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DETERRENTS TO PARTICIPATION IN EDUCATIONAL ACTIVITIES BY MICHIGAN FARMERS

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DETERRENTS TO PARTICIPATION IN EDUCATIONAL ACTIVITIES BY MICHIGAN FARMERS

By

Mark Francis Hansen

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ABSTRACT

DETERRENTS TO PARTICIPATION IN EDUCATIONAL ACTIVITIES BY MICHIGAN FARMERS

By

Mark Francis Hansen

No matter how motivated adults are to learn about a given topic, barriers exist which can deter them from participating in learning activities. Understanding these deterrents can help educators avoid or reduce those barriers and thereby increase participation. Also, as their personnel and operating budgets become smaller, educational organizations may be able to recoup costs through registration fees or other methods of charging for services, if the cost of participation does not out-weigh other types of deterrents.

This study was performed to expand the research related to the deterrent construct as described by Scanlan and Darkenwald (1984). The purposes of this study were to 1) develop a Deterrents to Participation Scale for Farmers (DPS-F), 2) identify farmer deterrents to participation in organized, non-formal, educational activities, 3) determine how the deterrent factors vary in type and importance in relation to sociodemographic variables, 4) examine the importance of cost as a deterrent in relation to the other deterrent factors identified, and 5) investigate whether the DPS-F could be used to predict participation behavior.

A Deterrent to Participation Scale for Farmers (DPS-F) instrument was developed using the Deterrent to Participation Scale for General Audiences (DPS-G) as a template (Darkenwald and Valentine, 1985), as well as through farmer focus group findings. A statewide mail survey of Michigan farmers utilizing a proportional, stratified random sample resulted in 466 valid questionnaires (42%) being returned by active farmers.

Six (6) deterrent factors were identified through Orthogonal Rotation, explaining 50.5 percent of the scale variance. The factors, as ranked in importance using a Friedman's Test, were Time Constraints, Scheduling Constraints, Lack of Course Relevance, Low Personal Priority, Cost, and Lack of Confidence. Cost emerged as being of lesser importance than most other deterrents. One-way analysis of variance showed that lack of confidence was more of a barrier for farmers age 65 and over than for farmers ages 18-34 and 45-54. Farmers with the highest gross farm sales indicated more time constraints than farmers in the lowest sales level. Farmers with off-farm jobs had more difficulty with scheduling constraints than those without off-farm jobs. Female farmers indicated cost as a more important deterrent than males. Dairy producers indicated that time constraints were more of a deterrent than did cash crop farmers, livestock producers, fruit growers and "other" farmers such as Christmas tree growers, bee-keepers, etc.. Logistic regression demonstrated that the DPS-F instrument was not successful in predicting participation behavior for non-participants. Evidence exists that the type and/or importance of deterrents may be different for participants and non-participants, and that participation can likely be influenced by removing certain barriers depending on sociodemographic group.

DEDICATION

To my wife, Nancy,
for her love and support as I completed this study.
To my daughters, Molly and Erin,
for the sacrifices they made during
their adolescent years so Dad
could work on his "book".
To my father, Edward R. Hansen,
a World War II veteran,
and a great Dad.

And to God, who was with me
from beginning to end.

And in loving memory of my late mother,
for convincing me that I "...could do anything
I wanted, if I just tried."

Vera Frances (Campbell) Hansen
1920-1990

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CHAPTER 1

INTRODUCTION

Statement of the Problem

No matter how much an individual wants to learn, deterrents can emerge which cause him or her to ignore or miss a learning experience. It may be that the educational activity is offered at an inconvenient time or location. There may be a registration fee that is too expensive to pay or the cost may out-weigh the perceived benefits which the activity will provide. Sometimes, the content of the activity is not relevant or the level of education is too elementary or too advanced. And sometimes, the individual either lacks the confidence or the enthusiasm to learn. Deterrents have existed since the beginning of time and will continue to exist, yet individuals still desire to learn.

Humans are constantly faced with the decision to participate in learning experiences. Some of these learning opportunities are required so that an individual can keep up with the technological demands of the job. Others find that even forms of recreation, e.g., "surfing the Internet" require knowledge that was not necessary ten years prior. In addition, learning new hobbies though educational classes is an on-going option for most of us. The technological change and recreational opportunities interwoven in the

agricultural industry are just as demanding of its members as they are in other industries. Therefore, farmers are faced with the challenge or opportunity of learning new skills or refining them, either through reading and other individual learning methods, or through formal and non-formal group methods of organized education. At the same time, they are also challenged with over-coming deterrents that may affect their desire or ability to participate.

Perpetual changes in the United States (U.S.) agricultural industry, have continued to require farmers' attention since the first settlers arrived in this country. According to Forbes (1934), one of the first examples in the United States of farmers receiving education in farming practices occurred when a Native American Indian named Squanto assisted the Pilgrims in growing corn. Without Squanto's help, these early settlers would not have survived the harsh New England climate. As the Colonies developed, an agrarian economy was formed. Food and fiber production was required to sustain society; therefore, farmers sought education and information on producing crops and livestock. Universities of that era were attended primarily by the wealthy and did not offer curricula in agriculture. These two barriers, i.e., the lack of wealth and lack of relevant curricula, served as major deterrents for farmers to attend college. Farmers learned new methods by sharing their experiences with each other, and techniques were passed on from generation to generation.

By the early 1800's, farmers were able to obtain new information by participating in

Farmer's Institutes and Farm Bureaus (Scott, 1970). These organizations allowed farmers to voluntarily come together on a more organized basis to learn and discuss new farming techniques. This desire and method for learning eventually led to the establishment of Land Grant Universities in 1862 and 1890 respectively (Vines and Anderson, 1976) . Agriculture and mechanical arts were offered for the first time in the U.S. by these institutions. However, the cost of attending college and the requirement for family labor on the farm still deterred many young people from attending. In addition, many farmers of that era had not completed high school and, therefore, were not academically prepared to attend college. Thus, the agrarian culture itself served as a deterrent to formal learning beyond secondary school — a deterrent still evident in the late 1900's (Galbraith, 1992).

A number of deterrents to learning were overcome in 1914, when the Cooperative Extension Service (CES) was established. Land Grant Institutions served as the administrative support base for CES while county agents delivered information directly to the farmer (Scott, 1970). Legislated through the Smith-Lever Act of 1914, CES was considered the educational arm of the United States Department of Agriculture (USDA) in transferring technology from Land Grant Universities to farmers and consumers (Scott, 1970). Extension education provided an important supplement to formal education in creating educational opportunities for the farmer and in removing institutional or situational deterrents to participation. Land Grant institutions provided formal and organized college courses in agriculture and the mechanical arts for those who could attend. The arrival of CES, on the other hand, gave those farmers who could not attend

college, a continuing opportunity to participate in organized, non-formal learning activities (Vines and Anderson, 1976).

Placing the educational activities and the instructors (county agents) at the county level removed some of the key deterrents to learning for farmers. Rural sociologists later referred to this system of information transfer as the "diffusion of innovations" model, which many countries around the world have adopted or attempted to emulate (Rogers, 1983). The diffusion model still hinges on the participant's desire to learn but fortunately for educators, most adults have a basic yearning to gain new knowledge (Houle, 1961).

Over time, many of the institutional deterrents of limited access to agricultural research and information have been removed. However, other deterrents seem to have taken their place. Situational and dispositional deterrents such as having someone to watch the farm while the owner-operator is away, schedule conflicts with farming practices and off-farm jobs, the costs of registration fees, or lack of interest in studying or learning still appear to prevent farmers from participating.

Since the 1940's, agriculture has witnessed a vast expansion of technologies in the products, equipment, and methods used. The advent of nitrogen to boost corn yields was an important transition in the agricultural technology boom (Rogers, 1983). With so much new technology evolving, private industry and other public organizations joined CES in offering farmers the opportunity to learn about agricultural products and practices.

This has led to numerous opportunities for farmers to participate in both formal and non-formal learning activities, through both public and private sources. However, regardless of the type or source of the educational activity, decisions to participate were, and still are, mostly voluntary, and deterrents exist.

With farmers and non-farmers alike, society's pace has determined the need for education. Merriam and Caffarella (1991) state that in pre-industrial times the knowledge that a person needed to succeed as an adult could be learned during childhood. But as technology expanded, adults found that additional education was necessary. Today, a higher percentage of individuals attend college or participate in supplemental courses or seminars in order to acquire jobs, or to up-date or improve their skills (Merriam and Caffarella, 1991). This has also been true within the agricultural industry. Organizations and companies support the farming industry by providing educational programs. Sometimes entities such as the government require that farmers or farm employees participate in training programs, e.g., certification in safe pesticide handling.

Farming has also been described as a "way of life" rather than a job or career, primarily because the majority of farmers live and work on the farm. The culture of farming includes hard work and long days, often seven days per week. The phrase "sunrise to sunset" has been used to describe the farmer's work day and, in general, this has been a valid descriptor. Little time or energy is left by the end of the day for the farmer to take part in extracurricular activities whether work related, recreational, or educational.

There is a major difference between the farm population and the general public in that the majority of farmers are self-employed. In most situations, no employer or supervisor exists to encourage or require participation, or to pay for the farmer to participate. Farmers do not always have an employee or family member who can assume management of the farm while the owner is away. Therefore, it is difficult to leave the farm during the day. As a result, farmers must voluntarily seek out educational activities, either for recreational, informational, or job-related purposes, and then evaluate whether participation is possible or beneficial.

This voluntary decision to participate in educational activities is of major importance to those agencies and organizations which sponsor learning activities for farmers. Many agencies, associations, and private firms now compete for the farmer's time in providing educational programs. According to Vergot (1991), farmers in the 1980's obtained information from a number of sources that included both private and public sponsorship. A Utah study recently showed that the majority of Utah fruit and small grain farmers surveyed named both CES and industry publications as their preferred, on-going method of learning about integrated pest management technologies (Alston and Reding, 1998). The study showed that this preference was followed by participation in workshops and conferences. Self-directed learning such as computer access to information, and obtaining information through media sources were less important methods of learning but still appeared as a form of education that competes for the farmer's time (Alston and Reding, 1998).

Regardless of the source of information or method of delivery, educational firms and organizations must have a clearer understanding of farmers as their audience, and what barriers exist to deter their participation in educational activities. This is important as the agricultural industry continues to advance as an industry and as farmers seek quality of life. It is also of critical importance because education, whether private or public, cannot take place without some form of physical effort and financial investment. Sponsoring educational organizations must realize a return on that investment, and it can only come if participation is strong.

Much effort has been placed on continuing education for adults in the United States. Houle published the first significant study on motivational orientation by adults toward education (Merriam and Caffarella, 1991). Houle's book, The Inquiring Mind (1961), discusses three types of learners, i.e., those who are "goal-oriented", those who are "activity-oriented", or those who are "learning-oriented". These findings were used as a foundation for other researchers. Among others, Sheffield, Boshier, Morstain and Smart, and Boshier and Collins expanded Houle's research and added to the literature on why individuals decide to participate in learning activities as adults (Merriam and Caffarella, 1991). According to Tough (1971), learning can take place for adults through many vehicles including both organized education and self-directed learning, or a variation of these. In each case, however, the individual adult must make that decision to participate, or not participate, in the learning activity. While research has been done regarding adult motivators or desires to participate in these learning activities, very little scholarly effort

has been devoted to identifying barriers to participation (Merriam and Caffarella, 1991; Scanlan and Darkenwald, 1984).

Authors have more recently begun to seriously examine the complexity of deterrents to participation in learning activities that exist to influence learners' decision-making processes. Earlier work by Johnstone and Rivera (1965) identified a list of ten barriers to participation and arranged these into two categories: 1) *external* or *situational* barriers, and 2) *internal* or *dispositional* barriers. Cross (1981) later separated a list of 25 barriers into three categories which she referred to as *situational* barriers, *institutional* barriers, and *dispositional* barriers. New studies performed by Darkenwald and Merriam (1982) added yet a fourth category which they referred to as the *informational* barrier, and re-defined the term "dispositional" as "*pyschosocial,*" which they felt provided a broader scope of attitudes and beliefs that deterred participation. These earlier studies took a somewhat simplified and intuitive view of the barriers that may deter adults from participating in educational activities.

When Scanlan and Darkenwald (1984), began to examine barriers to adult participation in learning activities, a new pathway was opened. They perceived the issue of deterrents to participation as a much more complex construct than that proposed in early studies. Scanlan and Darkenwald proposed that the deterrent construct was multidimensional, whereby a number of deterrents combine to synergistically deter participation. Scanlan (1982) developed the original survey instrument referred to as the Deterrent to

Participation Scale (DPS) to examine barriers to adult participation in formal education for allied health professionals. Darkenwald and Valentine (1985) then used the DPS as a template to develop a new instrument which was more conducive to examining the factors that deter the general public from participation in adult educational activities. This new prototype was coined "DPS-G". Subsequent to that study, a Deterrents to Participation Scale for Bankers (DPS-B) was developed at Rutgers by Davis (1988) and mailed to a random sample of 1200 bank managers to examine their participation behaviors. The same year, Weischadle (1988) used the DPS format to examine deterrents to participation in educational programs with licensed real estate professionals in New Jersey. A number of other researchers have since explored different populations using the DPS, DPS-G, or other modifications of these instruments.

The investigators who have developed and used various forms of the DPS instrument repeatedly found that 1) a multidimensional construct does appear to exist, 2) that the combination of deterrents impacting populations or sociodemographic groups are similar but appear to vary in importance by population and subgroup, and 3) that the DPS instrument can sometimes be used to assist in predicting participation behavior. Previous survey instruments keying on motivational constructs had not been useful in predicting participation. More recent investigations have suggested that much additional research needs to take place with regard to the multidimensional perspective of deterrents to participation in adult educational activities (Scanlan and Darkenwald, 1984; Darkenwald and Valentine, 1985; Weishadle, 1988). In addition, recommendations from DPS-type

studies have suggested that additional DPS instruments be adapted to measure deterrents for distinctive sub-populations.

Assuming that participation in learning activities would increase an adult's knowledge, and therefore increase his or her ability to accomplish more, it seems very beneficial to know as much about these deterrents as we know about motivators. And if organizations that sponsor learning activities possessed this type of insight, they would likely be much more successful in developing programs better suited to learner needs.

Purpose of The Study

Currently, data are limited which explain and predict participation in educational activities. This is even truer for the farm population, since research which has been performed on this topic to-date has primarily targeted non-farm audiences. Many different organizations, both public and private, offer educational opportunities for farmers, and these organizations would benefit by knowing more about farmers educational behavior patterns and the barriers that serve as deterrents to their participation in educational activities. The DPS methodology appears to be the first model which has shown some success in helping organizations explain and predict these patterns of behavior.

The purposes of this particular study were to 1) develop a deterrent to participation scale instrument for farmers, 2) identify barriers which serve as deterrents for farmers who might otherwise participate in educational activities, 3) examine how these deterrents may

vary by sociodemographic group, 4) examine the importance of "cost" as a deterrent for farmers, and 5) determine whether this model will allow investigators to predict participation behavior for farmers.

The development of a Deterrents to Participation Scale for Farmers (DPS-F) is an attempt to produce a reliable and valid scale with which educators can identify barriers that deter farmers from participating in educational programs. The DPS-F instrument was modified from the Deterrents to Participation Scale for General Audiences (DPS-G) developed by Darkenwald and Valentine (1985), and the Deterrents to Participation Scale (DPS) developed by Scanlan (1982). The DPS-F instrument was developed and used to identify principal components (deterrent "factors") that represent the barriers to participation in educational activities as experienced by farmers.

The deterrent factors, once identified, were correlated with sociodemographic data to initially identify relationships. One-way analysis of variance was then performed to examine whether there were significant and meaningful differences between the type and importance of deterrent factors based on the sociodemographic variables. This information can assist educational program planners in determining how to best reach specific types or categories of farmers by removing or diminishing those barriers which might deter their participation. Previous studies have shown that deterrent factors do vary based on sociodemographic group. For this study, sociodemographic groups were based on gender, age, level of education, primary enterprise type, amount of gross farm sales,

and farming status (part-time farming versus full time), and whether the farmer holds an off-farm job.

Previous deterrent studies revealed the importance of cost as a deterrent to the certain audiences or subgroups. The issue of cost as a deterrent to participation to farmers will be important to all organizations and firms offering educational programs to farmers where fees are considered. Private industry has been successful in attracting farmers to fee-based workshops and programs where the sponsoring firm intends to make a profit. International Extension systems have seen varying success in charging fees or developing fee-based arrangements for assistance, which have helped them support personnel and operating costs (Kirley and O'Toole, 1993; Harter and Hass, 1992; Healy and Associates, 1991; Kirley, 1994; Cooney, 1987; Carey, 1992; Gould and Cooney, 1987; Westermarck, 1987; Finley and Price, 1994; and Brewer, 1996).

Charging farmers a fee for attending programs could help generate revenues for CES or any other organization, and may be acceptable to farmers in the U.S. if the program meets the farmers' educational needs. During regional "Ag Interface" meetings with Michigan farmers, participants at five of the six input sessions stated (without prompting) that they would be willing to pay for Extension programs if the activities included information they needed (Brewer and Hansen, 1989). At Michigan State University, a farm financial workshop was filled to capacity even though participants paid a registration fee comparable to that charged by private industry (Hepp, 1992). The acceptance of this

delivery method supports the position that the cost of an educational program does not necessarily deter farmers from attending, if the program is relevant to their needs. If this is true, then CES and other program sponsors can focus on removing barriers other than registration fees and benefit from the monetary gains. On the other hand, if cost is found to be the most important deterrent to participation that farmers identify, then sponsors of educational programs might be advised to avoid charging a fee and either look for other delivery methods or other sources of revenues. Thus, another purpose of the study is to examine whether cost is the most important deterrent to farmers regarding participation in educational activities.

Finally, the DPS format has been used with mixed success in predicting participation status. For example, Scanlan (1982) and Weischadle (1988) had success using the original DPS instrument to explain and predict participation, i.e., differentiating between those who participate and those who do not, based on the deterrent factors. Davis (1988) and Essman (1994) were not able to repeat predictive results using this methodology. While new knowledge regarding the deterrents to participation for farmers will do much to help educators avoid those barriers, a predictive instrument would provide an even more valuable tool.

Research Objectives

Two objectives were developed for this study. The first objective was to develop a DPS instrument for farmers. This objective required testing for validity and reliability but did

not require hypothesis testing. The second objective required statistical testing to measure differences and relationships. This objective included four research questions which were matched with corresponding null hypotheses. The two objectives were:

Objective 1:

To construct a valid and reliable, farmer-oriented form of the Deterrents to Participation Scale (DPS-F).

Objective 2:

To use the instrument to identify and examine deterrents for farmers as follows:

a) To identify relevant and significant principal components, i.e., factors, that deter adult farmers from participating in organized adult education activities.

b) To determine how deterrents may vary with respect to sociodemographic variables such as age, level of education, type of enterprise, amount of gross farm sales, farming status (full-time versus part-time), and whether or not the farmer also holds an off-farm job.

c) To determine whether the cost of participating in a program, e.g., a registration fee, is the most important factor that deters farmers from participating in educational activities.

d) To determine whether the DPS-F can be used to predict participation behavior for farmers in the "participant" category and those in the "non-participant"category.

Research Questions

Four Research Questions were included in this study. The Research Questions for the study represent the second objective of the study, as mentioned above. The Questions are:

1) Using a farmer-oriented form of the Deterrents to Participation Scale (DPS-F), can source variables or factors be identified that deter adult farmers from participating in organized adult education activities?

2) Is there a difference in the type and/or importance of deterrent factors for farmers based on the sociodemographic variables of gender, age, level of education, type of enterprise, amount of gross farm sales, farming status and on- or off-farm employment?

3) Is "cost" the most statistically important factor that deters farmers from participating in educational activities?

4) Is there a statistically significant relationship between the type and importance of deterrents identified by participants and non-participants in educational activities that would allow prediction of participation behavior.

Null Hypotheses

The null hypotheses for this study correspond with the four research questions stated above:

Null Hypothesis # 1: There are no statistically significant and distinct deterrent factors to explain farmer participation in educational activities.

Null Hypothesis # 2: There is no significant difference in farmers' deterrents to participation in educational activities based on socio-demographic variables such as gender, age, amount of gross farm sales, level of income, farming status, or those holding or not holding an off-farm job.

Null Hypothesis # 3: Cost is not the most statistically relevant deterrent in farmers' decisions to participate in an educational activity.

Null Hypothesis # 4: There is no statistically significant relationship between the type and importance of deterrents identified by participants and non-participants in educational activities that would allow prediction of participation behavior.

Definition of Terms

The following terms are used in this study. These definitions are provided in order to assist the reader, and to help clarify points made within the study.

Adult Learner: For the purposes of this study, any person 18 years of age or older. Although some investigators have used age 16, 17, and 25 as the qualifying age to be considered an adult, in Michigan the legal age considered an adult is age 18.

Clientele: For the purposes of this study, clientele are those individuals who are the target audience of agricultural Extension programs, i.e., primarily farmers, or agribusiness representatives.

Cooperative Extension Service: Educational out-reach unit, usually headquartered within, or responsible to, the national government of a country. In the United States, Extension is a part of the United States Department of Agriculture (USDA) with leadership provided at the state level through the Land Grant Universities. Other synonymous terms used in this study are Extension, Extension System, and the acronym "CES".

Deterrents: Refers to those institutional, situational, informational, or psychosocial barriers to an individual's decision to participate in an educational activity. A synonymous term used in the study is the word "barriers".

Deterrent Construct: A premise that barriers to participation in educational programs consist of a complex, multidimensional framework, i.e., adults are deterred from participation by a set of barriers acting in concert, and these may be synergistically acting on the decision to participate.

Deterrent Factor: Group of deterrent items with a single label that represents one type of barrier to participation in educational activities, e.g., "Lack of Confidence". Also referred to in the literature as a source variable, factor, factor group, and principal component.

Deterrent to Participation Scale: The primary Likert-scale instrument used in the study which identifies deterrent items to participation in educational activities by the target audience. Also related to or referred to as DPS, DPS-B (DPS instrument for bank managers), and DPS-F (DPS instrument for farmers).

Educational Activity: For this study, the term "educational activities" refers to organized, non-formal activities which may be work-related, recreational, or informational. Examples of educational activities include workshops, tours, conferences, field days, tours, lessons, and seminars . Formal for-credit course work is not included as an educational activity, nor are forms of self-instruction. Also referred to as an "educational program".

Extension Agent: Refers to a field staff person of the Cooperative Extension Service, who serves as the usual point of contact with clientele at the county or local level. Synonymous terms are Extension Advisor, County Agent, Extension Educator, and Extension Field Staff Member.

Extension Specialist: In the U.S. Extension System, an Extension specialist is typically a professor or specialist who is located on campus at the Land Grant University. Extension specialists have a full or partial assignment in Extension to support technical and training needs of the Extension Agents. Extension specialists are sometimes referred to in the literature as "subject matter specialists".

Farmer: One who produces agricultural products; also referred to in the literature as a "producer" or "grower". Synonymously but more specifically referred to as a fruit grower, vegetable grower, beef producer, etc..

Fee-For-Service: In this study, fee-for-service applies to any service provided by Extension or another public agency, where fees are charged. Affiliated terms are User-Fees, Fee-Based, etc.; not to be confused with Privatization.

Land Grant University: Institutions of higher learning, originally created to teach agriculture and the mechanical arts; provided through the Morrill Act of 1862 and Morrill Act Amendment of 1890; funds to develop Land Grant universities were made available through land grants from the U.S. federal government to the states.

Importance of The Study

Farmers must stay abreast of new innovations and technology in order to survive and this translates into a need for continuing education. Less than 100 years ago, the United States was still considered an agrarian society. Families lived and worked on the farm, ate what they grew, and sold the rest to pay other expenses. The shape of agriculture has changed over time. Margins of profit have become narrow, forcing farmers to be more efficient and thus, better trained. Bernsten (1993) states that between 1950 and 1987 the U.S. population grew by 70 percent, while during the same period there was a 67 percent decline in farm numbers and a corresponding 82 percent increase in farm size. The 1992

Census of Agriculture shows that only 15 percent of the farmers in Michigan have gross cash receipts over $100,000, and these growers produce 78 percent of all farm sales (Ferris, 1994). Bernsten (1993) charges that, since 1939, non-farm factors, technical change, and economic conditions have all played a role in shaping agriculture. And while the number of farmers has declined over the years, the need for farmer education has increased. New technologies and efficiencies around the globe have helped U.S. farmers stay competitive in a global market, but only if they stay current in learning and adopting new and more efficient methods. Even operators of small and middle-sized farms have had to maintain a significant level of knowledge to farm profitably and to stay within regulatory limits. It is important, therefore, that learning opportunities are provided for farmers. Organizations which provide learning experiences to farmers must understand what, when, and how to provide these learning experiences so that farmers can and will participate. This includes not only what motivates farmers to attend educational programs, but also what deterrents are in play to discourage them from participating.

According to the literature, very little is known about the barriers that deter adults from participating in adult educational programs, whether these are formal or non-formal. Furthermore, even less is known about the deterrents that impact farmers in the U.S., as no specific studies have been performed on this subgroup. It is important that more research take place in determining how to best provide farmers with educational opportunities. This study attempts to contribute to that understanding by identifying the barriers that deter farmers from participating in educational activities.

Key industry leaders informed the Michigan Cooperative Extension Service (CES) during the early 1990's that CES must enhance its ability to meet the increasing technical demands of the industry it supports (Imig, 1995; Ferris, 1994). However, because of shrinking Extension budgets and expanding technologies, Land Grant Universities are experiencing larger challenges in maintaining adequate numbers of well-trained, technical field staff. Extension in Michigan is examining various revenue-generating alternatives to help relieve these budget challenges (Leholm, 1995a; Leholm, 1995b). Therefore, another important aspect of this study is to assess the issue of cost as a deterrent to participation in educational programs for farmers. This information can be used by CES, or other organizations, to assess the possibility of revenue-generators such as registration fees for selected educational programs to assist in supporting the organization's funding needs.

While the results of this study provide generalization to Michigan farmers, much depends on the response from farmers in various commodity groups, age groups, and income groups, etc.. Results of this study will assist in determining whether there is a difference in the deterrents these varying types of farmers identify, whether the cost of participating is a major deterrent for farmers, and whether behavioral predictions can be made based on those results.

Finally, this study will serve as a springboard for other research that examines deterrents to participation in educational programs. The study may also assist in laying groundwork for securing supplemental or alternative funding for Extension in the United States.

Limitations of The Study

This study focuses on the models developed by Darkenwald and others, regarding deterrents to participation in non-formal, organized educational activities. The investigator recognizes that many forces are at work in deterring farmers from participating. Theories on market failure (Weimer and Vining, 1992), valuation (Hubbard and Hawkins, 1969), and contingent valuation (Mitchell and Carson, 1989) do suggest that concepts or variables within each of these arenas can serve as barriers. However, economic theories and constructs were not within the scope of this investigation. This study focuses on adult learning theories, and on those deterrents that farmer focus groups identified as being real to them.

