DOCUMENT RESUME

ED 342 623 SE 052 042

AUTHOR Mecca, Peter M.
TITLE Mathematics-Science Integration Project: A Collaborative, Rural School Effort.
PUB DATE 91
NOTE 30p.; Paper presented at the Annual Meeting of the National Association for Research in Science Teaching (Lake Geneva, WI, April 7-10, 1991).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Educational Technology; Elementary Education; *Elementary School Science; Females; *Inservice Teacher Education; Interdisciplinary Approach; Mathematics Education; Minority Groups; *Problem Solving; Professional Development; Program Descriptions; Science Education; Workshops
IDENTIFIERS New York

ABSTRACT

The Mathematics-Science Integration Project is a continuation of an ongoing series of inservice workshops oriented towards the professional development of elementary school teachers and early secondary school mathematics and science teachers. The teachers served by this project included 75 elementary school teachers, 35 middle/junior high school teachers, and 38 secondary school teachers. The purpose of this project was: (1) to provide a series of inservice workshops that emphasize mathematics and science training in the areas of problem solving, integration, and the use of technology in the teaching of math and science; (2) to provide a workshop to develop an awareness and a strategy for increasing student participation in science and mathematics with particular attention paid to underrepresented populations; and (3) to support the professional development of special projects and to attend professional conferences. Evaluation of this project was carried out through maintenance of administrative records and through formative and summative evaluations of the project. As evidenced by participant responses, the project would have to be considered highly successful. Participants received further training in selected areas as well as exposure to new topics and techniques. Participants found the instruction excellent. They acquired new knowledge that could be taken back to the classroom and their interest in pursuing the topics further was stimulated. An introduction, a section on teachers' needs in mathematics and science, program activities, results, a discussion, and a summary are included. Evaluations from the problem solving, integrating mathematics and science, technology in teaching mathematics and science, and women in mathematics and science workshops, and an overall summary evaluation are appended. (KR)

MATHEMATICS-SCIENCE INTEGRATION PROJECT: A COLLABORATIVE, RURAL SCHOOL EFFORT

Peter M. Mecca
State University of New York College at Oneonta
Science Education
101 Fitzelle Hall
Oneonta, NY 13820-4015
OFFICE: (607) 431-3183
FAX: (607) 431-2107

A paper presented at the Annual Meeting of the National Association for Research in Science Teaching, Lake Geneva, Wisconsin, April 7-10, 1991.

ABSTRACT

The Mathematics-Science Integration Project continued an ongoing series of inservice workshops oriented towards the professional development of elementary school teachers and early secondary school mathematics and science teachers. The project, coordinated by a regional consortium, was funded by the Dwight D. Eisenhower Title IIA Higher Education Competitive Inservice Grants Program administered through the Bureau of Postsecondary Grants Administration within the New York State Education Department.

A regional consortium, encompassing an area of approximately 4,000 square miles, was comprised of the college, two BOCES units, a teacher center, and thirty-seven public school districts. The thirty-seven public school districts contain approximately 760 elementary school teachers and about 80 early secondary math and science teachers. The teachers served by this project included 75 elementary school teachers, 35 middle/junior high school teachers, and 38 secondary school teachers.

The purpose of this study was (1) to provide a series of inservice workshops which emphasize mathematics and science training in the areas of problem solving, integration, and the use of technology in the teaching of math and science, (2) to provide a workshop to develop an awareness and a strategy for increasing student participation in science and mathematics with particular attention paid to underrepresented populations, and (3) to support the professional development of teachers by providing small grants to teachers for the development of special projects and to attend professional conferences.

During the fall of 1989 there were two full day workshops, one addressing problem solving in mathematics and science (grades K-8) and one addressing the integration of mathematics and science (grades K-8). Also, teachers attended professional conferences on mathematics and science education. During the spring of 1990, a full day workshop was held related to the use of technology in science and mathematics classes (grades K-8). Additionally, a full day workshop for teachers (grades K-10) was held that dealt with increasing the number of women in science and mathematics. Teachers met also during this time to share the products developed as a result of conference attendance grants.

