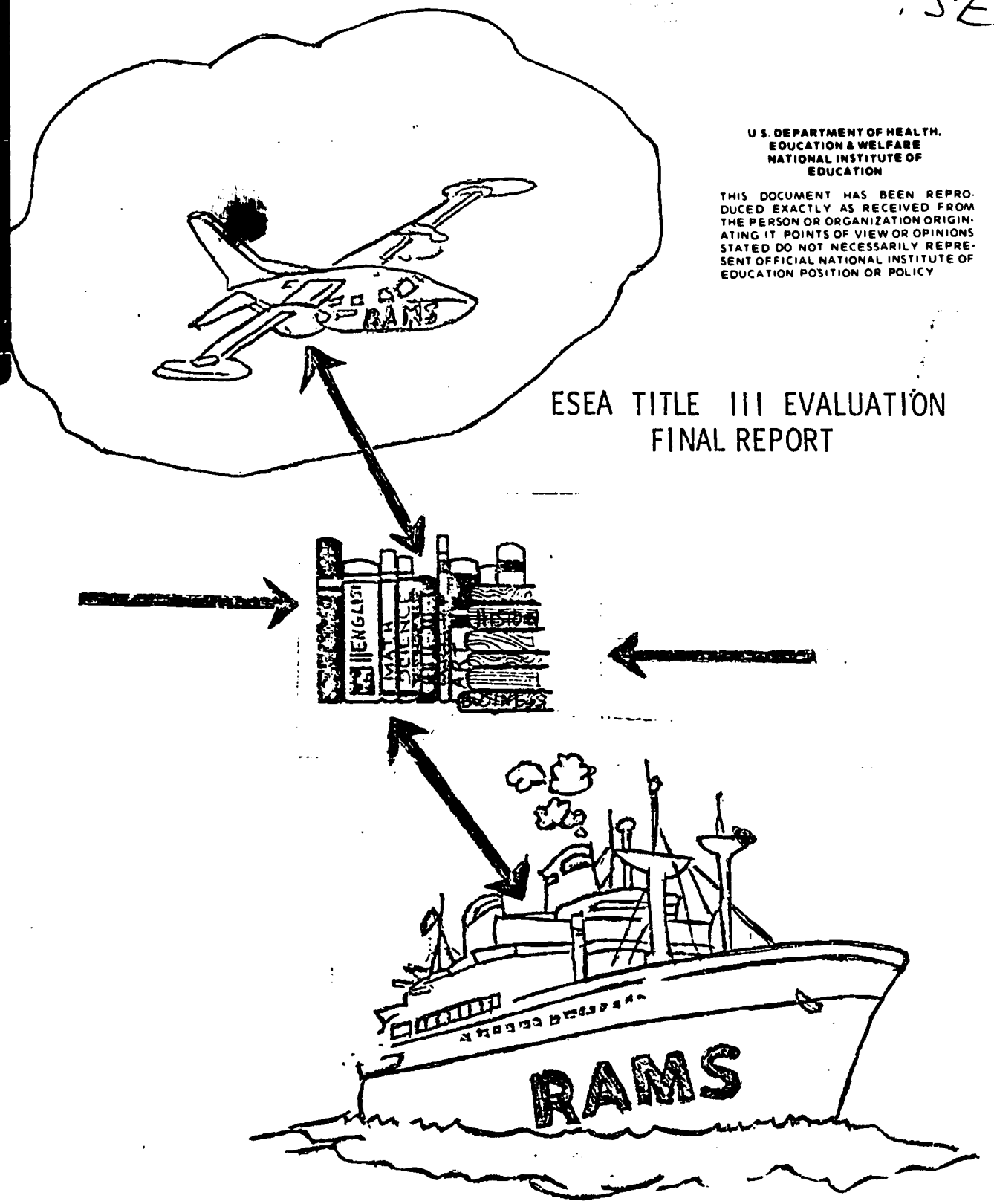
EDRS PRICE MF-$0.83 HC-$3.50 Plus Postage.
DESCRIPTORS Achievement; *Aerospace Education; Communications; *Curriculum; *Evaluation; Instruction; Mathematics; *Oceanology; *Program Descriptions; Reading; *Secondary Education; Secondary School Science
IDENTIFIERS Elementary Secondary Education Act Title III; ESEA Title III

ABSTRACT

An interdisciplinary program related to aerospace and marine topics was created for students in the ninth and tenth grades in Washington, D.C. The curriculum and staff development focused upon the development of experiences incorporated within science, mathematics, communication skills, career education, and physical education. Objectives of the program included raising student achievement and reducing absenteeism and tardiness of students. This document provides an evaluation of the project. Included are: (1) Evaluation Design; (2) Findings; (3) Summary of Findings; and (4) Recommendations. Progress in the project is noted, but a number of objectives were not obtained. Recommendations for future work focus on the objectives not attained. (RH)

PUBLIC SCHOOLS OF THE DISTRICT OF COLUMBIA

SE



ESEA TITLE III EVALUATION
FINAL REPORT

2

DIVISION OF RESEARCH AND EVALUATION
August 1976

EVALUATION OF THE PROGRAM:
RANDALL AEROSPACE AND MARINE SCIENCE PROGRAM

A TITLE III EVALUATION PROJECT

FINAL REPORT

Division of Research and
Evaluation
Public Schools of the District of
Columbia, Washington, D.C.

Contract Number: GA 76 CEC B4B 00 A17 2554
GA 065-AA-NS-0-6

Creative Research Associates, Inc.
15710 Allanwood Drive
Silver Spring, Maryland 20906

August 1976

Isadore Goldberg, Ph.D.
Principal Investigator

ACKNOWLEDGEMENTS

Dr. Vincent E. Reed
Superintendent of Schools

Dr. Mildred P. Cooper
Assistant Superintendent for Division of Research and Evaluation

Mrs. Lavolia Vails
Coordinator for Title III Project Evaluations

Mrs. Elsa Miller
and Mrs. Patricia Goins
Title III Advisory Council Chairperson and Co-Chairperson

Mr. Harris M. Taylor
Assistant Superintendent - Department of Federal Programs

Mrs. Grace H. Davis
Coordinator for ESEA Title III Projects

Mr. Raymond Compton
and Mr. Paul Shackleford
Project Coordinators, Randall Aerospace and Marine Science Project

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTD.)

LIST OF TABLES

EVALUATION OF THE
RANDALL AEROSPACE AND MARINE SCIENCE PROGRAM

FINAL REPORT

CHAPTER I
BACKGROUND AND PROJECT OBJECTIVES

The Randall Aerospace and Marine Science Program (RAMS) created an interdisciplinary specialty for students at the ninth and tenth grade levels aimed at providing experiences which integrate theoretical and practical applications through the use of the unique resources in the Southwest - near Southeast sections of Washington, D.C.

The aim of this project is to reach students through their interest in marine science and aeronautics "to motivate them to maximum achievement in the pursuit of their studies".

The curriculum and staff development focus upon the development of interdisciplinary experiences incorporated within science, mathematics, communication skills, career education, and physical education.