It is also recognized that this study depends on self-report by the respondents and is based on individual perceptions and values. The farming population in Michigan varies widely, not only due to the sociodemographic groups stated in this study, but also due to geographic and cultural differences, varying levels of access to educational activities, etc.. As in other sociological studies, human behavior is difficult to interpret and predict. Response to the deterrent items in the questionnaire are based on a five-point Likert scale which may limit responses by individuals. Response to the item in the questionnaire which addresses participation behavior is limited by the respondent's memory of activities attended over a twelve-month period.

The process of developing the instrument also could have led to limitations in identifying

potential deterrents for farmers. The deterrent items which were used in the questionnaire were retained based on farmer focus group findings and based on those items found in the DPS-G instrument. Farmers in the two focus groups included those who were known to participate in educational programs and those who were not known to participate. While concerted efforts were made to solicit a comprehensive set of deterrents for farmers, a different composition of farmers may have resulted in a slightly different set of deterrent items for the questionnaire. Using the DPS-G as a template helped to buffer those differences.

Finally, the study is limited to individuals actively involved in farming in Michigan. Due to the differences in climate, commodity types, educational opportunities, etc., this study cannot be generalized to farmers in other states or countries.

Organization of The Study

This study is broken down into five chapters: Introduction, Literature Review, Methodology, Results and Findings, and Conclusions, Implications, and Recommendations.

The Introduction describes the importance of continuing education for farmers, and how deterrents to their participation in educational activities have persisted over time and with the changing structure of agriculture. The Introduction provides a brief summary of agricultural education and the deterrents to participation for farmers from the time the

United States was first settled to present day agriculture. Also covered is an explanation of the purpose of the study, why this study is important to the educational research discipline, and limitations which exist in the study. Terms are defined to assist the reader in understanding acronyms and jargon which may be unfamiliar outside of the educational or agricultural arena.

The Literature Review provides a comprehensive examination of the related research on which this study is based. Included are well known theories and constructs on educational theory, background on farming and agricultural education, as well as data from recent research dealing with the deterrents construct.

The Methodology section assists the reader in understanding the scientific design and methods used. Included are the research questions, null hypotheses, identification of dependent and independent variables, explanation of expected errors in both internal and external validity, treatment method used for non-response error, and the types of statistical analyses.

The Results and Findings section provides the important data revealed in the study. Included are the results of the statistical analysis of the data which tests the null hypotheses, and an explanation of the findings.

The Conclusions, Implications and Recommendations section summarizes the findings,

provides an understanding of what the findings of the study represent, and relates the findings to the results of other similar studies. Finally, the investigator provides recommendations on how the data might be used by educational organizations, inferences toward the general population, as well as recommendations for additional research on this topic or related subjects.

CHAPTER II

LITERATURE REVIEW

Adult Motivation to Learn

Before one can fully understand how deterrents impact farmers' decisions to participate in educational programs, it is important to have some knowledge of why adults are motivated to learn. Research in adult education has taken many avenues of approach, and many studies have been published.

One of the earlier studies on participation in educational activities was performed by Cyril Houle (1961). Houle stated that most individuals have a desire to learn, and the audience he studied all had a number of commonalities when considering continuing education. These individuals had "goals" that they wished to achieve, and they found the process of learning an enjoyable experience. They also felt that learning was a worthwhile activity in its own right. However, these individuals varied in their "major conception" regarding the purpose and value of continuing education. Houle classified these individuals into three groups. He referred to them as 1) goal-oriented, 2) activity-oriented, and 3) learning-oriented. Using this terminology, Houle stated that goal-oriented learners have a goal in mind when deciding to participate in a learning activity. With this type of individual, the

need for learning may become apparent upon receiving a mailer or other notification of an educational activity being offered. Being goal-oriented, the individual typically participates in learning situations that will help accomplish the learner's goals. Often, these goals are related to the individuals work or career path.

Houle's second type of learners, "activity-oriented learners", partake of educational activities for some "meaning" other than the content provided in the learning exercise. For example, loneliness is one reason Houle cites for the activity-oriented learner to participate in a learning activity. It is an opportunity for the learner to interact with others or make new friends, while doing something productive. Others may be trying to escape from the boredom of daily routines, or to escape from distasteful situations at home. And still other activity-oriented learners, Houle states, simply wish to attain college credits, certificates or degrees, and care very little about the subject matter of the courses. Those individuals who participate due to cultural or family expectations also are identified by Houle as activity-oriented learners.

The third type of learner, referred to as "learning-oriented" individuals, participate to seek new knowledge, i.e., "the desire to know", according to Houle. These learners wish to increase knowledge of life in general, and the things around them. The learning-oriented tend to read avidly, not just for enjoyment, but to add to their general knowledge level.

Houle submitted that most individuals likely demonstrate some of each orientation when

deciding to participate in a continuing education activity, however, typically one of the three characteristics would be more dominant.

Participation in learning activities is a decision which is usually voluntary for adults unless, for example, it is required by an employer. Unlike children, who are required to attend school or coerced to participate in other learning situations, adults make decisions themselves as to whether, or when, they wish to learn. Tough (1971) states that about 70 percent of all learning projects are planned by the learner. Maslow (1970) describes this voluntary desire to learn as one of the many needs that humans possess. He also states that there is a hierarchy of needs that must be considered. For example, basic life-sustaining needs such as hunger, thirst, or safety, must be met before humans begin to worry about less critical needs, such as a need for learning or self-actualization. Maslow (1970) writes:

> "We should never have the desire to compose music or create mathematical systems, or to adorn our homes, or to be well dressed if our stomachs were empty most of the time, or if we were continually dying of thirst, or if we were continually threatened by an always impending catastrophe, or if everyone hated us."

These needs, in order of importance, include hunger and thirst, safety, belongingness, self-esteem, and the need for self-actualization (Maslow, 1970). The term self-actualization, refers to an adult's compassion to become what people feel he or she can become. Maslow states, "What a man can be, he must be." Learning activities are a part of self-

actualization, and learners decide for themselves what activities to participate in to meet their expectations. Tough (1971) states that an individual may want to participate in some type of learning exercise just to make an informed decision on purchasing an appliance, or he may wish to learn something with more long-term impact such as supervisory skills to use on the job. But either way, it is still a decision by the learner to participate in the learning activity. Tough states that "...many adults make highly deliberate efforts to learn."

According to Tough (1971), the average person participates in eight learning projects a year. In his studies, Tough described a learning project as a learning activity at least seven hours in length. His research showed that the typical adult in the US spends about 700 to 800 hours a year in learning projects, and some individuals spend up to 2000 hours in learning projects. He also found that 98 percent of the audience surveyed in one study, indicated that they had participated in at least one learning project during the past year. However, Tough's studies have shown that the amount of time spent in learning projects varies with type of job, social class, gender, age, and educational level.

Cross (1981) also discussed issues related to who, why, and how, adults learn, and also refers to external forces, i.e., the "environment", that impact individuals' decisions to participate in learning activities. Cross states that there is a current and growing increase in lifelong learning which can be seen in the adult population. She attributes this to three influences, i.e., 1) changing demographic factors with a larger adult populace than before

1975, 2) social change that includes the changing roles for women, e.g., early retirement, a rising education level of the general populace, etc., and 3) increasing technology that demands continued learning by workers and consumers to keep up with change. Because of this, adults are choosing to, or are required to, participate in continued lifelong learning.

While each of the aforementioned influences on adult education are important, the larger numbers of adults in society today compel us to respond to adult learners' needs. According to Merriam and Cafferella (1991), the median age of Americans is rising — from 30.6 in 1982, and will reach 36.3 by the year 2000. This trend toward an increasing age of society was caused by the post-World War II baby-boom. This group caused a population expansion that moved through the elementary grades, to middle schools and secondary schools, then to post-secondary schools and universities. Now these baby-boomers have reached adulthood. The need for adult education is expanding with the baby-boom population, just as it did in each of the previous stages (Cross, 1981). However, according to Cross, adult participation in educational activities in the 1980's out-distanced even the expansion of the adult population in the U.S.. This indicates that even though adults have become more numerous, more than just the number of adults is impacting the increased demand for adult education.

Merriam and Caffarella (1991), as well as Cross, comment that the demand for adult participation in educational activities has also changed over the years due to society's expanding knowledge base. In pre-industrial societies, the rate of change was slow and

what was needed in adulthood could be acquired in school as a youth. Today, adults must constantly acquire new knowledge to keep up with changing technologies (Merriam and Caffarella, 1991). This has been particularly true with farmers. Over the past 20 years, research has unveiled much more information about plant and animal genetics and breeding, pest biology and management, information systems related to agriculture, and a host of other technological advancements. During this same 20-year period, farmland and farm numbers declined while farm size grew (Bernsten, 1993). It became necessary for farmers to become more skillful and efficient in their professions to maintain viability. In order to do this, farmers, like other members of society, have had to learn and adopt new methods. They also have had to become aware of new products, and in some cases, develop new philosophies toward their profession. They have done this through many different learning methods including reading, attending farm meetings and seminars, participating in farm tours and conferences, utilizing media outlets, and by consulting with private or public consultants. According to Vergot (1991), farmers today acquire knowledge through many different sources.

For the purposes of this study, farmers are adults who are at least age 18 or older. It is logical to expect that the same behaviors that affect the general adult population regarding learning styles and educational participation, would affect them. However, while learning orientation, motivators and needs for self-actualization may exist, deterrents that impact the farmer may differ from those affecting the general populace.

Farmers' Learning Activities

Farmers like other adult individuals make deliberate decisions to learn. Several authors (Tough, 1971; Cross, 1981; Merriam and Caffarella, 1991), state that at least part of an adult's reason for participating in educational projects is to increase competencies in his or her job. Unlike many jobs in the marketplace, the farmer must be a botanist, an entomologist, an animal nutritionist, a mechanic, a commodity broker, and often a labor supervisor. Farmers are rarely able to specialize in all of the roles they play, however, a breadth of training is necessary to maintain minimal skills. Coupled with this dilemma is the ever-expanding technology in the agricultural industry (Ferris, 1992). With changes in the agricultural industry leading to larger, more specialized farms (Bernsten, 1993), coupled with increased technology and communication, it is expected that farmers will have to increase participation in educational activities, whether formal or non-formal, to compete in a global market (Shapley, 1992). Therefore, farmers must continue to learn throughout their farming years, in order to maintain an efficient and profitable farm business.

Learning may occur through participation in educational meetings, conferences, or tours, or merely through reading magazines, newspapers, and market reports. Tough (1971) states that "adult reading" is a widespread method of learning for adults in America. Tough demonstrated in one study, that adults spend at least one hour a day, or over 300 hours a year reading newspapers, with the majority indicating that they read newspapers for practical use. Only 12 percent of these individuals mentioned that relaxation was the

intent. Magazines also were demonstrated to be an important source of knowledge for adults, according to that study. Vergot (1991) found in a study of Southwest Michigan fruit and vegetable growers, that farmers do learn from various sources. Vergot's study reported that farm magazines, agricultural bulletins from universities, and weekly or monthly newsletters ranked at the top of 18 channels of information that farmers use in order to gain new agricultural information. However, participation in educational programs such as field days, trade shows, and twilight tours were still important sources of information.

Johnstone and Rivera (1965) stated that the major emphasis in adult learning was "on the practical rather than the academic; on the applied rather than the theoretical; and on skills rather than on knowledge or information." This compares with input from Michigan farmers who have continuously asked Extension for useable and practical information and research.

Johnstone and Rivera (1965) found that the most significant group of learning activities indicated by the adults in their survey, was related to topics that dealt directly with daily tasks and obligations. Farming represents a five-, six-, and often seven-day work week, depending on the farming enterprise and personal values. Many have described farming as "a way of life", referring to the fact that most farmers live on the farm, and are therefore continuously involved in the demands of the farm, 24 hours per day throughout the year. Thus, Johnstone and Rivera's reasoning would lead us to the conclusion that farmers

would more likely participate in educational opportunities related to farming activities than other learning activities, e.g., recreational activities. Scott (1970) states that, in fact, the reason for the establishment of Farmers Institutes, and later the U.S. Extension System, was to respond to farmers demands for practical and useful information related to their farming operations.

The reasoning behind farmers decisions not to participate in educational programs appears to be as complex an issue as it is for other adult groups. In preparation for this study, assessments of farmer deterrents were collected through focus groups consisting of active farmers. These individuals indicated that a number of deterrents may be in play which impact farmers decisions to participate in educational activities. Deterrents may include cost of registration fees that are too high, unawareness that a program is being offered, apathy toward education or toward attending educational events, conflicts with personal or professional schedules, inconsistencies between program content and the learner's needs, unsatisfactory past experiences in attending learning activities, lack of a responsible individual to manage the farm while the owner/manager is away, educational activities offered during inconvenient times or seasons, educational activities not held when the farmer needs the information, etc.. However, at the current time, scientific data is lacking on this topic and especially with regard to adults engaged in farming as a profession. Therefore, organizations that sponsor educational activities for farmers continue to guess at the types of barriers that may deter farmer participants from attending their educational programs.

Extension agricultural agents will point out that certain farmers repeatedly attend Extension programs throughout the year, while other farmers seldom, or never, participate. There does not appear to be a trait or situation that is common to either group. Those who attend Extension educational programs represent both large and small farms, full-time and part-time farmers, young and old age groups, and farmers with various levels of education. The content of the program may or may not be a deterrent (or motivator), however, an era existed in the 1980's when "gasohol" (alcohol made from farm crops) continually drew large crowds at Extension programs. Perhaps the novelty of this topic, or the fact that gasohol might create a new alternative market for their crops, motivated farmers to attend. Regardless, there are still individuals who are quite faithful in attending Extension programs, and those who are seldom associated. This appears to indicate that those who attend are motivated by certain aspects of educational programs, and there are others who are less motivated. This participation behavior could also be seen from a deterrent perspective, i.e., that some farmers are deterred from attending while some are not deterred.

Ownership, and thus participation, is achieved by including members of the user group during the planning process (Levine, 1992). Extension agents have attempted to address this when planning programs and this has been helpful, i.e., utilizing farmer-participant advisory groups to identify programmatic desires. Extension agents also attempt to keep costs low, and hold meetings in convenient locations or at convenient times or seasons. Yet, there are still many farmers who do not participate. This may indicate that program

content, cost, location, and timing are neither significant motivators nor significant deterrents to participation for this group, or that the correct combination of these deterrents/motivators vary from group to group or individual to individual..

It is also well known by professionals who work in the agricultural arena that cultural farming practices and traditions are often handed down from generation to generation, within a family farm operation or cultural group. Houle found that "carrying on a tradition of their family or culture" was a characteristic that caused some individuals to participate in learning activities (Merriam and Caffarella, 1991). In other words, children may adopt the parents' perspective toward continued learning, and then pass that value on to the next generation. Therefore, family members might be expected and/or encouraged to attend educational activities if that was a family value. On the other hand, negative values toward continuing education could also be handed down through the family as suggested by Darkenwald and Merriam (1992). If so, the lack of participation in educational programs, could be a tendency that has been accepted within a farm family culture, and therefore it may exist as more of a cultural non-expectation than a personal distaste for continued learning. Both Scanlan (1982) and Darkenwald and Valentine (1985) examined the absence of family member support in their questionnaires.

Deterrent Research

During the 1980's a new scale instrument was developed by Scanlan (1982) to investigate the construct of deterrents to participation in educational programs. Why adults

participate in educational programs had been the subject of much earlier research but until recently, little study had been performed regarding the barriers which deter adults from participating (Merriam and Caffarella, 1991). The foundation for the deterrent construct was performed at Rutgers University in New Jersey (Scanlan, 1982; Scanlan and Darkenwald 1984; Darkenwald and Valentine, 1985). Using principal components analysis, these researchers identified deterrent factors that varied between the different populations studied. These studies viewed the deterrent construct as a multidimensional phenomenon where various factors worked simultaneously and sometimes synergistically to deter adults from participating in educational programs. Prior to that period, the issue of barriers to participation in educational activities was seen as a more intuitive and simplified construct (Scanlan and Darkenwald, 1984).

Some of the earlier studies to address deterrents to participation in educational programs were performed by Johnstone and Rivera (1965). These investigators looked at educational experiences of the adult American population. Participants in that study were either over the age of 21, married or the head of a household, and had terminated or completed regular, full-time school attendance. In the study, these investigators identified motivators as well as deterrents to adult participation in educational programs. Johnstone and Rivera termed these deterrents as "barriers" and listed financial restraints (or cost), busy schedules, and lack of physical energy as the deterrents most frequently reported by respondents. They reported that women identified more obstacles to enrollment than men, older adults reported more obstacles than younger adults, and persons in lower

socioeconomic groups reported more obstacles than persons in higher socioeconomic groups. Johnstone and Rivera also described continuing education as "clearly a middle- and middle-upper class phenomenon" based on that research, and that persons in lower socioeconomic levels reported less interest in education, even when they knew it could elevate job or income status.

Johnstone and Rivera defined an educational activity as any organized learning experience that 1) provided an opportunity for the learner to acquire some type of knowledge, information, or skill, whether informational, recreational, or job related, and 2) was organized around some form of instruction. They considered only organized forms of self-study, however reading was included when it was part of a planned study. They also pointed out that this definition of an educational activity is much broader than that defined by the national Office of Education (OE) in a related survey of adult education. In the OE study, self-instruction such as correspondence courses, on-the-job training, private lessons, television courses and other home-study activities were excluded (Johnstone and Rivera, 1965).

As Johnstone and Rivera (1965) examined deterrents to participation in educational activities for adults, they identified two general categories for those individuals who were deemed at a level of "high participation readiness". These two categories included deterrents which were 1) *external* to the potential participant, i.e, beyond the control of the individual, and 2) *internal*, i.e., within the individual's control such as the participant's

attitude or disposition toward participating. The investigators provided respondents with 10 possible deterrents from which to choose. Of these, barriers that tended to be of the external variety were more often an influence than internal barriers.

Cross (1981) identified three major categories of deterrents for adults regarding participation in educational activities. These three categories were termed *situational*, *institutional*, and *dispositional*. She defines situational deterrents as "those arising from one's situation in life at a given time", e.g., lack of time due to job responsibilities, or lack of money to participate due to income level. Institutional deterrents are those which are created by the institution offering the educational activity, e.g., unattainable requirements for registration or participation, courses or workshops offered at inconvenient times or locations, or non-relevant topics. Dispositional deterrents refer to negative, internal feelings toward participation in educational activities, e.g., lack of confidence to complete the activity or even to attend, general dislike for studying or a disinterest in continuing education, a desire to do something else instead of participating in an educational activity, etc..

In summarizing 30 state and national surveys, Cross (1981) found that situational barriers led the list in all of the surveys she examined. The cost of education and lack of time led all other barriers substantially. She suggests that those who have the money do not have the time, and those who have the time, do not have the money. Individuals in the 25-45 year old age bracket appear to state lack of time more often than other age groups, due to

job and home responsibilities. Low income and younger people tend to report lack of money as a deterrent more often than those having higher incomes or older individuals. Cross also mentions that women indicate cost as a deterrent to participation more often than men. One national survey indicated women more often were expected to pay for the cost of participation from personal funds, while men were more often supported by employers. This phenomenon was reportedly due to the greater majority of men employed outside of the home at the time of the study (Cross, 1981). This was thought to be the major reason why females reported cost as a deterrent more often than men.

Cross cautions that having the ability to pay is not the same as having the willingness to pay. Also she suggests that the cost of the program is sometimes used as a maneuver by respondents to hide their real feelings. The phrase "costs too much", is often a socially acceptable response that people use when it may really mean that the value of the activity is not worth the cost, or is not a priority at the time. Therefore, it is sometimes difficult to measure in a survey whether individuals economically cannot attend (situational), or whether they just do not see a value derived by attending (dispositional). Cross also states that dispositional barriers may be underestimated in the literature, since it is more socially desirable to state that one is too busy than to say that one is not interested in learning, or not confident in their learning ability. This is supported by other studies which have shown that individuals may not indicate lack of interest in learning as a deterrent for themselves, yet they will cite this as a deterrent for others (Cross, 1981).

In the national study mentioned by Cross, institutional barriers included references to the amount of dedication expected by the learner, e.g., requirements to attend school full time, or courses meeting more often than the learner could attend. But Cross also mentions that inadequate information about educational offerings also can deter learners from participating. Cross groups institutional barriers into five areas, i.e., problems due to 1) scheduling, 2) location, 3) course relevancy, 4) procedural or time requirements, and 5) lack of information about the program. She states that "lack of information" about the program is cited less frequently than other deterrents.

Darkenwald and Merriam (1982) also cite lack of time and cost as the two barriers to participation most frequently reported by adults. They also agree with Cross (1981) that individuals will often cite lack of time or cost as a deterrent, rather than give a socially unacceptable reason such as not being interested or not feeling competent in their ability to learn. Darkenwald and Merriam added a fourth barrier to those offered by Cross (1981), and expanded the meaning of another. They grouped barriers into categories labeled *institutional*, *situational*, *informational*, and *psychosocial*. The informational category was added to reflect the lack of information that is often cited by respondents when trying to locate educational opportunities. They redefined the term "dispositional" as psychosocial which they report more broadly represents the category of attitudinal and dispositional responses.

Related to the informational barrier, Darkenwald and Merriam (1982) found that one-third

of all adults indicated that they had "no knowledge whatever of educational resources in their communities". This compares with the findings of Johnstone and Rivera (1965) who reported that this is more often true with disadvantaged and low income sectors of the adult population. Their study showed that about one-fourth of the adult population did not know where to go or who to ask about educational programs in their communities. Johnstone and Rivera also reported in one study that 85 percent of individuals of high socioeconomic status living in middle-sized cities knew of at least one place to go to find out about educational activities in their community. The same study showed that of individuals from low socioeconomic status in smaller towns, only 19 percent knew of at least one source for getting information on educational opportunities. Johnstone and Rivera (1965) and Darkenwald and Merriam (1982) found many similarities in their research which was used in subsequent research.

In these earlier studies, the concept of deterrents was examined through more simplified and intuitive methods (Scanlan and Darkenwald, 1984). Motivational research had not been successful in predicting participation, although motivational research did identify forces which motivated persons to learn (Scanlan and Darkenwald, 1984). More recently, Scanlan (1982) examined adult deterrents to participation in educational programs in New Jersey with hopes of constructing an instrument that would 1) more completely identify and explain deterrents to participation, and 2) be useful in predicting participation behavior in adult audiences. That study focused on health professionals, including physical therapists, medical technologists, and respiratory therapists who resided in that

state. Results of this study showed that a multidimensional construct existed and that using principal components analysis and multiple regression, the deterrent source factors which emerged could be used to predict participation behavior. To perform that study, an instrument was developed entitled the "Deterrents to Participation Scale (DPS)". A number of studies were performed in the 1980's which tested the DPS instrument and modified forms of the DPS. Scanlan (1982), Darkenwald and Valentine (1985), Weischadle (1988), Davis (1988) and Martindale and Drake (1989) used the DPS methodology to investigate barriers to participation in educational activities for various audiences. Using Orthogonal Rotation, deterrent factors were identified in each of these studies. Type, number, and importance of the deterrents varied with the target population (Table 1).

In the Scanlan study, a 6-factor solution of deterrent source variables was identified which accounted for 54 percent of the scale variance (Scanlan and Darkenwald, 1984). These factors were termed Disengagement, Lack of Quality, Family Constraints, Cost, Lack of Benefit, and Work Constraints. The predictive utility of these factors was examined through a regression equation using participation-nonparticipation as the dependent variable. With the exception of Factor 6, the source variables were useful in predicting participation behavior, explaining 41 percent of the variance (Scanlan and Darkenwald, 1984).

Table 1. Principal Components as Found in Various DPS Studies

Investigator	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Scanlan & Darkenwald (1984)	Disengage-ment	Lack of Quality	Family Constraints	Cost	Lack of Benefit	Work Constraints		
Darkenwald & Valentine (1985)	Lack of Confidence	Lack of Course Relevance	Time Constraints	Low Personal Priority	Cost	Personal Problems		
Weischadle (1988)	Time Constraints	Program Deficiencies	Cost	Scheduling Constraints	Incongruent Dispositions			
Davis (1988)	Course Deficiency	Time Constraints	Lack of Benefit	Negative Disposition	Cost	Other Options	Other-Dependent	
Martindale & Drake (1989)	Lack of Course Relevance	Lack of Confidence	Cost	Time Constraints	Lack of Convenience	Lack of Interest	Family Problems	Lack of Encourage-ment

In 1985, a general study on New Jersey households was performed using a new prototype version of the DPS instrument coined the "DPS-G" (Darkenwald and Valentine, 1985). The new instrument which explored deterrents to participation in educational programs among the general population also led to a six-factor solution of source variables although only one source variable (Cost) emerged that was also identified in the original DPS study. In order of explained variance, the six DPS-G factors were termed Lack of Confidence, Lack of Course Relevance, Time Constraints, Low Personal Priority, Cost, and Personal Problems. This difference in the factor solution was anticipated due to the differences in the two populations. This led to recommendations that new populations be studied using modified forms of the DPS or DPS-G instrument (Darkenwald and Valentine, 1985; Scanlan and Darkenwald, 1984).

Two more investigations into the deterrent construct were performed in 1988 by doctoral students at Rutgers University. Weischadle (1988) examined real estate professionals' response to a combination of the original DPS, an AACES (Adult Attitudes Toward Continuing Education Scale) instrument, and a Behavioral Index. Her study resulted in five deterrent source variables surfacing which accounted for 47.5 percent of the scale variance. These factors were identified as Time Constraints, Program Deficiencies, Cost, Scheduling, and Incongruent Dispositions. Two of these factors, Cost and Time Constraints were also seen in the Darkenwald and Valentine DPS-G study. The results support findings by Johnstone and Rivera (1965) and Cross (1981) in that cost and lack of time continue to be important deterrents. Weischadle's study did significantly differentiate

between the deterrent factors for real estate professionals, and supported the construct that deterrents are multidimensional in nature. Her study also demonstrated that real estate professionals may be more inclined to participate in educational activities that are work-related based on survey response. Using multiple regression in relating the DPS scores, attitude scores, and participation behavior, Weischadle did report the ability to predict participation behavior.

The second study that year by Davis (1988) examined deterrents to participation as reported by bank managers. Davis used a modified form of the DPS instrument referred to as DPS-B. Seven factors were identified and labeled Course Deficiency, Time Constraints, Lack of Benefit, Negative Disposition, Cost, Other Options, and Other-Dependents. The factors entitled Time Constraints, Lack of Benefit, and Cost were reported in the earlier DPS studies. Davis also incorporated role-related variables such as bank size, bank type, job level, etc.. Support was documented regarding the deterrent construct being multidimensional. Predictive measurements were significant, however Davis indicated that explained variance was small for the deterrent factors in relation to voluntary work-related participation levels. Therefore he states that the study, in itself, does not prove to be useful as predictor for participation behavior at a practical level.