Evaluation of the Mathematics-Science Integration Project was carried out through maintenance of administrative records and through formative and summative evaluations of the project. Formative evaluations were conducted at each session of the four workshops. Teacher development activities were evaluated via immediate teacher feedback and via follow-up studies. Summative program evaluation was conducted by an external evaluator via telephone and personal interviews of project staff, teacher center coordinator, and several math and science teachers. A form of stratified random sampling was used in an effort to enhance the ecological validity of the findings.

As evidenced by participant responses to both the items providing ratings and through their written comments, the project would have to be considered highly successful. Participants received further training in selected areas as well as exposure to new topics and techniques. Participants found the instruction excellent. They acquired new knowledge that could be taken back to the classroom and their interest in pursuing the topics further was stimulated.

INTRODUCTION

From 1985 to the present, the Mathematics-Science Project has provided numerous teacher workshops and courses, developed teacher support materials, and documented teaching techniques in the form of video tapes. Each project required the work of a consortium whose members worked cooperatively to develop programs to meet the specific needs of the teachers.

During the 1989-1990 academic year, the consortium developed and implemented a project (i.e., Mathematics-Science Integration Project) that emphasized the integration of math and science into the curriculum. The principal members of the consortium for this project included: the Delaware-Chenango BOCES; the Otsego-Northern Catskills BOCES; thirty-seven local school districts; the Catskill Regional Teacher Center; and the State University of New York College at Oneonta. These local educational agencies have a long history of cooperation in providing inservice training for area teachers since the 1950's.

The region served by the consortium is rural and encompasses approximately 4,000 square miles in five counties. Member schools in one of the BOCES Districts are as much as 100 miles apart. With a total enrollment of approximately 29,000 students, or about 7.25 students per square mile, the schools in this region of New York State have small student enrollments. In fact, the majority of the school districts within the consortium have under 500 students K-12. As these numbers suggest, the schools have small teaching faculties and equally small resources for inservice teacher training. It is precisely this set of circumstances that resulted in these schools, BOCES

units, and SUNY Oneonta joining together on many occasions to address teacher training needs.

In recent years, these educational institutions have joined together to create the Catskill Regional Teacher Center. The Teacher Center was developed as an umbrella agency for consortium sponsored projects. During the Mathematics-Science Integration Project, the Teacher Center assisted the project managers by acting as an information distribution and program coordinating center.

For this project, the consortium's school districts provided support principally through the availability of regional sites where training could occur. School based support of the project was indicated by the signatures of the Delaware-Chenango BOCES Superintendent and the Otsego-Northern Catskills BOCES Assistant Superintendent, who were acting as regional representatives for area schools. SUNY Oneonta supported the project by providing office space, meeting facilities, and clerical assistance.

The objectives of this project were (1) to support inservice workshops for teachers of mathematics and science in grades K-8 that emphasized problem solving, integration of math and science, and the effective use of technology in the teaching of math and science, (2) to support the professional development of teachers by providing opportunities to share ideas and activities related to the teaching of math and/or science, to develop special projects and to attend professional conferences, and (3) to support a workshop to develop an awareness and a strategy among teachers regarding the early withdrawal from the taking of math and science courses by individual underrepresented populations.

TEACHERS' NEEDS IN MATHEMATICS AND SCIENCE

The clientele served by this project came from among the approximately 760 elementary school teachers and 80 early secondary school mathematics and science teachers in the region. The project, therefore, emphasized the special needs of these rural school teachers.

Problem Solving in Mathematics and Science

One national study (National Research Council, 1989), as well as a local science education needs assessment (Mecca and Klindienst, 1989), had found that problem solving was an important need expressed by teachers. In addition, the Regents Action Plan (NYSED, 1984) indicated the need for students to learn how to think logically and creatively, and to apply reasoning skills to issues and problems.

Integration of Mathematics and Science

The Regents Action Plan (NYSED, 1984) specifically mentions the instructional significance for the integration of mathematics and science, "science instruction should demonstrate to students that mathematics is an essential tool for scientific investigation and for expressing scientific hypotheses and findings" (p. 46). The New York State mathematics and science syllabi provide a number of topics common to both areas where integration can occur. In a study by Mecca and Klindienst (1989), data show that elementary school teachers expressed a need for workshops on how to infuse science into other content areas.

