AN ABSTRACT OF THE THESIS OF

Robert C. Rost for the degree of Doctor of Philosophy in Education presented on May 7, 1997. Title: A Study of the Effectiveness of Using Distance Education to Present Training Programs to Extension Service Master Gardener Trainees

Abstract approved: Redacted for Privacy

Glenn Klein

Despite the availability of distance education technology, Oregon State University Extension Service educators have made limited use of this equipment for delivery of educational programs to clients of the state's 36 county Extension Service offices. Some Extension educators may be hesitant to use distance technology because they are unsure whether clients will accept distance delivered programming.

This project explored this issue, framed in the question: Is distance education received favorably or unfavorably by volunteer adult learners? A volunteer learner is defined as one who seeks to gain knowledge while interacting with others who share like interests, a description that fits many Extension Service clients. Other questions in the project were: How much do volunteer learners learn from distance delivered instruction compared to traditional instruction? and How much do volunteer learners interact with instructors and each other in the distance classroom compared to the traditional classroom?
Participants in the project were adults taking part in the MG training program in February 1993 in five Oregon counties. These adult learners participated in two 90-minute instructional segments; part one, 'Landscaping for Wildlife' and part two, 'Controlling Wildlife in the Home Landscape.' Part one was delivered via satellite delivery. Part two was delivered to participants in person by the instructor. In both parts, learners were pre- and post-tested on the subject matter presented. Learners also completed opinion surveys for each session. Audio tapes were made of each session for analysis of learner-learner, and learner-instructor interaction. Also, the Extension agents acting as downlink site coordinators in the project were interviewed to assess their opinions of the distance education session.

Comparison of the data indicate that learners felt the quality of learning experience in both modes of program delivery was about equal. Also, the testing component indicated that participants learned about the same amount of material. Interaction analysis results indicated little or no difference in the amount of interaction in both the traditional and distance sessions. The results show that the effectiveness of distance delivery of Master Gardener training instruction to adult learners is equivalent to traditional delivery of training instruction for participants in this study.
A Study of the Effectiveness of Using Distance Education to Present Training Programs to Extension Service Master Gardener Trainees

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Robert C. Rost

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Robert C. Rost, Author
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A Study of the Effectiveness of Using Distance Education to Present Training Programs to Extension Service Master Gardener Trainees

CHAPTER 1
INTRODUCTION

Over the past decade as communications technology has advanced, public education in the United States has increasingly embraced distance education as a means to provide growing numbers of students with educational access and opportunity. All levels of education, K-12, community college, and university, are increasingly relying on distance education in the delivery of course work. Distance education allows educators to reach more learners, providing programs at convenient times and at less cost.

The Cooperative Extension Service is also moving towards increasing reliance on distance education for the delivery of educational programs to adult learners. However, compared to the amount of distance education research conducted in K-12 schools, community colleges and universities, relatively few studies have been published on how adult participants in Extension programs respond to distance delivered instruction. The purpose of this study is to broaden the scope of what is known about the effectiveness of distance education in Extension educational programs and thereby broaden the general knowledge of this phenomenon.
This research project is a case study of the basic question: How effective is the delivery of instruction, via distance education (satellite) systems, to adult learners participating voluntarily in the Oregon State University Extension Service's Master Gardener program. Distance education, as the term is used here, means the transmission of an educational presentation from one geographic location to another via telecommunications technology. An example of distance education is an instructor delivering his/her presentation before a television camera in a studio on a college campus. The presentation is transmitted to several other cities and towns where students sitting in classrooms, or in their homes, watch it on TV monitors. The presentation is transmitted from the studio to the several classrooms in distant locations in real time, that is, the students view the instructor live. The students also have the option of interacting with the instructor during the presentation by calling in questions via telephone lines.

Distance Education in the United States

Distance education has been a part of the educational landscape in the United States for over 100 years, although it hasn't always been referred to by that name. Simply stated, distance education is education in which the instructor and student are physically separated by distance instead of together as they are in a traditional classroom setting (Willis,
Correspondence courses, which were common in the United States in the latter part of the last century are early examples of distance education.

The primary advantage of distance education is that it offers access to education that many potential students might not otherwise have. Distance learners can take courses where they are instead of moving to where the instructor is. This is an important feature to students who haven't the time or resources to travel to the classroom. The disadvantage of distance education is that the instructor is separated from the student. This separation is assumed to affect instructor-student interaction that takes place during question and answer sessions, and classroom discussions.

Researchers studying distance education have investigated whether the physical separation of instructor and student, and its effect on instructor-student interaction, has an impact on the learning experience. The standard of comparison is the learning experience of the traditional classroom where students and instructors interact face-to-face. For example, Wilkes and Burnham (1991) compared the motivations of adult students in a traditional classroom (with the instructor present in the same room with the students) with the motivations of adult students participating in a distance education classroom (in which the instructor appeared on a TV monitor).
Distance Education in the Cooperative Extension Service and the Oregon State University Extension Service

Distance education is a relatively new technology to the Oregon State University Extension Service. The state's county Extension offices began installing satellite receiving equipment in 1989. The placement of this equipment, made possible through a series of U.S. Department of Agriculture grants, is part of the Cooperative Extension Service's (CES) national effort to develop a strong distance education capability. In a paper called the FACT (Future Application of Communications Technology) report (DeWitt & Pooley, 1991), a committee of Extension Service professionals from throughout the United States stated:

We believe that in the decade ahead both traditional and new communication technologies [including distance education] can be strategically employed in new combinations to deliver high quality educational programming to clients and staff.

Distance education, for operational purposes, means the use of traditional and new communication technology to deliver structured, high quality CES learning opportunities to targeted staff and clientele identified as priority audiences within a framework of issues based programming. (p. 11)

At about the same time that the FACT report was being written, a national consortium of Land Grant universities called AG*SAT came into being for the purpose of developing and providing distance education programs relating to agriculture, food and nutrition, natural
resources and environment, communities, families and youth. Basically, AG*SAT is a satellite delivery network of land grant universities intended to extend access of land grant university generated educational programs, including Extension educational programs, to broader audiences via distance delivery technology. Oregon State University was one of the original cooperating institutions that participated in the launching of AG*SAT in 1991.

All of this activity testifies to the intent of the Cooperative Extension Service nationally and of Oregon State University to reach broader audiences through increased use of communications technology. Similar activity was taking place in the Extension Services of other states. In Minnesota, for example, the Minnesota Extension Service Distance Education Project began in 1990 with the goal of "implementing an information and education technology system to complement traditional extension delivery methods." (Coyle, 1991)

In Oregon, however, distance education has not achieved much importance in the delivery of Extension educational programs so far. Over the past four years, relatively few Extension educational programs, produced by Oregon Extension specialists and agents for delivery to Oregon Extension clients, have been attempted. There are no doubt many reasons for this reluctance on the part of Oregon State University Extension educators to develop and produce distance education programs for their clients. Many Extension educators in
Oregon might be concerned that delivering educational programs via satellite technology may reduce their quality, and hence, their appeal to learners. Or, it may be that Extension educators wonder whether the use of distance education technology in delivering information to clients will hamper an instructor's ability to influence the learning experience in which the information is received. More research is needed on the attitudes of Extension educators towards distance education, but that issue falls beyond the scope of this study.

The Cooperative Extension Service and the Master Gardener Program

The Cooperative Extension Service (CES), is part of the U.S. Department of Agriculture and began official operation in 1914 with the passage of the Smith-Lever Act. The mission of the CES is to design, develop and deliver informal (outside the classroom) educational programs, based on practical concerns and problems, to citizens throughout the United States. (Merriam & Cunningham, 1991) Currently the CES divides its educational offerings into seven program areas. They are: agriculture, home economics, community development, 4-H Youth, energy, marine resources, and forestry. The delivery of Extension educational programming takes many forms. Extension educators may meet with clients in workshops, seminars or in one-on-one consultations. The formats of some Extension programs are similar to college courses of study where learners meet with an
instructor weekly in a classroom over an 8-10 week period. In addition, a significant amount of Extension educational programming is delivered to clients via Extension publications and instructional videos in which information is provided for consumption at the learner’s convenience.

In most cases, the learner or client in an Extension education program is not participating for the sake of earning a credit, licensing or certification of some type. Most learners in Extension programs participate voluntarily, presumably because of their interest in the information offered. This is the case with Master Gardener Program participants. They are volunteers in the program and thus are volunteer learners. This implies that they enjoy a measure of freedom within the learning transaction in the Master Gardener Program. This is an important characteristic of volunteer learners that will be revisited later.

In the organization’s early years, the Extension Service served rural-dwelling audiences with educational programs on farm production and marketing, and home economics. However, as the mass of U.S. population shifted from rural areas to metropolitan centers, the Extension Service also shifted its focus to city-dwelling audiences, while maintaining its service to rural audiences (Knowles, 1960). The Master Gardener Program is a good example of an Extension educational program that serves both rural and urban audiences.
Although the Extension Service does feature a 4-H youth program, which provides a variety of educational activities for young people, the Extension Service's primary audience is adults. Because of this, the Extension Service is predominantly an adult education agency, employing design strategies for its educational programs that pertain to adult learners. These learning strategies will be discussed further in Chapter 2.

The Oregon State University Extension Service is the state of Oregon's component of the U.S. Department of Agriculture Cooperative Extension Service. The Oregon State University Extension Service has been providing adult education programs for the citizens of Oregon since the advent of the CES nationally. Programs are delivered locally in all of the state's 36 counties by a staff of Extension agents who reside in the county and work out of a county office usually located in the county seat. These agents are faculty members of Oregon State University. In keeping with CES philosophy, these programs are practical in nature and designed to help citizens solve everyday problems, while helping individuals lead better lives.

The Oregon State University Extension Master Gardener program has been one of the OSU Extension Service's most popular educational offerings since 1975. It stands apart a bit from other Extension educational programs in that instruction is delivered over a fairly long term—2 to 2 1/2 months—and participants are asked to
volunteer their time to help the Extension Service in return for training they receive.

The goal of the Master Gardener Program is to provide clients with practical, useful information about home gardening, and in the process, enlist volunteers who will help Extension agents in county Extension offices answer questions about home gardening from the public. These volunteers receive 8-10 weeks of instruction in home horticulture (gardening) before their volunteer service begins. The instruction is delivered by Oregon State University Extension specialists and professors from the Oregon State University College of Agricultural Sciences. The course curriculum draws on several disciplines including botany, plant pathology, soil science, entomology and horticulture, and blends selected topics from these subject areas to form a body of course work uniquely tailored to the informational needs and interests of home gardeners. Upon their completion of Master Gardener training, the volunteers complete their commitment of giving a pre-arranged number of hours to the Extension Service by helping agents respond to home gardening questions. The volunteers do this in a variety of ways. They may simply take telephone questions for a few hours each day in Extension offices, or they may staff master gardener clinics in shopping malls and garden centers where individuals can meet master gardeners face to face and discuss gardening questions with them. Some master gardeners serve as
speakers to community groups interested in gardening, while other master gardeners conduct special community activities such as composting workshops or gardening-as-therapy classes.

Master Gardener training takes place annually from January through March. The program is usually offered through 20 or more county Extension offices located throughout Oregon. Whether the Master Gardener Program is offered in a particular county is up to the Extension staff located in that county. Provision of the program is not mandatory in all Oregon counties. The 8-11 week curriculum of the training program is designed jointly by Extension agents in county offices who work directly with the volunteer Master Gardeners and Extension specialists on the Oregon State University campus. Input from Master Gardener graduates is also taken into account in program design. Most of the curriculum is standard material that is taught to all learners at all training sites. A smaller portion of the curriculum is determined by the local county agent with input from past Master Gardener trainees and is tailored to the local interests of home gardeners in that area. During the training period, presenters and instructors travel to each training site to conduct Master Gardener classes. This usually involves hundreds of miles of travel and many hours spent driving from one training location to another.
The Rationale for the Study

The basic goal of this study was to compare delivery of Master Gardener Program instruction via distance education delivery systems with a traditional classroom presentation of master gardener instruction. The results of that comparison will help to answer the question of how effective distance education is for learners in the Oregon State University Master Gardener Program. This is a systematic comparison utilizing three measurement processes of distance learning and traditional classroom learning: (a) attitude surveys, (b) subject matter testing, and (c) interaction analysis.

There are a tremendous number of studies on this general topic that arrive at the same conclusion—individuals, regardless of age, learn as well from satellite delivered instruction as they do from the traditional form of instruction where the presenter is in the classroom talking face-to-face with students. However, nearly all of these studies focused on learners enrolled in educational courses that offered credit towards completion of a program of study, or certification required for obtaining a license or securing a promotion. For example, situations studied include those in which elementary, high school and college students were taking classes for credit towards graduation, or cases where students in vocational and military learning situations were working towards completion of licensing, certification and rank advancement courses.
Based on the volume of writings in the Extension Service's sole professional journal, the *Journal of Extension*, it is clear that organizational interest in distance education is significant. Based on the limited number of published pieces that report the results of projects aimed at examining the effectiveness of distance education with Extension client/learners, it also appears clear that relatively little study of this use of distance education has been attempted.

The studies that have been published did not attempt the depth of systematic comparison that will be conducted here. For example, none of those studies included measurement of teacher-student interaction, which is a key component of this study.

This study will expand what is known about the learning effectiveness of distance delivered Extension education programs by systematically focusing on adult volunteers participating in a non-credit educational program—the Master Gardener program. The three research questions of this study are:

1) Is presentation of Extension educational programming delivered via distance technology perceived favorably or unfavorably by participants in a Master Gardener training session?

2) Do learners participating in Master Gardener training sessions learn as much in the distance delivered session as they learned in the traditionally delivered session?
3) Do learners participating in Master Gardener training sessions interact as much in a distance delivered session as they did in a traditionally delivered session?

It should be noted that prior to this study, no portion of Oregon State University Master Gardener Training had ever been attempted using distance education technology for program delivery.

Definition of Terms

Following are definitions of terms used in this paper:

Cable television - a communications technology in which television channels are transmitted through a distribution system, via coaxial cable, to several locations (usually homes).

Client/learner - a participant in an Extension Service educational program. The term 'client' is used in conjunction with the term 'learner' because individuals involved in Extension programs may be thought of as clients in terms of their receiving a service.

Closed-circuit television - a private TV system in which signals are sent via cable to selected viewing sites rather than broadcast to the public.

Distance education - an educational exchange between instructor and student in which the two are separated by distance.

Distance education technology - video and audio transmission equipment used to transmit instruction from one location to another.

This type of technology includes TV cameras, sound equipment, radio
and video transmitters, satellites, signal receiving and tuning equipment and telephone transmission and receiving equipment.

**Distance learning** - a learning transaction that takes place over a distance. In other words, the learner is physically separated from the instructor.

**Face-to-face instruction** (traditional instruction) - a learning transaction that takes place in a situation where the instructor is present with the learners and presenting information directly to them.

**Instructional television** - live televised programs that are designed to be instructional in nature rather than entertaining. Instructional television usually features an interactive component, or the technical capability to allow communication between the instructor and students.

**Interactive** - the capability of participants in distant locations to communicate with an instructor at the point of origin of a transmitted video/audio instructional program.

**Interactive video network** - a system of viewing sites between which two-way video transmissions can be transmitted and received.

**Satellite delivered instruction** - a video/audio instructional program that is transmitted from a ground site to a satellite and then re-transmitted back to several ground-level receiving sites.
**Satellite systems** - transmission networks that include satellite platforms for the distribution of transmitted programs from the sending site to the receiving sites.

**Satellite technology** - video/audio re-transmission equipment fitted to an orbital vehicle.

**Satellite videoconference** - electronic communications between two or more viewing sites featuring video/audio components made possible through re-transmission from a communications satellite.

**Telecommunications technology** - video, audio, computer and telephone communications equipment used for interaction between individuals separated by distance.

**Teleconference** - see satellite video conference.

**Telecourse** - instructional program delivered to a learner via video or audio communication system or computer.
CHAPTER 2
BACKGROUND

In the process of preparing to (a) assess the attitudes of Extension learners towards distance education, (b) measure the learning achieved by Extension learners in a distance education situation, and (c) study the interaction of Extension learners in distance education compared to a traditional situation, a review of the pertinent literature was undertaken. This chapter presents results of that review and a conceptual framework for the study. The conceptual framework relies heavily on Knowles concept of andragogy because it describes the adults in the study very well. They (a) are volunteers who choose to participate because of their interest in the subject matter, (b) desire to add new experiences to their previous gardening experiences, (c) seek practical gardening knowledge they can use, and, (d) intend to use this knowledge immediately in their own gardens and in their volunteer service with the Extension Service. These characteristics parallel the components of andragogy. Special emphasis is placed on the andragogical component of self-direction in adult learning and the related issue of learner control. The concept of learning community completes the framework and is included because it provides a theoretical basis for understanding the character of the Master Gardener classroom.
Andragogy

In terms of giving adult education a distinct identity, many adult educators believe that Knowles’ concept of andragogy has had more impact on the field of adult education than any other attempt at defining this province of education. The concept is interpreted in several ways. Some consider it a description of styles of adult learning. Others see it as a basis from which adult teaching styles can be developed. Many consider andragogy as the ultimate defining theory of adult education that clearly differentiates the education of adults from the education on non-adults. The four parts of Knowles’ theory of andragogy (Knowles, 1973) are:

1. Adults both desire and enact a tendency toward self-directedness as they mature, though they may be dependent in certain situations.
2. Adults’ experiences are a rich resource for learning. Adults learn more effectively through experiential techniques of education such as discussion or problem-solving.
3. Adults are aware of specific learning needs generated by real life tasks or problems. Adult education programs, therefore, should be organized around ‘life application’ categories and sequenced according to learners’ readiness to learn.
4. Adults are competency based learners in that they wish to apply newly acquired skills or knowledge to their immediate circumstances. Adults are, therefore, “performance-centered” in their orientation to learning. (pp. 45-49)

It should be noted that while some adult educators, for example McKenzie (1977) and Cross (1981), view Knowles’ concept of andragogy
favorably, more than a few, including Day and Baskett (Jarvis, 1987), Elias (1979), Hartree (Jarvis, 1987) and Jarvis (Brookfield, 1986) contend that it is a mistake to consider andragogy a theory of adult education, at least to the extent that it has any basis in empirical fact. Still others, such as Houle (1972) and London (1973), take issue with the concept of self-directedness in adults, arguing that in certain situations children may be self-directed also.

