DOCUMENT RESUME

ED 274 496 RC 015 943

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TITLE Energy Education in the Rural Elementary School: A Curriculum Infusion Project.
INSTITUTION Kansas State Univ., Manhattan. Coll. of Education.
SPONS AGENCY Kansas State Univ., Manhattan.; Shell Companies Foundation, New York, N.Y.
PUB DATE Sep 85
NOTE 16p.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adoption (Ideas); Change Strategies; *Curriculum Development; Educational Innovation; Elementary Education; *Energy Education; *Inservice Teacher Education; Institutes (Training Programs); Program Descriptions; Program Effectiveness; *Rural Education; Rural Schools; *Small Schools; Teacher Developed Materials; Teacher Recruitment; Videotape Recordings
IDENTIFIERS *Kansas

ABSTRACT

The Kansas State Energy Curriculum Institute (KSECI) was conducted for 2 weeks in June 1984 at Kansas State University, Manhattan, and was attended by nine rural elementary teachers from northeast Kansas. The program included the dissemination of energy curriculum materials, field trips, guest speakers, media production, and other energy education activities. Participants were required to develop a plan for instructional change in their own classrooms, to collect materials appropriate for use with their students, and to produce a videotape "commercial" convincing school districts and teachers of the need for energy education infusion into the curriculum. A questionnaire, "Stages of Concern about the Innovation," was used as a pretest and posttest to document program effectiveness. Results showed that KSECI participants gained knowledge and became more concerned about student outcomes and working with others following the Institute. Participants' evaluations of the Institute were mostly positive regarding materials, instructors, and field trips. The major criticism was that there was not enough time to explore materials and topics. (JHZ)

Energy Education in the Rural Elementary School:

A Curriculum Infusion Project

Running Head:

Rural Energy Education

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September 1985

NOTE: Funding for this project was provided by Shell Companies Foundation, Inc. and Kansas State University.

Abstract

This paper describes the need, development, implementation and evaluation of an energy education institute conducted at Kansas State University. Rural elementary teachers received instruction on various energy related topics and developed materials utilizing local resources. A mention of study specific problems involving participant recruitment is included.

Certain researchers and energy educators have recently developed concerns over the ways in which the public adjusts to the scarcity and increasing expense of energy supplies. This adjustment does not lend itself to the public developing positive attitudes toward energy management and energy issues. In turn, this may potentially lead to complacency with regard to energy education and future energy decision-making. In response to this state of affairs, a number of educators and energy experts have started to stress the importance of energy education for today's citizenry.

For some years now, energy has become a concern of most Americans. That this concern has prompted energy education projects is no surpise. Glass (1981) reported that teachers needed more knowledge about energy and attitudes pertaining to the use of energy.

The Kansas State Energy Curriculum Institute (KSECI), sponsored cooperatively by the Shell Companies Foundation, Inc. and Kansas State University, was conducted for two weeks in June, 1984 at Kansas State University, Manhattan. The KSECI involved nine rural elementary (K-8) teachers from northeast Kansas. The institute included the dissemination of energy curriclum materials, field trips, guest speakers, media production and other energy education activities.

Needs

According to a recent study of the energy education needs of rural elementary teachers in northeastern Kansas, teachers perceive the greatest needs in the areas of education and conservation topics in energy (James, 1982). In terms of their present knowledge on energy topics, educational related topics were the lowest. This shows the importance of the educational concerns of teachers in energy curriculum. The overall results of the survey

were used to develop the KSECI and the greatest areas of need were emphasized. These areas of greatest need were educational materials and curricula, and energy conservation topics.

Objectives

The overall goal of the KSECI was to assist rural elementary teachers in northeastern Kansas to infuse energy education concepts into their existing curriculum. Specific objectives were as follows:

1) to acquaint rural elementary teachers with local resources in energy education that are available,
2) to provide K-6 teachers with a solid background in energy education curriculum development,
3) to provide elementary teachers with a background in energy education issues,
4) to make available energy education curriculum materials and resources, and
5) to assist them in adapting these ideas and materials in a Local Energy Curriculum Action Plan.