Use of Technology

The Regents Action Plan (NYSED, 1984) suggests that teachers incorporate the use of microcomputers and other technology into various subject areas within the school's curricula. The use cf calculators and microcomputers are specifically mentioned as instructional tools for grades 7 and 8 in the mathematics syllabi. The National Resource Council (1989) listed the use of technology as one of seven transitions that will dominate the process of change in mathematics education during the remainder of this century. A study conducted by Mecca and Klindienst (1989) found that secondary school science teachers expressed as highest priority a need for inservice training in the use of microcomputers within their classrooms. In addition, teachers in the rural schools served by this project have had very little opportunity to receive up-to-date training in the use of technology.

Impact of Early Withdrawal from Mathematics and Science

Students who choose to take only a minimum of mathematics and science classes in the secondary schools are ill-prepared for careers in a society heavily influenced by science and technology. This poor preparation is a major block to increasing the number of underrepresented groups in math and science education. The Regents Action Plan (NYSED, 1984) mentions that many students, including a disproportionate number from minority groups, leave school without having acquired the basic knowledge and skills in mathematics necessary for productive lives. The same is true of a basic understanding of science. A study conducted by Mecca and Klindienst (1989) found that teachers

expressed a need for information on science/technology careers for their students.

Most schools serviced by this project did not have mathematics or science curriculum specialists. In many schools there may be only one teacher teaching a particular subject or grade level. These teachers need an opportunity to gain a broader perspective on mathematics and/or science education, and to network with other teachers in the area.

ACTIVITIES

To meet the objectives, the Mathematics-Science Integration Project emphasized three types of activities: inservice workshops; a grant program that provided support for teacher projects in mathematics and science, and which included a culminating day during which teachers shared the products with grant funding; and a grant program for teachers to attend professional conferences.

Two full day workshops were held in Fall, 1989, one addressing problem solving in mathematics and science (grades K-8) and one addressing the integration of mathematics and science (grades K-8). During Spring, 1990, a full day workshop was held related to using technology in math and science classes (grades K-8). Additionally, a half-day workshop for teachers (grades 5-10 was held dealing with retention of students (particular emphasis on underrepresented populations) in mathematics and science classes.

To encourage change in the teaching of mathematics and science, support in the form of grants was given to teachers for projects which focused on project objectives and activities. These grants were solicited by completing an application and were competitive. In their application, applicants had to

identify the category of the project and provide information with regard to grade level, objective, description, products that may result, and a budget.

Many of the teachers served by this project were from schools where there may be only one teacher per grade level or subject. Further, most elementary school teachers do not choose to use limited school conference funds to attend mathematics or science meetings. To address the need to further expose teachers in this service area to current trends in the teaching of mathematics and science, teachers (grades K-8) served by this project were encouraged to attend annual state mathematics or science conferences (e.g., Association of Mathematics Teachers of New York State, Science Teachers Association of New York State).

Teachers applied for support to attend conferences on a competitive basis. Teachers who have shown past leadership potential were given priority. Applicants were requested to identify the conference, indicate how they expected the conference to affect their teaching, and supply a budget of expenses. Reimbursement for expenses was made upon receipt of a voucher and a written report of the sessions attended.

RESULTS AND DISCUSSION

Evaluations were conducted at each session of the four workshops. While the topics addressed were diverse, the evaluation forms were general enough in nature to allow for responses from various sessions to be combined into a general overview of the workshop as a whole and of the year's activities. (See Appendices A-E for data on specific workshops.)

Problem Solving

This workshop consisted of six sessions: Science (K-3); Science (4-6); Math (K-3); Math (4-6); Math (7-8), two sessions. Each session was one half-day in length.

Combining the data from all six sessions resulted in a series of mean ratings which indicated a very high level of satisfaction on the part of the participants. Eight evaluation items addressed the effectiveness of the presenter. The mean scores for each of these items exceeded 4.65 on a 5.0 scale, where 5.0 was the highest score possible. These ratings indicated that, as group, the presenters clearly identified their objectives, were organized, knowledgeable, responsive to participant needs, communicated ideas clearly, and made the subject matter interesting.

Participants indicated that the sessions attended had provided information that could be used in support of the educational process (mean = 4.79) and that could be transferred into the classroom curriculum (4.73). The sessions were viewed by 87 percent of the participants as having encouraged them to learn more about the topic.

All things considered, participation in the workshop was considered very worthwhile by 94 percent of the respondents (mean 4.64). Ninety-five percent of the respondents would recommend the workshop to other teachers.