Concerning needs-based learning, Brookfield (1986) argues that it would be naive for adult educators to think that the limit of their curriculum development responsibility was simply to find out what adult learners want and provide it. If this were the case, Brookfield notes, adult education would be a “giant department store” with facilitators functioning as “technicians within a consumer mode.” Brookfield (1986) believes instead that adult education is in part a “transitional encounter” in which learner needs and desires and instructor priorities interact, influencing each other.

There have also been concerns about Knowles’ assumption that adults are performance-centered in their learning. To Houle (1961) this seemed a particularly narrow view adults as learners. It suggests that adults basically want no more from their educational experiences than to improve their level of skill in some kind of physical motor-function. Houle argues that adult education is much more, that it has the potential to help adults define themselves. He describes adults as
“learning oriented,” continually striving for new knowledge and skill mastery regardless of whether it relates to current life application or not.

All these points must be taken into account when considering andragogy. Knowles, after all, did not describe andragogy as a theory but rather a set assumptions about adult learners. Andragogy is not a fixed concept but rather is open to interpretation. In any event, andragogy is an important consideration within the framework of this case study because it describes fairly accurately, (a) the adult learners, (b) the learning situation and (c) the teaching styles of the typical Master Gardener training session.

Self-Directed Learners

Self-directedness as a characteristic of the adult learner is an important factor in consideration of this study. The learners in the Master Gardener training program are mostly self-directed learners simply because they choose to participate. They are not compelled by any force other than their own desire for gardening knowledge and/or desire to work as a volunteer in an Extension Service program.

The roots of the concept of self-directed learning run deep in the philosophy of education and adult education as it has evolved in the democratic institutions of the two English-speaking nations, Great Britain and the United States. At the base of the concept of self-
direction as a characteristic of the learner lies the idea of self-improvement. In the latter half of the nineteenth century in both Great Britain and the United States the trend toward self-improvement spread rapidly among the populace of both countries. In both nations libraries began to spring up, and mechanics and farmers institutes were formed, many evolving into the first labor unions. In the United States it was the time of the Morrill Land-Grant College act of 1862 (Ross, 1942) that established the beginnings of a nationwide system of land-grant, or people's, colleges where common folk could learn the mechanic and agricultural arts. It was also the time of the Progressive Era in the United States during which many writers, philosophers, politicians, and social workers united in advancing the idea that education was the best hope of bringing about needed change in the people and institutions of the country. One product that grew out of the progressive era was the Cooperative Extension Service with its mission of helping citizens to lead better lives through educating them to make better use of their resources.

In Great Britain self-improvement and self-help were the terms used to describe individual use of education for the betterment of people and society. In the United States the fashionable term was self-culture. Many writers of the period expounded on the need of self-culture intellectual and spiritual fulfillment as well as social advancement and economic mobility. (Candy, 1991).
Channing, writing on self-culture, noted,

There are two powers of the human soul which make self-culture possible—the self-searching and the self-forming power. We have first the facility of turning the mind on itself; of recalling its past, and watching its present operations. We are able to discern not only what we already are, but what we may become. We have a still nobler power, that of acting on, determining, and forming ourselves. This is a fearful as well as glorious endowment, for it is the ground of human responsibility. We have the power not only of training our powers, but of guiding and impelling them; not only of watching our passions, but of controlling them, not only of seeing our faculties grow, but of applying to them means and influences to aid their growth. (Candy, 1991, p. 28)

Given this background it is no surprise that the concept of self-direction in learning is very strong in the United States. Self-direction also ties in strongly with the humanistic philosophy of education, popular in this country, which holds personal growth and achievement of potential as the ultimate goals of education. Psychologists Maslow, with his concept of the self-actualized individual, and Rogers, with his view of education as learner-centered in which teachers function as facilitators, were major proponents of the humanistic view of education (Elias & Merriam, 1980).

It is clear that self-direction is a well-accepted idea in education and adult education, particularly in the United States, but having established that, many questions remain. For example, is self-direction a process or a goal of adult education? Is it an innate characteristic in all adults or can it be taught? Are adults the only ones capable of self-
direction in their learning or do children at times show self-direction in their learning? Should the term self-directed learner be used as a blanket term taken to include any and all learning where some degree of learner control is exercised?

Researchers who have studied self-directed, or autonomous learners, according to Brookfield (1986), generally look to the technical aspects of the learning activity or situation as indicators of the learner's self-directedness. Knowles (1975) defines self-directed learning as a process where learners take the initiative in designing the learning experience, determine their learning needs, locate resources, and conduct their own learning evaluation. Tough (1966, 1967) defines self-directed learning as a situation in which the learner assumes responsibility for planning and directing the course of his or her learning. Moore (1980) defines self-directed learners as those who identify learning needs and goals, and determine their own evaluation criteria. Penland (1977) defines self-directedness in learning as the individual's ability to independently plan, conduct, and evaluate learning activities.

Candy (1991) considers the term self-direction, as it applies to learning, to have two distinct meanings, (a) one referring to the independent pursuit of learning goals outside institutional structures, and (b) the other referring to the exercise of learner-control within formal instructional settings. However, he doesn’t see the boundary
between these two meanings as rigid and finite. Instead he argues that self-direction as it applies to learning should be considered in terms of degree. For example, an individual who practices teacher-less self-education may be described as a self-directed learner. In addition, a learner who exercises a high level of self-management of his or her learning within a classroom situation may also be described as a self-directed learner. At best, determining whether a learner is a self-directed learner may be considered to depend on a number of questions including (a) is the learner acting autonomously within the learning situation, and if so, to what degree?, and (b) is an instructor present in the learning situation, and if so, to what degree is that instructor exercising control?

**Learner Control**

It is by design that the Master Gardener training program provides for a high degree of learner control. Evidence of this lies in the fact that (a) Extension educators construct the program curriculum according to learner needs, in effect making this curriculum learner driven (Liss, 1991), (b) in keeping with the informal nature of Extension educational programming, Extension educators who conduct the training sessions readily function as facilitators when needed (Van Den Ban & Hawkins, 1988), (c) the major learning resource in the training is a large printed manual, which learners purchase so that they
may extract information from it at their convenience, therefore exercising self-regulation of the pace of their learning (Liss, 1991), (d) there is almost no testing in the program and basically no measurement of learner progress by instructors, therefore learners are left largely to gauge their own progress in the course (Liss, 1991), and (e) in keeping with the traditional style of Extension educational programs, learners are allowed and encouraged to question and interact with the instructor and each other (Phipps, 1954).

Learner-control means, simply, control by the learner of the learning situation. It is the opposite of teacher-control, a learning situation in which the teacher or instructor of the class or course dictates all activity taking place in the learning situation. It is appropriate to plan some degree of learner-control into a course to be offered to adult learners if you believe as Knowles did that adults tend to become self-directed (independent) as they mature and seek to satisfy 'life application' needs through their learning activities (Verduin & Clark, 1991). These assumptions about adult learners suggest that they will learn better in learning situations that are more democratic than dictatorial, and where emphasis is put on information that the learner wants to know.

In considering the idea of learner-control one must realize that it is not a one-dimensional concept. There are degrees of learner-control just as there are degrees of teacher-control. Whether by design or
coincidence these degrees of control are at work in every learning situation. Learner control may exist in a learning situation where outward appearances suggest a high degree of teacher control, and the opposite may be true as well. The physical absence of the teacher, such as in a distance education course, may suggest learner control of the course, but in a college credit distance education course the instructor is very much in control in terms of making curriculum decisions and evaluating student performance. On the other hand, in a traditional classroom with the teacher present, learner control may be very high if the instructor readily accepts learner input in curriculum decisions, allows learners to evaluate their own progress, and functions as a facilitator whenever that role enhances the learning environment of the class.

Typically the components of learner control in any learning situation include the following:

1. Learner-control of the instructional event
2. Learner-control of evaluation
3. Learner clarification of goals
4. Learner-control of diagnosis (performance levels and problems)
5. Learner-control of prescriptive decisions (management of instruction)

The extent to which each of these components exists in a particular learning situation would suggest the degree of
teacher/learner control of the situation. In the case of Master Gardening training, learners share in varying degrees with instructors in all six components.

**The Learning Community**

The theory of learning community is an important concept within the framework of this study because it defines an image of the classroom learning situation that conveniently accommodates the other components discussed above, andragogy, learner self-direction and learner control. The curriculum of the learning community is also an important part of the picture of this study because it describes perfectly the curriculum of the Master Gardener program.

According to Gabelnick, MacGregor, Matthews and Smith, (1990) learning communities are characterized by purposefully restructured curriculums designed to link together subject matter in such a way that students find greater coherence in what they are learning. The varied curriculum is conducive to team teaching, which is a frequent feature of the learning community. Learning communities also feature greater interaction between teachers and students than is usually found in the traditional classroom, in the belief that “learning is an inherently social process” (Dewey, 1938).

In formal education the learning community is seen as a part of the trend towards education reform, that is, the learning community is
considered by some to offer an enriched learning environment much more conducive to the learning process than the static, rigidly controlled environment of the traditional classroom. The concept of the learning community evolved out of the educational reform movement of the progressive era in the United States around the turn of the century. Progressive era educational theorists John Dewey and Alexander Meiklejohn both expounded ideas that brought the learning community into existence. Dewey believed that "we live in the present and in order to prepare for the future it is important to extract the full meaning of the present." (Gabelnick, et al., 1990) Meiklejohn (1932) wrote that education is a means to prepare students to live in the contemporary world and that the curriculum should require students to connect ideas in the classroom with the real world. The point is that the learning community was intended to be the antithesis of the traditional classroom with its rigidly structured curricular boundaries and strict instructor control of classroom activity, and where the student's mind is viewed by the teacher as "a piece of blotting paper that absorbs and retains automatically" (Dewey, 1933). The learning community is founded on the liberal democratic and humanist ideals and philosophies of the progressive era. The humanist tradition recognizes the innate freedom, dignity and autonomy of the individual, and the liberal tradition emphasizes the importance of teaching that is a process that begins with imparting knowledge to the
learner, but continues towards development of wisdom and understanding in the learner. The progressive ideal recognizes the experience-centered aspect of education. (Elias & Merriam, 1980)

The learning community is designed for a student who (a) is interested in connecting classroom learning with the real world, (b) who is autonomous, or self-directed, to some extent, and (c) who views personal experience as an important component of his or her learning process. The learning community offers students an environment in which instructors are willing to share control with learners, and course work that is not organized along traditional curricular lines, but rather along the lines of anticipated student informational needs. The Extension Service is another idea that had its birth in the progressive era. Many of the components of the Extension educational program are strikingly similar to the structure of the learning community. That is, Extension educational programs are informal learning opportunities where client/learners are considered by Extension educators to be peers rather than students, and the programs are intended to help people lead better lives by helping them solve practical problems with information they can use immediately. It may be largely coincidence, but it is undeniable that the ideal learning situation for the Extension educator is in effect the learning community.
Learner Response to Distance Education

Completion of the context for this study requires a review of published material having to do with learner response to instruction delivered via distance education technology. Studies and papers cited are broken down into three categories: (a) studies that deal with general learner response to distance education, (b) studies about adult learner response to distance education, and (c) studies or papers having to do with Extension Service use of distance education technology to deliver educational programs to clients.

The literature appears to consistently demonstrate that learners learn as well from distance delivered instruction as they do from traditionally presented instruction. Hundreds of studies spanning the past three decades bear this out. Studies have been conducted with most types of learners from elementary school-aged children to members of the armed forces.

Educators have been interested in using television to deliver educational programs since the advent of commercial television in the late 1940s. From the start, the overriding question for researchers studying televised instruction has been, Can students in a classroom learn as effectively from watching an instructor on a television as they can in a classroom with the instructor present in person? To put it another way, Is distance learning as effective as traditional instruction?
The first published studies relating specifically to the effectiveness of televised distance delivered instruction versus face-to-face instruction appeared in the early 1950s. In a study that examined the televised delivery of college credit courses to students in their homes, Stromberg (1952) concluded that "open-circuit TV is an effective means of teaching college credit students in their homes." A few years later in a comparative study of the use of traditional and televised instruction for advanced military technical training, Dowell (1956) noted "the presentation methods were equally effective."

In 1957 Benschoter and Charles conducted a study of the learning retention achieved by college psychology students in televised classes compared to students in traditional classes. Their finding: "Students taught by TV retained their material over three years as well as students taught by face-to-face methods of instruction." A year later in a study involving high school students, Champa (1958) compared test scores from groups of students in televised classes and traditional classes. He found that "analysis of variance indicated no significance differences in achievement scores."

In a study of the effectiveness of televised instruction with sixth-grade science students in Cincinnati Public Schools, Jacobs and Bollenbacher (1959) noted that "there was no significant difference between methods of instruction." In a four-year study of inter-institutional teaching by television in the Oregon State System of
Higher Education in the late 1950s, Starlin and Lallas (1960) wrote that in a variety of courses including classes on human development, chemistry, educational psychology and the school in American life, comparison of test scores from students in traditional classrooms versus instructional television classrooms indicated no significant differences.

A definite trend emerged in these studies and many similar ones in the 1950s that instructional television was equally effective to the traditional classroom in terms of what students learned in both situations. More of these types of studies followed in the 1960s and 1970s. Jacobs, Bollenbacher and Keiffer (1961) conducted a study in which seventh-grade students were taught mathematics via televised instruction. They compared test scores from TV-taught students to scores from students taking the same course in a traditional classroom situation and found that “There was no significant difference between TV and face-to-face taught students. Television instruction is equally effective to face-to-face instruction...”. The following year Schramm (1962) reviewed all research done up to that time on the effectiveness of instructional television and reported “… of 393 experimental comparisons on television versus classroom teaching, 255 of these comparisons showed no significant difference, 83 were significantly in favor of televised teaching and 55 significantly in favor of conventional teaching.” That same year Pflieger and Kelly (1962)
reported in an article on the national program in the use of television in the public schools that “…students in TV classes learned as much as students in face-to-face classes.”

In a study of teaching a foreign language via instructional television Gottschalk (1965) found that “…students learning German from closed-circuit television did significantly better in aural and reading comprehension than students taught by the conventional method. However, the two groups had no differences on written finals.” In a report by Saloman and Clark (1977) called “Reexamining the Methodology of Research on Media & Technology in Education” the two researchers noted, “Studies have consistently reported achievement on performance tests was similar regardless of the medium used…media (face-to-face versus television) were not significant factors on achievement…” In a study similar to the research reported in this paper (investigators measured student test performance, attitudes and interaction) Ritchie and Newby (1989) found that “…media (face-to-face versus television) were not significant factors on achievement.”

Commenting on three decades of research on the effectiveness of instructional television, Russell (1992) noted, “…the findings of comparative studies are conclusive…students learn equally well with each technology [instructional television, telecourses, satellite delivered instruction] as their on-campus, face-to-face counterparts.”
Studied with Adult Learners

Adult students have not been neglected in these research activities. In a study involving the use of telelecture with adult learners Boswell, Mocker, and Hamlin (1968) reported "Pre- and post-test results showed no significant differences in mastery of content; student course evaluations showed no difference in student attitudes."

Graham and Wedman (1989) noted that although many studies have concluded that televised instruction is no less effective than face-to-face instruction, insuring the acceptance of "teletraining" by adult learners requires consistent effort towards improving the appeal of teletraining. Following in-depth interviews with 125 business professionals who had just completed a telecourse, Graham and Wedman (1989) observed that teletraining can be improved through increased interaction between instructor and students, quality instruction, presence of an on-site coordinator, and use of quality print materials that relate to the instruction presented. In an article that was not a study but a report on the importance of distance education to adult learners, Seitz (1988) stated that, "distance study is preferred by adult learners who want to progress in another career while continuing to hold their present jobs."
Studies with Extension Educational Program Participants

The majority of studies in distance education research have dealt with formal learning situations in which the participating students were working towards a structured goal such as a final grade, credit towards graduation, or completion of a course needed for some type of promotion or advancement. Relatively few studies focus on the effectiveness of instructional television with the less formal learner, such as the adult learner participating in a learning situation solely for the purpose of gaining new knowledge about the subject at hand. These more casual learners, who usually are adults, frequently take part in outreach education programs offered by organizations such as the Cooperative Extension Service. A number of articles on distance education and the Extension Service do appear in the literature, but in-depth studies of Extension client/learners participating in distance education are few compared to the numerous studies of distance education applications in formal elementary, secondary, and college education. Most journal articles dealing with distance education in Extension Service educational programs urge the adoption of the technology and include evaluation results as proof that distance education works. For example, Branson and Davis (1985) conducted evaluation of a grain marketing course in 1982 and a swine breeding course in 1983. Both programs were presented to Extension clients via closed-circuit TV. The evaluators reported that 95 percent of 421
survey respondents in the first program indicated that the course met or exceeded their expectations. In the second course, the evaluators reported that 85 percent of the 500 participants rated the program good to excellent. An added feature of the evaluation of the second course was a pre-test, post-test in which test scores showed an average increase of 58.5 percent to 85.8 percent. In 1987, Stewart and Soliah conducted a rigorous study of an in-service training program in which Extension agents participated in a two-hour video conference. A treatment-control study was used and a pre-, post-test was administered yielding results that may be taken as fairly good indicators of the effectiveness of the televised training. However, this research was not a study of effectiveness of delivering Extension programs to the general public via distance education technology since the subjects were Extension staff rather than Extension clients.

