DISSERTATION

POST EDUCATION APPLICATION OF CATEGORY ONE TYPE CONTINUING EDUCATION REPORTED BY CERTIFIED FORESTERS

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY RALPH R. JOHNSON ENTITLED POST EDUCATION APPLICATION OF CATEGORY ONE TYPE CONTINUING EDUCATION REPORTED BY CERTIFIED FORESTERS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

POST EDUCATION APPLICATION OF CATEGORY ONE

TYPE CONTINUING EDUCATION REPORTED BY

CERTIFIED FORESTERS

This study was designed to evaluate the use of continuing forestry education (CFE) for CFE reported by Society of American Foresters Certified Foresters® (CF). Potential participants consisted of all CFs with an Email address on record with SAF. Surveys were distributed to 2076 CFs. An electronic link to the survey was sent in an Email indicating the survey related to only one selected continuing education event. This event was randomly selected from those that had been stored in the Society's database. The response rate to the survey was 32.1%.

Use was assessed using a self-reported single value (yes or no) and with a self-assessment score using changed stages of innovation adoption. Continuing Education (CE) use was positively correlated with length of the CE event and negatively correlated with proximity to retirement. Using a logistic regression model, use was predictable with innovation adoption score, percentage of time working full time in forestry, bringing a work related problem to the CE, receiving adoption strategies from the CE provider.

The study developed and used an Internet survey adapting two surveys used in health profession research. One survey was by Ottoson and Patterson (2000) and the other was Williams, Keim, and Johnson (2004). The survey was used in combination with historical data from a database of CFE information. Over 82% of Certified

Foresters reported they used their CFE. The majority of those reporting that they didn't use their education indicated they had no need to use it.

Descriptive information was collected for reporting general attitudes toward CE and methods of delivery of CE events. Most Certified Foresters reported they think CE is important, is something they've always done, is needed to assure competency, and is enjoyed. There was less agreement on other preference questions. CFs generally agreed they were likely or very likely to attend lecture, workshops, seminars, and field demonstrations. The least liked CE presentation methods were academic courses, posters, distance learning, satellite, and residency programs. Slightly under half of the CFs reported they had a learning plan. Most CFs responding to the survey worked full time as field foresters.

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CHAPTER 1 - INTRODUCTION

Formal certification of foresters by the Society of American Foresters (SAF) has been in place since 1994. Official action to create certification was confirmed at the Fall 1993 Council Meeting (SAF, 1993). The label, Certified Forester, is a registered trademark of the Society of American Foresters. Throughout this document, the term Certified Forester (CF), refers to this officially trademarked program. The Program's intent was to be:

> A voluntary, nongovernmental program, open to SAF members and nonmembers, that certifies an individual has completed minimum education, experience, and continuing education criteria for obtaining Certified Forester (CF) status, from the Society of American Foresters. [NOTE: As the experience criterion (#3, below) is further refined, certification's objective may be specific to "practicing" foresters, and the designation modified to reflect Certified Practicing Forester (CPF), or similar wording.] (p. 8)

In the year leading up to the decision, there were several commentaries, letters to the editor, and perspectives regarding professional identification in the *Journal of Forestry* (Amundson, 1993; Banzhaf, 1993; Heckman, 1993; Smith, 1993). These commentaries discussed both licensure and certification. Smith summed up the situation by stating that "Certification will not replace registration or licensing in the few states where such legislation exists, but will augment them with a national program. It will also provide managers and consultants in nonregulated states with a nationally developed measure of their commitment to professional practice" (p. 3). It is also worthwhile remembering the early 1990s saw significant public involvement in forestry that is best remembered by the Spotted Owl controversies. Forester Certification is not mandatory

for Society membership. Of the roughly 28,000 members of Society, nearly 3,000 have gone through the process to become certified (L. Murgia, personal communication August 26, 2004).

Statement of the Research Problem

For purposes of Re-certification, the Continuing Education requirement states the individual must complete a minimum of 60 hours. A minimum of 30 hours must come from Category One. Category one Continuing Education (CE) is described as:

> Organized course work or activities in forestry or forestry related subject matters such as silviculture, mensuration, forest pest management, habitat management, urban forestry, or forest policy. Included are seminars, short courses, and workshops conducted or sponsored by public or private organizations, as well as technical sessions of SAF meetings, or conferences. (SAF, 2004 ¶ 2.)

Public perception of professional competence is often stated as a goal of the CE requirement for Certification. The SAF stated that Certified Foresters value continuing education (Goergen & Hay, 2004). Research in professions other than forestry (Cividin & Ottoson, 1997; Garganta, 1989; Queeney, Smutz, & Shuman, 1990; Sattem, 1997) indicated there was a positive public perception to CE but there may or may not be a substantial increase in professional competence with mandatory CE. In part this disconnect can be explained by comparing theoretical characteristics of adult learners with characteristics of a mandatory education requirement.

Phillips (1987) proposed five characteristics of successful continuing medical education programs. These are noted as follows:

1. *Specified Audience.* Each of the physicians in the learning process were clearly defined and had expressed a desire to learn something.
2. *Identified Learning Need.* Each physician could identify a learning need, a gap between present and optimal performance. In each case emphasis was on patient need, and small groups were involved.

3. *Clear Goals and Objectives.* It was clear to all involved what was to be learned.
4. *Relevant Learning Methods, Emphasis on Participation, Clinical Setting.* Methods of learning were primarily participative, involving small group discussions and/or clinical procedures. Learning occurred in the participant's own hospital or clinic or simulated clinic setting.
5. *Systematic Effort to Evaluate.* Assessment of the value of the learning experiences was decided when programs were developed, based on clear definitions of learning needs. A variety of techniques were used. (p. 59)

So do professionals take CE credits just to meet the certification requirement, accomplish a function, or do they truly seek learning experiences to enhance their professionalism by seeking offerings consistent with the success elements posed by Phillips? Although the forestry certification program at SAF has been in existence for 10 years there has not been a formal examination of its effectiveness. Hence, it is time to evaluate the SAF continuing education requirement for Certification. I hoped to show that there is a paucity of evidence from most professions and for natural resource professions, and that a critical look at the value of a mandatory continuing education requirement for foresters is worthwhile. A look at Certified Foresters experience with their continuing education may lead the Society to evolve its CE requirement.

Mott (2000) suggested such an evolution when she stated: "CPE [Continuing Professional Education] programs that are dynamic, authentic, practice based, collaborative, and future oriented offer practitioners a broadened concept of professional development in keeping with the performance models" (p. 30). This statement is from a discussion by Mott of alternative CE models.

Two recent letters to *The Forestry Source* have, as their content, Continuing Education. One by Goergen and Hay (2004) presented a philosophical view that CE is good, while Raymond (2004) presented a practitioner frustration with attending CE

events that are poorly presented or not relevant yet meet the CE Category one requirement. Houle (1980) listed 14 such reasons for continuing education of professionals with public acceptance being among that list. Finding practical applications to solve problems was also on Houle's list. The topic of continuing education of foresters has been around for a considerable length of time with an excellent article by Muth and Hendee (1980) in the *Journal of Forestry* suggesting the need for personal contacts to get information transferred. Just as theories of adult learning have evolved, so have continuing education offerings. Hopefully over the last quarter decade, instructors have adopted more constructivist approaches to teaching. Constructivist approaches consider that learners learn in a social context and make meaning in their learning process by integrating these prior experiences. Gance (2002) summarized constructivist theory as:

1. A cognitively engaged learner
2. Hands on learning
3. There is a problem to solve
4. Learning has a social component

Although the SAF's Certified Forester requirements may seem to be more behaviorist in nature, the individual professional has had considerable latitude in selecting courses. A behaviorist uses a more objective approach and that learning is based on an absolute knowledge; something akin to there is only one right observable answer. Merriam and Caffarella (1999) summed behaviorist, "In brief, behaviorists define learning as a change in behavior" (p. 265). This research hoped to help discover what professional foresters do at their workplace, after the formal class was over. This is to say the learner may make meaning and use of continuing education much different than anticipated by the provider

of the education had anticipated. A constructivist would consider this part of the learner process completely acceptable. A further discussion of these topics was more fully summarized by Jonassen (1991).

In a review article in 1983, Rockhill summarized the issue of mandatory CE in the context of contemporary adult learning theory as follows:

> The point for many is that adults should have control over their own learning. Given the opportunity, the right conditions and incentives, adults learn on their own. Adults are capable of self-directed learning, and research shows that they engage in innumerable learning projects in connection with their work. People learn in many ways; only some choose to take courses; other find organized instruction inefficient or inappropriate to their ends. (p. 115)

Relationships to Technology Transfer Science

The science of technology transfer can be used to make sense of the application of education. Rogers (2003) referred to stages of innovation diffusion. He presented these as knowledge, persuasion, decision, implementation, and confirmation.

Rogers' (2003) stages can be used to help assess why a professional may or may not apply the content of a CE course in the workplace. Professional use of CE is more than a simple yes or no. Rather, it builds from just knowing about something to the more complex of reflecting on how the professional used it. If a professional determines the relative benefit is too small at the Decision stage, the content is not applied. In other cases the professional may decide the content is inappropriate for their application. The professional may apply the new idea and then decide to abandon the new method. These decisions may be totally reasonable in describing why CE content is not applied. The professional decision to use or not use new ideas and technologies must be taken in the context of the professional's practice. In the context of my proposed study, non-use of

educational content may, in a strange way, be considered use. That is to say, in making a professional decision to use a specific practice, the practice selected was chosen after comparing it to other alternatives, including the new one. The professional may keep this new technique in the back of their mind and possibly use it in a more appropriate circumstance.

Yet another point of view was presented by Stock and Tatikonda (2000) working in the field of operations management. They describe a technology transfer process, which relates technology uncertainty with organizational interaction. I paraphrase this as, if a learning event deals with subject matter which is poorly defined or developed, getting it into use by the student may require considerable interactions with developers, instructors, the student, and, possibly, other intermediaries. As an example, suppose a CE offering was designed to bring a professional forester up to date on new mapping software. Due to software "bugs", the professional was unable to apply the concept back at the office. Considerable interaction may be necessary between the professional and a software technician to apply the methods.

In a study of contextual influences on learning application, Ottoson and Patterson (2000) described five variables statistically associated with application of course content. These are encouragement from others, support for changes, opportunity to apply, sufficient resources, and authority to act

Williams, Keim, and Johnson (2004) conducted a survey sample of dietitians to quantify CE preferences. Their survey instrument is relevant to this study in describing professional learning preferences and will be discussed more in Chapter 2. The

evaluation of forester's application of CE could be investigated as a mix of the following topic areas:

1. Adult learning concepts, and specifically the benefits to the individual professional's competence
2. Continuing Professional Development --benefits to society by having competent professionals
3. Professional Credentialing requirements—marketing benefits to the professional and legal ability to practice the profession
4. Technology transfer theory—appropriateness of course content and its application
5. Course content complexity and uncertainty—maturity and direct application of the course content

The selection of attributes considered in this study allow for sifting through this complexity.

Purpose of the Study

This study documented the use of CE by foresters in light of three general concepts. The first of these was adult education. Kerka (1994) made recommendations for improving continuing professional education. Some of these relate to the purpose of this study. Ones of interest to this study are described in the following quote:

> Effective CPE should be accessible, affordable, and of **high standards** [author's emphasis]. It is difficult to balance quality considerations with the need to keep costs reasonable, serve large numbers, and address continual updating needs in many specializations. Collaboration among providers is recommended. CPE should be **relevant to individual learning needs, applicable to practice, and designed for different learning styles** [author's emphasis]. Professionals in organizational settings should receive support for transferring learning to practice, and interstate mobility of MCE credentials should be established. (p. 2)

Kerka's recommendations look very similar to comments made earlier by Phillips.

The second concept is that of technology transfer. As described by Rogers, diffusion of ideas is influenced by a variety of factors. This research will look at the stage of diffusion in relation of use of CE by Certified Foresters. The technology transfer concepts presented by Stock and Tatikonda (2000), specifically complexity/uncertainty of the technology and the interactions of recipients and providers of technology apply to the use of CE. Lastly, the role of the necessity of credentials to practice forestry and its influence in application of CE was looked at.

Research Questions

In a review paper, McDonald (2001) made the following statement:

> CPE programs often are not subject to much evaluation beyond determining numbers of participants and possibly participant satisfaction. Even if evaluators wanted to do more competency or performance evaluations, valid assessment tools simply are not available. Also, much of the research that been done regarding CPE has been limited to formal programs, in spite of the fact that most learning takes place in the workplace or through informal, self-directed means. Perhaps it is time to redirect the research energy and funds to a more productive and useful source of data: the workplace. (p.38)

This research attempted to implement McDonald's recommendation by examining what happened to a forester's use of CE instruction following the formal training. This research did not look at benefits to society or to the professional association, but it helps to help answer the following research questions:

1. Was the Continuing Education (CE) learning put into practice? (Is there a quantitative measure of "put into practice"?)
2. What is the association between hours of pre and post C E activities to use of the CE?

3. What factors are related to professional use of C E activities?
4. What preferences do Certified Foresters have toward C E methods?

Need for the Study

When certification was initiated for foresters, there was a program requirement that specified documentation exist proving the continuing education took place. In the minutes of the 1993 Council Meeting, (SAF, 1993) there is a note that there were further issues to address. One of those issues was the minimum education criterion. For recertification the stated requirement was 150 continuing education units in a three-year period. As noted earlier, the final wording of the education requirement for certification noted 60 units of Category One education. Based on experience with professions other than forestry, advances in adult education theory, and various other factors, a rigorous evaluation of the SAF's Certified Forester education requirements was appropriate. The Society of American Foresters supported this research and was an active collaborator (Appendix A). Active collaboration between SAF and this researcher helped assure proper access to member records at the start of the project, and adequate dissemination of results to the members following the study's completion.

Limitations to the Study

A limitation of applying results from this study is that the study was restricted to a population of professional foresters that have elected to obtain a professional credential that requires continuing education in order to be re-certified. This research does attempt to discover self-reported attributes of "post-course" learning that take place as part of a continuing education experience. If post-course learning can be described and quantified,

it is possible to allow additional credit hours for this additional work outside of the formal course setting. Such estimates of post education would be based on self-reported information.

Researcher's Perspective

The researcher had experience with participating in CE activities related to forestry. This experience indicated that events conducted in a traditional lecture format were often not used on the job. Researcher experience indicated activities that included a field trip or other interactive participant involvement were more frequently used when returning to the job.

The researcher was a Certified Forester and a licensed as a professional forester in the State of California. The researcher practiced forestry for the USDA Forest Service from 1968 until 2004. Given this career history, there may be participants that had a personal acquaintance. It was possible this may in some way have influenced their survey responses. At the time of the study, the researcher was no longer in any way the supervisor of any potential recipient.

An advantage of the professional background of this author is the personal CE experiences that can be incorporated into the study. These same personal experiences can help create text and terminology that is familiar to natural resource professionals. In addition to these benefits of a personal background, there are benefits gained from the knowing conditions practicing foresters encounter in trying to attain meaningful CE. It is my opinion; there was negligible bias and influence attributable my status as investigator.

CHAPTER 2 - REVIEW OF THE LITERATURE

For purposes of this dissertation, I divided the review of literature into five sections. The first of these sections references literature reviews, theory discussions, and general advice. The second section looks at studies focused on evaluations of Continuing Education (CE) in general. The third section focuses on studies of Mandatory CE. The fourth section looks at CE in the Natural Resources professions. Relevant literature in the area of research methodology is reviewed in the fifth section.

Advice, Theories, and Reviews

This study investigated the "use" of CE by Certified Foresters; it was helpful to first define "use". For example, Ford (1994) hinted at the complexity of this answer by suggesting answers to the following four questions:

1. What do you expect to change during an organized educational experience?
2. What Behaviors and in What Settings Do You Expect the Learner to Apply the Newly Acquired Knowledge, Skills or Attitudes?
3. What Are the Barriers or Inhibitors to the Effective Transfer of Learning?
4. How Long Do You Expect the Acquired Knowledge, Skills or Attitudes to Be Maintained Over Time? (p. 2-3)

Ford's questions suggest a constructivist perspective. That is to say, one must look at the learner in a way that takes into account the learner's social context.

Ottoson (2000) offered a learning model called Situated Evaluation Framework (SEF) to help guide evaluation of CE. I chose to couch "use" as the item to evaluate in this study of CE of forestry professionals. In the SEF Framework, Ottoson places the learner in the center of a complex of Program Process, Program Content, Organizational

Facilitators, and Social Support. The learner provides motivation, experience, and intent. The result, or use, is the construction, use, and diffusion of knowledge. The complex described is also consistent with the four questions offered by Ford. Cervero (2000) offered "three critical issues that must be addressed in building systems of continuing education" (p. 8). Two of the issues are related to this study. These two are:

> ISSUE 1. Continuing education for what? The struggle between updating professionals' knowledge versus improving professional practice.
> ISSUE 2. Who benefits from continuing education? The struggle between the learning agenda and the political and economic agendas of continuing education. (p. 9)

In a subsequent review article, Cervero (2001) reiterated the importance of his issues 1 and 2.

The SAF's stated reasons for CE suggested implementation of a professional's Continuing Forestry Education (CFE) to implement solutions to issues. The SAF World Wide Web (2005) states CE for re-certification as, "An active program of professional development keeps foresters abreast of the rapidly expanding scientific and technical knowledge and methods associated with forest resources". (¶ 2)

Is it assumed that professional development, especially through continuing professional education, will result in maintained competence? Neither this web reference, nor the initial SAF Council minutes (SAF, 1992; SAF, 1993) made an explicit connection between competence and hours of continuing education.

Nowlen (1988) provided a frequently heard quote regarding continuing professional education. It goes as follows:

> It is dominated by the informational update. In what is typically an intensive two- or three-day short course, a single instructor lectures and lectures and lectures fairly large groups of business and professional people, who sit for long hours in an audiovisual twilight, making never-to-be-read notes at rows of narrow tables

> covered with green baize and appointed with fat binders and sweating pitchers of ice water. (p. 23)

The image portrayed by Nowlen may reflect how professionals in forestry say they prefer to receive their CE. Eliason, Blinn, and Perry (2003) used focus groups consisting of forestry professionals to determine education needs for Forest Management Guidelines. In contrast to the lecture, lecture, lecture approach, these authors noted their professionals wanted background and rationale, an incorporation of localized information, and experiential practice.

There was a specific recommendation as follows:

> *Consider educational methods other than workshops.*
> Although the majority of natural resource professionals may learn well through hands-on activities "in the field," continuing education programs should employ a variety of educational methods to accommodate an array of learning styles and help boost the likelihood of learning for most participants. (p. 77)

Lecture isn't even noted in the focus group recommendation, although it could be included. When forestry professionals discussed "useful" CE, they illustrate the complexity discussed by Ford and Ottoson and reflect the adult learning concepts discussed in Chapter 1.

In a review chapter, Daley (2000) stated:

> Constructivist learning theory and situated cognition help us understand how professionals acquire knowledge, how they make use of their experiences, and how they learn through their practice. In my experience, however, there is another level of learning that goes beyond what we can understand from constructivist frameworks. Professionals will often describe how they learned topics in formal education programs only to have their ideas on those topics change in the context of practice. (p. 36)

For the proposed study, Daley's comment suggests a need to look at "use" in a longer term and more complex context. Although it may be relatively easy to keep track of CE credits posted by professionals, it is far harder to quantify the kind of learning and

post session learning described by Daley. Daley (2001) expanded on her comments when she added; "Professional practice seems to facilitate knowledge construction by fostering a reflective process". (p. 43)

Key to my research is a second impact noted by Daley;

> This study suggests implications for the practice of CPE. It is clear in the study results that knowledge, context, and professional practice interact to foster a process of constructing knowledge and using information. Yet, most CPE programs are created on the premise that simply providing transmission of information in an educational context will impact practice. (p. 50)

The message I interpreted from Daley's conclusions is consistent with Ford's and Ottoson's, that use of CE by professionals is complex.

The innovation diffusion theories (technology transfer) were discussed in Chapter 1. The key references I built upon are Rogers (2003) and Stock and Tatikonda (2000). From a technology transfer perspective, the Rogers' stages of diffusion are consistent with the continuing education theories noted in this chapter. The complexity/social interaction ideas of Stock and Tatikonda mentioned earlier are also consist. Professionals may or may not implement the content of a CE activity depending on the professional context and alternatives.

A variety of CE approaches have also been discussed in the literature. These have relevance to this study, as most of these alternative learning approaches don't qualify as Category One educational credit as described in Chapter 1. Eisen (2001) and King (2002) discuss peer-based learning. Merriam (2001) describes self-directed learning. Lovin (1992) discussed workplace partnerships. Jennett and Pearson (1992) describe practice-based learning. Hansman (2001) describes mentoring as a valid means of CE. Under the SAF rules, this form of CE would be difficult to use as Category One CE credit. Any of

these learning methods could be a pre or post part of a formal CE program that itself qualifies for Category One CE credit, yet these extra activities do not meet the model described for Category One CE.

The approach of counting education in the Category One format relates to contact hours of instruction. The easiest scenario is the classroom setting where the elapsed time can be easily calculated. But if the learning takes place when the learner works on a project of their own, works with a peer, or other non-behaviorist approach, competency is built and the education takes place. The only difference is it's hard to measure. There should be a way to include such learning methods along with traditional workshops and courses.

Evaluations of Continuing Education

This section focused on studies dealing with impact evaluations of continuing professional education. Baldwin and Ford (1988) published a review article on technology transfer research. The authors stated their work as a critique of transfer research from the organizational-training literature. The authors conducted their review using partitions of training inputs, training outputs, and conditions of transfer. Their overall critique states; "While the limited number and the fragmented nature of the studies examining transfer are disturbing by themselves, a critical review of the existing research reveals that the samples, tasks, designs and criteria used limit even further our ability to understand the transfer process" (p. 86). For my study, the findings needed to be taken in the context of the complex learner. The attendee at the training; or, in this context CE, may conclude the content isn't appropriate for their particular work context.

Impact studies need to be looked at from both the technology transfer/innovation diffusion side as well as the learner/receiver side.

Lockyer (1992) reviewed works on adoption of innovations in the health profession. Lockyer makes ties to Rogers' ideas. Lockyer noted that as complexity of content increases there is a need for more sources of information and social interactions.

Ottoson (1995a), who is also in the health field, investigated influences on the application of learning. Ottoson (1995b, 1997) expanded on her ideas of influences on CE application with the following statement:

> Application is a complex, multidimensional process that takes more than a good idea. It takes knowledge, skill, endurance, and artistry. Application requires multiple kinds of knowledge, including knowledge of the *thing*, the context, the practical, and the skill to put it all together." (Ottoson, 1995b, p. 25)

Axtell, Maitlis, and Yearta (1997) conducted a study using a mail survey of 62 individuals that attended a single human relations training session. In this study, respondents were surveyed immediately after the session. Eighty six percent of the respondents indicated they acquired a significant amount of new skill. The attendees were surveyed one year after the session, at which time only 49% of the attendees reported they transferred the training to practice. After one year only 45 attendees responded, so the sample was fairly small.

In a study of social workers, Smith et al. (2006), found that professionals used their continuing education on returning to practice. These authors used a mail survey that had resulted in 230 completed surveys. Respondents were asked how specific attributes contributed to application using a Likert scales and yes/no questions for a variety of questions in categories of predisposing factors and environmental factors. Several additional questions dealt with application. The dependent variable of perceived change

was a continuous variable that resulted from a constructed scale. The study indicated continuing education resulted in changed application. The indication of use did not seem to be as strong as the use reported by foresters; however, the survey questions were different. The biggest application reported for the social workers was a category called professional knowledge.

