ENERGY EDUCATION METHODOLOGIES FOR LIMITED INCOME FAMILIES

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CHAPTER I

THE RESEARCH PROBLEM

Introduction

The American dream may be a vision of several luxury cars and a split-level house loaded with labor saving appliances, but reality is a bit more modest. The "typical" American family bears little resemblance to television's famous "American Family," with their sprawling air conditioned contemporary house, four cars, swimming pool, and jet traveling children.

Results, from a study conducted by the Washington Center for Metropolitan Studies (1972-73), identify the "typical" American family as one living in a five room, single family house. The house structure, some 1200 square feet in size, usually contains some insulation, but most homes have neither storm windows nor a basement.

The average American household, according to the survey, consumes a total of 341 million BTU's of primary energy each year. This estimate is the equivalent of 848 gallons of gasoline plus over 8,000 kilowatt hours of electricity and 142,000 cubic feet of natural gas per household.

Further results of the study reveal the typical American home contained six energy using items: central heat, lights, hot water heater, stove, refrigerator, and washer. Together these items and other equipment use 20 percent of the total energy consumed within homes in the nation (Presley, Turner, and Hicks, 1976). The average American family spent six percent of its income for gas, electricity, and gasoline in 1972-73. Due to the increased demand and declining energy resources, the cost of energy is increasing. Because families are energy driven units, any increase in the price of energy will require changes in management of the household budget.

Limited income families are particularly affected by the increase in the cost of a survival resource such as energy. The families lack the flexibility of other income groups to accommodate rising prices.

One way to offset rising energy costs is to reduce the amount of energy consumed. If families are to use energy wisely, they must be made aware of the need for energy conservation and ways to change behavior. A study by Oklahoma State University, School of Industrial Engineering and Management (1976) projected that families can reduce utility bills by 30-50 percent through weatherization of homes and changes in habits within the house.

Educational programs such as those offered by Cooperative Extension Service provide a way of disseminating energy information. At present, Extension reaches clientele

through group meetings, a one-to-one method, fact sheets, newsletters, and mass media. While Extension is concerned with serving all people, it is particularly concerned about the limited income families. With the exception of the Expanded Foods and Nutrition Education Program, the programs of Cooperative Extension have not traditionally reached this audience.

Statement of Problem

The concerns and problems confronting families living in a changing society clearly reveal the importance of reliable, appropriate information related to their needs. A multiplicity of problems are encountered by limited income families. One major problem is lack of ability to cope with rapidly rising energy costs.

According to a report by the Energy Policy Project of the Ford Foundation (1974), although higher income groups use more energy, the lower income groups pay a larger percentage of its dollars for energy resources. Thus, the poorer family uses less, but the bigger slice of its income goes to paying for that energy. The limited income family has almost no discretionary money or room for financial error.

New technological information is being introduced to aid families in the use of their energy resources. However, success in meeting the energy challenge will depend heavily on the public's perception of the problem. Hyatt

(1977) states that Extension has both the technical information and the credibility needed to provide the public with factual information on the energy situation. If the objectives of the Cooperative Extension Service's Energy Management Program are to be fully realized, then emphasis should be placed on continued program evaluation and the development of methods to improve effectiveness. According to Bates, Director of Arkansas Extension Service:

> Effective Extension Programming . . . should be based on continuous evaluation of the various audience needs as well as the method and techniques used in providing the teaching and learning environment (Word, 1968, p. 3).

It is believed that those who become aware of the amount of energy they are consuming will modify their management practices to make the best use of their resources. However, relatively little is known about the energy management practices of limited income families. Further, little is known about the most effective methods of dissemination of energy related information. Also lacking is evidence of behavioral change resulting from the receipt of energy information.

Program planners need a data base to strengthen educational programs offered to limited income families. The data collected in this study provided that kind of information for use by personnel in Cooperative Extension and other educational organizations interested in reaching limited income families.

The emphasis now being placed on energy management increases the need for energy education for all incomes. Since energy is a fundamental resource used by families, changes in the amount of energy available will affect family management. Remarkably little is known about families' adoption rate of energy conservation practices.

Purpose and Objectives

The purpose of this study was to determine if there were any differences in the adoption rate of energy conservation practices of families taught by a one-to-one method and those taught by a one time group method. This research measured certain factors that contributed to the adoption rate of energy conservation practices by limited income families. The objectives for this study were:

(1) To identify those families who did or did not adopt the weatherization practices.

(2) To analyze the relationship between family characteristics and the adoption of weatherization practices.

(3) To identify reasons why the families did or did not adopt the weatherization practices.

(4) To develop recommendations for expanded energy education programs for limited income families.

Assumptions

The assumptions for this study are as follows:

The Cooperative Extension service will increase emphasis on energy education.

Home economists will be involved in planning, implementing, and evaluating energy education programs.

The use of paraprofessionals in reaching limited income families will increase.

Hypotheses

The general research hypothesis for this study was that certain characteristics of families are related to adoption of weatherization practices.

The following ten null hypotheses were tested at the .05 level of significance:

HO_1: There is no relationship between educational levels and adoption of weatherization practices.

HO_2: There is no relationship between marital status and adoption of weatherization practices.

HO_3: There is no relationship between sex of head of household and adoption of weatherization practices.

HO_4: There is no relationship between race and adoption of weatherization practices.

children, age of children, and the dependent variable of adoption of weatherization practices.

Limitations

The scope of the project was limited because of the seven week time period. Generalizations of the findings are limited because the sample was not randomly selected. Generalizations are further limited to urban families because the project was conducted in Tulsa, Oklahoma, a predominantly urban area.

Another limitation was the accuracy of information revealed by the families and the accuracy of data collected by the aides.