Whiting (1988) reported the evaluation of 14 Extension educational programs delivered to clients using distance education technology. He noted “approximately 90 percent of the respondents felt that satellite video teleconferencing was an effective way to deliver some extension educational programs.” A study conducted by Sunnarborg, Bradley and Haynes (1988) used the pre-, post-test technique to measure how much students learned from an Extension program on weight control and dietary requirements delivered to
clients via cable television. They found that clients viewing the cable TV program raised their test scores from 59 percent to 82 percent.

In the special report “A First: Satellite Videoconferencing” (Bogle, Allen, Grantham & Allen, 1989), Extension specialists at Oklahoma State University evaluated client reaction to over 60 satellite videoconferences produced by the Oklahoma State University Extension Service from 1986-1989. The videoconferences, and the equipment required to support their transmission and reception, were funded through a grant from W.K. Kellogg Foundation. The evaluators found that 45 percent of the several hundred respondents viewing the programs learned “very much” and the remaining 55 percent said they learned “a little.” Greer and Ziebarth (1994) conducted an evaluation of an Extension satellite video conference program on homelessness and its causes. They reported that 81 percent of 240 respondents indicated that the program provided useful information. In a study conducted by Flaskerud (1994) the pre- and post-test performance of participants in an interactive video workshop on commodities marketing was compared to that of participants in a face-to-face workshop on the same topic. Pre- to post-test scores increased from 57 percent to 79 percent for the video workshop and 56 percent to 76 percent for the face-to-face workshop. Flaskerud (1994) concluded that “The results indicate that participants significantly improved their knowledge of marketing concepts in both workshops.”
A host of other articles centering on distance education in the Extension Service have appeared in the *Journal of Extension*, but none of them examine learning effectiveness issues. For example, Rogan and Simmons (1984) noted the advantages and disadvantages of teleconferencing compared with face-to-face meetings, concluding with the observation that “Teleconferencing has vast potential for increasing the efficiency of human communication.” Lang, Blacklock and Rossing (1986) stressed the importance of community access cable TV in delivering Extension educational programs to client/learners and reviewed some case studies that showed significant numbers of community residents are aware of cable TV and view it frequently. Rockwell and Randall (1987) evaluated the delivery of farm commodity production and marketing information via a regularly scheduled TV program and concluded that this method of presentation “appears to be accepted well by farmers and ranchers.” Randall added that continual programming over several years is important in developing an audience. Harriman (1989) described distance education as providing a new set of challenges to Extension and stressed that special effort is needed to make sure that distance education facilitates education effectively. Long and Zoller (1990) conducted a survey to find out who was participating in Extension teleconferences produced by Oklahoma State University. Their survey indicated that viewers were older, better-
educated and more affluent than the general state population and that 66 percent of viewers preferred non-agricultural teleconference topics.

Evers (1990) conducted an evaluation of an Extension teleconference in Indiana and found that 90 percent of the 550 participants felt that they had learned new information from the program. On the basis of these results Evers urged Extension educators to make broader use of teleconferencing technology. Stryker (1991) reported a strong positive audience reaction to an Extension training program delivered via interactive television in Vermont. He noted that participants he communicated with “almost unanimously agreed to eagerly participate in a future training program using interactive television.”
CHAPTER 3
THE STUDY

This research project was conceived as a case study in order to examine a contemporary phenomenon—the delivery, via satellite, of instruction to adults participating in an Extension educational setting—in a natural context—an existing Extension Service educational program. Participants in the study were client/learners in Master Gardening training sessions at six county Extension offices in Oregon. The study measured learner attitudes, amount of subject matter learned, and classroom interaction in two learning situations that differed only in the means of delivery of the instruction. The controlled variables in the study were (a) the instructor, (b) the subject matter presented, (c) the instructional media used—lecture, slides, props—and (d) the classrooms utilized for the presentation. The independent variable in the study was the mode of delivery of the instruction to the classroom. In one learning situation the instruction was delivered to client/learners in the traditional mode—the presenter was present in the classroom with the learners and lectured to them directly. In the second learning situation the presenter’s lecture was transmitted via satellite systems to the classrooms from a remote location. In both situations, an Extension agent, acting as a learning facilitator, was present in the classroom while the instruction was being delivered.
Four sets of data were gathered from case study participants, (a) an attitude questionnaire, (b) pre-test and post-test on subject matter presented, (c) interaction analysis, and (d) demographic information. The purposes of gathering these sets of data were; (a) to assess student reaction to each presentation, (b) to measure student knowledge of the topic immediately before and after presentation of the subject matter, (c) to measure student/instructor interaction during the presentation, and (d) to gather demographic information on learners participating in the study. In other words, the first three methods of measurement described above were employed to find out what client/learners (a) thought of each presentation, (b) how much they learned in each presentation, and (c) how much they talked to each other and the instructor in each presentation.

Testing, surveying, and audio taping (for interaction analysis), was done twice in each of the five Master Gardener training classrooms. One round of data was gathered following the traditional classroom session and another round of data was gathered following the satellite-delivered classroom session. Testing and audio taping (no surveying) was done with a sixth group of Master Gardeners in Yamhill County, which served as a control group in the study. This large volume of data was gathered in order to build a more complete picture of client/learner response to the instructional delivery in each of the two learning situations.
In addition to the data above, interviews were conducted with six county Extension agents who acted as downlink site facilitators at the five training sites (two of the agents were from the same site) of the distance delivered segment of the study. Each was asked the same set of questions about their impressions of the distance presentation and their answers were recorded.

Getting Started

Preparation for the case study began following discussions of the project in the spring of 1992 with Ray McNeilan, the state coordinator for the Master Gardener Program. He agreed to invite the participation of as many county programs as were interested. In his letter of invitation McNeilan explained that participants would be asked to take tests and fill out surveys and questionnaires. As noted above, five county Extension Master Gardener training programs took part in the study. Three, Marion, Lane and Polk Counties, were located in the Willamette Valley, one, Jackson County, in southern Oregon and one, Deschutes County, in eastern Oregon. The Yamhill County Master Gardener trainee group, in the Willamette Valley, was added to the study as a control group.

The subject matter presented to client/learners in the case study was a two-hour unit of instruction on wildlife in the home landscape, given by Dan Edge, Oregon State University Extension wildlife
specialist. Part of Edge's job as an Extension educator, is to design and conduct presentations on wildlife for client/learners involved in Extension educational programs. He is a highly experienced educator accustomed to providing workshop-length (1-3 hours) presentations for young and old audiences.

The unit of instruction on wildlife was divided into two components, each one hour long. One was called Landscaping for Wildlife, that is, designing home landscape features that attract wildlife. The other was called Wildlife Control in the Home Landscape, which offered techniques for keeping unwanted wildlife out of the home landscape and home garden. This topic was chosen for presentation in the study because it was the only instruction offered on wildlife in Master Gardener program training that year.

A presentation schedule was developed that called for Edge to present Unit 1 of the instruction on landscaping for wildlife via satellite delivery. Edge traveled to each of the five counties to deliver, in person, Unit 2 of the instruction on wildlife control in the home landscape and garden. In discussions with Edge it was decided that the contents of each unit of instruction were sufficiently similar, although not identical, that there were no reasonable grounds to believe that differences in content would be a confounding factor in the later comparison of measurement results.
It should be noted that Edge had never delivered a distance presentation prior to his participation as presenter in this study. He agreed to assist in the study with the understanding that he was a novice distance presenter. He took a distance education workshop for presenters given by the Oregon State University Communications Media Center as part of his preparation for the study. Beyond that, his instructions were to prepare for the delivery of the wildlife instruction component to the Master Gardeners as he would for any other presentation he might give to an Extension client audience. Edge used a combination of lecture, slides, and display objects (such as stuffed animals) in all of his presentations. No attempt was made to influence Edge in any way concerning his use of lecture techniques and audio-visual materials. The purpose of this was to reduce as much as possible the introduction of any extraordinary instructor behavior that might be considered a confounding factor in the analysis of case study results.

In his in-person visits to each of the six county study sites, Edge simply traveled to the classroom location, conducted his presentation and departed, just as he would have on any county Extension office workshop assignment. The only atypical addition to these in-person presentations was the distribution and collection of surveys and tests, which Edge conducted at the end of each presentation. The Extension agent in charge of Master Gardener training at each county site assisted Edge as needed. Edge's satellite-delivered presentation, although it
differed in content, was essentially the same as his in-person presentations in regard to format. In the satellite-delivered session the Extension agent mentioned above acted as a downlink site coordinator and facilitator, and took responsibility for distributing and collecting tests and surveys.

**The Equipment and Locations**

The classrooms in use in five of the Master Gardener training locations were multi-purpose rooms that are part of the Extension office facilities in those counties. These rooms are frequently used for Extension educational presentations and therefore feature the usual amenities of tables and chairs and standard lighting, as well as facilities for the setup of audio-visual equipment. Two of the county Extension offices, Marion and Polk, share their meeting rooms with other agencies located in the same building. Deschutes county was the only one of the six participating in the study that made special classroom arrangements for the satellite-delivered program. Deschutes County Extension agent, Mike Bauer, had his Deschutes County Master Gardener trainees view the satellite program in a classroom at Central Oregon Community College in a classroom designed specifically as a distance education classroom. Bauer took this step because of technical problems with the satellite receiving equipment at the Deschutes County Extension office. None of the meeting rooms at the other five
county offices were equipped specifically for use as distance-education classrooms. In all cases, conversion of the standard meeting room into a distance education classroom amounted to moving a utility cart to the front of the room on which sat a large TV monitor, VCR, and satellite tuning receiver. Darome Convener units were added to this distance education equipment setup specifically for use in this study.

Considering it a given that ease of instructor/learner interaction enhances the quality of distance education presentations (or for that matter any educational presentation), special arrangements were made to ensure that instructor/learner interaction in the study would be as convenient as possible. To that end five Darome Convener units were secured for temporary use at five of the county Master Gardener training sites. This equipment was borrowed from Oregon ED-NET, a state agency that operates a statewide telecommunications network created in 1989 by the Oregon Legislature. Basically, the Darome Convener is a telephone with the added capability of automatically muting TV monitor audio whenever the talk button on the unit's microphone is pressed. This is a crucial feature because without the muting capability, interaction with a distance presenter from a distance classroom via telephone hookup would result in feedback, a high-pitched ear-splitting screech that would destroy any kind of useful interaction between the presenter at a remote site and the learner watching the TV monitor in the distance classroom. The Darome
Convener unit makes interaction during a satellite transmitted presentation easier than is possible via standard telephone. The Darome Conveners used in this study to augment interaction were not part of the standard distance education equipment inventories issued to county Extension offices in 1993. As noted above, the Darome Convener units were used in this study by special arrangement.

The satellite-delivered program in the study originated from a small studio in the Computer Engineering Building on the Oregon State University campus, where Edge presented before television cameras. The technical director for the presentation was Larry Pribyl, senior television producer/director for the Oregon State University Communications Media Center. The program signal was sent from the campus via landline to Oregon EdNet facilities in Portland, Oregon, where it was beamed to a satellite for transmission to the receiving sites.

Local Arrangements

In preparation for execution of the study, communication with the seven county agents who, along with their Master Gardener trainees, agreed to participate in the study, was conducted via fax and e-mail. Each of the agents (except the Yamhill County agent) was instructed that he or she would function as the downlink site coordinator during delivery of the distance delivered unit of
instruction in his or her county. As downlink site coordinators, these agents had responsibility for setting up the distance classroom, making sure all equipment was working properly, managing the session, and assisting with interaction by making sure learners were aware of the opportunity to interact and encouraging them to ask questions.

Detailed information was sent to all downlink site coordinators on how to conduct the distance presentation at the receiving site, and how to administer the various measurement instruments and tests that learners would complete. Although the copious amount of this instructional material added time and complexity to conducting the presentation, the agent/downlink site coordinators at the five sites cooperated fully and made reasonable effort to ensure that students received copies of all the instruments and tests, and time to complete them.

For the interaction analysis portion of the study, each agent/downlink site coordinator was supplied with a cassette tape recorder and tape, and asked to record the entire session. All coordinators agreed to do this and followed through by returning recorded tapes. Unfortunately, not all recording attempts were successful. In the class sessions in which Edge presented in person, he conducted the distribution and collections of the survey instruments and tests, and the tape recording of the session.
The Timetable

The study was conducted in February 1993. A schedule was developed including dates for the satellite-delivered session, and the sessions where Edge presented to Master Gardener trainees in person. Edge began in the first week of February, traveling to Deschutes County to present on February 2 and to Jackson County to present on February 3. The satellite-delivered component was delivered to the five counties on February 10. Edge traveled to Marion County to present in person on February 15, and he presented at both Polk and Lane Counties on February 17. Edge presented both units of instruction to the control group in Yamhill County on February 22. The design of this schedule was based solely on convenience. The goal was to arrange the times of the presentations so that the schedule was convenient for Edge, given that he had many other matters to attend to during the month of February, and convenient for the Master Gardener trainees in five of the six counties, who had to juggle their previously planned training schedules somewhat to accommodate the February 10 date of the satellite-delivered component of wildlife instruction.
Learner Perceptions of Distance Delivered Educational Programs

An opinion survey (see Appendix A, pp. 110-114) was employed to address the first research question: Is presentation of Extension educational programming delivered via distance technology perceived favorably or unfavorably by participants in a Master Gardener training session?

The opinion survey used in the study was developed from existing instruments used by Linn-Benton Community College, the Oregon State Board of Higher Education and the Oregon State University Extension Master Gardener Program. During development, the survey was reviewed by Pam Bodenroder, senior research assistant in the Oregon State University Survey Research Center.

The opinion survey consisted of a series of statements that study participants responded to by indicating their level of agreement or disagreement. Responses were recorded on a five-step Likert scale with '1' indicating strong disagreement and '5' indicating strong agreement. Two opinion surveys were used, one for use with the traditionally presented segment of the study and a second survey for use with the satellite-delivered segment of the study. The two surveys were identical except that the survey for the satellite-delivered segment included a second page that contained questions pertaining specifically to technical aspects of the distance education presentation.
The first page of the survey contained seven statements in random order and space for comments at the bottom of the page. Of the seven statements, four were phrased positively, that is, "instructor showed enthusiasm," "information given will be useful," and three statements were phrased negatively, that is, "subject was not interesting to me," "instructor did not show a concerned attitude." This change in phrasing was used to influence respondents to read the survey questions carefully. Asked in random order, two of the seven statements had to do with learner perceptions of the instructor, two statements had to do with learner perceptions of the clarity of the presentation, two statements had to do with learner interest in the subject matter, and one statement had to do with learner perceptions of instructor-student interaction.

The second page of the survey given to participants during the satellite-delivered session contained five statements having to do with participant response to the quality of the television audio and video components of the presentation. Three of these statements were phrased positively and two were phrased negatively. At the bottom of page 2 were questions asking participants whether they had participated in a satellite-delivered course before and whether they would consider doing so again. A comments section completed the page.

Following collection of opinion survey data, percentage distributions for all survey questions were computed. These
distributions are presented in a table in the following chapter. In addition, the numbers of responses to each of the five steps on the response scale were used to compute mean scores for each question. This was done by assigning the value '1' to 'Disagree Strongly', the value '2' to 'Disagree', the value '3' to 'Not Sure', the value '4' to 'Agree', and the value '5' to 'Agree Strongly'. Computation of the data for each question yielded a score in the range of '1', indicating strong disagreement, to '5', indicating strong agreement. This allowed direct comparison of overall scores for each question from the distance and traditional session surveys.

Learning Measurement

A pre-test, post-test procedure was used to address the second research question: Do learners participating in Master Gardener training sessions learn as much in the distance delivered session as they learned in the traditionally delivered session?

The pre-tests and post-tests were prepared by the presenter, Dan Edge (see Appendix B, pp. 115-123). He wrote one test for unit 1 of the instruction, 'Landscaping for Wildlife,' and another test for unit 2 of the instruction, 'Wildlife Control in the Home Landscape'. Both tests consisted of 20 multiple-choice questions. Each item on the tests was worth five points. A student selecting the right answer for all 20 questions received a score of 100.
Each of the six groups in the study, the five experimental groups and the control group, were given a pre- and post-test for each unit of instruction. All tests were hand-scored using a test-key. Collection and correction of all tests yielded 24 sets of scores. For the experimental groups, all pre-test scores from Unit 1 of the instruction were put together in one set for the computing of set range, distribution, standard deviation, and mean and median scores. The same process was followed with all post-test scores for Unit 1. The data from the two sets of scores were then compared to assess the degree of shift in range and distribution, change in standard deviation, if any, and increase in mean and median scores. Also, t-test analysis was conducted to assess the difference in mean scores from pre-test to post-test. Pre- and post-test scores from unit 2 of the instruction were handled in the same way, followed by the same type of analysis. The final four sets of scores were prepared in combination in histograms to provide a graphic comparison of shifts in the score data.

The control group pre- and post-test scores for both units of instruction were processed in the same way as the experimental group scores and comparisons between the control and experimental groups were made for both units.
Interaction Analysis

An interaction analysis technique called the Verbal Interaction Category System was used to address the third research question: Do learners participating in Master Gardener training sessions interact as much in a distance delivered session as they did in a traditionally delivered session?