Participants rated their familiarity with the topics slightly above the mid-point (mean = 3.58).. On the same scale, participants rated the extent to which the session provided new information at 4.17. The length of the sessions was viewed as appropriate by 85 percent of the respondents.

Integrating Mathematics & Science Workshop

This workshop consisted of five sessions which focused upon the integration of math and science into the curriculum at the following levels: K-3, two half-day sessions; 4-6, all day; and 7-8, two half-day sessions.

Data from all these sessions resulted in a series of mean scores which indicated a very high level of satisfaction on the part of the participants. For the eight evaluation items addressing the effectiveness of the presenter, the mean scores all exceeded 4.51 on the 5.0 scale. These ratings indicated that, as a group, the presenters clearly identified their objectives, were organized, knowledgeable, responsive to participant needs, communicated ideas clearly, and made the subject matter interesting.

Participants indicated that the sessions attended had provided information that could be used in support of the educational process (mean = 4.76) and that could be transferred into the classroom curriculum (4.79). The sessions were viewed by 86 percent of the participants as having encouraged them to learn more about the topic.

Participation in the workshop was considered very worthwhile by 93 percent of the respondents (mean = 4.53). Ninety-five percent of the respondents would recommend the workshop to other teachers.

Participants rated their familiarity with the topics slightly above the mid-point of the scale (mean = 3.53). On the same scale, participants rated the extent to which the sessions provided new information at 4.14. The length of the sessions was viewed as appropriate by 75 percent of the respondents.

Technology in Teaching Math and Science

In February, 1990, the project sponsored a day of workshop sessions which focused on technology in the teaching of math and science. Topics included: calculators (K-4), 5-9), two sessions each; computer labs; National Geographic Kids Network; Lego-Logo; laser disc; and IBM/MECC software.

The mean scores acquired from combining the data from all nine sessions indicated a high level of satisfaction on the part of the participants. Among the eight evaluation items addressing the effectiveness of the presenter, the mean scores ranged from 4.35 to 4.65 on a 5.0 scale. These ratings indicated that, as a group, the presenters identified their objectives, were organized, knowledgeable, responsive to participants, communicated ideas clearly, and made the subject matter interesting.

Participants indicated that the sessions attended had provided information that could be used in support of the educational process (mean = 4.52) and that could be transferred into the classroom curriculum (4.53). The sessions were viewed by 88 percent of the participants as having encouraged them to learn more about the topics explored.

All things considered, participation in the workshop was considered very worthwhile by 87 percent of the respondents (mean = 4.42). Eighty-seven percent of the respondents would recommend the workshop to other teachers.

Participant familiarity with the topics was measured by a mean score of 2.58, slightly below the mid-point of the scale. The extent to which the sessions provided new information was given a mean score of 4.15 by workshop participants. The length of the sessions was viewed as appropriate by 81 percent of the respondents.

The responses indicated that the participants were satisfied with the presentations. Mean scores for the items that addressed the effectiveness of the presenters ranged from 4.08 to 4.77.

Participants indicated, to a lesser extent, that the session had provided information that could be used in support of the educational process (mean = 4.0) and that could be transferred into the classroom curriculum (4.08). The session was viewed by 61 percent of the participants as having encouraged them to learn more about the topic.

All things considered, participation in the workshop was considered worthwhile by 75 percent of the respondents (mean = 4.08). Sixty-seven percent of the respondents would recommend the workshop to other teachers.

Participants rated their familiarity with this topic slightly above the mid-point of the scale (3.42). On the same scale, participants rated the extent to which the session provided new information at 4.0. The length of the session was viewed as appropriate by 73 percent of the respondents.

SUMMARY

As evidenced by participant responses to both the items providing ratings and through their written comments, the Mathematics-Science Integration Project was considered to be successful. Participants received further training in selected areas as well as exposure to new topics and techniques. The presentations were professional and informative. Participants found the instruction excellent. They acquired new information that could be used in the classroom, and their interest in pursuing the topics

further was stimulated.

For the past five years the teachers in this region of New York State have had many opportunities to expand upon their knowledge and skills in mathematics and science. The opportunities provided by this project continued the high level of participant satisfaction and learning experienced in previous years.