In this program students have opportunities for field experiences and practical applications. In science classes, for example, students may spend time exploring the river banks and cruising in local waters, or analyzing weather conditions for airflight, or they may test the principles of navigation in mathematics classes with power boats, sail boats and airplanes. Communication skills will be developed in relation to "real world" skills such as those required to successfully complete the F.C.C. reporting licence for boatsman or to develop the communication pattern for a pre-flight plan.

The development of the program will draw upon consultants and resources in the community to assist the staff team in the planning and preparation of the program. Students will also be active participants in the program development and the participation and support of the community has already been obtained in the preparation of the proposal.

As stated in the project proposal, the objectives of the program are as follows:

"Major Goal: to design and implement an educational program with a "Marine" and "Air" theme by integrating marine science and aerospace education in areas of the curriculum based on the fact that the generally high interest of youngsters in these areas will motivate them to maximum achievement in pursuit of their studies.

1. To demonstrate that the use of relevant marine-oriented facts, information and experiences as related to the subject areas of history, mathematics, language arts and science will raise the achievement of students in two or more academic areas as measured by the administration of pre and post tests in specified content areas, i.e., History will be taught through the study of kinds and progress of boats or airplanes and their impact upon mankind.

2. To utilize the unique resources of the community which will provide opportunities to test theory with practice and from practice, to formulate new understandings and constructs, in the teaching-learning process.

3. To design and implement within the Southwest community a marine-science/aviation program that focuses on raising the achievement of 80% of the students in communication skills as measured by their successful completion of the examination for F.C.C. operator licence for boatsman or successful development of the communication pattern for a pre-flight plan as determined by the instructor.

4. To design and implement a marine-science/aviation program that focuses on raising the achievement level of 80% of the students in computational skills as measured by the preparation and execution of a pre-flight plan for a short flight or demonstration of navigation skills in plotting a trip from port to port.

5. To demonstrate that student absenteeism and tardiness will be reduced by 50% as evidenced by the analysis of the records of 50 students who continue in the winter program and 50 students selected as the control group who attended other high schools in the District of Columbia."

CHAPTER II
EVALUATION DESIGN

An Input, Process and Product evaluation model was selected as the model most useful for revealing the actual impact of all the materials, methods and resources used in the development of the project. The facilities, curriculum units, community resources, selection processes used for selecting students, student involvement, staff and their training, parental and community involvement, the tests used to measure student progress and performance, attendance records, tardiness records were all examined in this evaluation.

Key features of the evaluation plan include the following:

1. Structured Program Review Instrument. This instrument was used to elicit detailed information of program activities from project coordinators, teachers, students, and consultants. Observations and findings presented later in this report are based in part on this instrument. Secondary data and documents provide another source of data for this instrument.

2. Teachers Questionnaire - to assess staff development experiences, progress in curriculum development, parent and community relations, student progress, the strengths and weaknesses of the project and how it can be improved.

3. Students Questionnaire - to obtain the students reactions to the program and to assess the students self-concept in areas related to schooling, motivation, and career awareness.

4. Other Student Data - analysis of student background data (socio-economic status and grades), and analysis of grades, attendance and tardiness records in the current year are carried out to assess students progress.

5. Results of available tests, the Prescriptive Reading Test and Prescriptive Mathematics Test, are analyzed.

6. Parent Questionnaire - to obtain parents reactions to the project. This questionnaire was added to the project evaluation following discussions with the project coordinators.

7. Site visits to the Randall School and to field sites, classroom observations and spot interviews with the teaching staff and students supplemented the above instruments.

It should be noted that comparative analyses of student data had been planned for a number of areas. Some of these analyses were not possible in the current year due to the unavailability of pre-test data and control groups. Comparisons are made for absences to systemwide data for students in grades 9 and 10, and for RAMS absences and test results with those for the entire Randall School.

CHAPTER III
F I N D I N G S

INTRODUCTION

The findings for this evaluation are presented in three parts. First we review the program operations and activities including such areas as the budget, materials and supplies, curriculum development, field site arrangements and staff development. Second, the results of questionnaires administered to students, teachers and parents are presented. The third part shows the students progress in the program including grades, absences and tardiness.

PROGRAM OPERATIONS

Budget, Facilities, Educational Materials and Supplies:

Problems with the budget have arisen largely in terms of the late release of funds, resulting in inability to expend funds for items as they are needed. Only about one fourth of the budgeted $67,000 had been released by the beginning of May 1976, causing serious problems in the acquisition of needed equipment and materials.

The delay in release of budgeted funds also caused serious problems in finalizing contracts with Colgen Airways and Lightship Chesapeake, preventing the program from using these resources for essential field experiences until December 1975. Additionally, funds needed for field trips were released too late to effectively plan and carry out an appropriate schedule of field activities.

The Randall School facilities are reported as marginal as the physical plant itself requires major repair and renovation. Field facilities for both marine science and aerospace components are reported as outstanding features of the program. Site visits to two marine science sites in Southwest Washington verify this observation. Educational materials and supplies needed for the program have been acquired throughout the year from the school system and from Federal and District Agencies. Many items from Federal Agencies have been acquired free of charge. The major problem reported was a lack of textbooks.

Curriculum and Field Sites:

A great deal of effort of the staff in this first year of the project has been devoted to the development of the

curriculum and the coordination of the field sites necessary to the project. A preliminary volume on the curriculum has been assembled. Although additions and editing will be needed, the curriculum package assembled appears to provide a sound beginning for the project which is fundamental for its future success.

An important part of the curriculum is its career development orientation, which will attempt to broaden students knowledge and attitudes toward the world of work. The aim of this aspect of the program is to develop students awareness and explorations in a wide range of career areas, including, but not limited to aerospace and marine science fields.

Curriculum and program development have benefitted greatly from inputs of various consultants, educators, and governmental agencies. Reports of similar programs in other cities have provided models, guidance and curriculum materials; the Federal Aviation Agency (FAA) and the U.S. Navy, among others, have provided materials to the project.

The following field sites were used in this first year of the project:

Dulles International Airport

1. National Weather Service Station
2. Mobile Lounges (FAA)
3. Fire Fighting Facility (FAA)
4. Tower and Approach Facilities (FAA)
5. National Transportation and Safety Board Training Facilities.

Leesburg Air Route Traffic Control Center, Virginia
Washington National Airport, Washington, D.C.

1. Tower and Approach facilities
2. Washington Technical Institute
3. Air Line Crew and Maintenance facilities.
4. F.A.A. Flight Standards, Maintenance, Security, and Flight Service Station facilities.

University of Maryland, College of Aeronautical Engineering
College Park Airport - 1st in the United States.

F.A.A. Headquarters, 800 Independence Ave., S.W., Washington, D.C.

Smithsonian Air and Space Museum, S.W., Washington, D.C.

Langeley - NASA.

Washington Navy Yard and Museum, S.E., Washington, D.C.

Anacostia, Fort McNair, Columbia Island, and Washington Marinas

Harbor Section, Metropolitan Police Department, S.W., Washington, D.C.