Participant Recruitment

The original recruitment plan for the KSECI involved local rural school districts. Five rural districts within a 40 mile radius of Kansas State University were selected for participation. Superintendents agreed to support the project, and each school principal was to nominate candidates. Preference was to be given where principals demonstrated support to local energy education curriculum. Responses from this initial plan were minimal. Although several teachers expressed interest, only one responded with an application to participate in the Institute. It was, therefore, necessary to

begin an "all out" recruitment plan utilizing site visits, mailings and telephone calls. Using the above techniques, over 550 teachers were contacted. From this pool 12 applied and 3 dropped out just before the institute started. The apparent need and interest reported earlier did not result in a more active participation for several reasons. First, the dates of the institute overlapped some district school closings. This problem was corrected by moving the dates on which the KSECI was held, but this solution may have occurred too late. Next, superintendents did not follow through with their commitent to assist in recruiting. Finally, the teachers were reluctant to participate in "just another" summer progam with little or no assurance of worthwhile content. It is hoped that such a perception will not be as great in the future since the beginning of a networking effect should have emerged from this project. All participants responded in the course of their work that they would highly recommend the KSECI in the future.

In planning future institutes the KSECI staff should utilize past participants in recruitment. Also, clear communication and frequent contact should be made to participating districts. Finally, the timing of the institute should be established by way of needs assessment during the midterm period of the spring semester.

Participants

Twelve participants were selected for the KSECI, of which 9 actually attended. Each participant received a $75 stipend and enrolled in 3 hours of graduate credit. All participants commuted to Manhattan with the greatest distance being 65 miles.

A brief profile of the 9 participants is as follows:

--the average age was 38.8 years

--1 taught early childhood

--5 taught elementary

--3 taught 7th grade science

--3 held a Master's degree

--the average amount of teaching experience was 9.6 years.

Participants considered the possibility of earning graduate credit a major reason for applying for the KSECI. However, several comments indicated that a keen interest in energy at a personal level may have had some influence on participation. Participants expressed no dissatisfaction with the institute assignments required to justify graduate credit.

Institute Format, Instructional Approach and Institute Products

Steinbrink and Jones (1981) suggest a model for the delivery of teacher institutes called the Shared Local Resources Model (SLRM). This model was used for the KSECI and its components consisted of formal presentations by the director, staff and several guest speakers with various levels of expertise, field trips, curriculum evaluation sessions and curriculum development sessions. A major part of the KSECI was devoted to "hands-on" curriculum development and evaluation. During the time set aside for energy curriculum development, each participant collected, examined and modified materials for their particular needs. This activity was most beneficial according to the participant teachers in that it gave them the opportunity to peruse many energy resources and curricula and collaborate with experts and other teachers. This activity resulted in ideas and material for subsequent activities. Clearly, the combination of information dissemination in the

forms of lectures, media and field experiences with curriculum development was worthwhile considering the quality of the KSECI products and outcomes.

In order to meet the objectives of the KSECI, efforts were directed toward participant development of four products: an action plan, a personal commitment, a collection of materials appropriate to each participant's curricular needs and a videotape. Generally, the action plans were to contain background information about the participant school, district, grade level, textbooks used and so forth. Current instructional procedures used by participants were to be included, along with procedures used to evaluate classroom instruction. The major thrust of the action plan was to outline a strategy for change. This planned strategy was seen to include changes in the teaching environment, instructional strategies and evaluation programs. The content materials and resources made available through the KSECI were seen as a major influence on the instructional strategies component of the action plans.

The personal commitment for the KSECI was accomplished by use of a Personal Commitment form. This product was produced during the last two days of the Institute, and required participants to assess their learning, attitudes, and feelings, and then write their own basic concerns with energy education, energy education goals of importance to them and ways to acheive those goals (actions to take). These commitments were viewed as extensions of the action plans.

The materials and resources used in the Institute were large in number and varied, as already mentioned in this report. All grade levels were addressed by these materials, as were most feasible energy resources and conservation activities. The materials were obtained through a number of

sources, including the U.S. Government DOE, petroleum corporations, state departments of education and private companies.

In an effort to have participants draw from selected materials and resources to synthesize a cohesive concept of energy curriculum for their needs, a fourth product of the KSECI was produced: a videotape. Participants had videotaping techniques and ideas presented during a session with a media expert. The task for the participants was to develop a videotape "commercial: extolling the benefits of and needs for energy education infusion into the curriculum. The objectives of this effort were threefold:

1) to provide the school district with a rationale for including energy education in the curricula,
2) to provide a medium for persuading other teachers to become involved in energy education, and
3) to utilize energy education concepts and attitudes derived from the KSECI and thus demonstrate competency in energy education.