Using a two-phase study of British dentists, Firmstone et al. (2004) looked at the change in practice as a result of continuing professional development (CPD). The first phase was a self-assessment survey with 2082 respondents with the survey asking about participation in CPD and the impact of the education on practice. In the second phase, 30 participants were interviewed two to three months after the CPD. The authors found a positive correlation between a high impact rating and the number of courses taken. They also noted a trend between impact rating and years of practice. Very young and very senior dentists reported lower ratings than those in the middle. In findings similar to those presented by Rogers (2003), the authors state the following:

> Put simply, courses must first be selected; barriers to attendance must then be overcome before a dentist can participate. As a result of the course, two things can happen—either little or no new learning occurs or, some new learning can be acquired. Where there is little or no new learning, the course can still usefully serve to reassure or confirm current practice. Where there is new learning, this can lead to change, an impact on practice, but this is subject to overcoming barriers to implementation. (p. 775)

The authors further noted that selection of courses was related to the areas of convenience and learning needs. These two concepts were queried of the participants in this study. Another recommendation from their study was to adjust CPE for dentists in later stages of their career. In relation to Certified Foresters, those in senior management positions, who are in or near retirement, fall in this category.

Holt (1994) suggested ten evaluation questions be asked by adult education participants. These ten questions are worth quoting now, will be found in the survey instrument or are a part of two relevant instruments that will be described in Chapter 3.

1. In what ways did the ideas or insights presented during the program have a direct impact on you?
2. Did you take notes during any of the sessions? If yes, how did you use the notes?
3. Have you used any of the program handouts? If yes, please describe.
4. In what ways have you followed up on any of the ideas or insights presented during the program?
5. Since the program, have you attended any similar programs?
6. Did you discuss any ideas or topics from the program with others following the program? If so, explain with whom and why you discussed.
7. Did the teaching methods help you transfer your learning? If not, what would have been more helpful?
8. The primary purpose of the conference was to... Do you think this goal was achieved?
9. Were your objectives for the program met?
10. Did the program prepare you to transfer new learning to work, home, or community settings? If yes, please explain. (p. 29)

The concepts noted in Holt's evaluation list can be transformed into quantitative values. Holt's concepts will show up in the instrument developed in the methods section of this proposal.

Mandatory Continuing Professional Education

For Certified Foresters to be re-certified, continuing education is a mandatory requirement. On the surface, the mandatory requirement appears to be at odds with the adult learning concepts of Knowles (1990) and other adult educators. The key contradiction is the impact of intrinsic versus extrinsic motivation. As a certified forester recently recertified, I noticed some increased anxiety as the due date approached and my CE credit completion needed to be assembled and submitted to the Society.

Donen (1998) posted pro and con arguments for mandatory continuing medical education (CME). Donen states, "It is important to stress that outcome, rather than process, governs the effectiveness of any CME intervention" (p. 1045). In an earlier work, Phillips (1987) concluded that mandatory CE was effective when there were learners having a desire to learn, there was a learning need, there were clear goals and objectives on what was to be learned, learning methods emphasized participation, or there were systematic efforts to evaluate the CE. There was little difference between mandatory and non-mandatory CE populations for people who were regularly and voluntarily participated in CE. Needing the Mandatory CE requirement could be associated with Rogers' innovation class of "Laggards". In another review article, Eustace (2001) noted, "Whether or not mandatory CE has the intended outcome of increasing knowledge and skill for better patient-care outcomes is still in question" (p. 136).

Using census data of engineering CE courses, Nielsen (1983) concluded growth in attendance at voluntary CE offerings as evidence a mandatory CE requirement isn't necessary. However; Nielsen didn't look at use of the CE in his analysis.

Queeney, Smutz, and Shuman (1990) compared behavior changes of counselors in mandatory and non-mandatory CE situations. Mail surveys were used in this study. One of their concluding statements is the following, "Lack of any apparent relationship between mandatory continuing professional education and participation in needs assessment, application of learning, and other supplementary learning activities merits attention" (p. 22). This finding would indicate some ability to translate CE use of a population with mandatory CE to the non-mandatory population. In the case of this study, Certified Foresters versus foresters not certified could be comparable.

Garganta (1989) noted the following:

> The case for mandatory continuing education begins to lose credibility, however, when the criteria or success includes significant, measurable changes in either the professional's method(s) of practice and/or the status (e.g., health, legal, psychosocial, financial, etc.) of the professionals' clients or patients. If these criteria represent the standards to which mandatory CPE is to be held, then the policy's success is, at best, inconclusive and, at worst, a failure. (p. 44)

Ligon (2000) conducted a case study of 25 attendees at a short course on a type of therapy called "brief" therapy. In this study using pre-test/post-test questions on change in behavior were given. The study is useful in that it attempted to find change in competency. It fails in that it didn't have a follow-up at a time interval sufficient to detect real long tern behavior change and the responses were self-reported.

Coffee and Beegle (1994) surveyed Certified Public Accountants to help determine the impact of mandatory CE. Using a questionnaire survey, the authors concluded accountant's perceived quality of their professional work improved after mandatory CE.

In a rather unique study, Moore, Sischo, and Hutchinson (1996) conducted an impact evaluation of veterinarians to a continuing education course on dairy production

medicine. The authors looked at dairy herd performance for two groups; one group took the course the other didn't. Herd performance was better for those farms whose veterinarian took the continuing education. Also working with veterinarians, Connor (2003) used a combined study of questionnaires, focus groups, and interviews to look at attitudes of British veterinarians toward formal continuing professional development and informal learning. Of 30 respondents to the questionnaire, 17 indicated formal training helped the most. Roughly one-fourth of subjects indicated work experience and discussion with colleagues as the biggest factor. Connor concluded with a recommendation that informal reflective processes contribute to professional development. This study was a small sample of individuals who attended a summer veterinarian meeting.

Cantillon and Jones (1999) conducted a bibliographic data base search looking at the question "Do educational interventions based on general practice change doctors' behavior and improve patient outcomes" (p. 1276)? The authors pointed out that in studies they surveyed, "Formal continuing medical education was partly responsible for behavior change in only one third of cases. Organizational factors and contact with other healthcare professionals were equally important factors" (p. 1278). A final recommendation on CE based on observations in the medical education literature suggests a CE program that is "self directed, practice based, and multiprofessional" (p. 1279). These recommendations seem to be at odds with the SAF Category One definition of courses by forestry specialists in an educational setting.

Harrison and Hogg (2003) interviewed six family doctors regarding attendance at continuing medical education activities. Those interviewed indicated they attended to

learn new information and be reassured that what they were doing was in agreement with current practice. When informed of the findings in prior studies that CE content indicated the inefficiency of CME formats, the interviewees disagreed. This finding confirmed some of the difficulty in assessing "use" of CE by professionals. The study doctors indicated the changes made as a result of CE were small and incremental and hard to measure. The authors have the following research recommendation; "Further study could involve trying to find ways to measure the 'scattered' learning occurring at traditional CME events and the small changes that this causes at the practice level" (p. 888).

Forestry Continuing Education

Some examples of forestry continuing education studies were found in the literature. As mentioned in Chapter 1, Muth and Hendee (1980) looked at CE from the technology transfer view. They suggested a social component to achieve better transfer. Fischer and O'Leary (1987) surveyed Indiana foresters asking what program areas were needed, attitudes toward CE, and literary sources of information. In a key finding of 196 respondents, the authors reported, "Often foresters with the greatest amount of experience were the least supportive of continuing education" (p. 18). Contrary to the editorial in *The Source* noted in Chapter 1, "Many respondents did not believe that continuing education would improve public image of foresters as professionals" (p. 18).

Comeau (1997) and Gauthier, Parsons, and Comeau (2002) summarized continuing forestry education in Canada. The article summarized requirements by Province. CE of foresters is not mandatory throughout Canada. In the Gauthier and others

(2002) update of the 1997 survey, the authors made the following recommendation that applies to this study:

> Professional associations must ensure that their members maintain their competence throughout their careers. As in the Ontario Registered Professional Foresters Association and the New Brunswick and Nova Scotia Forest Technicians Association, professional associations should institute mandatory CPE programs to ensure that professionals have credibility with the public. (p. 230)

The authors synthesized this conclusion after surveying a number of forest regulatory bodies and the Canadian Institute of Forestry. An interesting finding reported by the authors was that in Alberta Province, RPF's (Registered Professional Foresters) claim 10 days CFE credit if employed full-time in the practice of forestry under the practical learning category. A second learning category was called "structured" and the minimum CFE in this category was five days per 12 months. This requirement is similar to that used by SAF.

Jensen (1989) conducted a research evaluation for his dissertation of a program called the Silviculture Institute. The Silviculture Institute was an intense formal program targeted at mid-career forestry professionals and consisted of six two-week modules. Using a survey of attendees and their supervisors, Jensen attempted to assess change in forestry practice. He found positive change in practice noted by both the attendees and their supervisors. This form of CE was far more intense than the traditional workshop at a hotel described by Nowlen (1988). In a related discipline, Murphy (1994) did his PhD research on CE needs of state agency wildlife biologists. This research was targeted at content needs analysis. Murphy prepared a list of tasks undertaken by wildlife biologists. Individuals were asked to rate their need for continuing education in relation to each task.

In relation to this study, foresters could be asked to assess if need for a CE activity was a consideration when selecting the activity.

This Review of the forestry literature indicates other continuing education studies seem to be focused on needs assessment and not on the impact of the CE. Based on this review of the literature, it appears a study of the use of CE by foresters, especially Certified Foresters, was timely and relevant to those few studies in related professions.

Comparison of Research Methodologies

Studies on use of CE by professionals have taken several forms. The primary research method has been the use of questionnaires to derive descriptive statistics and associations. Two studies of particular relevance to this study were conducted by Ottoson and Patterson (2000) and Williams, Keim, and Johnson (2004). These studies used surveys. Moore, Sischo, and Hutchinson (1996) used a quasi-experimental method. Connor used a combination of questionnaires, focus groups, and interviews; the study blended quantitative and qualitative methods. Sibley et al. (1982) conducted a study using a full experimental design. All of these studies looked at use or application of a continuing education activity.

The Sibley and others study assigned a variety of educational packages to groups of physicians. There were controls. Of the possible subjects for the study, 61 percent refused to participate. The final group for the study was 16 family physicians. The authors noted the sampling variation might make generalization of the findings difficult. Interestingly the discussion of this paper noted:

> Despite statistically significant gains in their knowledge of how to evaluate and manage a variety of indicator conditions, the study physicians in this trial had neither clinically important nor statistically significant improvements in the

> documented overall quality of care that they provided to patients with these conditions. (p. 514)

The important conclusion I gained from this study is the expected findings are small and the cost and complexity make the value of this research methodology are not appropriate for this study of Certified Foresters.

In Connor's (2003) study, a survey was distributed to 123 participants at a veterinary seminar in Great Britain. Only 30 were completed. Only three people attended the focus group. These findings illustrate the difficulty of getting professionals to voluntarily participating in studies of this type.

The Moore, Sischo, and Hutchinson study looked at the impact of CE on dairy herd performance. The authors sampled 56 dairy herds whose veterinarians attended a dairy production medicine continuing education program and 97 herds whose veterinarian didn't attend the session. This look at impact of CE seems to be unique in the literature. The authors note a complexity in this type of methodology. The complexity is that veterinarians that enrolled in the subject course were more likely to have already implemented new practices. This points to the Roger's concept of early adopters and laggards. By self-selecting the treatment group, there may be strong correlation with the findings. For foresters, looking at impact of forest management can take decades for visible results. This method, though interesting, was probably not practical.

The survey methods used by Ottoson and Patterson (2000), and Williams, Keim, and Johnson (2004) show promise for use in this study. The Ottoson and Patterson method used pre, post, and 2 month follow-up surveys looking at implementation of CE content. The general methodology was also used by Ottoson (1995a) in a pilot study looking at influences on application of learning. The formal study was reported in 2004,

the study sample size of 549 represented only 20 per cent of the 2,900 health professionals that attended one of four types of training. The study illustrates the difficulty in matching pre, post, and follow-up surveys. One interesting finding from the study is that the educational program component of use, only had a weak significance in predicting use. In addition, this study was able to focus on four programs. With foresters, there is no equivalent grouping of trainings. The survey instrument, however, presents a valuable offering for this study. The topic is related to this study, and the wording and presentation has been used and successfully analyzed. This study will use portions of the Instrument developed by Ottoson and Patterson.

Williams, Keim, and Johnson (2004) utilized a survey to evaluate CE activities selected by two groups of dieticians. The research was to look at choices of CE offerings, with specific relations to a program called Professional Development Portfolio. My study looked at why foresters selected CE offerings so the Instrument developed by Williams et al. proved useful. Their methodology used descriptive statistics and they did develop some associations. The authors were able to distribute their survey to 3,530 subjects. The sample size is about the same as the number of Certified Foresters. Portions of the survey called *Your Opinion of Professional Development* were adapted for this study of application of CE by foresters.

Based on this literature review, the methodology used by Ottoson and Patterson (2000) and by Williams et al. (2004) seemed most appropriate and promising for my study. These studies used methods that were conducted efficiently and timely. If converted to an electronic survey instrument, completion of the instruments was even easier than the paper surveys used by these authors.

CHAPTER 3—METHODS

The application of continuing education (CE) of professionals has been shown to be a complex process (Ottoson, 1997; Smith et al., 2006). This research design selected was a quantitative-evaluation research study. Foresters have participated in the Certification program across a wide range of years. Foresters practice in all states, practice in a variety of professional disciplines, and have a variety of needs for continuing education.

Gliner and Morgan (2000) posed five axioms to be answered in selecting the quantitative paradigm. The authors' first axiom is The Nature of Reality. If a measure of use could be determined and preferences toward CE could be objectively categorized, the research could be categorized as having a Positivist view of reality. Axiom two discusses the relationship between the investigator and the participants. In this study there was no direct relationship between the researcher and the participants. Axiom three discusses how the results could be generalized. This study was offered to all Certified Foresters. For this population the ability to generalize the results is good. The results should be generalizable to other natural resources professionals. Axiom four is about causal relations. Although this study design did not use experimental designs, the use of regression methods of analysis leads me to favor a positivist paradigm. The last axiom deals with values. This study introduced some potential bias, which resulted from the selection of the data to obtain from a database of information and questions developed for the surveys.

The preponderance of responses to the axiom questions of Gliner and Morgan point to this study being a quantitative study. The study recognized the introduction of

values in questions, the inability to create causal relationships and the nature of reality by allowing the respondents to introduce additional responses in the form of open ended questions.

Through this study, I addressed the following research questions:

1. Was the CE learning put into practice? (Is there a quantitative measure of "put into practice")
2. What is the association between hours of post Continuing Education activities and other factors to *use* of the CE?
3. What factors are related to professional use of Continuing Education activities?
4. What preferences do Certified Foresters have toward Continuing Education methods?

The Population

Forestry has been a recognized program of study at numerous higher education institutions through out the world. As with most professions, there is a recognized accrediting body for foresters. In the United States this is The Society of American Foresters (SAF). There are approximately 28,000 members of SAF (Murgia, 2004). Although not all foresters are members of SAF, all members are qualified as foresters. Within SAF there has been a program of Certified Foresters (CF). There are about 3000 Certified Foresters (a little over 10 per cent of the SAF membership). Certified Forester has been a Registered trademark of the Society of American Foresters.

Certification was not required by all employers to practice the profession of forestry, so one would expect there were proportionately more CFs practicing when employers require certification. Some states with forestry licensing requirements

accepted a CF credential in lieu of state license examinations. In these states, one would also expect proportionately more CFs than the population as a whole.

One of the requirements for CF certification renewal was a requirement to post continuing education (CE) credits with SAF. There was a database showing CE credits for both CFs and non-CFs within SAF. Only CFs were required to post CE in the database. Given this restriction, this study only surveyed Certified Foresters. The population being studied was further restricted to only include CFs with posted CE credits. The purpose of this study was to investigate use of CE and it therefore wasn't appropriate to survey foresters that didn't undertake CE. This study essentially did not use a sample of individuals in the population of Certified Foresters. Rather, a complete enumeration was made for distribution of the survey instrument.

Sample of CE Activities

By definition, all recipients of the survey completed one or more CE activities. In this research, one CE event was selected randomly for each individual. The selection was not weighted by the number of CE hours. From the SAF's CE database, an electronic list was created showing the individual's CF Identification number and the event name. Other information used in the analysis (see Table 1) was utilized in the analysis but not used in the selection of an event. Simple random selection of one activity from among the posted events of an individual was done using a random number process. For example if five events were listed in the CE database for an individual, the events were numbered from one to five sequentially. A random number was selected from one to five. The event associated with that selection was the event examined. General information about the other activities was associated with the individual forester;

however, there was no information requested of the individual about the other events specifically.

Table 1

Data items obtained from the Society of American Foresters Continuing Education Database

Item Number	Variable Name	Type of Variable
Q1	Name of Individual	Text
Q2	Member Number	Text
Q3	e-mail address	Text
Q4	Physical Address	Text
Q5	Employer Type	Text
Q6	State where employed	Text
Q7	Total Cat. 1 CE credits reported	Real
Q8	Total number of Cat. 1 courses	Real
Q9	Course delivery method	Text
Q10	Date of SAF membership	Date
Q11	Date of Bachelor's degree	Date
Q12	Year first certified as CF	Date
Q13	Year recertification due	Date
Q14	Grandfathered	Binomial
Q15	Course name	Text
Q16	Course hours	Real
Q17	Date of course	Date
Q18	Specialization	Text

Application of Results to the General Population

Based on the literature review conducted, professionals should have an interest in lifelong professional learning and development (*e.g.*, Daley, 2000; Phillips, 1987) In this study the certification requirement of SAF mandated CE be undertaken. It is possible the reason foresters elected to not certify may have been related to their unwillingness to take continuing education as part of their professional obligation. In this sense findings from this study would not apply to them. In general, and especially in States where a license was required to practice and the SAF Certified Forester accreditation was accepted for

licensure, the populations of CF and non-CF could be considered similar and findings ought to be applicable to the general population of foresters.

Only one CE event was investigated for each CF in the study. This study associated use of education with attitudes for the CE selected. There should have been no bias in findings of relationship given only one event was selected from among many.

Findings from this study should apply to CE in the array of natural resource professions. Unlike many CE activities in the health profession (health literature form the basis of much of the CE literature), natural resources professionals all share a common theme of relatively few CE offerings, still fewer offered with no or low cost, seasonal nature of the work, and remote location of field offices.

Instrument

The instrument used in this study was designed to address the research questions for the study. Part of the study was intended to develop regression relationships and correlations between variables. The concept for this part of the survey questions, which addressed relationship questions, was heavily influenced by the work of Ottoson and Patterson (2000), who used a questionnaire to study the use of continuing education in the health professions. The general types of questions used by Ottoson and Patterson were adjusted to reflect terminology and specifics used in natural resource professions. Additional relationship questions were developed for this particular study.

The portion of the survey that addressed continuing education use through self-assessment of Rogers' stages of adoption was uniquely designed for this study. Selected self-assessment rankings were developed, which were adapted to the published Rogers' categories. The Society of American Foresters (SAF) was interested in general continuing

education attitude rankings. Portions of the instrument used by Williams, Keim, and Johnson (2004) was adopted, with minor adjustment for these questions. Specific forestry related descriptive values were added to instrument, to address the desire to acquire relevant background data for use by the SAF.

Staff at the College of Applied Human Sciences computer group at Colorado State University and assistance from the Continuing Education Staff at The University of Montana had the skills and software to convert the paper survey to an electronic survey. This support was used to create a process for E-mail distribution of the instrument to Certified Foresters. The E-mail list was obtained from a query of the SAF continuing education database. Returned questionnaires from the survey company were in the form of a comma delimited computer files. One of the elements in the response was the member identification number (Q2), which was passed to the survey company through the E-mail link. This was linked back to the records in the data base query results. This linked file had the name and intuitively meaningful identifier removed and replaced with a randomly assigned identifier. With this process the original file was archived on and stored under the control of the academic advisor.

Because the instrument presented in Appendix B was new, it was pilot tested before production distribution to a small group of foresters. This group of about five pilot subjects received the pilot electronic survey. Corrections to the wording and other items were made to make sure the document could be interpreted correctly. Responses from this small sample provided the PI with a sample data set to work out the logistics of mail merging, response file management, merging responses with the SAF database query, and removal of subject identifiers.

Data Collection Methods

Based on investigations of other studies in this area of interest (Connor, 2004; Moore, Sischo, & Hutchinson, 1996; Ottoson & Patterson, 2000; & Sibley, et al., 1982) a determination was made to not attempt a quasi-experimental or experimental design. The research method selected is descriptive and associational. Two studies in particular were used to pattern this study; both were conducted with health care professionals. The first of these was a study where application of CE was investigated (Ottoson & Patterson, 2000). The second was a descriptive study looking at demographic information of CE participants (Williams, Keim, & Johnson, 2004). Printed survey instruments were obtained from these authors. Permission was obtained to adopt them (Appendix C). In addition to selected questions from these paper surveys, additional questions were asked relating specifically to foresters. An example of this was the frequent use of field trips as part of forester continuing education programs, which are not common in the health professions.

Table 1 contains a list of variables obtained through a query of the Society of American Forester's database of posted continuing education credits. Characteristics of the variables are presented in Table 1. Appendix B contains the paper version of the survey instrument used in this study and question numbers are used for reference in the following sections.

Analysis and Presentation of Findings

Data Sources and Organization

Data were derived from two sources. The first source was the SAF continuing education database. This source is referred to as the Query and data elements will be references as Q1, Q2, Q3 and so forth as are noted in Table 1.

The second source of data was organized in the paper instrument (Appendix B) which was the source for the web based survey. In the instrument, questions resulted in data elements to be used in the analysis. Data obtained from the Survey were referred to as S1, S2, S3 and so forth, where 1, 2, and 3 are the question numbers on the survey. Some data will be the result of calculated values. Data resulting from calculations are described in the following sections.

Research Question 1 on CFE Use of Their Education

Was the CE learning put into practice? (Is there a quantitative measure of "put into practice")? The analysis for Question 1 was done using two indices. First, the assessment used a simple division of the count of respondents saying they used the CE (S5 equals YES) by the total respondents. This proportion is displayed as a percent. For example, if there are 1,200 respondents to the survey and 300 indicate they applied their CE:

Proportion using their education = (300/1200*100) = 25%

A second method used of a score generated as follows: Each participant was asked to place themselves into one of Rogers' stages of innovation diffusion at three points in time (S20). Those points in time were before the CE activity, immediately after the CE

activity, and one or more months after the activity. I used ordinal values associated with each stage as follows:

0 = no knowledge of the subject

1= Knowledge of the subject

2= Persuasion

3 = Decision

4 = Implementation

5 = Confirmation

A score was calculated by subtracting the value assigned at the later point in time from the value assigned at the earlier point in time. For example: If a person considered themselves knowledgeable before the session and Implemented at the session, the score would be 4 – 1 = 3. If they hadn't confirmed after an appropriate period of time (two months), there score would be 4 – 4 = 0. This would indicate no additional learning took place after the session with a composite score of 3. In another example a person may have no knowledge before the session, felt persuaded immediately after the session, and confirmed the new material was correct 2 months later the scores would be:

3 – 0 = 3 (session related)

5 – 3 = 2 (post session related)

A composite score would be 3 + 2 = 5 for the impact of this session. This score was used as an empirical way to assess post session contribution to the learning process. The mean USE score was calculated for each Roger's change category. Differences between means were evaluated in terms of size of difference and directions of differences.

Research Question 2 on Hours and Use of the Education

What is the association between hours of post Continuing Education activities and whether or not individuals used the education? The average hours of pre and post activity mean (S7) was compared between the groups using the education those not using the education. In addition, for each USE category the total credits (Q7), years to retirement (S27), and CE attitude scores (C1) (Composite score of the attitude questions calculated by summing the Likert scores for $S22_{a-k}$). To add further insight into the pre and post hours of activity, the hours of activity (S7) was correlated with total credits (Q7), years to retirement (S27), and CE attitude scores (C1). Scatter plots of these relationships were evaluated and relationships presented as correlation coefficients.

Research Question 3 on Using the Education

What factors are related to professional Use (S5) of Continuing Education activities? Regression was used to in the analysis for Question 3. In question 2 the intent was to look at the post activities on use. This question looked at what factors were related to Use. The dependent variable, Use, is a binomial variable. A logistic regression was used to investigate what significant variables statistically predict Use. There are a large number of independent variables in this portion of the analysis. In all likelihood there will be considerable co-linearity of these variables. This was a significant consideration in assessing the regression solution.