U.S. Naval Academy

U.S. Coast Guard Station

Washington Technical Institute Marine Science facilities, N.W., Washington, D.C. and Lewes, Delaware

Bethlehem Steel, Sparrows Point, and Baltimore Ship Yards, U.S. Constellation, Baltimore, Maryland

Ft. McHenry, Balimore, Maryland

"The U.S. Department of Interior's National Capital Parks Division provided introductory marine field experience on the Lightship Chesapeake. Additional learning experiences were designed using the lightship facilities and the services of graduate students from Howard and George Washington Universities, the staff of the Lightship, and the project staff.

"The Harbor Section of the Washington Metropolitan Police Department provided a 16 hour course in Boat Handling and Seamanship. Sixty Randall students have participated by attending school at the Harbor site.

"The Federal Aviation Administration provided seven flight experiences for staff and students, including four shuttle flights for students between Dulles and National Airports, an excursion to Langeley Research Center in Hampton, Virginia for eight students, eight staff, a parent, and a D.C. Public Schools Information Officer; and two trips to August Martin High School in Jamaica, New York for staff and summer student participants.

"The Helicopter Division of the Metropolitan Police Department landed a helicopter at Randall and talked to students about careers in the squadron.

"Students visited the F.A.A. headquarters in S.W. Washington, viewed films on the history of aviation and listened to quest speakers from the F.A.A. and N.T.S.B.

"Students were the guests of Mr. Robert O'Neil at Galesville, Maryland where they were permitted to pilot a house boat and use ship-to-shore communication radios. Mr. O'Neil, President of the Washington Area Marine Dealers Association, also provided an ATC-510 flight simulator for student use on a limited basis.

"Mr. Frank Christhiff of the National Oceanic Atmospheric Administration has provided aeronautical and nautical charts for student use.

"Mr. William Broadwater, Air Traffic Control Specialist for the F.A.A. and Elwood Driver, President of the Tuskegee Airmen's Association of Washington, D.C. presented classroom talks on Blacks in Aviation.

"Mr. Steve Mangiapane, an aeronautical engineer for the F.A.A. and graduate of the University of Maryland demonstrated flying model aircraft.

"Mr. Lou Purnell, Curator for the Smithsonian Air and Space Museum, provided a tour and lecture at the Smithsonian.

"Mr. Harry Hubbard, Tower Chief, Washington National Airport, assisted with a visit to the approach control facilities and the tower at National Airport. Students were able to meet and talk with controllers as they coordinated air traffic.

"Mr. John Scott, former Presidential Pilot, member of the Tuskegee Airmen's Association, and investigator for N.T.S.E., received Randall students at the N.T.S.E. Dulles facility for a film presentation and talk on careers as employees of the N.T.S.E.

"Aerospace students visited the Air Route Traffic Control Center at Leesburg, Virginia, the University of Maryland College of Aeronautical Engineering Laboratories and the Aerospace Technology facilities of Washington Technical Institute at National Airport.

"United Airlines provided a tour of their crew facilities at National Airport where Captain Holman and Beverly Ishol conducted a tour onboard a 727 that was hangared for maintenance."

Student Recruitment and Selection:

It was the intent of the RAMS program to draw students from throughout the city who have an interest in the program and the types of experiences that can be provided. An attempt was made at the beginning of the school year to recruit interested students.

Recruitment efforts were delayed, in part, because of the necessary approval required for Randall to become a Junior Senior High School. This approval was obtained in August 1975, delaying efforts that might have taken place in the summer. A letter sent to principals of Junior High Schools and High Schools asked that interested students be referred to Randall. This effort, however, did not prove very successful as all but two students were from Randall or nearby Jefferson Junior High School. The project coordinators report the following as possible reasons for the project drawing students largely from the immediate Southwest area:

1. Students reluctant to travel the greater distance to Randall School.

2. Randall, although in a transition from a Junior High School to a Junior Senior High School is viewed by many students as a Junior High School.

3. Senior high school offerings of interest to many students (e.g., typing, computer technology) are not yet available at Randall. Thus some students initially interested in the program have elected to attend another school.

The project coordinators report that they are planning a more active recruiting campaign for the coming year. Although it is still the intent of the program to draw interested students from throughout the city, they anticipate that most students will come from Randall and nearby Jefferson Junior High School.

All interested students were accepted into the program. Enrollment at the beginning of the school year was 89. Two students entered the program after the beginning of the school year. By the end of the second advisory, 16 students were discharged from Randall. It is not known how many of these students transferred to another school and how many dropped out of school. However, the project coordinators reported that some students had expressed an interest in attending another school to obtain courses (e.g., typing or computer technology) of interest to them. Student enrollment at the end of the school year was 69 students, a net loss of 20 students or 22.5%.

Staffing and Staff Development:

Teaching staff assigned to the project were to prepare lesson units focusing on the Marine Science and Aerospace Science themes of the program. A six week staff development program was held for this purpose in the Summer 1975, with

preparation continuing throughout the year. Teachers were assigned in the following subjects: Science, Mathematics, English, Social Studies and Industrial Arts (two teachers). Problems resulting from staff turnover were encountered in that the presently assigned Science and Mathematics teachers were not employed until November 1975 and the Social Studies teacher participated in only two of six weeks of the summer staff development program. Only the English teacher and the two Industrial Arts teachers participated in the full six week staff development program. These staffing problems inevitiably limit the impact that can be expected of the project in the current year.

Community and Parent Involvement:

Both community members and parents have been involved extensively in the program. The community resources employed in the program (discussed under Curriculum Development and Field Sites) are extensive.

Parents and other community members also participated in the following:

- Survey of the need for a high school in the Southwest area that led to the designation of Randall as the school to be modified into a junior senior high school.

- Site visits to the Beach Channel High School, Rockaway Island, New York, to observe their oceanographically oriented program, and to August Martin High School, Jamaica, New York to observe their Aerospace Program.

- A parent reception held on board the Wilson Line's Catamaran S.S. America to inform parents of student progress. Slides of student activities were shown. A "get acquainted hour" followed as the ship made its way along the Potomac River.

- A second parent reception held at Dulles International Airport on board a 747 in April, 1976. Over 60 parents and interested community members attended.

In addition, the project coordinators report that they maintain frequent contact with community leaders and that parents are frequent visitors to the school.

The Randall School Context:

Although this evaluation is of the RAMS project itself, certain constraints posed by the context of the program within the Randall School must be recognized. Starting in 1976 the Randall School is in the process of changing from a junior

high school to a senior high school. The limiting factors to the RAMS project are as follows:

1. The physical plant is reported as marginal and badly in need of repair.

2. Science laboratory facilities need to be upgraded to high school level.

3. Industrial Arts shop facilities need to be upgraded to high school level. Materials are in short supply for the types of projects RAMS students should undertake.

4. The type of senior high school program offerings of interest to many students (e.g., typing, computer technology, business) may be limiting factors in the recruitment and retention of students. (A number of students have expressed concern over the limited course offerings. However, the impact of the limited course offerings requires further investigation.)