Definition of Terms

From the educational literature reviewed as background information relating to the study, definitions were formulated. For the purposes of this study, the following terms were defined:

Dissemination: Refers to the transmission or flow of information from one person or group to another person or group.

Education Level: Low--those household heads with eighth grade education or less; medium--those with nine through twelfth grade education; and high--those with more than a high school education.

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Energy Conservation Practices: Activities which directly use or conserve non-human energy in the household.

Family Unit: All persons who are related by blood, marriage, or adoption who reside in the same household.

Housing Status: Indicates ownership or rental of home.

Laborer (structural): Based on definition from the Dictionary of Occupational Titles. This category includes occupations concerned with fabricating, erecting, installing, paving, painting, repairing, and similarly working on structures or structural parts, such as bridges, buildings, roads, motor vehicles, cables, airplane engines, girders, plates, and frames. The work generally occurs outside a factory or shop environment, except for factory production line occupations. Tools used are hand or portable power tools, and such materials as wood, metal, concrete, glass, and clay are involved. Workers are frequently required to have a knowledge of the material with which they work, e.g., stresses, strains, durability, and resistance to weather (DOT, p. 183).

Limited Income Families: Families whose income is less than 80 percent of the median income for a particular area. The area for the purpose of this study is Tulsa, Oklahoma.

Paraprofessional (Project Aides): A non-professional person employed and trained to deliver educational information to selected clientele. The paraprofessional or

project aide usually lives within the community that is being served and acts as an intermediary between the professional and the audience to be reached. The aide is usually under the supervision of a professional staff member.

Service Occupations: This category includes occupations concerned with performing tasks in and around private households; serving individuals in institutions and in commercial and other establishments, and protecting the public against crime, fire, accidents, and acts of war.

Type of Residence: Refers to single family dwelling or multiple family dwellings.

Weatherization Practices: Refers to weatherstripping, caulking, and installation of plastic storm windows.

CHAPTER II

REVIEW OF LITERATURE

The review of literature for this study includes the topics of communication patterns, methods of disseminating information and practices, and energy education for limited income families. A summary of the literature concludes this chapter.

Communication of Information

The science of communication is of vital importance today. It's ramifications reach into fields of human interest of great diversity. People are essentially communicating animals and communication is one of their oldest activities. Cherry (1966, p. 35) defines communication as "that which links any organism together." Cherry further states that it must be emphasized that this definition of communication is by no means complete and that, although it has proved to be particularly relevant to technical communication channels such as the telephone, radio, radar, and television, it's interpretation in broader fields of interest is relatively undeveloped. Due to a lack of understanding of the nature, scope, and function of a particular definition for communication, no one definition is all

inclusive nor can it be used to include all aspects of communication. Communication is so diverse and discursive that the attempt to create a generally accepted definition becomes so profoundly involved that it hinders rather than helps further thought on the subject.

The current explosion of knowledge has complicated the role of many Extension professionals. The dissemination of information from research to the clientele is easy when the clients actively seek out the information, but this study focused on problems involved in helping the limited income families who seldom seek information.

Information to antipoverty (limited income) programs have traditionally been sent through institutionalized channels--newspaper, magazines, radio, and television. Why do Extension professionals rely so heavily on the institutionalized media to communicate with their clientele? An article written by Awa (1974) stated that one primary reason is that so much has been written about the catalytic role of the mass media in stimulating a change in the modernization process.

A study made in Yates County, New York, in 1972, indicated that some of the "hard to reach" segments of population could be reached through non-institutionalized channels. This county was selected because previous studies by a Cornell researcher indicate that a substantial segment of the limited income families in Yates County

did not participate in programs designed to palliate or prevent poverty in the area.

The study's main aim was to discover sources of communication barriers between community leaders and their limited income clients and suggest ways of improving communication between them. Results from the study indicated that two obstacles to leader-client communication existed in the county--lack of money and motivation.

Methods of Dissemination

Results from previous studies indicate a need to investigate the pathways by which useful information is disseminated and the paths and processes through which energy conservation information reaches the masses of people. Kroeber (1973) defines diffusion as the process, usually, but not necessarily gradual, by which elements or systems of a culture are spread and content is transmitted from one person to another or from one population to another.

The two methods of diffusion studied in this research were the one-to-one method and the group method. The one-to-one method was facilitated by the use of paraprofessionals. The use of paraprofessionals or aides has been employed in numerous programs in the area of business, industry, and human services as a result of the 1960 anti-poverty legislation (Grosser, Henry, and Kelly, 1971). This amendment is defined as:

> A movement to recognize and establish new qualifications for careers in human services so that the economically and educationally disadvantaged persons might have the opportunity to upward mobility (Mallory, 1971, p. 326).

This amendment has been expanded far beyond the initial provision.

A number of reasons were cited for using paraprofessionals as a source of manpower to reach disadvantaged families (Word, 1968). They include: 1) shortage of personnel; 2) performance tasks offer no challenge to professional worker; 3) shortage of patience by professionals; 4) expense of employing sufficient number of professionals to provide face-to-face relationships necessary to involve clientele; and 5) availability of local people who are highly motivated and trainable to do the job of improving delivery and quality of services.

Several studies have reported some success with paraprofessionals in educating and assisting limited income families with management problems. One such program is the Expanded Food and Nutrition Education Program being administered by the Cooperative Extension Service. The pilot project for the Expanded Food and Nutrition Education Program was conducted in low income rural areas in Alabama. The results of the project (1969) indicated that some families or individuals are handicapped by the lack of vocational training, some by little or no formal education, some because of lack of economic resources, some by lack of motivation, and some by the presence of poor health.