The Verbal Interaction Category System was developed by Edmund Amidon in association with Ned Flanders (Amidon Sr Hough, 1967) (see Appendix C, p. 124). When Amidon and Flanders developed this technique, their purpose was to study teacher-pupil contact with the goal of measuring the degree to which the teacher either maintained strict control in the classroom by doing most of the talking, or allowing pupils some freedom in the classroom by allowing them to talk intermittently. This system utilizes verbal behavior because it is easier to recognize and can be observed with "higher reliability." (Amidon & Hough, 1967)

The Verbal Interaction Category System defines 10 categories of verbal activity and two additional categories for "silence" (no talking in the classroom) and "confusion" (everyone talking at once). These categories are assigned numerical designators. Observers can then inventory classroom interaction by listening to a class or a tape of the classroom session and marking down the appropriate category designator every 3 seconds. These tallies are then re-recorded on a
specialized chart that yields percentage values of various kinds of communication. These percentage values represent the comparative amounts of the 12 categories of verbal activity that took place during the class.

In this case study, it is assumed that the Extension agent/instructors in the Master Gardener training program readily give freedom to their students, inviting them to question and comment whenever they like. Therefore, in this situation the Verbal Interaction Category System is used not so much for measuring teacher control as for comparing the level of verbal interaction between instructors and learners in two learning situations—a traditionally delivered presentation and a satellite delivered presentation. Conventional wisdom suggests that instructor-student interaction would be lower in the satellite delivered presentation because students would have to rely on technology (communications systems) to ask questions or comment rather than simply speaking up as they would do if the instructor was physically present in the classroom. Interaction analysis of audio tapes containing recordings of the experimental and control sessions in the study were used to examine this issue.
Contextual Data

A demographics questionnaire was distributed to study participants with the opinion survey to provide descriptive data relating to learner characteristics (see Appendix A, pp. 110-114).

Responses to the demographics survey were tabulated to indicate percentages of study participants in various age, income, education, ethnic, and size-of-community groups. Also, the demographics survey revealed the marital status and gender of study participants. As with the opinion survey, demographics survey items were reviewed by Pam Bodenroder, senior research assistant in the Oregon State University Survey Research Center. This descriptive data revealed basic characteristics of participants and the data were compared to an earlier survey of basic characteristics of Oregon Master Gardeners.

Also, immediately following the end of the distance session, telephone interviews were conducted with the Extension agents who acted as downlink site coordinators at the five locations where Master Gardener trainees participated in the distance session of the study. A set of six questions (see Appendix F, pp. 138-145) was developed to assess the agents' impressions of the distance session. The answers to the questions provided a pool of anecdotal data used for comparison to the results of the survey, testing, and interaction analysis measurements.
CHAPTER 4
FINDINGS

The findings of this study are presented in four parts: (a) participant attitudes about instructional delivery; (b) participant learning in traditional and distance sessions; (c) instructor-learner interaction; and (d) the context of the learning environment.

Participant Attitudes about Instructional Delivery

In Part 1 of the findings two areas are explored; participant attitudes about the quality of the instruction in both sessions, and participant attitudes about the technical quality of the distance session. Before examining the findings it should be noted that the literature in the area of learner attitudes towards distance education is sparse compared to the number of published studies having to do with learner achievement in distance education classes versus traditional classes. According to Biner, Dean and Mellinger (1994), research evaluating the effectiveness of televised instruction has focused primarily on student performance in the form of test grades and final course grades. Biner adds that, on a comparative basis, researchers have neglected the study of distance learner satisfaction and that when satisfaction measures are included in distance education studies they are often given little mention in final reports. Because of this there are relatively few research sources on distance learner satisfaction to provide context for the Master Gardener
attitude results given below. This study provides data that expands the present knowledge base relating to learning satisfaction with distance education programs.

Survey results are given in Tables 1 and 2. Part 1 of the survey was given to both traditional and distance session participants and focused on the instructor (his interest, enthusiasm, and concern for students); the instruction (whether clear, interesting and useful to students), and instructor-student communication. Part 2 of the survey contained statements and questions having to do specifically with the technical quality of the distance session presentation and so was administered to distance session participants only. (See Appendix A for the survey instrument.)

Quality of Instruction

Participant reaction was generally positive to both the distance and traditionally presented training sessions. A mean score for each survey item was calculated using a 5-point scale with 5 being the highest. Mean scores for quality of instruction ranged from of 3.96 to 4.53. (See Table 1 for a listing of items and ratings for each.) A number of observations from the survey data stand out. The survey item relating to the usefulness of the information received the highest mean scores (4.53 for the traditional session and 4.45 for the distance session). Survey items about the instructor’s interest and enthusiasm (4.52 for the traditional session and 4.42 for the distance session), and attitude toward students (4.52 for the traditional session and 4.40 for the
Table 1. Participant Attitudes About Quality of Instructional Sessions\(^1\)  
Survey Opinion Statements\(^2\) and Five-Step Scale

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Agree Strongly</th>
<th>Mean Rating(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The instructor showed interest and enthusiasm</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>42%</td>
<td>56%</td>
<td>4.52</td>
</tr>
<tr>
<td>Distance</td>
<td>0%</td>
<td>0%</td>
<td>3%</td>
<td>52%</td>
<td>45%</td>
<td>4.42</td>
</tr>
<tr>
<td>I was satisfied with the amount of communication between the instructor and students during the presentation</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>24%</td>
<td>67%</td>
<td>4.49</td>
</tr>
<tr>
<td>Distance</td>
<td>0%</td>
<td>3%</td>
<td>4%</td>
<td>38%</td>
<td>55%</td>
<td>4.45</td>
</tr>
<tr>
<td>The course objective (what to learn) was clear</td>
<td>3%</td>
<td>6%</td>
<td>3%</td>
<td>45%</td>
<td>43%</td>
<td>4.19</td>
</tr>
<tr>
<td>Distance</td>
<td>1%</td>
<td>9%</td>
<td>7%</td>
<td>28%</td>
<td>54%</td>
<td>4.22</td>
</tr>
<tr>
<td>The subject of the presentation was interesting to me</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>49%</td>
<td>43%</td>
<td>4.35</td>
</tr>
<tr>
<td>Distance</td>
<td>0%</td>
<td>3%</td>
<td>12%</td>
<td>39%</td>
<td>46%</td>
<td>4.28</td>
</tr>
<tr>
<td>The information given in the presentation will be useful to me in my home gardening and landscaping activities</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>45%</td>
<td>55%</td>
<td>4.53</td>
</tr>
<tr>
<td>Distance</td>
<td>0%</td>
<td>2%</td>
<td>4%</td>
<td>41%</td>
<td>53%</td>
<td>4.45</td>
</tr>
<tr>
<td>The instructor presented information clearly and concisely</td>
<td>4%</td>
<td>7%</td>
<td>6%</td>
<td>38%</td>
<td>45%</td>
<td>4.13</td>
</tr>
<tr>
<td>Distance</td>
<td>2%</td>
<td>9%</td>
<td>10%</td>
<td>49%</td>
<td>30%</td>
<td>3.96</td>
</tr>
<tr>
<td>The instructor showed an interested and concerned attitude toward students</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>45%</td>
<td>54%</td>
<td>4.52</td>
</tr>
<tr>
<td>Distance</td>
<td>0%</td>
<td>2%</td>
<td>3%</td>
<td>48%</td>
<td>47%</td>
<td>4.40</td>
</tr>
<tr>
<td>Totals</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>41%</td>
<td>52%</td>
<td>4.39</td>
</tr>
<tr>
<td>Distance</td>
<td>1%</td>
<td>4%</td>
<td>6%</td>
<td>42%</td>
<td>47%</td>
<td>4.30</td>
</tr>
</tbody>
</table>

\(^1\)N=148-151; N=143-147

\(^2\)All statements are worded in positive form so all distributions are given left-negative to right-positive.

\(^3\)Mean scores for all survey statements were computed by assigning the following values to steps in the response scale: Disagree Strongly=1, Disagree=2, Not Sure=3, Agree=4, Agree Strongly=5.
distance session) received scores just slightly lower. Over 93 percent of both groups "agreed" or "strongly agreed" that the information presented would useful to them in their gardening activities, and that the instructor showed interest, enthusiasm, and a concerned attitude toward students.

Given these findings, it is interesting to note that participants gave their lowest ratings to survey items about the clarity and conciseness of the instructor's presentation (4.13 for traditional, 3.96 for distance), and the clarity of the course objective (4.19 for traditional, 4.22 for distance). It appears that even though participants in both sessions found the clarity of the presentation a bit lacking, that didn't affect their strong positive reaction to the instructor's interest and enthusiasm. One possible explanation may be that due to their motivation to participate in the course, participants remained open and receptive to the instructor even though they did not always clearly understand what he was saying.

Another interesting observation lies in how participants rated their interest in, and usefulness of, the information presented. As noted above, participants in both sessions gave usefulness their highest rating (4.53 for traditional, 4.45 for distance). They rated their interest in the presentation slightly lower (4.35 for traditional, 4.28 for distance). This indicates that participants found the presentation more useful than interesting (although only slightly more). This finding is not surprising given that the learners are adults and therefore very conscious of the utility of the information they learn (Knowles 1973). In addition, when you consider that these particular
learners are volunteers in an adult education training program, it seems all
the more plausible to suppose they would be motivated to learn subject
matter they can use, even if their initial interest in the information lags
slightly.

On close examination, traditional and distance session scores for two of
the survey items stand out; the survey item relating to clearness of the course
objective, and the survey item relating to the clarity and conciseness of the
instructor's presentation of information. Although both items were given
low ratings overall, compared to other survey items, the two items differed
greatly in the individual scores given to each by the traditional and distance
groups. The largest difference between groups was recorded for the item
about instructor clarity and conciseness (4.13 for traditional, 3.96 for distance).

It is indeed interesting to find that the smallest difference in ratings between
groups was recorded for the other survey item relating to clarity of the course
objective (4.19 for traditional, 4.22 for distance), which, incidentally, is also the
only survey item where the distance group rating is higher than the
traditional group rating. Comparing these two items suggests that (a)
presentation of the course objective was clearer to learners than presentation
of information during the session and (b) delivery of the Master Gardener
training session via distance education technology clearly reduced learner
satisfaction with the clarity of the instructor's presentation. The latter result
was not unexpected given that traditional face-to-face exchange is universally
considered to be the ideal learning transaction. What stands out in this
portion of the study is that although learners rated the clarity of the distance presentation comparatively low, they rated the distance session's interest and usefulness considerably higher.

Although the survey item about clarity of course objective was the only item to be rated higher by the distance group (4.19 for traditional, 4.22 for distance) it was rated only very slightly higher (+.03).

In sum, the attitude survey shows that although the traditional and distance groups gave the clarity of the presentation their lowest ratings, both groups were strongly positive about the instructor and the usefulness of the information.

These results are similar to the findings of a study conducted by Egan, Welch, Page and Sebastian (1992) in which college graduate students were surveyed for their perceptions of conventional and televised instructional delivery systems. In that study, subjects in both groups rated the instructor's presentation well above the clarity of the presentation. Both groups also rated the relevance (a descriptive term closely related to the concept of usefulness) of the presentation above clarity. It should be noted that the subjects in this study were taking the course for credit towards graduation.

Ratings for the item relating to communication during the session (4.49 for traditional, 4.45 for distance) almost equaled ratings for the instructor and usefulness of information items, indicating that participants in both traditional and distance sessions had a favorable perception of classroom interaction. This finding is supported by the results of a study conducted by
Fulford and Zhang (1993), which measured the perceptions of interaction of students in a distance education course. In that study investigators found a strong correlation between students' overall perception of interaction and their satisfaction with the course. Although no attempt was made to measure correlation of survey items in the Master Gardener study, it is obvious that participants rated interaction in both sessions on a level nearly as high as their ratings of the instructor and the usefulness of the information.

Overall, differences in mean ratings from both groups for individual survey items are generally quite small, and the distance presentation was consistently rated lower than the traditional session for all items but one. Mean ratings for item totals also show a slightly higher 4.39 for the traditional session than the 4.30 recorded for the distance session. This indicates that although participants generally rated the traditional class session higher, they found the distance session satisfactory.

The general acceptability of distance delivered instruction to Extension audiences is also reported in several recent evaluations of distance education programs conducted by Extension educators. Evers (1990) reported that 90 percent of 550 Extension homemaker volunteers indicated, via survey, that they learned new information from an Extension distance education program on nutrition. Herman (1991), evaluating an Extension distance education program on diet and health, surveyed 26 participants who gave the session identical ratings of 4.6 (on a scale of 1 being worst and 5 being best), on content of program, presentation of program, and value of the program. Rockwell
and Randall (1987), surveyed viewers of an Extension television series featuring agricultural production and marketing information and found that 98 percent of surveyed viewers found the content pertinent and 83 percent felt the information was delivered appropriately.

Technical Quality

Part 2 of the survey (see Appendix A) measured participant attitudes about the technical quality of the distance session. The survey questions (see Table 2) focused on visual aids used by the instructor; the audio characteristics of the session, and the video characteristics of the session.

Mean scores for technical quality ranged from 3.68 to 4.14, and were overall lower than scores for the quality of instruction survey. Also, the highest percentage of respondents marked the ‘agree’ column for all items on the technical quality survey, whereas the highest percentage of respondents marked the ‘agree strongly’ column for items on the quality of instruction survey. This indicates that respondents were less certain of their satisfaction with the technical aspects of the distance presentation than with their satisfaction with the instructional quality of the distance session. Still, respondents to the technical quality survey indicated a high degree of agreement with all items having to do with technical aspects.

Participants gave their highest ratings to statements about the operation of video equipment (4.14) and sound quality (4.12) during the session indicating general agreement that learners could hear and see the
Table 2. Participant Attitudes About Technical Quality of the Distance Session Survey Opinion Statements\(^1\) and Five-Step Scale

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Agree Strongly</th>
<th>Mean Rating(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The video images of title slides and other graphics used by the instructor were easy to read</td>
<td>4%</td>
<td>14%</td>
<td>5%</td>
<td>64%</td>
<td>13%</td>
<td>3.68</td>
</tr>
<tr>
<td>I was satisfied with the audio equipment operation during the presentation</td>
<td>2%</td>
<td>4%</td>
<td>4%</td>
<td>68%</td>
<td>22%</td>
<td>4.04</td>
</tr>
<tr>
<td>The videotaped excerpts used as a part of the presentation were clear and easy to understand</td>
<td>0%</td>
<td>5%</td>
<td>8%</td>
<td>66%</td>
<td>21%</td>
<td>4.03</td>
</tr>
<tr>
<td>I was satisfied with the video equipment operation during the presentation</td>
<td>0%</td>
<td>3%</td>
<td>4%</td>
<td>69%</td>
<td>24%</td>
<td>4.14</td>
</tr>
<tr>
<td>The overall sound quality of the instructor was clear and easy to understand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Totals

| Distance Session | 1% | 7% | 5% | 64% | 23% | 4.0 |

\(^1\)All statements are worded in positive form so all distributions are given left-negative to right-positive.

\(^2\)Mean ratings for all survey statements were computed by assigning the following values to steps in the response scale: Disagree Strongly=1, Disagree=2, Not Sure=3, Agree=4, Agree Strongly=5.
distance presentation adequately. Rated a bit lower were survey items relating to the operation of audio equipment (4.04) and clarity of videotaped excerpts (4.03) used by the instructor during the presentation. These survey items were intended to measure attitudes about particular details of the distance session such as microphones used in the distance classrooms for student-instructor interaction and short video clips used by the instructor to liven the presentation. Although ratings for these items are slightly lower than ratings for the first two items discussed above, the ratings for audio equipment and videotaped excerpts still fall within a range that indicates generally favorable response.

The lowest rating on page 2 (and the lowest rating overall in the survey) was recorded in response to the statement about title slides and other graphics on video monitors (3.68). Nearly a quarter of the participants responding to this item could not agree that video images of title slides and other graphics in the distance presentation were easy to read. This indicates that even though participants found the video portion of the presentation, and video clips used within it, acceptable, a relatively large number of these same learners found the onscreen graphics objectionable. Egan et al. (1992) recorded a similar finding in their study of the attitudes of college students towards a distance delivered graduate course. In that study respondents gave the value of visual materials a mean rating of 3.89 and the value of text screens a rating 3.76.
Note that the difference between ratings for video portions of the presentation and ratings for graphic portions (considered here to be basically equivalent to the text screens item of the Egan study) is much greater in the Master Gardener study than in Egan et al. (1992). A factor that may account for some of this difference is the age of the participants in each study. Recall that the subjects in the Egan et al. (1992) learners’ perceptions study were college graduate students, specifically, "post-bachelor’s certification students enrolled in a teacher preparation program, or graduate students completing a master’s degree in special education." The age ranges of the subjects in Egan et al. (1992) are not given, but it is probably reasonable to assume that most of these subjects are between the ages of 25 and 40. In the Master Gardener study 74 percent of the subjects were over the age of 40, which is an important detail in regard to ease of reading words and understanding graphics displayed on a television monitor. According to Cross (1981), on average, vision declines sharply from age 41 to 55, and at a slower rate beyond the age of 55. Taking this into account, it is perhaps not surprising that a group of viewers containing a majority of persons older than 40 would express some difficulty in reading words on a television screen, while at the same time they would express less discomfort with viewing the purely visual portions of the video presentation.

The final two items in the attitude survey asked participants if they had ever taken a distance education before and if they would consider taking a distance education course again. Eighty-eight percent of the participants
responded that they had not taken a distance education course before, and 92 percent responded that they would be willing to take another distance education course. This result strongly suggests that participants in the study were generally positive about their distance education experience.

**Participant Learning in Traditional and Distance Sessions**

Learning was assessed by giving multiple-choice tests (See Appendix B) to participants immediately before and after each session. The tests were designed to measure general knowledge of the subject matter covered in the session. Figures 1 and 2 below show pre- and post-test scores for each session of the study.