REACTIONS OF STUDENTS, TEACHERS AND PARENTS TO THE RAMS PROGRAM

Results of the Students Questionnaire:

Table 1 shows the results of the students questionnaire. Completed forms were received from 52 of the 72 students, a return rate of 72%. The results in Table 1 show the findings for all students as there were no statistically significant differences among the 9th and 10th grade Aerospace and Marine Science students using the Chi Square test and the "t" test.

The results show that 36 or 69.2% students felt that the science program was "much more interesting than other science courses," while only 4 or 7.7% felt that the science program is not as interesting. The RAMS approach seems to receive high marks by about 7 out of 10 students.

At least a majority of the students rate their academic subjects (English, Mathematics, History and Science) as Very Interesting or Very Useful (scores of 4 or 5). As shown in Table 1, History rates the highest in interest while English rates highest in usefullness. Science is rated in third position in terms of interest and usefullness, while Mathematics rates fourth position in both areas. The failure of many students to see the utility of Science and Mathematics should be reviewed by the project staff. Although 7 of 10 students

TABLE 1

RESULTS OF THE STUDENTS' QUESTIONNAIRE

Item Number and Description	Response Categories		f	%
Question 3	Much more interesting		36	69.2
My Science program is:	About the same		11	21.2
	Not as interesting		4	7.7
	No opinion		1	1.9
Question 4				
How interesting are the subjects you are taking in school?				
English	Very Interesting	5	23	44.2
		4	13	25.0
	Interesting	3	14	26.9
		2	1	1.9
	Not Interesting	1	1	2.0
Mathematics	Very Interesting	5	15	28.8
		4	11	21.2
	Interesting	3	18	34.6
		2	4	7.7
	Not Interesting	1	4	7.7
History	Very Interesting	5	26	50.0
		4	17	32.7
	Interesting	3	4	7.7
		2	4	7.7
	Not Interesting	1	0	0
	No Response		1	1.9
Science	Very Interesting	5	22	42.3
		4	12	23.1
	Interesting	3	11	21.2
		2	4	7.7
	Not Interesting	1	3	5.7

N = 52

(Contd...)

TABLE 1 (Contd..)

Item Number and Description	Response Categories		f	%
Question 5				
How useful are these subjects?				
English	Very Useful	5	37	71.1
		4	7	13.5
	Useful	3	8	15.4
		2	0	0
	Not Useful	1	0	0
Mathematics	Very Useful	5	26	50.0
		4	7	13.5
	Useful	3	12	23.1
		2	2	3.8
	Not Useful	1	5	9.6
History	Very Useful	5	28	53.8
		4	11	21.2
	Useful	3	12	23.1
		2	0	0
	Not Useful	1	0	0
	No response		1	1.9
Science	Very Useful	5	26	50.0
		4	9	17.3
	Useful	3	12	23.1
		2	3	5.8
	Not Useful	1	2	3.8
Question 6				
To what extent have you learned about career opportunities in the RAMS project?	A lot		23	44.2
	Some		27	51.9
	Not much		2	3.8

N = 52

find the RAMS approach more interesting than the regular science program, continuing work in the program should seek additional ways to stimulate student interest and to relate the usefullness of both Science and Mathematics to careers and to every day life.

Almost all of the students (50 to 52) felt that they had learned something about career opportunities through the RAMS project (question 6). Thus, the RAMS emphasis on career development seems to be having the impact desired.

When asked to list the three most important things that they have learned about careers, 45 of the 52 (86.5%) responded. Answers for Aerospace and Marine Science Students are presented separately in Table 2. Overall, the answers reflect serious and thoughtful career growth experiences. While many of the answers are related to career knowledge in Aerospace and Marine areas, the majority of responses reflect personal career growth of a broader scope. Thus the avenue of stimulating interest through a program in Marine and Aerospace Science as a means to aiding growth in other areas seems to be borne out in the impact of the program on the career development of the students.

Table 3 shows the students responses to the question: "What did you like most about the program?", ten Aerospace and 11 Marine Science students listed the field trips as the thing they liked most about the program. Eight Aerospace students and 4 Marine Science students listed the teachers themselves as the thing they liked most about the program. Actually learning to fly was an important part of the program to eight of Aerospace students. The remainder of the responses show positive areas of the program cited by one or two students in each case. In all 90% (47 of 52) of the students gave at least one thing that they liked about the program. In contrast only 6.0% (3 of 52) of the students indicated that there were some things that they did not like about the program. Inadequate supplies and books (Table 4) were cited by 10 students (3 Marine Science and 7 Aerospace) as the thing they liked least about the program. Four Marine Science students did not like the Mathematics and Science courses; while three Aerospace students felt that there were not enough Aerospace trips.

Suggestions for improvement of the program (Table 5) were headed by the need for more materials, books, and supplies with 33 students; the need for a full scale physical education program in the school with 14 students; and the need for better transportation (presumably for use in field trips) with 8 students.

TABLE 2

THREE MOST IMPORTANT THINGS LEARNED ABOUT CAREERS THROUGH RAMS PROGRAM

Frequency	Response
	Aerospace Students
9	Aspects of careers in aviation, including reading maps, knowledge of the parts of a plane and planning flight.
9	The value of money.
6	That a good job requires training and education.
6	That there are many different kinds of jobs for which a person may qualify.
5	How to get a good job including what to wear, and conducting a successful job interview and filling out an application.
4	Good career fields.
3	Careers based on academic subject --- math, History, and English.
2	That a career involves hard work and getting along with people.
	Marine Science Students
12	Careers based on Marine Science (which offers jobs to women), English, Mathematics, History, Oceanography and Science.
8	Careers related to boating.
7	Money.
6	Education
3	Finding the career the student is most suited for.
2	Careers in teaching and nursing.
1	The value of hard work.
1	The importance of reading.

TABLE 3

WHAT STUDENTS LIKE MOST ABOUT THE RAMS PROGRAM

Response	Aerospace Students	Marine Science Students	Total
Field Trips	10	11	22
Teachers (helping students, who do their job well and take an interest in the home problems of students)	6	4	10
Learning to fly (Aerospace) or boating (Marine)	8	1	9
Learning about careers and job opportunities	4	1	5
English Classes	2	3	5
Everything	2	2	4
Miscellaneous (one each-small size of classes, opportunities to meet new people, history class, shared experiences)	3	1	4
Projects and making models	1	1	2
TOTAL	36	24	61

TABLE 4

WHAT STUDENTS LIKE LEAST ABOUT THE RAMS PROGRAM

Response	Aerospace Students	Marine Science Students	Total
Lack of adequate supplies and books	7	3	10
Mathematics and Science courses	0	4	4
Not enough aerospace field trips	3	-	3
Too many students who misbehave, are absent or tardy	1	2	3
School too far from home, no means of transportation	0	2	2
Miscellaneous (One each - lack of organization, lengthier field trips)	-	2	2
(One each - project is boring; subject work is unrelated to Aerospace; no plane to work on; not enough teachers; not enough business courses; students with good attendance are chosen as the ones to go on field trips.)	6	-	6
TOTAL	17	13	30

TABLE 5

STUDENTS RECOMMENDATIONS FOR IMPROVING THE RAMS PROGRAM

Responses	Aerospace Students	Marine Science Students	Total
More money for supplies, books and materials	20	13	33
More extensive physical education program in the school	6	8	14
Transportation for trips to and from the school	3	5	8
More teachers	2	1	3
Better student participation and not late to class	0	3	3
More students	3	0	3
Miscellaneous (Two each - business courses, more interesting courses; one - driving and first aid class)	4	1	5
TOTAL	38	51	69

Results of the Teachers Questionnaire:

The teachers in the program were asked to complete a questionnaire, however only 3 of the 8 teachers responded. Their responses are given in Table 6. Overall, the responding teachers feel that the program is good or excellent (question 10). In rating their students (question 3), interest and motivation was rated excellent by 2 of 3 teachers, while the remaining areas were rated good or fair by 2 of 3 or all three teachers.