Some families are hard to reach because of one or a combination of these reasons. Therefore, dissemination methods for reaching them need to be developed.

In many instances the very "personalized" method of one-to-one teaching of very elementary subjects was essential. There was also evidence that the informal group method is an effective method of reaching homemakers. Many times it is necessary to begin the teaching with the one-to-one method, and then encourage the family to attend the group method. Based upon the characteristics of the families in the Expanded Foods and Nutrition pilot project, it appears that the poorly educated, limited income people who are severely isolated are the most difficult to involve in an educational program.

Adoption of Information and Practices

The adoption of information among limited income families is affected by the following: lack of information, assurance, money, and access to the right information. The question that arises is: What is it about a social network that affects the behavior of persons within it? Is it merely the transmission of information or is it because of the number of people within the social network who have already adopted the practices? Coleman, Menzel, and Katz (1959), in a study of the "Social Processes in Physicians' Adoption of a New Drug" revealed that the

friendship network yields the largest difference in the adoption rate of information.

Energy Education

Wise use of resources is an important concept in family management. The increased emphasis placed on energy has raised the question of what can be done to help those families most affected to efficiently manage their resources? One alternative is to motivate families to reduce the amount of energy used based on knowledge of conservation practices.

In the past few years, a number of research studies have focused on the conservation of non-human energy. In the Warren (1974) study, the analysis of socio-economic factors related to energy conservation revealed that the higher the income, the higher the adoption of energy conservation practices--particularly those related to the use of the car. Warren proposed that families with higher incomes were better able to make adjustments in their lifestyles because they had more discretionary resources. The ability of lower income families to conserve energy was limited to the range of household appliances and transportation resources available. Limited income groups report some energy conservation practices, but the number of practices adopted were fewer than that of the higher income.

Warren also found that the type of neighborhood and the families' integration into the neighborhood affected

their adoption of the practices. Warren (1974) concluded:

> If people have a great distrust in the reality of the energy crisis but many individuals around them are taking action regarding conservation . . . to the extent that they identify themselves with that neighborhood or community, their behavior may be more in line with the publicly defined norms. . . . (p. 88).

Kilkeary and Thompson (1975) reported that several variables were related to the adoption of energy practices: exposure to blackouts, direct payment of utility bills, car ownership, belief in family effort to produce change affecting the energy crisis, income, and family composition. Direct energy use in households was found to be positively related to family income in the Newman and Wachtel study (1974). They reported from a national survey of 1,455 households that the poor used less energy in maintaining their level of living, but spent a greater proportion of income to direct energy cost than higher income groups. The poor families spent about 15 percent of their income for natural gas, electricity, and gasoline compared to seven percent for lower-middle, six percent for upper-middle, and four percent for "well off" families. Newman and Wachtel (1975) reported that about 50 percent of the poor had insulation in their homes compared to 95 percent of the well-off; 31 percent of the poor had storm windows compared to 63 percent of the well-off families. One of the most important problems uncovered was the high energy cost for low income families. Gladhart (1975) stated that family income was found to be the strongest single predictor

of home energy use in the general population. Research in the past substantiates the need for effective methods to reach limited income clientele with an Energy Education Program.

Summary

In summary, the review of literature indicated a real need for effective methods to reach the limited income families. It further indicated the need for energy education information for all income levels, but especially those in the limited income level.

CHAPTER III

DESIGN OF STUDY

Increased efforts by Cooperative Extension Service Personnel to broaden their area of concern have focused attention on the special needs of many groups of people, including those of limited income families. However, an effective way of reaching these families has not been developed. This study was designed to test the impact made by two educational methods presently being used by Cooperative Extension Service.

This study involved: (1) a comparison of two methods of disseminating energy conservation information to limited income families; (2) the analysis of characteristics of families adopting and families not adopting the weatherization practices; (3) the investigation of the relationship existing between certain independent variables and the dependent variable of adoption of weatherization practices; and (4) recommendation to Oklahoma Cooperative Extension Service for Expanded Energy Education Programs. It was assumed that the results of this study would be helpful in effectively planning, implementing, and evaluating programs designed to reach limited income families.

Population and Sample

The study was conducted in Tulsa County, Oklahoma during the winter, 1977-78. According to the 1970 census statistics, Tulsa County had a population of 401,663, with nine percent of the population having an income less than poverty level. Poverty level, as defined by the U.S. Department of Labor, includes families receiving less than $6,000 annually. Tulsa County was chosen because of the researcher's familiarity with the area and the clientele to be investigated. Availability of former aides who worked with the Expanded Foods and Nutrition Education Program was another factor in the selection of Tulsa County. The target population for the study was composed of 438 families who were contacted individually by the aides. Of the 438 families, one hundred fifty-six families were worked with individually by aides and fifty-seven families were contacted by the aide through group meetings. The target population was further broken into sub-groups for follow-up interviews. The sub-groups included all of the families contacted by the one-to-one method who adopted (45), a sample of those contacted by the one-to-one method who did not adopt (38), and a sample of those contacted by the group method (42).

Instrumentation

The instruments used in this study were developed after an extensive review of literature and evaluation of other instruments previously used in studies similar to this one.

Four forms were designed to be used by the six aides working with families on a one-to-one basis. These included: (1) Home Visit Form; (2) Family Record Form; (3) Energy Inventory Form; (4) Energy Project Evaluation Forms. The Home Visit Form was designed to record information on content of the home visit between the aide and the families. This helped the researcher gain a greater insight of the family situation and better understanding of the information contained on the other forms. The Family Record Form and Energy Inventory Form were used to collect demographic data for the study. The Evaluation Form was used at the end of the seven weeks to find out what weatherization practices the families had adopted.