Another study was performed by Martindale and Drake (1989) with Air Force Personnel where eight deterrent factors were identified. Of these source variables, four had been identified with previous audiences, i.e., Lack of Course Relevance, Lack of Confidence,

Cost, and Time Constraints. The remaining four source variables, i.e., Lack of Convenience, Lack of Interest, Family Problems, and Lack of Encouragement were new factor labels. The results of this study also showed that institutional and situational deterrent items ranked highest in mean score while dispositional items ranked lowest. Martindale and Drake did not test for predictability of the deterrents with regard to participation behavior. As found in earlier research, lack of confidence was found to increase with age and decrease with educational attainment. Also, younger Air Force personnel were less deterred by lack of confidence but more deterred by cost.

In 1994, the DPS methodology was used to investigate participation in continuing professional education programs by university-based nurses at Syracuse University (Essman, 1994) The study incorporated the original DPS instrument, along with a nine-item Continuing Learning Activity Survey and inventory of sociodemographic and clinical practice variables. The study revealed five deterrent factors identified as Alternative Choices, Program Constraints, Cost/Benefit Constraints, Time Constraints, and Family Constraints. Findings of the study supported the construct in being complex and multidimensional, however the results were not useful in predicting the participation behavior of university-based nurses.

There is repeated evidence that the deterrent construct is more complex and multidimensional than that proposed by earlier investigators, however many variables are related in much the same way as those based on the earlier works by Johnstone and Rivera

(1965), Cross (1981), and Darkenwald and Merriam (1982). A general agreement in the literature reveals that lack of confidence becomes more of a deterrent as a person ages and with lower socioeconomic status, but decreases as a deterrent with educational attainment. Cost appears to be a stronger deterrent for females than for males, and for young age groups more than older age groups. Low personal priority or lack of interest in participating in educational activities is shown to be a stronger deterrent with individuals of lower socioeconomic status, and higher for individuals with higher educational levels. Time and lack of money repeatedly surface as being two the most commonly reported barriers. And in studies with a cross section of income levels, age groups, and socioeconomic levels, institutional and situational barriers continually emerge as more important deterrents to participation in educational activities than dispositional barriers.

Demographics and Barriers

Previous studies by researchers in adult education have reported significant findings about the adult population and participation behavior. While Scanlan and Darkenwald (1984) state that sociodemographic traits only account for about 10 percent of the variance in studies on participation behavior, it is important to examine the similarities from various studies.

Gender

While Darkenwald and Merriam (1982) saw negligible differences between participation and non-participation due to gender, Johnstone and Rivera (1965) reported that women

identified more obstacles to enrollment in courses than men. Also they found that more women than men declared busy schedules and lack of energy as barriers (Johnstone and Rivera, 1965). Merriam and Caffarella (1991) state that women on the average paid less for education than men. Cross (1981) states that white females are the only population subgroup where the majority of learners are supporting educational costs from their own resources or from family funds. Darkenwald and Merriam (1982) concurred with those findings stating that educational costs for men were more often supported by employers while women paid educational costs from personal or family funds. Cross (1981) suggests that this may be why women are more likely than men to cite cost of attending an educational activity as a deterrent. She states that men from a given socioeconomic status (SES) are willing to pay more for education than women of the same SES. Weischadle (1988) found that females are more likely to cite cost and scheduling constraints as a deterrent than men. Findings by Davis (1988) in a study with bank managers and Darkenwald and Valentine (1985) in a study of the general public also showed that females more often cited cost as a deterrent than did men. Davis (1988) also reported that course deficiencies and the lack of benefit from attending were more of a deterrent for male bankers than female bankers. Darkenwald and Valentine (1985) in studying general audiences found males to indicate lower personal priority in participating in educational programs than women, while women cited personal problems such as child care, family concerns, etc., as more important deterrents than did men.

Age

Johnstone and Rivera (1965) stated that older adults reported more obstacles than younger adults. They also found that younger adults cited financial restraints more often than older adults, while older adults appeared to lack more confidence. Some older adults also stated that they felt they were "too old to learn", however differentiation between young and old was more pronounced in the lower socioeconomic levels. Cross (1981) states that young adults are more likely to see cost as a deterrent than are older adults. She comments that young people tend to see education as a "right", i.e., something that should be provided, where older people see education as a "privilege", and thus are more willing to pay. Cross (1981) also found that older people on fixed incomes are more willing to pay than younger people, and lack of time appears to be more of a problem for people in their 30's and 40's, than for the younger or older. Older individuals also tend to have more problems with transportation (Cross, 1981). Weischadle (1988) saw time constraints decrease with age for real estate professionals but cost, unlike the findings in most studies, became more important as a deterrent with age, . Davis (1988) reported that older bank managers were more likely to cite course deficiency or negative dispositions toward participation, while younger bankers appeared to be more restrained by time and money. Darkenwald and Valentine (1985) observed that lack of confidence, cost, and personal problems declined with age as deterrents to participation.

Level of Education

Houle (1961) stated that "the most universally important factor [regarding participation in adult education] is schooling". He states that the higher the level of education, the more likely the individual is to take part in some form of continuing education. Cross (1981) stated that the highly educated proclaim lack of time as a barrier more than those with lower levels of education. Weischadle (1988) found that real estate professionals' dispositions toward education decreased as the level of educational attainment increased. Darkenwald and Valentine (1985) in working with general audiences saw that lack of confidence, cost and personal problems declined as level of educational increased.

Socioeconomic Status

Johnstone and Rivera (1965) reported that persons in lower socioeconomic status (SES) groups reported more obstacles than persons in higher socioeconomic levels. They also identified four tendencies: 1) Persons in the lower SES groups more often reported financial restraints as a barrier to participation than did persons in higher SES groups, 2) Persons in the lower SES groups were more likely to cite the lack of facilities in their area as a barrier, 3) Persons with a high SES say they are too busy to participate, 4) Persons with a middle level SES cited more difficulty in getting away from home in the evenings to participate. Johnstone and Rivera also found that persons of low SES were more likely to have not heard of any courses interesting enough to attract them into enrolling. Persons with high income levels tend to indicate lack of time as a barrier, more than persons with a lower income. Darkenwald and Merriam (1982) found that individuals with low SES

demonstrated less interest in education even though they were aware that educational attainment could lead to better jobs and higher income levels. Weischadle (1988) reported that as income increased, real estate professionals became more concerned about program deficiencies. Darkenwald and Valentine (1985) stated that as income for general adults increased, cost and lack of confidence became less of a deterrent.

For the most part, the findings in the above studies agree and are logical. In summarizing, females cite cost as a deterrent more so than males, however males appear to be more concerned about program relevancy, and state that low personal priority is a stronger deterrent for participating than it is for females. Older individuals often state lack of confidence as a deterrent to participation in learning experiences. Although studies have shown mixed results regarding time constraints and cost, it appears that typically an older person has more money and less time to attend educational activities. It has repeatedly been shown in the literature that as level of education increases, lack of confidence decreases and personal priority for participation increases. Socioeconomic status (SES) is also fairly dependable in dictating participation in educational activities. Generally, the higher the SES, the more inclined an adult is to participate, costs are less of a deterrent, and time constraints become more of a barrier. On the other hand, persons with a low SES tend to have more time available, less money, and a lower personal priority toward participation in educational activities.

Summary of Adult Education And Deterrents

The literature has shown that most adults prefer to participate in some type of continuing education activities, although the amount of participation and the types of deterrents vary with sociodemographic group. Motivational research, although comprehensive in demonstrating the reasons why individuals seek to learn, has not shown the ability to predict participation for adults according to Scanlan and Darkenwald (1984). Earlier research focusing on the barriers to participation provided logical reasons why people do not participate but the construct was not examined as a multidimensional network of relationships (Scanlan and Darkenwald, 1984). The deterrent to participation scale, and modified forms of the scale, provided a new pathway to investigate the deterrent construct and have been able to provide a prediction of participation behavior in certain studies (Scanlan, 1982; Weischadle, 1988). Studies have repeatedly shown that barriers to participation do not show up as a single deterrent type, but rather appear as a number of deterrents working together to deter an individual from participation. Previous assumptions regarding sociodemographic variables and deterrents found in early forms of adult education research have been reconfirmed through DPS-type studies.

Hobbs (1992) states that rural communities have lagged behind in the proportion of college graduates and number of jobs requiring higher levels of education. Those who attain post-secondary degrees then leave the rural community for better jobs. Land use trends may be changing this balance, as individuals with higher socioeconomic status move their homes to rural areas. Hobbs states that there is a need for continuing education in

rural communities as regional and national changes impact rural communities. Farms are growing in size and becoming more specialized (Bernsten, 1993). Technology and communications are becoming increasingly complex yet probably offer the greatest return on investment (Ferris, 1992). At the same time, experts state that numbers of on-farm laborers are decreasing in number and that farm owners and managers will depend on technologies to replace that labor and increase efficiency (Shapley, 1992). To compete and survive in a global market, farmers will have to continue to participate, if not increase participation, in educational activities or be driven out of business by those who do.

As a result, the public and private organizations that provide educational opportunities for agricultural producers must be ready. They must know why farmers attend and what deters them from attending. As stated by Merriam and Darkenwald (1982), "... in adult education, the effectiveness and often the survival of educational programs depends on a thorough understanding of the needs, problems, attitudes, and preferences of its clienteles and potential clienteles."

Return on investment to educational institutions who work with producers will be as important as it is to the producers themselves, and registration fees may have to be included as a way to cover implementation costs. This is especially true for public entities which have limited personnel and operating budgets. While recognizing that the identification of farmers' deterrents to participation will greatly aid those organizations in allowing or encouraging farmers to participate, the ability to predict participation behavior

will be an even greater tool in the agricultural educational arena. The current study on the "Deterrents to Participation in Educational Activities by Michigan Farmers" will attempt to explore and unveil some of these unknowns, and provide useable data for all educators working with the agricultural industry.

CHAPTER III

METHODOLOGY

Introduction

This section of the dissertation presents the methodology that was used in the study. Topics discussed include the nature of the study, the research design, a review of the research questions, dependent and independent variables, internal and external validity, generalizations to populations, reducing sampling bias, instrument development, data collection, correction for non-response error, and data analysis.

This study, performed via a mail survey, takes an applied approach to the problem addressed, and falls into the category of educational research. Ary et. al. (1990) state:

> "Educational research is the way in which one acquires dependable and useful information about the educative process. Its goal is to discover general principles or interpretations of behavior that can be used to explain, predict, and control events in educational situations--in other words, scientific theory."

Nature of The Study

In this study, Michigan farmers were surveyed via a mail questionnaire (Dillman, 1978), to examine aspects of the deterrents construct. The study attempts to 1) develop a valid and reliable "deterrents to participation" survey instrument for farmers, 2) identify significant factors that serve as deterrents to farmers' participation in educational programs, 3) observe whether differences exist in the deterrents identified based on socio-demographic differences in the sample population, 4) determine whether the cost of attending an educational program serves as the most important deterrent to participation for farmers, 5) observe whether there is a statistically significant relationship between the type and importance of deterrents identified by participants and non-participants that would allow prediction of participation behavior? A goal was established to develop and test a model the would predict participation behavior by farmers.

To date, much research has been performed on learning style, learning orientations, and those stimuli which motivate adult participation in educational activities. However, based on the literature, motivational research has not been substantially useful in predicting adult participation behavior (Scanlan and Darkenwald, 1989). In addition, limited research has been performed in the area of deterrents to participation, and this is virtually non-existent in regard to farmers. These findings and sources have been reviewed in Chapters I and II.

Research Design

Introduction

The nature of this study required that a descriptive research design be used. Descriptive research is recommended when a population will be examined and the observations organized, summarized and described (Ary et. al., 1990). In this study, farmers were questioned via a mail survey as to the barriers that deter them from participating in educational activities. The term "educational activity" was defined as any type of organized, group learning experience, whether recreational, informational, or work-related. Source variables ("factors") were identified and compared using factor analysis.

Inferential statistics were used to assist in predicting the results of this study to the general population of farmers in Michigan. Responses were analyzed using Orthogonal Rotation, Pearson Product-Moment Correlation, Friedman's Test, Repeated Measures Test, Logistical Regression, and One-Way Analysis of Variance. Factors identified were examined with regard to sociodemographic groups and with regard to participants and non-participants. In this study, farmers were termed "participants" if they had participated in at least one organized, educational activity in the past twelve months prior to receiving the questionnaire.

Sociodemographic groups were compared based on gender, age, level of education, amount of annual gross farm sales (farm income), type of farming enterprise, farm

employment status (i.e., part-time or full-time), and whether they also held an off-farm job in addition to farming. Statistical analysis was performed to identify deterrent factors and to see if there were relationships or differences between these groups regarding the factors that influence their decisions not to participate in educational programs.

Instrument Development

The scale instrument was modeled after the Deterrent to Participation Scale for General Audiences (DPS-G), which was developed by Darkenwald and Valentine (1985). The DPS-G was a new prototype fashioned from the original Deterrent to Participation Scale (DPS) developed and tested by Scanlan (1982). After examining both scales, the DPS-G appeared more easily adaptable to a farming audience. The new instrument, modified for farmers, would be referred to as the Deterrent to Participation Scale for Farmers (DPS-F).

A focus group process was used to identify the items to be asked in the survey and to enhance pre-testing face validity (Krueger, 1994; Heinze, 1996). Focus group meetings consisted of two groups of farmers from two Michigan counties. The first focus group meeting was held in Eaton County, Michigan and was comprised of Eaton County farmers, while the second meeting was held in Ingham County, Michigan with Ingham County farmers. While Krueger (1994) suggests involving a minimum of 4 persons in the focus group, only 3 of the 9 farmers invited attended the first focus group meeting. Five of the 12 invited farmers attended the second meeting. These meetings were held during seasons when farmers are not busy, i.e., early summer and early autumn, respectively.

The format for focus group questioning followed that suggested by Krueger (1994). Focus group participants were asked to indicate barriers to their participation in any educational activities, regardless of whether the activities that were farm-related, recreational, or just informational. "Educational activity", for purposes of the study, was explained to each focus group as a non-formal, organized educational activity. It excluded such things as reading and self-study, college or formal course work, etc., and included such activities as farm tours, workshops, weed control meetings, golf lessons, Bible study, etc.. The resulting responses were used to assist in constructing the research questionnaire.

Cross (1981) cautions researchers regarding respondents who may lie in order to provide a socially acceptable answer. Krueger (1994), supporting this belief, states that "people often want to tell us how they wish to be seen as opposed to how they are." In other words, it is possible that a farmer may not list socially, non-acceptable answers, such as "I am not interested in learning" or answers that may negatively impact his self-esteem, e.g., "I do not feel confident in my ability to keep up with the class". Therefore, in order to better identify these types of items for the questionnaire, participants in the focus groups were not only asked to identify valid deterrents for themselves, but they were also asked to identify the deterrents they thought "other" farmers might name. The investigator of this study also has a strong agricultural background, which was valuable in interpreting farmer input regarding perceived deterrents. However, participants were still asked to clarify any comments that were unclear to the proctor or group, or that could be

interpreted in more than one way.

Using the information compiled from the focus group sessions, questions were generated for the pilot survey. Deterrent items from the original DPS-G instrument that were also mentioned in the farmer focus groups were left intact for the DPS-F instrument. Those deterrent items in the DPS instruments that were not specifically mentioned in farmer focus group sessions and did not seem to apply to most farmers, were either merged into a related item that surfaced during the focus group sessions or were deleted from the questionnaire. For example the item, "Because of transportation problems...", does not apply well to farmers since farmers must have vehicles for moving from field to field, or traveling to town for parts, groceries, etc.. Most farmers have at least a pick-up truck for hauling supplies, etc., or in some cases a horse-drawn vehicle or van in the case of certain cultural groups, such as Amish and Mennonite families. Therefore, this particular item was not included in the DPS-F questionnaire. Deterrent items related to location of the program allowed respondents to provide "location" as an alternative deterrent but did not focus on the method of transportation being the cause if this was a deterrent for them.

A total of 56 deterrent items surfaced at the Eaton County focus group session, while 39 deterrent items were named at the Ingham County session. These two sets of deterrent items were compared with each other and with the DPS-G instrument. After merging duplicate or triplicate deterrent items and eliminating DPS-G items not related to the occupation of farming, a total of 39 deterrent items remained. These 39 items were

incorporated into the DPS-F instrument as Likert scale items. This number was similar in size and scope to other DPS scales that have been used.

Prior to testing the pilot questionnaire, a group of qualified university faculty and Extension staff members were asked to review the instrument for face validity (Dillman, 1978). Suggestions were made to change the wording on an open-ended question near the end of the survey, and to drop the labels, "Part I, Part II, etc" from the various sections of the questionnaire. Typographical errors were discovered and corrected. A suggestion was also made to place sociodemographic questions at the end of the survey, especially since one question asked respondents to indicate their income, i.e., annual farm sales. Although this was an optional question, it was agreed that respondents would more likely complete all or most sociodemographic questions, once they had invested time in the Likert scale portion of the questionnaire.

As a second step in testing for face validity, 5 individuals who work directly with farmers, e.g., Extension agents, USDA Natural Resources Conservation Service staff, and agribusiness representatives were also asked to review the questionnaire to help ensure that it would be readable and acceptable to farmers (Dillman, 1978). Several suggestions were made, some of which did not follow Dillman's guidance. Those suggestions which did not follow established mail survey procedures nor comply with Dillman's recommendations were disregarded. The first question regarding the number of activities attended was reworded slightly based on this phase of the input.

After validity was assumed, a pilot test was administered to 11 Michigan farmers, comprised of 9 males and 2 females (Dillman, 1978). The pilot group was comprised of Ingham County farmers who were not involved in focus groups nor individual input to construct the scale items. Potential pilot participants were invited by telephone and these consisted of individuals known to participate in educational programs and not known to participate. During the verbal invitation, pilot participants were told that they would be completing a pilot survey as part of a research project, but no explanation, descriptions, etc., were provided. On the day of the pilot testing, the proctor welcomed the group, thanked them for participating, and stated that they he would explain the reason for the pilot survey after they completed the exercise. This method was implemented to better assimilate a person receiving the cover letter and questionnaire in the mail. Pilot participants were asked to read the cover letter and then complete the questionnaire without the proctor's assistance. Participants were asked to place an "x" or "check-mark" next to any item that was confusing or of concern. These items were brought before the entire group for discussion and potential concurrence among the members after taking the pilot test. Again, to assimilate a person completing the questionnaire as a mail survey, no time limit was set. When everyone had completed the questionnaire, the proctor asked everyone to put their pencils down and make no more marks on the questionnaire. Participants were then offered an opportunity to provide verbal feedback, however they were again instructed not to change any answers or comments on their questionnaire. Many participants offered constructive comments. In the first item of the questionnaire, there was agreement that farmers should not be asked to name the educational activity(s)

that they had attended, therefore that portion of the first section was omitted from the final questionnaire. Other suggestions for rewording questions were made, although participants all stated that the questionnaire was generally clear and concise. Therefore, a decision was made not to reword those questions unless the reliability analysis identified a problem. Results of the pilot test were analyzed for reliability using Cronbach's Alpha Coefficient with alpha = .8831 for the 39 items. Although five items showed a slightly higher alpha value if deleted (optimum alpha value of .8901), four of these items appeared in the original DPS-G and the remaining item was specific to the farming audience, i.e., "Because the activity schedule conflicted with my off-farm job". All five items had been developed or reaffirmed through focus group input and therefore, these items were retained. No additional changes were made to the questionnaire after the reliability analysis, and that version of the questionnaire was considered the final draft of the instrument.

Research Instrument Summary

Using the input from farmer focus groups and one-on-one input, a modified scale was developed for use with farmers. This scale was based on the Deterrents to Participation Scale for General Audiences (DPS-G) developed by Darkenwald and Valentine (1985), with consideration given to the Deterrents to Participation Scale (DPS) developed by Scanlan (1982), and the Deterrents to Participation Scale for Bankers (DPS-B) developed by Davis (1988). This new modified scale, which is referred to as the Deterrents to Participation Scale for Farmers (DPS-F), attempts to identify those factors which serve as

deterrents to farmers' participation in educational activities.

The DPS-F consisted of a five-item Likert Scale mail questionnaire. In addition to the Likert Scale format, one question was asked regarding participation in educational programs during the 12-month period prior to receiving the questionnaire. As with other DPS studies, those respondents who indicated any type of participation in one or more organized, educational activities during the 12 month period prior to the study were considered a "participant". Those who had not participated in any organized, educational activities in the 12-month period prior to receiving the questionnaire were considered a "non- participant". According to Tough (1971), the average adult normally participates in eight learning projects per year. Cross (1981) states that about one-third of the adult population participates in some type of "organized learning" activity each year. Therefore, for possible future use with the data, respondents were allowed to select one of four options, i.e., that the respondent had participated in no educational activities ("none"), 1-5 educational activities, 6-10 activities, or 11 or more activities in the past year. These categories were selected in units of five, i.e, "1-5", "6-10", etc., to help reduce confusion for growers who may not remember the exact number of activities they had attended. These responses were later utilized during the analysis to see if there was a relationship between the deterrent factors and participation behavior.

In addition, a section was provided to determine socio-demographic characteristics of the sample population. These questions helped to determine differences due to gender, age

group, level of education, type of farming enterprise, amount of gross farm sales, farming status, i.e., full- time or part-time farmer, and those with or without off-farm jobs.

In order to achieve the highest level of response in the mail survey, questionnaires were mailed during the months of March and April 1997. These are slower months for farmers in regard to farming activities, and should have allowed them time to complete and return the survey more readily before becoming busy with spring field activities. A copy of the research instrument is included as Appendix B at the back of this dissertation.

Review of The Research Questions

This section provides an overview of the research questions. Table 2 identifies the research questions that were asked, and those statistical tests that were applied. In addition, questionnaire items that were critical to the analysis are identified.

Table 2. Research Questions, Tests, and Related Items

RESEARCH QUESTIONS	TESTS	RELATED ITEMS
1. Using a farmer-oriented form of the Deterrents to Participation Scale (DPS-F), can significant and distinct source variables or factors be identified that deter adult farmers from participating in organized adult education activities?	Means, Frequencies, T-Tests, Cronbach's Alpha Coefficient, Factor Analysis with Orthogonal Rotation using the Varimax procedure with Kaiser Criterion, Repeated Measures Test.	Deterrent Items:: #1 - 39.
2. Is there a difference in the type and/or importance of deterrent factors for farmers based on the socio-demographic variables of gender, age, level of education, type of enterprise, amount of gross farm sales, farming status and on- or off-farm employment?	Means, Pearson Product-Moment Correlation Coefficient, One-Way Analysis of Variance with Tukey's HSD post hoc tests.	Deterrent Items: #1 - 39; Sociodemographic Items: #1,2, 5, 6, 7,8, 9.
3. Is "cost" the most statistically important factor that deters farmers from participating in educational activities?	Friedman's Non-Parametric Test for K-Related Samples.	Deterrent Items: #10,#22,#37 (based on results of factor analysis, i.e., Factor #6 - Cost); Factors #1-5.
4. Is there a statistically significant relationship between the type and importance of deterrents identified by participants and non-participants in educational activities that would allow prediction of participation behavior?	Pearson Product-Moment Correlation Coefficient, Logistical Regression.	First Item on Number of Activities (grouped by participant or non-participant) Pg 3; Deterrent Items: #1 - 39.

Generalizations to Populations

Generalization to Michigan farmers was addressed through a proportional stratified random sample of farmers (Ary, et. al., 1990). Names and addresses were selected via a computer process for the study from mailing lists maintained by the Michigan Agricultural Statistics Service. This division of the Michigan Department of Agriculture maintains a list of farmers in Michigan, which is comprehensive and represents all types and sizes of Michigan farms. According to Pscodna (1996), the MASS mailing list includes about 70 percent of Michigan farmers with farm sales over $1000, and is the most complete and unbiased list available in Michigan. Unlike mailing lists available from CES or the USDA Farm Service Agency, the MASS list is not biased toward those farmers who normally participate in educational programs nor toward those who participate in government farm programs, i.e., typically larger farms. Names on the MASS list are generated from combined sources which include, but are not limited to, the USDA Farm Service Agency, agricultural commodity groups and associations, state government, Michigan State University Extension, and direct reports to MASS from farmers when farms are sold to new owners (Pscodna, 1996).

The proportional breakdown of the sample was based on the percent breakdown of primary enterprise types (by percentage of total) on the MASS list and represents as closely as possible the percentages of farm types in Michigan. Since the sample represents the general farm population in the state, the results of this study can be generalized to that population, assuming a similar response pattern. According to Pscodna, the remaining 30

percent of farms not included in the MASS list are typically very small farms. These are more likely to be missed in the development of the total MASS list, merely due to the number of very small farms and hobby farms in Michigan (Pscodna, 1996). Also, according to Pscodna, many of those Michigan farms missing from the list are so small that the owners do not consider themselves true farmers even though they meet minimum qualifications as described in the US Census of Agriculture (1992). A small tendency for error could occur in generalizing to farmers operating these very small farms or hobby farms. Also, while gender did show acceptable confidence levels in non-response error tests, the significance level fell exactly at $p = .05$. There is a slight possibility for error in generalizing the data based on gender.

Because of the variation in geography, climate, and cultural differences in the United States, the results of this Michigan study cannot be generalized to the farming population of the entire country.

Internal and External Validity

Internal Validity

Although this study falls in the category of descriptive research, there are aspects of internal validity which were considered such as selection bias, instrumentation, testing, attitude of subjects, and survey implementation (Fraenkel and Wallen, 1993). Where possible, precautions were taken against such error as explained below.

Selection bias may skew test results if subjects in the group differ on such variables as age, gender, ability, socio-economic status, and background. The large number in the sampling group should have helped to buffer this type of error. In addition, a number of key differences between members of the audience, e.g., age, income level, etc., were intentionally differentiated in order to see if there, in fact, is a difference based on these types of traits.

Instrumentation, i.e., the way in which the survey instrument is developed and how data are collected, can lead to internal errors of validity. By following Dillman's guide in instrument development, an attempt was made to minimize errors in instrument development. Also, since a mail survey was used, errors in data collection bias, i.e., how questions are asked and scored, were uniform.

The term testing refers to the process of actually taking the test or filling out the survey. With a mail type survey, there is no way to protect against the participant discussing the questions with a friend or relative, thereby influencing how the participant answered the questions. Some possibility for error does exist here, as in most mail type surveys. However, again, the size of the sample has helped to buffer any testing effect.

The way in which the participants viewed the study, i.e., the attitude of subjects, may be the most likely threat to validity in this study. This threat arises when the participant knows they are part of a study and their answers are influenced due to that knowledge. In

this particular study, it is possible that individuals who may not have a desire for learning, may in fact have answered questions as though they did have that desire. This study examines a person's attitude with respect to continuing education, and the survey was sent from an educational institution (Michigan State University). A possibility for error in validity does exist since a respondent may not have wanted to state that they are adverse to continuing education when they are aware that university staff may see their response.

External Validity

Elliot (1990) identifies three types of external validity to be protected, i.e., population external validity, ecological external validity, and external validity of operations.