The need for supplies, materials, books, facilities, and resources is once again underscored by the teachers.

Results of the Parents Questionnaire:

Parents reactions to the project were overwhelmingly favorable as shown in Table 7. Their comments underscored their desire to have the program continued at Randall, the benefits of the educational experience, and the need for books and supplies.

The low rate of return, with 12 parents responding, was due to the fact that the last meeting of the parents had already been held and the questionnaires had to be administered on an individual basis.

STUDENTS PROGRESS IN THE PROGRAM

Socio-Economic Status of Students:

Participation in the Schools Free Lunch Program was used as the measure of socio-economic status. Students of limited means receive lunch free of charge or at a reduced rate. Table 8 shows that just over one half of the students are on free or reduced lunches, showing relatively low socio-economic backgrounds for the group as a whole. This is comparable to the 60% of students from low income backgrounds reported for the school as a whole.

Grades:

Grade Point Averages (GPA) for 1974-75, the year prior to entering the RAMS program, were obtained to serve as a measure of academic ability of the students entering the RAMS program. Comparison of the 1974-75 GPA to the 1975-76 GPA provided a basis for measuring gains in grades before and after one year in the program. The GPA was computed on the basis of grades in academic subjects - English, Science,

TABLE 6

RESULTS OF THE TEACHERS QUESTIONNAIRE

(N = 3)

1. In Service Activities

   a) What did you like most about the in service activities?

      Answers:
      - Enthusiasm of program director;
      - Field trips;
      - Printed materials.

   b) What did you like least about the in service activities?

      Answers:
      - Lack of supplies-equipment, books, transportation;
      - Students were not given enough time to assemble to make and test models.

   c) How could the in service activities be improved?

      Answers:
      - Release budget money;
      - Programming activities.

2. Curriculum Development

   a) How much progress did you make in the development of curriculum units in your subjects taught for the RAMS project?

      Answers:
      0 - A great deal; 1 - Some; 1 - Not involved in curriculum development.
      1 - No response.

   b) Please describe briefly your curriculum development activities in the RAMS project:

      Answers:
      - None;
      - Research - assimilation of materials.

   c) Please describe briefly what more needs to be done in curriculum development for the RAMS project in the subjects you teach?

      Answers:
      - Curriculum should be more responsive to students;
      - More specific directions to follow.

(Contd.....)

3. Please rate your RAMS students in each of the following areas:

	Excellent	Good	Fair	Poor
a. Academic progress	0	1	2	0
b. Class attendance	0	3	0	0
c. Behavior	1	1	1	0
d. Interest and motivation	2	1	0	0
e. Development of career awareness	1	2	0	0
f. Other - tardiness	0	0	1	0

4. To what extent have students been involved in developing the program?

   Answers:
   1 - Not at all; 2 - Some.

5. To what extent have parents been involved in the program?
   Answers:
   0 - Not at all; 2 - Some; 1 - A great deal.

6. Resources

   a) How adequate are the resources for the project?
   Answers:
   2 - Very Adequate; 0 - Adequate; 1 - Poor.

   b) Please list adequate and inadequate resources:
   (No response)

7. What are the strengths of the RAMS project?
   Answers:

   - Staff; Resources; Parents.
   - A change from the usual structured classroom activities.

8. What are the weaknesses of the RAMS project?
   Answers:

   - Lack of supplies, materials, equipment, books, etc.
   - Program needs more staff.

9. How could it be improved?
   Answers
   - Resources needed for additional staff and supplies;
   - New facilities;
   - Recruitment;
   - Upgrading student population;
   - Region II Administative Assistance;
   - Assistance from Federal Programs.

10. Overall rating of the RAMS project:
    Answers:
    1 - Excellent; 2 - Good; 0 - Fair; 0 - Poor.

TABLE 7

RESULTS OF THE PARENTS QUESTIONNAIRE

(N = 12)

1. What are your reactions to the RAMS Project?
   Answers:

   9 - Very Favorable; 3 - Favorable;
   0 - No Opinion; 0 - Unfavorable or Very Unfavorable.

2. What do your children think of the RAMS Project?
   Answers:

   8 - Very Favorable; 3 - Favorable;
   1 - No Opinion; 0 - Unfavorable or Very Unfavorable.

3. Parents Comments:

" RAMS - Aerospace Program was very good for the students. It gave them experience to something new and education. The program should stay at Randall Jr.-Sr. High.

" The exposure of this program to Randall students can create a more open mind for the planning of their future. They receive on-the-project experience which will either be helpful for the desired vocation, or opportunity to determine the job in mind is suited for them.

" RAMS program is the most impressive program that Randall ever had. I am fascinated by the faculty and the parents of the students involved; I wish to see it continue.

" I feel that the RAMS project has helped my son very much. We need more projects like this in our schools. The parents should be more a part so that they can understand and help or support their child and the project.

" I think it is a good concept, however, there did not seem to be enough pupils involved in the program from all parts of the city. I hope there will be enough books for the regular school part of the program next year. I think that the ninth graders should not be forced to graduate and then return to some school the next year. High school begins at the ninth grade level not tenth.

" New text-books are needed. "

TABLE 8

SOCIO-ECONOMIC STATUS OF RAMS PROJECT STUDENTS - PARTICIPATION IN THE FREE LUNCH PROGRAM

Details of the Lunch Program	Number	Percent
Free Lunch	35	48.3
Reduced Lunch	3	4.2
Not on Free or Reduced Lunch	34	47.5
TOTAL	72	100.0

Mathematics, History, Social Science, Geography and Civics. Non-academic subjects (Business, Music, Health, Industrial Arts, Electives) were not included. Computation was based on a four point scale, namely, A = 4, B = 3, C = 2, D = 1, F = 0. The formula was:

$$GPA = \frac{X}{n}$$

where X is the grade value and "n" is the number of grades included in the average.

Table 9 shows the results of the analysis. For 1974-75, data were available for 63 of the 72 RAMS students currently enrolled, and for 1975-76 GPA could be compared for 69 of 72 students in 1974-75.

Comparing the results for the two years, the data show that there was a percentage increase of both the top and bottom of the GPA distribution. GPA's of 3.00 or higher increased from 4.8% in 1974-75 to 8.7% in 1975-76. GPA's of 0.99 or lower also increased from 12.7% in 1974-75 to 39.1% in 1975-76. While the increase in GPA at the higher level is gratifying, the increase in GPA's of 0.99 or less is of great concern. Using the Chi Square test, these differences were statistically significant beyond the 1% level of confidence (Chi Square 14.34, df = 3).