Binomial independent variables were treated as dummy variables. Variable S22 (attitudes toward CE) was analyzed as a score (C1--total of Likert values for variable S22 sub-questions). Review of this portion of the analysis focused on the sign (+ or -) of the regression coefficients, change in the odds, and the magnitude of the coefficients.

Research Question 4 on the Certified Foresters Preferences

What preferences do Certified Foresters have toward Continuing Education methods? Research Question 4 was addressed using descriptive statistics. Figures and tables was used to display the following attributes using either the database query or the Internet survey:

Histogram showing hours of CE (Q7) reported by CFs

Histogram showing number of CE courses (Q8) recorded by CFs

Histogram showing frequency of CF's by states (Q6) with and without CE requirements for licensure or certification

Histogram showing frequency of CF's by years certified (Q12 –date of survey)

Histogram showing frequency of CFs by years certified (C3= today's date - Q12)

Histogram showing frequency of reasons for taking the "survey selected" CE (S1)

Histogram showing frequency of reasons for how course was selected (S3)

Histogram showing frequency of success in meeting learner needs (S4)

Histogram showing frequency of sources of post CE assistance (S6)

Histogram showing frequency of reasons for not applying (S9)

Table showing proportion of responses where:

Learner was allowed to bring project (S10)

Course was modified for the learner (S11)

Learner brought a work related problem (S13)

Learner was given time to relate course content to work problem (S15)

Pie chart showing overall proportion of CE time by instructional methods (S16)

Histogram showing extra hours reported by CFs (S17)

Chart showing percentage of respondents by work status (S19)

Table showing attitudes about CE (S22)

Table showing attitudes about instructional methods (S23)

Table showing proportion of CFs having a learning plan and not having a plan (S24)

Chart showing proportion of respondents by professional position (S28)

Calculation showing proportion of respondents working in states requiring licensure (S29)

Summary of Methods

This study was designed to look at use of continuing education by Certified Foresters. Two forms of data collection were used. One form was a query of the Society of American Forester's Continuing Education database for known items. The key item in this list was a listing of the reported continuing forester education posted by individuals. In a second step of data collection, an electronic survey was designed and distributed to individual Certified Foresters using the Internet. Portions of the survey drew on printed surveys of a similar nature, which were developed for the health profession. This self-reported survey solicited information on use, attitudes, and additional efforts made on the part of the individual to use the content of their continuing education activity in their daily professional activities.

This analysis consisted of statistical reports of attributes collected in this study as well as an analysis of what attributes are related to the use of the education. Results from this study and subsequent analysis, will help fill a void of information on use of continuing education in the natural resources professions.

CHAPTER 4 - RESULTS

Data Collection Phase

In December 2005, the Society of American Foresters was requested to submit the data as outlined in the proposed query in Chapter 3. Support staff at SAF was not able to replicate the data request exactly as outlined. The data were supplied in two steps. One step contained general member data; a second step contained data on each member's CFE events. Some data elements were not available from the SAF database of CF continuing education activities. Data not available are shown in Table 2.

Table 2

Information that was not available using a query of the SAF member database.

Item Number	Variable Name
Q6	State where employed
Q8	Total number of Category 1 courses
Q9	Instructional delivery method
Q11	Date of Bachelor's degree
Q12	Year first certified as Certified Forester
Q14	Certified through grandfather process
Q18	Specialization

Critical to this study were the availability of individual CFE event data, which were provided by SAF. The SAF data were placed in a local database for purposes of selecting a random event from among all those listed for each member. A random selection computer program was created for this step. As noted in Chapter 3, one CFE event was randomly selected from the list of events each member had provided to SAF. The code that was used to randomly select a course is presented in Appendix D. Data received from SAF consisted of information for 2,225 Certified Foresters. Of these, 2,223 had a Category One course reported with SAF. Of these, 2,076 had an E-mail address.

An example of the Email message, which served as the cover letter, is presented in Appendix E. In order to help minimize the number of rejected mailings, Microsoft Corporation's Mail Merge was used. With this technology, the recipient appears to have received a message from a sender as a unique message to the recipient rather than a message sent to a number of individuals. Each recipient received their request to take the survey using a memo that contained their member identification number (coded in the survey hyperlink) and the name of the event they were to reference for the survey. In a later step, a random number assuring an anonymous response replaced the member identification number.

The survey phase of this study was conducted using a survey technology provided by a company called SurveyMonkey.com©. The survey was pilot tested by several professional foresters to help assure the survey mechanically worked and that the questions were appropriate. This step served as some minimal level of face validity. As a result of this pilot study, changes were made in question wording for the final survey. A copy of the final survey is available in Appendix F

Notice of the survey was advertised in the February 27, 2006 issue of the newsletter publication called *The E-Forester*. The announcement was as follows:

> Colorado State University, in cooperation with SAF, will conduct a survey to help SAF understand how CF's use continuing education. The findings will be used to inform the SAF education and policy committees. Your participation is appreciated and confidential. (SAF, 2006)

This was an Internet survey, and no attempt was made to send out paper copies of the survey, unless a specific recipient requested a paper copy. One recipient requested a paper copy, which was sent. It was not returned. Some of the electronic mailings were returned as a result of SPAM (the Internet Service Provider (ISP) identified request

memo as junk mail) trapping software. In cases where the ISP asked for verification of the sender, the surveys were resent after confirming the source of the sending party. Clearly, some surveys were not delivered as result of other Internet SPAM trapping or recipient deletion of the electronic mail message. There is no way of knowing how many deliveries fell in this category.

SPAM trappers and other Internet security methodologies have changed the implementation of generally accepted methods recommended by Dillman (2000). In this study the survey was not redistributed to non-respondents, as this would have been futile. The survey was distributed in April of 2006, and the survey was closed in May of 2006. There were 717 responses for a response rate of 32.2%. Two respondents did not report an answer to the survey question, which asked if the CF used their education. This meant the total useful responses were 715 for a final response rate of 32.1%.

Although a response rate of over 30% might be considered good for an Internet survey, one still must ask if the individuals that responded are representative of the whole population that received the survey. It's possible that individuals that respond to surveys are more likely to use Continuing Education. I have made the assumption that there is similarity between respondents and non-respondents. One of the questions asked in the survey was whether licensing is required in the State where the respondent practices. About 23.6% reported that licensing was required. It's not known if this is representative of the general population of CFs, as this information was not retrieved from the SAF database.

Data were retrieved from SurveyMonkey.com© in an expanded format. For example, if a question asked for a Likert response that varied from 1 to 5, the expanded

form of the data created a variable for the 1 response, a variable for the 2 response and so forth. In this way the data could be reconfigured in a variety of ways. Open-ended questions were retrieved as text values.

This study addressed four research questions. In this data analysis chapter, the analysis is presented in four separate sections. One section is related to each question. The first section addressed how Certified Foresters used Continuing Education (CE). The second looks at correlations between hours of CE and the use of CE. The third looks at relationships between use and a variety of independent variables. The fourth looks at a wide series of descriptive variables, which will be used by the Society of American Foresters and others to review the CE program for Certified Foresters.

Research Question 1 on CFE Use of Their Education

Was the CE learning put into practice? (Is there a quantitative measure of "put into practice")? This question was answered using two techniques. The first is a simple ratio of positive answers to the yes/no question of whether the Certified Forester used the education or not only expressed as a percent. The second technique used was a numerical scale attached to nominal values assigned to Rogers' stages of adoption.

Based on the 715 useful responses, 82.4% of the respondents indicated (survey question S5) they used the content or concept when they returned to work following the selected specific event. The numerator for the calculation of this percentage was the count of yes answers to survey question five. The denominator was the count of all valid responses (both yes and no) to survey question S5.

As was noted in Chapter 3, a second method of determining if a forester used their education was to have them self-assess a position in the Roger's stages of innovation

diffusion. This assessment was done for three points in time. This process used values reported in survey question S20. Those points in time were before the event, immediately after the event, and 1 month after the event. Each stage was assigned a numerical value with 1 for the lowest stage and 6 for the highest stage.

For the analysis, unlike that described in chapter 3, the numerical values were adjusted to make it easier to distinguish non-responses as follows:

1 = No knowledge of the subject

2 = Knowledge of the subject

3 = Persuasion

4 = Decision

5 = Implementation

6 = Confirmation

Roger's stages of innovation diffusion questions were not set up as a mandatory response. Multiple responses could have been provided for one or all of the points in time. The way the survey was constructed individuals could have provided multiple answers for a given time step. For example, an individual might have indicated they experienced persuasion and decision between the start and finish of the educational program. In order to calculate the proposed Roger's scale, the highest numerical stage score was used. In the example above, the value associated with "decision" was used for a score calculation.

Table 3 presents the change values of Roger's stages as reported at the immediate end of the education. The numerical value of use was zero for use and one for not used. Values closer to 0 indicate more responds used their CE.

Table 3

Average Use value for Rogers' Change Score Categories

Time Period	Score Change Categories										
	-5	-4	-3	-2	-1	0	1	2	3	4	5
Before to After	.00	.67	.11	.12	.07	.28	.17	.08	.06	.03	.15
After to After plus 1 month		.00	.00	.00	.08	0.21	0.06	.13	.14	.17	.00

The general trend is for more use as the Roger's stage moves from No Knowledge to Decision. Out of 425 responses for the Roger's question, only 4 respondents reported a change of 5 units. This is also illustrated in Figure 1. Based on earlier discussion, it is possible that individuals reaching the Decision stage, made a decision to not use the content of the education. Although there is a clear trend in more use with higher Roger's change values, Table 4 shows additional information by displaying the frequency of responses shown in Table 3.

Table 4

Frequency of responses for Rogers' Change Score categories

Time Period	Score Change Categories										
	-5	-4	-3	-2	-1	0	1	2	3	4	5
Before to After	1	3	9	8	15	114	96	129	82	35	13
After to After plus 1 month		4	3	2	36	204	112	39	22	6	1

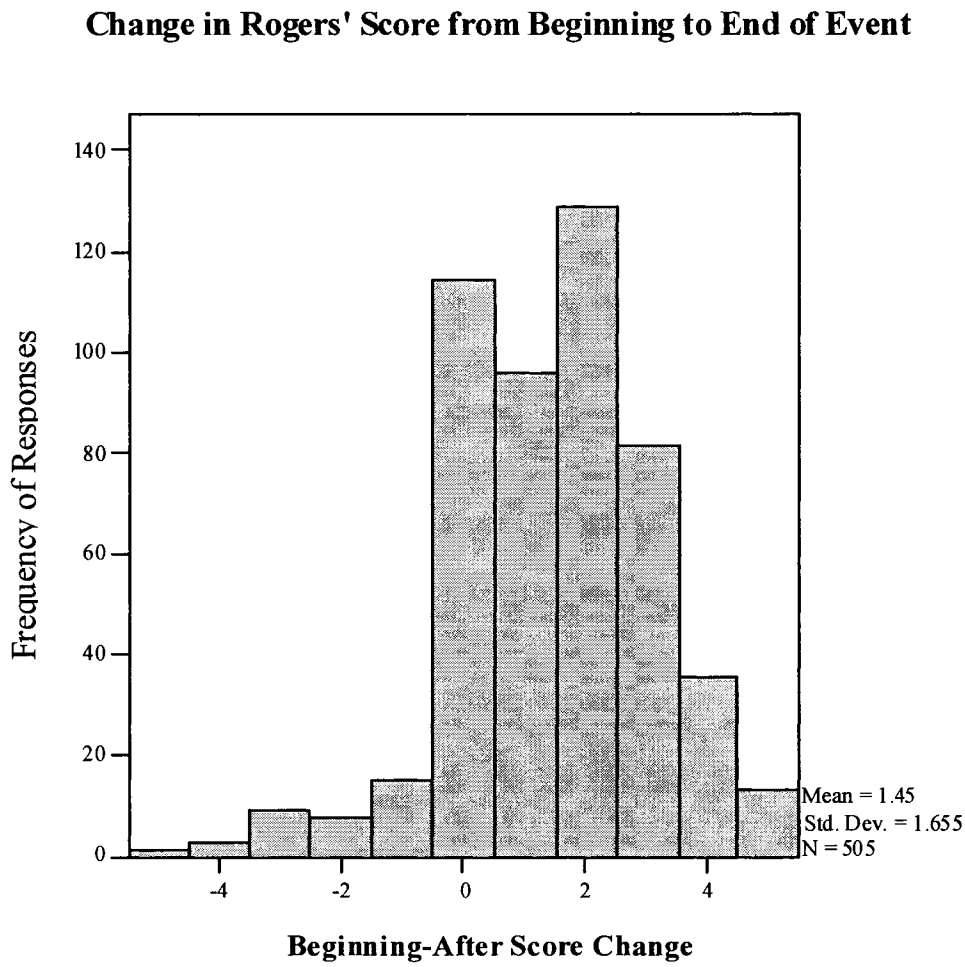

Figure 1. **Change in Roger's stage during the period of the CFE program**

Most respondents indicated a positive move to a higher Roger's stage after the CFE event attended. Respondents rated their Roger's stage for the period following the CFE program. Figure 2. shows the frequency of change responses for the period following the CFE. It is interesting to note that some respondents continued to change Roger's stages, after they returned from a CFE program, as shown in Figure 2. In a more static presentation, Figure 3 illustrates the state of adoption reported by CFs for the three time periods of before, immediately after, and one month after the event.

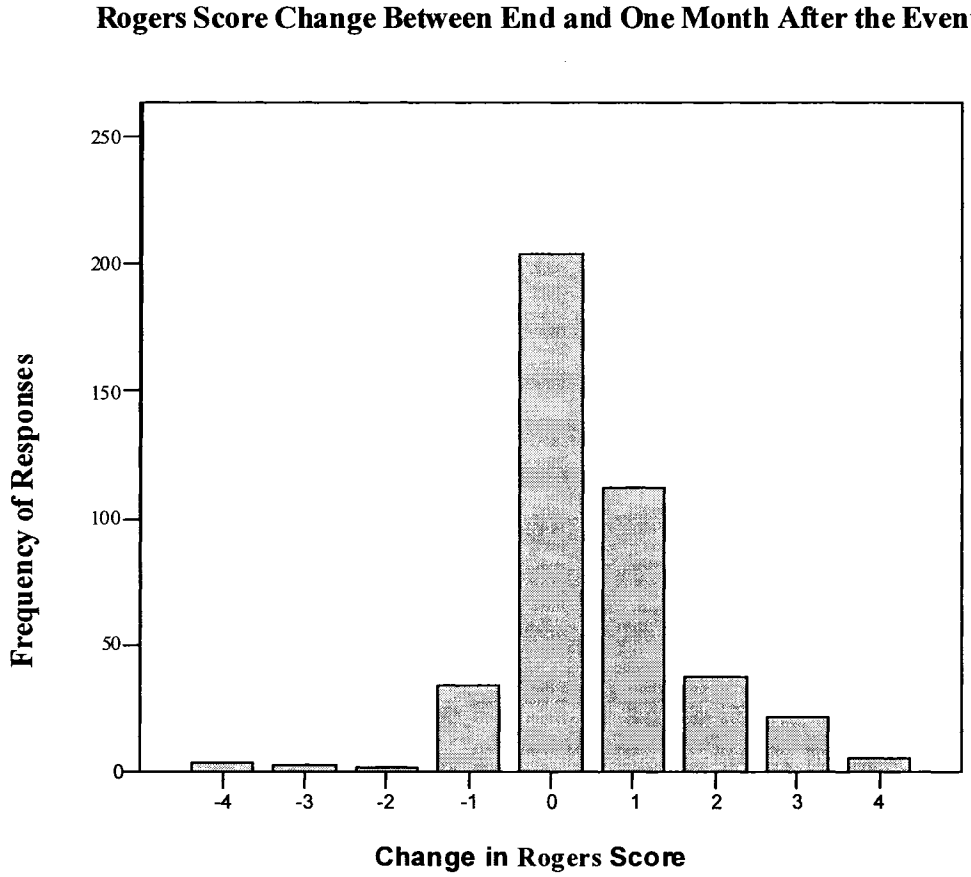

Figure 2. **Change in Rogers Stage of Innovation Diffusion between the end of the CFE event and 1 month later.**

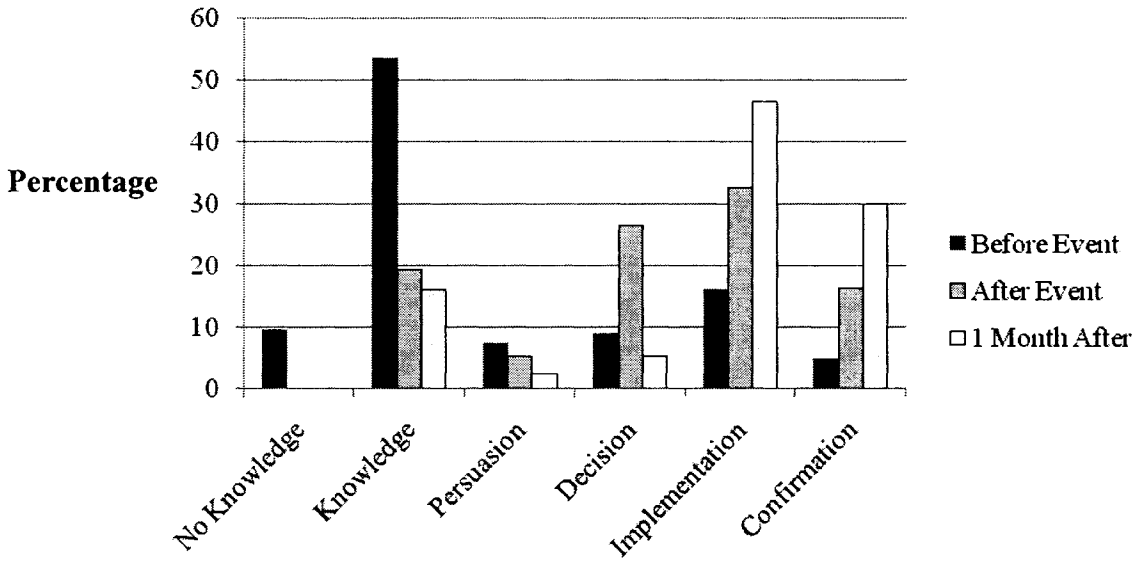

Figure 3. **Self-reported Rogers' stages of adoption for three points in time.**

Research Question 2 on Hours and Use of the Education

What is the association between hours of pre and post Continuing Education activities and whether or not individuals used the education? Foresters that used the content presented at the CFE event reported that on average they spend seven hours after the session ended in implementing the event's concepts or content. Respondents that indicated they did not use their education were not asked for the number of hours they might have spent trying to use the concept or content.

Average course hours (using Q16) for those who indicated they used the content or concept was 8.2 hours, while the course hours for those who indicated they didn't use the content or concept was 5.4 hours. This would indicate a positive relation between

length of course, as expressed by number of hours, and whether or not the person used the concept or content.

Of the 51 individuals that reported they were retired (survey question S27) , 72% indicated they used the content or concept of the CFE, while 84% of non-retirees reported use. In the survey, respondents were asked a series of questions about their attitude toward continuing education (Question S22). Summing the Likert ratings of these attitude questions created a score value. The attitude value for those that used their CFE was 22.5, while the score for those not using their CFE was 22.1. Although this measure is crude, there does not appear to be a major difference in attitudes toward CFE between the users and non-users.

The correlation between the number of post-session hours of education (question S7) that each participant spent on the content or context and the total Category 1 hours (Q7), years to retirement (S27), and the Continuing Education Attitude score (sum of S22) was calculated and is presented in Table 5. None of these correlations appear to be very strong.

Table 5

Correlations between post-event hours of education and use

Attribute	Pearson Correlation
Total event hours	0.061
Years to retirement	-0.006
Attitude toward CFE score	-0.121

Research Question 3 on Using the Education

To answer research question 3, "What factors are related to professional Use (S5) of Continuing Education activities?", a logistic regression was selected as the procedure to find relationships between the CF's use of their education (S5) and a variety of factors that were collected in the survey and the query of the SAF database. For this study, CF's either reported they used their education or they did not use their education on returning from education event. This binomial response was used as the independent variable in this part of the analysis. Using a preselected logistic regression model, only four factors were shown to be significant. These attributes were:

Change in Rogers' score between start and end of the CFE (S20)

Worked full time in forestry (S19)

Was allowed to bring a problem to the CFE (S10)

Solved a work related problem (S12)

$$P/(1-P) = e^{b}_{1} * e^{b}_{2} * e^{b}_{3} * e^{b}_{4} * e^{b}_{5} * e^{b}_{6} * e^{b}_{7} * e^{b}_{8} * e^{b}_{9} * e^{b}_{10} * e^{b}_{11}$$

Where:

P is the probability of answering yes to the question of whether or not the recipient applied the content or concept presented at the CFE program when the respondent returned to work. Coefficients and variable definitions are as follows:

$b_1 = 0.715$

bringprob0_1 : CF was allowed to bring a problem to the CFE program (S10)

$b_2 = 0.324$

Begin_after : A value calculated by subtracting a Rogers' stages of innovation diffusion value at the end of the session from the score at the start of the session. (S20)

$b_3 = 0.280$

Complex : a Likert scale variable of complexity ranging from 1 very simple to 5 very complex. (S21)

$b_4 = 0.280$

expertise0_1 : CF reported that the reason for taking the CFE was to gain expertise in the topic (S1a is true)

1 = yes
0 = no

$b_5 = -0.670$

credit0_1 : CF reported the reason for taking the CFE was to get the CFE credit (S1c is true)

1 = yes
0 = no

$b_6 = 0.166$

r4oth0_1 : Course was taken for reasons other than those provided. This category represented CFs, many who noted they were speakers at an event or the event consisted of committee meetings in their open-ended comments. Some comments indicated they didn't see this type CFE as a learning experience. (S1e is true)

1 = yes
0 = no

$b_7 = 0.988$

Fultime0_1 : CF worked full time in forestry (S19)

1 = yes
0 = no

$b_8 = 3.456$

solprob0_1 : CFE helped solve a problem (S12)

1 = yes
0 = no

$b_9 = 0.660$

appstrat0_1 : CFE provided a strategy for implementation (S14)

1 = yes
0 = no

$b_{10} = 0.006$

lecture0_1 : a percent of delivery which was conducted using lecture (a value [0,100]) (S16a)

b_{11} = 0.007

fieldtrip0_1 : percent of delivery which was conducted using field trips (a value [0,100]) (S16f)

Constant = -2.154

Constant : a constant was used in the regression model

The values for these coefficients, illustrate a consistency with the theories presented in Chapter 2. Given that the coefficients are multiplicative, values less than one reduce the prediction and values greater than 1 increase the prediction. Odds calculation indicate a respondent that primarily took the course to get credits for certification was less likely to use the course content to solve a work problem than a respondent that did not indicate they took the course primarily for certification credit. Other variables increased the odds of use. Recipients who used CE included those who indicated positive move through the Rogers' Stages of adoption, took the CFE for personal improvement, the CFE helped solve a work related problem, and the CFE provided strategies for applying the CFE content or concept.

I speculated that foresters that had a problem to solve, brought a problem to the program, were given strategies to apply the subject matter, were more active continuing education participants (as measured by recorded hours of CE), had less complex topics to learn, showed a positive move in Rogers' stages of diffusion, worked full time in forestry, and took the CFE to gain expertise would be good predictors of whether or not the forester used the education. I also speculated that attributes such as lecture delivery methods and reason for taking was "for CFE credits" would have " no use" while

delivery such as field trips would have "yes use". For the regression to be meaningful, only data where the respondents reported Rogers' scores were reported was used. This brought the size of the population used for regression estimation down from 717 to 505.

With the logistic regression, the exponentiated coefficients shed some light on the impact on the odds of a forester to use their continuing education on the job. Those who brought a problem to the CFE event had 104 percent higher odds of using their CFE on the job over those who didn't bring a problem. CFs who reported they took the CFE to increase their expertise had 28 percent higher odds of using the content or concepts. CFs reporting they took there CFE for getting credential credit had nearly half the odds of using their CFE. The odds of using CFE increased about 18 percent when the reason was "not one of the reasons presented in the survey". Based on the open-ended comments to this question, other reasons were frequently associated with individuals that posted CFE for events like meeting attendance, program presenter, and publishing articles. The odds of using CFE on the job increased 94 percent when the CFE provided strategies for application. Delivery methods of lecture or field trip showed no real difference in odds of application. For the last of the independent dichotomous variables, the odds of full time foresters using their CFE is over two and one half times higher than those working less than full time in forestry.