Population external validity relates to the sample population being representative of the population to which the findings will be generalized. The sample constructed for the mail survey was a proportional stratified random sample (Ary, et. al., 1990) of 70 percent of Michigan farmers producing over $1000 in farm receipts. Pscodna (1996) states that this list includes the majority of the farmers in Michigan, and that those not included on the list are likely to be very small farms. Therefore, population external validity should be high and generalization to the entire population of Michigan farmers should be acceptable (Ary et. al., 1990). Ary et. al, also state that factorial designs strengthen population external validity regarding interaction of subject characteristics and treatment.

Ecological external validity relates to the physical and mental environment in which the

respondent completes the questionnaire and whether this may affect the way in which the participant responds. Effects due to pre-test or post-test sensitization and interaction between history and treatment effects are eliminated since only one sampling was incorporated, i.e., no pre- and post-tests were applied. Pretest sensitization to those individuals selected for piloting the questionnaire for reliability was not a threat since those same individuals were not selected to participate in the actual survey.

Novelty and disruption effects were avoided or reduced in this study, since questionnaires were completed at the farmers residence and questions were based on the farmer's past experience or attitudes rather than an artificial treatment.

Ecological external validity was strengthened due to the use of a mail survey, since there is no environmental setting or classroom effect that is unique to one particular group. Differences in response due to the age of the respondent, level of education, etc., were intentionally examined as a part of the study. A weakness in ecological external validity could appear in reactive affect, sometimes referred to as the Hawthorne Effect, where respondents react differently when they are aware of being part of a study. Ary et. al. (1990) state that this effect can cause respondents to alter their responses as a "good subject" rather than to display their typical behavior. Krueger (1994) and Babbie (1983) also state that this type of study can lead to respondents giving socially acceptable answers. Respondents were encouraged (via the instructions in the questionnaire) to be honest in answering the questions and were told that their individual responses were

anonymous and would be kept confidential.

External validity of operations is threatened when one experimenter, interrogator, or evaluator has a different effect on the respondent, for example when one evaluator is more enthusiastic than another in the course of implementing a telephone survey or interview. This is sometimes referred to as the "experimenter effect". The use of a mail survey to all members of the sample, eliminated this threat. The telephone non-response process was conducted by 6-8 professional interviewers of MASS on a week night between the hours of 4:30 pm and 8:30 pm. After completing this telephone non-response error check, it was discovered that selected male respondents were likely still doing farm work, as a high percentage of women were answering the telephone. Therefore, the telephone survey was not used to protect for non-response error. There was no possibility for external validity of operations due to the telephone survey. Non-response error was instead tested using a comparison between early and late respondents (Miller and Smith, 1983; Elliot, 1990).

Operational definitions of the independent and dependent variables are a threat, since different farmers could have interpreted deterrents items or "educational activities" in a different way than intended in the questionnaire. Emphasis was placed on keeping deterrent items clear and concise, and in instructing the respondents as to a single meaning for the term "educational activities". Face validity activities and pre-test reliability analysis should have helped to reduce this threat.

Reducing Sampling Bias

Sampling bias is addressed below in categories of sampling error, frame error, selection, measurement, and non-response error.

Sampling Error

Sampling error is the difference between the characteristics of a sample and the characteristics of the population from which the sample is drawn (Elliot, 1990). Since the sample was taken via a proportional stratified sample of the MASS list, the possibility of a sampling error is greatly reduced (Elliot, 1990; Ary et. al., 1960). Stratification of the sample provided assurance that subgroups such as equine producers or fruit growers were represented in the sample in proportion to their numbers in the Michigan population. Randomization allowed all members of these subgroups, regarding age, gender, amount of gross farm sales, etc., to be selected. Sampling error is also a function of the sample size, with the error being larger when the sample is small. In this study, the sample size was considerably larger than recommended in the literature to achieve significance. Research shows that with a total available population of 37,000 farmers in Michigan, a sample of 380 farmers should be drawn, in order to provide a 95 percent confidence level (Krueger and Suvedi, 1996). However, a sample of 1207 farmers was taken from the total MASS list of 37,000 farmers with 466 useable questionnaires returned. This response provided sufficient numbers for the proportional stratified sample and the analyses based on the entire group response. Where tests were applied to sociodemographic groups, those with less than 30 respondents per group were not used to test the hypotheses.

Frame Error

Frame error, according to Elliot (1990), is "the discrepancy between the intended target population and the actual population from which the sample is drawn". The sample was intended to represent a cross-section of Michigan farmers. Frame error was reduced by using the MASS list, which is comprised of only Michigan farmers and is up-dated on a regular basis. The MASS list represents approximately 70 percent of Michigan farmers earning over $1000 in annual farm sales (Pscodna, 1996). This list is thought to be the most comprehensive list available in Michigan that includes farmers of all ages, all size farms, all levels of education, all levels of income, all types of primary enterprises, etc., and is not limited to those enrolled in government programs or on educational mailing lists. A tendency for bias in frame error could have occurred regarding very small farms or hobby farms, since these are the types most likely missed by MASS in developing their mailing list according to Pscodna, (1996). The Michigan Agricultural Statistics Service (MASS) provided address labels for the 1207 intended recipients identified in the sample.

As expected, some questionnaires were returned with no forwarding address. These questionnaires were returned to MASS to check for errors or up-dated mailing addresses, and then re-mailed. In total, 94 recipients could not be located, were no longer farming, or were deceased, thereby lowering the accessible sample population to 1113 potential respondents.

Selection Error

Selection bias was reduced through a proportional stratified sample, which provided all farmers on the MASS list an equal chance within their enterprise type of being selected (Ary et al, 1999). The sample was computer generated by MASS, which eliminated any chance of human intervention or bias. The random sample was taken from the entire MASS list, excluding those who were selected to complete the pilot questionnaire. The computer was programmed to select farmers on the list only once each. This guarded against any farmers having more than one opportunity to be selected due to managing more than one farming enterprise, e.g., dairy and field crops.

During the telephone survey for non-response error check, a significantly higher response by females was noted. This was likely due to the timing of the calls, which began at approximately 4:30 pm in the afternoon and continued until approximately 8:30 pm. It was not taken into consideration during the planning phase that those members of the farm family that perform the majority of farm work (males) might still be in the barn or field. Spouses (primarily females), on the other hand, were in the house preparing the evening dinner, and therefore the person more often answering the telephone. The telephone survey was taken solely for non-response error testing and dealt only with sociodemographic questions in the survey. Because this was a key frame error which could be eliminated without affecting the study, the telephone survey for non-response error check was not used and non-response error was checked using the "early-late" respondent technique (Miller and Smith, 1983; Elliot, 1990).

Measurement Error

Elliot (1990) describes measurement error as any "systematic effects which operate to bias recorded results...". This includes error due to misinterpretation of questions by the respondent, instructions for the respondent which are not clear, tendency for the respondent to give a socially-correct answer, or tendency for the respondent to lie.

Measurement error was addressed through validity and reliability tests (Dillman, 1978). To do this, a panel of MSU faculty who are familiar with testing were asked to review the questions for clarity and specificity. Next, agriculturalists who were knowledgeable of the subject matter area and who have experience working directly with farmers were asked to review the questionnaire. Last, the questionnaire was piloted with a panel of farmers to check for reliability using Cronbach's Alpha Coefficient. Questions which appeared to be confusing, ambiguous, or otherwise unusable were deleted or revised. An opportunity did exist for farmers to provide socially acceptable answers or to lie. However, to reduce this possibility for error, the survey instructions to the respondent 1) asked for honest answers, 2) stated that the respondent should not place their name on the questionnaire so as to guarantee anonymity, and 3) stated that individual survey results would be kept confidential.

Non-response Error

Non-response error was examined for any variations due to those who may not return the survey. Non-response error was tested using the early-late respondent technique (Miller

and Smith, 1983; Elliot, 1990). A threat does exist in that those individuals responding may be more biased toward the value of education than those not responding. Individuals not responding to the first item regarding participation may be those who do not normally participate in educational activities, thus biasing the results of this item. A more detailed description of the check for non-response error in this study is listed later in this chapter.

Reliability

Instrument reliability was achieved by administering a pilot test of the survey instrument to a representative sample of the population. Eleven farmers completed the pilot survey. A reliability test was performed using Cronbach's Coefficient Alpha of Homogeneity to test for consistency of the survey instrument in measuring results (Ary et. al., 1990). Pre-test reliability coefficients ranged from .8699 to .8901 with an over-all alpha coefficient of .8831. Five items were identified that, if deleted, may have slightly raised the alpha coefficient. After considering the strength of the initial over-all item alpha value along with close scrutiny of the five items, it was decided to leave the 39 deterrent items intact. Reliability was again checked after testing based on the 466 returned surveys resulting in an alpha coefficient of .9012.

Data Collection

Data collection was achieved though a mail survey to a proportional stratified sample of Michigan farmers, obtained through lists maintained by the Michigan Agricultural Statistics Service. This follows the prescribed format as stated by Dillman (1978) for mail

surveys. All target recipients received an identical questionnaire and cover letter, which were mailed on March 11, 1997. This initial letter was followed by a reminder postcard seven days later on March 18. A follow-up questionnaire and cover letter were mailed on April 1, i.e., 14 days after the postcard was sent. In each request, recipients were instructed to return the completed survey as quickly as possible, and informed that their input was important to MSU in serving the agricultural industry in Michigan. To encourage respondents to mail back the questionnaire, the instrument was designed so that the respondent could fold it in half, tape it shut, and then mail it without a postage stamp. A first class mail permit was purchased by the investigator to cover all return postage costs. The words "BUSINESS REPLY MAIL: Postage will be paid by addressee" were stamped on the folded "front" side of the questionnaire. In the upper left hand corner, the phrase "No postage necessary if mailed in the United States" was imprinted.

A third cover letter and questionnaire was not used 1) due to the cost of printing and postage, and 2) because the Michigan agricultural community is a culture that generally responds quickly or not at all. Less than positive comments written on some questionnaires by late respondents after the second mailing indicated that a third mailing of the questionnaire would not be productive. Because a large and adequate number of questionnaires had been returned at that time, a decision was made not to distribute a third cover letter and questionnaire.

Correcting for Non-response Error

To correct for non-response error, early respondent responses were compared with those of late respondents (Dillman, 1978; Miller and Smith, 1983; Elliot, 1990). The cut-off date used in determining whether a response was "early" or "late" was April 2, 1997. The final reminder letter and questionnaire were mailed on the afternoon of April 1. Mail in the United States typically requires one or more days to reach it's destination. Therefore, the earliest date that a respondent could have received the second cover letter and questionnaire in the mail was April 2. Given that a respondent could have immediately completed the survey, and mailed it back, the earliest postmark that could have appeared on a returned survey prompted by the final mailing would be April 3, 1997. Therefore, any postmark on or after April 3, 1997, was considered a "late respondent" for purposes of this study.

Several additional steps were taken to encourage response and lessen non-response error. Miller and Smith (1983), state that "The first control strategy involves getting back as many responses as possible." Based on Miller and Smith's recommendations as well as those by Dillman (1978) and Elliot (1990), a postcard reminder was sent as well as a second mailing of the questionnaire. A business reply permit was used so that respondents did not need to purchase a postage stamp. Because farmers do not live close to town or the local post office, the business reply permit allowed the farmer to complete the questionnaire and then just place it in the mailbox in front of his home or farm. The U.S. Mail service allows postal carriers to retrieve out-going mail from residential mailboxes

and transport it back to the local post office for mailing purposes.

Also according to suggestions by Miller and Smith, official Extension letterhead was used on the cover letters to increase credibility. The postcard and envelop containing the cover letter and questionnaire included an MSU return address. Also, an MSU address was used as the location where the questionnaire would be returned, i.e., on the front of the folded questionnaire. Each cover letter included an original, personal signature in blue ink to add credibility to the survey process and show personal attention. The cover letter was examined using WordPerfect Grammatik software to make sure that the text was between sixth and tenth grade reading level, as recommended for general audiences. The questionnaire was mailed during a less-busy farming season. The questionnaire cover was printed on colored paper and included a picture of a farm on the front cover. The words "Michigan Producer" were used on the questionnaire cover instead of "Michigan Farmer", as this is the more acceptable and professional term used within the farming industry. All attempts were made to keep the cover letter and questionnaire short, and the questionnaire was reduced to 79 percent of original 8.5 by 11 inch paper size.

Data Analysis

Data were compiled and analyzed using SPSS PC+ software. Each survey was examined by the investigator for valid and legible answers prior to input into the statistical software package. Any questionnaire that was 1) marked "yes" for actively involved in farming, 2) included sociodemographic data and 3) had at least one Likert scale item marked were

considered useable questionnaires. Others that did not include this information were considered unusable, with the investigator of the study making this assessment.

All computer input from questionnaires into SPSS was also performed by the investigator of the study. Each questionnaire had been pre-printed with an identification number which coincided with one person on the sample mailing list. This information was kept by MASS and not provided to the investigator to insure confidentiality. As each questionnaire was received, the identification number was entered into SPSS as an identification number under a variable labeled "ID". The identification numbers of those questionnaires received were then given to the coordinator at MASS, and those farmers were not contacted again. In addition to the imprinted questionnaire number, each questionnaire was also given a case number (in pencil) by the investigator in the same order as the responses were loaded into SPSS. For example, the first questionnaire received and loaded into SPSS was assigned the case number 001; the second questionnaire was assigned case number 002, and so on. The questionnaires were then stored for later access in the order of case number. Having an SPSS "ID" number and corresponding case number provided a method for quickly accessing stored questionnaires.

A total of 1207 questionnaires were initially mailed. Questionnaires returned due to lack of a valid mailing address were returned to MASS to re-check for errors or alternate addresses and re-mailed if possible. After all attempts were made to locate members of the sample population, it was decided that 94 members of the sample were unreachable,

either because they were no longer farming or deceased, or because no forwarding address was available. Of the 1113 potential respondents remaining, 466 useable surveys were returned resulting in a 41.9 percent response rate. These questionnaires were entered into the statistical program and analyzed. Exploratory factor analytic procedures were utilized, with a principle components analysis process employed to extract the initial factors (Guertin and Bailey, 1970; Norusis, 1992; Dunteman, 1989; Harman, 1960; Babbie, 1983). This consisted of an Orthogonal Rotation using the Varimax procedure, an analysis that reduced the 39 deterrent items in the questionnaire to a smaller number of "factors". These "factors" explain most of the variance in the larger set of 39 deterrent items. The number of factors to retain was determined using the Kaiser criterion. Factors with Eigenvalues exceeding 1.0 and having a loading weight of .40 or greater were maintained for comparisons and correlations, which was similar or identical to criteria used in other DPS analyses. Those factors retained were use for further statistical analysis.

Two open-ended questions were provided at the end of the questionnaire. Responses to the first of these two questions were included in the appendix and used for non-statistical comparisons with the data. The second open-ended question was provided so that respondents could provide thoughts or suggestions to the investigator regarding the questionnaire or the study in general. These comments did not influence the findings in the study and therefore were not included in the appendix.

CHAPTER 4

REPORT AND ANALYSIS OF THE DATA

Introduction

Chapter 4 presents the findings of this study along with a brief discussion. Included in this chapter is a demographic summary of the respondents including general deterrent descriptives, followed by the analytic results to each of the four research questions.

Demographic Summary of the Respondents

Response Rate

A total of 1207 questionnaires were initially mailed. Of these, 94 questionnaires were returned due to the farmer's relocation and lack of a new mailing address, retirement from farming, or the individual was deceased and no one was able to complete the survey at that farm. Based on the revised accessible sample population of 1113 farmers, the 466 returned questionnaires resulted in a 41.9 percent response rate. Table 3 shows a breakdown of respondents by sociodemographic group, including the number of respondents in each group and percent of total response. The agronomic culture is a male-dominated society in terms of farm ownership and on-farm jobs, although women often assume responsibilities as milking or livestock care, equipment operation, financial

record-keeping for the farm, and other various tasks during peak farming periods. Farm family members tend to carry a strong work ethic, and possess a slightly lower educational level than a more urban type population (Galbraith, 1992). Therefore it is logical that sociodemographic response to this survey is more comparable to the US Census of Agriculture for Michigan than to other populations examined in previous DPS studies.

Response by Gender

Of those responding to the questionnaire, 98.7 percent indicated their gender. Of these, 400 (87%) were male and 60 (13%) were female. Six respondents did not indicate their gender. This response rate is somewhat higher for females than the 1992 Census of Agriculture for Michigan, which shows that of 46,562 farm owners, only 7 percent were female. However, indication of gender in this study does not represent primary ownership of the farm, since identified participants in the study were encouraged to pass the questionnaire on to another individual who was "actively involved in farming" if not able or qualified to complete it. A male farmer who was quite busy or did not like surveys may have passed the question on to a female family member who was also actively involved in the farming business. The survey was not designed to be representative of primary operator gender, but to describe the educational habits of persons actively involved in farming.

Table 3. Respondents by Sociodemographic Group, Number and Percent of Total

Characteristics	N*	Valid** Percent
Gender		
Male	400	87.0
Female	60	13.0
Age		
18-24	2	0.4
25-34	30	6.5
35-44	87	18.8
45-54	132	28.6
55-64	121	26.2
65 & over	90	19.5
Level of Education (Highest Completed)		
Elementary	12	2.6
Some High School	31	6.7
High School Diploma or GED	140	30.4
Some College	86	18.7
Technical or Trade School Certification	50	10.9
2-Year College Degree	38	8.3
4-Year College Degree	36	7.8
Some College Graduate Work	25	5.4
Graduate Degree	42	9.1

Table 3. Respondents by Sociodemographic Group, Number and Percent of Total (Continued)

Characteristics	N*	Valid** Percent
Primary Farming Enterprise		
Cash Crops	165	36.3
Dairy	59	13.0
Livestock (except Equine)	88	19.3
Equine	28	6.2
Fruit	34	7.5
Vegetables	18	4.0
Nursery, Greenhouse, Etc.	32	7.0
Other	31	6.8
Annual Gross Sales		
Less Than $2500	54	13.7
$2500 - $4999	42	10.6
$5000 - $9999	30	7.6
$10,000 - $24,999	53	13.4
$25,000 - $49,999	50	12.7
$50,000 - $99,999	54	13.7
$100,000 - $249,999	67	17.0
$250,000 - $499,999	21	5.3
$500,000 or more	24	6.1

Table 3. Respondents by Sociodemographic Group, Number and Percent of Total (Continued)

Characteristics	N*	Valid** Percent
Part-Time or Full-Time Producer		
Part-Time Producer	241	52.4
Full-Time Producer	219	47.6
Off-Farm Job		
No	239	52.4
Yes	217	47.6
Number of Educational Activities Attended		
None	86	24.1
1-5 Activities	191	53.5
6-10 Activities	59	16.5
11 or more Activities	21	5.9

* Total number of respondents (N) may vary from group to group, due to missing data.
** Totals may not equal exactly 100 percent due to rounding error.

A T-test for Independent Samples (equality of means with equal variances assumed) was used to perform the non-response error check for the mail survey. The non-response error check showed no significant difference in the early and late respondents. The T-test for Independent Samples did result in a 2-tailed level of significance exactly at .05 when applied to the gender variable. Therefore, while gender will be used in this study as an indicator to summarize toward the general population of females involved in farming in Michigan, it is possible for an error to exist when using this variable.

Response by Age Category

Age categories were selected based on the 1992 Census of Agriculture. Of those responding to the questionnaire, 462 (99.1%) indicated the age category in which they fit. The breakdown included 2 (.4%) of the respondents in the 18-24 years category, 30 (6.5%) were ages 25-34, 87 (18.8) were ages 35-44, 132 (28.6%) were ages 45-54, 121 (26.2%) were ages 55-64, and 90 (19.5) were age 65 or over. This is very similar to the percentage breakdown shown in the Census of Agriculture for Michigan, i.e., 1.3 percent, 9.9 percent, 21.9 percent, 24.2 percent, 21.7 percent, and 20.9 percent respectively for the same age groups. These results strengthen the ability to generalize the results of this study to the general population of Michigan farmers.

Response by Farm Size in Acreage

Farm size ranged from 0.0 acres to 6000 acres. Only one individual indicated he was actively farming on 0.0 acreage. This person was involved in bee-keeping and it is

assumed that the hives were either placed in another person's orchards, clover fields, etc., or that the hives were located on his/her own property which was less than 1 acre.

A total of 443 (95.1%) individuals responded to this question. Some of those did not indicate the acreage, while others chose to complete the square footage (greenhouse) item instead. Some respondents indicated both acreage and square footage. According to the analysis, the average farm size in acres in the study was 290.04 acres with a standard error of the mean of 21.41 acres. This value is higher than the 1992 Census of Agriculture (1992) which indicates the average farm size in Michigan as 217 acres. However, this figure is not widely different from the 1992 state average, and specialists at the Michigan Agricultural Statistics Service have stated that their list may omit smaller farms where the operators may not have identified themselves as "agricultural producers" or "farmers" (Pscodna, 1996). Also, the 1997 Census of Agriculture is underway and it is expected that average farm size will increase from that reported in the 1992 Census. Therefore, it appears that farm size may provide a reasonable base for generalizing data, when used with a co-variable. Number of acres (farm size) carries little meaning for this study without relating it to enterprise type. Therefore, this variable was not used in further analysis for this study, but was retained for any future analyses of the data.

Response by Farm Size in Square Feet

This item was provided for those producers operating greenhouses or nurseries where facilities or land are measured in square footage, rather than acreage. Of the 466 surveys

returned, 32 (6.8 %) respondents indicated farm size by square footage, and size of operation ranged from 336 to 300,000 square feet. The 1992 Census of Agriculture shows that in Michigan, about 4 percent of farms are involved in greenhouse and nursery. The sample response as a percentage exceeded the Census values, however due to the small number of respondents combined with a wide range in farm size based on square footage, this sociodemographic criterion was not used further in statistical analysis.

Response by Level of Education

Of the 466 respondents to the mail survey, 460 (98.7%) indicated their highest level of education completed while 6 respondents did not complete this item. Categories used in this item of the questionnaire were developed by the investigator to best represent succinct and easily recognized categories that respondents could identify with. Education level ranged throughout each category, i.e., from elementary level to those holding a college graduate degree. Statistical mean for this group was 4.67 or in the category indicating "some college", while the mode placed most respondents in the category of "high school diploma or GED". Of the respondents, 12 (2.6%) indicated they had completed elementary school, 31 (6.7%) had completed "some high school", 140 (30.4%) held a high school diploma or GED, 86 (18.7%) had completed "some college", 50 (10.9%) had completed technical or trade school certification, 38 (8.3%) had completed a 2-year college degree, 36 (7.8%) had completed a 4-year degree, 25 (5.4%) had completed some college graduate work, and 42 (9.1%) had completed a graduate degree.

It is interesting to note that 39.8 percent of farmers responding to the survey held the equivalent of a high school diploma or less, while 60.2 percent had continued their education beyond high school. It is possible that those with higher levels of education were more prone to respond to a survey dealing with an educational theme. Regardless, the number of respondents who had attended trade school or college reflects that farmers are not an uneducated group. Hobbs (1992) states that "rural communities lag behind in the proportion of college graduates and in occupations requiring higher levels of education and training." He also states that those having higher educational credentials often leave rural communities to seek jobs which offer "a good return on their education." Therefore, it is expected that educational levels of the farm audience may appear slightly lower than their urban and suburban counterparts.

Response by Primary Enterprise Type

Respondents represented all categories offered in the questionnaire with 455 of 466 responding (97.6%). Categories were determined after reviewing those listed in the 1992 Census of Agriculture and after visiting with Michigan Agricultural Statistics Staff. The categories selected appeared to best reflect the major agricultural industries in Michigan. The proportional stratified random sample was based on percentages of farm type in the MASS mailing list. Respondents to the "Other" category included producers of honey, wood lots, Christmas trees, and all other agricultural commodities which did not fall into the other seven enterprise groups. Farmers who were enrolled the USDA Conservation Reserve Program (CRP) were also included in this category. Although one could argue

that CRP is not "actively" farming, the owner is receiving income from farmland for intentionally keeping it out of production. Therefore, a farmer earning CRP income was included as a valid respondent who was "actively" farming, and when determining farming enterprise type.

Of those who responded to the primary enterprise item, 165 (36.3%) produced cash crops, 59 (13.0%) were dairy producers, 88 (19.3%) raised livestock not including equine, 28 (6.2%) raised equine, 34 (7.5%) were fruit producers, 18 (4.0%) produced vegetables, 32 (7.0%) listed greenhouse and nursery, etc., and the remaining 31 (6.8%) respondents selected "other", as described in the preceding paragraph.. The number of questionnaires mailed and received are listed in Table 4. Response rates by percentage were similar in proportion to the demographic breakdown in the Census of Agriculture which helps to support the generalization of the results to Michigan farmers.

Response by Annual Gross Farm Sales

Interval amounts for the "farm sales" item were taken from the 1992 Census of Agriculture. Of the 466 respondents to the questionnaire, 395 (84.8%) responses were received, even though this item was listed as "optional". It was expected that some respondents might not like to reveal their farm income. Thus in order to encourage completion of the questionnaire, this item was indicated as an "optional" item. Each of the farm sales amounts in this item drew responses. Of the 395 individuals responding, 54 (13.7%) indicated that their average annual farm sales was less than $2500 per year, 42

Table 4. Number and Percent of Questionnaires Mailed and Received by Enterprise Type*

Enterprise Type	Number of Questionnaires Mailed	Percent Mailed	Number of Questionnaires Received	Percent Received
Cash Crops	601	49.8	165	36.3
Dairy	148	12.3	59	13.0
Livestock (Exc. Equine)	135	11.2	88	19.3
Equine	61	5.1	28	6.2
Fruit	73	6.0	34	7.5
Vegetables	42	3.5	18	4.0
Nursery, Greenhouse, etc.	76	6.3	32	7.0
Other	71	5.9	31	6.8
Total	1207	100	455**	100

* Percentage totals may not exactly equal 100 percent due to rounding error.
** Of the 466 respondents, 455 indicated their primary enterprise.

(10.6%) had farm sales of $2500-$4999, 30 (7.6%) had farm sales of $5000-$9999, 53 (13.4%) had farm sales of $10,000-$24,999, 50 (12.7%) had farm sales of $25,000-49,999, 54 (13.7%) had farm sales of $50,000-99,999, 67 (17%) had farm sales of $100,000-249,999, 21 (5.3%) had farm sales of $250,000-499,999, and 24 (6.1%) had farm sales of $500,000 or more per year.

Response Based on Farming Status

Of the 466 respondents to the questionnaire, 460 (98.7%) respondents completed this item. Part-time producers out-numbered full-time producers slightly in this study. Of

those responding, 241 (52.4%) indicated that they were "part-time producers", while the remaining 219 (47.6%) stated that they were farming "full-time". It should be noted that part-time farming status does not necessarily reflect that the farmer held an off-farm job. Some respondents were semi-retired but still operating a farm. Some respondents indicated that they farm full-time, while still holding an off-farm job. It is interesting to note that the percentages of part-time and full-time farmers appear to be similar to the percentages in the next item regarding farmers having or not having an off-farm job.