The majority of RAMS students come from relatively poor socio-economic backgrounds and about two thirds of them have academic standings lower than a "C" average in the current year. More attention needs to be given to improving the performance of the students with poor academic records.

Tables 10 and 11 show the grades of Marine Science and Aerospace Science students for the first advisory and the final grades. The results suggest that much more improvement is needed. Most notable are the substantial number of D's and F's received in the academic subjects - Science, English, History and Algebra. Although many students are receiving grades of A, B, or C, the percentage receiving failing grades is substantial - 4 of 11 in 9th grade Marine Science, 9 of 24 in 10th grade Marine Science, 3 of 13 in 9th grade Aerospace Science and 7 of 21 in 10th grade Aerospace Science (all final grades).

Caution should be exercised in reviewing the academic progress of these students. A similar Aerospace Project in California notes that academic progress was minimal in the first year, but improved in the second year. Furthermore, problems encountered in the project may have limited student gains.

TABLE 9

GRADE POINT AVERAGES OF RAMS STUDENTS ONE YEAR BEFORE AND AFTER THE RAMS PROGRAM

Grade Point Average	Year 1974-75		Year 1975-76	
	Number of Students	Percent of Students	Number of Students	Percent of Students
3.00 or higher	3	4.8	6	8.7
2.00 - 2.99	21	33.3	17	24.6
1.00 - 1.99	31	49.2	19	27.6
0.00 - 0.99	8	12.7	27	39.1
TOTAL	63	100.0	69	100.0
Mean	1.55	-	1.36	-
Standard Deviation	.78	-	1.01	-

TABLE 10

GRADES OF MARINE SCIENCE STUDENTS - ADVISORY 1 AND FINAL GRADES

Grade/ Score	Marine Science		English		History		Spanish		Algebra	
	A.1	F	A.1	F	A.1	F	A.1	F	A.1	F
Grade 9										
A	0	0	1	0	1	0	0	0	0	0
B	1	0	2	1	1	2	3	1	2	2
C	3	3	1	4	5	3	0	1	4	4
D	5	3	3	1	2	3	3	3	2	2
F	2	4	4	4	2	2	3	4	3	2
Blank	0	1	0	1	0	1	2	2	0	1
Total	11	11	11	11	11	11	11	11	11	11
Grade 10										
A	0	0	0	0	1	1	0	0	1	1
B	7	1	2	1	4	2	0	0	0	0
C	4	4	3	0	7	1	1	0	4	4
D	6	10	7	9	6	12	3	2	11	6
F	5	9	10	14	4	8	6	9	4	12
Blank	0	0	0	0	0	0	12	13	2	1
Total	22	24	22	24	22	24	22	24	22	24

Note: A.1 = Advisory 1; F = Final Grades

TABLE 11

GRADES OF AEROSPACE SCIENCE STUDENTS - ADVISORY 1 AND FINAL GRADES

Grade/ Score	Aerospace		English		History		Spanish		Algebra	
	A.1	F	A.1	F	A.1	F	A.1	F	A.1	F
Grade 9										
A	0	0	0	0	2	0	0	0	2	2
B	2	2	1	1	4	7	2	0	3	2
C	5	5	6	5	6	4	3	3	4	5
D	4	3	4	7	1	2	1	0	3	0
F	2	3	2	0	0	0	0	2	1	4
Blank	0	0	0	0	0	0	7	8	0	0
Total	13	13	13	13	13	13	13	13	13	13
Grade 10										
A	2	0	6	3	4	2	0	0	1	0
B	5	4	4	4	5	6	2	1	4	4
C	9	5	5	7	6	4	2	2	9	9
D	6	5	5	4	6	4	0	0	7	2
F	4	7	6	3	5	3	0	0	5	6
Blank	0	0	0	0	0	2	22	18	0	0
Total	26	21	26	21	26	21	26	21	26	21

Note: A.1 = Advisory 1; F = Final Grades.

Marine Science and Aerospace Tasks:

Students have also received training in a number of areas related to Marine and Aerospace programs. For example, 26 Marine Science students have received certificates for completing the U.S. Coast Guard Auxiliary Youth Safe Boating Course. This is an eight hour course which includes the following: Small Boat Handling, Marine Engines, Sailboats, Small Boat Maintenance, First Aid for Boating, Marine Radio Telegraphy, Charts and Compass, and Weather.

Twentysix students have also attended the Boat Handling and Basic Seamanship Course given by the Metropolitan Police Harbor Section. To date nine students have passed the examination for this course. It should be noted that this is an adult level course.

Achievement of important student milestones in the Aerospace program were hindered by problems in the acquisition of a flight simulator and delays in contracting for additional flight experience. The flight simulator is needed to provide hands-on experience at Randall prior to the actual field flight checks and flying experience. Flight training normally follows this path of simulated experience to provide greater readiness for actual flight experiences. The flight simulator was available on loan for about a month, but had to be returned when funds were not released in time for its purchase.

Nonetheless, 24 of the Aerospace students logged 20 minutes of flight time. All students started a flight plan, and 9 of them made sufficient progress to warrant plans for further flight training.

Clearly the early availability of the flight simulator, preparation of Mathematics and Science teaching units geared to developing a flight plan, and early contractual arrangements for flight experience will set the stage for great improvement in the year to come.

Absences and Tardiness:

Absences and tardiness records were obtained for all RAMS students for the first and second semesters of the school year. Data were obtained for all RAMS students rather than the 50 RAMS students originally proposed in order to obtain more reliable results. First and second semesters are compared to see if the program had any impact in reducing absences and tardiness. Additionally, absence records are compared with system wide results and with results for the Randall School for the previous year.

Table 12 shows the results for absences. For Marine Science students, the median or average absence rate increased from 18.0% in the first semester to 31.2% in the second semester. This difference in absence rates was statistically significant beyond the 1% level of confidence, using the sign test (Chi Square = 16.13, df = 1). Absence rates for the Aerospace Science students declined slightly from 12.4% in the first semester to 11.8% (median) in the second semester. This difference in absence rates was not statistically significant at the 5% level of confidence using the sign test (Chi Square = 1.24, df = 1).

System wide results show absence rates of 18.9% for Junior High Schools and 20.7% for Senior High Schools for the school year 1974-75, the most recent results available at the time this report was prepared. In the same year, the absence rate for Randall was 24.1%. The Aerospace Science students actually had lower absence rates throughout the year than the Junior and Senior High School students in general and about half the rate of other Randall students. In the first semester, Marine Science students absence rates were about comparable to Junior and Senior High School students throughout the system but about 6% lower than other Randall students. The second semsester absence rate of 31.2% was substantially higher than Junior and Senior high school students and of other Randall students.

Table 13 shows the results for tardiness for Marine Science and Aerospace students. Tardiness rates were higher for the year for Marine Science students (21.4%) compared with the Aerospace Science students (14.1%).