Change in Rogers' scores of one unit from before CFE to the end of the CFE showed a 38 percent increase in the odds of use. For example, a person who indicated they changed their Rogers score from no-knowledge to knowledge had 38 percent higher odds of use than someone who reported a change of zero (no change). Another example is comparing an individual who reported a change from no-knowledge to needed

persuasion to adopt the content had 38 percent higher odds of use than a person that only changed from no-knowledge to knowledge.

Individuals had 32 percent higher odds of use for each 1-unit increase on the complexity scale. Perhaps those attending events that had more complex topics have a more need to use the material.

Research Question 4 on the Certified Forester's Preferences Toward Continuing Education

Research question 4 asks what are CF's preferences toward continuing education. This analysis used a series of descriptive statistics for those responders having hours reported in the SAF database. Figure 4 illustrates their distribution of CF's hours of CFE (Q7).

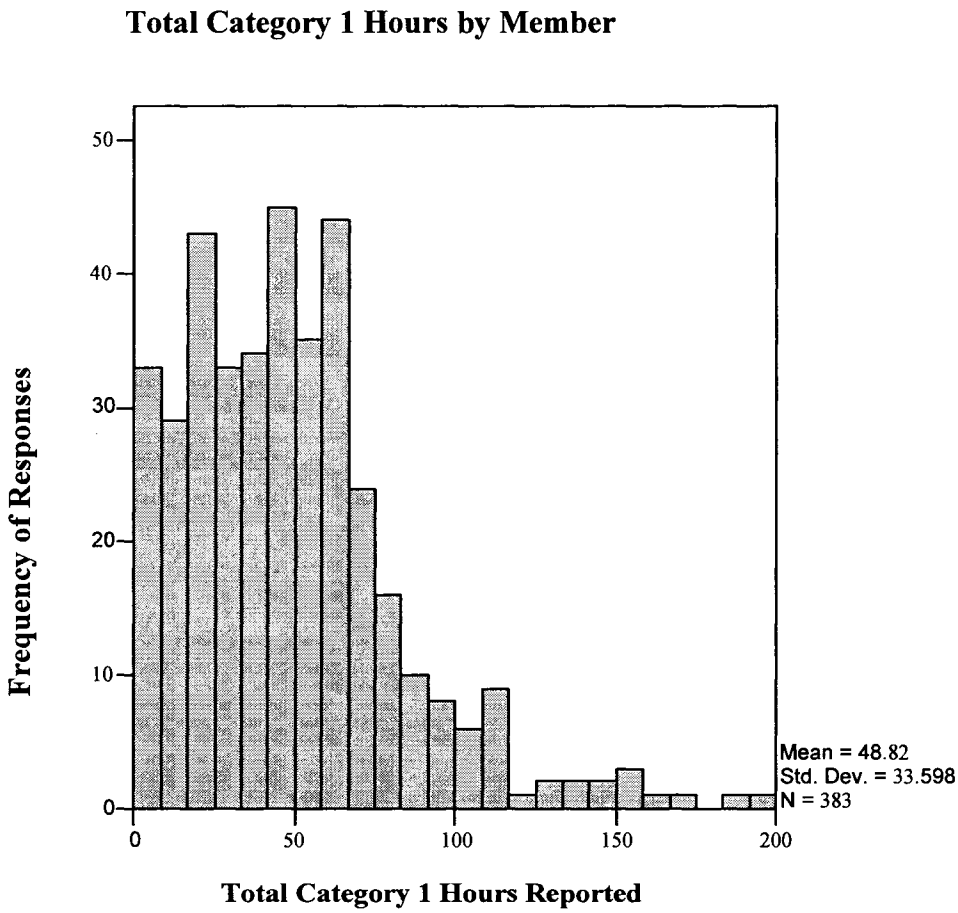

Figure 4. **Total Category 1 hours reported by Certified Foresters.**

Members have reported different numbers of courses into the SAF CFE database. Figure 5 illustrates the distribution of the number of courses for those who responded to this survey (Q8).

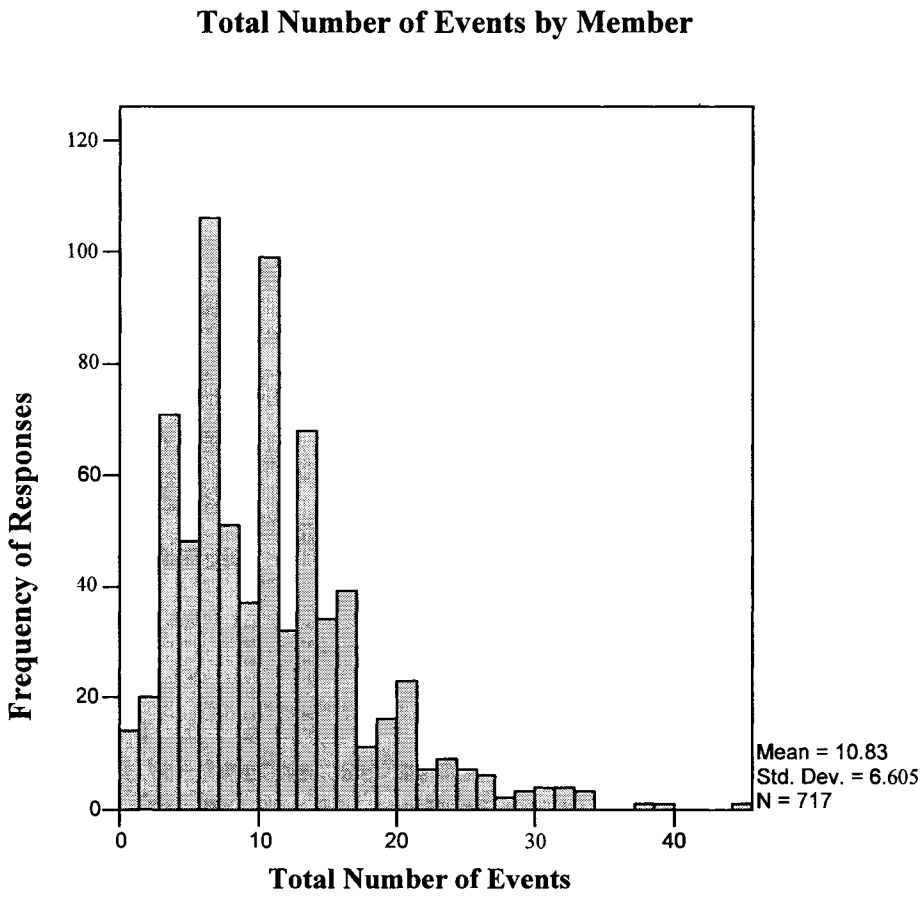

Figure 5. **Total number of events reported by Certified Foresters**

Foresters have attained their Certified status over a number of years since the program was established. Prior to a cutoff date in 2002, members could be certified without taking a certification examination. This impact is clearly displayed in Figure 6 showing the year the member was certified (Q12).

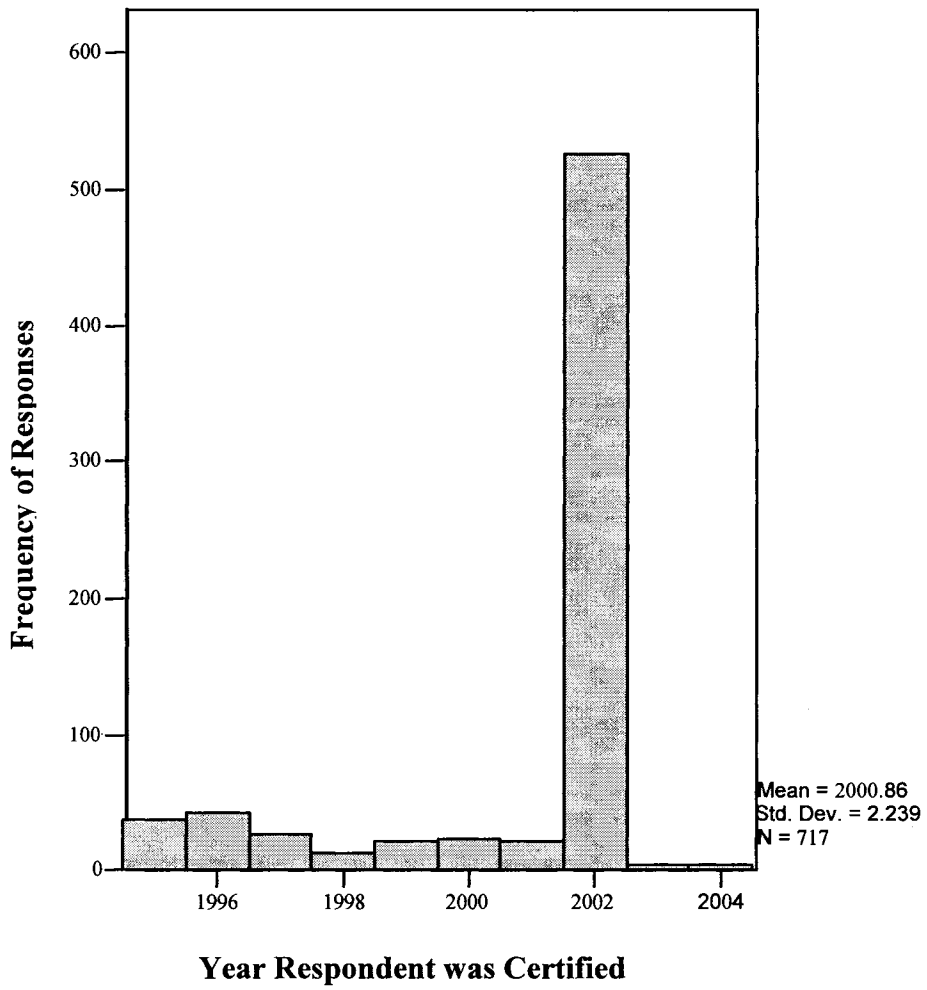

Figure 6. **Frequency of members by year certified.**

Based on the large proportion of members becoming certified in 2002, most of the members would have just completed their CFE recertification requirement prior to this study in 2006. The certification requirement mandates completion of the education in a

three-year period. For most, this three-year requirement would have been at the end of 2005.

Personal improvement and the similar category of developing expertise represented about 50% of the responses, as shown in Figure 7 (S1). Nearly 30% reported they attended the CFE event for credit or certification purposes.

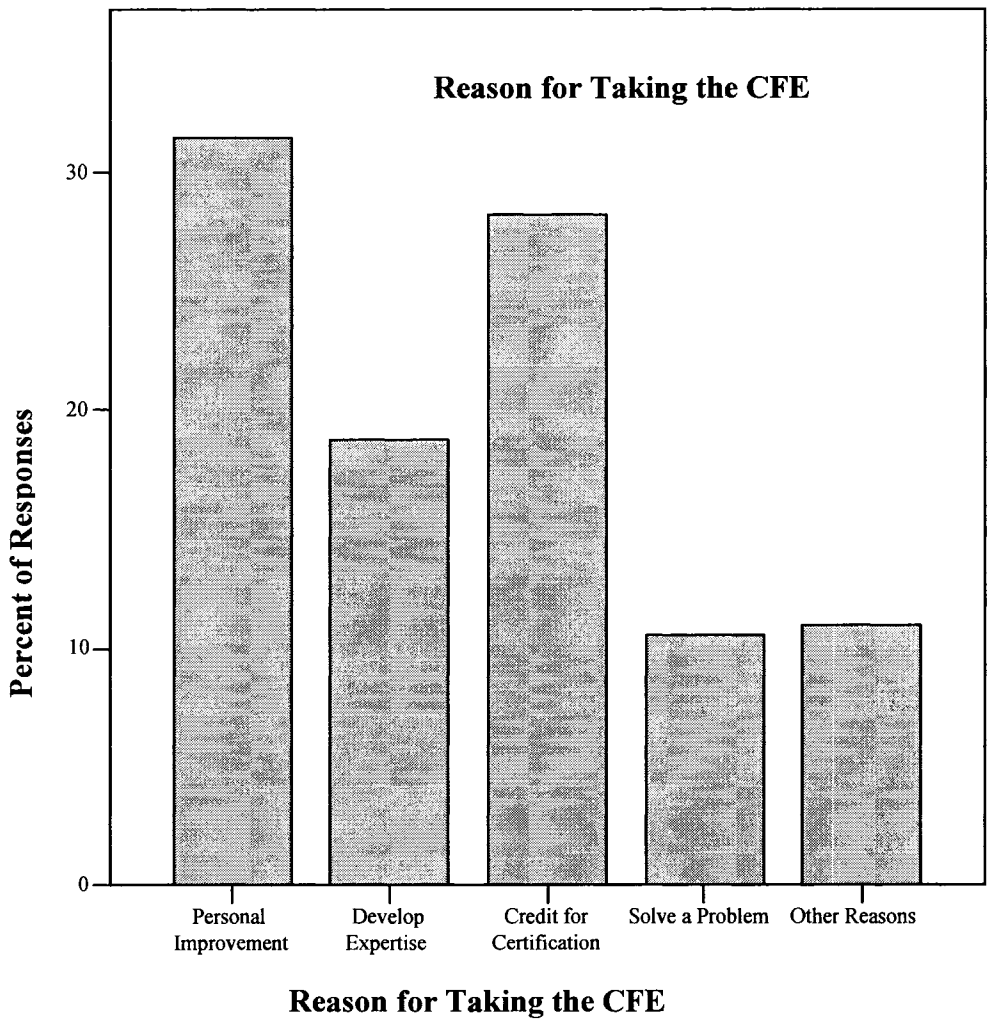

Figure 7. **Reasons Certified Foresters stated for taking the CFE event selected.**

Based on the information provided in Figure 8, most Certified Foresters made their decision to attend the CFE event based on their own independent decision (S3).

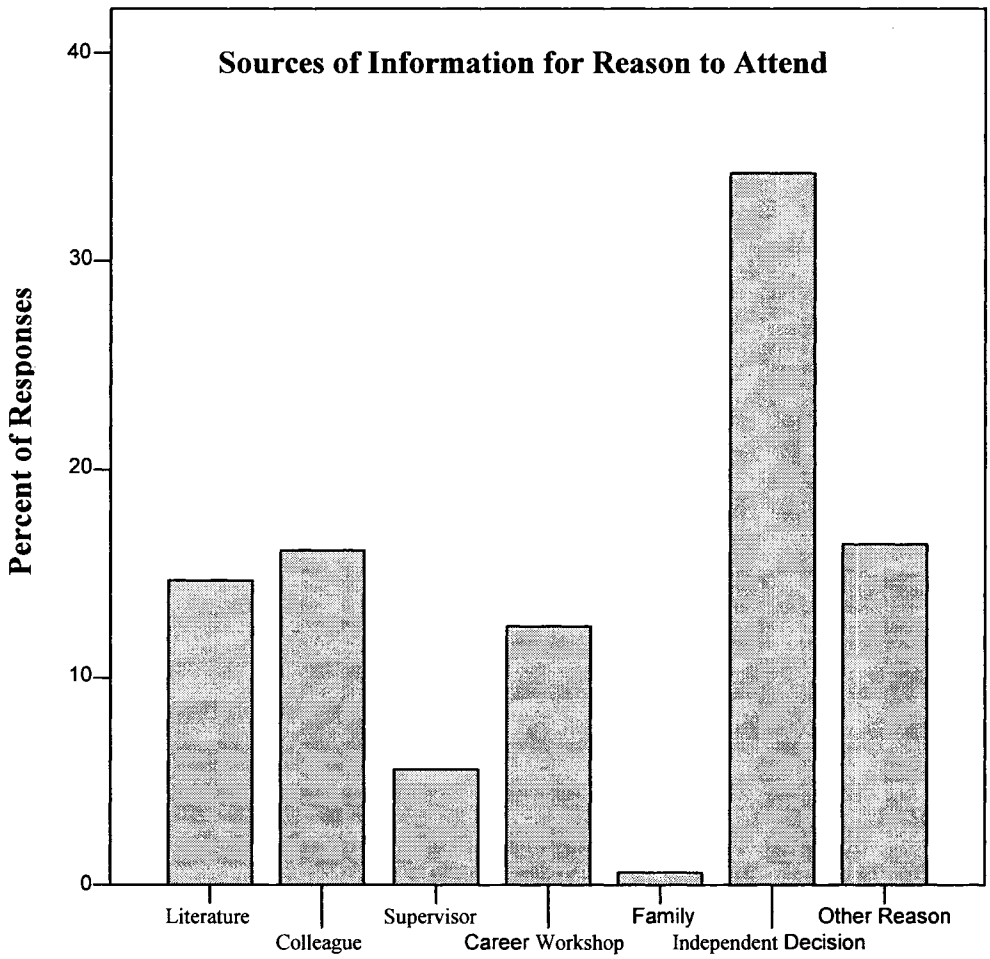

Figure 8. **Sources of information Certified Foresters reported used in selecting the CFE event for this survey.**

Figure 9 shows the primary reason stated for not using the content or concept provided at the CFE event was "no need to use", over 10% reported that the concept or content was no better than what they were using (S9).

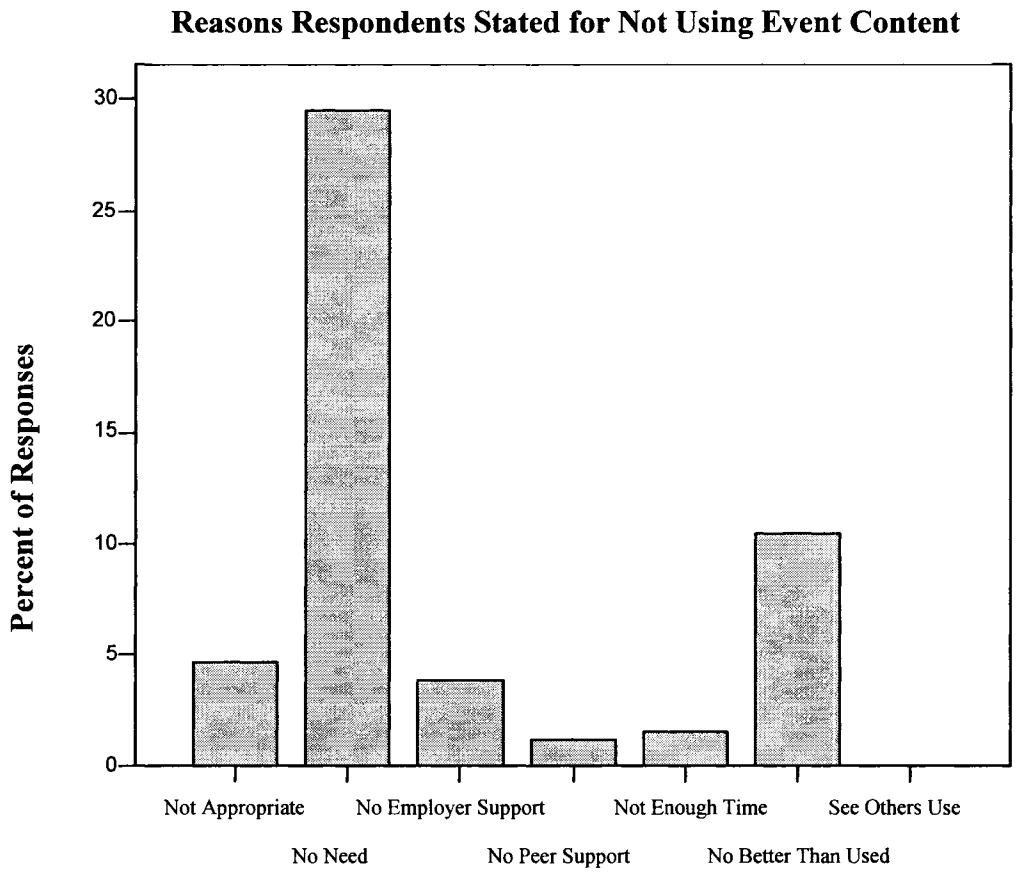

Figure 9. **Reasons Certified Foresters provided for not using the content or concept provided at a CFE event.**

Certified Foresters were asked how the selected CFE event met their learning need (S4a). Certified Foresters overwhelming reported the CFE event met their learning need. The summary of the responses is shown in Figure 10. Respondents also agreed that the CFE event helped solve a problem (S12), as is shown in Figure 11.

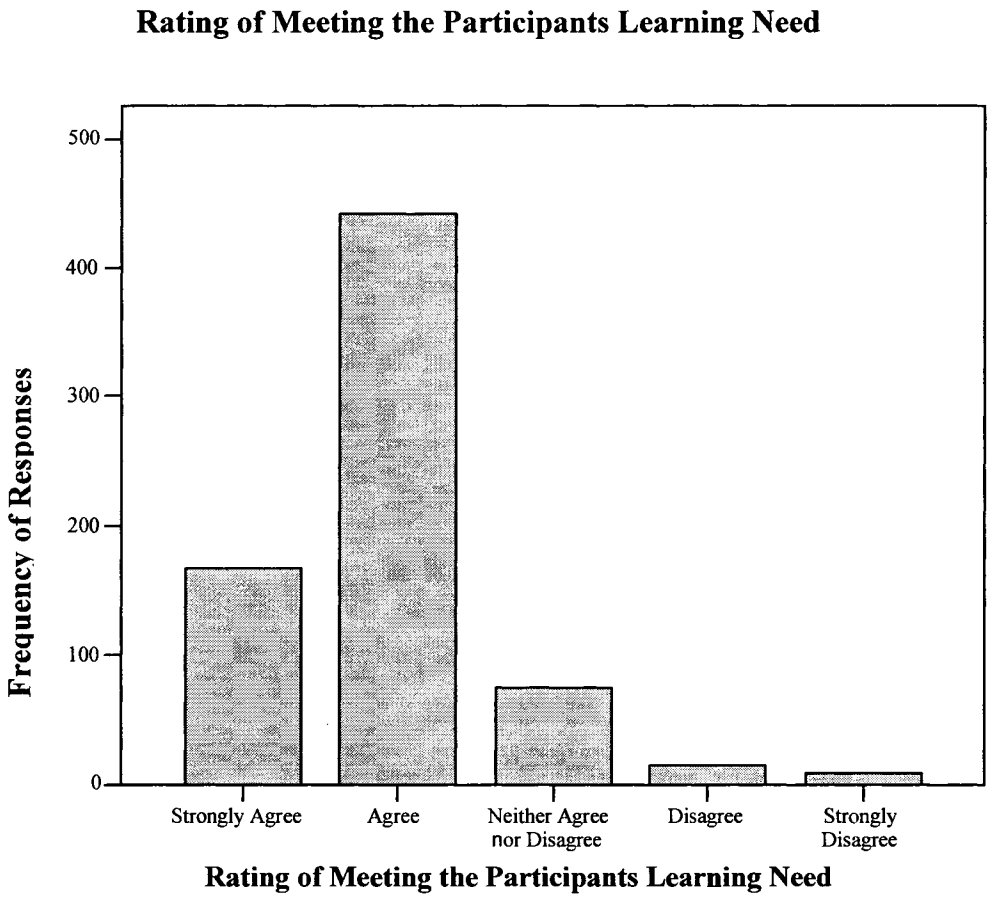

Figure 10. **Rating Certified Foresters provided when asked how the CFE event met their learning need.**

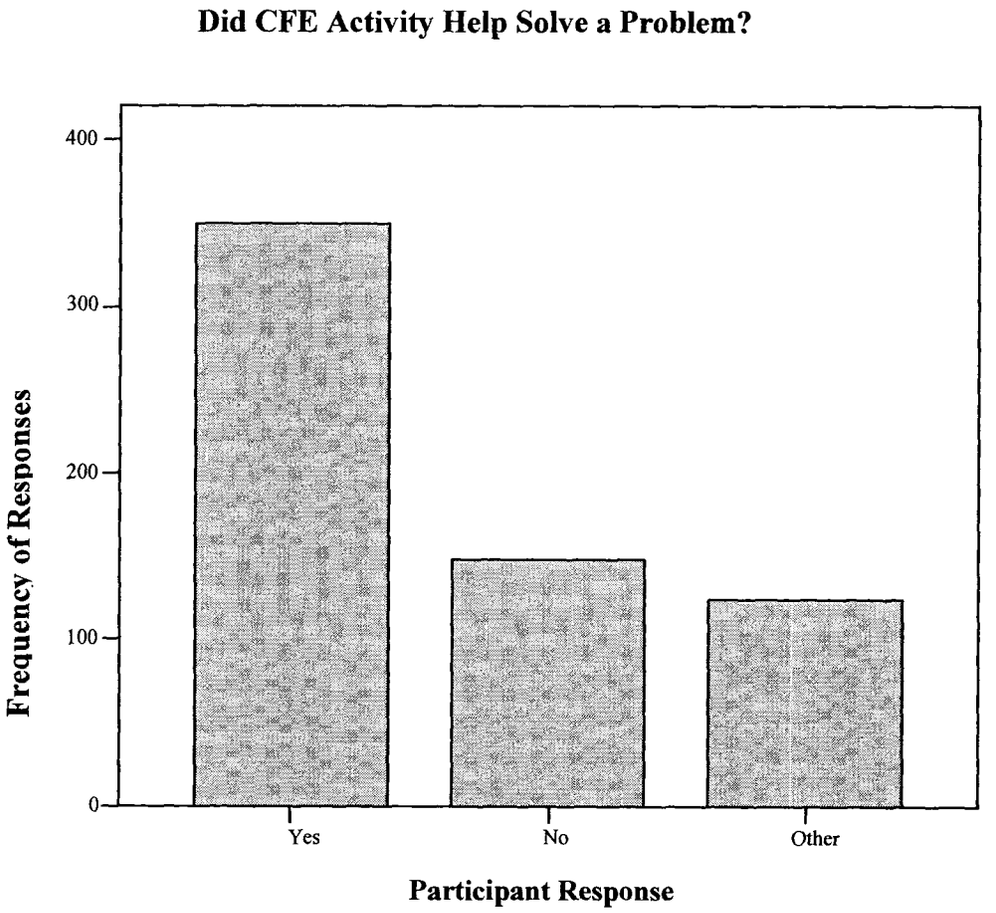

Figure 11. **Response by Certified Foresters to the question, "Did the CFE activity help solve a problem?"**

In relation to the event itself, most respondents agreed they could bring a problem (S10) to the event; however, 65.9% indicated they didn't bring a problem (S13). Over 90% indicated the event was not modified for their needs (S11), but they were allowed time to relate the program to their work related problem (S15). These responses are summarized in Table 6.