Response Based on Off-Farm Employment

This item collected demographic information related to producer respondents holding, or not holding, an off-farm job. Of the 466 total respondents to the questionnaire, 456 (97.9%) responded to this item. Those producers not employed off of the farm slightly out-numbered those with off-farm jobs. Of those who responded to this item, 239 (52.4%) indicated that they did not have an off-farm job, while 217 (47.6%) stated that they did have an off-farm job. There were a few questions that arose under this item related to seed sales from the farm, and whether this was considered off-farm employment. Some producers, especially those with larger farms serve as "seed dealers", i.e., they serve as a distribution point for agronomic seed companies. These producers typically keep the income from sales or commission separately from the farm business. However, since the income was still derived from the farm facilities, i.e., farm buildings and vehicles used to store and transport crop seed, etc., an additional job such as a seed dealer was not considered as an off-farm job.

Participation Behavior

The first item in the questionnaire asked the respondent how many educational activities he or she had attended in the past 12 months. Of the 466 respondents, 357 completed this question while 109 did not, i.e., a 76.6 response rate. The lower response to this item may have been due to the questionnaire structure, which did not number the first question and thus it may have been overlooked by respondents. However, the validity tests did not indicate this as a potential problem. More likely, the lower response to this item was due to the social context of the question, i.e., that the U.S. culture places a high value on education and the desire to learn. Individuals who did not attend any educational activities may have felt it less embarrassing to skip this question than to appear as societal non-conformists (Krueger, 1994).

Of the 357 individuals responding to this question, 86 (24.1 percent) indicated that they had not attended an educational program during the past twelve months. Of the remaining respondents, 191 (53.5 percent) had attended 1 to 5 educational activities, 59 (16.5 percent) had attended 6 to 10 activities, and 21 (5.9 percent) had attended 11 or more educational activities. In other words, approximately one-fourth of the respondents to this question had not attended an educational activity during the past year, while three-fourths had participated, i.e., a three-to-one ratio. The item mean, median, and mode scores for the respondents were 2.04, 2.00 and 2 respectively, thereby reflecting the category of "1 to 5 activities" attended. This is somewhat similar to the findings of Tough (1971), who stated that the average person participates in eight learning projects and that in one study,

98 percent of the audience surveyed indicated that they had participated in at least one learning project during the past year. It is interesting to note that this participation and non-participation rate found in the DPS-F was almost identical to that found by Scanlan (1982) in the original study using DPS. That study showed that 24.4 percent of the respondents had not participated in an educational activity in the past 12 months preceding the study, versus 24.1 percent found in the DPS-F study. Tough's (1971) studies have shown that the amount of time spent in learning projects varies with type of job, social class, gender, age, and educational level.

Objective #1: Development of The DPS-F Instrument

Objective # 1 called for the development of a reliable and valid DPS instrument that could identify farmers' deterrents to participation in educational programs, i.e., the Deterrent to Participation Scale for Farmers (DPS-F). After face validity and reliability of the pilot instrument appeared satisfactory, the questionnaire was mailed to farmers and the results were analyzed. The 39 Likert style deterrent items in the questionnaire were analyzed and ranked according to mean score and standard deviation (Table 5). Item means range from 1.32 to 3.5, while the overall item mean score was 2.29. The over-all scale mean for the DPS-F was 89.3. The inter-item correlation mean was .199. Reliability remained high for the 39 items resulting in alpha = .90. These scores are similar to those found in the original DPS and DPS-G studies.

Of the first ten ranked items, all can be identified as institutional or situational barriers to

Table 5. Deterrent Items by Rank, Mean Scores and Standard Deviation

Rank	Item No.	Deterrent Item	Mean	S.D.
1	1.	Because the activity was offered during a busy time of year....	3.50	1.33
2	9.	Because the activity was offered at an inconvenient location....	3.35	1.38
3	13.	Because of the amount of time required to attend all of the sessions....	3.14	1.32
4	14.	Because the activity was scheduled at an inconvenient time of day....	3.10	1.42
5	4.	Because the farm or business comes first and I didn't think I should be gone....	3.02	1.41
6	23.	Because the available activity did not seem useful or practical....	2.86	1.44
7	3.	Because there was no one at the farm or business who could cover for me....	2.86	1.54
8	8.	Because the activity that was offered did not seem interesting enough....	2.85	1.31
9	22.	Because I didn't receive enough information about the activity ahead of time...	2.80	1.34
10	7.	Because pre-registration was required and I didn't want to make a commitment that far in advance....	2.75	1.33
11	30.	Because I didn't think the activity would meet my needs....	2.66	1.39
12	2.	Because the activity schedule conflicted with my off-farm job....	2.63	1.65
13	39.	Because I didn't find out about the activity far enough in advance to make plans....	2.63	1.45
14	34.	Because the activity was not offered when I needed the information....	2.57	1.38

Table 5. Deterrent Items by Rank, Mean Scores and Standard Deviation (Continued)

Rank	Item No.	Deterrent Item	Mean	S.D.
15	12.	Because I didn't know about educational activities available on this topic....	2.51	1.35
16	25.	Because a last-minute conflict arose that prevented me from attending....	2.45	1.42
17	32.	Because I did not feel that the activity was worth the fee for attending....	2.45	1.38
18	6.	Because I wanted to learn something specific but the activity was too general...	2.42	1.26
19	21.	Because my participation would take away time from my family....	2.35	1.31
20	5.	Because there were too many activities were offered at the time to attend all of them....	2.32	1.32
21	28.	Because the activity was not on the right level for me....	2.24	1.30
22	16.	Because I prefer to learn through other methods such as reading, radio, etc....	2.16	1.25
23	17.	Because I thought that the activity available would be of poor quality....	2.14	1.29
24	10.	Because I couldn't afford the registration or activity fees....	2.13	1.34
25	24.	Because I wasn't willing to give up my leisure time....	2.03	1.24
26	27.	Because I could afford miscellaneous expenses like travel, meals, etc....	2.01	1.28
27	37.	Because I was not willing to pay the cost of the registration....	1.98	1.27
28	19.	Because of conflicts with my children's activities....	1.98	1.34
29	36.	Because I prefer to learn on my own....	1.94	1.22

Table 5. Deterrent Items by Rank, Mean Scores and Standard Deviation (Continued)

Rank	Item No.	Deterrent Item	Mean	S.D.
30	29.	Because the activity conflicted with my civic or community duties....	1.89	2.31
31	20.	Because I'm not that interested in attending educational activities....	1.84	1.17
32	26.	Because I felt unprepared for the activity....	1.77	1.06
33	33.	Because I lacked the energy to attend....	1.76	1.11
34	11.	Because I felt I was too old to participate in the activity....	1.76	1.20
35	35.	Because no one I knew was planning to attend....	1.76	1.10
36	18.	Because I was not confident of my learning ability....	1.64	1.10
37	15.	Because my family did not encourage my participation....	1.60	.98
38	31.	Because I do not read or write well enough to feel comfortable participating....	1.39	.93
39	38.	Because my friends did not encourage my participation....	1.32	.72

participation which supports the typology presented by Cross (1981) and assists in confirming the validity of the instrument.

Prior to performing the factor analysis (Orthogonal Rotation), Bartlett's Test of Sphericity and the Kaiser-Meyer Olkin Measure of Sampling Adequacy were computed to see if the results were suitable for factorial analysis. Bartlett's Test gave a chi square of 5940.31 with significance = .00000, while the Kaiser-Meyer Olkin Measure gave a score of .869. According to Norusis (1992), a factorial model is appropriate when high values occur in the Kaiser-Meyer Olkin Measure (near 1.0), and when high values in the Bartlett's Test correspond with low significance values. Therefore, it was appropriate to perform an Orthogonal Rotation on the 39 deterrent items in the questionnaire to identify principal components (Dunteman 1989; Babbie, 1983; Guertin and Bailey, 1970; Harman, 1960).

Using the Varimax Procedure with Eigenvalues accepted at 1.0 or greater, 10 solutions were originally extracted with loading weights fixed at .40 or higher to define the solutions. The 10-factor solution explained 62 percent of the variance. However, to arrive at a more parsimonious solution, rotations were performed to identify 5, 6, 7, 8, and 9-factor solutions. After intensive comparison and scrutiny, the 6-factor solution appeared to provide the most meaningful representation of the data for further analysis. The six factors accounted for 50.523 percent of the explained variance. In this solution, 4 of the 39 items loaded on more than one factor. One item which loaded exactly at the .40 level and was retained in order to benefit reliability within that factor group. Two items

that did not load under any factor were omitted in the final solution. After careful inspection, labels were assigned to each factor while considering previous factor labels described in other DPS studies by Scanlan and Darkenwald (1984), Darkenwald and Valentine (1985), Davis (1988), Weischadle (1988), and Martindale and Drake (1989). The DPS-F factors in order of percent of explained variance were Lack of Course Relevance, Lack of Confidence, Time Constraints, Low Personal Priority, Scheduling Conflicts, and Cost (Tables 6-11).

The first factor, Lack of Course Relevance (Table 6), included eight items related to the educational activity lacking personal value to the respondent either due to program content or that it was not offered at a time when the farmer needed it. This factor label had been also used by Darkenwald and Valentine (1985) and Martindale and Drake (1989), and included similar scale items in their factor sets. In fact, six of the eight items in the DPS-F study, were identical to those found in both the Darkenwald and Valentine (1985) study, and the Martindale and Drake (1989) study. In addition, the first and second items respectively, in the DPS-F findings, "Because I didn't think the [activity] would meet my needs" and "Because the available [activity] did not seem useful or practical", were also ranked one and two in the Martindale and Drake (1989) study. One item, "Because I did not feel the activity was worth the fee for attending", loaded on both Factor 1 of the DPS-F and on the sixth DPS-F factor labeled Cost. Loading values dictated that this item be associated with Factor 1, i.e, Lack of Course Relevance. This item appeared to have more to do with farmers not valuing the educational activity's

Table 6. Variable Loadings, Item Means, and Scale Ranks: Factor 1 - Lack of Course Relevance

Variable (Item)	Loading Value	Item Mean	Scale Rank
Because I didn't think the activity would meet my needs.	.808	3.50	11
Because the available activity did not seem useful or practical.	.804	2.86	6
Because I thought the activity available would be of poor quality.	.689	2.14	23
Because the activity that was offered did not seem interesting enough.	.660	2.85	8
Because the activity was not on the right level for me.	.608	2.24	21
Because I did not feel that the activity was worth the fee for attending.	.608	2.45	17
Because I wanted to learn something specific but the activity was too general.	.548	2.42	18
Because the activity was not offered when I needed the information.	.468	2.57	14

Table 7. Variable Loadings, Item Means, and Scale Ranks: Factor 2 - Lack of Confidence

Variable (Item)	Loading Value	Item Mean	Scale Rank
Because I was not confident of my learning ability.	.739	1.64	36
Because I do not read or write well enough to feel comfortable participating.	.657	1.39	38
Because I felt unprepared for the activity.	.619	1.77	32
Because I felt I was too old to participate in the activity	.604	1.76	34
Because my family did not encourage my participation.	.585	1.60	37
Because my friends did not encourage my participation.	.541	1.32	39
Because no one I knew was planning to attend.	.533	1.76	35

Table 8. Variable Loadings, Item Means, and Scale Ranks: Factor 3 - Time Constraints

Variable (Item)	Loading Value	Item Mean	Scale Rank
Because the farm or business comes first and I didn't think I should be gone.	.792	3.02	5
Because there was no one at the farm or business who could cover for me.	. 763	2.86	7
Because the activity was offered during a busy time of year.	. 592	3.50	1
Because the activity was offered at an inconvenient location.	.499	2.91	9
Because of the amount of time required to attend all of the sessions.	.473	3.14	3
Because there were too many activities offered at the time to attend all of them.	.459	2.32	20
Because pre-registration was required and I didn't want to make a commitment that far in advance.	.400	2.75	10

Table 9. Variable Loadings, Item Means, and Scale Ranks: Factor 4 - Low Personal Priority

Variable (Item)	Loading Value	Item Mean	Scale Rank
Because I prefer to learn on my own.	.757	1.94	29
Because I prefer to learn through other methods such as reading, radio, etc..	.682	2.16	22
Because I wasn't willing to give up my leisure time.	.629	2.03	25
Because my participation would take away time from my family.	.549	2.35	19
Because I'm not that interested in attending educational activities.	.487	1.84	31
Because I lacked the energy to attend.	.472	1.76	34

Table 10. Variable Loadings, Item Means, and Scale Ranks: Factor 5 - Scheduling Constraints

Variable (Item)	Loading Value	Item Mean	Scale Rank
Because the activity schedule conflicted with my off-farm job.	.633	2.63	12
Because I didn't find out about the activity far enough in advance to make plans.	.570	2.63	13
Because of conflicts with my children's activities.	.556	1.98	28
Because I didn't receive enough information about the activity ahead of time.	.547	2.80	9
Because the activity was scheduled at an inconvenient time of day.	.429	3.10	4
Because I didn't know about educational activities available on this topic.	.440	2.51	15

Table 11. Variable Loadings, Item Means, and Scale Ranks: Factor 6 - Cost

Variable (Item)	Loading Value	Item Mean	Scale Rank
Because I was not willing to pay the cost of the registration.	.819	1.98	27
Because I couldn't afford the registration or activity fees.	.802	2.13	24
Because I couldn't afford miscellaneous expenses like travel, meals, etc..	.787	2.01	26

relevance to their needs (willingness to pay for it), than a problem of the activity not being affordable (ability to pay for it). A second item, "Because the activity was not offered when I needed the information" also loaded on Factor 1 and on Factor 5, Scheduling Constraints. However, the item loaded more heavily under Factor 1, and the aspect of program relevance seemed to be a more appropriate fit than conflict with farmers' schedules. Therefore, this item was also included under Lack of Course Relevance. Factor 1, accounted for 11.7 percent of the total explained variance, with loading weights ranging from .808 to .468. Item-total reliability was alpha = .8591 for the factor group.

Factor 2 identified by the analysis was termed "Lack of Confidence", which had also been identified in previous DPS studies (Darkenwald and Valentine, 1985; and Martindale and

Drake, 1989). Seven items, shown in Table 7, were included in this factor group with loading weights ranging from .739 to .533. Identified deterrents related to the farmer not feeling prepared, feeling too old to participate, not receiving encouragement from family and/or friends to attend, etc.. The item, "Because I was not confident of my learning ability" appeared as the most important item in the DPS-F results, and in both the Darkenwald and Valentine study and the Martindale and Drake study, based on loading values within the factor group. Five of the items appearing in the DPS-F study also appeared in the Darkenwald and Valentine (1985) study. One new item added to the DPS-F study, i.e., "Because I do not read or write well enough to feel comfortable participating", emerged as the second highest loading item in this factor. This item was developed and added during the DPS-F focus group input sessions with Michigan producers, and helps confirm the importance of focus group input and the validity of the instrument. The strong similarities in item content within the factor group to other DPS studies led to the assignment of the label, Lack of Confidence. The item "Because I'm not that interested in attending educational activities" loaded on both Factor 2, Lack of Confidence and Factor 4, Low Personal Priority. After reviewing respective loading weights and the general meaning of the deterrent item, it was retained under Factor 4, Low Personal Priority. Factor 2 accounted for 9.102 percent of the total explained variance, with an item-total reliability for the group of alpha = .7834.

Factor 3 was labeled Time Constraints (Table 8). This factor label is identical to that used in four previous DPS studies (Darkenwald and Valentine, 1985; Davis, 1988; Weischadle,

1988; and Martindale and Drake, 1989) and relates to the farmers' inability to attend due to time limitations. Seven items loaded under this component with loading weights ranging from .792 to .400. The highest loading item, "Because the farm or business comes first and I didn't think I should be gone", was a new item added to the DPS-F based on focus group input, again confirming the importance of focus group input and the validity of the instrument. Other items dealt with the time required to attend all of the sessions, the activity being held during a busy time of year or inconvenient time of day, etc.. Another new item added to the DPS-F, "Because there were too many activities offered at the time to attend all of them", emerged in this factor set. The item, "Because pre-registration was required and I didn't want to make a commitment that far in advance" loaded exactly at the .40 level in this factor group, and was retained to benefit the alpha score. One item, "Because the activity was scheduled at an inconvenient time of day" loaded on both Factor 3, Time Constraints, and under Factor 5, Scheduling Constraints. This item appeared to be a better fit under Scheduling Constraints since it dealt more with conflicts of schedules than the farmer having the time to participate. After comparing item-total reliability using both scenarios, a decision was made to place this item under Factor 5, Scheduling Constraints. The item, "Because a last-minute conflict arose that prevented me from attending" appeared under Factor 3, Time Constraints however, this item scored below the required loading weight of .40 and therefore was omitted from the results. Item-total reliability for Factor 3 was alpha = .7613, with a total explained variance of 8.598 percent for the factor group.

Factor 4 was labeled "Low Personal Priority". This factor group, shown in Table 9, included six deterrent items with loading weights ranging from .757 to .472. This principal component included items such as "Because I prefer to learn on my own", "Because I lacked the energy to attend", "Because I wasn't willing to give up my leisure time", etc.. This factor group was most similar to Darkenwald and Valentine's factor group titled "Low Personal Priority", but contained two items respectively in both Martindale and Drake's factor group labeled "Lack of Interest" and Scanlan and Darkenwald's factor group labeled "Disengagement". Because there was a closer match with Darkenwald and Valentine's factor group, and because all of the items loading under this factor can be attributed to a decision based on "low personal priority", that label was assigned to the component. The item "Because I'm not that interested in attending educational activities loaded on both Factor 2, Lack of Confidence and Factor 4, Low Personal Priority. After reviewing respective loading weights and the general meaning of the deterrent item, it was retained under Factor 4. Factor 4 accounted for 7.587 percent of the total explained variance, with a item-total reliability of alpha = .7494.

Factor 5 dealt with the issue of conflicts between the farmers schedule or commitments and the inability to participate. Five deterrent items loaded under this factor with weights ranging from .633 to .440 (Table 10). Items such as conflict with an off-farm job or children's activities, and not finding out about the program in time, provided the focus for this component. As a result Factor 5 was labeled "Scheduling Constraints". There appears to be a "situational" or "institutional" theme as the foundation for this factor

group. Inability to attend is not controlled by the farmer but is based on his situation at the time the program was offered or announced. Weischadle (1988) also used the label Scheduling Constraints in her results, although the items loading under the DPS-F group appeared to be an even better fit for the label than some of those found in her study. Of the five DPS-F items loading, four of them are identical or directly related to items in Weischadle's findings. The fifth item, "Because of conflicts with my children's activities" was not included in Weischadle's findings but is clearly an issue of schedule conflicts and fits well in this group. As stated under Factor 3 above, one item, "Because the activity was scheduled at an inconvenient time of day" loaded on both Factor 3, Time Constraints and under Factor 5, Scheduling Constraints. A comparison of item-total reliability using both scenarios, as well as "apparent fit", showed that this item should be placed under Factor 5. One item, "Because the activity conflicted with my civic or community duties" was extracted under Factor 5, however it did not attain the required .40 loading criterion and was omitted from the results. Explained variance for Factor 5 was 6.812 percent of the total explained variance, while item-total reliability for the group was alpha = .6904.

The final factor set, Factor 6, was labeled Cost. Three items loaded under this component with each item referring to the ability or desire to pay for the activity. Loading weights of the deterrent items in this component ranged from .819 to .787 (Table 11). These included "Because I was not willing to pay the cost of registration", "Because I couldn't afford the registration or activity fees", and "Because I couldn't afford miscellaneous expenses like travel, meals, etc.". This "Cost" factor group emerged in all five previous

DPS studies surfacing either in the third, forth, or fifth order of importance based on amount of explained variance. Cross (1981) stated that having the ability to pay is not the same as having the willingness to pay. The second and third items loading in this component clearly reflect an issue of "ability to pay". The first and heaviest loading item "Because I was not willing to pay the cost of the registration" could be seen as a determination that the activity was not valued enough for it's relevance to warrant paying the registration; or it might instead be a statement by the farmer that he could not afford to pay for educational meetings as long as the information is available elsewhere at less cost. This item did not load on Factor 1, Lack of Course Relevance, and therefore it is assumed that "cost" of the activity in this factor is more related to inability to pay and therefore was a satisfactory fit for the Cost factor. Another cost-related item, "Because I did not feel that the activity was worth the fee for attending" loaded both under Factor 1, Lack of Course Relevance and Factor 6, Cost. This item loaded more heavily on Factor 1, and it clearly reflected that the farmer might have paid a fee if the activity would have been "worth" the fee being charged. Therefore, that item was included in Factor 1 to match the best fit for the two components. Explained variance for Factor 6 was 6.710 percent of total explained variance, while item-total reliability was alpha = 8330.

In summary, the six factors that emerged from the Orthogonal Rotation appeared to be parsimonious, and provide support to the validity of the instrument in its ability to identify relevant deterrents for farmers. In addition, alpha coefficients of reliability for total item scores and for factor item scores were acceptable and similar to other DPS scales,

particularly the DPS-G which was used as the primary template. Table 12 lists the resulting six factors by label in order of explained variance and cumulative variance.

Table 12. Deterrent Factors in Order of Importance by Explained Variance and Cumulative Variance

FACTOR NUMBER	FACTOR LABEL	EXPLAINED VARIANCE	CUMULATIVE VARIANCE
1	Lack of Course Relevance	11.715	11.715
2	Lack of Confidence	9.102	20.817
3	Time Constraints	8.598	29.415
4	Low Personal Priority	7.587	37.002
5	Scheduling Constraints	6.812	43.814
6	Cost	6.710	50.523

Research Question #1: Factor Differentiation

Research Question #1 calls for a comparison of the six factors identified by Orthogonal Rotation, to determine if they are statistically distinct and separate source variables. A General Linear Model was applied using a Repeated Measures test, with the deterrent factors serving as the dependent variables and within-subject factors. Mean scores and standard deviations of the six factors are listed in Table 13. A multivariate analysis showed that Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root tests all resulted in a significant difference between the means of the six factors at $p <$

.001. Therefore, statistical analysis does demonstrate that a significant difference does exist between the six factor mean scores. These results provide statistical evidence that the six source variables (factors) identified through Orthogonal Rotation are distinct and separate, and may be used to further analyze the data with respect to the deterrent factors.

Table 13. Repeated Measures Test to Compare Factor Scores*

FACTOR**	MEAN	S.D.	N
3-Time Constraints	2.9996	.8821	446
5-Scheduling Constraints	2.4999	.9241	446
1-Lack of Course Relevance	2.4640	.9527	446
6-Cost	2.0419	1.1239	446
4-Low Personal Priority	2.0097	.8247	446
2- Lack of Confidence	1.6070	.6972	446

* $p < .001$

**Factors are listed in order of mean score rather than factor identification number.

Research Question 2: Deterrent Factors And Sociodemographic Variables

Correlations for Factors and Sociodemographics

Research Question 2 asked whether deterrent factors varied in type and importance with varying sociodemographic variables. In order to address the question, the six source factors were first correlated with sociodemographic variables using Pearson Correlation Coefficient (r) calculations. Although a Spearman Rank-Order analysis is typically used to compare relationships between dichotomous category-type variables (Elliot, 1991), a Pearson analysis can be substituted if resulting values are essentially the same. A sample

test between the strongest correlating variables, i.e, between Scheduling Constraints and Off-farm Job yielded correlations of $r = .334$ ($p < .01$) for the Pearson Correlation and $r = .340$ ($p < .01$) for the Spearman non-parametric correlation. The two processes resulted in similar values and therefore, the Pearson Correlation was used for analyzing preliminary relationships between the factors and sociodemographic variables. This analysis was used only as an indicator for further ANOVA tests. Primary enterprise (commodity type) was not used in the correlation due to it's nature as a multi-categorical variable. Table 14 depicts the resulting correlations.

The sociodemographic variable, gender, correlated negatively with Low Personal Priority and positively with Cost. A positive relationship was shown between age and Lack of Confidence, while Time Constraints and Scheduling Constraints resulted in a negative relationship with age. A negative relationship occurred between level of education and Low Personal Priority. Annual gross sales correlated positively with Lack of Course Relevance and Time Constraints, and negatively with Low Personal Priority and Schedule Constraints. Farming status (part-time versus full-time) showed a positive correlation with Time Constraints and a negative correlation with Low Personal Priority and Scheduling Constraints. Holding an off-farm job correlated negatively with Lack of Confidence and positively with Scheduling Constraints.

The strongest correlation occurred between Factor 5, Scheduling Constraints and holding an off-farm job with a Pearson r-value of .334 ($p < .01$), i.e, a moderate association

Table 14. Correlations Between Source Factor Scores and Sociodemographic Variables

Socio-Demographic Variables	Source Factors 1 Lack of Course Relevance	2 Lack of Confidence	3 Time Constraints	4 Low Personal Priority	5 Scheduling Constraints	6 Cost
Gender	-.022	-.045	-.033	-.114*	-.036	.160**
Age	.011	.201**	-.107*	.072	-.109*	.003
Level of Education	-.015	-.205**	-.042	-.115*	.035	-.029
Annual Gross Sales	.146**	-.090	.226**	-.122*	-.154**	-.052
Part-time or Full-time	.036	-.040	.188**	-.129**	-.213**	.016
Off-Farm Job	-.016	-.145**	-.002	-.015	.334**	-.034

*p < .05 **p < .01

(Elliot, 1991). Annual gross sales correlated significantly with four factors. In three of these four correlations, significance appeared at $p < .01$.

ANOVA's for Factors And Sociodemographics

One-Way Analysis of Variance was applied to test differences in the type and importance of the six deterrent factors, based on sociodemographic groups where significant Pearson r correlations appeared. Tukey's Honestly Significant Difference (HSD) test provided post hoc range tests and pairwise multiple comparisons where categories within the sociodemographic variable numbered more than two. Each deterrent factor served as a separate dependent variable. Where mean scores indicated a difference of .5 or greater, the difference was stated to be both "significant and meaningful".

Two of the sociodemographic variables having eight or nine categories, were transformed by condensing categories into fewer logical groups before the ANOVA was applied. Level of Education was reduced from nine categories to four, i.e., holding less than a high school diploma, holding a high school diploma, at least some post-secondary education, and 4-year college degree or beyond. Annual gross sales was also reduced from nine categories to three, i.e, $9,999 or less per year, $10,000 to $99,999 per year, and $100,000 or more per year. Number of acres was not used in the comparisons because the "number of acres" on a farm does not reflect level of income, level of management required, etc., and thus it is difficult to interpret the outcomes. For example, a farmer with muck vegetables may be an intensive, full time farmer with only 30 acres, while a cash

crop farmer could not sustain full-time employment or a livelihood on only 30 acres.

Only two farmers in the youngest category (18-24) responded to the questionnaire. Elliot (1991) stated that a sample is unbiased when N is equal to or greater than 25, therefore the 18-24 and 25-34 age categories were combined for further analysis with n = 32. The remaining four categories were left unchanged.