The aide working with families in the group method did not use the four forms. Thus, no demographic data were collected on participants attending the group meeting. At each meeting, however, an attendance sheet was taken. Names, addresses, and phone numbers for each person attending were then available for the follow-up interviews.

Interview forms were developed to be used with three sub-groups selected randomly from the total sample. These

interview forms were designed to be used after the seven week period ended. The follow-up interviews were conducted with those families contacted by the group method to find out which families had adopted the weatherization practices and which families had not and reasons for the behavior of each. Follow-up interviews were also conducted with all of those families contacted by the one-to-one method who weatherized and a random sample of those who did not weatherize. Copies of all instruments are included in the appendix.

Data Collection

Seven aides were employed to deliver information to families. These people were chosen because of their experience in working with Cooperative Extension Programs for limited income families. Because of prior employment by Cooperative Extension, their educational expertise and familiarity with the clientele, their training for the energy project was limited to weatherization skills, energy information, and delivery of that information.

The aides received eight hours of initial training. This included four hours of training in how to caulk, weatherstrip, and put plastic on doors and windows. A house in the limited income area was chosen for the aides to work on in order to give them experience in performing the weatherization techniques. The training session also

included information on how to fill out the necessary instruments for the study.

After the initial training, the aides received two hours of supplemental training once a week for the seven week period. At the weekly trainings data collected by the aides were turned in to the researcher for evaluation.

The energy conservation information was delivered (1) by six aides to families in their homes, where the aide taught the families weatherization practices and (2) by one aide using the group method.

The six aides used the one-to-one method of dissemination in six districts of Tulsa County. In a seventh district, an aide, skilled in group teaching, delivered the information to existing groups in that area. Efforts were made to contact families with similar characteristics as those in the other six districts. The goal of all the aides was to get those families contacted by each method to adopt the weatherization practice of caulking, weatherstripping, and applying plastic to doors and windows.

During each family visit, the aides gathered demographic information which served as part of the data base for the study. The aide conducting the group meeting received name, address, and phone number of participants in the group sessions. At the end of the seven week period, each of the six aides using the one-to-one method made final contact to determine which families adopted the weatherization practices. This was documented on the

Energy Evaluation Form. Contact with the group members was made by the researcher and the aide who conducted the group method to determine which participants adopted the weatherization practices. A sub sample of the families served by the project was chosen for further indepth interviewing by the researcher. The purpose of the interviews was to ascertain what variables influenced the families' rates of adoption of the weatherization practices. (A report with details, evaluation, testimonies, and other pertinent information is available from Bonnie Braun or Linda Murray, Division of Home Economics, Oklahoma State University, Stillwater, Oklahoma, 74074.)

Treatment of Data

The chi-square test for independence was used to ascertain whether or not the characteristics of the adopters differed significantly from the characteristics of the non-adopters. With the chi-square technique, one can determine the probability that a relationship exists between two variables (Tate, 1965). The chi-square was used to ascertain whether or not the differences could be attributed to something other than chance alone. The .05 level of confidence was used as the criterion for significance.

Chi-square is not a measure of the strength or direction of a relationship. It is used to estimate the likelihood that some factor other than chance accounts for the apparent relationship between two variables. The test

evaluates the probability that the observed relationship results from chance, but doesn't indicate cause-effect relationships (Best, 1977).

CHAPTER IV

ANALYSIS OF DATA

The purpose of this study was to determine if there was any difference in the adoption rate of energy conservation practices by families taught by a one-to-one method and those taught by a one time group method.

The first objective was to identify those families who did or did not adopt the weatherization practices. The sample was divided into two groups. Group A were those family units contacted by the one-to-one method and Group B, those contacted by the group method. The groups were further categorized as to the kind of weatherization practices adopted. For reporting purposes, four categories were used. Three (3) indicated those participants who adopted all three weatherization practices; two (2) those who adopted at least two of the weatherization practices; one (1) those who adopted one practice; and zero (0) those non adopters. Results of the analysis are summarized in Table I.

The second objective was to analyze the characteristics of families for variables affecting the adoption of weatherization practices. This objective was tested only

on Group A. Chi-square tests were used to test the ten hypotheses to meet this objective. The results and probability levels are shown in Table II.

TABLE I

NUMBER OF FAMILIES IN GROUP A AND GROUP B WHO DID OR DID NOT ADOPT WEATHERIZATION PRACTICES

	Group A		Group B	
	Number	Percent	Number	Percent
3	9	6	0	0
2	13	8	1	2
1	23	14	1	2
Sub-Total	45	28	2	4
0	111	72	40	96
Total	156	100	42	100

HO_1: There is no relationship between educational levels and adoption of weatherization practices. The relationship between education and the adoption of weatherization practices was found to be significant at the .05 level, so HO_1 was rejected. Of those families with low education, only 24 percent adopted weatherization practices; 31 percent of those with medium education and 75 percent of those with high education adopted weatherization practices.

TABLE II

CHARACTERISTICS OF FAMILIES WHO DID OR DID NOT ADOPT WEATHERIZATION PRACTICES

	Did Adopt	Did Not Adopt	Chi-Square Significance Level
Education Level			
8th grade or less	17 (24)	55 (76)	
9th-12th grade	25 (31	55 (69)	.05
Over 12th grade	3 (75)	1 (25)	
Marital Status			
Single	3 (33)	18 (67)	
Married	34 (43)	45 (57)	
Divorced	5 (23)	17 (77)	.005
Widowed	3 (8)	31 (92)	
Sex of Household Head			
Male	35 (45)	43 (55)	
Female	10 (13)	68 (87)	.005
Race			
White	41 (36)	74 (64)	
Non-White	4 (10)	37 (90)	.005
Age of Household Head			
21-35	18 (41)	26 (59)	
36-45	14 (41)	20 (59)	
46-60	4 (21)	15 (79)	.005
61 and over	9 (15)	50 (85)	
Housing Status			
Ownership	27 (29)	67 (71)	
Renting	18 (29)	44 (71)	N.S.
Type of Residence			
Single family	43 (29)	103 (71)	
Other	2 (20)	8 (80)	N.S.