Comparing first and second semester results show that tardiness rates more than doubled in the second semester, increasing from 13.5% in the first semester to 31.2% in the second semseter for Marine Science Students and from 9.0% in the first semester to 20.4% in the second semester for Aerospace Science students. (For Marine Science Chi Square = 16.13, df = 1; for Aerospace Science, Chi Square = 17.79, df = 1; both Chi Squares are statistically significant beyond the 1% level of confidence.)

The results for absences and tardiness presented here seem to show that first semester results are consistent with the objective stated for this project that absences and tardiness rates would be reduced. However, second semester results of absences for Marine Science and tardiness for both groups do not support the objective.

The delay in funding; the consequent delay in acquiring textbooks, equipment, and materials for the project; the limitations in field trips; staff turnover; and the transition of Randall from a Junior to a Senior High School may have had a negative impact on the students school motivation

TABLE 12

A B S E N C E S O F R A M S S T U D E N T S

	Marine Science Students		Aerospace Science Students	
	First Semester	Second Semester	First Semester	Second Semester
Average (Median) Days Absent	16	29	11	11
School Days in Semester	89	93	89	93
Average (Median) Absence Rate	18.0%	31.2%	12.4%	11.8%

Comparisons

Absence Rates in 1974-75 for:

System wide Junior High Schools	-	18.9%
System wide Senior High Schools	-	20.7%
Randall School	-	24.1%

TABLE 13

TARDINESS OF RAMS STUDENTS

	Marine Science Students		Aerospace Science Students	
	First Semester	Second Semester	First Semester	Second Semester
Average (Median) Days Tardy	12	29	8	19
School Days in Semester	89	93	89	93
Average (Median) Tardiness Rate	13.5%	31.2%	9.0%	20.4%

in so far as it is measured by absences and tardiness. These results may reflect more directly a lack of motivation on the part of the students brought about in part by the noticable lack of promised resources for the program and for the school. In the students questionnaire, many students noted the lack of resources and the limitations of the school program. While showing interest in the RAMS concept, the inability of the program to carry out its announced program would inevitably have an impact on the students motivation for school.

Standardized Testing:

The original plan for standardized testing included the administration of a pretest and posttest to RAMS students and to a control group. These plans had to be abandoned when requests for standardized tests were not met by the D.C. Public Schools. (The request for standardized tests was made in a memo to Mr. Farr, Director of Pupil Appraisal, dated October 28, 1975. According to the program coordinators, several follow-up calls did not yield the needed tests.)

Several alternatives were examined to find out if pretest data might be available for the RAMS students. It was found that neither the scores of the California tests nor the D.C. Prescriptive Reading Test (PRT) or the Prescriptive Mathematics Test (PMT) were available for these students in sufficient number to be useful as pretests in order to make a study of gains resulting from the program.

It was decided to administer the PRT and PMT in May 1976 and again in May 1977 as measures of growth in the basic skills for the second year of the program. Presented here are the results of the May 1976 testing using the PRT and the PMT. These data are presented to show the level of achievement of the RAMS students. As no pretest data is available, the test scores cannot be interpreted as reflecting program outcomes.

Table 14 shows the results of the Prescriptive Reading Test for the 17 (out of 24) ninth grade RAMS students and 44 (out of 48) tenth grade RAMS students. Also shown for comparative purposes are the results for all 221 ninth grade Randall students. The table shows the percent of students who achieved mastery in each area of the test. This information should prove useful to teachers in understanding areas that require emphasis and those in which a majority of students have achieved mastery.

Statistical comparisons among the groups showed that the RAMS students are quite similar to the population of ninth grade Randall School students. The "z" test and "t" test for proportions were used to compare the two RAMS groups to the

TABLE 1

RESULTS OF THE PRESCRIPTIVE READING TEST FOR RAMS STUDENTS AND RANDALL SCHOOL NINTH GRADE STUDENTS - PERCENT MASTERY FOR EACH TEST AREA

Test Area	RAMS Students		Randall School 9th Grade Students	Statistical Significance of Difference
	9th Grade	10th Grade		
Word Perception				
1. Final Vowel	59	59	69	
2. Two vowel	47	41	45	
3. R-Controlled	71	55	59	
4. Adjective Forms	76	86	86	
5. Syllabication	88	84	82	
6. Affixes Inflections	82	89	88	
7. Reading/Silent Letters	18	25	28	
8. Context Clues	94	95	97	
9. Compound Words Punctuation	24	20	21	
10. Accent/Like Consonants	12	23	26	
11. Accept/"Le" Words	18	27	23	
12. Accent/Long Vowels	29	48	36	
13. Accent/3 Syllable Words	6	32	23	+ *
14. Accent/Double Consonants	35	41	33	
15. SCHWA Vowel	53	45	40	
16. Accent Rule/Suffixes	24	48	29	
17. Locating Accent/Suffixes	6	11	10	
18. Accent/Suffixes	35	20	26	
19. Phonetic Analysis	71	75	70	
Comrehension Interpretation				
1. Inferences	59	64	64	
2. Making Judgements	76	70	80	@
3. Facts/Opinions	24	41	30	
4. Conclusions	71	66	67	
5. Locate Information	65	50	61	
6. Prove a Point	65	68	73	
7. Conclusion	41	59	56	
8. Punctuation	71	50	62	
9. Sensory Imagery	65	57	66	
10. Pace and Mood	47	61	63	

(Contd....)

TABLE 14 (Contd..)

Test Area	RAMS Students		Randall School 9th Grade Students	Statistical Significance of Difference
	9th Grade	10th Grade		
Study Reading				
1. Simple Index	76	64	64	
2. Printed Directions	82	68	78	
3. Dictionary	41	18	34	@
4. Note Taking	24	16	36	@
5. Three or More Point Outline	35	25	31	
6. Interpret Diagrams	59	64	64	
7. Locate Reference	47	41	56	
N =	17	44	221	

+ Difference between RAMS 9th and 10th grade statistically significant at 5% level of confidence.

* Difference between Randall and RAMS 9th grade statistically significant at 5% level of confidence.

@ Difference between Randall and RAMS 10th grade statistically significant at 5% level of confidence.

Randall ninth graders, and to each other. The results show only 5 significant differences out of 108 comparisons. At the 5% level of confidence, 5 significant differences would be expected on the basis of chance alone.

Table 15 shows the results for the PRT in terms of the distribution of percent mastery for the 36 areas of the test. This table reinforces the point that the RAMS students are quite similar in reading skills to Randall ninth graders. The table also shows that one half or more of RAMS (and Randall) students have achieved mastery in one-half or more areas of the PRT. Reading improvement for the RAMS program for the next year should concentrate on important areas of weakness revealed by the test.

Table 16 shows the results for the Prescriptive Mathematics test for the RAMS and Randall students. The results for Mathematics are much poorer than for Reading. There was not even one area in which any of the student groups had 50 percent achieving mastery, while there were 48 or 49 out of 55 areas in which the percent who achieved mastery was below 10 percent. This dramatically poor showing shows a serious need for improved Mathematics education. These poor results could however also be the result of a difficult test or of the scores required to achieve mastery in each area.