Results of ANOVA: Lack of Course Relevance

Factor 1, Lack of Course Relevance demonstrated a low but positive association with annual gross sales at $r = .146$ ($p < .01$). The trend appearing in the data suggests that course relevance becomes more important as annual gross sales increases. This appears to be logical, since with increasing sales comes increasing time spent in managing the farm operation. Time would likely be less available and those who would attend educational activities may put more emphasis on attending only those activities that were most relevant to their needs. However, analysis of variance (Table 15) showed that while a pattern exists, there was no significant nor meaningful difference between the three income groups ($p = .066$). No other sociodemographic group displayed a significant correlation with this factor.

Table 15. Summary of ANOVA: Lack of Course Relevance and Annual Gross Sales*

Annual Gross Sales	Mean	S.D.	N
$9,999 or less	2.3202	.9520	117
$10,000 - $99,999	2.5279	.9516	152
$100,000 or more	2.5964	.9070	110
Total	2.4837	.9433	379

*ANOVA did not show a significant difference at $p < .05$

Results of ANOVA: Lack of Confidence

Factor 2, Lack of Confidence demonstrated a significant but low association with age at $r = .201$ ($p < .01$), level of education with $r = -.205$ ($p < .01$), and holding or not holding an off-farm job with $r = -.145$ ($p < .01$).

When an analysis of variance was applied to Lack of Confidence and the age categories, the significance between groups resulted in $p < .001$ (Table 16). Lack of Confidence was compared with the means of the six age groups using Tukey's HSD test. A significant difference was seen in the importance of confidence as a deterrent between those ages 65 and over with those in the 18-34 year old category ($p < .05$), and the 35-44 category ($p < .05$). A significant difference was also seen between the 45-54 category and the 55-64 age group ($p < .001$). While each was significant, the only meaningful differneces were between the 18-34 age group and 65 and over age group, and between the 45-54 age group and 65 and over age group.

Table 16. Summary of ANOVA: Lack of Confidence and Age

Age	Mean	S.D.	N
18-34	1.5144	.4806	32
35-44	1.5567	.5694	87
45-54	1.4740	.6441	132
55-64	1.7486	.9003	117
65 and over	2.0146	1.0523	85
Total	1.6651	.8067	453

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.768	4	4.442	7.200	.000
Within Groups	276.408	448	.617		
Total	294.176	452			

An analysis of variance was applied to Lack of Confidence and level of education (Table 17). Examining mean scores, a trend does appear in the data showing a general increase in Lack of Confidence as a deterrent as the level of education decreases. This would be expected and compares with findings by Darkenwald and Merriam (1982). However, while the correlation showed a low association i.e., $r = -.205$ ($p < .001$), significant but not meaningful differences appeared in the ANOVA between farmers possessing a 4-year degree or higher with those with no high school diploma, and between farms with a 4-year degree or higher with those holding a high school diploma.

Table 17. Summary of ANOVA: Lack of Confidence and Level of Education

Level of Education	Mean	S.D.	N
Less than High School Diploma	1.8542	.8097	41
High School Diploma or GED	1.8342	.9118	137
Some College	1.6329	.6678	171
4-Year Degree or more	1.3868	.7346	102
Total	1.6585	.7931	451

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.443	3	4.481	7.429	.000
Within Groups	269.612	447	.603		
Total	283.055	450			

Lack of Confidence also demonstrated a negative correlation with holding or not holding an off-farm job at $r = -.145$ ($p < .01$), although only displaying a low association. Table 18 includes the results of the analysis of variance showing a significant difference in the two categories within the sociodemographic group ($p < .05$). However the deviation in means was not sufficient to show a meaningful difference between the groups..

Table 18. Summary of ANOVA: Lack of Confidence and Off-Farm Job

Off-Farm Job	Mean	S.D.	N
No Off-Farm Job	1.7803	.9140	232
Off-Farm Job	1.5446	.6628	215
Total	1.6670	.8108	447

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.200	1	6.200	9.614	.002
Within Groups	286.971	445	.645		
Total	293.171	446			

Results of ANOVA: Time Constraints

Factor 3, Time Constraints showed a negative correlation with age of $p < .05$, and positive correlations with both annual gross sales and farming status (part-time versus full-time) at $p < .01$. Table 19 portrays the ANOVA between Time Constraints and age. Group mean scores of those in the five age categories showed that those in the "65 and over" category indicated Time Constraints to be less important as a deterrent than the other age groups. This appeared to be especially true when comparing farmers age 65 and over, with farmers age 35-44 ($p = .052$). This also compares with studies by Darkenwald and Merriam.

However, for farmers, the Tukey HSD test did not show a significant nor meaningful difference between age groups.

Table 19. Summary of ANOVA: Time Constraints and Age*

Age	Mean	S.D.	N
18-34	2.9844	.7076	32
35-44	3.1743	.6998	87
45-54	3.0854	.8414	132
55-64	3.0042	.9296	119
65 and over	2.7857	1.1157	82
Total	3.0196	.8939	452

*ANOVA did not show a significant difference at $p < .05$

The Time Constraints factor showed a positive correlation with annual gross sales at $r = .226$ ($p < .01$). The correlation showed a direct relationship between groups with $p = .000$. Time Constraints became more important as a deterrent with increasing income. An ANOVA was used to examine the differences between the three income levels within this category (Table 20). Tukey's test indicated a significant difference ($p < .001$) between the lower income level ($9,999 or less) and the higher income level ($100,000 or more), but not between the lower and middle income levels. A significant difference also appeared between the middle level ($10,000 to $99,999) and higher level with $p < .05$. A meaningful difference occurred between the lower gross sales group and higher gross sales group, but not between the middle and higher groups.

Table 20. Summary of ANOVA: Time Constraints and Gross Annual Sales

Annual Gross Sales	Mean	S.D.	N
$9,999 or less	2.7751	.9270	121
$10,000 - $99,999	3.0055	.8803	153
$100,000 or more	3.2837	.6585	111
Total	3.0133	.8594	385

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.990	2	7.495	10.659	.000
Within Groups	268.599	382	.703		
Total	283.589	384			

Time Constraints also displayed a low but positive association with farming status, i.e., farming part-time or full-time with $r = .188$ ($p < .01$). The analysis of variance resulted in a significance level of $p < .001$. Mean score comparisons show that full-time producers scored Time Constraints as more important as a deterrent to participation than did part-time farmers (Table 21), however a meaningful difference did not exist.

Results of ANOVA: Low Personal Priority

Factor 4, Low Personal Priority showed a low association but did correlate negatively with gender, level of education, annual gross sales, and farming status.

Table 21. Summary of ANOVA: Time Constraints and Farming Status

Farming Status	Mean	S.D.	N
Part-Time Producer	2.8651	.8799	235
Full-Time Producer	3.1957	.8518	215
Total	3.0231	.8813	450

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.267	1	12.267	16.333	.000
Within Groups	336.459	448	.751		
Total	348.726	449			

Primary enterprise, although not included in the Pearson correlation, did reveal significant differences in the ANOVA test between dairy enterprises and four other enterprise groups including cash crops, livestock, fruit, and "other" at $p < .01$. Mean score differences show that dairy producers report time as a more important deterrent than producers from any of these other four enterprise groups. The differences in mean scores between these groups also demonstrate that the differences are statistically meaningful. Equine ($n = 25$) and vegetables ($n=18$) did not provide large enough samples to adequately eliminate statistical error, and therefore were not considered in the ANOVA results.

Table 22. Summary of ANOVA: Time Constraints and Primary Enterprise

Enterprise	Mean	S.D.	N
Cash Crops	2.8543	.9215	162
Dairy	3.5764	.7879	58
Livestock	2.9620	.8748	87
Equine	3.0350	.7131	25
Fruit	2.8346	.8949	34
Vegetables	3.2917	.7110	18
Nursery, etc	3.1992	.7987	32
Other	2.8869	.8903	30
Total	3.0224	.8927	466

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	26.752	7	3.822	5.105	.000
Within Groups	327.911	438	.749		
Total	354.663	445			

Low Personal Priority and gender correlated with low association at $r = -.114$ ($p < .05$). An analysis of variance between these two variables showed a significant difference between males and females in their scoring ($p < .05$). Mean score comparisons demonstrate that males tend to find this factor as more important than females as a deterrent to participation (Table 23), although not at a meaningful level.

Low Personal Priority and level of education also correlated with low, negative association at r = -.115 (p < .05). There appears to be some preference for those with a higher level of education to have more interest in participating and less concern about how

Table 23. Summary of ANOVA: Low Personal Priority and Gender

Gender	Mean	S.D.	N
Male	2.0826	.8829	392
Female	1.7819	.8054	57
Total	2.0444	.8783	449

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.500	1	4.500	5.896	.016
Within Groups	341.129	447	.763		
Total	345.628	448			

they learn. This would likely be expected. An analysis of variance resulted in a significant difference between groups of p = .030, while Tukey's HSD test showed significance at p = .044 for mean differences between those who had completed some college and those who had completed a 4-year degree (Table 24). However, based on the resulting mean scores, no meaningful difference exists between education levels.

Low Personal Priority correlated with annual gross sales, although a low, negative association appeared at $r = -.122$ with $p < .05$. Mean scores show a definite inverse relationship, however, an analysis of variance demonstrated that while these two variables

Table 24. Summary of ANOVA: Low Personal Priority and Level of Education

Level of Education	Mean	S.D.	N
Less than High School Diploma	2.2114	1.0730	41
High School Diploma or GED	2.0694	.9039	135
Some College	2.1125	.8360	170
4-Year Degree or more	1.8284	.7655	102
Total	2.0439	.8716	448

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.774	3	2.258	3.012	.030
Within Groups	332.836	444	.750		
Total	339.610	447			

are related, categories within the annual gross sales variable did not show a significant difference between means (Table 25). Although not large enough to be meaningful, there does appear to be a slight trend of decreasing importance in the deterrent of Low Personal Priority as income increases.

Factor 4, Low Personal Priority and farming status correlated with low, negative association at r = -.129 although with higher significance than other sociodemographic variables ($p < .01$). An analysis of variance procedure revealed a significance in

Table 25. Summary of ANOVA: Low Personal Priority and Gross Annual Sales*

Annual Gross Sales	Mean	S.D.	N
$9,999 or less	2.1924	.9494	119
$10,000 - $99,999	2.0249	.8803	155
$100,000 or more	1.9606	.6814	110
Total	2.0584	.8545	384

*ANOVA did not show a significant difference at $p < .05$

differences of means for those farming part-time and those farming full-time ($p = .006$). Table 26 shows the mean differences and standard deviations for this relationship. Although not large enough to be considered meaningful, a slight pattern exists showing that part-time farmers see Low Personal Priority as more important in deterring them from participating in educational activities than full-time farmers.

Results of ANOVA: Scheduling Constraints

Factor 5, Scheduling Constraints gave the highest number (4) of correlations with the six sociodemographic variables, relating significantly to age, annual gross sales, farming status, and off-farm jobs. Correlation Coefficients all showed relationships ranging from r = -.109 ($p < .05$) to r = .334 ($p < .01$), the latter being the strongest correlation among the

Table 26. Summary of ANOVA: Low Personal Priority and Farming Status

Farming Status	Mean	S.D.	N
Part-Time Producer	2.1613	.9512	235
Full-Time Producer	1.9352	.7734	213
Total	2.0538	.8776	448

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.710	1	5.710	7.523	.006
Within Groups	338.535	446	.759		
Total	344.245	447			

factors and sociodemographic variables.

The correlation of Scheduling Constraints and age revealed a low, negative association of $r = -.109$ ($p < .05$), which was the smallest correlation under this factor. Table 27 provides the results of the ANOVA and Tukey test. The Tukey test revealed that a significant difference in mean values appeared between farmers in the 65 and over category and those in the 35-44 age group, and between the 65 and over category with the 45-54 age group. The data imply that farmers in the oldest age group see scheduling as less of a deterrent to participation than those in mid-career, but no difference appears between any other groups. No meaningful difference exists between the age groups.

Table 27. Summary of ANOVA: Schedule Conflicts and Age

Age	Mean	S.D.	N
18-34	2.3958	.8639	32
35-44	2.6981	.9315	87
45-54	2.6572	.9109	132
55-64	2.5034	.9916	118
65 and over	2.2463	.9567	81
Total	2.5322	.9518	450

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.770	4	2.943	3.315	.011
Within Groups	395.021	445	.888		
Total	406.792	449			

The correlation of Factor 5, Scheduling Constraints and annual gross sales resulted in a value of $r = -.154$ ($p < .01$), a negative and low association between the variables. When an ANOVA was performed on these variables (Table 28), a significant difference surfaced between the lower income group (less than $9,999 per year) and the higher income group ($100,000 and over per year). However, mean scores did not differentiate sufficiently to demonstrate a meaningful difference due to gross farm sales. No difference was seen between any other two groups.

Table 28. Summary of ANOVA: Schedule Conflicts and Annual Gross Sales

Annual Gross Sales	Mean	S.D.	N
Less than $9,999	2.7292	1.0194	120
$10,000 - $99,999	2.5730	.9444	152
$100,000 or more	2.3214	.8861	112
Total	2.5484	.9631	384

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.783	2	4.892	5.394	.005
Within Groups	345.490	381	.907		
Total	355.273	383			

Factor 5, Scheduling Constraints, also correlated significantly with farming status showing a low, negative association at $r = -.213$ ($p < .01$). This relationship was the second strongest of all comparisons between factors and sociodemographic groups. Analysis of variance showed that part-time producers identified Scheduling Constraints significantly more important as a deterrent to participation than full-time farmers ($p < .001$). Still, with mean scores differing by only .41, there was not an adequate interval to indicate that a meaningful difference existed. Table 29 shows a comparison of means and standard deviations as well as the results of the ANOVA test.

Table 29. Summary of ANOVA: Scheduling Conflicts and Farming Status

Farming Status	Mean	S.D.	N
Part-Time Producer	2.7323	.9547	235
Full-Time Producer	2.3280	.9004	213
Total	2.5401	.9500	448

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.259	1	18.259	21.143	.000
Within Groups	385.168	446	.864		
Total	403.427	447			

The final correlation between the factor Scheduling Constraints and "off-farm job" resulted in the highest correlation between the six factors and the sociodemographic variables with $r = .334$ ($p < .01$). The correlation resulted in a positive relationship and was the only correlation among the variables resulting in a "moderate" association. The data from the ANOVA (Table 30) show that farmers who hold an off-farm job have more difficulty with Scheduling Constraints as a deterrent to their participation in educational activities than farmers who do not hold an off-farm job. Results of the analysis of variance were both significant and meaningful with $p < .001$.

Table 30. Summary of ANOVA: Scheduling Constraints and Off-Farm Job

Off-Farm Job	Mean	S.D.	N
No Off-Farm Job	2.2196	.9099	227
Off-Farm Job	2.8509	.8751	217
Total	2.5282	.9464	444

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	44.218	1	44.218	55.437	.000
Within Groups	352.549	442	.798		
Total	396.767	443			

Results of ANOVA : Cost

Factor 6, Cost, was the final source variable correlated with sociodemographic variables and the only sociodemographic variable resulting in a significant correlation with gender at $r = .160$ ($p < .01$). A positive, but low association exists. The ANOVA shows that cost is significantly more important to females as a deterrent that it is to males, and a meaningful difference exists between the group mean scores. Significance resulted in $p < .001$ (Table 31).

Table 31. Summary of ANOVA: Cost and Gender

Gender	Mean	S.D.	N
Male	1.9742	1.0927	387
Female	2.5179	1.2727	56
Total	2.0429	1.1300	443

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.461	1	14.461	11.597	.001
Within Groups	549.946	441	1.247		
Total	564.407	442			

Research Question 3: The Importance of Cost as a Deterrent

Research Question #3 asked if cost was the most important deterrent to participation in educational activities for farmers. To address this question, it was necessary to statistically rank the six deterrent factors based on the individual rankings. This ranking was performed using a non-parametric Friedman's Test which tests the null hypotheses that k related variables come from the same population. The test was performed using the entire sample of farmers who responded to this item (Table 32).

Table 32. Friedman's Test to Rank the Deterrent Factors: Participants and Non-Participants

FACTOR	RANK	MEAN RANK	FACTOR ITEM MEAN	S.D.	N
Time Constraints	1	5.01	2.9996	.8821	446
Scheduling Constraints	2	3.98	2.4999	.9241	446
Lack of Course Relevance	3	3.93	2.4640	.9527	446
Low Personal Priority	4	3.10	2.0097	.8247	446
Cost	5	2.88	2.0419	1.1239	446
Lack of Confidence	6	2.11	1.6070	.6972	446

N	Chi-Square	df	Sig.
446	697.405	5	.000

Results of the Friedman's Test showed that the deterrents were statistically different at $p < .001$ and ranked them in the following order from most important to least important: 1) Time Constraints, 2) Schedule Conflicts, 3) Lack of Relevance, 4) Low Personal Priority, 5) Cost, and 6) Lack of Confidence. A Friedman's Test was then performed for non-participants only (Table 33) with identical results in rank order of deterrents except for Lack of Relevance and Low Personal Priority. These two factors interchanged between third most important and fourth most important. Levels of significance again emerged as significant ($p < .001$). However, in either test it is shown that the deterrent factor "Cost" is not the most important and remains fifth in importance based on Friedman's ranking.

Table 33. Friedman's Test to Rank the Deterrent Factors: Non-Participants

FACTOR	RANK	MEAN RANK	FACTOR ITEM MEAN	S.D.	N
Time Constraints	1	4.66	2.6376	1.0363	78
Scheduling Constraints	2	3.67	2.2692	.9459	78
Low Personal Priority	3	3.60	2.1137	.8939	78
Lack of Course Relevance	4	3.44	2.1548	.8880	78
Cost	5	3.03	2.0470	1.1973	78
Lack of Confidence	6	2.60	1.7137	.8359	78

N	Chi-Square	df	Sig.
78	61.014	5	.000

Research Question 4: Predicting Participation Using Deterrent Factors

Correlation of Factors and Participation

Research Question #4 called for the ability to predict participation behavior based on the deterrent factors identified. To initially examine the relationships between the six factors and participation behavior, a Pearson r Correlation was performed between the two variable types. Four of the six deterrent factors demonstrated a significant correlation with level of participation (1 = nonparticipant; 2 = participant). The four factors were Lack of Course Relevance, Lack of Confidence, Time Constraints, and Low Personal Priority. Factors #4 and #5 did not show a significant correlation (Table 34).

Factor 1, Lack of Course Relevance and level of participation showed a low, positive association of $r = .163$ ($p < .01$), indicating that course relevance was more important for individuals who normally participate in educational programs. The correlation between Factor 2, Lack of Confidence and level of participation revealed a low negative association of $r = -.149$ ($p < .01$), indicating that lack of confidence was a more important deterrent for non-participants than for participants. Factor 3, Time Constraints demonstrated a low, positive association with level of participation at $r = .197$ ($p < .01$), which indicated that those who normally participate see time constraints as more of a deterrent than non-participants. The fourth factor, Low Personal Priority yielded a low, negative association with level of participation at $r = -.148$ ($p < .01$). This correlation indicates non-participants are more apt to be deterred from participating by low personal priorities than those who normally participate.

Table 34. Correlations Between Deterrent Factors and Level of Participation

	Deterrent Factors					
	1 Lack of Course Relevance	2 Lack of Confi-dence	3 Time Con-straints	4 Low Personal Priority	5 Scheduling Constraints	6 Cost
Level of Participation	.163**	-.149**	.197**	-.148**	.067	-.056

*p < .05 **p < .01

Logistic Regression for Predicting Participation Behavior

A logistic regression was performed to examine the ability to predictive participation behavior for participants and non-participants based on the six deterrent factors. Using the Chi-Square statistic, the analysis revealed that there was no significant relationship between the observed and predicted for non-participants due to the deterrent factors. While predictability is very high for the participant group with a value of 98.11 percent, predictability for non-participants is very low at 11.54 percent (Table 35) and thus, the results were not significant for the test. According to the results, the 6 deterrent factors identified in the study could be used to predict participation behavior by those who normally participate, but not for those who are non-participants. The results suggest that perhaps there are differences between the two populations which are not explained by the deterrents as they are now identified, yet impact their decisions not to participate in educational programs.

To further explore these results, separate Pearson r correlations were performed for participants and non-participants respectively, to examine the relationships between the deterrent factors and sociodemographic variables. Table 36 shows the results of the correlation for participants, while Table 37 shows the results of the correlation for non-participants (Appendix F & G).

Results of the two correlations did show differences in how sociodemographic and

Table 35. Logistic Regression with Chi-Square Statistic: Test for Prediction of Participation Behavior for Participants and Non-Participants in Educational Activities.

	Chi-Square	df	Sig.
Goodness-of-Fit	2.6339	8	.9552

	PREDICTED		
OBSERVED	**Non-Participants**	**Participants**	**PERCENT CORRECT**
Non-Participants	9	69	11.54%
Participants	5	260	98.11%
		Overall	**78.43%**

VARIABLES IN THE EQUATION

VARIABLES	B	S.E.	Wald	df	sig	R	Exp(B)
Lack of Confidence	-.4595	.2332	3.8834	1	.0488	-.0716	.6316
Cost	-.1894	.1412	1.7990	1	.1798	.0000	.8274
Low Personal Priority	-.4354	.2083	4.3715	1	.0365	-.0803	.6470
Lack of Course Relevance	.3520	.2020	3.0372	1	.0814	.0531	1.4220
Scheduling Constraints	.1023	.1809	.3198	1	.5717	.0000	1.1077
Time Constraints	.6737	.1981	11.5697	1	.0007	.1613	1.9615
Constant	.2479	.4910	.2548	1	.6137		

deterrent variables relate for participants and non-participants based on the deterrent factors identified. Significant relationships appeared in 10 correlations for the participant group, while only 4 correlations emerged for the non-participant group. Two of these correlations occurred between the same deterrent factor and sociodemographic variable, i.e., 1) Scheduling Conflicts and off-farm job and 2) Lack of Confidence and age. The association between schedule conflicts and off-farm job was the strongest correlation (moderate association) for both participant and non-participant correlations and was also the strongest association for "all respondents" (Table 14). The correlation between lack of confidence and age is logical and is supported by the literature (Johnstone and Rivera, 1965). An expected association between lack of confidence and level of education was only observed in the participant group and did not appear for non-participants at a significant level. An expected association between level of education and low personal priority surfaced at a significant level for non-participants but not participants. Also the deterrent factor Cost correlated only with gender for non-participants and not for those who are in the participant group. Studies have shown that women typically cite cost more strongly as a deterrent than men (Cross, 1965; Darkenwald and Valentine, 1985; Davis, 1988; Weischadle, 1988).

When comparing the findings of correlations of participants and non-participants ((Appendix F, Table 36 & Appendix G, Table 37) with all respondents (Table 14), differences appear regarding the correlations. This appears to support the supposition that these two populations may differ in ways yet to be discovered regarding participation

behavior, therefore leading to an inability to predict participation behavior for non-participants.

Open-Ended Items

Two open-ended items were placed at the end of the DPS-F questionnaire. The first of these questions was stated, "Finally, please list the item that is most important to you in your decision to participate in an educational activity." This item was stated from a positive perspective rather than negative as in the 39 deterrent items, in order to examine (non-statistically) how the responses would compare with the results of the deterrent items. These responses are listed in Appendix H, and support the findings of the study.

The final question was stated, "Feel free to list below, any barriers to your participation in educational activities that were not mentioned in this questionnaire? Also list any other suggestions you have." This item was not intended for comparison with the findings. It was placed on the questionnaire in order for respondents to provide feedback about the questionnaire, to share thoughts regarding the study, or to provide any other input. These comments were retained by the investigator and not placed in the appendix.

CHAPTER 5

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Conclusions

Introduction

The Conclusions, Implications, and Recommendations section explains and connects the data with regard to findings in this study and in related studies. Implications of the findings and recommendations for further study are also included. Sub-chapters and sections include the Conclusions, Introduction, Deterrent to Participation Scale for Farmers, Significance and Relevance of Deterrent Factors, Factors and Sociodemographic Variables, Factor 1: Lack of Course Relevance, Factor 2: Lack of Confidence, Factor 3: Time Constraints, Factor 4: Low Personal Priority, Factor 5: Scheduling Constraints, Factor 6: Cost, Ranking Cost as a Deterrent, Predicting Participation Based on Deterrent Factors, Open-Ended Responses, Implications of the Findings, and Recommendations for Future Study.

The first objective of the study was to develop a valid and reliable Deterrent to Participation Scale for Farmers (DPS-F) which could identify relevant principal components (factors) to best represent the many deterrent items reported by farmers.

The second objective consisted of four research questions which would 1) test whether the six deterrent factors were significantly different, 2) test whether there were differences in the type and level of the six deterrent factors based on sociodemographic variables, 3) examine the importance of Cost as a deterrent, and 4) test whether participation behavior can be predicted based on the deterrent factors identified.

Deterrent to Participation Scale for Farmers

The first objective of the study was performed to develop a valid and reliable DPS instrument for farmers. Of the 1207 questionnaires mailed, a relatively high percent (41.9 percent) of the potential, reachable audience responded providing much useable data. The reliability of the questionnaire remained high throughout implementation and resulted in an alpha score of .9012.

Statistical analysis including Orthogonal Rotation using the Varimax Procedure revealed a set of six source variables (factors) which represented 50.523 percent of the explained variance and was the most parsimonious solution in representing farmer deterrents to participation. This percent of explained variance is within the range of values found in other DPS studies, which again supports the DPS-F as a valid and reliable instrument.

Because scale items represented a negative perspective, it was appropriate to use factor labels that also represented a negative perspective. The factors that emerged closely resembled deterrent factors identified in previous DPS studies, although in a different

order of importance based on explained variance. In fact, the results of the Orthogonal Rotation process showed that many of the deterrent items remained in the same factor groups as in past DPS studies. As a result, factor labels from previous DPS studies were used to identify the DPS-F factors. The six factors, in order of importance of explained variance, were labeled Lack of Course Relevance, Lack of Confidence, Time Constraints, Low Personal Priority, Scheduling Constraints, and Cost. Total item mean scores for the 39 Likert scale items tended to be low, ranging from 3.5 ("Somewhat Important" to "Quite Important") for the highest ranking item to 1.32 ("Slightly Important") for the lowest ranking item. As shown in earlier DPS studies, consistent low mean scores on scale items support the position that the deterrent construct is multidimensional and not dependent on a single type of deterrent. The ten highest ranked items by mean score for the entire scale are classified as situational and institutional, which compares with the typology of Cross (1981) and with other DPS findings. This further confirms the DPS-F as a valid instrument to measure deterrents to participation for this subgroup.

The DPS-F performed well in identifying deterrent factors for farmers and can be used as a valid and reliable instrument in identifying farmer deterrents to participation. Thus, the first objective of this study was achieved.