The finished videotapes were intended to serve as change agents for other teachers as well, and to reduce their resistance to energy education. The videotapes were further to be used for PTA and small group (including building faculty) meetings. Participants collaborated to develop their own scripts and arrange charts and other visual aids. Rehearsals were completed one day prior to actual videotaping, which occurred in the television studio located in the KSU College of Education Media Center. Videotaping and editing were done by KSECI staff and the director of the Media Center. Tape segmets were intended to be from three to five mintes in duration. Each participant received a single tape containing a copy of all participants' segments.

Evaluation and Observations

In order to assess the degree to which the 1984 KSECI was successful in achieving the planned goals, the following evaluation was conducted. Concern about energy education was assessed on the participant group of 8, both prior to and following the KSECI. Stages of Concern were determined through the use of the Stages of Concern Questionnaire developed at the University of Texas R & D Center (Hall, G., George, A., & Rutherford, W. 1981). The dimensions measured in this instrument are depicted in Figure A.

Figure A

Stages of Concern About the Innovation
(G.E. Hall, R.C. Wallace, & W.A. Dossett, 1973)

0 AWARENESS: Little concern about or involvement with the innovation is indicated.

1 INFORMATIONAL: A general awareness of the innovation and interest in learning more detail about it is indicated. The person seems to be unworried about herself/himself in relation to the innovation. She/he is interested in substantive aspects of the innovation in a selfless manner such as general characteristics, effects, and requirements for use.

2 PERSONAL: Individual is uncertain about the demands of the innovation, her/his inadequacy to meet those demands, and her/his role with the innovation. This includes analysis of her/his role in relation to the reward structure of the organization, decision making, and consideration of potential conflicts with existing structures or personal commitment. Financial or status implications of the program for self and colleagues may also be reflected.

3 MANAGEMENT: Attention is focused on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, scheduling, and time demands are utmost.

4 CONSEQUENCE: Attention focuses on impact of the innovation on students in her/his immediate sphere of influence. The focus is on relevance of the innovation for students, evaluation of student outcomes, including performance and competencies, and changes needed to increase student outcomes.

5 COLLABORATION: The focus is on coordination and cooperation with others regarding use of the innovation.

6 REFOCUSING: The focus is on exploration of more universal benefits from the innovation, including the possibility of major changes or replacement with a more powerful alternative. Individual has definite ideas about alternatives to the proposed or existing form of the innovation.