Table 6

Proportion of responses for course implementation attributes

Item	Yes	No	Total Responses
Learner was allowed to bring a project to the program	64.3%	35.7%	628
The program was modified for the learner	8.0%	92.0%	626
Learner brought a work related problem	34.1%	65.9%	624
Learner asked the instructor to modify the program	8.0%	92.0%	626
Strategies provided on how to apply content to work related problem	82.4%	17.6%	621
Learner was given time to relate program content to work problem	69.8%	30.2%	613

When asked what method of delivery was used (S16), respondents indicated most of the time was spent using lecture methods (Figure 12.), with field trips being the next most frequent delivery method.

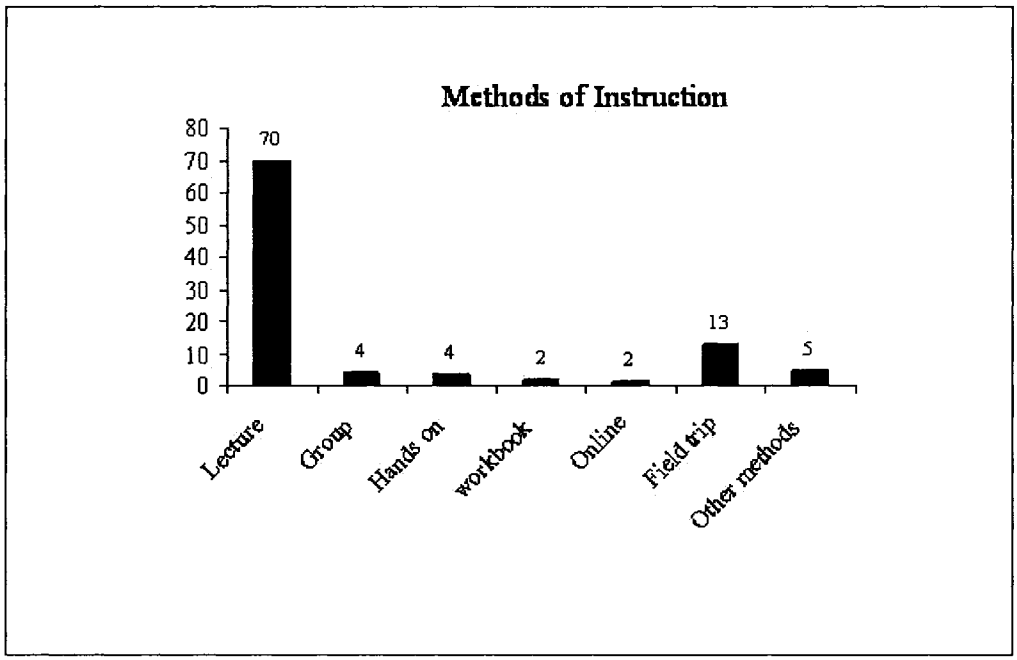

Figure 12. **Percentage of time by instructional method.**

In this survey, nearly 50% of respondents reported they spent 1 to 5 hours in additional learning after the event concluded (S7). Figure 13 illustrates how post session hours of learning were distributed. Figure 14 shows that most respondents are field foresters.

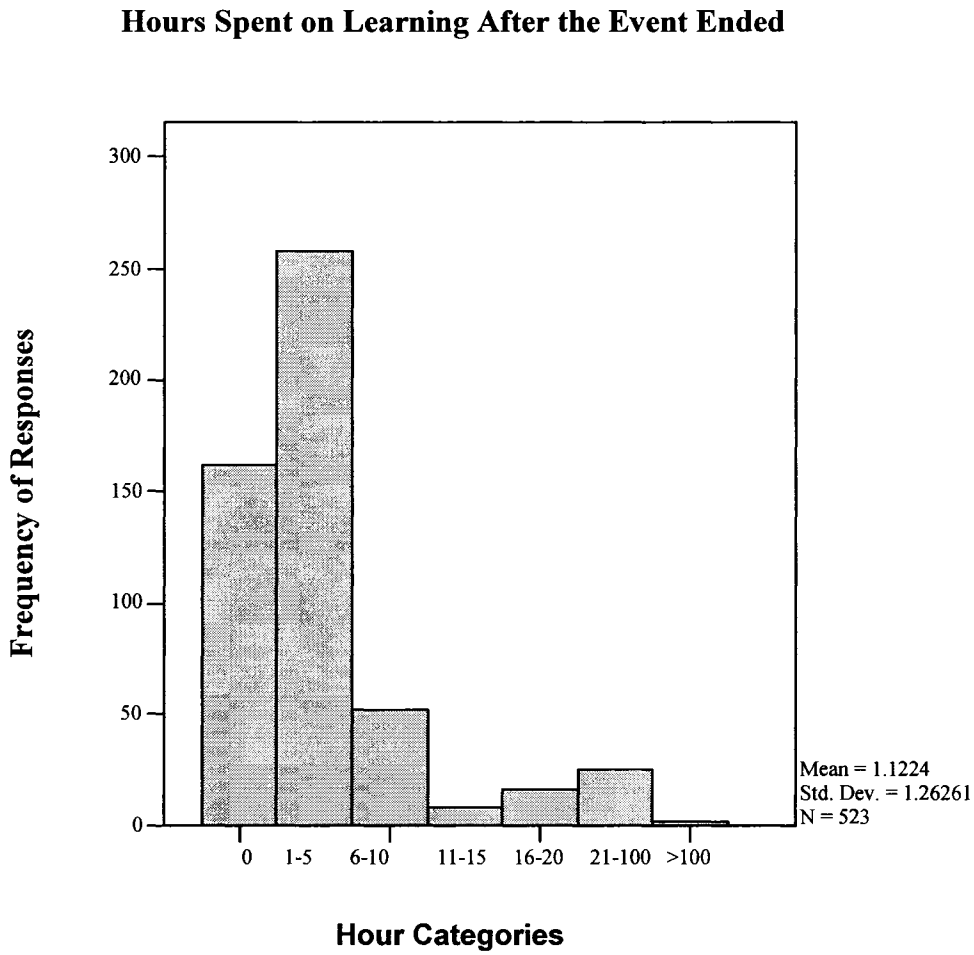

Figure 13. **Distribution of responses for the number of hours spent by respondents after the event concluded.**

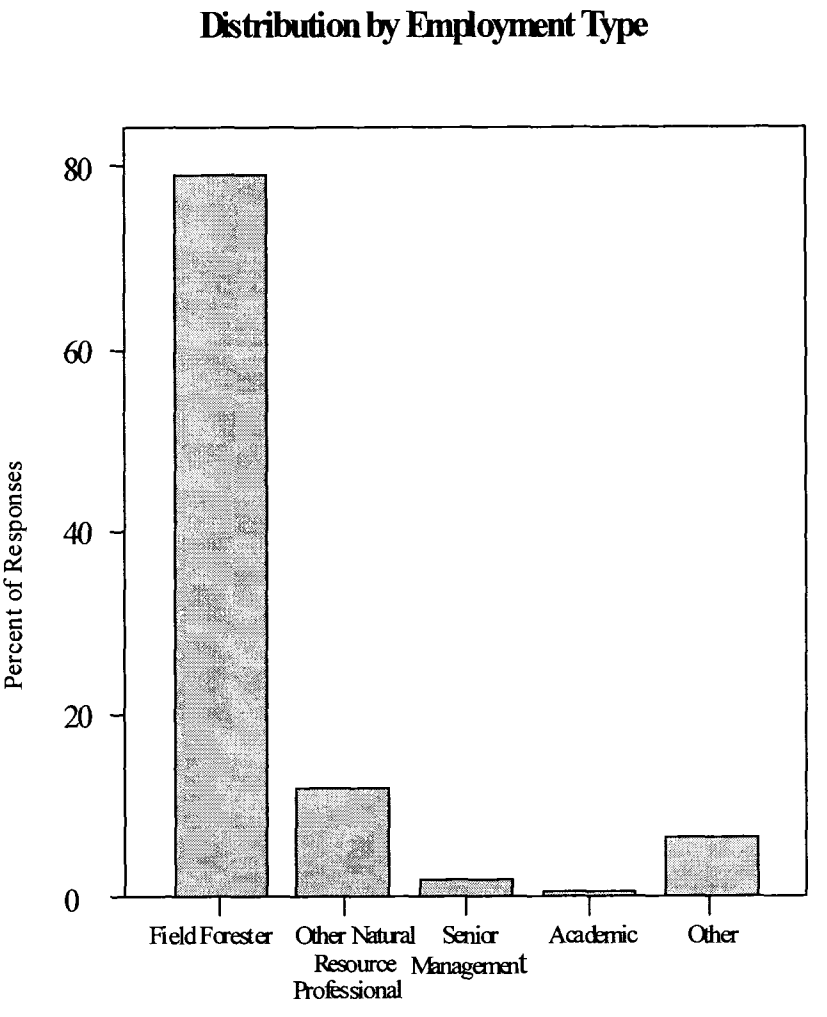

Figure 14. **Distribution of number of respondents by professional position category.**

One of the survey questions (S22) asked a series of questions about the respondent's attitudes toward continuing education. Specifics of these responses are presented in Table 7; figures presenting these results are show as part of Appendix G. Certified Foresters overwhelming reported that they think CE is important, is something they've always done and is needed to assure competency. They also generally agree that they enjoy CE and think it should be mandated for certification.

There was mixed agreement about the need for CE to protect the public and that it is expensive. That is to say, about as many agreed as disagreed with this question. Slightly more respondents agreed than disagreed that CE takes a lot of time. Most respondents disagreed with the statement that they couldn't find the right program. Nearly 20% of respondents agreed with Raymond (2004) that they had trouble finding useful continuing education. More respondents agreed than disagreed that CE should be audited.

Table 7

Results of Question 22 Regarding Professional Development

Professional Development	SA	A	N	D	SD	M	SD
a. Is important	51.5	40.8	4.7	2.3	0.7	1.6	0.75
b. Is difficult to accomplish	6.2	28.2	23.1	35.4	7.1	3.1	1.08
c. Is something I have always done	34.3	51.8	7.9	5.4	0.7	1.9	0.82
d. Needs to be done to ensure competency	40.4	40.8	11.4	5.7	1.7	1.9	0.94
e. Is something I have always enjoyed doing	30.2	48.2	15.8	4.7	1.2	2.0	0.87
f. Needs to be mandated by the professionals organization	41.7	37.0	11.5	5.7	4.1	1.9	1.06
g. Needs to be done to protect the public	16.9	31.5	28.4	14.8	8.4	2.7	1.17
h. Is expensive	12.8	36.1	33.4	15.1	2.5	2.6	0.98
i. Takes a lot of time	11.6	38.4	30.4	18.0	1.7	2.6	0.97
j. Is difficult to do because I can't find the right continuing professional education activities	6.2	12.2	27.5	41.8	12.2	3.4	1.05
k. Is something that must be randomly audited to ensure accountability	8.7	42.6	36.6	9.9	2.2	2.54	0.87

Appendix G presents graphic summaries of responses relating to preferences toward methods of delivery. Table 8 presents Likert scores for the preferences respondents had for different delivery methods (1 = very unlikely to 5 very likely).

Table 8

Results of Question 23 Regarding Potential Educational Activities

Activity	1	2	3	4	5	M	SD
a. Lecture	1.8	3.1	11.5	63.9	19.7	4.0	0.77
b. Workshops	1.0	1.5	6.0	59.5	32.0	4.2	0.70
c. Journal clubs or study groups	14.6	44.4	29.1	10.0	2.0	2.4	0.92
d. Seminars	1.0	2.5	10.9	66.3	19.4	4.0	0.70
e. Case presentations	2.0	12.8	29.0	47.7	8.5	3.5	0.89
f. Video, audio, and computer based materials	5.1	21.9	31.5	36.3	5.2	3.2	0.99
g. Self-study programs	6.0	24.8	29.0	34.2	6.0	3.1	1.03
h. Internet, Web based course	6.5	21.1	30.4	33.0	9.0	3.2	1.07
i. Courses by satellite	10.2	31.2	35.5	19.9	3.3	2.8	0.99
j. Distance learning (meet with local cohorts but part of bigger class)	7.2	28.3	34.9	25.9	3.7	2.9	0.99
k. Experiential skill development	4.8	16.5	40.0	33.0	5.7	3.2	0.94
l. Certificate programs	3.5	12.7	32.5	44.2	7.1	3.4	0.92
m. Academic course work	9.0	30.0	28.9	27.5	4.6	2.9	1.05
n. Exhibits or field demonstrations	0.8	1.8	5.2	60.1	32.1	4.2	0.69
o. Individual Professional journal reading	5.7	19.9	24.0	35.9	14.5	3.3	1.12
p. Posters	12.4	32.9	32.5	18.9	3.3	2.7	1.02
q. Residency and fellowship programs	30.0	42.7	19.0	5.9	2.3	2.1	0.97
r. Sponsored learning by employer or third party	4.7	6.9	13.4	51.0	24.0	3.8	1.02

In answer to the question of leaning plans (Q24), 46% of respondents indicated they had a learning plan. In answer to the question about forester licensure requirement, 24% indicated a license is required to practice forestry in their state of practice.

For the survey question about using the online reporting feature for CFE (S24), 73% reported they used the feature. Only 5% reported they did not know about online reporting. Most respondents reported they reported the same amount of education using the online reporting feature (S26). Twenty-six percent reported they didn't use the online reporting feature.

CHAPTER 5 - DISCUSSION

Research Question 1 - The Measure of Use

Based on this study, Certified Foresters overwhelming reported that they used their Continuing Forestry Education after they returned from the selected Continuing Forestry Education (CFE) event. The overall percent of respondents (82%) that indicated they used their education is consistent with findings of Axtell and Maitlis (1996).

Rogers' stages of innovation diffusion represent an alternative measure of use. Seventy percent of Certified Foresters reported that they tended to move positively in Rogers' score, with an average change of 1.5 stages between the start of the event and the end of the event. Forty one percent of respondents, who completed the Rogers questions, indicated they continued to move positively through Rogers' stages in the month following the event.

The Smith and others (2006) study of social workers illustrated how professional response to application is complex. Their result is confirmed with this study. The percent of foresters indicating they used their CFE, when taken in the context of the variety of Rogers' Stages of Adoption reported, is an indication that some must have considered use being something other than clear application to a work related problem. One of the Rogers' stages is a stage called implementation. Less than 82% of respondents indicated a Rogers' stage of decision, implementation, or confirmation; the stages that would directly equate to use. Respondents apparently equated use at levels less than decision.

Foresters were simply asked if they applied the content or concept presented at the CFE event. This methodology would allow foresters to self-define the meaning of use. This high level of "yes" responses would be consistent with the qualitative survey of Canadian doctors noted in Chapter 2 (Harrison & Hogg, 2003). In that study, the authors reported the following:

> The lack of congruence between what the CME literature shows and what these doctors believe happens following attendance at a CME event is important. One explanation could be that if changes made are small and incremental, as the doctors in this study acknowledge, such changes would be difficult to measure accurately in a randomized, controlled study. (p. 887)

An equally important statement by Harrison and Hogg that helps validate the value of a self-developed measure of use is this statement:

> It is likely that there is a difference between the 'intended' learning on the part of the course planners and the 'actual' learning that takes place. Learning is to some degree serendipitous and may not be linked to the objectives of the course planners. (p. 887)

Once again, the definition of use by professional foresters seems to indicate, that even small changes in knowledge or proficiency, be interpreted as use.

Two measures were calculated using an analytical approach to the Rogers' Stages of Adoption. Averages of the use variable, as calculated using the binomial values interval [0,1] were displayed for Rogers' change classes in Table 3. Those reporting their stage had changed from no knowledge toward confirming decision to adopt, showed a positive relation with their binomial response that they had used their education. Few respondents reported moving from no knowledge to decision to adopt, which would have been a full move through the entire Rogers' Stages. A surprising number of respondents reported no change in Rogers' score. It was also interesting that some respondents moved backwards toward no knowledge, although there were very few of those.

A number of respondents reported a continued move along the Rogers' scale in the period after the continuing education ended. As happened with the rating from start to immediate end of the CE, some respondents reported moving backward in their rating for period after the CE. Once again there were very few that reported going backward. Using Rogers' Stages of Adoption appears to provide an alternative and useful measure of self-assessment of use, that provides richer detail than a simple yes or no question.

Research Question 2 - Relationships to Use

In looking at a variety of variables in this study, there was a weak relationship between the length of the event and whether or not the education was used. Those who reported they were retired reported slightly less use than those not retired. This is not an unexpected result; as retirees would be have less opportunity to apply their new skills and knowledge. The positive, although small, correlation between use and length of the event reinforces the need to have events that are long enough for a participant to get engaged for their to be an adoption by the participant. Ottoson (1995a) noted a weak relation between a variable called practice time and use. This study tends to reinforce the general concept by looking a length of an educational event. In yet a still different context, this study result may add some basis for the SAF requirement of a minimum of 60 Category One education hours. The minimum hours requirement addresses the idea that one needs enough time in engagement for the engagement it to be useful. I was not successful in finding other educational literature that specifically addressed how time in the education event was related to the use of the education in practice. SAF has a minimum hours per event requirement, which was one hour.

Research Question 3 - Predictors of Use

I used a logistic regression method as an approach to investigate the complex nature of professional use of CE as other authors had suggested (Axtell & Maitlis, 1997; Ottoson, 1995; & Smith et al., 2006). These same authors describe the very complex nature of why professionals use their education. This complexity was hinted at in this study by finding several variables that showed significance in a predicting use. As was reported in the previous two research questions, the significant variables were, the complexity of the session, bringing a problem to the event, working full time in forestry, and the Rogers Change Score (before to end of event).

The regression technique used for this analysis used the fitting of the variables mentioned above in one step. An alternative method might have processed the regression by looking at use regressed on complexity, then use regressed on bringing a problem, and so forth. Using the method of all variables in one step hides the possibility that a variable like delivery method may have a larger coefficient if the other variables are left out of the fitting process.

The relationship between use and having a problem to solve is consistent with the suggestions of the noted adult education theorists. Gance (2002) suggested having a problem to solve, Mott (2000) suggested practice based learning, Phillips (1987) emphasized participation and clinical settings, and Houle (1980) suggested finding practical applications to solve problems.

The calculation of the Rogers' score change (as developed for this study) adds still more basis to the idea that determining use of continuing education is complex. Some respondents who indicated they used their Continuing Education reported Rogers'

change to just a level of knowledge. Other respondents indicated use and a corresponding Rogers' change to a level that indicated implementation.

The relation of more likely use with increased complexity was an unexpected finding. I expected that more complex sessions would have less likely use on returning to work. Stock and Tatikonda (2000), in their description of technology transfer processes; note that complexity and uncertainty can require interaction with the developer and the user. It would seem this interaction could take considerable time making even a one-month interval inadequate to get to result in use. As noted above in the section on Rogers' stage change, use has broad interpretation.

Research Question 4 - Certified Forester's Preferences Toward Continuing Education

Figure 5 showed how dramatically skewed the histogram was for the year respondents were certified. Year 2002 had the preponderance of responses. It's possible the press of meeting the CFE time limit requirement may have influenced the type of continuing education selected. Responses shown in Figure 6 illustrate a high value for the category of credit or certification as the reason for taking as possible support of this possibility. For those reporting they didn't use the content or concept of the event they attended, the most frequent response was "no need". Although not directly connected, those taking continuing education for credit only, might be less likely to select programs that provide immediate solutions to problems and selected events that made it easiest to obtain the necessary credits.

As was noted for the discussion of Research Question 1, having a problem to solve assists learners in using their education. Most respondents indicated they could bring a problem; only slightly over one third did. Few respondents asked to have the course modified for their needs. One exciting finding is that nearly 70% of respondents were given time to relate the event content to a work problem.

Respondents were in strong agreement that they were most likely to attend lecture, seminars, workshops, and field demonstrations. This is the similar list to that reported by Williams et al. (2004). A considerable proportion of respondents indicated they were neutral or had a dislike for group learning, video learning, self-study, World Wide Web, satellite, distance methods, certificate methods, posters, residency or fellowship programs, and academic courses. Yet editorial comments like those from Raymond (2004) regarding the difficulty in finding suitable offerings could be partially solved by using the full variety of offerings that utilize education methods other than lecture. Responses to education delivery preference questions from this survey correspond to responses by dieticians and dietetic technicians to the Williams et al. (2004) survey, which was the partly the basis to question in this study. Williams et al. reported the top four educational methods used by their respondents were lectures, seminars, workshops, and exhibits; this is the same top four preferences reported by Certified Foresters. Respondents reported a dislike for the academic course work delivery method.

Implications for Practice

It is clear from this study that the Certified Foresters in this study agree with the SAF premise that continuing education is needed. The need for a requirement of

mandatory education is somewhat clouded, as most respondents indicated they do CE anyway. As in prior studies (Donen, 1998; Phillips, 1987; Nielson, 1983), Certified Foresters in this study are not in full agreement that CFE is necessary to protect the public. The overwhelming finding in this study is that CFs use their education and more used their education when they had a problem to solve. Based on open-ended questions, there is some concern by CFs that learning is not a part of, or is difficult to define, when the reason for CFE was for attending meetings or making a presentation. SAF should address this concern by better defining how the learning that occurs in these activities is truly continuing education.