Significance and Relevance of Deterrent Factors

The first null hypothesis examined whether the six deterrent factors were significantly distinct and separate. Null Hypothesis #1 was stated, "There are no statistically significant

and distinct deterrent factors to explain farmer participation in educational activities." To address this question, the six factors identified through Orthogonal Rotation were transformed into new variables utilizing total item mean scores within each factor. The six new variables were then compared using a repeated measures test with multivariate analysis of variance and paired t-tests. Results showed that the six factor variables were indeed significantly different at the $p < .001$ level, and represented distinct and separate source variables that could be utilized further to analyze sociodemographic and participation data. Therefore, based on the repeated measures test and F-statistic at the $p < .05$ level, Null Hypothesis #1 is rejected.

Factors and Sociodemographic Variables

Null Hypothesis #2 was stated, "There is no significant difference in farmers' deterrents to participation in educational activities based on sociodemographic variables such as age, level of education, amount of gross farm sales, farming status, or those holding or not holding an off-farm job." This question examined whether farmers from different sociodemographic categories differ regarding the type and importance of the six identified deterrent factors that serve as barriers to participation in educational activities. No attempt was made to combine effects of sociodemographic variables, e.g., age and income in regard to a deterrent factor.

To address this question, a Pearson Product-Moment Correlation analysis was implemented to initially compare factors and sociodemographic variables for significant

relationships. Farm size, by both acreage and number of square feet, was not analyzed due to the wide range in farm sizes reported, and because farm size has little meaning without linking it to farm type. Of 36 possible correlations between the six deterrent factors and six sociodemographic variables, the analysis revealed 16 correlations that emerged at a significant level of $p < .05$. Of the 16 significant correlations, 15 showed only "low" association, i.e., $r = .20$ to .30 (Elliot, 1991). The remaining one correlation between Factor 5, Scheduling Constraints and the sociodemographic variable, Off-Farm Job revealed a "moderate" association , i.e., $r = .30$ to .49 (Elliot, 1991).

In order to test the hypothesis regarding sociodemographics and the deterrent factors, a One-Way Analysis of Variance was performed where each significant correlation had appeared. In two of the ANOVA tests, no statistical difference was found, i.e, between Factor 1, Lack of Course Relevance and annual gross farm sales, and between Factor 3, Time Constraints and age group. The variables Time and primary enterprise type were not analyzed using a Pearson Correlation, however an ANOVA with Tukey HSD was used to look for significant differences due to enterprise type.

Factor 1: Lack of Course Relevance

The source variable (Factor 1) capturing the highest amount of explained variance in the rotation was labeled Lack of Course Relevance. This factor correlated significantly with annual gross sales only, indicating that the importance of course relevance increases with income level (annual gross sales). However, this correlation was weak. Likewise, the

ANOVA did not reveal a significant nor meaningful difference between the three income groups. This does not mean that course relevance is unimportant. In fact, the factor scale mean surfaced as being second-highest of the six factors with a value of 2.47, i.e., "slightly important" to "somewhat important", while the mean for the entire scale instrument was 2.53. The data appear to show that this item is a relatively important deterrent among all farmers, but that it does not seem to vary due to sociodemographic group. This factor resembled previous deterrent research findings in that all items within this factor are of either the institutional or situational type.

Factor 2: Lack of Confidence

Lack of Confidence correlated significantly with age, level of education and holding an off-farm job. The relationships between lack of confidence and these independent variables are logical and agree with the literature (Johnstone and Rivera, 1965; Darkenwald and Merriam, 1982). The data indicated that lack of confidence increases with age, particularly with farmers 65 years of age and over. Results of the analysis of variance indicate that there is a significant and meaningful difference between those who are 65 and over and those in the 18-34 age group, and between those who are 65 and over and the 45-54 age group. According to the data, farmers in the oldest group are more likely than the other two groups to avoid participation due to lack of confidence. The study also showed that lack of confidence decreases with increasing levels of education and for those working off the farm, however differences did not vary enough in the study between levels of education nor between those holding off-farm jobs and not holding off-

farm jobs to be meaningful.

Factor 3: Time Constraints

Factor 3, Time Constraints correlated significantly with age, annual gross sales and farming status, indicating that time constraints become less of a deterrent with age, but more of a deterrent with increasing farm sales (income) and those farming full-time versus part-time.

The relationship between time constraints and age appears to be a logical pattern with the largest variation in mean scores occurring between farmers age 35-44 and farmers 65 and over. This could be a practical observation, i.e., the age group 35-44 is likely about the age that farmers are assuming ownership of the family farm as the father enters retirement. However, the analysis of variance demonstrated that no significant nor meaningful difference occurred between these two variables.

Time constraints would also likely become more important as gross farm sales rise, since this implies more product sold and likely higher time requirements in managing the farm. Significance was seen between the low gross farm sales group ($9,999 or less) and high gross farm sales group ($100,000 or more), and also between the medium gross farm sales group ($10,000 to $99,999) and high gross farm sales group. Although time constraints provided a continuum of increasing importance with increasing farm sales, there was no significant difference shown between the low and medium gross farm sales groups, nor did

a meaningful difference occur between the middle and higher gross sales groups. The data do show, however, that a significant and meaningful difference does exist between the lower gross farm sales group and upper gross farm sales group. This is a logical result, since the data show increasing importance of time as a deterrent as farm sales rises. Farmers in the higher gross farm sales group appear to have much more difficulty in finding time to participate than farmers in the lower gross sales groups.

The data also show that a significant difference occurs between full-time and part-time farmers suggesting that full-time farmers have more time constraints than part-time farmers. However, the difference in mean scores from the study are not sufficient to support a meaningful difference due to farming status.

Finally, the ANOVA and Tukey HSD tests between Time and primary enterprise showed that a significant and meaningful difference did appear in four analyses. Time constraints were shown to be significantly more important as a deterrent 1) for dairy farmers than for cash crop producers, 2) for dairy farmers than for livestock producers, 3) for dairy farmers than fruit growers, and 4) for diary farmers than farmers in the "other" enterprise category. While mean scores between dairy and equine producers did equate to more than a .5 interval, significance appeared at $p = .150$ and therefore was not included as being significant nor meaningful. The low number of equine producers ($n = 25$) may have led to this outcome.

Factor 4: Low Personal Priority

Factor 4 dealt with the farmer's disposition toward learning and a priority of how that person wished to use available time. Because a negative label was necessary to describe this barrier type, "Low Personal Priority" was chosen. Factor 4 showed significant but low negative associations with gender, level of education, annual gross sales and farming status, indicating that a person's priority to learn at other times or in other ways decreases as a deterrent as education levels increase, as gross sales increase, and in moving from full-time to part-time farming status.

According to the results of this study, females place less importance on how and when they learn than males, which was a similar finding to Darkenwald and Valentine (1985) in the DPS study with general audiences. However, the results of the ANOVA show that there were not sufficient differences in the two mean scores to suggest a meaningful difference.

The relationship between low personal priority and level of education is supported in the literature by Houle (1961), Cross (1981), Darkenwald and Merriam (1982), and also by Weischadle (1988) in a study of real estate professions. These studies show that adults with low levels of education tend to place a lower priority on continuing education than do persons with higher levels of education. This trend is also seen in mean scores of farmers in the four levels of education, however insufficient ranges between the lowest and highest mean scores indicate that a meaningful difference does not exist between the

education levels based on the ANOVA tests in this study.

Low Personal Priority and farm gross sales, while showing a significant correlation, did not show significance during ANOVA tests nor did any meaningful differences emerge. Low Personal Priority did result in a significant relationship with farming status, indicating that those who farm full-time based less importance on this variable as a deterrent than did part-time producers. However, in ANOVA tests, the variation in mean scores did not produce a meaningful difference due to farming status.

Factor 5: Scheduling Constraints

Factor 5, Scheduling Constraints correlated significantly with age, annual gross sales, farming status, and on- or off-farm employment, indicating that scheduling constraints become more of a deterrent with those holding an off-farm job versus no off-farm job, but less of a deterrent as farmers grow older, as sales increase, and as farmers move from part-time to full-time. The correlation between scheduling constraints and those who hold off-farm jobs was the strongest ("moderate") association of the 16 correlations identified. This was further supported by correlations performed separately under Research Question #4 (Appendix F), where moderate associations emerged for both participant and non-participants, respectively between these variables. This appears to indicate that one of the more important deterrents to participation for farmers exists in scheduling conflicts for those farmers who hold an off-farm job.

When the null hypothesis was tested using ANOVA, variation in mean scores for all variables except holding an off-farm job resulted in less than a meaningful difference in mean scores. However, the ANOVA did indicate a meaningful difference in Scheduling Constraints as a deterrent between those holding or not holding an off-farm job. Those holding off-farm jobs appear to have more difficulty in balancing schedules to participate in educational activities than farmers without off-farm jobs.

Factor 6: Cost

Factor 6, Cost correlated significantly only with gender, showing that females see cost as more of a deterrent than do males. This is supported in the findings of Cross (1981), Darkenwald and Merriam (1982) and in DPS studies by both Davis (1988) and Weischadle (1988). It is interesting to note, however, that the correlations performed in relation to Research Question #4, i.e., for participants and nonparticipants, respectively, a significant relationship between these two variables emerged only for non-participants. In fact, a moderate association of $r = .341$, appeared. The correlation between these two variables for farmers in the participant group did not reveal a significant association indicating that cost may be more important for females who do not typically attend educational activities. Nevertheless, for all respondents as a group, cost does serve as a significant and meaningful deterrent to participation for females, based on the results of this study.

An ANOVA between Cost and gender did reveal that a significant and meaningful

difference exists. Female farmers indicate that cost is more of deterrent to their participation in educational activities than do males.

In summary, five significant and meaningful differences were seen between the six deterrent factors and seven sociodemographic variables. Lack of confidence was more of a deterrent for farmers over age 65 than for farmers in the 18-34 and 45-54 age groups. Time constraints were more of a deterrent for farmers in the highest gross farm sales category than for farmers in the lowest gross farm sales category. Schedule constraints were more of a deterrent for farmers who hold off-farm jobs than for those who did not have an off-farm job. Cost was more of deterrent to participation for female farmers than for male farmers. Time constraints were a more important deterrent for dairy producers than for cash crop producers, livestock producers, fruit growers, or farmers in the "other" enterprise category.

The results of the study indicate that significant and meaningful differences are shown in regard to the deterrent factors as the sociodemographic groups vary. Based on results of the One-Way Analysis of Variance and Tukey HSD Tests using the F-statistic at the $p < .05$ level, Null Hypothesis # 2 is rejected.

Ranking Cost as a Deterrent Factor

The third null hypothesis focused on the deterrent factor labeled "Cost" to determine if this was the most important deterrent for farmers in their decisions to participate in

educational programs. Null Hypothesis #3 was stated, "Cost is not the most statistically important deterrent in farmers' decisions to participate or not participate in an educational activity."

To address this question, a Friedman's Non-Parametric Test was implemented to statistically rank the six deterrents in order of importance. This was performed for all respondents as a group, and also for non-participants as a group in a separate test to see if the two groups differed in how the factors ranked. Results of this test revealed that regardless of the group selected, the deterrent factor Cost emerged as the fifth most important factor among the six deterrents identified for farmers. Time Constraints and Scheduling Constraints emerged as the most important and second most important deterrent, respectively, for the total respondent group and for the non-respondent group. Lack of Course Relevance surfaced as the third most important deterrent for all respondents as a group, with Low Personal Priority emerging as fourth most important. Lack of Course Relevance and Low Personal Priority were in reverse order for the non-respondent group, i.e, Low Personal Priority (third) and Lack of Course Relevance (fourth). Both groups indicated Lack of Confidence as the least important deterrent, based on the six factors identified.

Therefore, since Cost ranked as the fifth most important deterrent in both Friedman tests, it is shown that Cost is not the most important deterrent for farmers in their decision to participate in an educational activity. Thus, based on results of Friedman's

Non-Parametric Test using the Chi-Square statistic at the $p < .05$ level, Null Hypothesis #3 is accepted.

Predicting Participation Based on Deterrent Factors

The forth null hypothesis examined whether participation behavior could be predicted with respect to the sociodemographic traits and the deterrent factors. Prior to testing the null hypothesis, a Pearson r correlation was performed to identify significant associations between participation behavior and the deterrent factors. The Pearson correlation revealed significant associations on four of the six factors indicating that relationships did exist with Lack of Course Relevance, Lack of Confidence, Time Constraints and Low Personal Priority. Preliminary results of these correlations indicated that Lack of Course Relevance and Time Constraints were more important as a deterrent for participants than non-participants, and that Lack of Confidence and Low Personal Priority were more important deterrents for non-participants than participants.

To test the null hypothesis, a Logistic Regression was performed. While the Logistic Regression was able to predict participation behavior 98 percent of the time for the participant group, it demonstrated a very low success rate in predicting for non-participation (11%). These findings indicate that the DPS-F, while useful in identifying farmers' deterrents to participation, cannot be used to adequately predict participation for the non-participant group. The results suggest that the non-participant group differs in some way that could not be revealed through the deterrent factors identified. Therefore,

based on the Logistic Regression using the Chi-Square statistic at $p < .05$, Null Hypothesis #4 is accepted.

Because the DPS-F was shown not to be useful in predicting participation behavior of the "non-participant" farmer group, further exploration was performed to see if participants and non-participants varied with respect to participation behavior and the deterrent factors. Pearson r correlations were performed separately on both the participant group and non-participant group, using the sociodemographic variables and the deterrent factors. Results of the correlation demonstrated that significant associations occurred in 10 correlations for participants and only 4 correlations for non-participants (Appendix F, Table 36 & Appendix G, Table 37). Only two of these correlations involved the same two variable combinations for both participants and non-participants. Scheduling Constraints and off-farm job resulted in a moderate positive association for both participants and non-participants. Lack of Confidence and age resulted in a low positive association for both groups. Also, Cost and gender resulted in a positive, moderate correlation, indicating that for non-participants, Cost is a more important deterrent for females than for males. The findings of the correlations indicated that further study is needed to examine how participants and non-participants vary, in regard to participation behavior. The results suggest that perhaps there are differences between the two populations which are not explained by the deterrents as they are now identified.

Open-Ended Response

Respondents were provided opportunities to provide feedback through two open-ended items placed at the end of the questionnaire. The responses from the first item allowed farmers to indicate what was most important to them in their decision to participate in an educational program. Responses were diverse ranging from time and location, to the relevancy of the information to their needs (Appendix H). Farmers also commented that they were too old to continue their education, or were not aware of educational activities being available to them. Some responses were very specific, e.g., relating to a very specific topic that would spur their interest enough to attend, while others stated more general items. The diversity of the responses appeared to support the findings in the study, i.e., that the deterrent construct is not comprised of a single type of barrier, but that it is complex and multidimensional in nature.

Responses from the second item included such comments as suggestions for additional deterrent items that were not included in the study, to notes of thanks for being selected to participate in the mail survey. As expected, because of the apparent (and intended) source of the survey, comments also appeared in relation to Michigan State University and its programs — both constructive and complimentary.

Implications of The Study

The development of a Deterrent to Participation Scale for Farmers (DPS-F) provides the first known instrument of its type to identify and measure deterrents to participation

specifically for farmers. The study demonstrates that it is a valid and reliable tool for both researchers and other educators to use in identifying and analyzing deterrents to participation. The instrument can be used to examine a general population of farmers, or a specific producer group. Examining deterrents to a specific producer group will be more valuable when attempting to plan educational activities for that particular type of farmer. Those barriers can then be addressed to increase grower participation.

While Extension educators were often mentioned in the study as important players in transferring educational information to farmers, there are many other public organizations and private firms which offer educational programs and tours for farmers. The DPS-F and it's findings should be useful for all of these organizations to help them better understand their audiences and customize programs to reduce or avoid deterrents to farmer participation.

The study also underscores the importance of "deterrents" in the educational arena. Motivational research has shown that adults participate in learning experiences for certain reasons, and that these reasons vary from individual to individual. These studies have also shown that similarities exist with respect to sociodemographic group. Research has shown that deterrents also vary from individual to individual and with respect to sociodemographic group. Therefore, educators must consider both the motivational incentives and the barriers when planning and implementing educational activities.

Advisory groups or committees that work to plan programs often focus on those issues which meet the needs of the target audience. Discussions on program content, potential resource persons, program date and location, etc., are all fitting topics when planning programs. However, advisory groups should remember that these program components can serve as deterrents as much as incentives if not handled with the target audience in mind

In addition to identifying six major deterrents that impact Michigan farmers, the study was able to rank the deterrents according to importance as individual deterrent factors. The rankings were almost identical for both the total sample and the non-participant group. Time constraints and scheduling constraints appear to be the two leading deterrents for farmers and these compare favorably with previous research findings for adult learners (Johnstone and Rivera, 1965; Cross, 1981).

Lack of confidence, while tending to be a larger deterrent for certain sociodemographic groups, ranked last for the entire group sampled in this study and therefore may not be as important for general farmer audiences. However, the results of this study were similar to previous studies which indicated that lack of confidence can be more of a deterrent to participation for older adults than for younger adults. While some older farmers indicated that they were "too old to learn", the agricultural arena is one where older adults still have an important role. Unlike many other types of industries, farmers often continue to provide important input into farm management decisions well after the age of 65, especially on

family owned and operated farms. Therefore, farmers over 65 years of age are still an important target audience for organizations which provide educational programs for farmers. Programs targeted at older farmers may need to consider promotional techniques that would increase audience confidence levels. Educational activities that target general audiences, such as using computers on the farm, could be offered in different formats with one format offered to younger farmers who may have more computer experience or more confidence in learning, and in a different format for older farmers who may have a "fear" of computer technology.

Cost did not surface as the most important deterrent among those factors identified. Therefore, it may not serve as a barrier for those agricultural producers who have the time to participate and are truly interested in the program content. This finding supports the results of a farm financial workshop held at Michigan State University where participants were asked to pay a substantial registration fee. The topic of the workshop was relevant to farmers' needs at that time and apparently considered other items that could have served as barriers. As a result, the workshop was filled to capacity with 51 producers attending and revenues off-setting some, or all, program implementation costs. However based on the findings in this study, if registration fees are charged, the activity must be relevant to the information the farmer needs, and offered at time or season when attendance is convenient.

In addition, the findings showed that females, as a specific sociodemographic group, do

identify cost as a deterrent. This appears to be especially true for female farmers who do not usually participate in educational activities. This may be a direct result of the role that women often play on the farm, i.e., the bookkeeper. On many farms, the farm wife handles the financial records. It is often said that the person who "holds the purse-strings" is more cautious of how money is spent. Regardless, organizations offering programs where women are the target audience or a portion of the target audience must consider cost as a potential barrier and plan accordingly.

The study indicated that time constraints are significantly more important as a deterrent to participation for dairy producers than for other types of producers, such as cash crop and livestock producers, fruit growers, or farmers representing the "other" category in the study. This is an important finding since agricultural programs for specific sub-groups are often sub-group specific. For example, programs addressing such topics as dairy calf morality, milk quality, and sire selection would not be pertinent to most other types of farmers other than dairy producers. It is well known that most dairy producers milk cows and do related chores in the early morning and late afternoon. Extension agents realize this and typically start educational programs for dairy farmers later in the morning and end the programs in time for producers to return to the farm for the evening milking. The results of this study reveal however, that time constraints may be an even larger barrier than previously thought for dairy farmers, and additional study may be warranted.

The DPS-F instrument was not successful in predicting participation behavior for non-

participants, although it did provide a very high level of prediction for those who normally participate in educational programs. It appears, from follow-up correlations in this study, that there may be important differences between farmer "participant" groups and "non-participant" groups. Additional research must be performed to determine whether there are other unknown variables at work which impact participation decisions by non-participants. This may mean that the two groups should be studied separately, or perhaps, a modified DPS-F for non-participant types should be developed through focus groups consisting of only non-participant farmers. While it is important to concentrate on non-participants and how educators might find ways to attract those individuals, deterrents also exist for those who do participate. Even individuals who normally participate in educational activities cannot attend every learning activity offered. It will be important to continue investigations of both participants and non-participants and the barriers which impact their participation.

Comparing the DPS-F findings with earlier deterrent research confirms that differences do vary with populations or subgroups. We cannot simply assume that one group's deterrents, such as those of the general audience, will be similar to another group's deterrents. Therefore, additional study of specific sub-groups will lend much to our understanding of barriers to participation in educational programs.

The study confirms the importance of knowing the target audience when planning educational programs. The issue of deterrents to participation in educational programs,

while important for outreach units such as Cooperative Extension Service, is just as critical for the university general which administers the Extension program. Universities reach out in many ways to adult audiences, through on-going or special programs, institutes, on-campus and off-campus course work, etc.. The success of the DPS instruments in identifying deterrents for distinct populations demonstrates that it can also be modified for use with other target audiences of the university. The DPS-F findings indicate that cost is not the most important deterrent to farmers in Michigan, and that program fees could be considered as a way to recoup expenses. This could have positive implications for Extension in Michigan -- as well as other programs and institutes at Michigan State University which target farmers. Additional DPS studies of other MSU target audiences may show that this is true for other outreach programs and audiences as well.

Recommendations

This study was intended to further expand the findings and foundation of the deterrent construct by examining a population not yet investigated in previous DPS studies. The results of the Deterrent to Participation Scale for Farmers (DPS-F) investigation support the construct initially proposed by Darkenwald and Scanlan (1984), in that the construct appears to be sophisticated and complex, and represents a multidimensional premise.

This study provides the first known instrument of its type to examine deterrents to participation for farmers. The DPS-F study was successful in identifying and ranking the

deterrents indicated by Michigan farmers. Because the DPS-F instrument was able to identify statistically distinct deterrents for agricultural producers and provide a ranking of importance of those deterrents, it is recommended that further exploration take place with other sub-populations such as fruit growers, dairy producers, young farmers, females, or members of the farm family who keep the farm financial records, to see how these audiences might be better targeted when planning educational programs. Although we know the rankings in importance of the six deterrents in this study, they exist for Michigan farmers in general and for non-participant types. The rankings of these deterrents may also vary by sociodemographic group.

The application of the DPS-F as a reliable and valid instrument to predict participation did not prove useful for non-participants. However, the high level of prediction for farmers that normally participate implies that it can be a reliable and valid tool. Additional study is needed to determine ways in which to enhance prediction ability of non-participant farmers using the DPS-F. The inability to predict participation behavior for non-participants may demonstrate that non-participant audiences need to be analyzed separately. It is not clear from the results of this study whether other unknown variables are impacting decisions to participate by non-participants. One method to address this issue is to develop a modified form of the DPS-F instrument, where deterrent scale items are developed by non-participant types only. Therefore, it is recommended that the instrument be tested solely on a non-participant farmer sample to check for predictability with that group, and to compare, generally, how the deterrents for non-participants compare and contrast with

deterrents for the participant group. Other DPS studies have occasionally incorporated complementary scales, e.g., the Adult Attitudes Toward continuing Education Scale (AACES), with the DPS instrument while others have incorporated job roles (Weischadle, 1988; Davis, 1988). The results have been mixed in regard to predictability, however this may assist in strengthening the ability to predict participation in farm audiences.

This particular study addresses deterrents to participation in educational programs for Michigan farmers with particular attention to various sociodemographic groups. Much additional study is needed to better understand the deterrents that affect Michigan farmers, and how these vary between specific groups. Additional study of various commodity groups would be valuable for Extension in addressing the farmer's educational needs. Also, follow-up DPS-F surveys of sociodemographic groups based on age, gender, level of education, geographic area, or cultural group, etc., will assist in qualifying the findings of this study, while helping educators in this state to better understand Michigan farmers. Because Michigan farmers consist of both part-time and full-time producers, it would help greatly to better understand the differences in motivators and barriers for these two groups.

The deterrents identified in this study may or may not represent farmers in other geographic areas. Farmers in California or South Dakota, for example, may have very different deterrents due to weather impacts, geographic distances between farms and towns, availability of quality educators, or accessibility to educational activities based on

budgets (limitations or surpluses) of Extension or other agricultural organizations which provide educational activities. Statewide DPS-F surveys, or surveys of specific farm groups should help Extension and other educators learn more about their potential audiences regardless of the state or region being explored.

While cost was shown to be less important than other deterrents, further investigation is warranted on this issue. Cost does appear to be more of a deterrent for female farmers than male farmers, which supports previous studies dealing with barriers to participation for adults in general. At this time, we do not know if this is due to the fact that the farm wife is often the farm business bookkeeper, i.e, more prudent in spending farm funds, or if there are other reasons. The correlations between the deterrent factors and participation behavior (Appendix F & G) show that there is no significant relationship for Cost between males and females for those classified as "participants". However, a moderate association appears for the "non-participant" group, showing that Cost is a significantly more important deterrent for females than males. Based on this finding, the entire issue of Cost, with regard to relationships and differences between male and female farmers, needs additional study.

The Cost factor has shown up in several deterrent studies, but not all studies compare the importance of this factor with other deterrent factors. The DPS-F study has shown that it is not the most important barrier for farmers, and that other issues such as time constraints and schedule conflicts, program relevance, and low personal priority at the time of the

program offering, may outweigh cost as a deterrent. Additional study of farmers' behavior in response to registration fees and other program costs, would help social scientists and economists to better understand how farmers react to Cost as a potential deterrent. The DPS-F study implies that if the program is offered at a convenient time, day or season, and includes information needed at that time by farmer clientele, they will participate regardless of costs. This finding is not unexpected and is likely a cost-benefit issue. In this case, the value is placed on the returns of participating in an educational activity. Due to tighter budgets for public education institutions, including Cooperative Extension Service and institutions of higher learning in general, it is important to know when clientele are willing to pay a fee for the privilege of participating and when they are not. If there are ways to recoup expenses through program fees, then many educational institutions could benefit financially. The DPS methodology should be considered to explore this arena by utilizing DPS instruments already in place, through modifications of existing DPS templates, or by developing new DPS instruments through focus group input. It may also be possible to incorporate methodologies that include the theory of value, such as contingent valuation, to see how those constructs complement the deterrent construct in educational research.

The findings in this study support not only the deterrent construct, but other facets of educational research such as program planning techniques. Barriers such as time constraints, schedule conflicts, relevancy of program topics or level of learning are all components that a good program planner should take into account, regardless of the

audience. Extension staff and other individuals and organizations who target farm audiences will want to explore those audiences with respect to the deterrents that may keep them from attending. According to the DPS-F findings, the quality of an educational program should not be sacrificed due to the cost of implementation, however female participants may find cost as a deterrent more than males. The results show that farmers in general may be willing to pay registration fees, if other deterrents can be excluded. Extension agents, typically guided by limited operating budgets when planning programs, may be able to provide enhanced quality to programs by recapturing costs or creating revenues that could be returned to program implementation. Regardless, Extension agents in Michigan , based on the findings in this study, should be more fearful of loosing audience participation due to the timing of the activity, due to inadequacies in program content, or due to the method of program delivery, than due to program costs.

One thing is certain. Technological advancement is impacting farmers and their practices. This relates not only to operating in an environment of global market forces, but also to breakthroughs in computer technology, genetic engineering, crop and animal management, etc.. Farmers have no choice but to participate in continuing education if they wish to survive. At the same time, educators who provide information for farmers must be able to deliver programs and activities in a manner that is acceptable to U.S. farmers. Extension staff and other educators should place critical importance in understanding participation behavior related to motivators and deterrents for their clientele, and in regard to determining clientele needs. This underscores the importance of

advisory group input when planning educational programs.