Substantial increases in subject matter knowledge, as indicated in comparisons of sets of test scores, were noted for both traditional and distance learners. A comparison of the distribution of pre-test scores with post-test scores for the traditional session (Figure 1) shows considerable gains through the dramatic right-ward shift of the score distribution and mean. \( t = -17.44; p = <.05 \)

A similar trend was noted for the distance group (Figure 2) with the strong right-ward shift of the post-test score distribution and increase in mean score indicating that students performed markedly better on the post-test. \( t = -12.94; p = <.05 \)
Figure 1. Traditional Session: Distribution of Pre- and Post-test Scores. 
Y = number of students. X = test score.

N= 155. Post-test mean score—82. Standard deviation—11.7. Median score—85. Range of scores, 40-100. T-
test analysis yielded a 95% confidence interval for the difference in the two means. t = -17.44; p = <.05.
T-test analysis gave a 95% confidence interval for the difference in the two means. $t = -12.94; p<.05$. 

Figure 2. Distance Session: Distribution of Pre- and Post-test Scores.
Y = number of students. X = test score.
The results of pre- and post-test analysis indicate that respondents taking the tests improved their scores on the post-test an average of 20-25 points for both distance and traditional delivery. This suggests that, on average, participant involvement in the two sessions led to an improved knowledge of the subject matter captured in the test questions. Comparisons of pre-test scores from both the traditional session and distance session, and comparisons of post-test scores from both sessions do not suggest that the conditions of the presentation affected the test performance of participants. The median post-test scores for the traditional session and distance session were equal and the average scores and ranges for both sessions were nearly equal.

Another way to compare the differences between the progress of the traditional and distance groups is to determine the “effect size” for the scores from both groups. The effect size is a dimensionalist measurement indicating the movement and direction of groups changes. For each group (traditional and distance), the means of the post-test are first compared to the means of the pre-test. The resulting difference, or “group gain,” for each group is then divided by the standard deviation of the pre-test to determine the “gains score.” For this study, the following figures apply:

<table>
<thead>
<tr>
<th></th>
<th>Traditional</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test mean score</td>
<td>57</td>
<td>65</td>
</tr>
<tr>
<td>Post-test mean score</td>
<td>82</td>
<td>84</td>
</tr>
<tr>
<td>Group gain</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>SD of pre-test</td>
<td>13.4</td>
<td>14.1</td>
</tr>
<tr>
<td>Gains score</td>
<td>1.87</td>
<td>1.35</td>
</tr>
</tbody>
</table>
The resulting scores show that both groups moved in the desired direction, but the traditional group gained more. The traditional group scored 1.87 standard deviations above their pre-test performance, while the distance group scored 1.35 standard deviations above their pre-test measure.

The increase in post-test scores by distance session participants is similar to the findings of some other Extension educators evaluating the test performance of learners in Extension distance education programs.

In Flaskerud's 1994 study, participants in an Extension Service grain marketing workshop were divided into two groups, with one group receiving the workshop in the traditional way and the other group receiving the workshop via distance delivery. Mean scores from pre- and post-tests given to both groups ranged from 56 percent to 76 percent for the traditional workshop and from 57 percent to 79 percent for the distance delivered workshop. In the Branson and Davis (1985), and Sunnarborg, Bradley and Haynes (1988) studies only participants in distance delivered Extension courses were given pre- and post-tests so there was no comparison of scores from traditional and distance sessions. However, the mean pre- and post-test scores recorded, 58.5 percent to 85.8 percent in Branson and Davis (1985) and 59 percent to 82 percent in Sunnarborg et al. (1988), were close to the mean pre- and post-test scores recorded for distance participants in this study.
Figure 3. Comparison of Pre-Test Scores: Traditional and Distance Sessions. 
Y = numbers of students. X = test score.

Traditional session pre-test mean score—57. Median score—60. Range of scores, 15-85. 
Distance session pre-test mean score—65. Median score—65. Range of scores, 20-100.
Figure 4. Comparison of Post-Test Scores: Traditional and Distance Sessions.
Y = numbers of students. X = test score.

Traditional session post-test mean score—82. Median score—85. Range of scores, 40-100.
Distance session post-test mean score—84. Median score—85. Range of scores, 35-100.
Figures 3 and 4 are included to compare the difficulty of pre-tests and post-tests from each session for the learners in the traditional and distance groups. Figure 3 compares the pre-test scores for both sessions and Figure 4 compares the post-test scores for both sessions.

The range and distribution of test scores in Figure 3 suggest that participants taking the tests found them to be of average difficulty. The curves formed by the distributions of both ranges of pre-test scores conform roughly to the standard distribution curve, suggesting that the pre-test was neither overly difficult nor overly easy.

The range and distribution of test scores in Figure 4 show a strong rightward shift, which is mirrored in the higher mean scores for both post-tests. The curves formed by the distributions of both sets of post-test scores show a noticeable leftward tail, indicating that scores were higher overall and both tests were less difficult for participants.
Control Group Pre- and Post-Test Scores

Two additional histograms (Figures 5 and 6) show distributions of pre- and post-test scores from the control group in the study. As noted in the previous chapter, the control group was the Master Gardener class in Yamhill County. Dan Edge presented both sessions from the study—Animal Damage Management and Landscaping for Wildlife—to the Yamhill County Master Gardeners in the traditional way.

The control group test scores offer a limited basis of comparison because there were so few scores (22 pre-test, 23 post-test) in the group. However, it is noteworthy that the mean scores for both sessions increased 15 and 20 points respectively from pre- to post-test in the control group. This increase in score is similar to the score increases recorded for the experimental groups.
Figure 5. Yamhill County session 1, “Landscaping for Wildlife.”
Y = numbers of students. X = test score.


Figure 6. Yamhill County session 2, “Animal Damage Management.”
Y = numbers of students. X = test score.

Learner Interaction

As outlined in the previous chapter, interaction analysis was used in the study to compare the amounts of teacher and student talk in the traditional sessions with the amounts of teacher and student talk in the distance sessions. Teacher talk and student talk are catchall categories. The Verbal Interaction Category System (VICS) divides teacher-student communication into 10 carefully defined types of interaction, but those types can conveniently be grouped into two overall categories, which has been done here to make presentation of the data more straightforward. For a complete breakdown, using VICS categories, of all the data collected from the nine class sessions in the study, see Appendix C.

The study design called for the audio taping of both the traditional and distance session at each of the five county sites in the study. Yamhill County was added as a control group. In Yamhill County, both sessions were presented in the traditional way and both were audio taped. Had the interaction analysis portion of the study worked perfectly, there would have been 12 tapes, two from each of six counties, to analyze. As it turned out technical problems led to the failure to record three of the sessions; the distance sessions in Deschutes and Jackson Counties and the traditional session in Lane County. Figure 7 compares, in column graph form, the interaction results for the nine class session tapes analyzed.
Figure 7. Comparison of interaction analysis results from all nine observations at the six county sites.

M-T = Marion County traditional session; M-D = Marion County distance session; P-T = Polk County traditional session; P-D = Polk County distance session; D-T = Deschutes County traditional session; J-T = Jackson County traditional session; L-D = Lane County distance session; Y-1 = Yamhill County control group session 1; Y-2 = Yamhill County control group session 2.

NOTE: The category “confusion” appears only in the J-T and D-L columns because the Jackson County traditional session and the Lane County distance session were the only two where a significant amount of confusion time (<1%) was logged. Within the Verbal Interaction Category System time identified as “confusion” is logged in the “z” category. (Amidon-Hough, 1967)
A special note should be made of the fact that in the case of all distance sessions, the audio tape recording from each site where taping was successful included questions and comments from all the sites participating in the distance session. To put it another way, the tape recording of the distance session recorded in Polk County caught questions and comments from Marion, Jackson, Lane, and Deschutes County, as well as questions and comments made at the Polk County site during the distance session. This would seem to suggest that all tape recordings made of the distance session were essentially the same. The analysis of the tapes suggests that this is only partially true. The data from recordings of the distance session made in Polk and Lane Counties are similar, but data from the recording of the distance session made in Marion County is slightly different from that of the other two counties. The most logical explanation for this may be that in all three counties, questions and comments were made that were picked up by tape recorders at those sites, but not by tape recorders at other sites.

The data indicates no clear trend suggesting that interaction was any less or any greater in distance sessions than in traditional sessions of the Master Gardener training classes observed in the study. The least and the most amounts of interaction were recorded in the control group sessions. Student talk consumed just 4 percent of the time in Yamhill County's Session 1, while the same students talked 14 percent of the time in Yamhill County Session 2. It should be noted that these sessions were presented consecutively on the same day.
All other observations fell in between these two extremes. The greatest amount of student talk recorded in the experimental group was 13 percent for the Jackson County traditional session. The least amount of student talk recorded in the experimental group was 5 percent for the Deschutes County traditional session. Student talk recorded in the three distance sessions was 12 percent for the Marion County distance session; 10 percent for the Polk County distance session, and 10 percent for the Lane County distance session.

The Context of the Learning Environment

This section consists of components of the study that are descriptive rather than quantitative in nature. Four areas are covered, (a) demographic characteristics of the learners; (b) opinions of the downlink site coordinator/Extension agents about the distance session; (c) the cost factors pertaining to traditional versus distance education presentation, and (d) possible influencing factors encountered in the study.

First given are the demographic characteristics, which are compared to the results of an earlier demographics survey of the statewide Extension Service Master Gardener Program.

Characteristics of the Learners

A demographics survey (see Appendix A) was administered to all study participants. The results of both surveys are given in Table 3. The
Table 3. Demographics Data: Comparison of Two Master Gardener Surveys

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>N=276</td>
<td>N=164</td>
<td></td>
</tr>
</tbody>
</table>

**Age group**
- Under 20: 0%  | 0%  
- 21-30: 3%  | 2%  
- 31-40: 13% | 24%  
- 41-50: 18% | 24%  
- 51-60: 16% | 18%  
- 61-70: 26% | 24%  
- Over 70: 24% | 7%  

**Gender**
- Female: 58%  | 63%  
- Male: 42%  | 37%  

**Marital status**
- Single: 21%  | 26%  
- Married: 79% | 74%  

**Annual income**
- under $15,000: 13%  | 13%  
- $15,000-$24,999: 25%  | 23%  
- $25,000-$49,999: 46%  | 45%  
- $50,000+: 16% | 19%  

**Highest level of education achieved**
- Less than 12 years: 2%  | 0%  
- High school graduate or equivalent: 13%  | 17%  
- 2 years or less of college: —  | 28%  
- 3-4 years of college: 28% | 13%  
- College degree (BS, BA): 30% | 23%  
- Advanced college degree: 18% | 18%  
- College graduate program: 9% | —  

**Ethnic group**
- Caucasian: 95%  | 96%  
- Hispanic: 1%  | 1%  
- Black: 1%  | 0%  
- Asian: 1%  | 0%  
- Native American: 2%  | 2%  
- Other: —  | 1%  

**Residence**
- Large city (50,000+ population): 31% | 29%  
- Small city (10,000-50,000 pop.): 29% | 31%  
- Town (10,000 or less population): 14% | 11%  
- Rural area (open country): 26% | 29%  

information categories were the same as those appearing in a 1992 survey of Master Gardeners (see Appendix D, pp. 127-132) conducted by Ray McNeilan of the Oregon State University Extension Service. The 1992 survey was sent to a random sample of all registered Master Gardeners in Oregon that year. The purpose of this demographics survey is to compare it to the larger 1992 survey to determine whether case study participants are similar to the average Master Gardener as represented by the 1992 survey.

Comparison of the two surveys highlighted some important points. First, the demographics data in this study are, overall, quite similar to the demographics data gathered by McNeilan (1992) (see Appendix D) in all but one category. This indicates that Master Gardener participants in this study are fairly well representative of the average Oregon Master Gardener as described by the McNeilan survey.

Age was the single category where a noteworthy difference was observed. In this study 7 percent of the participants reported being over 70 years of age. In McNeilan's 1992 survey 24 percent of the respondents were over 70. Also, in the case study 24 percent of the participants reported being 31-40 years of age. In the 1992 survey 13 percent of the respondents reported being 31-40. This shows that the case study population had fewer persons over 70 years of age and more persons 31-40 years of age than reported in the 1992 Oregon Master Gardener survey.

This finding may lead one to observe that the presence in the study population of more younger people than exist in the statewide Master
Gardener population could possibly account, at least in part, for the high degree of receptiveness to the distance session shown by study participants. Of course this observation rests on the supposition that young adults are more receptive to the application of distance education technology than older adults.

**Attitudes of the Site Coordinators**

An interview procedure for the county Extension agents participating as downlink site coordinators was added to the study to assess their attitudes towards the distance session. Six agents were questioned in telephone interviews. Two were downlink site coordinators at the same session. All agents received the same set of six questions (see Appendix F). Agents were asked about their overall impressions of the distance session, and their impressions of student response to the session, interaction during the session and equipment operation. Lastly, agents were asked their thoughts about using distance education technology to train Master Gardeners.

The agents gave the distance session generally high marks. Two agents said they were unsure about how well the session would be accepted by their trainees, but noted that students seemed to become accustomed to it as the session wore on. One agent commented that his students were "totally elated" with the experience.

Commenting on equipment operation, four agents indicated varying degrees of problems, all of which were eventually resolved, but one agent
noted that “if these kinds of problems were experienced in future distance programs, we wouldn’t participate.” Another agent reported that the technical portion of the session worked “great,” but it should be noted that in his case, the distance session was held in a specially equipped ‘distance classroom’ at a local community college.

In their remarks about interaction taking place during the session, two agents present at the same site reported that their students asked questions so eagerly that some confusion ensued as a result of several students vying to be heard at the same time. All other agents reported that their students were hesitant to ask questions and only did so towards the end of the session when they became more comfortable with the presentation.

All six agents indicated that distance delivery of Master Gardener training was acceptable to them, and all agreed that distance delivery was a good way to train Master Gardeners, particularly in terms of allowing improved access to gardening information.

The reports of technical difficulty with the distance program were predictable given that distance delivery of education programs is highly dependent on technology. Smooth operation of equipment is always a concern to distance educators, including those in the Extension Service.

Agent responses about hesitant interaction parallel concerns about Extension distance education that appear in the literature. Extension educators Rogan and Simmons (1984) wrote that teleconferencing can never take the place of face-to-face communication. Montgomery, Craig, Larson and
Tesmer (1992), in a survey of Extension agents, found that agents felt one of the greatest barriers to Extension use of distance education was audience preference for face-to-face interaction. Kolomeychuk and Peltz (1991) conducted an evaluation of a series of Extension distance education programs and reported that respondents felt the lack of personal interaction between sites was one the greatest disadvantages of the programs.

It appears that doubts about the interactivity of distance education programs has been an ongoing concern with Extension educators. Perhaps this concern accounts for the hesitation of Extension educators in Oregon to make greater use of distance education programs. This is interesting speculation, particularly in light of the fact that all agents interviewed replied that although they have some doubts about distance delivery of instruction, they felt distance education offers new opportunities the Extension Service needs to take advantage of. The latter point echoes strongly in the literature. Lang et al. (1986), Whiting (1988), Flakerud (1994), Branson and Davis (1985), Stryker (1991), Evers (1990) and others note that distance education is a potent educational tool that the Extension Service can and should make increasing use of.

Comparative Costs

Cost is a major point of comparison in the Extension Service use of distance education in place of traditional teaching methods. The literature on distance education in Extension consistently points out cost savings with
distance delivered programs. Stryker (1991) noted that participants in an Extension distance program "applauded the economy of not having to travel long distances for the training." Bjorkland and Fredmeyer (1985) conducted a cost comparison of teleconferencing versus traditional regional meetings for Extension staff and concluded "cost analyses have indicated that using this method (teleconferencing) is both efficient and effective." Similar conclusions were reached by Stewart and Soliah (1987), Bogle et al. (1989), and Sunnarborg et al. (1988). Comparison of costs associated with the two instructional delivery methods in this case study led to a similar finding.

Dan Edge, the presenter in this study, kept track of his travel costs in visiting the five county Extension office sites in the study. He figured in mileage, expenses (food and lodging) and salary on a per hour basis for the time spent driving to and from the five offices. The total was $906.03 (see Appendix E, pp. 133-137). The cost of producing the distance session in this study was $691.34 (see Appendix E). This figure includes the costs of satellite time, studio and equipment rental, and salary for a technician. The cost of Edge's preparation time for the presentation and time spent in delivering the presentation is not included in the above figures. Direct comparison of the two figures indicates that presenting the traditional sessions cost 24 percent more than presenting the distance session. Therefore, if it can be concluded that the distance session was as effective for learners as the traditional session it makes economic sense to utilize the cheaper mode of program delivery. It is obvious from a close examination of the figures in Appendix E that the
further the location from Corvallis, the higher the travel costs. This simple fact suggests that the greater the distance, the more cost-effective satellite-delivered educational programs will be.

Possible Influencing Factors

There were a few possibly confounding features associated with the study that should be mentioned in conjunction with consideration of the study results.

1) All Oregon county Extension Service offices participating in the Master Gardener program are free to schedule their training dates whenever they desire. This created a scheduling problem in the study because the distance session was presented one time only at 10 a.m. on a Wednesday. Two of the five counties in the study had scheduled weekly training days other than Wednesday and so had to juggle their schedules to arrange meeting on Wednesday to participate in the distance session. This may have reduced participation somewhat in the distance session. On the other hand, numerous unknown factors may have contributed to the slightly reduced participation in the distance session as suggested by the lower number of surveys returned for that session.

