DOCUMENT RESUME

ED 137 098 SE 022 291

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TITLE How Elementary Teachers Learned to Use, and Their Resultant Satisfaction With, Their Science Curricula.
PUB DATE Mar 77
NOTE 18p.; Paper presented at the annual meeting of the National Association for Research in Science Teaching (50th, Cincinnati, Ohio, March 22-24, 1977); Not available in hard copy due to marginal legibility of original document

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS Educational Research; Elementary Education; *Elementary School Science; *Inservice Teacher Education; *Instructional Materials; *Science Curriculum; Science Education; *Science Teachers; *Surveys
IDENTIFIERS Research Reports

ABSTRACT

To determine methods by which elementary science teachers learn to use instructional materials, the University of South Dakota, as part of the National Science Foundation-sponsored project TAPE (Tactics for Applying Programs in Education), mailed a questionnaire to a randomly selected group of elementary science teachers in South Dakota, Iowa, Nebraska, and Minnesota. Data collected in the survey indicated most elementary science teachers learn about their science instructional materials as they use them. Teachers using NSF-financed elementary science curricula are more active in learning how to use their curricula than are the teachers in the non-NSF programs, frequently learning to use their curricula through college courses, workshops, independent study or textbook representatives. Also, while most elementary science teachers report satisfaction with the curriculum they are using, those teachers using NSF curricula express a significantly higher degree of satisfaction than those teachers using non-NSF curricula. (Author/CS)

HOW ELEMENTARY TEACHERS LEARNED TO USE, AND THEIR RESULTANT SATISFACTION WITH, THEIR SCIENCE CURRICULA

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Presented at the Annual Meeting of the
National Association for Research in Science Teaching
March 22, 1977
Cincinnati, Ohio

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SUMMARY

TARGET POPULATION

(Elementary Science Teachers)

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ACCESSIBLE POPULATION

(Elementary Science Teachers from South Dakota, Iowa, Nebraska, and Minnesota)

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SAMPLE SELECTION

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QUESTIONNAIRE ADMINISTRATION

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CONCLUSIONS

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1. Most elementary science teachers learn to use their curricula as they implement them.

2. Teachers using NSF financed elementary science curricula are more active in learning how to use their curricula than are the teachers of the non-NSF programs.

3. Teachers using NSF elementary science curricula report greater satisfaction with the curricula they are using.

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The methods by which elementary science teachers learn to use their curricula are important to know since a thorough understanding of them could greatly increase the effectiveness and efficiency with which curricula developers, textbook publishers, and institutions of teacher education are able to inform elementary science teachers of the proper utilization of the new and revised science curricular materials available to them. As a means of assessing how elementary teachers learned to use their currently taught science curricula, the University of South Dakota, as part of the National Science Foundation sponsored Project TAPE, mailed a questionnaire to a randomly selected group of elementary science teachers in South Dakota, Iowa, Nebraska, and Minnesota in March, 1975. The questionnaire was composed of several distinct sections designed to measure the familiarity with and the use of the National Science Foundation (NSF) supported elementary science curricula of Elementary Science Study (ESS), Science-A Process Approach (S-APA), Science Curriculum Improvement Study (SCIS), and Conceptually Oriented

Program in Elementary Science (COPES). The attention of this paper, however, is directed toward the survey's questions explaining how elementary teachers learned to use their current science curricula and how well satisfied they were with those curricula. In addition, this paper explores the differences reported by teachers who use the NSF supported elementary science curricula and by teachers who do not use these curricula.

Questionnaires were mailed to 700 elementary science teachers in South Dakota, Nebraska, Minnesota, and Iowa. A response rate of slightly more than 85% resulted when 597 of the teachers completed the survey. Their responses are reported in Table 1.

(Insert Table 1)

The data reported in Table 1 indicates most (58.3%) elementary science teachers learned about their science curricula as they used it. If the individual science teacher is well-trained and experienced in elementary science teaching methods, this mode of self-instruction could indeed adequately prepare him to teach the curriculum. However, as may often be the case, especially in the self-contained classroom where one is expected to teach all subjects, the teacher may not have had the proper background of scientific knowledge and science

Table 1

Methods in Which Elementary Science Teachers
Learn to Use Their Science Curricula
N = 597

	Learned as it was used	Demonstrated by textbook representative	Learned in a college course	Learned in a workshop	Other
Number of Teachers	348	65	81	88	48
Percent of Respondents	58.3	10.9	13.6	14.7	8.0

instructional techniques to properly learn the science curriculum as he used it. This could well lead to a deficient science program for the students.

Since most elementary science teachers appear to learn about their curriculum as they use it, and since elementary science teachers may not have always had the necessary scientific knowledge and instructional methods background, it would seem imparative that textbook publishers make a conscious effort to produce very explicit and detailed teachers' manuals with pertinent references and instructional aids to supplement the teacher's level of expertise.