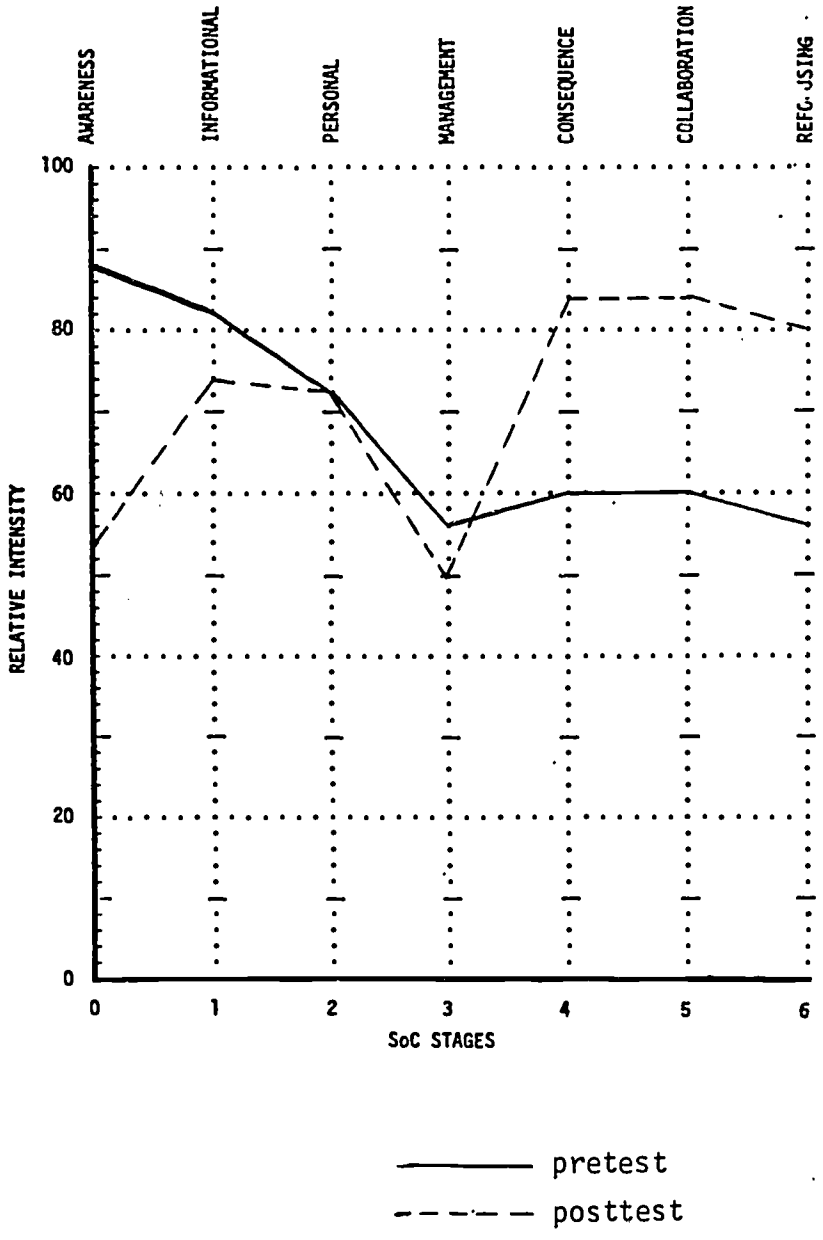
This questionnaire consisted of 35 statements dealing with energy education as an innovation. Energy education as a subject to be integrated into the participant's curriculum as dipicted by the Shared Local Resources Model (SLRM) (Steinbrink and Jones, 1981) was considered the innovation. The results of the Stages of Concern (SoC) are depicted in Table I.

The pretest SoC indicates the highest concerns were in the areas of Awareness and Information with lower areas in Management, Consequence and Refocusing. The KSECI was designed to address Awareness and Information and later to concentrate on consequences of the innovation. The posttest differed from the pretest by depicting an increase in the higher concerns of Consequence, Collaboration and Refocusing. This indicates that the participants were more concerned about the effect on students, coordinating -- with others -- efforts toward using the innovation (energy), and some refocusing as to how existing materials and curricula could be changed to increase their benefit to students. Awareness dropped considerably, indicating that the KSECI reduced this concern. Information remained relatively high, perhaps indicating that they wanted more information about energy. Personal concerns showed no change. Managemet concerns also remained low, which was expected in that the teachers had not had to actually deal with implementing the innovation in their classrooms and schools. In preparation for such implementation, participants were required to work with one another to produce a videotape, as mentioned earlier in the report. This work perhaps contributed to the higher level of Collaboration since participants not only had to work together to accomplish the task, but also had to prepare to present the results to the faculties in their own schools.

In terms of participant comments, most reflected positive attitudes. Most participants felt that the materials provided were excellent and comprehensive. However, several stated that more time to peruse the materials would have been valuable. Several comments were made concerning the instructors and guest speakers which reflected satisfaction and appreciation. The participants stated that both the volunteers and staff speakers presented material well. All expressed satisfaction with the field trips. Finally, the major criticism involved lack of time to "get into" some of the topics.

TABLE I

Total Group Concerns Profile



In summary, the 1984 Kansas State Energy Curriculum Institute was effective in adding to the knowledge of the participants. Also, participants became more concerned about student outcomes and working with others following the KSECI. Concerns about information, however, remained high indicating that follow-up activities to provide informational material might be wise and useful. Additional data are needed to make generalizations as to the use of the energy materials as well as the model. This should be done by site visitations and interviews with the participants during the school year. In terms of the major criticism from participant comments, an effort should be made to lengthen the Institute or reduce the amount of materials and activities presented. In light of participant responses and input, lengthening of the Institute would appear to be the most appropriate means of best meeting the perceived needs of the participants, as opposed to reducing the amount of materials and activities presented.

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