The majority of respondents to this study indicated they prefer lecture program delivery. Continuing education literature from professions other than forestry, indicate education delivery methods other than passive lecture should be utilized in concert with peer/employer support for application, if the education is to be applied. Foresters need to break out of their lecture/workshop preference mode and gain experience in other education methodologies. In addition, the SAF should broaden their view of acceptable methodologies to include methods which are more experiential, self-directed, and adapted to newer technologies. Such processes should be considered Category One, whether formal or not. The test should be whether or not a forester is more proficient or competent, not whether the course was formally presented. Having a problem to solve, is very important to use of education, as has been shown in this study. A majority of respondents report they spent one or more hours on learning after the formal event. SAF should consider allowing credits for this after event learning.

Recommendations for Further Research

Future studies should be designed to deliver the same program content via traditional seminar/lecture format and via the Internet or self-directed methods. As most CFs reported they selected lecture delivery CE and they indicated they preferred lecture delivered CE, it's possible they have not had an opportunity to truly evaluate other delivery methods. Use of distance delivery methods and other methods than lecture and field trips might also address the needs of the nearly 25% of respondents that indicated they had trouble finding the right program. No allowance is made for learner defined experiential learning programs and programs such as case studies to be used as methods qualifying for Category One CE credit. Alternatives to formal programs should be investigated as meeting the intent of Certified Forester Continuing Education.

A second topic for future research is to test if the Rogers' change score can be generalized into a measure of program impact on the attendee. For example is there a difference if the attendees only obtain knowledge or if they implement after the session? Such a study would also benefit program providers, who search for easy to apply evaluation methodology that attempts to obtain information on impacts and outcome.

This study did not investigate if CE contributed to forester competence or changed practice as a result of their CE event. Future research should investigate if there is such a connection. As noted by other authors (Ottoson, 1995a & Firmstone et al., 2004), detecting impact is difficult and such a study of foresters would be equally difficult. Experience from this quantitative study lead to a recommendation for future research regarding change in competency would be better if qualitative research techniques were adopted.

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Appendix A - Letter of Agreement

Society of American Foresters
Growing better all the time

July 27, 2005

Ralph R. Johnson
2961 Hunters Lane
Stevensville, MT 59870

Dear Ralph,

This letter confirms the agreement between the Society of American Foresters and Colorado State University in regards to the doctoral research study being conducted by Ralph R. Johnson. The topic of this research is an evaluation of the Certified Forester® continuing education program. Specifically this research will investigate the extent to which foresters apply or otherwise utilize the education they use in meeting their continuing education requirement.

SAF will provide Mr. Johnson and Colorado State University with limited access to SAF's continuing education data. This includes the names, e-mail, and physical addresses of current Certified Foresters. The Certified Foresters that requested omission from any type of solicitation will be omitted from the list. SAF will also provide access to the continuing education attributes such items as contact hours, method of instruction, dates of instruction, and course name.

SAF expects that participation by Certified Foresters in this study will be voluntary, and all responses are expected to be kept strictly confidential. Information provided by SAF will not be utilized in any activity beyond this study. In addition, both Mr. Johnson and the Colorado State University will not share this information with 3rd parties.

In return for participation, SAF expects to receive copies of the results of this research for its own use in reviewing the continuing education program.

The Society considers this study to be timely and appropriate to its needs. Findings could well lead to future changes in the professional foresters continuing professional education requirements.

Sincerely yours,

Michael T. Goergen, Jr.
Executive Vice President

CC: Dr. Leonard Albright, School of Education, Colorado State University

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www.safnet.org

Appendix B - Sample Survey Questions (Paper Version)

The following questions relate to the specific course specified in your cover memo. You may have posted several CE Continuing Forestry Education (CFE) courses with SAF. Only one has been selected from the list you have submitted.

1. Which of the following describe your reasons for taking the CFE program? (Select all that apply)
   a. Personal improvement
   b. Expand your expertise into a new area
   c. Get the credits needed for certification
   d. Needed to help solve a work related problem
   e. Other (Please specify)

2. Question 2 was not used in the electronic version

3. I used the following sources in selecting this course to attend (select all that apply)
   a. Literature about career and skill enhancement
   b. A professional colleague
   c. My supervisor/ school advisor
   d. Career and skill enhancement workshops
   e. My family
   f. I did it independently
   g. Other (please specify)

4. This question is designed to determine the adequacy of the CFE program in meeting your learning needs. Please indicate your agreement level with the following statements.

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Agree
a. Met my learning needs					
b. Was affordable					
c. Was geographically accessible					
d. fit my schedule					

5. Did you apply the content of concepts presented at the CFE program when you returned to work. An answer to this question is a critical part of this study and an answer is needed to proceed with the survey.
   a. Yes
   b. No

If yes:

Yes you applied the course content

6. Indicate your need for additional assistance in order to apply the education: Select all that apply
    a. I didn't need any additional instruction to apply
    b. From the instructor
    c. From a peer
    d. From a fellow attendee at the CFE program
    e. From a subject area expert
    f. From additional formal methods (more course)
    g. From course provided training materials (handouts)
    h. From a hotline or user support system
    i. Other (please specify)

7. What was the amount of time you spent with additional learning in order to apply the content of the program. This is learning that occurred after you returned from the CFE Program (in hours)?
    _____ hours

8. Did the CFE program assist you in making the decision to apply the programs content when you returned to the job?
    a. Yes
    b. No

If No:

You did not apply the education

Since you did not apply the program's content when you returned from the session, these questions seek reasons why you think you didn't apply what you learned.

9. From the following descriptions, which describe why you think you didn't apply the program's content. (select all that apply)

    a. After reflection, I decided the material wasn't appropriate
    b. Didn't have a need or project requiring its use
    c. I had no employer support in applying the content
    d. I had no peer support
    e. I didn't have time to apply the content
    f. The education provided a solution no better than what I was doing
    g. I need to see others using the content before I apply
    h. I attended the program to increase my awareness of the topic
    i. Other (please specify)

Some additional questions about the selected course

The following questions look specifically at how the course was taught and the teaching methods which were used

10. Were you allowed or encouraged to bring your own work related problem to the program?
    a. Yes
    b. No

11. For the CFE program selected, did you ask the instructor to modify the curriculum for your need or problem?
    a. Yes
    b. No

12. Did the CFE program help you solve your work related problem?
    a. Yes
    b. No
    c. Other (please specify)

13. Did you bring a work related problem to the CFE program?
    a. Yes
    b. No

14. Did the Instructor or program provide strategies on how program content could apply to work related problems?
    a. Yes
    b. No

15. Were you given time during the program to relate your work related problem to the CFE program?
    a. Yes
    b. No

16. What instructional methods were used for the program which was selected for this survey? Enter the approximate percentage of time devoted to each method (must total to 100%)
    a. Lecture _____
    b. Group Project _____
    c. Individual Hands on practice _____
    d. Self administered workbook _____
    e. Online (internet) training _____
    f. Field tour/trip _____
    g. Other _____

If you could, how many additional CE hours would you have reported for this activity beyond what was reported for the CFE category 1 credits?

____ hours

18. What is your opinion of receiving additional CFE credit hours for time spent (post session) applying and further learning the content of this CFE program? (Indicate on the scale)
    a. I don't like the idea of additional credit hours
    b. I am neutral to the idea of additional credit hours
    c. I like the idea of additional credit hours

19. Please select the category the best described your work situation at the time period you took the CFE program
    a. Worked full time in forestry (40 or more hours/week)
    b. Worked less than full time in forestry
    c. Worked, not in forestry
    d. Did not work
    e. Other (please specify)

20. Rogers (2003) a noted specialist in technology transfer describes 5 phases individuals experience as they adopt new ideas. Regarding the content of the course you attended, select the phase which best describes the phase you were in at each of three points in time (check one box in each column):

	Before the course started	Immediately after the course ended	1 or more months after the course ended
a. No knowledge of the subject			
b. Knowledge of the subject			
c. Needed persuasion to adopt the content			
d. Was deciding to adopt			
e. Was implementing the content			
f. Was confirming the decision to adopt			

21. Complexity and uncertainty of content can impact your retention and use of the CFE program. How would you rate the complexity of the program content. Select one value
    a. Very simple
    b. Simple
    c. Neither simple nor complex
    d. Complex
    e. Very simplex

The following questions relate generally to Continuing Forestry Education

22. Please indicate your agreement with the following statements. Make one rating per row[1]

	SA	A	D	SD	DK
a. CFE is important					
b. CFE is difficult to accomplish					
c. CFE is something I have always done					
d. CFE needs to be done to ensure professional competency					
e. CFE is something I have always enjoyed doing					
f. CFE should be mandated for certification					
g. CFE needs to be done to protect the public					
h. CFE is expensive					
i. CFE takes a lot of time					
j. CFE is difficult to do because I can't find the right program					
k. CFE is something that must be randomly audited to ensure accountability					

[1] From Williams, Keim, and Johnson

23. Please select your likelihood to attend the following CFE activities[2]

Very unlikely to attend Very likely to attend

a. Lecture
b. Workshop
c. Study group or journal club
d. Seminar
e. Case presentation
f. Video, audio, and computer based material (not Internet)
g. Self-study program
h. Internet, Web based course
i. Courses by satellite
j. Distance learning (meet with local cohorts of a bigger class)
k. Experiential skill development
l. Certificate programs
m. Academic course work
n. Exhibits or field demonstrations
o. Individual Professional journal reading
p. Poster
q. Residency and fellowship program
r. Sponsored learning by employer or third party

24. Do you have a professional development learning plan?
    a. Yes
    b. No

25. Do you use the SAF's CFE online reporting to report your CFE credits?
    a. Yes
    b. No
    c. Didn't know about this reporting feature

26. SAF has initiated an online procedure for reporting CFE program hours. How has this new process changed your CFE reporting?
    a. I report more CFE program hours
    b. I report the same CFE program hours
    c. I report less CFE program hours
    d. I didn't use this feature

[2] From Williams, Keim, and Johnson

Questions About You

These last questions are about you

27. Proximity to retirement could have an influence in your participation in CFE programs. If you plan on retiring, how far off would your retirement date be? Enter 0 (zero), if you've already retired
    a. Years
    b. Months

28. Which on the following best describes your current professional position. (Select one)
    a. Technical field forester
    b. Other natural resource professional
    c. Senior management (supervise a staff of professionals)
    d. Academic
    e. Other (please specify)_____

29. Is a license required to practice forestry in the state where you practice?
    a. Yes
    b. No
    c. Don't know
    d.

30. Please let us know other comments on the SAF Continuing Education requirement for Certified Forester.

Appendix C - Letter Showing Permission to Adopt Survey Questions

From: Judith M. Ottoson [padjmo@langate.gsu.edu]
Sent: Friday, March 18, 2005 9:38 AM
To: Johnson, Ralph
Subject: Re: Permission to use your survey instrument

Ralph, great to hear from you and know that you are making progress. I am sorry to be so slow in responding. Knee surgery last month set me back a bit, but I'm up and about again and feeling great. Since we were last in contact, I have moved back home to San Francisco. I want you to have my new e-mail address so you can keep me posted over time: jottoson@comcast.net

You surely to have my permission to use the questions we used previously. I think the reference to the Patterson and Ottoson article would be the appropriate citation. I'll be interested to know your findings. All the best in your studies, Judith

Judith M. Ottoson
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Institute of Public Health
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>>> "Johnson, Ralph" <ralph.johnson@mso.umt.edu> 03/07/05 12:19 PM >>>
Dr. Ottoson,

About a year ago you were kind enough to send me some very useful reference materials relating to "use" of continuing professional education. In with this material was a paper copy of a survey instrument use used and published in an Ottoson and Patterson article. As my research proposal for my Doctorate, I am finding significant portions of your survey useful in my research. I am a graduate student at Colorado State University (but work at The University of Montana). I wish to reconfirm that (with proper citation) I might use portions of your instrument. Thanks for your help. Ralph

Ralph R. Johnson

Program Manager, UMOnline

Continuing Education

The University of Montana

Missoula, MT 59812

(406) 243-6317

(406) 243-2047 FAX

<http://www.montana-education.com>

Appendix D - Computer Code Used to Select Random Event

```
<?php

$tablename1 = "tony";

// Database connection information omitted for security purposes.

echo "<b>Ralph Request:</b><BR><BR>";

$sql = "SELECT DISTINCT Person_ID FROM $tablename1 ORDER BY person_id
ASC";
$result = mysql_query($sql) or die(mysql_error());

$input = 0;
$count = 0;
while ( $row = mysql_fetch_array($result) ) {

                                $count = $count + 1;
                                $c_count = 0;
                                $person_id = $row[0];
                                //echo "<b>" . $count . ": </b>";


                                $sql2 = "SELECT * FROM $tablename1 WHERE
Person_ID = '$person_id'";
                                $result2 = mysql_query($sql2) or
die(mysql_error());
                                while ( $row2 =
mysql_fetch_array($result2) ) {

                                      $c_count = $c_count + 1;

                                }

                                $random = rand(1, $c_count);

                                $c_count = 0;

                                $sql3 = "SELECT * FROM $tablename1 WHERE
Person_ID = '$person_id'";
                                $result3 = mysql_query($sql3) or
die(mysql_error());
                                while ( $row3 =
mysql_fetch_array($result3) ) {

                                      $c_count = $c_count + 1;

                                            if($c_count ==
$random){
```

```
                                                    $person =
$row3[0];
                                                    $course =
$row3[1];
                                                    $title =
$row3[2];
                                                    $date = $row3[3];
                                                    $hours =
$row3[4];
                                                    echo $person .
"," . $course . "," . $title . "," . $date . "," . $hours;

                                                    $input = $input +
1;
                                                    echo "<br>";
                                                }

                                    }




}


echo "<BR><b>$count...Done.</b><BR>";
echo "<BR><b>$input...Done.</b><BR>";

?>
```

Appendix E - Sample of Cover letter sent to each recipient

Dear Mr. Last Name,

Forester Certification has been in place for 10 years with Society of American Foresters. SAF is cooperating with Colorado State University in conducting a research study to investigate member attitudes toward the mandatory continuing education requirement for re-certification and an assessment of how you have used the Category One continuing education you posted with SAF. The title of this research is *Post Education Application of Category One Type Continuing Education Reported by Certified Foresters*. The Principle Investigator for this study is Dr. Leonard Albright, Professor, School of Education, Colorado State University. The Co-Principal investigator is Ralph Johnson, Doctoral Candidate, Colorado State University.

The survey should take about 10 minutes to complete. There are no known risks to taking the survey. It is not possible to identify all potential risks in an experimental procedure, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks. Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled. If you have any questions about your rights as a volunteer in this research, contact Janell Meldrem, Human Research Administrator at 970.491.1655.

It is our intention to provide the results of this study as an article in the *Journal of Forestry* and as a presentation at the SAF National Convention. Since this is dissertation research, results will also be available as a formal dissertation at Colorado State University.

We will be keeping a coded link to identify your CFE information available through SAF and information provided in this internet survey. We will remove any connection between your name and this information after we connect the survey with the SAF provided data.

Information from this research will be used in an aggregate form and no linkage with your name will be retained after your survey response is linked with data provided through the Society of American Foresters Continuing Forestry Education (CFE) database. It is our hope, information derived in this study, will shed new light on how foresters are using their continuing education and allow SAF to factor these findings into the CFE policies. This could be a direct benefit to you in future management of your continuing forestry education activities.

At the conclusion of this note you will find a World Wide Web link, which will take you to the survey portion of this study. We realize surveys can be a nuisance, but your participation is critical to making the results of this study useful for improving SAF's Continuing Forestry Education program. If you wish to receive a copy of the results of this study, please respond to this e-mail. If you have questions about the study, please call the Co-Principle Investigator, Ralph Johnson, Colorado State University at (406) 396-0619. Thank you for your participation.

For this study only one of the CFE programs you have submitted for CFE credit will be specifically referenced. Some questions will be directed at this one selected CFE program, while other questions will be more general in nature. For your survey, the specific program which as been selected, is **Name of Session**. Please try to remember this particular program.

Click on this link to enter the survey:

http://www.surveymonkey.com/s.asp?u=121121498667&=csaf#

Ralph R. Johnson
Colorado State University
School of Education
Fort Collins, Colorado
Email: saf.survey@lamar.colostate.edu

Appendix F - Actual Survey Recipient Linked To

Certified Forester's Use of Continuing Forestry Education

1. introduction

This survey is part of a Colorado State University Dissertation research project, which is being conducted as a cooperative project with the Society of American Foresters. If you have questions about the survey you may contact Ralph Johnson at (ralphj@lamar.colostate.edu) or call at (406) 396-0619. Thanks for your assistance in completing this project. Ralph

2. first page of questions

The following questions relate to the specific CFE program which was noted in your cover memo. You may have posted several CE continuing forestry education (CFE) programs with SAF. Only one has been selected from the list you have submitted to the Society of American Foresters.

Which of the following describe your reasons for taking this CFE program? (Select all that apply)

- ☐ Personal improvement
- ☐ Expand your expertise into a new area
- ☐ Get credits needed for certification
- ☐ Needed to help solve a work related problem
- ☐ Other (please specify)

I used the following sources in selecting this CFE program. (Select all that apply)

- ☐ Literature about career and skill enhancement
- ☐ A professional colleague
- ☐ My supervisor/school advisor
- ☐ Career and skill enhancement workshops
- ☐ My family
- ☐ I did it independently
- ☐ Other (please specify)

This question is designed to determine the adequacy of the CFE program in meeting your learning needs. Please indicate your agreement level with the following statements.

	strongly agree	agree	neither agree nor disagree	disagree	strongly disagree
Met my learning needs	○	○	○	○	○
Was affordable	○	○	○	○	○
Was geographically accessible	○	○	○	○	○

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fit my schedule ○ ○ ○ ○ ○

Did you apply the content or concepts presented at the CFE program when you returned to work. An an answer to this question is a critical part of this study and an answer is needed to proceed with the survey.

○ yes
○ no

3. Yes you applied the course content

The next series of questions look at what additional things you did to apply the course content after you left the program.

Indicate your need for additional assistance in order to apply the education. Select all that apply

☐ I didn't need any additional instruction to apply
☐ From the instructor
☐ From a peer
☐ From a fellow attendee at the CFE program
☐ From a subject area expert
☐ From additional formal methods (more courses)
☐ From course provided training materials (handouts)
☐ From a hotline or user support system
☐ Other (please specify)

What was the amount of time you spent with additional learning in order to apply the content of the program. This is learning that occured after your returned from the CFE program(in hours)?

hours

Did the CFE program assist you in making the decision to apply the program's content when you returned to the job

○ yes
○ no

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4. You did not apply the education

Since you did not apply the program's content when you returned from the session, these questions seek reasons why you think you didn't apply what you learned.

From the following descriptions, which describe why you think you didn't apply the program's content. (select all that apply)

- [ ] After reflection, I decided the content wasn't appropriate
- [ ] I didn't have a need or project requiring its use
- [ ] I had no employer support in applying the content
- [ ] I had no peer support
- [ ] I didn't have time to apply the content
- [ ] The education provided a solution no better than what I as doing
- [ ] I need to see others using the content before I apply
- [ ] I attended the program to increase my awareness of the topic
- [ ] Other (please specify)

5. Some additional questions about the selected course

The following questions look specifically at how the course was taught and the teaching methods which were used

Were you allowed or encouraged to bring your own work related problem to the program?

- ◯ yes
- ◯ No

For the CFE program selected, did you ask the instructor to modifiy the curriculum for your needs or problem

- ◯ Yes
- ◯ No

Did the CFE program help you solve your work related problem?

- ◯ Yes
- ◯ No
- ◯ Other (please specify)

Certified Forester's Use of Continuing Forestry Education

Did you bring a work related problem to the CFE program?

- ◯ Yes
- ◯ No

Did the instructor or program provide strategies on how program content could apply to work related problems?

- ◯ Yes
- ◯ No

Were you given time during the program to relate your work or problem to the CFE program?

- ◯ Yes
- ◯ No

What instructional methods were used for the program which was selected for this survey? Enter the approximate percentage of time devoted to each method (must total to 100%).

Lecture	
Group project	
Individual hands on practice	
Self administered workbook	
Online (Internet) training	
Field tour/trip	
Other	

If you could, how many additional CFE hours would you have reported for this this activitiy beyond what was reported for the CFE category 1 credits?

hours

What is your opinion of receiving additional CFE credit hours for time spent (post

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Certified Forester's Use of Continuing Forestry Education

session) applying and further learning the content of this CFE program?

- ◯ I don't like the idea of additional credit hours
- ◯ I am neutral to the idea of additional credit hours
- ◯ I like the idea of additional credit hours

Please select the category which best describes your work situation around the time you took the CFE program.

- ☐ Worked full time in forestry (40 or more hours/week)
- ☐ Worked less than full time in forestry
- ☐ Worked, but not in forestry
- ☐ Did not work
- ☐ Other (please specify)

Rogers (2003), a noted specialist in technology transfer, describes 5 phases individuals experience as they adopt new ideas. Regarding the content of the course you attended, select the phrase which best describes the phase you were in at each of three points in time(Check one box in each column):

	Before the course started	Immediately after the course ended	1 or more months after the course ended
No knowledge of the subject	☐	☐	☐
Knowledge of the subject	☐	☐	☐
Needed persuasion to adopt the content	☐	☐	☐
Was deciding to adopt	☐	☐	☐
Was implementing the content	☐	☐	☐
Was confirming the decision to adopt	☐	☐	☐

Complexity and uncertainty of content can impact your retention and use of the CFE program. How would you rate the complexity of the program content. Select one value

- ◯ very simple
- ◯ simple
- ◯ neither simple nor complex
- ◯ complex
- ◯ very complex

Certified Forester's Use of Continuing Forestry Education

6. Questions about CFE in General

The following questions relate generally to Continuing Forestry Education

Please indicate your agreement with the following statements. Make one rating per row. You may select don't know.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
CFE is important	○	○	○	○	○
CFE is difficult to accomplish	○	○	○	○	○
CFE is something I have always done	○	○	○	○	○
CFE needs to be done to ensure professional competency	○	○	○	○	○
CFE is something I have always enjoyed doing	○	○	○	○	○
CFE should be mandated for certification	○	○	○	○	○
CFE needs to be done to protect the public	○	○	○	○	○
CFE is expensive	○	○	○	○	○
CFE takes alot of time	○	○	○	○	○
CFE is difficult to do because I can't find the right program	○	○	○	○	○
CFE activity is something that must be randomly audited to ensure accountability	○	○	○	○	○

Please select your likelihood to attend the following CFE activities

	very unlikely to attend	unlikely to attend	Neither likely nor not likely to attend	likely to attend	very likely to attend
Lecture	○	○	○	○	○
Workshop	○	○	○	○	○
Study group or journal club	○	○	○	○	○
Seminar	○	○	○	○	○
Case presentation	○	○	○	○	○
Video, audio, and computer based material (not internet)	○	○	○	○	○
Self-study program	○	○	○	○	○
Internet, Web based course	○	○	○	○	○
Course by satellite	○	○	○	○	○
Distance learning (meet with local cohorts of a bigger class)	○	○	○	○	○
Experietial skill development	○	○	○	○	○
Certificate program	○	○	○	○	○
Academic course work (for credit)	○	○	○	○	○
Exhibit or field demonstrations	○	○	○	○	○

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Individual professional journal reading	◯	◯	◯	◯	◯
Poster	◯	◯	◯	◯	◯
Residency and fellowship program	◯	◯	◯	◯	◯
Sponsored learning by employer or third party	◯	◯	◯	◯	◯

Do you have a professional development or learning plan?

- ◯ yes
- ◯ no

Do you use the SAF's CFE online reporting to report your CFE credits?

- ◯ Yes
- ◯ No
- ◯ Didn't know about this reporting feature

SAF has initiated an online procedure for reporting CFE program hours. How has this new process changed your CFE reporting?

- ◯ I report more CFE program hours
- ◯ I report the same CFE program hours
- ◯ I report less CFE program hours
- ◯ I didn't use this feature

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7. Questions about you

These last questions are about you

Proximity to retirement could have an influence in your participation in CFE programs. If you plan on retiring, how far off would your retirement date be? Enter 0 (zero), if you've already retired.

Years

Months

Which of the following best describes your current professional position. (Select one)

- ◯ Technical field forester
- ◯ Other natural resource professional
- ◯ Senior management (supervise a staff of professionals)
- ◯ Academic
- ◯ Other (please specify)

Is a license required to practice forestry in the state where you practice?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please let us know other comments on the SAF Continuing Education requirement for Certified Forester.