The 597 responding elementary teachers were divided into two groups as determined by the science curricula they used. There were 145 teachers using curricula whose development was financed by the National Science Foundation (ESS, SCIS, S-APA, COPES) and 442 teachers using curricula not financed by the National Science Foundation. (Since ten of the respondents indicated they taught elementary science but did not answer the questions identifying their curricula, they were not included in this section.) Tables 2 and 3 report the methods in which the teachers of the NSF elementary science curricula and the teachers of the non-NSF elementary science curricula learn to use their programs.

(Insert Table 2)

(Insert Table 3)

Upon comparing the data from Table 2 with the data from Table 3, one will immediately notice the higher percent of responses recorded by teachers of the NSF financed curricula than by the non-NSF curricula teachers. In conjunction with that, it will also be noticed that the teachers of NSF supported curricula were more active in learning how to use their curricula than were the teachers of the non-NSF programs, i.e., they more frequently learned to use their curricula through college courses, workshops, independent study, textbook representatives and by other means. The differences between the NSF curricula teachers and the non-NSF curricula teachers for each of the five categories listed in Tables 2 and 3 are significant (.001) as determined by a two-tailed t-test.

The noticeable differences in the ways they learned about their curricula could be attributed to the great emphasis placed upon the NSF developed curricula in the late 1960's and early 1970's as evidenced by the large number of NSF sponsored workshops, college courses, and extension classes in which NSF curricula were emphasized and taught. These curricula are also the main ones stressed in college-level elementary science programs.

Table 2

Methods in Which Teachers of NSF Supported Elementary Science Curricula Learn Their Use
N = 145

	Learned as it was used	Demonstrated by textbook representative	Learned in a college course	Learned in a workshop	Other
Number of Teachers	97	19	54	68	21
Percent of Respondents	66.9	13.1	37.2	46.9	14.5

Table 3

Methods in Which Teachers of non-NSF Supported Elementary Science Curricula Learned Their Use
N = 442

	Learned as it was used	Demonstrated by textbook representative	Learned in a college course	Learned in a workshop	Other
Number of Teachers	239	47	31	22	28
Percent of Respondents	54.1	10.6	7.0	5.0	6.3

While NSF curricula have been widely disseminated via the federal financing of college workshops, college courses and extension classes, and through their emphasis in the elementary science programs of teacher training, the non-NSF curricula have most likely been restricted to the more traditional means of dissemination via textbook representatives and by teachers requesting examination copies of publishers' science curricula as the typical five-year (or more) cycle of textbook replacement occurred. It is probably due to this difference of curriculum dissemination that accounts for the large category differences observed in Tables 2 and 3.

Teachers' satisfaction with their curricula was elicited by the question, "Would you recommend the science curriculum you use to a teacher friend?". The results are reported in Table 4.

(Insert Table 4)

Although Table 4 shows all three categories of elementary science teachers willing to recommend their science curriculum, a greater percentage of teachers using NSF supported programs were more willing to do so than were those teachers using programs not supported by NSF. The questionnaire used to gather data for this survey did not probe into the reasons why a person

Table 4

Would You Recommend the Science Curriculum You Use to a Teacher Friend?

	Number responding: YES	NO	Percent responding: YES	NO
All Elementary Science Teachers	238	166	58.9	41.1
NSF Curricula Teachers	93	39	70.4	29.6
Non-NSF Curricula Teachers	140	121	53.6	46.4

would or would not recommend their curriculum, however one cannot help but wonder if those teachers using NSF feel more competent and comfortable with their programs because they appear to have had more training in their use as was evidenced by the data in Tables 2 and 3.

In summary the data show that (at least for the midwest states surveyed) those teachers using NSF curricula (ESS, SCIS, S-APA, COPES) have had more formal training in their use than have their colleagues not using NSF curricula. It would also appear as if the efforts of the National Science Foundation to disseminate knowledge and training about their curricula are more successful than the more traditional methods used by the publishers of non-NSF programs. Finally, it appears as if the teachers of NSF curricula are more satisfied with their programs than are those teachers using non-NSF curricula.

This study has unveiled several problems that should be investigated if one is to gain a more complete understanding of how teachers learn to use their curricula and how well satisfied they are with those curricula: 1) Why do teachers use their current science curricula?; 2) What factors influence a teacher's selection of curricula?; 3) Is there a difference in science training between those teachers using NSF materials and those who don't?; 4) Do schools using the NSF curricula tend to

have more financial resources than those who don't?;

5) Do schools using the investigatively oriented NSF curricula tend to use a similar approach in other fields?;

6) Do teachers express satisfaction with a science curriculum because of its inherent qualities, student response, or being able to choose it themselves?; and

7) Is there a relationship between the use of NSF curricula and a school's structure, i.e., departmentalized vs. self-contained classrooms?