TABLE II (Continued)

	Did Adopt	Did Not Adopt	Chi-Square Significance Level
Both Spouses Employed			
Yes	5 (38)	8 (62)	N.S.
No	40 (28)	103 (72)	
Previous Energy Education			
Yes	3 (37)	5 (63)	N.S.
No	42 (28)	106 (72)	
Previous Acquaintance with Aide			
Yes	14 (45)	17 (55)	.05
No	31 (25)	94 (75)	

HO_2: There is no relationship between marital status and adoption of weatherization practices. Marital status was found to be related to the adoption of weatherization practices ($p<.005$). Forty-three percent of those who were married adopted some weatherization practices, while only 33 percent of the singles and 23 percent of the divorced persons evidenced that behavior. Hypothesis HO_2 was rejected in favor of the alternative hypothesis that a relationship existed other than by chance.

HO_3: There is no relationship between sex of household head and adoption of weatherization practices. Analysis of data rejected HO_3. The probability of .005

indicated that a significant relationship existed between sex of household head and adoption of weatherization practices. It was found that 45 percent of families with male household heads did some weatherizing compared with 13 percent of the families with female heads. Of the non-adopters, 55 percent had male heads compared to 87 percent with female heads.

HO_4: There is no relationship between race and adoption of weatherization practices. HO_4 was also rejected on the basis of the chi-square test. Results revealed a significant relationship between race and adoption of weatherization practices ($p<.005$). Thirty-six percent of the whites adopted weatherization practices compared to 10 percent of the non-whites. Sixty-four percent of the whites compared to 90 percent of the non-whites did not adopt any of the weatherization practices.

HO_5: There is no relationship between age of household head and adoption of weatherization practices. The analysis of the probability of a relationship between age of household head and adoption of weatherization practices rejected HO_5. Age of head of household was found to be related to the adoption of weatherization practices ($p<.005$). Forty-one percent of those with household heads between the age of 21 and 35 adopted; 41 percent of the 36-45 age group; 21 percent of the 46-60 age group; and 15 percent of those 61 and over did some weatherizing. Analysis of the data further revealed that 59 percent of

of the 36-45; 79 percent of the 45-60; and 85 percent of the 61 and over age category did not adopt any weatherization practices.

HO_6: There is no relationship between the adoption rate of weatherization practices by those families with both spouses employed and those with one spouse employed. Results revealed very little difference between the adoption rate of weatherization practices by those families with one spouse and those with two spouses employed. It was found that 38 percent of those families with both spouses employed did some weatherizing compared to 28 percent of those with one spouse employed. Sixty-two percent of those with both spouses employed compared to 72 percent of those with one spouse employed did no weatherization to their homes.

HO_7: There is no relationship between type of residence and adoption of weatherization practices. HO_7 was accepted. Results indicated 29 percent of those families living in single family dwellings adopted compared to 20 percent of those living in other types of dwellings.

HO_8: There is no relationship between housing ownership status and adoption of weatherization practices. It was found that 29 percent of the families in both the ownership and renting category did some weatherization to their homes. Based on the results, HO_8 is accepted.

HO_9: There is no relationship between previous energy education and adoption of weatherization practices. In

testing the relationship between previous energy education and adoption of weatherization practices, no definite relationship was observed; therefore, the hypothesis was accepted. It was found that 37 percent of those who had previous energy education did some weatherization compared to 28 percent who had no previous energy education.

HO_{10}: There is no relationship between previous acquaintance with aide and the adoption of weatherization practices. Results of the analysis indicate a relationship does exist between adoption of weatherization practices and previous acquaintance with aide. Forty-five percent of those who were previously acquainted with the aide adopted the weatherization practices compared to 25 percent of those who were not acquainted with the aide. HO_{10} is rejected on the basis of those findings.

Other variables not tested in the ten hypothesis are reported as follows.

Independent Variables

Employment of Household Head

Employment of the household head was classified in four major categories: (1) unemployed and on public assistance (welfare), (2) retired and on social security, (3) laborers (structural), and (4) service workers. Forty-nine percent of the adopters were laborers compared to 25 percent of the non-adopters. Twenty-two percent of the

adopters were service workers, whereas 11 percent of the non-adopters were listed in that category. Of the adopters, 2.5 percent of the adopters were receiving public assistance as their only source of income compared to 18 percent of the non-adopters. Forty-six percent of the non-adopters were retired and receiving social security compared to 24 percent of the adopters.

Income

The average income of the adopters was $528 monthly compared to $357 for the non-adopters with the median income being $525 for the adopters compared to $362 for the non-adopters. Incomes ranged from $200 to $900 monthly for the adopters and from $0-$800 for the non-adopters.

Length of Residence

The average length of residence for the adopters was 10 years compared to 12 years for the non-adopters. The median length of residence for both groups was five years. Length of residence ranged from two weeks to 36 years for the adopters and one month to 40 years for the non-adopters.

Number of Children

The number of children ranged from 1-5 for the adopters and from 1-6 for the non-adopters. The average number of children for both adopters and non-adopters was one.

Age of Children

It was found that the age of children ranged from eight months to 27 years for the adopters and from seven weeks to 33 years for the non-adopters. The average age of children of the adopters was 15 compared to 12 for the non-adopters.