REFERENCES

Mecca, P.M., & Klindienst, D.B. (1989). Perceived needs of elementary teachers & secondary science teachers toward the teaching of science: A preliminary report. Paper presented at the annual spring conference of the Association for the Education of Teachers in Science, Syracuse, New York.

National Research Council (1989). Everybody counts: A report to the nation on the future of Mathematics. Washington, D.C.: Author.

New York State Education Department (1984). Action plan to improve elementary and secondary education results in New York. Albany, New York: Author.

PMM:ehl

Appendix A:
Summary of All Workshop Evaluations

SUCO MATH-SCIENCE PROJECT
Program Evaluation Summary

SUMMARY OF ALL EVALUATIONS: 7/1/89-6/30/90

Number of Evaluations: 238 f:msev89-0.23

		Strongly Disagree 1	2	3	4	Strongly Agree 5	NA	MEAN
1. The presenter clearly identified the session's objectives.	N		3	28	57	148	2	4.48
	%	0	1	12	24	63		
2. The session was organized effectively.	N		4	16	60	157	1	4.56
	%	0	2	7	25	66		
3. The presenter was well prepared for the session.	N		5	8	43	182	-	4.69
	%	0	2	3	18	76		
4. The presenter was knowledgeable about the subject.	N		4	5	36	193	-	4.76
	%	0	2	2	15	81		
5. The presenter communicated ideas clearly.	N		2	17	67	152	-	4.55
	%	0	1	7	28	64		
6. The presenter made the subject matter interesting.	N		2	10	60	166	-	4.64
	%	0	1	4	25	70		
7. The presenter was responsive to the session's participants.	N		1	12	54	170	1	4.66
	%	0	0	5	23	72		
8. All things considered, the presenter was an effective teacher.	N		1	9	58	170	-	4.67
	%	0	0	4	24	71		
9. Today's program provided specific and practical ideas that could be transferred to the classroom curriculum.	N		3	11	57	167	-	4.63
	%	0	1	5	24	70		
10. Today's session provided specific and practical information that could be used in support of the educational process.	N		2	12	56	166	2	4.64
	%	0	1	5	24	70		
11. Today's program has encouraged you to learn more regarding this topic.	N		3	30	72	125	8	4.39
	%	0	1	13	31	54		
12. All things considered, participation in today's program was very worthwhile.	N		1	22	66	141	8	4.51
	%	0	0	10	29	61		

13. I would recommend today's program to other teachers.	N		1	21	60	148	8	4.54
	%	0	0	9	26	64		
		Low				High		
14. How would you rate your familiarity with this topic before the session began?	N	31	33	67	60	38	9	3.18
	%	14	14	29	26	17		
15. To what extent has this session provided you with new information about this topic?	N		8	33	105	83	9	4.15
	%	0	3	14	46	36		

16. For the topics covered, this session was:

	N	%
Too Short	36	16
Appropriate	182	81
Too Long	7	3
No Response	13	

COMMENTS: See individual session summaries.

Appendix B:
Problem Solving Workshop Session Evaluations

SUCO MATH-SCIENCE PROJECT
Program Evaluation Summary

Workshop Session: ALL SESSIONS

Number of Evaluations: 90

Date: October 19, 1989

f:msev89-0.7

		Strongly Disagree 1	2	3	4	Strongly Agree 5	NA	MEAN
1. The presenter clearly identified the session's objectives.	N		1	5	17	66	1	4.66
	%	0	1	6	19	74		
2. The session was organized effectively.	N		1	5	15	69	-	4.69
	%	0	1	6	17	77		
3. The presenter was well prepared for the session.	N			3	13	74	-	4.79
	%	0	0	3	14	82		
4. The presenter was knowledgeable about the subject.	N			1	10	79	-	4.87
	%	0	0	1	11	88		
5. The presenter communicated ideas clearly.	N			3	21	66	-	4.70
	%	0	0	3	23	73		
6. The presenter made the subject matter interesting.	N			3	17	70	-	4.74
	%	0	0	3	19	78		
7. The presenter was responsive to the session's participants.	N			1	19	70	-	4.77
	%	0	0	1	21	78		
8. All things considered, the presenter was an effective teacher.	N			2	15	73	-	4.79
	%	0	0	2	17	81		
9. Today's program provided specific and practical ideas that could be transferred to the classroom curriculum.	N		1	1	19	69	-	4.73
	%	0	1	1	21	77		
10. Today's session provided specific and practical information that could be used in support of the educational process.	N			2	15	72	1	4.79
	%	0	0	2	17	81		
11. Today's program has encouraged you to learn more regarding this topic.	N			11	27	49	3	4.44
	%	0	0	13	31	56		
12. All things considered, participation in today's program was very worthwhile.	N			5	21	61	3	4.64
	%	0	0	6	24	70		