2) The six county Extension agents (two were from Lane County) who agreed to participate in the study were volunteers. That is, their act of consenting to be part of the study would seem to suggest a desire on their part to participate in a distance education program. This may have contributed to
a sort of John Henry effect (Borg & Gall, 1989) in the study where study subjects make special effort to perform well because of their knowledge of the study and their interest in it. On the other hand, the extent to which county Extension agent enthusiasm for the study (if indeed any existed) carried over to Master Gardener learners is impossible to tell. It should be noted that the county Extension agents participating in the study volunteered in the late summer of 1992, a few months before registration for their county-wide Master Gardener programs began in the fall. Therefore, at the time they volunteered, the agents did not know anything about the eventual adult participants in the study.

3) County Extension agents (who also acted as downlink site coordinators in the study) differed appreciably in their technological expertise. For example, three (two from Lane County and one from Jackson County) of the county agents in the study seemed able to set up and operate all of the equipment used in the distance session quickly and easily. They also seemed able to diagnose technical problems and solve them with relatively little difficulty. Two other agents in the study (from Marion and Polk Counties) seemed much less able to set up and operate equipment easily and required a lot of technical support. The other agent (Deschutes County) in the study used a community college classroom for the distance session and relied on college staff to operate all equipment and solve technical problems. This may have affected the quality of the distance session for learners at some downlink sites, but the extent to which this may be true is difficult to determine.
4) Technical support from personnel on the OSU campus was more readily available to county sites closer to Corvallis than to the sites located further away. In fact, a technician from OSU visited the Polk County and Marion County sites (both a relatively short distance from OSU in Corvallis) just days before the distance session was conducted. Had this visitation not been made it is possible that the participation of Polk and Marion Counties in the distance session might have been precluded by technical difficulties. The Lane County site was also close enough to Corvallis that an 11th hour visit by a technician was possible, although such a visit was not necessary. The Jackson County and Deschutes County sites were simply too far away from Corvallis to arrange for a technical support visit on short notice. As it happened, neither Lane, Jackson, or Deschutes Counties requested a technical support visit from OSU for the distance session in the study, so the question of whether the opportunity to provide such a visit would have appreciably improved the quality of the distance presentation in those counties never arose.

5) Relatively few counties participated in the study considering that over 20 Oregon Counties offered the Master Gardener program in the winter of 1993 when the study was done. This suggests that the study population may not have reflected the general Master Gardener population precisely. And, in fact, the demographics survey does suggest that a higher proportion of younger adults participated in the study than are found in Oregon’s Master
Gardener population. This condition of the study does not invalidate the study results, but it should be pointed out as a factor that possibly could have affected some of the study findings.
CHAPTER 5
SUMMARY AND CONCLUSIONS

As stated at the beginning of this paper, the basic question of this study is: How effective is the delivery of instruction, via distance education (satellite) systems, to adult learners participating voluntarily in the Oregon State University Extension Service’s Master Gardener program? Within the framework of this case study, the factors that in sum determine effectiveness, or lack or it, are (a) the learners’ acceptance of distance delivered instruction, (b) the learners’ gain in knowledge from distance delivered instruction, and (c) the level of interaction between learners and the instructor taking place in the distance education classroom. To measure and analyze these three factors, the study employed the techniques of opinion survey, pre- and post-test procedure, and interaction analysis. A demographics survey was administered along with the opinion survey to reveal basic characteristics of study participants, and interviews were conducted with the agent/downlink site coordinators following the distance session to compare their impressions of the session with other data. All of these steps taken in the process of conducting the study were intended to answer the three basic research questions:

1) Is presentation of Extension educational programming delivered via distance technology perceived favorably or unfavorably by participants in a Master Gardener training session?
2) Do learners participating in Master Gardener training sessions learn as much in the distance delivered session as they learned in the traditionally delivered session?

3) Do learners participating in Master Gardener training sessions interact as much in the distance delivered session as they did in the traditionally delivered session?

The study participants were the 140-150 Master Gardener trainees in the five county Master Gardener programs that served as experimental groups, 23 Master Gardener trainees in Yamhill County who served as the control group, and the six Extension agent/downlink site coordinators. Following the surveying, testing, interaction analysis, and interviewing steps of the study, data was compiled and compared. Examination of the data points to the following findings:

1. Most learners responded favorably to distance delivered master gardener instruction

2. Most learners learned as much from distance delivered master gardener instruction as they did from traditionally delivered master gardener instruction

3. Learners in the study did not interact with each other and with the instructor any more or less in the traditionally delivered session than in the distance delivered session.
4. Almost all the learners in the study would not be opposed to participating in another Extension educational program employing distance delivery technology.

5. Learners in the study were similar to the average Oregon master gardener except in the category of age.

These findings point to the following conclusions:

1. The adult learners in this study, participating in Master Gardener training, reacted to distance delivered instruction in much the same way as they reacted to traditionally delivered instruction.

2. The adult learners in this study reacted to distance delivered instruction in much the same way as many other kinds of learner groups in similar studies.

3. In light of this, there is no compelling reason to believe that adult learners participating voluntarily in an Extension educational program would not be as open to distance education programs as other learner groups.

If the motivations of these learners are fairly described by Knowles' concept of andragogy, it perhaps should not be surprising that they responded equally to distance delivered and traditionally delivered instruction. Recall that Knowles (1973) said adult learners are:

...aware of specific learning needs generated by real life tasks or problems. Adult education programs, therefore, should be organized around 'life application' categories and sequenced according to learners' readiness to learn, and that adults are
competency based learners in that they wish to apply newly acquired skills or knowledge to their immediate circumstances. Adults are, therefore, 'performance-centered' in their orientation to learning. (pp. 45-49)

If this is the case then it is reasonable to conclude that adult learners would not be as concerned about the conditions under which they receive information as they would be concerned with the information itself as long as (a) it pertains directly to an issue or topic with which the adult learner is currently and actively involved, and (b) the educational information is of such a practical nature that the learner can apply it directly and immediately. Strong positive responses to opinion survey questions indicate that in both the traditional and distance sessions, participants had a strong interest in the subject of the presentation and a high opinion of the usefulness of the information.

A factor central to the participants' reaction to the distance session in the study, or any educational presentation for that matter, is the ability and attitude of the instructor. As Wilkes and Burnham (1991) noted, "If instructors are boring in a face-to-face setting, they can reach undescrivable depths of insipidity coming across the phone lines." Although the presenter, Dan Edge, Oregon State University Extension Service wildlife specialist, was not a study subject within the framework of this research project, the quality of his performance was crucial to the outcome of the study. Survey results suggest that Edge's teaching in the traditional session was highly appreciated by study participants, and that Edge apparently carried the quality of his teaching over into the distance session as well. Strong positive response to
survey questions about the instructor indicate that Edge clearly was a big reason for the learners' strong positive reaction to the distance session and for their strong positive reaction to the instructional situation.

Overall, the opinion survey and pre- and post-test portions of the study serve to reaffirm what earlier researchers have found. Survey respondents gave the distance session in this study high scores, with 92 percent indicating that they would be willing to take another distance education class. This result is similar to findings from other studies of Extension Service audiences, for example, Branson and Davis (1985), where 95 percent of 421 survey respondents indicated that a distance delivered course "met or exceeded their expectations," and Greer and Ziebarth (1994), where 81 percent of 240 respondents felt a distance delivered educational program "provided what they wanted."

Previous studies of Extension programs featuring the pre- and post-test technique also furnished results similar to the findings of this study. In the Master Gardener case study, pre- to post-test scores from the distance session increased 20 points from an average score of 65 to an average score of 85. In Sunnarborg, Bradley and Haynes (1988), subjects taking pre- and post-tests increased their scores, on average, from 59 percent to 82 percent, an increase of 23 percent. In Flakerud (1994), pre- and post-tested participants improved their scores 20 percent from an average low of 57 percent for pre-tests to an average high of 79 percent for post-tests.
The interaction analysis component of this project adds an extra dimension not found in any previous studies of the effectiveness of distance-delivered Extension educational programs. Recall that in the introduction of this paper, interactional analysis was referred as a key component of this study. Interaction is an important factor in the success of any learning situation. Extension educators know this and strive to make interaction a consistent feature of Extension educational programs. Kolomeychuk and Peltz (1991) noted that "A high level of interaction is important in teaching and learning and in meetings in order to increase the attention and motivation levels." They added that "The greatest challenge in interactive video instruction, or meetings, is overcoming the barriers of distance and technology that hinder, normal personal interaction." If the formula for success in distance education is "the same as that for face-to-face teaching," as Coyle (1991) states, then it is not unreasonable to believe that Extension educators would be concerned, in some cases perhaps overly concerned, about a teaching situation in which freedom of interaction is dependent on the smooth operation of what may seem to the educator to be a very complex array of sophisticated communications equipment. Lending credence to this point of view is a report summarizing the evaluation of the use of distance education programs by the Oklahoma State University Extension Service from 1985-1989. Bogle, et al. (1989) noted that surveyed Extension personnel reported the "impersonal nature of the videoconference" as one several barriers to its use. In another portion of the
summary report, Extension agents, surveyed about the effectiveness of conducting statewide videoconference staff meetings, indicated lack of interaction and technical problems as principal weaknesses of these meetings.

The interviews conducted with agent/downlink site coordinators following the distance session of this study clearly show that they were concerned about the ease of interaction between students and instructor during the session. Agents at four of the five distance session sites observed that interaction was either poor, or acceptable only after "hesitant" students "warmed up" to trying to communicate with an instructor on a TV screen.

The interaction component of the Master Gardener study was included in anticipation of the 'lack of interaction' question. As stated above in the conclusions of this study, the results of the interaction analysis indicate that learners did not interact with each other and with the instructor any more or less in the traditionally delivered session than in the distance delivered session. The survey results support this finding. Responding to the statement about their degree of satisfaction with the amount of communication between instructor and students, participants in both the traditional and distance sessions answered strongly in the affirmative with mean scores of 4.49 and 4.45 respectively. This evidence strongly supports the position that distance delivery of instruction should be employed if such delivery improves the efficiency and cost-effectiveness of the instructional program.
Cumulatively, the data gathered in this study points to the general overall conclusion that for the learners in the Master Gardener training sessions under study, distance delivery of instruction was just as effective as traditional delivery of instruction.

Recommendation

The results of this study make a convincing case for greater use of distance education technology in delivering educational programs to adult learners participating in Extension Service programs. There can be no doubt, given evidence gathered here and in a host of other similar studies, that distance education technology can be useful and effective, while reducing the costs of program delivery. In times of tight budgets, reduced funding and lean staffing, the Oregon State University Extension Service must find new ways to meet a growing demand from the state’s citizens for practical educational programming that improves quality of life. Distance education technology offers a way and it should be used.

It is recommended, in view of the outcome of this study, that the application of distance education technology be continued in the OSU Extension Service Master Gardener Program. It is further recommended that potential uses of distance education technology in other OSU Extension Service programs be explored and application of the technology made as situational circumstances allow.
Areas for Further Study

The results of this study are generally similar to those of many other distance education studies involving learners of every type and age. The findings here are consistent with what is already generally known about the effectiveness of distance education as compared to traditional teaching methods. However, as Dillon and Walsh (1992) noted, most research in distance education to date has focused on the learner. Few studies have looked at faculty attitudes towards distance education and faculty potential for engaging distance teaching. It is worth noting that in 1994, the year after this case study was conducted, Dan Edge presented another distance education presentation on wildlife in the home landscape intended for Master Gardener trainees. All county Extension programs in Oregon offering the Master Gardener program were notified of the presentation and given tune-in information about it. Of the five counties participating in the Master Gardener distance education experiment a year earlier, only one tuned into the 1994 program. Could it be that even after directly participating in a distance education program that they themselves described as successful, the majority of the county agents involved in the 1993 experiment remain unconvinced that distance education can be useful in the delivery of Master Gardener training programs? Also, in the exit interviews all six agents were positive in their appraisal of the distance session, but only one of the six expressed interest in presenting a distance
program himself. Of course, it should be noted that none of the six were asked directly if they would personally consider making a distance presentation. More might have said yes if asked directly, but the fact that only one volunteered the comment suggests what some studies have found, that faculty in general seem to resist the idea of distance teaching or are undecided about how effective it might be.

In a survey at California State Polytechnic University-Pomona, Blanch (1994) found that a significant percentage of faculty who had participated in distance teaching in the school of hotel and restaurant management were not overly enthusiastic about it. Blanch surveyed and interviewed 22 faculty members. Forty-seven percent responded that "they did not think their faculty colleagues believed that teaching on PolyNet (the university's distance education system) was a viable alternative to the traditional model (of teaching). Twenty percent responded that they believed their colleagues thought distance teaching was viable and 33.3 percent were undecided. Blanch's sample was small, which calls into question any conclusion that faculty in higher education throughout the U.S. generally agree that distance education is not viable compared to traditional teaching. But Blanch's study does raise questions that should receive more attention. A survey of Extension educators soliciting their opinions and attitudes about the use of distance education programming in
Extension work would be a valuable beginning in the process of learning how receptive Extension educators are to distance teaching and how they might be persuaded to be more receptive.

In a study of the attitudes of higher education faculty toward distance education, Clark (1993) surveyed a random sample of 502 faculty in universities and community colleges throughout the United States. He received 317 usable surveys from this group. In summing up his findings, Clark noted that "cautious optimism is warranted" in regard to the future of distance education in universities and colleges across the U.S., but that faculty support was mixed with concern about distance program quality, quality of interaction during distance programs, and concern about ensuring the use of distance education in appropriate situations.

Dillon and Walsh (1992) reviewed 225 distance education studies and found only 24 that focused on faculty rather than learners. In analyzing the content of these studies Dillon and Walsh found that many higher education faculty are actively engaged in distance teaching and that as faculty gain experience with distance teaching they tend to become more supportive of its use. However, the two researchers also surveyed studies that found faculty often prefer face-to-face instruction because of the quality of interaction and the satisfaction gained from teaching in the traditional way.

The attitudes of Extension educators' towards the use of distance education in Extension programs do not appear to have been studied specifically. This is an important area of future study. Extension educators
no doubt are similar to other higher education faculty in many ways. However, as was noted in an earlier chapter of this paper, Extension educators often teach in informal situations and their students are adult learners who are generally more independent as students than learners at the K-12 level or the college undergraduate level. Extension educators are concerned to provide the high level of interest and quality of learning experience that they believe adult learners want. This sets them apart as instructors and provides some justification for studying them as a distinct group.
REFERENCES


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APPENDICES
APPENDIX A
SURVEYS USED IN THE STUDY
We would like to know how you feel about the training session you just completed. Your participation in this survey is voluntary and confidential. When you have completed this questionnaire, please return it to the Extension agent leading the session.

1. In the table below are some statements about this Master Gardening training session. Please read each one and indicate how strongly you disagree or agree by circling the appropriate number.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree Strongly</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Agree Strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. The instructor showed interest and enthusiasm</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>b. I was not satisfied with the amount of communication between the instructor and students during the session</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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</tr>
<tr>
<td>c. The class session objective (what to learn) was clear</td>
<td>2</td>
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<td>4</td>
<td>5</td>
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<tr>
<td>d. The subject of the presentation was not interesting to me</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>e. The information given in the session will be useful to me in my home gardening and landscaping activities</td>
<td>2</td>
<td>3</td>
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<tr>
<td>f. The instructor presented information clearly and concisely</td>
<td>2</td>
<td>3</td>
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<tr>
<td>g. The instructor did not show an interested and concerned attitude toward students</td>
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<td>4</td>
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Comments:_________________________________________________________

_______________________________________________________________

GO ON TO THE NEXT PAGE
OSUES Master Gardener Training training session evaluation, page 2

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<tr>
<th></th>
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<th>Strongly Disagree</th>
<th>Not Sure</th>
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<th>Strongly Agree</th>
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<td>h. The video images of title slides and other graphics used by the instructor were difficult to read</td>
<td>2</td>
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<td>4</td>
<td>5</td>
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</table>

i. I was satisfied with the audio equipment operation during the presentation | 2 | 3 | 4 | 5 |

j. The videotaped excerpts used as a part of the presentation were clear and easy to understand | 2 | 3 | 4 | 5 |

k. I was satisfied with the video equipment operation during the presentation | 2 | 3 | 4 | 5 |

l. The overall sound quality of the instructor was distorted and difficult to understand | 2 | 3 | 4 | 5 |

Please answer the following questions by circling the best response.

2. Have you taken a course employing distance learning technology before?
   - yes
   - no

3. Would you take a course employing distance learning technology again?
   - yes
   - no

Comments:

THANK YOU
Oregon State University Extension Service Master Gardener Training  
Class Session Evaluation  
We would like to know how you feel about the training session you just completed.  
Your participation in this survey is voluntary and confidential. When you have  
completed this questionnaire, please return it to the Extension agent leading the  
session.

1. In the table below are some statements about this Master Gardening training session.  
Please read each one and indicate how strongly you disagree or agree by circling the  
appropriate number.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Disagree</th>
<th>Disagree</th>
<th>Not Sure</th>
<th>Agree</th>
<th>Agree</th>
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<tbody>
<tr>
<td>a. The instructor showed interest and enthusiasm</td>
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<td>b. I was not satisfied with the amount of communication</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
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<tr>
<td>between the instructor and students during the session</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>c. The class session objective (what to learn) was clear</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td></td>
</tr>
<tr>
<td>d. The subject of the presentation was not interesting to me.</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>e. The information given in the session will be useful to me in my home</td>
<td>2</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. The instructor presented information clearly and concisely</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>g. The instructor did not show an interested and concerned attitude</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>toward students</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:  

__________________________________________________________________________

GO ON TO THE NEXT PAGE
OSU Extension Service Master Gardener General Information Survey

Please respond to the following items as accurately as possibly. Circle the appropriate answer. Your response is confidential.