Deterrents to participation do exist for farmers and they vary by population and sociodemographic group. The DPS-F may help scientists and educators in the future, in identifying those deterrents for other farmer types or in other farming areas. Regardless, the study has added to the discipline of adult education and has taken us one step closer to understanding deterrents which affect learning behavior of an adult population.

APPENDICES

APPENDIX A

UNIVERSITY COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS

MICHIGAN STATE
UNIVERSITY

January 19, 1998

TO: Carroll H. Wamhoff
410 Agriculture Hall

FR: David E. Wright, Ph.D.
Chair
The University Committee on Research
Involving Human Subjects (UCRIHS)
246 Administration Building

RE: IRB#: 97-122
TITLE: DETERRENTS TO PARTICIPATION IN EDUCATIONAL ACTIVITIES FOR MICHIGAN FARMERS
CATEGORY: 1-C
APPROVAL DATE: 02/21/97

RENEWAL: Our records indicate that this project was approved on the date shown above. As you know, UCRIHS approval is valid for one calendar year. If you are planning to continue your study after February 21, 1998, you must complete and return to the UCRIHS office a green renewal application form by January 21, 1997. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

CHANGES: As you are aware, UCRIHS must review and approve all revisions to human subjects activities, prior to initiation of the change. Therefore, if you have any future study revisions you wish UCRIHS to review and approve at this time, please answer question #7 on the renewal form "no" and follow the instructions given there.

If you have decided to discontinue the research or if you have already submitted your application to renew this study, please disregard this reminder.

THE APPLICATION FOR RENEWED APPROVAL HAS BEEN SENT TO THE RESPONSIBLE PROJECT INVESTIGATOR (ADDRESSEE ABOVE).

cc: Mark F. Hansen

OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES

University Committee on Research Involving Human Subjects (UCRIHS)

Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046

517/355-2180
FAX: 517/432-1171

APPENDIX B

SURVEY INSTRUMENT

PARTICIPATION IN EDUCATIONAL ACTIVITIES

A Questionnaire for Michigan Producers

AEE Center of Evaluative Studies
408 Agriculture Hall
Michigan State University
East Lansing, MI 48824-1039

PURPOSE OF THE STUDY

The purpose of this study is to help the agricultural industry better understand the barriers that prevent farmers from participating in educational activities. Your help in identifying these reasons, is very important to us. Would you please help us by completing this brief questionnaire. Please respond as honestly and as thoughtfully as you can. You are not requested to put your name on this survey.

The following example will help demonstrate how to complete this survey.
(Circle the number that best describes your opinion or situation .)

Example:
Even though I wanted to learn more about the topic covered, I decided not to attend a recent educational activity...

Reasons	This reason for not participating was... Not Important	Slightly Important	Somewhat Important	Quite Important	Very Important
1. Because of the location where it was held.....	1	2	3	(4)	5

By circling "4," the respondent indicates that the location of the educational activity was "quite important" when deciding not to participate.

Are you at least 18 years of age and actively involved in an agricultural or horticultural business at the present time? ***(Examples include a farm, orchard, nursery, etc.)***

_____ YES

If "NO", please pass this questionnaire to an individual on your farm or business who meets these criteria .

First of all, we recognize that people learn in different ways. Participation in planned and organized educational activities is one method that people may use to learn new things. These may be related to work or just taken for enjoyment.

How many educational activities did you participate in during the past year? Include both agricultural and non-agricultural related educational activities. Include such things as educational tours or meetings, lessons, conferences, demonstrations, etc.. *(Circle one answer only.)*

1 None
2 1-5 activities
3 6-10 activities
4 11 or more activities

Think of an educational activity -- whether farm-related or not -- that you WANTED to attend within the past 12 months, but never did. Examples might include flying lessons, computer training, a marketing workshop, etc..

How important was each reason listed below, in your decision NOT to participate in that educational activity ? *(Circle only one answer per question.)*

Reasons	This reason for not participating was...				
	Not Important	Slightly Important	Somewhat Important	Quite Important	Very Important
1 Because the activity was offered during a busy time of year.....	1	2	3	4	5
2 Because the activity schedule conflicted with my off-farm job	1	2	3	4	5
3 Because there was no one at the farm or business who could cover for me	1	2	3	4	5
4 Because the farm or business comes first and I didn't think I should be gone.....	1	2	3	4	5
5 Because there were too many activities offered at the time to attend all of them.....	1	2	3	4	5
6 Because I wanted to learn something specific but the activity was too general.....	1	2	3	4	5

(Continued)

Reasons	This reason for not participating was... Not Important	Slightly Important	Somewhat Important	Quite Important	Very Important
7 Because pre-registration was required and I didn't want to make a commitment that far in advance	1	2	3	4	5
8 Because the activity that was offered did not seem interesting enough	1	2	3	4	5
9 Because the activity was offered at an inconvenient location	1	2	3	4	5
10 Because I couldn't afford the registration or activity fees	1	2	3	4	5
11 Because I felt I was too old to participate in the activity	1	2	3	4	5
12 Because I didn't know about educational activities available on this topic	1	2	3	4	5
13 Because of the amount of time required to attend all of the sessions	1	2	3	4	5
14 Because the activity was scheduled at an inconvenient time of day	1	2	3	4	5
15 Because my family did not encourage my participation	1	2	3	4	5
16 Because I prefer to learn through other methods such as reading, radio, etc	1	2	3	4	5
17 Because I thought that the activity available would be of poor quality	1	2	3	4	5
18 Because I was not confident of my learning ability	1	2	3	4	5
19 Because of conflicts with my children's activities	1	2	3	4	5

(Continued)

Reasons	This reason for not participating was... Not Important	Slightly Important	Somewhat Important	Quite Important	Very Important
20 Because I'm not that interested in attending educational activities	1	2	3	4	5
21 Because my participation would take away time from my family	1	2	3	4	5
22 Because I didn't receive enough information about the activity ahead of time	1	2	3	4	5
23 Because the available activity did not seem useful or practical	1	2	3	4	5
24 Because I wasn't willing to give up my leisure time	1	2	3	4	5
25 Because a last-minute conflict arose that prevented me from attending	1	2	3	4	5
26 Because I felt unprepared for the activity	1	2	3	4	5
27 Because I couldn't afford miscellaneous expenses like travel, meals, etc	1	2	3	4	5
28 Because the activity was not on the right level for me	1	2	3	4	5
29 Because the activity conflicted with my civic or community duties	1	2	3	4	5
30 Because I didn't think the activity would meet my needs	1	2	3	4	5
31 Because I do not read or write well enough to feel comfortable participating	1	2	3	4	5
32 Because I did not feel that the activity was worth the fee for attending	1	2	3	4	5
33 Because I lacked the energy to attend	1	2	3	4	5

(Continued)

Reasons	This reason for not participating was...				
	Not Important	Slightly Important	Somewhat Important	Quite Important	Very Important
34 Because the activity was not offered when I needed the information	1	2	3	4	5
35 Because no one I knew was planning to attend	1	2	3	4	5
36 Because I prefer to learn on my own	1	2	3	4	5
37 Because I was not willing to pay the cost of the registration	1	2	3	4	5
38 Because my friends did not encourage my participation	1	2	3	4	5
39 Because I didn't find out about the activity far enough in advance to make plans	1	2	3	4	5

Now we would like to ask some questions for statistical analysis. *(Circle the item that applies, or fill in the requested information.)*

1 **What is your gender?** *(Circle one item.)*

1 MALE 2 FEMALE

2 **In which age category are you?** *(Circle one item..)*

1 18-24
2 25-34
3 35-44
4 45-54
5 55-64
6 65 & over

3 **In what county are most of your agricultural products raised or produced?**

COUNTY NAME:_____

4 **List the number of acres or square feet that you manage?** *(Include owned and rented.)*

_____ ACRES (FARM, ORCHARD, ETC.)

OR

_____ SQUARE FEET (GREENHOUSES, ETC.)

5 **What is your highest level of education completed?** *(Circle one item.)*

1 ELEMENTARY SCHOOL
2 SOME HIGH SCHOOL
3 HIGH SCHOOL DIPLOMA OR GED
4 SOME COLLEGE
5 TECHNICAL OR TRADE SCHOOL CERTIFICATION
6 2-YEAR COLLEGE DEGREE
7 4-YEAR COLLEGE DEGREE
8 SOME COLLEGE GRADUATE WORK
9 GRADUATE DEGREE

6 **What is the PRIMARY enterprise on your farm or business?** *(Circle only one item.)*

1 CASH CROPS
2 DAIRY
3 LIVESTOCK (EXCEPT EQUINE)
4 EQUINE
5 FRUIT
6 VEGETABLES
7 NURSERY, GREENHOUSE, ETC
8 OTHER_____

7 **What is your average annual gross sales from the farm or business?** *(Optional)*

1 LESS THAN $2,500
2 2,500 - 4,999
3 5,000 - 9,999
4 10,000 - 24,999
5 25,000 - 49,999
6 50,000 - 99,999
7 100,000 - 249,999
8 250,000 - 499,999
9 $500,000 OR MORE

8 **Do you consider yourself a part-time or full-time producer?** *(Circle one item.)*

1 PART-TIME PRODUCER 2 FULL-TIME PRODUCER

9 **In addition to your farm or business, do you have an off-farm job?** *(Circle one item.)*

1 NO 2 YES

Finally, please list the item that is most important to you in your decision to participate in an educational activity. *(Write these on the line below.)*

ITEM: _____

Feel free to list below, any barriers to your participation in educational activities that were not mentioned in this questionnaire? Also list any other suggestions you have.

_____

_____

THANK YOU !!

When you are finished with this questionnaire, please fold along the dotted line, tape the survey (do not staple), and place in the mail.

0007

Fold on the line

71-7503 (MH)

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APPENDIX C

FIRST COVER LETTER

MICHIGAN STATE
UNIVERSITY

March 11, 1997

Dear Agricultural or Horticultural Producer:

Producers sometimes like to take part in educational activities. They may do this to learn a new idea related to the farm or business. They may also want to learn about a non-farm interest such as a hobby. However, sometimes barriers or other reasons prevent producers from taking part in these educational activities.

We know very little about these barriers or reasons. The only way to find out is to ask you. Your thoughts and opinions are important to us. We have invited only 15 or 20 producers in each county of Michigan to take part in this study.

We have enclosed a questionnaire. **This questionnaire will take about 12 minutes to complete.** You indicate your voluntary agreement to participate by completing and returning this questionnaire. We will keep your responses confidential. You will not place your name on the questionnaire. We have placed a code number on the questionnaire for mailing purposes only. When we receive your completed questionnaire, we will remove your code number and name from the mailing list. This will prevent us from sending you a second questionnaire.

Department of Agricultural
& Extension Education
410 Agriculture Hall
Michigan State University
East Lansing, Michigan
48824-1039

517-355-6580
FAX 517-353-4981

Michigan State University will use the results of this study in planning educational programs for producers. Please return your completed questionnaire by Tuesday, March 18, 1997. When completed, simply fold the questionnaire in half as instructed. Then tape it shut and drop it in the mail box. We have already paid the postage.

Thank you very much for taking part in this study.

Sincerely,

Mark F. Hansen
Extension Agricultural Agent

APPENDIX D

POSTCARD REMINDER

Dear Agricultural or Horticultural Producer:

Last week we mailed you a survey entitled "Participation in Educational Activities". If you have already completed and returned the questionnaire, please accept our sincere thanks. If not, please do so as soon as possible. Your response is very important to us. The opinions of Michigan producers will be used to help improve the way that educational activities are offered. If by some chance you did not receive the questionnaire or it was simply misplaced, another questionnaire will be mailed to you within the next two weeks. Thanks for your assistance.

Sincerely,

Mark F. Hansen
Michigan State University Extension

APPENDIX E

SECOND COVER LETTER

MICHIGAN STATE
UNIVERSITY

April 1, 1997

Dear Agricultural or Horticultural Producer:

Three weeks ago, we mailed you a questionnaire entitled "Participation in Educational Activities". We have now heard from a number of producers. However as of this writing, we have not received your response. If you have already responded, thank you. We realize that you are very busy, and probably receive many surveys in the mail. However, very little research has been done to understand the barriers that farmers face in trying to attend educational activities. That is what we are attempting to study. We have invited only 15 or 20 producers in each county of Michigan to take part in this study.

We have enclosed a questionnaire in case the first one was misplaced. **This questionnaire will only take about 12 minutes to complete.** You indicate your voluntary agreement to participate by completing and returning this questionnaire. We will keep your responses confidential. We have placed a code number on the questionnaire for mailing purposes only.

Michigan State University and other organizations will be able to use the results of this study in planning educational programs for producers. Please return your completed questionnaire by Tuesday, April 8, 1997. When completed, simply fold the questionnaire in half as instructed. Then tape it shut and drop it in the mail box. We have already paid the postage.

Thank you very much for taking part in this study.

Sincerely,

Mark F. Hansen
Michigan State University Extension

Department of Agricultural & Extension Education
410 Agriculture Hall
Michigan State University
East Lansing, Michigan
48824-1039
517-355-8580
FAX: 517-353-4981

APPENDIX F

CORRELATIONS BETWEEN SOURCE FACTOR SCORES AND SOCIODEMOGRAPHIC VARIABLES FOR FARMER PARTICIPANTS

Table 36. Correlations Between Deterrent Factors and Sociodemographic Variables for Farmer Participants

Socio-Demographic Variables	Source Factors 1 Lack of Course Relevance	2 Lack of Confi-dence	3 Time Con-straints	4 Low Personal Priority	5 Scheduling Constraints	6 Cost
Gender	-.014	-.154*	-.062	-.123*	.013	.103
Age	.077	.127*	-.030	.046	-.041	-.027
Level of Education	-.077	-.282**	-.105	-.091	.012	-.013
Annual Gross Sales	.137*	.018	.176**	-.048	-.171**	-.087
Part-time or Full-time	.040	-.008	.170**	-.063	-.269**	.039
Off-Farm Job	-.052	-.085	-.021	-.064	.301**	-.064

*p < .05 **p < .01

APPENDIX G

CORRELATIONS BETWEEN SOURCE FACTOR SCORES AND SOCIODEMOGRAPHIC VARIABLES FOR FARMER NON-PARTICIPANTS

Table 37. Correlations Between Deterrent Factors and Sociodemographic Variables for Farmer Non-Participants

Socio-Demographic Variables	Source Factors 1 Lack of Course Relevance	2 Lack of Confi-dence	3 Time Con-straints	4 Low Personal Priority	5 Scheduling Constraints	6 Cost
Gender	.115	.146	.174	-.078	-.093	.341**
Age	.039	.229*	-.113	-.061	-.191	-.001
Level of Education	-.065	-.094	.014	-.238*	.056	-.127
Annual Gross Sales	.050	-.150	.211	-.187	-.120	.104
Part-time or Full-time	-.065	-.096	.133	-.184	-.214	.106
Off-Farm Job	.068	-.107	.056	.218	.401**	.098

*p < .05 **p < .01

APPENDIX H

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE

The following comments are in response to the open-ended question on Page 7 of the questionnaire, i.e., "Finally, please list the item that is most important to you in your decision to participate in an educational activity."

- Location, Timing, Subject.
- Widow and unable to do anything different.
- Having it during the time (hours) I can attend.
- Having enough time to go to class.
- Location of site as well as time of day.
- Time, Location.
- Will it help me make more money.
- 1-Location, 2-Subject Matter, 3-Appropriate for field of endeavor, 4-Timely Subject.
- Need to know or improve.
- I really want to hear about some agricultural ideas unrelated to commercial activities.
- Location of educational activity.
- Location and time of year.
- Item most important for participation.
- Benefits it will have for me.
- Interest in topics.
- Bottom line.
- Knowledge to improve farming practices, RUP credits, working cooperation and rapport with Extension agent.
- I don't know about these programs.
- Growing information with details, facts, new organic ways.
- If it interests me and have time to attend; distance.
- I'm 86 years old and must conserve extra [?].*
- Offers information I need.
- Time of year, of day & location.
- Money & Time.
- I feel the college professors are well-paid and the opportunity to come to local areas should be rewarding..
- Who the speaker is; people that are in industry often more knowledgeable and can relate better.
- Equine.
- Do I really need it?
- Leader, Location, Cost.

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- Need to know.
- Information on the subject
- If the activity is to the point and not dragged out.
- Location, costs, subject.
- Advance notice & content of meeting to be held.
- Convenience, time.
- Location.
- Needed to continue my business.
- Time of activity - it cannot interfere with job.
- 22" Rows.
- Usefulness in improving personal performance.
- Who the speaker or teacher will be.
- We need to be able to apply the topic to our farm and it needs to be a new idea.
- Person giving activity & subject.
- Convenient time & place.
- Topic.
- Timing with chores.
- Time of the year - winter months only.
- An interest in what is being taught.
- Item most important for participation.
- To learn; to talk with other producers.
- Time of day of the meetings.
- Free time and no conflict with other activities.
- Benefit to me.
- Something that would benefit me at 64 years old.
- Whether or not the subject matter is of primary concern to me at the time.
- Time - I don't have enough time!
- Subject.
- It's value to me.
- Place - time - educational activity.
- Time & Location.
- Knowledge (useful) gained vs. time commitment.
- It is educational so I learn.
- Subject to be covered, where & when.
- Time of day & Location (how far away).
- Information I needed, had time to participate & handy.
- Location and a convenient time (evening).
- Expenses, travel, time.
- Health permitting.

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- [?] - Item # 23 ("Because the available activity did not seem useful or practical.")
- Quality of program.
- To stay abreast & learn of new products & methods.
- Item #23 ("Because the available activity did not seem useful or practical.").
- Time of day. Time of year & location.
- Topics of current interest relating to profitability of my operation.
- Is it beneficial to my family or business?
- Farm coverage to allow me to go.
- Value of info presented.
- Perceived program value to my goals.
- To learn something.
- Length & Time.
- To know more about a product or practice that's taught.
- Available time.
- If it pertains to my farm operation.
- Interest in the subject.
- Time to attend.
- Will it benefit my business?
- Acquisition of knowledge.
- Information up-dates, exchange ideas.
- Time of activity. Most conflict with off-farm job.
- Relate to other producers.
- To keep up on new system to use.
- My problems with alfalfa. (Bugs, weeds, & disease.).
- To enhance my knowledge to farm better & more efficient.
- Encouragement - Approval - Cost.
- Item most important for participation.
- Reforestation.
- How it affects my business financially.
- Speaker & Material.
- Education in my line of production.
- Time. Have a part-time job as a [?], not sure when I may have to work for them.
- New technology.
- Scheduling plus business interests.
- Useful on my farm.
- Keeping up with the times.
- Bee keeping.
- Computer knowledge for farming & fun.
- Total time invested vs. knowledge/materials gained..

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- I just don't have much time.
- The time of day planned
- Time of year.
- Cost vs. what will it do for my farm. Loose $200.00/day in wages & travel if I attend vegetable convention in Grand Rapids.
- Time of year.
- To keep abreast of the agricultural changes.
- If the classes will be up to level anticipated to be.
- Money.
- Self Improvement.
- Topic.
- I look at specific results & the level of information.
- Time.
- Continue to learn new things.
- Time.
- Meeting my farming needs.
- Factual information that is up to date.
- Personal interest in topic and amount of creativity involved in participation. ..don't like lecture style...
- Topic and content.
- Time and purpose.
- Day of week & time of day.
- Soil quality/health - will it help to reduce off-farm inputs - less pesticide/fertilizer purchases.
- Time available.
- Location, Interesting, Timing, Subject.
- Keeping my mind open to new ideas.
- Had time.
- Farming.
- Item most important for participation.
- I'm a hobby farmer just to have something on the farm.
- Timing and length of season.
- Information to be given (topic).
- Specific interest and location.
- Cost, topic, of meeting, time of year or day.
- Knowing when & where the activity is.
- Cost, Location, Time.
- Review & New Technology.
- Location.

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- To learn more about my line of work.
- Of importance to farm operation.
- The content of activity.
- Convenience.
- Has to be valuable to my occupation.
- Is interesting to me.
- Time & Location.
- Someone who has experience.
- Interested in topic.
- Will it do me any good?
- Computer up-dates are needed in agriculture, fast if not yesterday.
- Topic & Time.
- Location.
- If I have the time and it is an interesting subject, I will attend.
- Knowledge & Special Activities.
- Convenient Location.
- If it is applicable.
- Information for crops I grow; close to home within 30-40 mile drive.
- Interest in the subject.
- Location and the time of day - prefer evenings.
- Specific subject matter.
- Cover crop information is real helpful.
- Interest in subject matter and opportunity to learn.
- Day of week & time of day.
- Location.
- Amt of practical-hands on experience the instructor has - not # of degrees or # of papers he has published.
- The program relevance.
- Item #3 ("Because there was no one at the farm or business who could cover for me.").
- Location & Length.
- If I can use what I learn.
- Time.
- Location.
- Keep informed about new technology in the greenhouse business.
- Item most important for participation.
- I like to see new things and learn new [languages].**
- To obtain license.
- Being able to work into my schedule.

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- Usefulness.
- Location.
- I don't have time for many outside activities.
- Money.
- Am I going to learn anything new.
- To learn more.
- Timing - medication at time needed.
- Something related to improving $ return in our farming activity - to do a better job.
- If it pertains to the crops I raise.
- Retired.
- No-till.
- We are retired (but earnings from farm).
- Value of material to be covered.
- Relevancy to our business.
- Business, the more I learn the less I have to sub-out labor.
- Location.
- Whether I have a sitter for my children.
- Time, location & cost.
- If it covers information that I can use.
- Time available when not working at full-time job.
- Learn more about something.
- Has to do with the crops I grow.
- If it is interesting and I can learn about something new.
- Cost and if it is interesting.
- Finding the time in my schedule to attend.
- Presentation topic & content.
- Time & Location.
- Topic must include fruit & vegetable crops which I propagate.
- Time of day - prefer morning.
- Time of day.
- Will it be interesting and be an addition to what I already know.
- If I want to do it or not.
- In Florida 8 months, 4 months in Michigan.
- Notification of educational activity, time to plan for it.
- Subject, time, location, in that order.
- I know little or nothing of your courses. No advanced notice of courses.
- To learn more on subjects that are hard to get information on.
- How to be most productive-dairy cows or steers -- or get out.

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- I wanted a session on fruit-you had one 10 years ago. Everything I learn extra I pick up from Pro-Farmer.
- Increase my knowledge in that topic.
- Item most important for participation.
- Time of day.
- Time.
- Evening classes.
- Get the pesticide license.
- Topic & when offered.
- Cost.
- Computer Training.
- Item #4 (Because the farm or business comes first and I didn't think I should be gone).
- Topic & time available.
- Relevant and specific - most activities seem to general.
- Starting and ending time, as I have cattle to feed.
- Less than 25 miles from home between 10:00 am and 4:00 pm.
- Subject content.
- Immediate need for information offered.
- If I have the time to go.
- Location close to home - within one hour.
- Topics.
- Location - how helpful it will be to my situation.
- Didn't know about any.
- Cross breeding beef cattle & raising hay.
- Need for knowledge.
- I am going to be 70 years old this year; I have enough interest without furthering my education.
- Usefulness and timing.
- Solution to control of honey bee mite problems.
- Being more profitable.
- Will I benefit?
- If it is scheduled during evening hours.
- Topic, Location.
- Value of information presented.
- Becoming a better servant of our Lord Jesus Christ.
- Something that fits my needs.
- Anything to improve general farming.
- Personal interest and potential for learning something new.

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- Money.
- New concepts and products.
- Directly benefits the business.
- Problem solving - Continue to involve MSU staff members.
- Item most important for participation.
- Greenhouse.
- Information (useful), deregulation.
- Lack of information on when [activity is held].
- Curiosity.
- Whatever activity involves to learn more about my business.
- Forestry.
- Free time to attend.
- Interest.
- My need to know.
- Something that pertains to my dairy.
- None.
- People I meet sometimes give me more information than I receive at the meeting.
- None.
- If I feel it will help my business.
- Useful [information].
- Information that is practical - that I can use.
- Direct interest in our operation - and quality instructors.
- Location.
- None.
- Time of day.
- Time, place, subject.
- Need evening meetings.
- I just don't have the time.
- To be mailed info on time.
- Something new worthwhile learning.
- Hearing problem.
- Curiosity; desire to learn more.
- Length of time.
- Money.
- No activities are of interest to me.
- Need information to make a decision.
- Dairy management.
- Learn how to make a profit.
- Reasonable cost/critical information/as little time as possible.

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- Application.
- Interest.
- Do I feel I will learn something at the meeting.
- Needed information.
- Item most important for participation.
- Personal interest in the subject being covered.
- Improved production.
- Will it help me be a better person in general.
- The usefulness of the information.
- Location and time of year.
- Items #7, #20, and #30.
- If it helps increase cash flow.
- Future plans for feeding the world.
- Computer - knowledge for record keeping.
- Time and distance away.
- Item #8 (..activity that was offered did not seem interesting enough).
- Time of year and day.
- Type of class.
- Better way of farming.
- I learn new things all the time about things I already thought I knew.
- Convenience and content.
- Information.
- Being able to take off work at second job to attend.
- If it is something I am interested in and I can put the information to use.
- Applicability/relevance. I've heard too many of "same guy - same [explicative]" presentations, [e.g., Kg/ha].
- Time and appropriate topic.
- If it is something I can use.
- Just wanting to learn something different.
- Those that solve problems.
- Getting too old.
- Ag laws.
- Relevance to my operation.
- Interesting.
- Had to work out [off the farm] all my life to keep the farm.
- Work horses.
- None.
- Needs to be practical in everyday life - Item 23.
- To learn in order to do a better job.

OPEN-ENDED RESPONSES TO THE QUESTIONNAIRE
(Continued)

- Knowledge is the only thing that can't be stolen from you.
- Item most important for participation.
- Pesticide control.
- I'm not interested in farm related educational activities.
- Interest - new ideas.
- Must not be too general.
- The need for information offered.
- Some informational activity and good speaker.
- Whether or not the topic is useful to my farm production.
- Need in-depth information on specific topics.
- Relevant information to our life.
- Knowing about them.
- Type; time of year should be winter.
- If it would be held on weekends, not weekdays.
- Have educational dairy or agricultural meetings closer to home.
- Available time.
- Learn something that will be useful.
- Second request.
- Time.
- Time.
- Something that will benefit me and my family.
- Lack of time.
- "Ignorance" - the older I get, the more I realize that I don't know. I would attend...if more were offered.
- [Would like to] Learn how to write.
- Location and time.
- Fore-knowledge of the event & enough information showing the activity worthwhile.
- Conflict with my off-farm job.
- Farming [but] retired.
- I want to be knowledgeable in this area [dairy farming] as much as possible.
- Location (travel time).
- Educational activities scheduled during workday.
- Learning - especially if it affects the bottom line or the environment that I live in.

* [?] - Unable to read handwriting and unsure of word or phrase.
** [ ] - Items in brackets were added or rephrased to clarify comment.

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