13. I would recommend today's program to other teachers.	N			4	16	67	3	4.72
	%	0	0	5	18	77		
		Low				High		
14. How would you rate your familiarity with this topic before the session began?	N	3	7	28	33	15	4	3.58
	%	3	8	33	38	17		
15. To what extent has this session provided you with new information about this topic?	N		2	14	37	33	4	4.17
	%	0	2	16	43	38		

16. For the topics covered, this session was:

	N	%
Too Short	9	11
Appropriate	72	85
Too Long	4	5

COMMENTS:

See individual session summaries.

Appendix C:
Integrating Mathematics & Science Workshop Evaluations

SUCO MATH-SCIENCE PROJECT
Program Evaluation Summary

Integrating Mathematics and Science Workshop

Workshop Session: All Sessions

Number of Evaluations: 43

Date: November 14, 1989

f:msev89-0.13

		Strongly Disagree 1	2	3	4	Strongly Agree 5	NA	MEAN
1. The presenter clearly identified the session's objectives.	N			6	8	28	1	4.52
	%	0	0	14	19	67		
2. The session was organized effectively.	N		1	3	8	30	1	4.60
	%	0	2	7	19	71		
3. The presenter was well prepared for the session.	N		1	1	8	33	-	4.70
	%	0	2	2	19	77		
4. The presenter was knowledgeable about the subject.	N			1	8	34	-	4.77
	%	0	0	2	19	79		
5. The presenter communicated ideas clearly.	N			1	13	29	-	4.65
	%	0	0	2	30	67		
6. The presenter made the subject matter interesting.	N				11	32	-	4.74
	%	0	0	0	26	74		
7. The presenter was responsive to the session's participants.	N				5	38	-	4.88
	%	0	0	0	12	88		
8. All things considered, the presenter was an effective teacher.	N			1	8	34	-	4.77
	%	0	0	2	19	79		
9. Today's program provided specific and practical ideas that could be transferred to the classroom curriculum.	N				9	34	-	4.79
	%	0	0	0	21	79		
10. Today's session provided specific and practical information that could be used in support of the educational process.	N				10	32	1	4.76
	%	0	0	0	24	76		
11. Today's program has encouraged you to learn more regarding this topic.	N			6	15	21	1	4.38
	%	0	0	14	36	50		
12. All things considered, participation in today's program was very worthwhile.	N			3	14	26	-	4.53
	%	0	0	7	33	60		

13. I would recommend today's program to other teachers.	N			2	17	23	1	4.50
	%	0	0	5	40	55		
		Low				High		
14. How would you rate your familiarity with this topic before the session began?	N	2	8	9	13	11	-	3.53
	%	5	19	21	30	26		
15. To what extent has this session provided you with new information about this topic?	N		2	6	19	16	-	4.14
	%	0	5	14	44	37		

16. For the topics covered, this session was:

	N	%
Too Short	9	23
Appropriate	30	75
Too Long	1	3
NA	2	

COMMENTS:

See individual session summaries.