2. Please indicate your age group.
   1 Under 20
   2 21-30
   3 31-40
   4 41-50
   5 51-60
   6 61-70
   7 Over 70

3. Are you female or male?
   Female
   Male

4. What is your marital status?
   Single
   married

5. What is your annual family income?
   1 under $15,000
   2 $15,000-$24,999
   3 $25,000-$49,999
   4 $50,000 or more

6. What is your highest level of education achieved?
   1 less than 12 years
   2 high school graduate or equivalent
   3 2 years or less of college
   4 3-4 years of college
   5 college degree (BS, BA)
   6 advanced college degree

7. Which one of the following best describes your ethnic group?
   1 Caucasian
   2 Hispanic
   3 Black
   4 Asian
   5 Native American
   6 Other (specify) _______________________

8. What size community do you live in?
   1 large city (more than 50,000 population)
   2 small city (10,000-50,000 pop.)
   3 town (10,000 or less population)
   4 rural area (open country)

THANK YOU FOR YOUR COOPERATION
APPENDIX B
MULTIPLE CHOICE TESTS USED IN THE STUDY
Master Gardener Program--Pre and Post Test
Animal Damage Management Module

Instructions: Circle the letter corresponding to the most appropriate answer.

1. What are the 4 steps leading to a successful animal damage management program?
   a. Toxicants, behavior modification, habitat alteration, and population reduction.
   b. Pest identification, habitat alteration, use of appropriate control method, and monitoring for reinfestation.
   c. Toxicants, scaring devices, repellents, and traps.
   d. Exclusion, habitat alteration, behavior modification, and toxicants.

2. Correct identification of the pest may require the use of what cues?
   a. Hair, type of damage, and visual identification.
   b. Habitat, type of damage, and visual identification.
   c. Habitat, type of damage, and smell.
   d. Type of damage, habitat, sign, and sometimes visual identification.

3. Habitat alteration is designed to reduce access to which of the following habitat requirements?
   a. Food.
   b. Cover.
   c. Water.
   d. All of the above.

4. Habituation to a negative stimuli occurs most often for which of the following control methods.
   a. Trapping.
   b. Toxicants
   c. Repellents.
   d. Scaring devices.

5. Which three species are not protected by the Federal Migratory Bird Treaty Act?
   a. House finches, starlings, and pigeons.
   b. Starlings, crows, and blackbirds.
   c. Pigeons, crows, and starlings.
   d. None of the above.
6. Which of the following is not a method for reducing a pest species' population?
   a. Toxicants.
   b. Shooting.
   c. Trapping.
   d. Repellents.

7. For which group of animals are frightening devices most likely to be successful?
   a. Large mammals.
   b. Birds.
   c. Burrowing mammals.
   d. Rodents.

8. Which of the following methods is the most effective for preventing deer damage?
   a. Repellents.
   b. Toxicants.
   c. Fencing.
   d. Landscaping with deer resistant plants.

9. Which of the following methods is legal for controlling deer in urban areas?
   a. Shooting.
   b. Toxicants.
   c. Trapping.
   d. None of the above.

10. The diet of moles is primarily
    a. Grass
    b. Forbs
    c. Invertebrate animals
    d. Soil

11. The mounds of moles and pocket gophers can be differentiated by:
    a. Shape.
    b. Size.
    c. Location.
    d. Number.
12. The most successful method for controlling moles is:
   a. Repellents.
   b. Toxicants.
   c. Trapping.
   d. Scaring devices.

13. The best method for controlling pocket gophers in urban areas is:
   a. Repellents.
   b. Toxicants.
   c. Trapping.
   d. Scaring devices.

14. Habitat for voles is typified by:
   a. Abundant water.
   b. Thick grass cover.
   c. Shrubs.
   d. All of the above.

15. Vole population reduction is best accomplished by:
   a. Toxicants.
   b. Trapping.
   c. Shooting.
   d. Fumigants.

16. The most effective method for controlling bird damage to berry crops is:
   a. Shooting.
   b. Trapping.
   c. Exclusion.
   d. Scaring devices.

17. Which of the following plants are not resistant to deer browsing?
   a. Iris.
   b. Cactus.
   c. Larkspur.
   d. None of the above.
18. Which of the following species requires a permit for population reduction?
   a. Robins.
   b. Voles.
   c. Rabbits.
   d. Pocket gophers.

19. Control of rats and mice in homes will require:
   a. Sanitation measures.
   b. Rodent proofing and exclusion.
   d. All of the above.

20. Which of the following species is most likely to feed at bird feeders?
   a. Opossum.
   b. Tree squirrels.
   c. Raccoons.
   d. Deer.
Master Gardener Program--Pre- and Post-test
Landscaping for Wildlife Module

Instructions: Circle the letter corresponding to the most appropriate answer.

1. What are the four basic wildlife habitat requirements?
   a. Nutrition, cover, territory, and water.
   b. Food, cover, water, space.
   c. Streams, food, thermal cover, and space.
   d. Niche, food, cover, water.

2. Free water is not an important habitat requirement in portions of western Oregon typified by excessive rainfall.
   a. True.
   b. False.

3. Hummingbirds are attracted to what types of flowers?
   a. Large disk-shaped flowers.
   b. Blue tubular flowers.
   c. Red tubular flowers.
   d. All of the above.

4. Cover or shelter provides wildlife with:
   a. Protection from predators.
   b. Thermal protection.
   c. Protection from energy loss.
   d. All of the above.

5. In order to provide habitat for a single species of butterfly throughout the year, you must:
   a. Provide a succession of blooming plants from March through October.
   b. Provide nectar-rich plants throughout the year.
   c. Provide pollen-rich plants throughout the year.
   d. Provide foliage for caterpillars and nectar-rich plants for adults.
6. Which of the following is not a benefit resulting from landscaping for wildlife?
   a. Increased property value.
   b. Habitat for kids.
   c. Increased wildlife diversity and abundance.
   d. None of the above.

7. Which of the following is not a vegetative wildlife habitat component?
   a. Snags.
   b. Winter food plants.
   c. Grasses and legumes.
   d. Nuts and Acorns.

8. Snags are use by wildlife in the following ways:
   a. Perches.
   b. Feeding sites.
   c. Nesting sites.
   d. All of the above.

9. Water which is ________ will be most attractive to wildlife.
   b. Clean.
   c. Moving.
   d. Cold.

10. The basic habitat requirement that is most commonly limited in urban yards is:
    a. Thermal cover.
    b. Food.
    c. Space.
    d. None of the above.

11. When developing a landscape planting plan or map, vegetation should be arranged to:
    a. Avoid placement of plants in rows.
    b. Place food plants in close proximity to cover.
    c. Provide shelter from the prevailing wind.
    d. All of the above.
12. A landscape that provides structural diversity will:
   a. Provide more cover year-around.
   b. Provide more food year-around.
   c. Increase wildlife diversity.
   d. None of the above.

13. The most common structural hazard for wildlife are:
   a. Electrical wires.
   b. Large windows.
   c. Fences.
   d. Telephone poles.

14. Native plants are preferred for landscaping for wildlife because they:
   a. Are more readily recognized by wildlife.
   b. Require less maintenance.
   c. Are adapted to climatic condition.
   d. All of the above.

15. Which of the following types of diversity are most important in urban areas?
   a. Species diversity.
   b. Structural diversity.
   c. Landscape diversity.
   d. All of the above.

16. Grasses and legumes used for wildlife habitat:
   a. Provide forage.
   b. Provide nesting cover.
   c. Should not be mowed until after mid-June.
   d. All of the above.

17. Winter food plants commonly:
   a. Have red waxy berries.
   b. Provide hiding cover.
   c. Increase structural diversity.
   d. None of the above.
18. Hawthorn, grapes, privet and crabapples are examples of:

a. Summer food plants.
b. Fall food plants.
c. Winter food plants.
d. Thermal cover.

19. Bird species such as Rufous-sided towhees, Varied thrushes, Song sparrows and Quail:

a. Eat only sunflower seeds.
b. Will only feed on the ground.
c. Are not common in urban landscapes.
d. Will not eat cracked corn.

20. Logs and rock piles:

a. Are important habitat components for small mammals, reptiles, and amphibians.
b. Are important habitat components for many bird species.
c. Are commonly used by deer for cover.
d. None of the above.
APPENDIX C
INTERACTION ANALYSIS DATA IN RAW FORM
Interaction analysis results.
Interaction analysis categories (Amidon & Hough, 1967).

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<th>C-3</th>
<th>C-4</th>
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<td>Yamhill (Y-1)</td>
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<td>5%</td>
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<td>6%</td>
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<td>&gt;1%</td>
<td>0%</td>
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<td>(distance session)</td>
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<td>Deschutes (D-T)</td>
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<td>0%</td>
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<td>0%</td>
<td>0%</td>
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<td>0%</td>
<td>13%</td>
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<td>1%</td>
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</tr>
<tr>
<td>Lane (L-D)</td>
<td>84%</td>
<td>&gt;1%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
<td>5%</td>
<td>2%</td>
<td>&gt;1%</td>
<td>4%</td>
</tr>
<tr>
<td>(distance session)</td>
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</tbody>
</table>

Categories:

| Teacher-initiated talk                      | 1. Presents information or opinion  |
|                                           | 2. Gives directions                 |
|                                           | 3. Asks narrow question             |
|                                           | 4. Asks broad question              |
| Teachers response                          | 5. Accepts idea                     |
|                                           | 6. Rejects idea                     |
| Student response                           | 7. Responds to teacher              |
|                                           | 8. Responds to another pupil        |
| Student-initiated talk                     | 9. Initiates talk to teacher        |
|                                           | 10. Initiates talk to another pupil |
|                                           | 11. Silence                         |
|                                           | Z. Confusion                        |

A category is marked down on a tally sheet every three seconds during the class. This yields 20 tallies per minute for the duration of the class (Amidon & Hough, 1967).
APPENDIX D
1992 MASTER GARDENER PROGRAM SURVEY
OREGON MASTER GARDENER PROGRAM 1992 SURVEY SUMMARY

Prepared by Ray A. McNeilan, Ext Agt & Oregon MG Program Coordinator
211 SE 80. Portland, OR  97215

During August 1992, a survey was prepared to obtain information about the status of the Oregon Master Gardener Program. The survey instrument was developed for Oregon, based on a survey done by Cornell University several years previously. It was sent to the 22 extension agents who are conducting Master Gardener volunteer programs in Oregon. Agents were given the option of revising and sending their own questionnaire, or having it sent (and returned) from a central point. Most opted to have the survey questionaire sent from the state coordinators office, and for the returns to be evaluated in the same place.

This survey was developed because of the felt need for demographics of the volunteers in the program, and to learn of how these volunteers look upon the Master Gardener program, their evaluation and their involvement. Approximately 600 copies were mailed to a randomly selected population of Master Gardeners across Oregon. The tenure of these volunteers ranged from less than one year to 15 years in the Oregon program. Nearly 46% of the questionaires were returned for developing this report.

How did these volunteers learn about the Oregon Master Gardener program??

<table>
<thead>
<tr>
<th>Source</th>
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<tr>
<td>Newspaper</td>
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<tr>
<td>Friends/Relatives</td>
<td>25%</td>
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<tr>
<td>Master Gardeners</td>
<td>14%</td>
</tr>
<tr>
<td>Extension Agent</td>
<td>9%</td>
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<tr>
<td>Plant Clinics</td>
<td>5%</td>
</tr>
<tr>
<td>Gardening Event</td>
<td>3%</td>
</tr>
<tr>
<td>Newsletter</td>
<td>2%</td>
</tr>
<tr>
<td>Radio/Television</td>
<td>1%</td>
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</tbody>
</table>

How About Oregon MG's??

- Average tenure: 3.7 years
- Hours per year volunteered: 63

Where do they help other gardeners??

- 19 hours, Extension office
- 9 hours, Clinics, Speaking
- 21 hours, Civic projects
- 4 hours, Youth Gardening

Respondents to the questionnaire showed an average of 74 people were directly assisted each year by each volunteer. What do these volunteers like to do as they spend their time with Extension??

<table>
<thead>
<tr>
<th>Rank</th>
<th>Activity</th>
<th>Asked how often do you talk to others about what you have learned:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Answer phone questions</td>
<td>61%...........Often</td>
</tr>
<tr>
<td>2</td>
<td>Demonstration garden work</td>
<td>10%...........Very often</td>
</tr>
<tr>
<td>3</td>
<td>Plant problem clinic work</td>
<td>23%...........Once in a while</td>
</tr>
<tr>
<td>4</td>
<td>Extension office clerical</td>
<td>4%...........Only when asked</td>
</tr>
<tr>
<td>5</td>
<td>Talk to civic groups</td>
<td>1%...........Seldom</td>
</tr>
<tr>
<td>6</td>
<td>Managing special projects</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Writing or editing</td>
<td></td>
</tr>
</tbody>
</table>

---more---
Respondents were asked to estimate their total annual dollar outlay to participate in Oregon’s Master Gardener program (considering both training time and volunteer work). The average estimated costs were $192.00 (mileage, parking, child care etc.).

The issues that are perceived by Master Gardeners as being valuable parts of their volunteer career, are listed in descending order of importance:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Activity</th>
<th>Rank</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>training received</td>
<td>5</td>
<td>new acquaintances</td>
</tr>
<tr>
<td>2</td>
<td>new horticulture insight</td>
<td>6</td>
<td>payback activities</td>
</tr>
<tr>
<td>3</td>
<td>association with Extension</td>
<td>7</td>
<td>in-service training</td>
</tr>
<tr>
<td>4</td>
<td>rapport with other gardeners</td>
<td>8</td>
<td>managing activities</td>
</tr>
</tbody>
</table>

The Master Gardener program is designed to sharpen the skills of volunteers and then to provide them with an outlet for their gardening knowledge. Many find avenues of their own through which to direct gardening information or to provide assistance to other gardeners. Groups assisted, in descending order, are:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Group</th>
<th>Rank</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Friends/Relatives</td>
<td>8</td>
<td>Neighborhood Association</td>
</tr>
<tr>
<td>2</td>
<td>Neighbors</td>
<td>9</td>
<td>Plant Societies</td>
</tr>
<tr>
<td>3</td>
<td>Garden Clubs</td>
<td>10</td>
<td>Youth Groups</td>
</tr>
<tr>
<td>4</td>
<td>Church Group</td>
<td>11</td>
<td>Library</td>
</tr>
<tr>
<td>5</td>
<td>Garden Center/Nursery</td>
<td>12</td>
<td>Citizens Advisory Group</td>
</tr>
<tr>
<td>6</td>
<td>Schools</td>
<td>13</td>
<td>Business Groups</td>
</tr>
<tr>
<td>7</td>
<td>Senior Citizens Groups</td>
<td>14</td>
<td>Physically Challenged</td>
</tr>
</tbody>
</table>

In answer to questions designed to learn more about how these volunteers feel about the organized training program the following information was obtained:

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes Percentage</th>
<th>No Percentage</th>
<th>Maybe Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>were you adequately trained?</td>
<td>✓ (91%)</td>
<td>✓ (2%)</td>
<td>✓ (9%)</td>
</tr>
<tr>
<td>is the payback requirement fair, equitable?</td>
<td>✓ (53%)</td>
<td>✓ (22%)</td>
<td>✓ (2%)</td>
</tr>
<tr>
<td>did you learn new gardening knowledge?</td>
<td>✓ (99%)</td>
<td>✓ (2%)</td>
<td>✓ (5%)</td>
</tr>
<tr>
<td>did you meet other gardeners?</td>
<td>✓ (95%)</td>
<td>✓ (2%)</td>
<td>✓ (5%)</td>
</tr>
<tr>
<td>did you have opportunity to help others?</td>
<td>✓ (97%)</td>
<td>✓ (2%)</td>
<td>✓ (5%)</td>
</tr>
<tr>
<td>did you gain new sources of information?</td>
<td>✓ (99%)</td>
<td>✓ (2%)</td>
<td>✓ (5%)</td>
</tr>
<tr>
<td>did the training help you to gain a job?</td>
<td>✓ (22%)</td>
<td>✓ (2%)</td>
<td>✓ (2%)</td>
</tr>
<tr>
<td>did it provide a creative outlet for you?</td>
<td>✓ (86%)</td>
<td>✓ (14%)</td>
<td>✓ (20%)</td>
</tr>
<tr>
<td>could you apply what you learned?</td>
<td>✓ (98%)</td>
<td>✓ (2%)</td>
<td>✓ (5%)</td>
</tr>
<tr>
<td>did it improve your self confidence?</td>
<td>✓ (78%)</td>
<td>✓ (2%)</td>
<td>✓ (20%)</td>
</tr>
<tr>
<td>did you learn more about OSU Extension?</td>
<td>✓ (95%)</td>
<td>✓ (2%)</td>
<td>✓ (5%)</td>
</tr>
<tr>
<td>did you gain new gardening skills?</td>
<td>✓ (100%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
To learn how the volunteers felt about their own participation in the program, these questions were asked, (responses and percentage are listed):

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>Uncertain (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>did you feel your MG experiences were more rewarding in comparison to other volunteer experiences?</td>
<td>(97%)</td>
<td>(3%)</td>
<td></td>
</tr>
<tr>
<td>would you have volunteered to become an MG if you had known the time demands?</td>
<td>(95%)</td>
<td>(1%)</td>
<td>(4%)</td>
</tr>
<tr>
<td>did you gain new <strong>knowledge</strong> in areas other than gardening and plant science?</td>
<td>(65%)</td>
<td>(5%)</td>
<td>(30%)</td>
</tr>
<tr>
<td>did you gain new <strong>skills</strong> in areas other than gardening and plant science?</td>
<td>(54%)</td>
<td>(5%)</td>
<td>(41%)</td>
</tr>
</tbody>
</table>

Knowledge gains included:

- information about...
  - #1 Agricultural Issues
  - #2 Community Organizations
  - #3 Community Resources
  - #4 Local Community Needs
  - #5 Problems In My Community
  - #6 Government Supported Resources
  - #7 Governmental Agencies

"It is very hard to get recognition for your accomplishments as an adult. The MG program is a great morale and self esteem builder that often draws people out who normally wouldn't join groups" (comments from a five-year The Dalles, OR, MG)
Other feelings and comments from the 1992 survey included the following questions and responses:

<table>
<thead>
<tr>
<th>issue</th>
<th>Yes</th>
<th>response</th>
</tr>
</thead>
<tbody>
<tr>
<td>it is important to me to be a representative of Oregon State University</td>
<td>✓</td>
<td>(75%)</td>
</tr>
<tr>
<td>it is important that volunteers (providing home horticulture information) be certified</td>
<td>✓</td>
<td>(95%)</td>
</tr>
<tr>
<td>it is important to re-certify MGs who remain in the program after their initial year</td>
<td>✓</td>
<td>(80%)</td>
</tr>
<tr>
<td>this program has given me a way to grow and develop through education &amp; service</td>
<td>✓</td>
<td>(93%)</td>
</tr>
<tr>
<td>this program fills a need in my community</td>
<td>✓</td>
<td>(97%)</td>
</tr>
<tr>
<td>I intend to continue active participation in the Oregon MG program in the future</td>
<td>✓</td>
<td>(94%)</td>
</tr>
</tbody>
</table>

Question: To what degree were you involved with the OSU Extension Service before becoming a Master Gardener volunteer?