Reasons for Adopting and Not Adopting Weatherization Practices

The third objective of the study was to identify reasons why families did or did not adopt the weatherization practices. The data for this objective came from all families who did adopt weatherization practices and a sample of those who did not. When the families were asked why they weatherized, 65 percent of the responses given were for comfort; 35 percent for cost. Some of the families gave both comfort and cost (high utility bills) as reasons for adopting.

When the non-adopters were asked why they did not adopt, 53 percent of the responses were lack of money, 18 percent near a holiday season (Christmas and New Years), 14 percent weather, 11 percent renting, and four percent home already weatherized. Some of the families gave multiple reasons.

The families who adopted were asked, "Were there any people that influenced your decision to adopt?" Seventy-

nine percent said "yes"; 21 percent said "no." They were further asked, "Who influenced your decision to adopt?" Sixty-eight percent said the project aide, 30 percent friends, and 2 percent landlady.

The non-adopters were asked if they planned to weatherize. Eight percent said yes, 92 percent said no. The reason cited most often for not planning to weatherize was lack of money.

The fourth objective was to develop recommendations for expanded energy education programs for limited income families. Recommendations will be discussed in Chapter V.

Summary

The four objectives of the study were achieved. Those families who did and did not adopt the weatherization practices were identified. Characteristics of the adopters and non-adopters were analyzed by testing the hypotheses for the study. Analysis of the data contributed to the rejection of six of the ten null hypotheses and acceptance of four. Reasons for adopting, as well as reasons for not adopting were cited. To meet the fourth objective, recommendations are discussed in the next chapter.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Due to the increased demand and declining energy resources, the cost of energy is increasing. All families are affected, but particularly the limited income. If families are to use energy wisely, they must be made aware of the need for and ways to change behavior.

Educational programs such as those offered by the Cooperative Extension Service provide ways of disseminating energy information. While Extension is concerned with serving all people, it is particularly interested in effectively reaching limited income families. This research measured certain factors contributing to the adoption rate of energy conservation practices by limited income families.

The purpose of the study was to determine if there are any differences in the adoption of energy conservation practices by families taught by a one-to-one method and those taught by a one time group method.

Further objectives of the study were:

(1) To identify those families who did or did not adopt the weatherization practices.

(2) To analyze the characteristics of families for variables affecting adoption of weatherization practices.

(3) To identify reasons why the family did or did not adopt the weatherization practices.

(4) To develop recommendations for expanded energy education programs for limited income families.

The general research hypothesis was that certain characteristics of families are related to adoption of weatherization practices. The characteristics were analyzed by testing ten null hypotheses at the .05 level of significance.

HO_1: There is no relationship between educational levels and adoption of weatherization practices.

HO_2: There is no relationship between marital status and adoption of weatherization practices.

HO_3: There is no relationship between sex of head of household and adoption of weatherization practices.

HO_4: There is no relationship between race and adoption of weatherization practices.

HO_5: There is no relationship between age of household head and adoption of weatherization practices.

HO_6: There is no relationship between the adoption of weatherization practices by those families with both spouses employed and those with one spouse employed.

HO_7: There is no relationship between type of residence and adoption of weatherization practices.

HO_8: There is no relationship between housing ownership status and adoption of weatherization practices.

HO_9: There is no relationship between previous energy education and adoption of weatherization practices.

HO_{10}: There is no relationship between previous acquaintance with aide and the adoption of weatherization practices.

Seven energy project aides were employed and received training in energy conservation. Six aides contacted families individually in their homes and one aide worked with a comparable number of family units in group situations. Both the group participants and the individual families were presented the same information. For seven weeks, the aides worked in Tulsa County delivering energy information on caulking, weatherstripping, and application of plastic storm windows to limited income families. They also collected demographic information using instruments developed for the study.

The instruments were designed to collect information on: marital status, race, education, sex, and age of household head; dual employment of spouses, housing ownership status, type of residence, previous energy education, previous acquaintance with aide, employment of head, income,

length of residence, age of household head, number of children, and age of children.

After the seven week period, follow-up interviews were used to collect data on reasons for adopting and not adopting and to substantiate information previously collected. All of those families who adopted, a comparable number of non-adopters (10 percent) and 42 (73 percent) of the group participants were contacted in follow-up interviews.

The chi-square test was used to determine the relationship between the independent and dependent variables. The data were tabulated and analyzed, and conclusions and recommendations were made.

Conclusions

From the findings of this study, the researcher concluded the following:

1. There is a difference in the adoption of energy conservation practices by families taught by a one-to-one method and those taught by the one time group method. More families taught by the first method adopted than those taught by the second method.
2. People with higher education levels tended to adopt weatherization practices more frequently than did people with lower education.

3. Those who were married tended to adopt weatherization practices more than single, divorced and/or widowed.
4. More families with male household heads adopted weatherization practices than those with female heads.
5. More white families adopted than non-white families.
6. Families with heads under 45 years of age tended to adopt more than those over 45.
7. There was no difference in adoption of weatherization practices between families with one spouse employed and families with both spouses employed.
8. There was no difference in the adoption of weatherization practices between families living in single family dwellings and those in multiple family dwellings.
9. There was no difference in the adoption of weatherization practices between families who owned their homes and families who were renting.
10. Most families had no previous energy education.
11. Families previously acquainted with aide adopted weatherization practices more than those who had not known the aide.
12. More families with a member employed as a laborer (structural) tended to adopt weatherization

practices than families with a member employed in any other occupation.

13. Families in the highest income levels adopted weatherization practices more than those in lower income levels.

Recommendations

Recommendations are divided into two categories--those for further study and those required by the fourth objective for expanded educational programs.