The comparisons among the groups show that they are quite similar.

TABLE 15

PERCENT MASTERY DISTRIBUTION FOR THE PRESCRIPTIVE READING TEST

Percent Mastery	RAMS Students		All Randall Ninth Grade Students
	Ninth Grade	Tenth Grade	
90-100	1	1	1
80-89	3	3	4
70-79	7	3	3
60-69	3	7	9
50-59	4	6	3
40-49	5	7	2
30-39	3	1	6
20-29	5	6	7
10-19	3	3	1
0-9	2	0	0
Total	36	36	36
N	17	44	221

TABLE 16

PERCENT MASTERY DISTRIBUTION FOR THE PRESCRIPTIVE MATHEMATICS TEST

Percent Mastery	RAMS Students		All Randall Ninth Grade Students
	Ninth Grade	Tenth Grade	
50-100	0	0	0
40-49	1	0	0
30-39	0	1	1
20-29	2	3	3
10-19	3	3	2
0-9	49	48	49
Total	55	55	55
N	20	38	226

CHAPTER IV

SUMMARY OF FINDINGS

Overall, the project has suffered from a number of serious problems beyond its control including the late release of funds, limited availability of materials and books, staff turnover, and a school facility and program itself in the process of change and growth.

In spite of these limitations, the project staff have made considerable progress in curriculum development, field site arrangements, acquiring texts, materials and equipment, and in involving parents and the community at large. Alleviation of the problem areas cited should go a long way toward making RAMS a successful project in the coming years.

Reactions of students, teachers and parents to the RAMS project are positive. All groups underscored the need for materials, equipment and texts. Student responses illustrate the effectiveness of the career development approach subsummed within the RAMS curriculum. Parents comments emphasize the importance of continuing the project at the Randall School.

Students were found to come from low socio-economic backgrounds and relatively poor levels of achievement - about two-thirds with average grades below C in the year before the project. Although there was an increase in the percentage of students earning a B average or better when grades for 1975-76 were compared with grades for 1974-75, the percentage of students who earned a D average or below also increased.

Absences for Aerospace students were significantly lower thoughout the year than those for Marine Science students, for Randall School as a whole and for Junior and Senior High Schools in the D.C. Public Schools. Absences for Marine Science students were significantly below those of Randall School and Junior and Senior High Schools in the D.C. Public Schools in the first semester, but were significantly higher in the second semester.

Contrary to expectations, tardiness rates increased significantly from the first semester to second semester.

Student achievements in Marine Science tasks included completion of the U.S. Coast Guard Auxiliary Youth Safe Boating Course by 26 students and the Metropolitan Police Harbor Section, Boat Handling and Basic Seamanship Course (an adult course) completed by 9 of the 26 students to date.

All Aerospace students started a flight plan, and 24 students each logged 20 minutes of flying time. Greater progress would have been made had a flight simulator and other materials been available early in the project.

Results of the Prescriptive Reading Test and Prescriptive Mathematics Test do not yield a measure of program impact as pretests were not available. These tests establish the pretests for measuring gains due to the program next year. The results do show that all students need much more work in Mathematics. The percentage of students achieving mastery typically was below 10% for 48 or 49 of the 55 areas included in the test. In reading the results were more favorable with about one-half of the students, on the average, achieving mastery in about one-half of the areas measured by the test.

Overall, these results are gratifying considering the many factors beyond the project's control that would tend to limit the effectiveness of the program. Given the necessary support in terms of on-time release of funds, availability of texts, equipment and materials, and a trained staff, the RAMS project should show marked achievement in the coming year.

CHAPTER V

R E C O M M E N D A T I O N S

Recommendations for the School System:

Better support is needed in terms of release of funds on time, provision of requested tests, textbooks supplies and materials. Improvement is also needed in contracting arrangements, particularly for Aerospace Flight experiences.

Recommendations for the Randall School and the RAMS Program:

Staffing and staff development will require continued attention. Staff turnover, particularly in science and mathematics limited the extent to which the science and mathematics teachers who completed the 1975-76 school year were able to embed Marine Science and Aerospace themes within their classwork. Although a great deal was accomplished in terms of assembling a curriculum package, the staff development process by which these curricula were translated into teaching units actually used in the classroom was not completed. The project coordinators reported that they plan to give a good deal of attention to this area in the coming year.

Laboratory facilities for science need to be upgraded to the high school level. Although this is the responsibility of the D.C. Public Schools and of the Randall School rather than the RAMS project itself, the quality of science education that can be delivered with the present science laboratory is necessarily limited.

The RAMS staff however, will need to assume that the upgrading of the science laboratory will require more than one year as Randall moves from Junior High School to Senior High School status. Therefore the RAMS staff should continue to concentrate its efforts in laboratory type field experiences such as those on the Lightship Chesapeake and though preflight check routines. The field experiences may have compensated to some extent for the lack of laboratory facilities in the school, however, in the long run, more adequate in-school laboratory facilities will be needed for the teaching of biology, chemistry, and physics.

Given timely release of funds, it is recommended that the project immediately acquire those essential items of equipment needed for more effective "hands-on" learning experience in the school. Foremost among these items are a flight simulator and related equipment and materials for

pre-flight checks. More extensive materials for the construction of sophisticated models in the Industrial Arts class are also important.

The Project Coordinators should continue to expand the base of field experiences available to the students. The coordinators have, in fact, continued in their planning for a wider range of field experiences for this next year. It is also recommended that the staff establish a monitoring/evaluation system for each of the field experiences in order, in the long run, to select those experiences that seem most fruitful. A record of student reactions and staff observations regarding the following would be helpful: (1) field experience motivating to students, (2) specific learning experiences, (3) time requirements and logistics, (4) reinforcement of classroom experiences.

Parent involvement in the program, though well conducted through several meetings and continuing effort of the staff should be more throughly documented. Most helpful would be a summary log of parent visits and inquiries to the school and questionnaires distributed to parents at meetings. Although a parent questionnaire was developed this year, problems arose in terms of distributing the questionnaire to an adequate sampling of parents.

More attention needs to be given to the basic educational needs of these students. The majority of the students come from poor economic backgrounds, course grades are poor (with about two-thirds below a C average) and test scores show poor performance in Mathematics. Given opportunity to acquire necessary materials and books for the science courses and industrial arts, and given opportunities to maintain a trained staff, improvements in course grades should be expected as a result of the RAMS program in its second and third year of operation. However, the program staff will need to continually explore ways in which to reach these students in order that their motivation might be channeled into improved academic performance.

In addition to absences and tardiness, data on retention in the program which distinguish transfers from dropouts would be very useful in assessing the impact of the RAMS program. In the age-grade group of the RAMS students, many students decide to drop out of school. Additionally, because the Randall School is limited in its course offerings during this transition period from Junior to Junior-Senior High School status, some students may decide to transfer to another high school. For these reasons, records should be maintained of transfers vs. dropouts to obtain an adequate picture of the "holding power" of the RAMS program. It is reasonable to hypothesize that the RAMS program should reduce school dropouts. Many students might, however, wish to transfer elsewhere in order to take programs of greater interest to them.