Appendix D:
Technology in Teaching Mathematics and Science Evaluations

SUCO MATH-SCIENCE PROJECT
Program Evaluation Summary

Technology in Teaching Mathematics and Science

Workshop Session: All sessions

Number of Evaluations: 92

Date: February 6, 1990

f:msev89-0.21

		Strongly Disagree 1	2	3	4	Strongly Agree 5	NA	MEAN
1. The presenter clearly identified the session's objectives.	N		2	14	26	50	-	4.35
	%	0	2	15	28	54		
2. The session was organized effectively.	N		2	7	32	51	-	4.43
	%	0	2	8	35	55		
3. The presenter was well prepared for the session.	N		4	4	19	65	-	4.58
	%	0	4	4	21	71		
4. The presenter was knowledgeable about the subject.	N		4	3	14	71	-	4.65
	%	0	4	3	15	77		
5. The presenter communicated ideas clearly.	N		1	12	28	51	-	4.40
	%	0	1	13	30	55		
6. The presenter made the subject matter interesting.	N		2	7	28	55	-	4.48
	%	0	2	8	30	60		
7. The presenter was responsive to the session's participants.	N		1	11	24	55	1	4.46
	%	0	1	12	26	60		
8. All things considered, the presenter was an effective teacher.	N		1	6	31	54	-	4.50
	%	0	1	7	34	59		
9. Today's program provided specific and practical ideas that could be transferred to the classroom curriculum.	N		1	7	26	58	-	4.53
	%	0	1	8	28	63		
10. Today's session provided specific and practical information that could be used in support of the educational process.	N		1	7	27	57	-	4.52
	%	0	1	8	29	62		
11. Today's program has encouraged you to learn more regarding this topic.	N		1	10	27	50	4	4.43
	%	0	1	11	31	57		
12. All things considered, participation in today's program was very worthwhile.	N		1	11	26	50	4	4.42
	%	0	1	13	30	57		

13. I would recommend today's program to other teachers.	N		1	11	24	53	3	4.45
	%	0	1	12	27	60		
		Low				High		
14. How would you rate your familiarity with this topic before the session began?	N	26	17	24	10	11	4	2.58
	%	30	19	27	11	13		
15. To what extent has this session provided you with new information about this topic?	N		4	11	41	32	4	4.15
	%	0	5	13	47	36		

16. For the topics covered, this session was:

	N	%
Too	16	18
App	72	81
Too	1	1
NA	3	

COMMENTS:

See individual session summaries.

Appendix E:
ɔmen in Mathematics and Science Evaluations

SUCO MATH-SCIENCE PROJECT
Program Evaluation Summary

Women in Mathematics and Science

Number of Evaluations: 13

Date: March 22, 1990

f:msev89-0.22

		Strongly Disagree 1	2	3	4	Strongly Agree 5	NA	MEAN
1. The presenter clearly identified the session's objectives.	N			3	6	4	-	4.08
	%	0	0	23	46	31		
2. The session was organized effectively.	N			1	5	7	-	4.46
	%	0	0	8	38	54		
3. The presenter was well prepared for the session.	N				3	10	-	4.77
	%	0	0	0	23	77		
4. The presenter was knowledgeable about the subject.	N				4	9	-	4.69
	%	0	0	0	31	69		
5. The presenter communicated ideas clearly.	N		1	1	5	6	-	4.23
	%	0	8	8	38	46		
6. The presenter made the subject matter interesting.	N				4	9	-	4.69
	%	0	0	0	31	69		
7. The presenter was responsive to the session's participants.	N				6	7	-	4.54
	%	0	0	0	46	54		
8. All things considered, the presenter was an effective teacher.	N				4	9	-	4.69
	%	0	0	0	31	69		
9. Today's program provided specific and practical ideas that could be transferred to the classroom curriculum.	N		1	3	3	6	-	4.08
	%	0	8	23	23	46		
10. Today's session provided specific and practical information that could be used in support of the educational process.	N		1	3	4	5	-	4.00
	%	0	8	23	31	38		
11. Today's program has encouraged you to learn more regarding this topic.	N		2	3	3	5	1	3.85
	%	0	15	23	23	38		
12. All things considered, participation in today's program was very worthwhile.	N			3	5	4	1	4.08
	%	0	0	25	42	33		

13. I would recommend today's program to other teachers.	N			4	3	5	1	4.08
	%	0	0	33	25	42		
		Low				High		
14. How would you rate your familiarity with this topic before the session began?	N		1	6	4	1	1	3.42
	%	0	8	50	33	8		
15. To what extent has this session provided you with new information about this topic?	N			2	8	2	1	4.00
	%	0	0	17	67	17		

16. For the topics covered, this session was:

	N	%
Too	2	18
App	8	73
Too	1	9
No Response	2	

COMMENTS:

High on activity - low on content in helping our older female students.

Did not give that much information for science. Also most activities were for general relaxation for all with math - not any extra emphasis aimed at women.

Odds on you. Too many directions. Music was distracting. Nice dinner.

As a math person I felt it was more dynamic to me than a science person. Dinner and atmosphere was nice.