- 28% — not aware of Extension or its programs
- 62% — aware of Extension but not enrolled in any of its programs
- 9% — enrolled already in Extension programs (Home Ec., 4-H, etc.)
- 1% — involved in Extension advisory committee work

General information and demographics about Oregon's volunteer Master Gardener staff showed the following:

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Marital</th>
<th>Children at home</th>
</tr>
</thead>
<tbody>
<tr>
<td>3% under 30</td>
<td>58% female</td>
<td>21% single</td>
<td>76% none</td>
</tr>
<tr>
<td>13% 31-40</td>
<td>42% male</td>
<td>79% married</td>
<td>7% one</td>
</tr>
<tr>
<td>18% 41-50</td>
<td></td>
<td></td>
<td>16% two or more</td>
</tr>
<tr>
<td>16% 51-60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26% 61-70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24% over 70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13% under $15,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25% $15,000-$25,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46% $25,000-$50,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16% $50,000 or more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2% less than 12 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13% high school graduate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28% 2-4 years college</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30% college degree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18% advanced college degree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9% graduate program</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“*I’ve enjoyed the program and the variety of people involved in it*” – Lane County MG
While the Oregon Master Gardener program attracts primarily caucasian participants, those involved as volunteers felt that their participation took the program to the total community. Most of the survey respondents (96%) indicated strongly that this Extension program extends educational services into their community.

**Ethnic**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>95%</td>
<td>Caucasian</td>
</tr>
<tr>
<td>1%</td>
<td>Hispanic</td>
</tr>
<tr>
<td>1%</td>
<td>Black</td>
</tr>
<tr>
<td>1%</td>
<td>Asian</td>
</tr>
<tr>
<td>2%</td>
<td>Native American</td>
</tr>
</tbody>
</table>

Gardening is sometimes seen as an occupation that requires one’s full faculties of mobility. However, as volunteers have entered the program with their own physical limitations, they have helped to start and have conducted many horticulture projects, which, in turn, have attracted a total cross section of Oregonians to the program. 79% listed themselves in excellent health, while nearly 20% listed limitations due to health or handicap.

In what type of community does the Oregon Master Gardener volunteer staff live?

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Community Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5%</td>
<td>live inside Portland city limits</td>
</tr>
<tr>
<td>12%</td>
<td>in metropolitan suburbs</td>
</tr>
<tr>
<td>12%</td>
<td>in a large city (more than 50,000 population)</td>
</tr>
<tr>
<td>29%</td>
<td>in a small city (10,000 - 50,000 population)</td>
</tr>
<tr>
<td>14%</td>
<td>in a town (less than 10,000 population)</td>
</tr>
<tr>
<td>26%</td>
<td>in a rural setting</td>
</tr>
</tbody>
</table>

And finally, to get an idea of how “volunteer minded” this group is, responses were asked regarding the average number of hours per week spent on voluntary work, outside the home, and excluding the Master Gardener program. Nearly 65% reported voluntary work other than as a Master Gardener, for an average of 6 hours per week.

Comments from the respondents:

- “This year I worked full time in a garden center. My MG training helped me get my job! I’ll be back next year to re-certify and begin volunteering again! Thanks so much.” Multnomah County MG, 2 year.

- “Volunteer inefficiency upset me at first but actually helped me make the transition from fast track (where I moved from) to laid back (where I’ve moved to)”. Josephine County 1st year MG.

- “I was impressed with the very high quality of the MG training program and have been very appreciative of it”. Wasco County, 1st year MG.

- “I learned how much I did not know, which is scary. However your program provides good resource material for answering the phone at the Extension office”. Marion County, 1 year MG.

- “I recommend the MG program to all I meet. I value the program goal, ‘to help others to help others (etc)’. Clackamas County, 1 year MG.

- “Some of my yard and garden existed long before I completed MG training, now generally it flourishes with better methods, acquired and used”. Douglas County, 8 year MG.

- “Association with OSU gives credibility to the MG program and acceptance in the community. The program is essential to the members and the community”. Deschutes County, 6 year MG.

- “Extension involves more persons in highly productive volunteer service to the community and the country than any other program. Thanks for the opportunities afforded”. Jackson County, 11 year MG.

- “This is the most productive and satisfying program I have experienced in the past 40 years”. Marion County, 2 year MG.

APPENDIX E
COMPARATIVE COST INFORMATION
MEMORANDUM

Date: 17 March, 1993

From: W. Daniel Edge

To: Bob Rost

Subject: Travel Costs for Master Gardener Program Delivery

The attached table represents the estimated costs for my program delivery if I were to visit each county separately (as I would normally do). Mileage estimates are 0.22/mi for personal vehicle. My time for traveling is approximately $23.85/hr plus 36% OPE ($32.44), and I have just used the standard per diem and motel rates.

<table>
<thead>
<tr>
<th>County</th>
<th>Mileage</th>
<th>Per diem</th>
<th>Motel</th>
<th>Salary</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Josephine</td>
<td>$92.40</td>
<td>$32.75</td>
<td>$32.65</td>
<td>$259.00</td>
<td>$416.80</td>
</tr>
<tr>
<td>Deschutes</td>
<td>55.88</td>
<td>26.75</td>
<td>32.65</td>
<td>162.00</td>
<td>277.28</td>
</tr>
<tr>
<td>Polk</td>
<td>12.76</td>
<td>6.75</td>
<td>32.44</td>
<td>51.95</td>
<td>51.95</td>
</tr>
<tr>
<td>Yamhill</td>
<td>20.24</td>
<td>6.75</td>
<td>56.76</td>
<td>83.75</td>
<td>83.75</td>
</tr>
<tr>
<td>Lane</td>
<td>17.60</td>
<td>6.75</td>
<td>51.90</td>
<td>76.25</td>
<td>76.25</td>
</tr>
<tr>
<td>Total</td>
<td>$198.88</td>
<td>$79.75</td>
<td>$65.30</td>
<td>$562.10</td>
<td>$906.03</td>
</tr>
</tbody>
</table>
Date: ___

MC SERVICE ORDER

No. AV 0

De.: ___ 5 6

Acct. 34-050-04 4 9 0

 slashed 7 3 3 4 9

Person to Contact: Bob Rast

CMC WILL RETURN: Yes No

SERVICE REQUESTED: ___ Repair: ___ Purchase: ___ Production: ___ Editing

Equipment: ___ Manuf.: ___

Model #: ___ CSU #: ___

SERVICE DESCRIPTION: CMC EQUIPMENT LOANED: Yes No

WORK DESCRIPTION:

See attached Worksheet


<table>
<thead>
<tr>
<th>Quantity</th>
<th>Part #</th>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SERVICE COMPLETED: ___

Date: 3-22-97

TOTAL: 175.00

NOT AN INVOICE

Materials

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Videotapes (VHS)</td>
<td>4.10</td>
<td>4.10</td>
</tr>
<tr>
<td>Dubbing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablets &amp; Pens</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: 20.00
Distance Learning Invoice Worksheet

Program Description

<table>
<thead>
<tr>
<th>Title</th>
<th>Master Gardener Training Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Person</td>
<td>Bob Post</td>
</tr>
<tr>
<td>Phone</td>
<td>733-381</td>
</tr>
<tr>
<td>Presenter(s)</td>
<td>Dan Edge</td>
</tr>
</tbody>
</table>

Day: Wed  
Date: 3-10-93  
Time: 10:00 - 12:00  
Origination Site: ASU  
Receive Sites: Extension Sites

<table>
<thead>
<tr>
<th>Rate</th>
<th>Length</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Rate, Origination:</td>
<td>70 HR 2.5</td>
<td>175.00</td>
</tr>
<tr>
<td>Room Rate, Receive:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Personnel:</td>
<td>$20.00 HR</td>
<td>1</td>
</tr>
<tr>
<td>Overtime Rate:</td>
<td>$35.00 HR</td>
<td></td>
</tr>
<tr>
<td>Student Rate:</td>
<td>$10.00 HR</td>
<td></td>
</tr>
</tbody>
</table>

Materials

<table>
<thead>
<tr>
<th>Video Tapes (VHS)</th>
<th>4.10</th>
<th>4.10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dubbing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablets &amp; Pens</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>Page 1</td>
<td>Page 2</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Graphics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overheads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Other)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Film Transfer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Videotape Dubbing</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Telephone Services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Distance Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mailing Services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ed-Net Services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone Audio Bridge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microwave Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITFS (OPB) Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional Production &amp; Misc</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total From Page 1 $199.10
Total From Page 2 $432.24
TOTAL INVOICE $631.34
APPENDIX F
AGENT/DOWNLINK SITE COORDINATOR INTERVIEWS
RESULTS OF INTERVIEWS CONDUCTED WITH AGENT/DOWNLINK SITE COORDINATORS IMMEDIATELY FOLLOWING THE DISTANCE SESSION IN THE STUDY

Donna Allison, Marion County
Q-1—What were your first impressions of how the distance presentation went?
It really went well, the class raved, they thought it was great, and they thought Dan Edge's personality had a lot to do with it. They said it was like he was in the room with them. They thought the work that had gone into the program from the production end was excellent. It made it so interesting, with the video clips and the shots that they would zoom in on, and they really liked the picture on the screen and Dan up in the corner talking, so they saw both pictures. The comments on the way out were all really positive. We had 42-46 students. I think it is an excellent educational tool
Q-2—How would you describe your students' response to the distance presentation?
The student response was very positive.
Q-3—Did the equipment work well?
The equipment did work properly at 10 am [the start time of the distance session] but there were a lot of little problems. As we get more comfortable doing this we should not have the anxiety attacks that we have had.
Q-4—How would you describe the instructor-student interaction taking place during the distance presentation?
The theory, the idea and the acceptance [of interaction in the distance program] were all very good. Personally I think that we need to rethink it a little more because one of my people got intimidated when it took three or four tries before she was able to ask a question because other calls were
coming in. The idea of doing it [live interaction during the distance program] is excellent but maybe there is a better way of doing it that we could brainstorm out.

Q-5—Is the use of distance education technology an acceptable way to present training programs to Master Gardener trainees?
Definitely, this is an acceptable way to train.

Q-6—Is the use of distance education technology a good way to present training programs to Master Gardener trainees?
I think it [distance learning] is a method that we should incorporate along with our other methods of training. I think it should definitely be in our arsenal.

Additional comment: We wouldn’t have made it without Karl. [The support technician who made a visit to Marion County a day before the program.]

Bob Lisec, Polk County

Q-1—first impressions?
I don’t know why we had so much static on the program, but that was the only problem. We didn’t seem to have any other problems as far as I know. I had to leave before the program ended. I think people are more willing to ask questions if the teacher is standing right there. It’s more of a personal thing. I know for myself that’s true, but eventually you would get used to doing something like that [asking questions over a telephone line]. Other than that I think it worked out all right and I didn’t see any big problems with it.

Q-2—student response?
I guess it was accepted. It was OK, but it wasn’t in the top ten. Let’s put it that way.
Q-3—equipment?
As soon as I figured out how to hook it up I didn’t have any problems [equipment problems] at all.
Q-4—interaction?
It was very accessible, but I think it’s still the idea of where they are a little bit hesitant. It’s something new. I think they’re still a little bit hesitant to go through and ask questions.
Q-5—acceptable?
I don’t think there would be a problem with it once people get used to it.
Q-6—good?
I think we’re going to have to go to more of this because I want to get good speakers for the program and because of the travel involved I won’t be able to get them to come here. I think it’s a good way because of the people we’ve got involved in it. I think it’s something we’re going to have to do.

Pat Patterson, Lane County
Q-1—First impressions?
It went over really well with the class. The only problem was the timing on it. The one and a half hour segment doesn’t fit well with our program. That was the only thing we got complaints on. It worked out better than I thought it would.
Q-2—student response?
Excellent.
Q-3—equipment?
During the program it was OK, but just before the program there were some problems. It took several hours to get everything going. If it were to take that long in future programs we wouldn’t participate. It’s got to be made simpler. We need someone here to take us through the setup process who knows what they’re doing.
Q-4—interaction?
I especially liked hearing the questions from the other counties. That was some of the best part of it. Our students were not at all hesitant to ask questions. I think our students asked more questions during the program than any of the other counties involved. We had 47 new students.

Q-5—acceptable?
I think it is and I think it's a great way to use some of our instructors who are located a long ways away from here. I wouldn't want to do the whole program this way [via distance delivery].

Q-6—good?
Yeah I think it's a good way.

George Tiger, Jackson County

Q-1—first impressions?
I was concerned about the impersonal nature of the program [the presenter appeared on a TV monitor rather than in the room] and some students told me that they didn't expect much from the program, but students seemed to warm up to it. I think their willingness to go to the microphone and ask questions during the program indicated that they warmed up to it. Afterwards I had people come to me and tell me what a great program it was. The instructor did a great job with the graphics, although some things could've used a little work. But overall it was a an excellent program.

Q-2—student response?
Good.

Q-3—equipment?
Good after a fuzzy start.

Q-4—interaction?
Through about three quarters of the program nobody asked any questions, but then a student asked a question and that seemed to get other people going. After that several people asked questions. Use of the Darome
system [see chapter 3, p. 37] makes asking questions much easier than just using the telephone. The opportunity to ask questions made the class more personal for the students and kept them more involved with the class.

Q-5—acceptable?
I think you could probably do a percentage of your training with this. A steady diet of this [distance delivery of training programs] would be a problem, but mixing a few of these programs in with traditional programs would not be a problem.

Q-6—good?
For us it was great because the graphics showed up great.

Ross P., Lane County

Q-1—first impressions?
At first I wasn’t sure how it would go, but after it was over, people were totally elated with the program.

Q-2—student response?
I had six people come up and say it was the greatest thing they had seen. I thought that was good response.

Q-3—equipment?
The set-up took about three times longer than I thought it would, but after we got it going it was all right.

Q-4—interaction?
Overall it worked well. At times there might have been too many people wanting to ask questions at the same time. I don’t know if there’s any way around that. It seemed that Lane County dominated the question-asking during the program at certain points. We kind of pushed them [students at the Lane County site] at this end to ask questions rather than having blank space. Use of the Darome equipment made the questioning closer to the experience of talking with someone present in the room.
Q-5—acceptable?
At the end of the program people seemed to think it was very acceptable. People enjoyed it. Some people commented that the print on some of the graphics slides was very small and hard to read. But, including video segments and photographic slides for illustration of various points kept people awake very well. There were periods where it seemed to go on and on and the lecture style seemed to lose some people, but overall it seemed to come out well.

Q-6—good?
I would prefer the live person in the room with the students. That style has more interaction. But in view of budget limitations, I think the distance delivery is something we have to look at. When economics begin to take opportunities away, this [distance delivery of programming] gets that other person in front of us in a little bit different way. It's not as good as having the person in the room, but at least we can still get the presentation. This is something we should try to do once a year.

Mike Bauer, Deschutes County

Q-1—first impressions?
Technically it was perfect and as far as the interaction I was quite impressed with the way it worked. It was professional, technical problems were corrected quickly and efficiently. Production was very professional. I've certainly seen a lot worse satellite programs.

Q-2—student response?
[Students were] bashful at first, kind of wary of the technology, and then they jumped in. After the first question was asked at our site people seemed to become a lot easier with it.

Q-3—equipment?
Worked beautifully, but we were at a community college. (see Chapter 3, p. 37)
Q-4—interaction?
Excellent, once they [students] got comfortable with it
Q-5—acceptable?
Yes.
Q-6—good?
Yes I would like to see it [distance delivery] used for some of the
standardized programs in the training like plant problem diagnosis or basic
botany. Teleconferencing is really good for visual things like slides and
video segments. I really didn’t know what to expect when I walked into
this program. I wondered if I would see the presenter’s talking head for an
hour and a half. I thought the slides in the program were excellent, but
that’s the biggest variable in teleconferencing, the kinds of audio-visual
materials that you incorporate. Putting the presenter up in the corner of
the screen while other visuals appeared in the center of the screen was
excellent. I had 18 students. I think the program went over well. I would
like to see this type of program delivery developed more and I would even
be willing to make a satellite presentation myself in my area of expertise.