8. Thank you

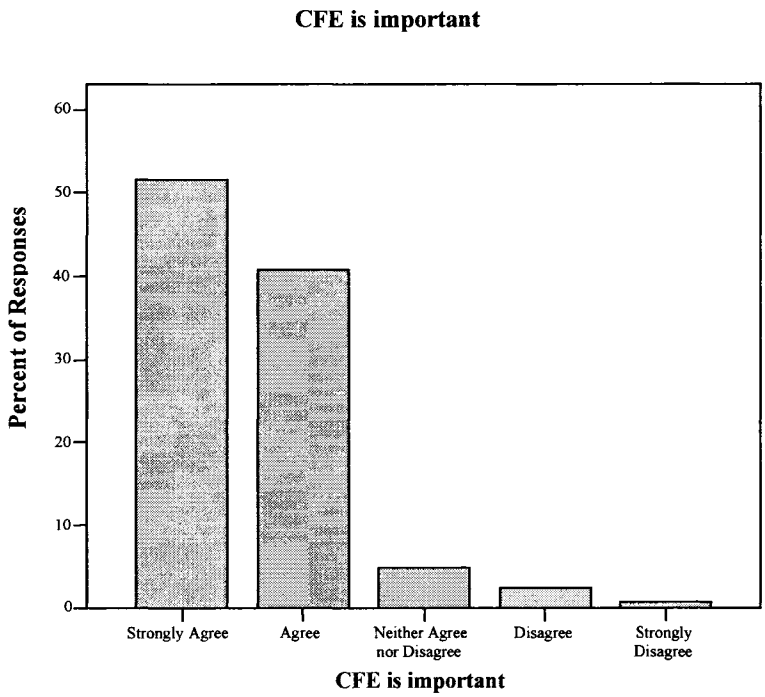
Thank you for taking time from your schedule to assist with this evaluation research into the SAF's Continuing Forestry Education program

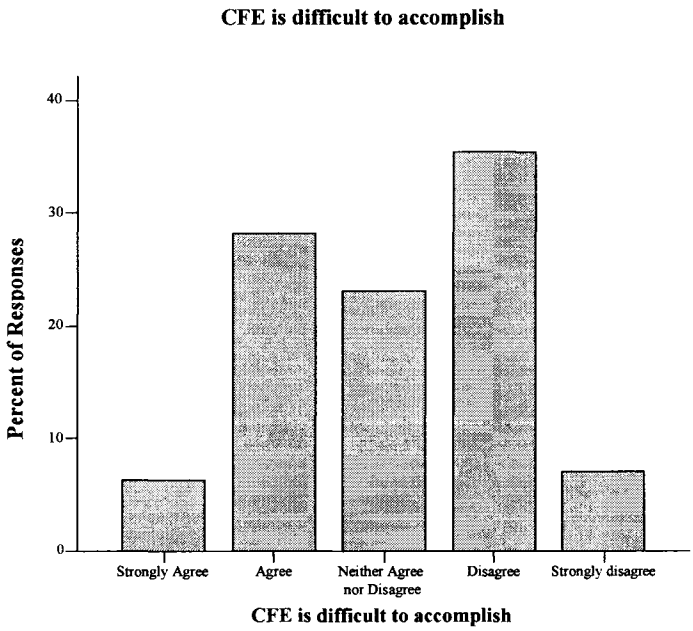
Ralph R. Johnson
Graduate Student
Colorado State University

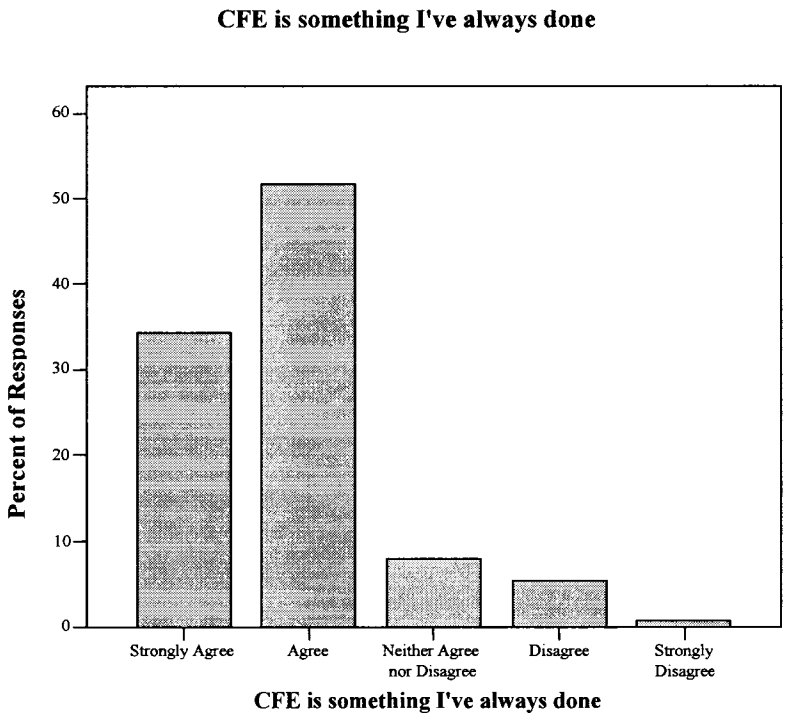
Appendix G - Certified Foresters Attitudes Toward Continuing Education Delivery Methods

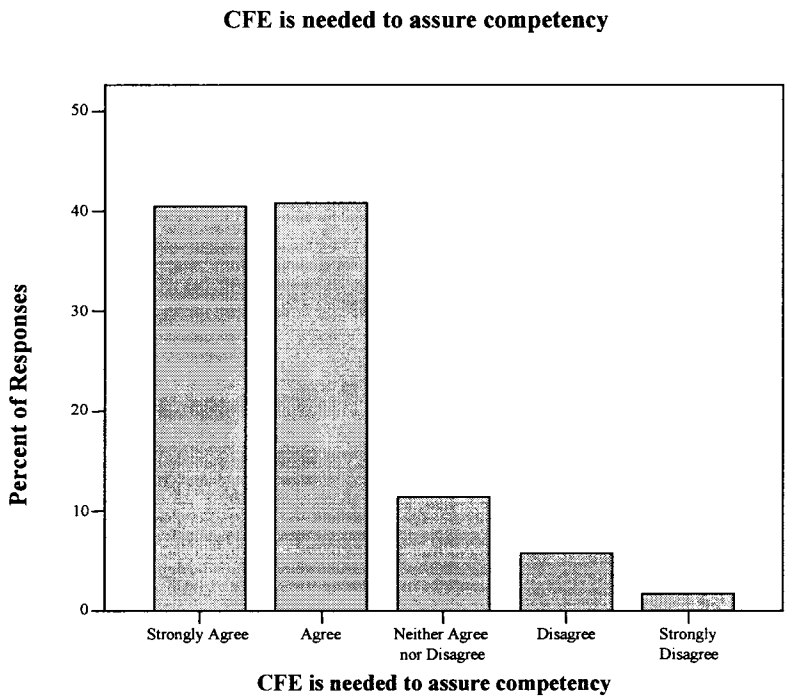
Legend for the Likert scale used in assessing Certified Forester's preferences toward CFE delivery methods

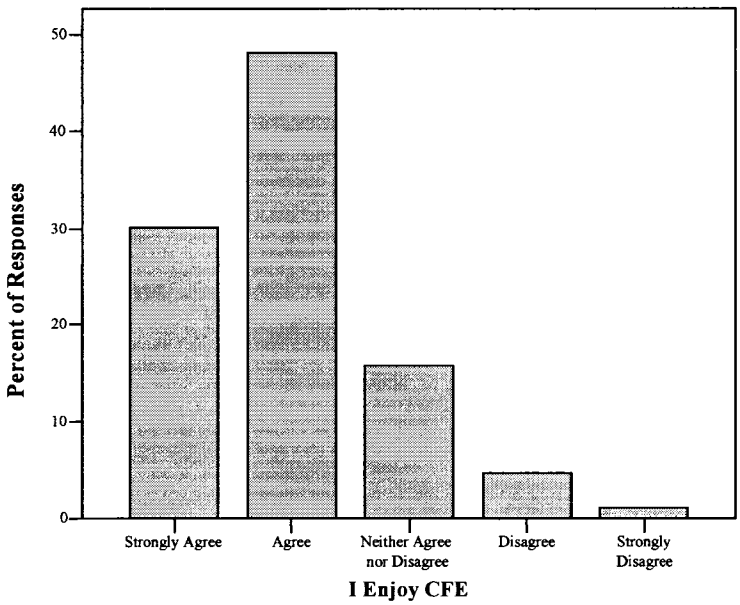
1 – Very Unlikely to Attend
2 – Unlikely to Attend
3 – Neither Likely nor Unlikely to Attend
4 – Likely to Attend
5 – Very Likely to Attend



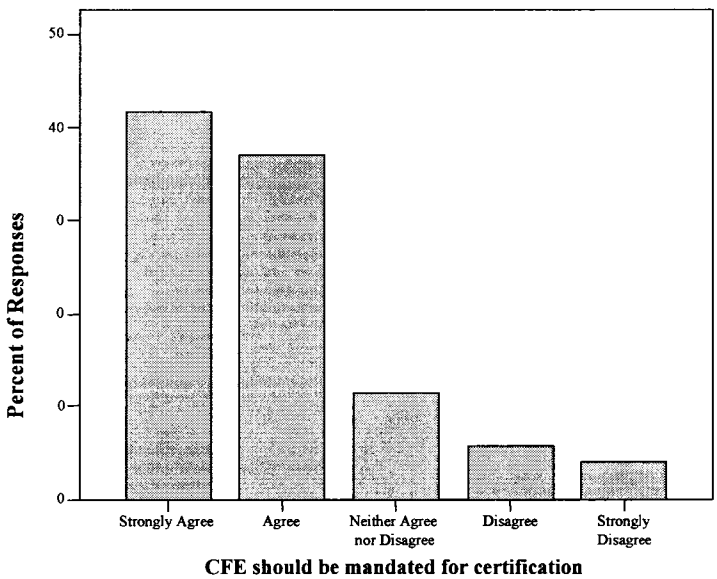


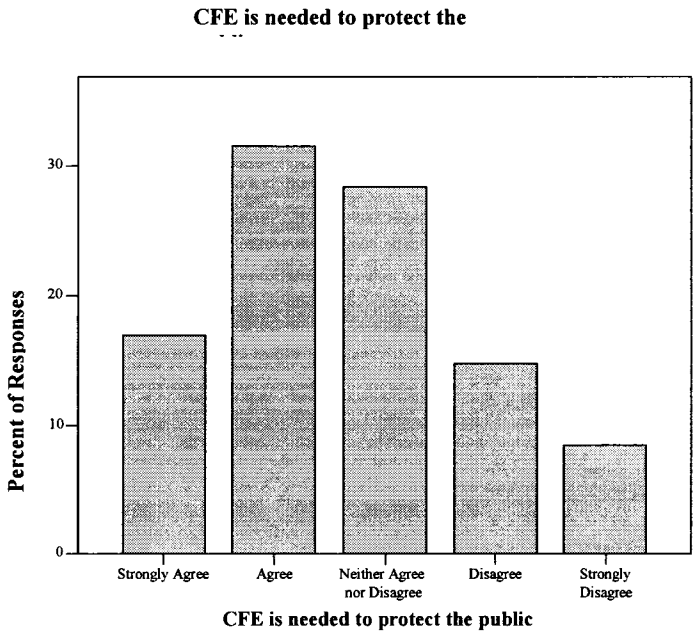


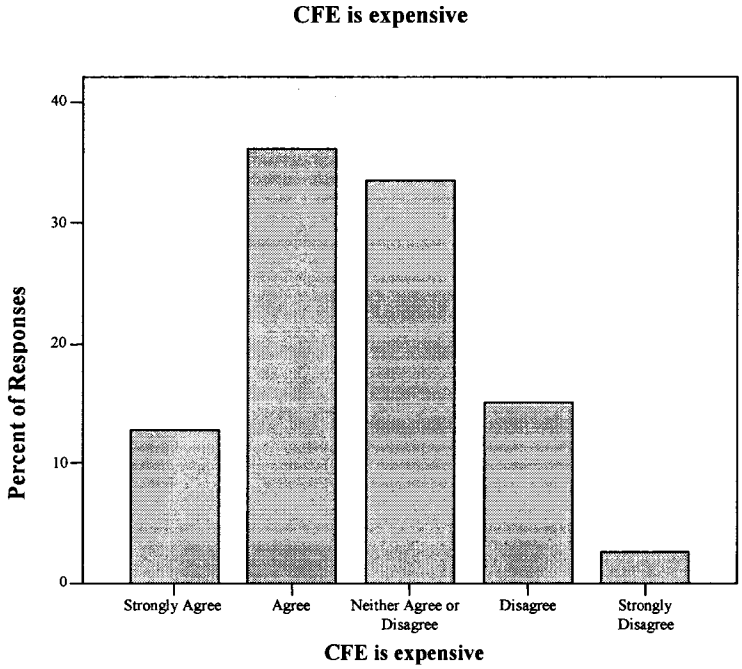




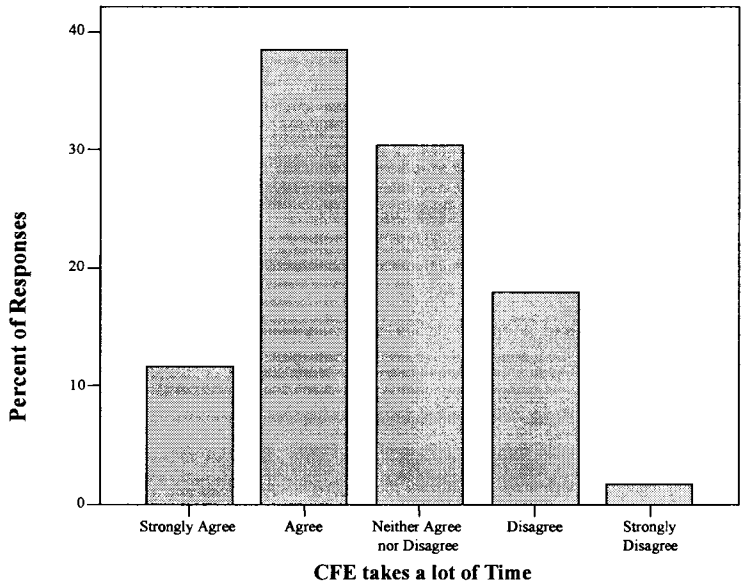
CFE should be mandated for certification



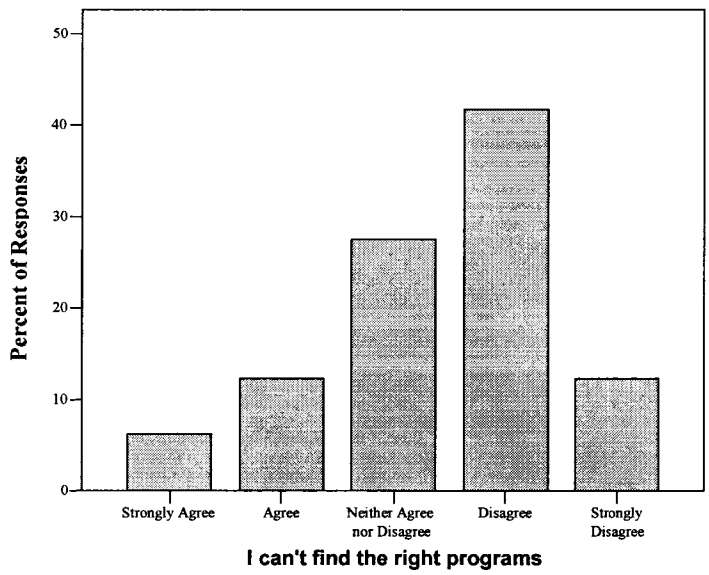


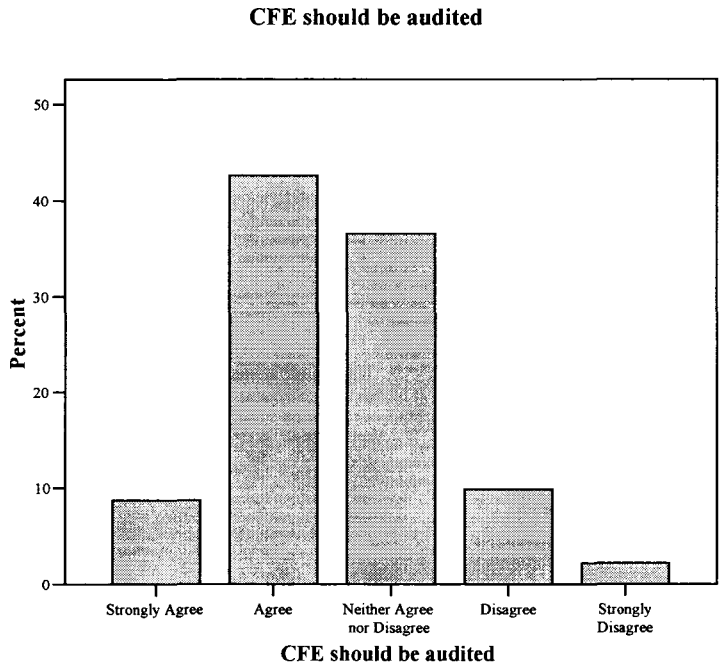


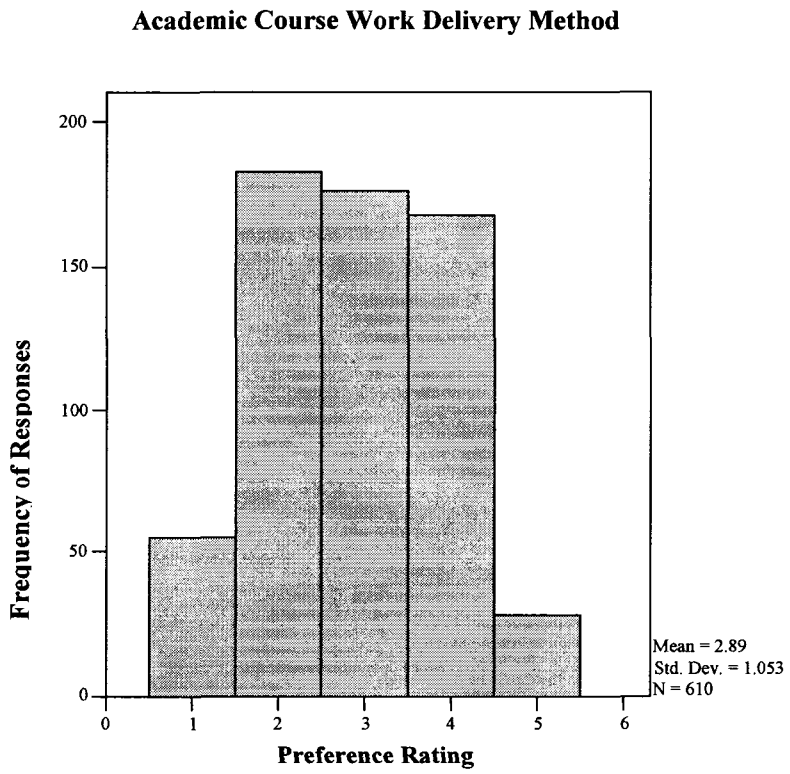
CFE takes a lot of Time



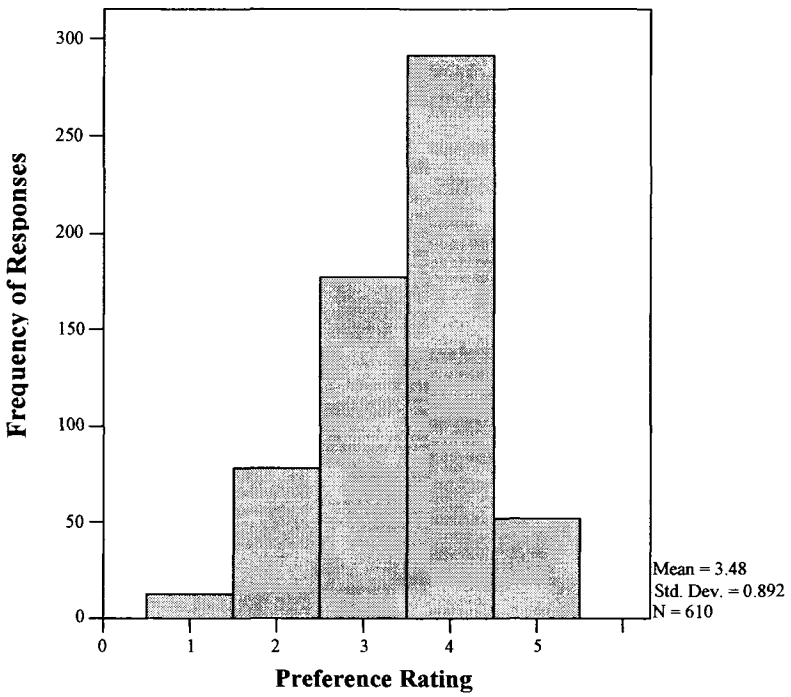
Agreement with question: I Can't Find the Right Programs







Case Presentation Delivery Method



Distance Delivery Method

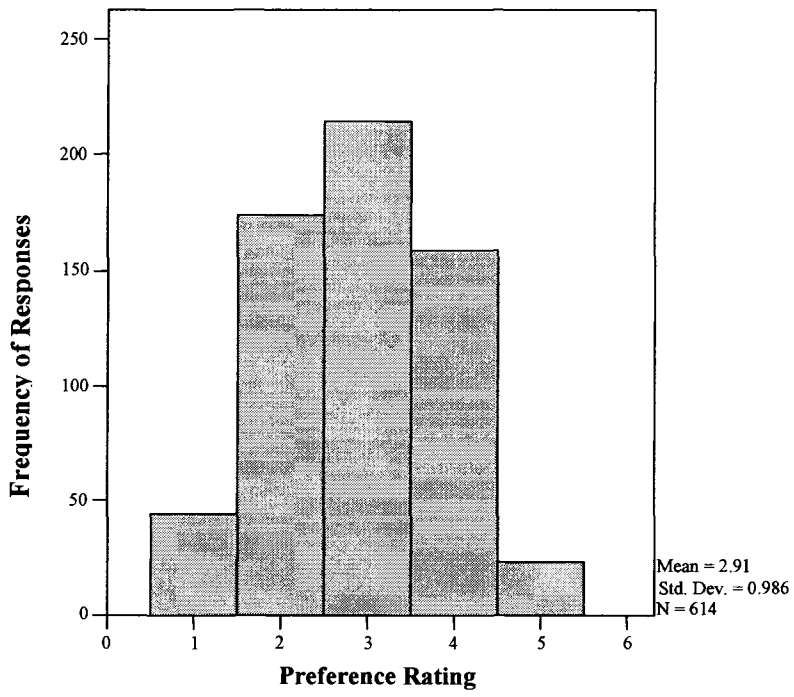
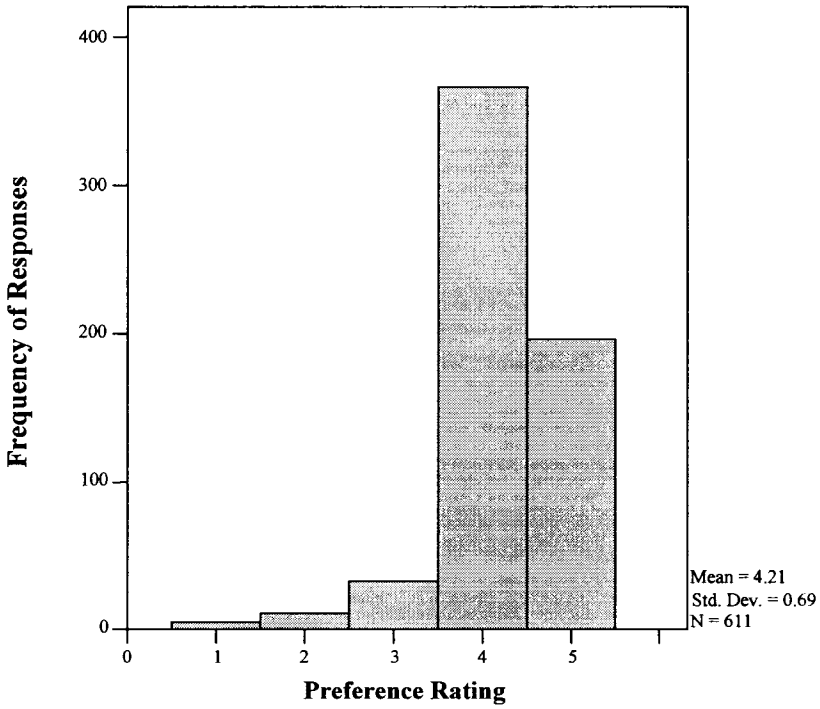
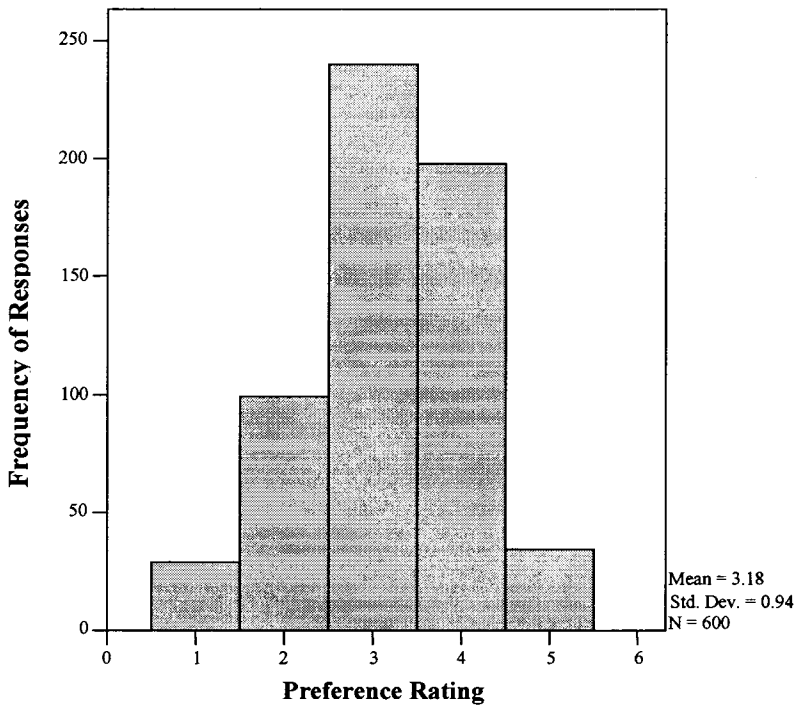