Recommendations for Further Study

1. That the study be repeated in an urban area with a larger sample, for a longer period of time to further substantiate the findings of this study.
2. That a similar study be conducted in a rural area to investigate differences and similarities in results.
3. That a similar study be conducted with families in private and public multiple dwelling housing units.
4. That a more complex study be made to investigate the relationship of employment of both spouses and the employment of one spouse, and the adoption of weatherization practices; the relationship between families living in single family dwellings and those in multiple family dwellings

and the adoption of weatherization practices; and the relationship of ownership and renting and adoption of weatherization practices.

5. That a study be made using a multivaried analytical technique to obtain a more precise and definitive measure of variables.
6. That an investigation of energy education designed specifically for older adults, American Indians, and Spanish speaking families be conducted.
7. That the same families be revisited the next winter and thereafter to determine whether or not they continue to weatherize their homes.
8. That a study be made to determine the effect of Public Policy decisions on the implementation of energy education programs.

Recommendations for Expanded Education Programs

1. That an energy education program utilizing paraprofessionals be implemented by Cooperative Extension Service in Oklahoma. Use of paraprofessionals seems to be an effective method for reaching this audience. Paraprofessionals could be

hired as in this project and/or could be recruited as volunteers from various organizations, including both adult and youth. The researcher further recommends that youth in 4-H and other programs be trained as paraprofessionals.

   a. That those who assist limited income families receive training in communication on how to reach and effectively work with this clientele in addition to intensive subject matter training and practice in weatherizing housing.
   b. That in employment of aides, consideration be given to the results of this study that more families adopted who were acquainted with the aide than those who were not.

2. That more effort be devoted to working with families via the group method to further test that delivery system. If the group method is used, follow-up visits and evaluation should be conducted with the participants to encourage adoption of weatherization practices.
3. When motivating families to adopt weatherization practices, comfort should be stressed, as well as cost (reduction of utility bills).
4. For families who cite cost of materials as a reason for not weatherizing, some source of subsidy is needed.

5. Because of the negative impact of weather and the holiday season (with its expenses) an energy education project should be conducted in the fall of the year.
6. To encourage renters to weatherize, the educator should work with owners and/or managers of the homes.
7. Because many families with heads of household sixty and over did not adopt weatherization practices due to cost and labor, a subsidy for both resources should be provided.

Summary

Findings indicated that an imaginative, flexible energy education program congnizant of target population assets, interests, and sensitivities can both attract and serve that population. Such a program must continue to look for, try out, and evaluate new approaches.

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APPENDIXES

APPENDIX A

FAMILY INFORMATION FORM

Energy Education Project

Family Information Form

1. Project aide's name _____

2. Date of visit _____

3. Family ID number _____

4. Name _____ Address _____

6. Telephone number _____ 7. City, State _____

8. Zip code _____ 9. (Check one) ___Single ___Married
___Divorced

10. Area of residence (Check one) ___Urban ___Suburban
___Rural

11. How many persons are in household? _____

Family Members (Name)	Age	Relationship (Son, Daughter, Etc.)	Are you employed? If so, list occupation	
			Yes	No

12. What family member is head of household?
___Mother ___Father ___Other

13. What is the highest grade completed by head of household? (Check one)

___8th grade or less ___high school graduate

___college graduate ___other

14. What is the take home pay of the head of household?

_____

_____Weekly ____Bi-weekly ____Monthly

15. (Check one for family)