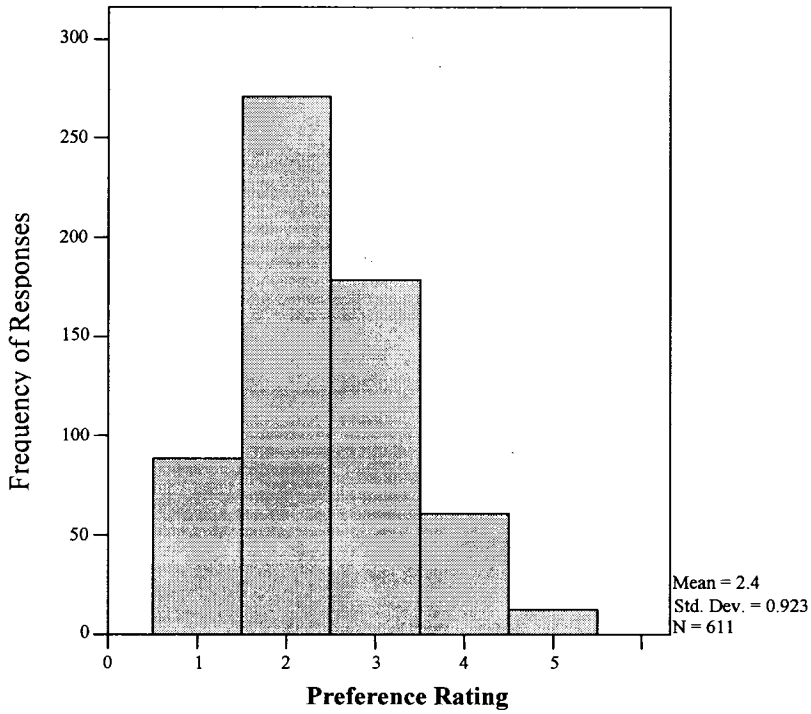
Exhibit or Field Demonstration Delivery Method



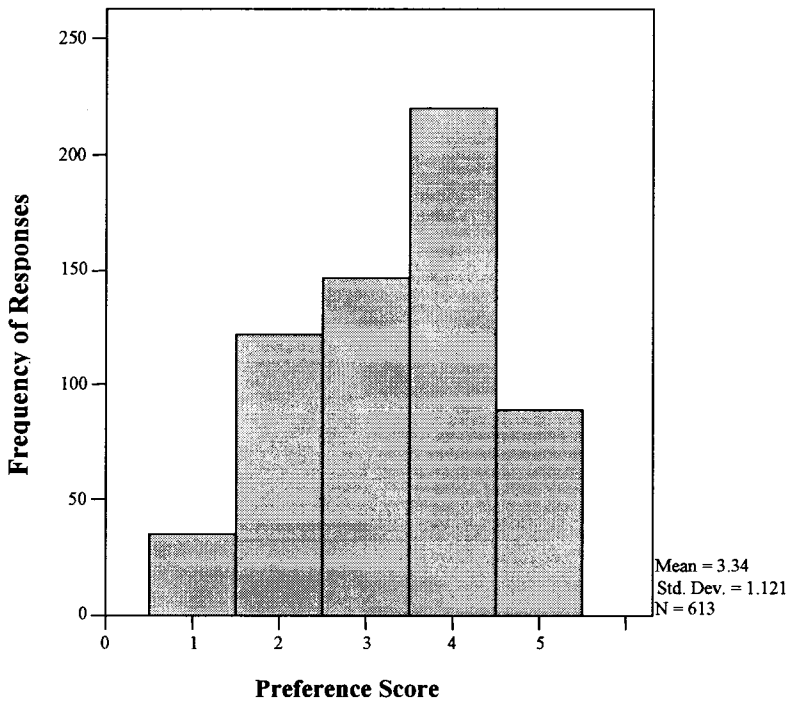
Experiential Delivery Method



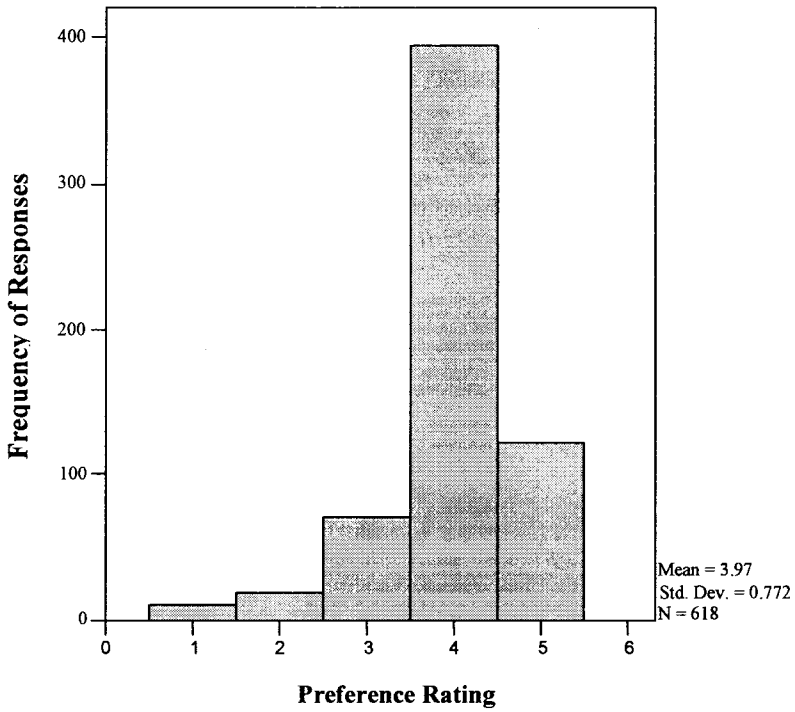
Group Learning Delivery Method



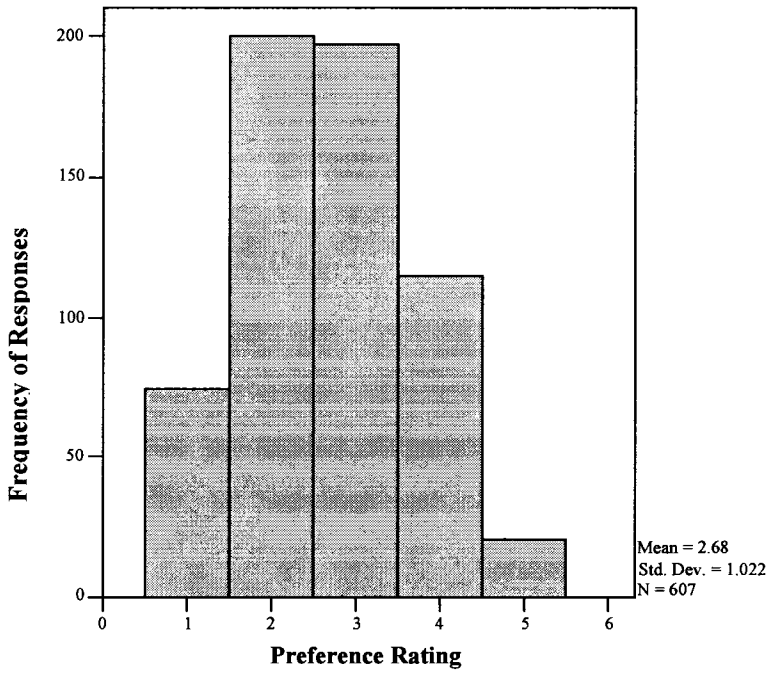
Professional Journal Reading Delivery Method



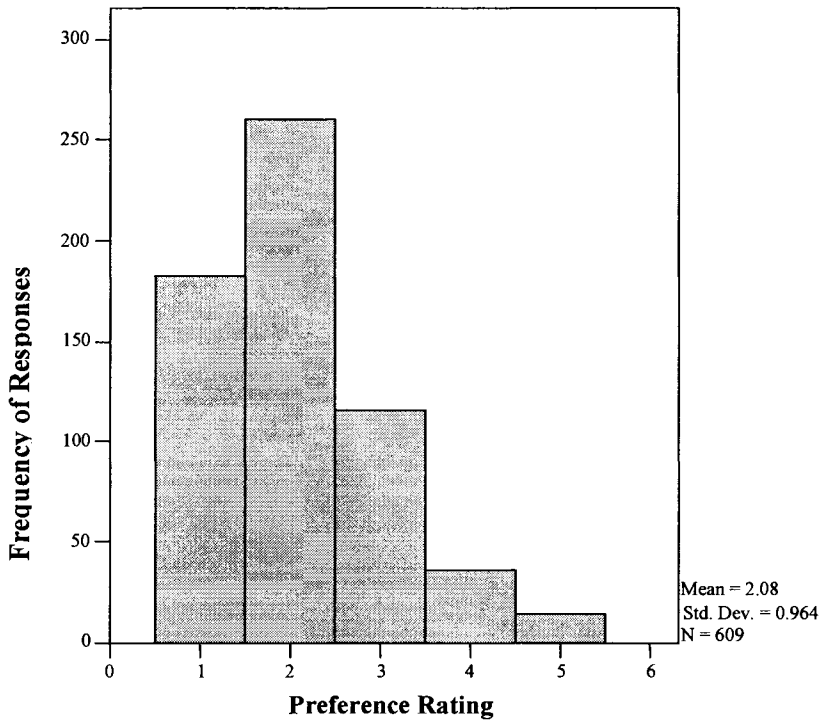
Lecture Delivery Method



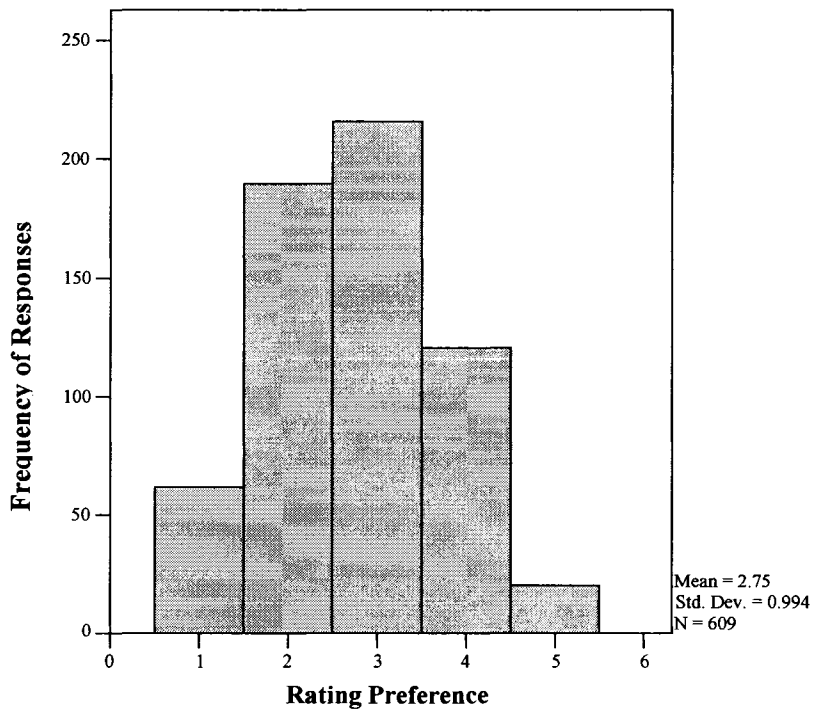
Poster Delivery Methods



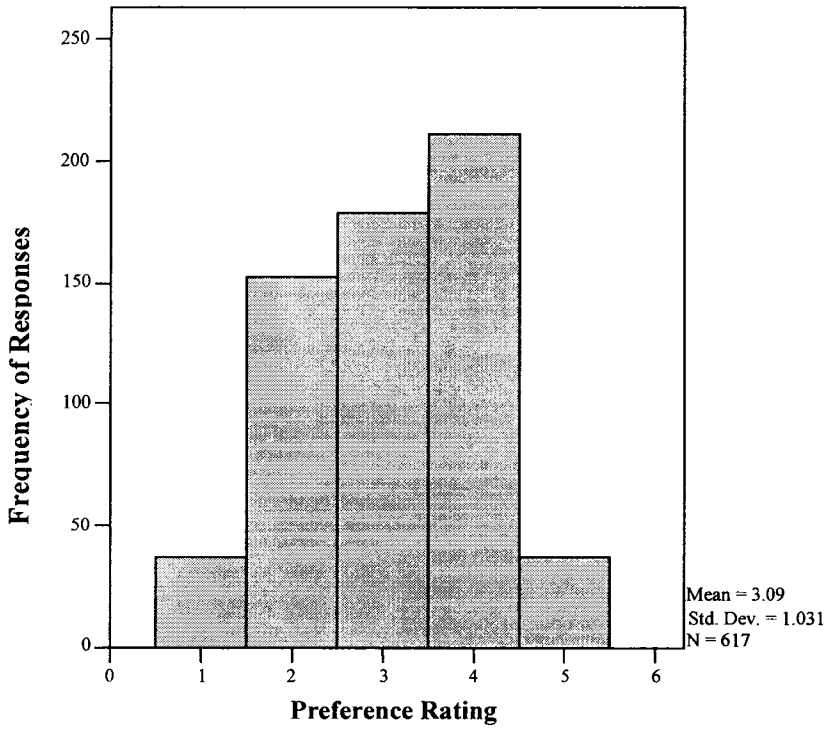
Residency or Fellowship Program Delivery Method



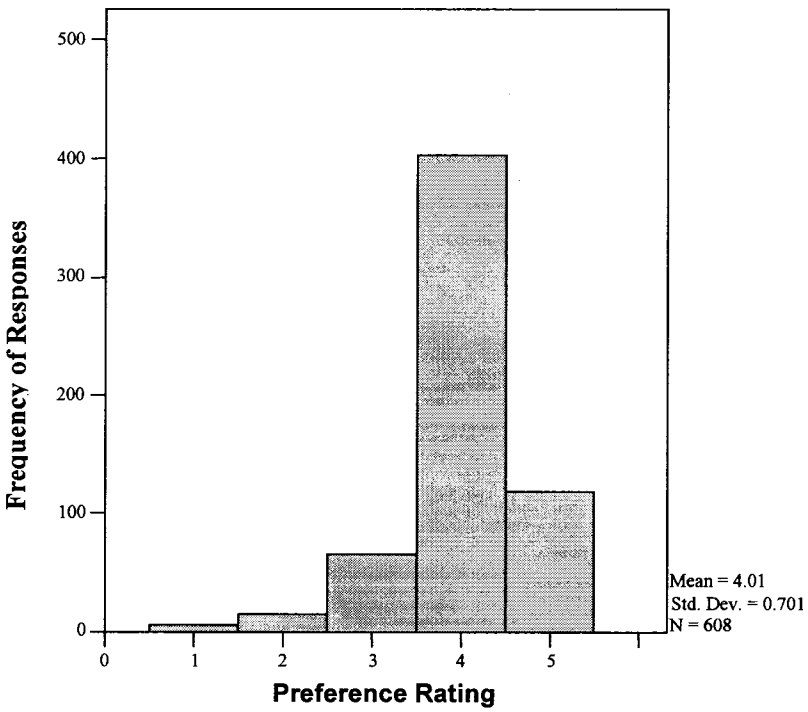
Satellite Delivery Method

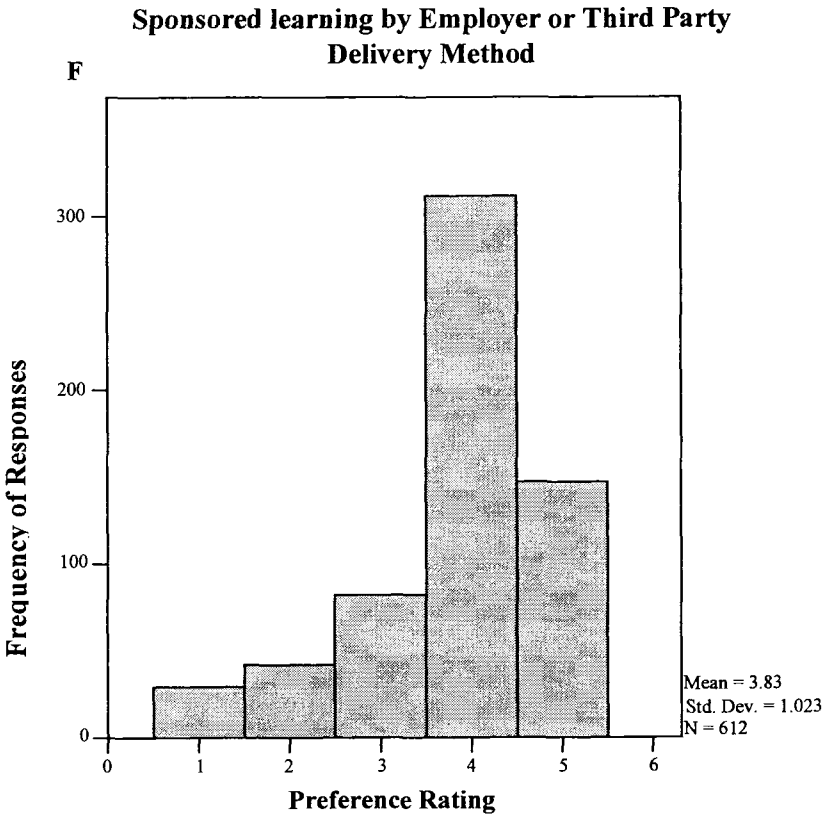


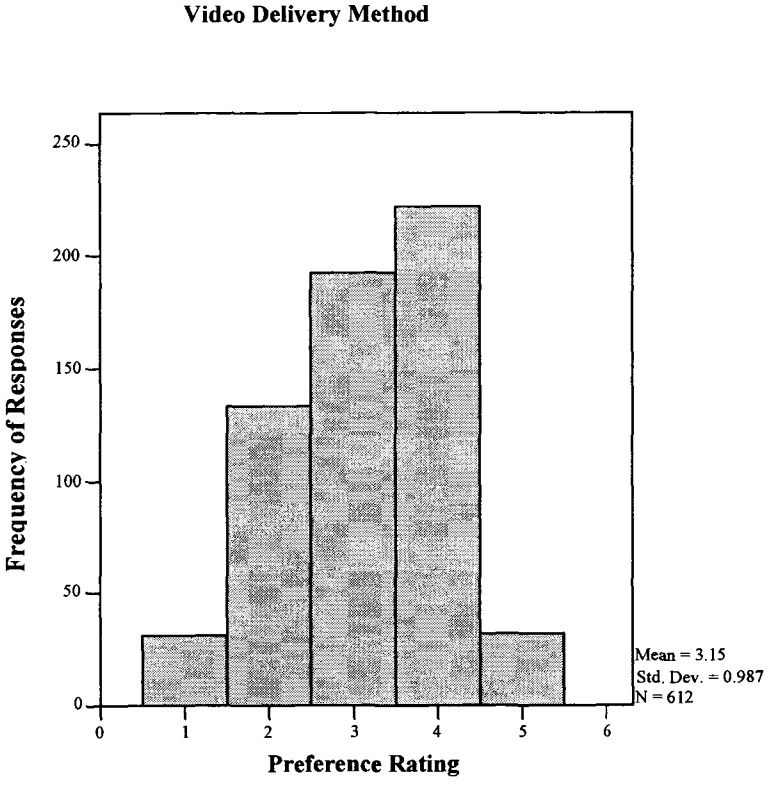
Self Study Delivery Method



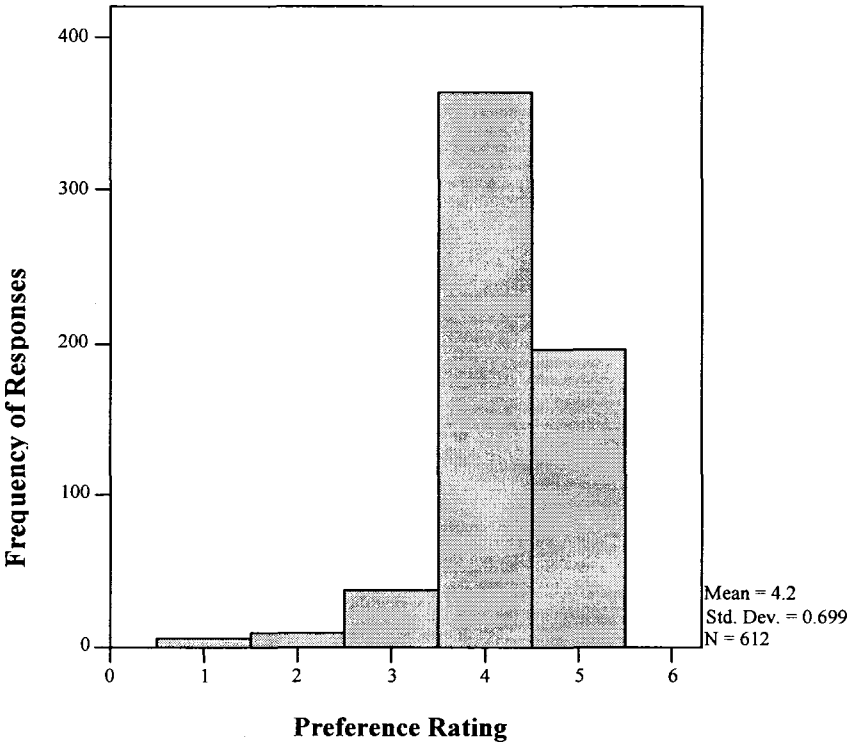
Seminar Delivery Method







Workshop Delivery Method



World Wide Web Delivery Method