____White ____Hispanic ____American Indian

____Black ____Asian or Pacific Islander

16. Housing status (Check one)

____Own home ____Buying home ____Renting

____Other, specify_____

17. Length of residence. ____Years ____Months

18. Projected residence. ____Years ____Months

19. Previous Energy Conservation Education? ___Yes ___No

If so, explain_____

_____

20. Previous acquaintance with aide? ___Yes ___No

Length of acquaintance. ____Years ____Months

APPENDIX B

ENERGY INVENTORY FORM

Energy Education Project

Energy Inventory Form

1. Project aide's name_____

2. Date_____ 3. Family name_____

4. Family ID number_____ _____
Address

_____
City, State

5. Residence type (Check one)

____1 Single family ____ 2 Duplex ____ 3 Mobile home

____4 Apartment ____ 5 Other (specify)

6. Total number of rooms ____

7. Number of bathrooms ____

8. Number of bedrooms ____

9. Approximately how old is your home? ___Years ___Months

10. How long have you lived in this home?

___Years ___Months

11. In the past five years (or since you moved to this house) have any repairs or improvements been made to your home?

____1 Yes (Describe)_____

____2 No ____3 Don't know

12. Check statement that applies to your home.

____ 1 Not insulated at all ____ 2 Partially insulated

____ 3 Fully insulated ____ 4 Don't know

13. If home is insulated, is it (Check ones that apply):

____ 1 Attic insulation ____ 2 Wall insulation

____ 3 Floor insulation ____ 4 All of these

____ 5 None

14. Type of heating system (Check one)

____1 Space heater (wood, coal, gas, oil, electricity, etc.)

____2 Central heat (forced air or steam)

15. Type of cooling system (Check one)

____1 Central air ____2 Window air conditioning unit

____3 Other (Explain)

16. Do you have storm windows? ____1 Yes ____2 No

17. Type of storm windows (Check one)

____1 Glass ____2 Plastic ____3 Other (Explain)

_____

18. What type windows does your home have? (Check one)

____1 Wood, fixed ____2 Wood, moveable

____3 Metal, fixed ____4 Metal, moveable

____5 Combination ____6 Other (Specify)

19. Do any of the windows and doors have weatherstripping?

____ 1 Yes, all windows and doors

____ 2 Yes, some windows and doors

____ 3 None

20. What is the overall condition of the windows?

____1 Tightly fitted ____ 2 Moderately fitted

____ 3 Loosely fitted

21. What type of foundation does your home have? (Check all that apply)

____1 Open ____2 Closed, stone or concrete

____3 Closed, wood ____ 4 Metal skirting

____5 Other (Specify)_____

22. What is the condition of the foundation? (Check one)

____ 5 Very good

____ 4 Good

____ 3 Fair

____ 2 Poor

____ 1 Very poor

23. How many stories does your home have?

____1 One story ____2 two stories or more

____3 Split level ____4 Other (Explain)_____

_____

24. Does the home have a basement? ____1 Yes ____2 No

25. Does the home have a fireplace?____1 Yes ____2 No

26. If yes, is your fireplace:

____1 Gas burning ____2 Wood burning

____3 Other _____

27. Does the home have an attic fan? ____1 Yes ____2 No

28. What type of floor does your home have?

____1 Wood ____2 Concrete ____3 Other (Specify)

_____

29. What type of floor covering does the home have?

____1 Carpet ____2 Linoleum (tile, vinyl)

____3 Wood ____4 Combination ____5 Other (Explain)

_____

30. What kind of water heater does the home have?

____1 Gas ____2 Electric ____3 Other (Explain)

_____

APPENDIX C

HOME VISIT FORM

Energy Education Project

Home Visit Form

1. Project aide's name_____

2. Family visited_____

3. ID number_____

4. Date of visit_____

5. Name of family member worked with_____

6. Is this your first visit? ____Yes ____No

7. How long did you visit with the family?_____

8. What did you discuss today? ____Weatherstripping

____Caulking ____Plastic storm windows

____Other energy conservation techniques

9. Describe, briefly, the contents of your visit with the family today:

_____

_____

_____

_____

_____

10. How many times have you visited with this family?

_____

11. Other comments:

_____

_____

_____

_____

_____

APPENDIX D

EVALUATION FORM

Energy Education Project

Evaluation Form

Program Family ID_____

Program Aide _____

Please check one:	Yes	No
1. Has your home been weatherized?	____	____
2. Did you caulk your home?	____	____
3. Did you apply plastic storm windows to your home?	____	____
4. Did you weatherstrip your home?	____	____
5. When was your home weatherized?	____	____

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX E

INTERVIEW FORM I

Family ID _____

Date _____

Interviewer _____

Energy Education Project

Interview Form I

Hello, I'm _____. I have been working with the energy education project from Oklahoma State University. One of the aides working with the project reported that you did some weatherization to your home.

DO NOT READ RESPONSES

1. Could you tell me what you did to your home?

   ____ (1) Weatherstrip ____ (3) Put plastic on windows and doors

   ____ (2) Caulk

   ____ (4) Other (Explain)

   _____

   _____

2. Why did you decide to weatherize?

   ____ (1) Because of drafts ____ (3) High utility bills

   ____ (2) For more comfort ____ (4) Letters from Extension office

   ____ (5) Other (Explain)

   _____

3. Have you done any other weatherizing to your home since you talked to the aide? _____ If so what?

   _____

   _____

4. Were there any people who influenced your decision to weatherize?

   ____ (1) Project aide ____ (3) Community leader

   ____ (2) Family (yours) ____ (4) Friends

   ____ (5) Other (Explain) _____

5. Is there anything else you would like to tell us about the energy education project?

_____

_____

_____

_____

_____

_____

Thank you for talking to me.

APPENDIX F

INTERVIEW FORM II

Family ID _____

Date _____

Interviewer _____

Energy Education Project

Interview Form II

Hello, I'm _____. I have been working with the energy education project from Oklahoma State University. One of the aides in the project reported that she had contacted you but that you did not weatherize your home.

DO NOT READ RESPONSES

1. Could you tell me why you did not weatherize?

   ____ (1) Lack of money

   ____ (2) Weather (too cold)

   ____ (3) Too close to Christmas

   ____ (4) Home already weatherized

   ____ (5) Renting (landlord does not allow)

   ____ (6) Other, explain

   _____

2. Do you plan to weatherize your home some time in the future? _____ If yes, when?

   ____ (1) Before next winter ____ (2) In the summer or spring

   ____ (3) This fall

3. Is there anything you would like to tell us about the energy education project?

   _____

   _____

   _____

   _____

   _____

Thank you for talking to me.

APPENDIX G

INTERVIEW FORM III

Family ID_____

Date _____

Interviewer_____

Energy Education Project

Interview Form III

Hello, I'm _____. I have been working with the energy education project with Oklahoma State University. Marlene Slavens reported that you attended a meeting to learn more about weatherization of your home.

DO NOT READ RESPONSES

1. Have you done any weatherization to your home?

____ (1) Caulk

____ (2) Weatherstrip

____ (3) Putting up plastic storm windows

____ (4) Other (Explain)

_____

_____

2. If so, why did you decide to weatherize?

____ (1) Because of drafts

____ (2) For more comfort

____ (3) High utility bills

____ (4) Other (Explain) _____

_____

3. If not, why did you not weatherize?

____ (1) Lack of money

____ (2) Weather (too cold)

____ (3) Too close to Christmas

____ (4) Home already weatherized

____ (5) Renting (landlord won't allow

____ (6) Other (Explain)

_____

_____

4. Were there any people who influenced your decision?

____ (1) Project Aide ____ (3) Community leader

____ (2) Family (yours) ____ (4) Friends

____ (5) Other (Explain)

_____

5. Do you plan to winterize your home in the future?

_____

6. Is there anything else you would like to tell us about the energy education project?

_____

_____

_____

_____

_____

_____

Thank you for talking to me.

VITA 2

Linda Faye Murray

Candidate for the Degree of

Master of Science

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